Erika Shook

From: Stephanie Buffum <stephanie@sanjuans.org>
Sent: Tuesday, August 14, 2018 2:31 PM
To: DL - Council; Sue Kollet; Lynda Guernsey; Linda Ann Kuller; Erika Shook
Cc: Amy Vira; Tina Whitman; Lovel Pratt; Bruce Rylander; Dixie Budke; Janet Alderton; Ken Burtness; Ken Carrasco; Michael Riordan; Paul Anderson (Seattle); 'Sanford Olson'; Shireene Hale; Susan Dehlendorf; 'Toby Cooper'; Katie Fleming; Michel Vekved; 'Shannon Davis'; 'Stephanie Buffum'
Subject: FSJ supplemental - Guidance documents for SMP Compliance Aug 17 Hearing
Attachments: 2018-06-16_GMHB_SMP_Compliance_order.pdf; Analysis of the Effectiveness and Implementation of Permitting and Enforcement SnoCo.pdf; SMP Handbook Ch 4 NNL.pdf; CAO Handbook FinalChapter7wAppendices.pdf; FSJ_SMP_Comments_to_SJCC_and_PC_08-13-2018_w_attachments.pdf

Dear County Council and Planning Commission members,

As you strive to ensure compliance with Growth Management Hearings Board (GMHB) Final Decision and Order (FDO), I would like to point you to three guidance documents from the State and Snohomish County (attached).

- *Critical Areas Monitoring Report: Analysis of the Effectiveness and Implementation of Permitting and Enforcement to Protect Critical Areas in Snohomish County, Snohomish County*
- *Chapter 4 No Net Loss of Shoreline Ecological Functions*, SMP Handbook, Dept. of Ecology
- *Chapter 7 Monitoring and Adaptive Management of Critical Areas Regulations,* Critical Areas Handbook, State of Washington Department of Commerce

Also attached is a copy of our 8-13-18 SMP comment letter and a copy of the Growth Board Order which identifies the three substantive issues you must resolve in the GMHB FDO, including:

- GMHB FDO Issue No. 2 Environmental Impact Mitigation: requirement for alternative compensatory mitigation to occur within the same watershed as the impact (WAC 173-26-201(2)(e)(ii)(B)) as addressed in Section 3 of the draft ordinance;

- GMHB FDO Issue No. 4 Shoreline Stabilization: requirement for tightening of both the allowance criteria for new or expanded soft armoring and the definition of soft shore armoring (RCW 90.58.020, WAC 173-26-231(3)(a)(iii)(B) and WAC 173-26-231(3)(a)(ii)) as addressed in Sections 1, 4, 5, and 6 of the draft ordinance; and

- GMHB FDO Issue No. 7 Evaluation of the Cumulative Impacts of Authorized Development: requirement to develop and implement a mechanism for documenting all project review actions in shoreline areas and process for periodically evaluating the cumulative effects of authorized development on shoreline conditions (WAC 173-26-191(2)(a)) as addressed in Section 2 of the draft ordinance.

Protecting our marine shorelines is the most important action we can take as a community to support the recovery of Chinook salmon and the Southern Resident Killer Whales, as well as preserving the physical and

aesthetic qualities of the natural San Juan shorelines that are so integral to our sense of place for residents and visitors alike.

We look forward to San Juan County's timely and thorough completion of the required updates to the SMP.

Sincerely,

Stephanie

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Protecting and preserving the San Juans and Salish Sea for people and nature since 1979.

BEFORE THE GROWTH MANAGEMENT HEARINGS BOARD
WESTERN WASHINGTON REGION
STATE OF WASHINGTON

FRIENDS OF THE SAN JUANS,

Petitioner,

v.

SAN JUAN COUNTY AND STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY,

Respondents.

Case No. 17-2-0009

FINAL DECISION AND ORDER

SYNOPSIS

The Friends of the San Juans (Petitioner) challenged the Department of Ecology's (DOE) approval of San Juan County's (County) Shoreline Master Program update, adopted with the passage of County Ordinance Nos. 1-2016 and 11-2017. The Board concluded the Petitioner demonstrated some elements of *San Juan County's Shoreline Master Program violated sections of chapters 90.58 RCW, 36.70A RCW, 43.21C RCW, and/or 173-26 WAC. The Board remanded the matter to the County to take action to come into compliance with the Shorelines Management Act consistent with the Final Decision and Order.*

I. PRELIMINARY MATTERS

The Board withheld ruling on the Petitioner's February 16, 2018, motion to supplement the record with a public records request it propounded to the County together with the County's response. The Board allowed the Petitioner to submit the documents with its brief, and the Board opted to defer ruling on the motion. At commencement of the Hearing on the Merits, the Presiding Officer announced that the Board had determined the

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exhibits would possibly be of substantial assistance and the documents were added to the record. However, the Board notes that neither of the two exhibits were ultimately considered and did not factor into the Board's decision in regards to Issue 7.

II. BOARD JURISDICTION

The Board finds the Petition for Review was timely filed, pursuant to RCW 90.58.190(2)(a) and RCW 36.70A.290(2). The Board finds the Petitioner has standing to appear before the Board, pursuant to RCW 36.70A.280(2)(a) and (b) and RCW 36.70A.210(6). The Board also finds it has jurisdiction over the subject matter of the petition pursuant to RCW 36.70A.280(1) and RCW 90.58.190(2).

III. STANDARD AND SCOPE OF REVIEW, BURDEN OF PROOF

Appeals of Shoreline Master Programs (SMPs) are governed by the Shoreline Management Act (SMA) and are adjudicated by the Growth Management Hearings Board.[1] The Board is charged with adjudicating Growth Management Act (GMA) compliance and, when necessary, invalidating noncompliant plans and development regulations.[2]

Comprehensive plans and development regulations, including shoreline master programs, are presumed valid on adoption.[3] This presumption creates a high threshold for challengers, who have the burden to overcome the presumption of validity.[4]

The Board must grant deference to counties and cities in their planning for growth, so long as such planning is consistent with the requirements and goals of the GMA.[5] That is because, while local planning takes place within a framework of state requirements, the local community has the responsibility to account for local circumstances.[6] Deference is also due Ecology's interpretation of certain SMA regulations included in chapter 173-26 WAC

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[1] RCW 90.58.190(2).
[2] RCW 36.70A.280 and RCW 36.70A.302.
[3] RCW 36.70A.320(1); *Lake Burien Neighborhood v. City of Burien*, GMHB No. 13-3-0012 (Final Decision and Order, June 16, 2014) at 3.
[4] *Id.* at 3-5.
[5] RCW 36.70A.3201.
[6] *Id.*

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(Guidelines), which were adopted by Ecology to assist and guide jurisdictions in the development of their master programs.[7] The SMA "is exempted from the rule of strict construction, and it shall be liberally construed to give full effect to the objectives and purposes for which it was enacted."[8] "The Shoreline Management Act of 1971 is to be broadly construed in order to protect the state shorelines as fully as possible."[9]

The Board's review of Ecology's decision to approve or reject an SMP is governed by RCW 36.70A.320(3) and RCW 90.58.190. The SMA prescribes different levels of Board review for SMP provisions concerning shorelines and those concerning shorelines of statewide significance (SSWS).

RCW 90.58.190(2)(b) provides:

> If the appeal to the growth management hearings board concerns shorelines, the growth management hearings board shall review the proposed master program or amendment solely for compliance with the requirements of this chapter, the policy of RCW 90.58.020 and the applicable guidelines, the internal consistency provisions of RCW 36.70A.070, 36.70A.040(4), 35.63.125, and 35A.63.105, and chapter 43.21C RCW as it relates to the adoption of master programs and amendments under chapter 90.58 RCW.

RCW 90.58.190(2)(c) provides:

> If the appeal to the growth management hearings board concerns a shoreline of statewide significance, the board shall uphold the decision by the department unless the board, by clear and convincing evidence, determines that the decision of the department is inconsistent with the policy of RCW 90.58.020 and the applicable guidelines.

Where the challenge concerns shorelines,[10] the Board reviews a master program for compliance with the SMA and the Guidelines, the policy of RCW 90.58.020, the internal

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[7] *Postema v. Pollution Control Hearings Bd*., 142 Wn.2d 68, 86 (2000); RCW 90.58.060(1); *Elizabeth Mooney v. City of Kenmore*, GMHB No. 12-3-0004 (Final Decision and Order, February 27, 2013) at 5.

[8] RCW 90.58.900.

[9] *English Bay Enterprises, Ltd. v. Island County*, 89 Wn.2d 16, 20 (1977).

[10] "'Shorelines' means all of the water areas of the state, including reservoirs, and their associated shorelands, together with the lands underlying them; except (i) shorelines of statewide significance; (ii) shorelines on segments of streams upstream of a point where the mean annual flow is twenty cubic feet per second or less and the wetlands associated with such upstream segments; and (iii) shorelines on lakes less than twenty

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consistency provisions of RCW 36.70A.070, 36.70A.040(4), 35.63.125, and 35A.63.105, and SEPA compliance in master plan adoption. The Board shall find compliance unless it determines that the action is *clearly erroneous* in view of the entire record before the Board.[11] To find an action clearly erroneous, the Board must be left with the firm and definite conviction that a mistake has been committed.[12] While deference is due the County under the clearly erroneous standard, it is not unlimited.[13]

Where the Board's review concerns shorelines of statewide significance (SSWS), the scope of the Board's review "is narrower and the evidentiary standard is enhanced, consistent with the enhanced protection of the statewide interest over the local interest."[14] The Board shall uphold Ecology's decision regarding approval of a master program unless the Board determines, by clear and convincing evidence, that the decision is noncompliant with the policy of RCW 90.58.020, the Guidelines, or RCW 43.21C.[15] Clear and convincing evidence "requires that the trier of fact be convinced that the fact in issue is 'highly probable.'"[16] This means that the facts relied upon must be clear, positive, and unequivocal in their implication.[17] Significantly, the Board's scope of review for SSWS does not include GMA consistency considerations.

For San Juan County, "shorelines" are the tidelands and the shorelands 200 feet landward from the ordinary high water mark together with all of its freshwater lakes 20 acres

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acres in size and wetlands associated with such small lakes." RCW 90.58.030(2)(e). "Shorelands" in turn are those lands extending landward for 200 feet in all directions as measured on a horizontal plane from ordinary high water mark; floodways and contiguous floodplain areas and associated wetlands. RCW 90.58.030(2)(d).

[11] RCW 36.70A.320(3); *Olympic Stewardship Found. v. W. Wash. Growth Mgmt. Hearings Bd.* 199 Wn. App. 668, 685 (2017); *Mooney v. City of Kenmore*, GMHB No. 12-3-0004 (FDO, February 27, 2013) at 4.

[12] RCW 36.70A.320(3).

[13] *Swinomish Indian Tribal Cmty. v. Western Washington Growth Mgmt. Hearings Bd.*, 161 Wn.2d 415, 435 n.8 (2007).

[14] *Confederated Tribes and Bands of the Yakama Nation v. Yakima County*, GMHB No. 10-1-0011 (Final Decision and Order, April 4, 2011) at 4 n.8.

[15] RCW 90.58.190(c).

[16] *Colonial Imports, Inc. v. Carlton NW. Inc.*, 121 Wn.2d 726, 735, (1993).

[17] *Id.*

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or larger.[18] The Board reviews SMP provisions for these areas under the clearly erroneous standard.

Shorelines of statewide significance are defined with specificity in RCW 90.58.030(2)(f). For San Juan County, the parts of the shoreline which are of statewide significance are "all those areas lying waterward from the line of extreme low tide."[19] Uses which are located in or extend into marine waters below extreme low tide, such as docks, piers, buoys, and floats, fall within the SSWS. Some uses and shoreline modifications permitted may occur both within shorelines and below extreme low tide in SSWS. To the extent that the Petitioner challenges provisions relating to SSWS, the scope of the Board's review is narrowed and Petitioner must meet the clear and convincing burden of proof.[20]

SMA/GMA Statutory Framework

In enacting the SMA, the Legislature found that "the shorelines of the state are among the most valuable and fragile of its natural resources and that there is great concern throughout the state relating to their utilization, protection, restoration, and preservation." Accordingly, "coordinated planning" between the state government and local governments is necessary in order to protect the public interest and to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines.[21]

Local government has the primary responsibility for initiating SMA-required planning.[22] While the statutory scheme provides for coordinated authority between the state and local government, the state reserves ultimate control and primary authority to manage shoreline development.[23]

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[18] Comprehensive Plan Section B, Element 3, Shoreline Master Program, September 19, 2017, at 1.
[19] RCW 90.58.030(1)(f)(iii).
[20] See *Hood Canal Sand & Gravel, LLC v. Jefferson County*, GMHB No. 14-2-0008c (Order on Dispositive Motion, September 5, 2014) at 5.
[21] RCW 90.58.020. The SMA is to be broadly construed in order to protect the state shorelines as fully as possible. *Buechel v.Dep't of Ecology*, 125 Wn.2d 196, 203 (1994).
[22] RCW 90.58.050.
[23] *Biggers v. City of Bainbridge Island*, 162 Wn.2d 683, 687 (2007); *Citizens for Rational Shoreline Planning v. Whatcom County*, 172 Wn.2d 384, 391 (2011).

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RCW 90.58.080(1) provides that local governments "shall develop or amend a master program for regulation of uses of the shorelines of the state consistent with the required elements of the guidelines adopted by" the Department of Ecology (DOE). RCW 90.58.060(1) requires DOE to adopt guidelines for the development of Shoreline Master Programs for the regulation and uses of shorelines. The SMP Guidelines are codified within WAC Chapter 173-26, and these SMP Guidelines are binding state agency rules.[24]

Although the SMA directs each local government to develop and administer its SMP, DOE has a pervasive, state-mandated role in the development, review, and approval of local SMPs.[25] The Washington State Supreme Court has ruled that the local government acts as an agent of the state in developing the SMP – the city/county acts at the instance of and, in some material degree, under the direction and control of the state.[26] DOE's statutorily-mandated involvement in the process of SMP development is considerable and, ultimately, determinative – a local SMP becomes effective only upon approval by DOE.[27] Locally-developed and DOE-approved SMPs are the product of state regulation and constitute land use regulations for the various shorelines of the state.[28]

The GMA defines "Development Regulations" as "controls placed on development or land use activities by a county or city, including, but not limited to, zoning ordinances, critical areas ordinances, shoreline master programs . . . ."[29] Much of the SMP, including use regulations, "shall be considered a part of the county or city's development regulations."[30]

For shorelines of the state, the statutes provide that the goals and policies of the SMA as set forth in RCW 90.58.020 are added as one of the goals of the GMA as set forth

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[24] RCW 90.58.030(3)(c); RCW 90.58.080(1) & (7); RCW 90.58.090(3) & (4); RCW 90.58.190(2)(b) and RCW 90.58.190(2)(c).
[25] *Citizens for Rational Shoreline Planning v. Whatcom County*, 155 Wn. App. 937, 943 (2010).
[26] *Orion Corp. v. State*, 109 Wn.2d. 621, 643-44 (1987) [SMA created an agency relationship with state as principal and local government as agent].
[27] RCW 90.58.090(1); *Citizens for Rational Shoreline Planning v. Whatcom County,* 155 Wn. App. 937, 943 (2010).
[28] RCW 90.58.100(1); *Citizens for Rational Shoreline Planning v. Whatcom County*, 155 Wn. App. 937, 945 (2010).
[29] RCW 36.70A.030(7).
[30] RCW 36.70A.480(1).

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in RCW 36.70A.020 without creating an order of priority among the 14 goals; the goals and policies of a SMP "shall be considered an element of the county or city's comprehensive plan."[31]

IV. ANALYSIS AND DISCUSSION

Issue No. 1

Does the Update's shoreline environment designations, as reflected in the Comprehensive Land Use and Shoreline Maps, conflict with RCW 36.70A.020 goals 9 and 10, the policies of RCW 90.58.020, the requirements of RCW 90.58.100, the provisions of Chapter 43.21C RCW, and SMP Guidelines for inventorying shoreline conditions and analyzing shoreline issues of concern (WAC 173-26-201(3)(c), -201(3)(d)), for establishing shoreline environment designations (WAC 173-26-201(3)(f), -211), for using the most current, accurate, and complete scientific and technical information available (WAC 173-26-201(2)), and for protecting shoreline ecological functions (WAC 173-26-181, -186(8), -201(2)(c), -221(2),-221(5))?

Issue 1 focuses on the "designation" the County applied to some of its shorelines. Shoreline "physical conditions and development settings" vary widely and, consequently, environmental protection measures, use provisions, and development standards need to take those variances into account.[32]

> The method for local government to account for different shoreline conditions is to assign an environment designation to each distinct shoreline section in its jurisdiction. The environment designation assignments provide the framework for implementing shoreline policies and regulatory measures specific to the environment designation. WAC 173-26-211 presents guidelines for environment designations in greater detail.[33]

WAC 173-26-211 applies to the establishment of environment designation boundaries and provisions. WAC 173-26-211(2)(a) states that the "classification system shall be based on the existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through comprehensive plans as well

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[31] *Id*.
[32] WAC 173-26-191(1)(d).
[33] *Id*.

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as the criteria in this section".[34] WAC 173-26-211(4)(b) suggests the use of the following designation categories: Hi-intensity, shoreline residential, urban conservancy, rural conservancy, natural, and aquatic. WAC 173-26-211(4)(c) authorizes local governments to use different designation systems; the County uses Urban, Rural, Rural Residential, Rural Farm Forest, Ports, Marina and Transportation (PMT), Conservancy, Natural, and Aquatic.[35]

It is the Petitioner's contention that the County SMP fails to meet SMA requirements as the County did not apply the "natural" designation for shoreline areas that have been shown to be forage fish spawning areas and feeder bluffs.[36] The Petitioner argues that only 4% of identified forage fish spawning areas were designated as natural and only 14% of the County's feeder bluffs. The Petitioner states that the Guidelines as well as the County's Comprehensive Plan required it to designate those forage fish and feeder bluff areas as Natural and that the designations it made "do not bear any correlation to the shoreline resource".[37] By way of example, it observes that some forage fish spawning beaches, feeder bluffs, and wetlands on Shaw Island were designated Rural Farm Forest and feeder bluffs on Lopez Island were designated Rural Farm Forest or Conservancy.[38] The specific concern raised is that neither of those designations prevent the construction of shoreline armoring, citing Ordinance No. 11-2017 at page 56, while a natural designation prohibits armoring.[39]

The Petitioner summarizes its argument by stating that the designations did not "include the requisite biological and physical information", did not comply with the

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[34] WAC 173-26-211(2)(a).
[35] Ordinance No. 01-2016 at 8, paragraph III.
[36] Shipman, H., MacLennan, A., and Johannessen, J. 2014. Puget Sound Feeder Bluffs: Coastal Erosion as a Sediment Source and its Implications for Shoreline Management. Shorelands and Environmental Assistance Program, Washington Department of Ecology, Olympia, WA. Publication #14-06-016, at iv: Feeder Bluff: An eroding coastal bluff that delivers a significant amount of sediment to the beach over an extended period of time and contributes to the local littoral sediment budget.
[37] Petitioner Friends of the San Juans' Prehearing Brief at 11.
[38] *Id*. at 11, 12.
[39] Ordinance 11-2017 allows both new hard and soft structural stabilization in all designations other than Natural but such allowance is "Subject to shoreline substantial development permit unless exempt per B above".

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Guidelines' requirement to apply the "most accurate, current scientific information", ignored the primary purpose of the SMA to "protect shorelines as fully as possible", as well as the SEPA policies recognizing the rights of all to shoreline preservation and enhancement.[40] As a result, it is the Petitioner's contention that the SMP fails to comport with the SMA's directive to achieve no net loss (NNL) of shoreline ecological functions through an SMP and permitting.[41]

The Petitioner asserts that the designations the County made resulted from what it characterizes as a flawed Inventory and Characterization (I & C) process, in which the shoreline evaluations were done at an inappropriately large scale, notwithstanding the availability of appropriate scale information.[42] The scale used by the County, the Petitioner suggests, was based on its failure to characterize the shorelines by "drift cells".[43] The Petitioner states these failures reflect the County's desire to ensure designations would be consistent with the "existing land use", "zoning", or "rest of parcel", rather than on the

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[40] Petitioner Friends of the San Juans' Prehearing Brief at 13.

[41] RCW 90.58.060, WAC 173-26-186(8)(d), WAC 173-26-201(2)(c); WAC 173-26-201(2)(c), in part: Master programs shall contain policies and regulations that assure, at minimum, no net loss of ecological functions necessary to sustain shoreline natural resources. To achieve this standard while accommodating appropriate and necessary shoreline uses and development, master programs should establish and apply:

- Environment designations with appropriate use and development standards; and
- Provisions to address the impacts of specific common shoreline uses, development activities and modification actions; and
- Provisions for the protection of critical areas within the shoreline; and
- Provisions for mitigation measures and methods to address unanticipated impacts.

When based on the inventory and analysis requirements and completed consistent with the specific provisions of these guidelines, the master program should ensure that development will be protective of ecological functions necessary to sustain existing shoreline natural resources and meet the standard. The concept of "net" as used herein, recognizes that any development has potential or actual, short-term or long-term impacts and that through application of appropriate development standards and employment of mitigation measures in accordance with the mitigation sequence, those impacts will be addressed in a manner necessary to assure that the end result will not diminish the shoreline resources and values as they currently exist. Where uses or development that impact ecological functions are necessary to achieve other objectives of RCW 90.58.020, master program provisions shall, to the greatest extent feasible, protect existing ecological functions and avoid new impacts to habitat and ecological functions before implementing other measures designed to achieve no net loss of ecological functions.

[42] Petitioner Friends of the San Juans' Prehearing Brief at 13.

[43] WAC 173-26-020(12). "Drift cell," "drift sector," or "littoral cell" means a particular reach of marine shore in which littoral drift may occur without significant interruption and which contains any natural sources of such drift and also accretion shore forms created by such drift.

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"existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community".[44] The Petitioner contends that, as a consequence, areas that should have been designated as natural, consisting of various forage fish spawning areas and feeder bluffs, were not so designated.

One of the first steps in updating an SMP is to inventory existing shoreline conditions and to then characterize shoreline ecosystems and their associated ecological functions, resulting in the Inventory[45] and Characterization[46].[47] The County contracted with Herrera Environmental Consultants, ICF International, and The Watershed Company to craft the I & C. Numerous drafts were prepared over approximately 18 months. Characterization in the County's I and C used what was described as "a nested system of reaches and management areas".[48] The County was divided into 20 management areas that were then used to inventory, analyze, and characterize the shorelines.[49] As the I & C points out, an inventory would "typically be characterized at a watershed scale (a hydrologic unit). However, as there are no County streams within SMA jurisdiction "management areas were defined based on land use boundaries, the physical landscape and or critical hydrogeomorphic or biological processes".[50]

Segments of the management areas were subsequently divided into "reaches".[51] The I & C includes an explanation of the methodology employed. While noting that the use of drift cells to delineate shoreline sections is commonly used in Puget Sound, the authors of

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[45] SMP Handbook, DOE Publication Number 11-06-010, Ch. 7 at 1: The inventory includes existing data, information and descriptions of watershed and shoreline attributes that pertain to existing and emerging problems and issues in a jurisdiction. It describes existing shoreline conditions and development patterns, including attributes of a healthy ecosystem. The inventory is necessary to conduct the characterization.
[46] *Id.* at 1: The characterization is the description of the ecosystem wide and shoreline processes, shoreline functions, and opportunities for restoration, public access and shoreline use. The characterization identifies the current shoreline conditions, is a key product for developing the SMP, and is the baseline for measuring no net loss of shoreline ecological functions.
[47] IR 001479.
[48] IR 001479, Bates 001507.
[49] *Id*.
[50] *Id*. Bates 001507-1508.
[51] A "reach" is a "specific segment of shoreline . . . typically distinguished by the relative intensity of land use development patterns, the physical landscape or critical biological processes." IR ECY036786.

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the I & C observed that a significant portion of the County's shorelines are composed of bedrock obviating the ability to map those shorelines into drift cells.[52] In addition, they observe that other features also made it difficult to use the drift cell model.[53] Consequently, the I & C classified the shorelines' reaches into "geomorphic units" which "allowed for a broader scope that better addressed the range of shoreline conditions found in San Juan County than a traditional drift cell-based reach delineation".[54] The authors acknowledge that other land use aspects were also considered in delineating the reaches, including zoning, parcel density, and existing riparian cover and structures.[55]

DOE suggests that the Petitioner "overstates the guidelines' directive, [and] ignores the County's well-reasoned rationale for declining to use drift cells . . .".[56] It states the Guidelines neither prescribe the specific reach delineation process that must be used in updating an SMP, citing WAC 173-26-201(3)(c), nor do they prescribe the shoreline functions to be considered in scoping the characterization, citing WAC 173-26-201(3)(d)(i)(C).[57] It concludes that the County's approach was "entirely consistent with Ecology's SMP Handbook, and meets the SMP guidelines' directive to '[map] inventory information at an appropriate scale'".[58]

The Board concurs with those observations. Initially, the I & C's explanation for varying from the typical drift cell analysis method is well supported. Beyond that, a low percentage of shorelines designated as natural, or a reduction in such designations from a prior SMP, as argued by the Petitioner, do not establish violations of the SMA statutes or the cited Guidelines alleged to have been violated. While DOE's interpretation of its regulations is entitled to deference, the Board finds and concludes that none of the Guidelines cited and

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[52] IR 001510.
[53] *Id.*
[54] *Id.*
[55] *Id.*
[56] Respondent Department of Ecology's Prehearing Brief at 6.
[57] *Id.* at 8.
[58] *Id.* at 8.

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argued by the Petitioner mandate the application of the natural designation[59] to all, or a higher percentage of, forage fish spawning areas and feeder bluffs.[60] As observed by DOE, while WAC 173-26-211(2)(a) sets out basic requirements for designation of the various shoreline areas, that Guideline does not require the County to prioritize any of the listed characteristics over the others.[61] The inventory clearly appears to have collected the information required by WAC 173-26-201(3)(c) and characterized the functions and ecosystem-wide process, specifically the marine water shoreline ecological functions, as directed by WAC 173-26-201(3)(d)(i)(C). Again, while concerns were raised regarding the scale employed in designating the various shoreline reaches, the Petitioner has not shown that the methodology employed violated any of the applicable Guidelines. Finally, a review of the County's Comprehensive Plan sections cited by the Petitioner does not disclose a mandate requiring designation of all or a higher percentage of forage fish spawning areas or feeder bluffs as natural.[62]

While the Petitioner raises valid concerns regarding potential impacts to forage fish spawning areas and feeder bluffs, the SMA mandate to "assure, at minimum, no net loss of ecological functions necessary to sustain shoreline resources" is accomplished through a combination of the designations and the applicable regulatory scheme. That is, the threat of

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[59] WAC 173-26-211(5)(a)(iii) A "natural" environment designation should be assigned to shoreline areas if any of the following characteristics apply:
(A) The shoreline is ecologically intact and therefore currently performing an important, irreplaceable function or ecosystem-wide process that would be damaged by human activity;
(B) The shoreline is considered to represent ecosystems and geologic types that are of particular scientific and educational interest; or
(C) The shoreline is unable to support new development or uses without significant adverse impacts to ecological functions or risk to human safety.

[60] WAC 173-26-201(2) and (3), WAC 173-26-211(2) and (5).

[61] WAC 173-26-211(2) Basic requirements for environment designation classification and provisions.
(a) Master programs shall contain a system to classify shoreline areas into specific environment designations. This classification system shall be based on the existing use pattern, the biological and physical character of the shoreline, and the goals and aspirations of the community as expressed through comprehensive plans as well as the criteria in this section.

[62] Comprehensive Plan sections 3.3.F.a, ECY 035948 (Bates 036035) and 3.2.C (Bates 036024). For example, CP section 3.3.F states that a Natural designation "should" meet one or more of a list of criteria.

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ecological function loss posed by development, including armoring or overwater structures, cannot be and is not addressed based solely on the designation assigned.[63]

The Board finds and concludes that the Petitioner has failed to meet its burden of proof to establish violations of the SMA and Guideline provisions cited and argued under Issue 1.

Issue No. 2

Do the Update's mitigation provisions at 2016 Ordinance New Sections 19-21, which do not require the complete replacement of lost functions and values, or in-kind, on-site compensation, conflict with RCW 36.70A.020 goals 9 and 10, the policies of RCW 90.58.020, the requirements of RCW 90.58.100, the provisions of Chapter 43.21C RCW, and SMP Guidelines for mitigation (WAC 173-26-186(8)(b)(i), -201(2)(e), -221(2)(c)(i)(E),-221(2)(c)(i)(F), -221(2)(c)(iii)(C), -221(3)(c)(i), -231(2), -241(3)(b)(i)(C)), for using the most current, accurate, and complete scientific and technical information available (WAC 173-26-201(2)), and for protecting shoreline ecological functions (WAC 173-26-181, -186(8), -201(2)(c), -221(2), -221(5), -221(6))?

Any development has the potential to negatively impact shoreline ecological functions. Consequently, the SMA and the Guidelines require SMPs to include regulations and mitigation standards to ensure no net loss (NNL) of those ecological functions.[64] With Issue 2, the Petitioner alleges the County's SMP violates various applicable Guideline requirements as its mitigation provisions do not require the complete replacement of lost functions and values, or in-kind, on-site compensation.

The Petitioner alleges the mitigation regulations fail to ensure NNL as required by WAC 173-26-186(8)(b)(i). It argues that the SMP does not include provisions requiring that proposed individual uses and developments analyze environmental impacts and measures to mitigate environmental impacts not otherwise avoided or mitigated[65], that the SMP does not manage shorelines to safeguard ecosystem-wide processes like the movement of fish

[63] This Final Decision and Order considers below some portions of that regulatory scheme in its consideration of other issues raised by the Petitioner.
[64] WAC 173-26-201(2)(c).
[65] WAC 173-26-201(2)(e).

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and wildlife as well as individual components and processes such as shoreline vegetation[66], and allows mitigation other than in the vicinity of the impacted functions, let alone within the same watershed.[67]

The Petitioner makes four specific assertions in regards to mitigation. It states the challenged SMP's NNL provisions do not include either the denial of projects that would impact sensitive areas, or the replacement of such areas with the same scale and quality of habitat and ecological function. The Petitioner observes that the SMP merely requires mitigation consistent with the mitigation standards for critical areas, as opposed to mitigating for the impacts to shoreline ecological functions. It also argues that full mitigation is not required. Rather, a project proponent is not required by the SMP to pay more than 115% of the projected mitigation expense, nor the cost of monitoring beyond a five-year period. The SMP merely states that the County may require additional action and extended monitoring. The Petitioner observes there is no mandate applicable in that regard to the County nor are any standards included for the exercise of that discretion.[68]

The Petitioner also states that the SMP allows mitigation actions outside of impacted watersheds, contrary to Guideline requirements. Its final argument under Issue 2 references "… the overwhelming rate of failure for marine compensatory efforts". It observes that, due to that high failure rate, the County's Marine Resources Committee stated that, "mitigation for the loss of functions and values of marine habitat areas should not be allowed".[69]

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[66] WAC 173-26-201(2)(c).
[67] WAC 173-26-201(2)(e)(ii)(B).
[68] The Petitioner cites IR 5074, 2015 comments from DOE on the County's critical areas ordinance in which it observed that the draft regulation then being considered by the County be amended to read as follows: "A monitoring schedule. Data collection shall occur at the completion of site construction and planting (Year 0; as built), at Years 1, 3 and 5, and when necessary, Years 7 and 10;" . . . The monitoring schedule is five (5) years when the mitigation involves only the planting of herbaceous species and ten (10) years for mitigation planting shrubs and trees unless the director makes a written determination that the mitigation is successful, functioning as designed and the established performance standards have been met;
[69] Petitioner Friends of the San Juans' Prehearing Brief at 24.

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In essence, the question presented by Issue 2 is whether the County's SMP mitigation sequencing regulations fail to ensure NNL of ecological functions in violation of the requirements of the aforementioned Guidelines.

The Petitioner initially argues that the mitigation approval criteria do not apply to the protection of shoreline functions, but rather only to critical area impacts. (Not all of the County's shorelines are designated as critical areas under RCW 36.70A.170.) The argument is not well taken. As the County observed, the SMP mitigation criteria do apply to shorelines as the definition of "critical area functions and values" specifically includes the following: "within shoreline jurisdiction, shoreline ecological functions and values".[70] That is, shoreline ecological functions and values are included as critical area functions and values.

Furthermore, Ordinance 11-2017, Section 10A, provides that "Shoreline development, land uses, structures and activities must meet the no net loss requirement of WAC 173-26-186(8)(b). If a project proposal does not comply with the critical area protections, including the no net loss requirement, a mitigation sequence analysis must be submitted to the County.[71] The first mitigation measure listed in the mitigation sequence is "[avoiding] the impact altogether".[72] Only when an applicant can demonstrate that avoidance is not feasible, does one proceed to consider the additional mitigation measures.[73] Ordinance 11-2017 sets forth the mitigation sequencing requirements, and details the specific information that must be included in mitigation plans if impacts are unavoidable.[74]

Whether or not a specific development proposal would be denied would depend first on a determination that the proposal/use was authorized by the County Code, secondly on

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[70] SJCC 18.20.030, the definition of "Critical area functions and values".
[71] ECY 035948, Ordinance 11-2017, at 23 (amending Section 19 of Ordinance 1-2016).
[72] *Id.*, A. Shoreline development, land uses, structures and activities must meet the no net loss requirement of WAC 173-26-186(8)(b). If project proposals do not comply with the critical area protections in Section 18 of Ordinance 1-2016, applicants must submit a mitigation sequence analysis to the department.
B. Mitigation measures must be applied in the following sequence. The applicant must demonstrate that each mitigation action is not feasible or applicable before proceeding to the next option or action: 1. Avoiding the impact altogether by not taking a certain action or parts of an action;
[73] ECY 035948, Ordinance 11-2017, Section 10 A, at 23.
[74] *Id.*, and Ordinance 11-2017, Section 10 A, at 23, (amending Section 20 of Ordinance 1-2016 at 24).

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whether it met other applicable regulations and permit requirements, and also on whether the proposal met the NNL requirements. A specific proposal would properly be denied by the County if it failed to meet the NNL requirements following application of the mitigation sequencing measures.

The Board also rejects Petitioner's arguments that "full mitigation" is capped at 115% of projected costs and that monitoring is limited to a five (5) year period. While it is true that the County's regulations do not specifically require additional payment or extensions of the monitoring period, the regulations provide for same.[75] The Board assumes the County will administer its SMP so as to ensure that the "goals, objectives and performance standards of the mitigation plan" are met.

However, Petitioner's final assertion raises a concern over the geographic location of authorized mitigation, that is, that mitigation is authorized outside of the impacted watershed. WAC 173-26-201(2)(e)(ii)(B) provides:

> When compensatory measures are appropriate pursuant to the mitigation priority sequence above, preferential consideration shall be given to measures that replace the impacted functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive resource management plans applicable to the area of impact may be authorized. Authorization of compensatory mitigation measures may require appropriate safeguards, terms or conditions as necessary to ensure no net loss of ecological functions. (emphasis added)

Ordinance 11-2017 includes the following:

> When feasible, adverse impacts are to be mitigated on site. If off-site mitigation is proposed, the mitigation site must be located on the same island, as close as feasible to the development site.[76]

[75] IR 007518, Ordinance 1-2016, Section 21C at 55: If the goals, objectives and performance standards of the mitigation plan are not met, the decision-maker may require additional actions and may extend the monitoring period, financial guarantee and associated agreement.
[76] ECY 035948, Ordinance 11-2017, Section 10C at 24.

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> Mitigation options may include the use of certified mitigation banks and approved in lieu fee mitigation sites when they are identified and approved by the County Council.[77]

While the County's regulations do give "preferential consideration" to mitigation in the direct or immediate vicinity, the WAC does not authorize mitigation "on the same island" (unless that island was within a single watershed) or potentially at an in-lieu mitigation site not within the same watershed. As the Petitioner points out, the San Juan islands include numerous watersheds.[78] DOE's statement that the Guidelines do not require mitigation within the same watershed is inaccurate.[79] WAC 173-26-201(2)(e)(ii)(B) clearly provides that location within the same watershed is a fallback from siting mitigation directly or in the immediate vicinity.

The Board finds and concludes as follows:

1. San Juan County's decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, specifically those regulations relating to mitigation for adverse impacts to shoreline ecological functions beyond the watershed of the anticipated impacts, failed to comply with the policies of the Shoreline Management Act and Shoreline Master Program Guidelines.

2. The Petitioner has met the applicable burdens of proof, whether that be the clearly erroneous standard or the clear and convincing evidence in the record standard. The Growth Management Hearings Board finds and concludes that San Juan County's decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, specifically regulations relating to mitigation for adverse impacts to shoreline ecological functions beyond the watershed of the anticipated impacts, fails to comply with the policies of RCW 90.58.020 and the requirements of WAC 173-26-201(2)(e)(ii)(B).

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[77] ECY 035948, Ordinance 11-2017, Section 11C at 25.
[78] IR 202815-202817.
[79] Respondent Department of Ecology's Prehearing Brief at 13.

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3. The Petitioner has failed to meet its burden of proof to establish any other alleged violations set forth in Issue 2.

Issue No. 3

Does the Update's shoreline buffer scheme, incorporated by 2016 Ordinance New Section 18 and referenced throughout, conflict with the policies of RCW 90.58.020, the requirements of RCW 90.58.100, the provisions of Chapter 43.21C RCW, and SMP Guidelines for analyzing and conserving shoreline vegetation (WAC 173-26-201(3)(d)(viii), -221(5)), for using the most current, accurate, and complete scientific and technical information available (WAC 173-26-201(2)), and for protecting against site-specific and ecosystem-wide impacts (WAC 173-26-181, -186(8), -201(2)(c), -201(3)(d)(iii), -221(2), -221(5), -221(6))?

Issue 3 focuses on the SMP's regulations applicable to shoreline buffers designed to protect and restore shoreline vegetation. The Petitioner argues that the buffers are too narrow, allow excessive removal of vegetation, and authorize "unnecessary buffer development".[80] It contends that the buffer scheme fails to reflect scientific recommendations, including a prior recommendation from Ecology.[81] It observes that adoption of the Critical Area Ordinance (CAO) merely required "inclusion" of Best Available Science (BAS) while an SMP must be "based" on BAS.[82] In support of its contentions, the Petitioner cites WAC 173-26-221(5)(b) which sets forth the numerous functions served by shoreline vegetation. That rule requires jurisdictions to address vegetation conservation and restoration, and include regulatory provisions addressing conservation of vegetation to assure NNL. In doing so, local governments "must use available scientific and technical information, as described in WAC 173-26-201(2)(a). At a minimum, local governments

[80] Petitioner Friend of the San Juan's Prehearing Brief at 20-23.
[81] *Id*. at 18.
[82] RCW 36.70A.172 requires jurisdictions to "include the best available science" while RCW 90.58.100 requires local governments to "Utilize a systematic interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts" and 'Utilize all available information regarding hydrology, geography, topography, ecology, economics, and other pertinent data". WAC 173-26-201 then expands on the use of scientific and technical information: "base master program provisions on an analysis incorporating the most current, accurate, and complete scientific or technical information available".

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should consult shoreline management assistance materials provided by" DOE and the Washington State Department of Fish and Wildlife.[83]

A jurisdiction's SMP may incorporate other adopted regulations. Incorporated provisions must "provide a level of protection to critical areas located within shorelines of the state that assures no net loss of shoreline ecological functions necessary to sustain shoreline natural resources".[84] SMPs must also address "[p]rotecting existing and restoring degraded upland ecological functions important to critical saltwater habitats, including riparian and associated upland native plant communities."[85] In this instance, the County's SMP incorporated its CAO.[86] The County's CAO includes, among other provisions, regulations applicable to buffer widths, the level of development allowed within buffers, and buffer vegetation retention. Those regulations now apply to the County's shorelines in order to protect shoreline ecological functions and values as the definition of "critical area functions and values" specifically includes shoreline ecological functions and values.[87] Beyond that, a significant percentage of the County's shorelines have been designated as Fish and Wildlife Habitat Conservation Areas (FWHCAs), as addressed below.[88]

WAC 173-26-221(5)(b) requires jurisdictions to address vegetation conservation and restoration.[89] SJCC 18.35.130, one of the incorporated CAO regulations, includes site-specific buffer regulations related to aquatic FWHCAs. FWHCAs include shellfish areas, kelp and eelgrass beds, forage fish spawning areas, pocket beaches and feeder bluffs as

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[83] WAC 173-26-221(5)(b).
[84] RCW 36.70A.480(4).
[85] WAC 173-26-221(2)(c)(iii)(B).
[86] Some specific CAO regulations were not incorporated as they were determined to be inconsistent with the SMA. See Ordinance 11-2017, Section 9B at 22, amending Ordinance 1-2016, Section 18.
[87] *Supra* at 14.
[88] FWHCAs are a type of critical area. See RCW 36.70A.030(5).
[89] "Master programs shall include: Planning provisions that address vegetation conservation and restoration, and regulatory provisions that address conservation of vegetation; as necessary to assure no net loss of shoreline ecological functions and ecosystem-wide processes, to avoid adverse impacts to soil hydrology, and to reduce the hazard of slope failures or accelerated erosion."

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well as areas having a "primary association" with certain species, including designated stocks of chinook and chum salmon.[90]

SJCC 18.35.130's site-specific buffer regulations include water quality buffers, tree protection zones and, in some cases, coastal geologic buffers.[91] SJCC 18.35.130B sets out a step-by-step process for determining buffer widths[92] and regulations applicable to their maintenance:

> Structures, Uses and Activities Allowed and Prohibited in and over Aquatic FWHCAs and their Water Quality Buffers and Tree Protection Zones. Development activities, removal of vegetation and other site modifications are limited or prohibited within aquatic FWHCAs and their water quality buffers and tree protection zones. Allowable activities vary depending on whether the activity is within a tree protection zone or a water quality buffer, and are described separately below.
> 1. Tree protection zones are divided into two sections: Zone 1 consists of the first 35 feet adjacent to the water, beginning at the OHWM, or for streams, the bank full width. Zone 2 is the remainder of the tree protection zone.
> To allow for a view or for fire hazard reduction, minor trimming and pruning of the foliage of trees within both Zone 1 and Zone 2 is permitted provided the health of the trees is maintained, trees are not topped, and all branches and foliage overhanging aquatic FWHCAs are retained. In no case shall more than 20 percent of the foliage of a tree be removed during one 12-month period. Within Zone 1, no tree removal is allowed (though pruning is allowed in conformance with the above requirements). Within Zone 2, construction of one primary structure, and/or limited tree removal to allow for a filtered view from the primary structure, are allowed in conformance with all of the following:
> a. The structure, impervious areas, and areas where soils will be graded, compacted or where the organic soil horizon will be removed, are located landward of the water quality buffer;

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[90] SJCC 18.35.130.

[91] SJCC 18.35.130 A. Sizing Procedures for Buffers and Tree Protection Zones. This subsection provides a site-specific procedure for determining the size of vegetative buffers and tree protection zones necessary to protect aquatic FWHCAs. Three separate components are considered: a water quality buffer that applies in all cases, tree protection zones that apply to areas with trees, and a coastal geologic buffer that applies to areas subject to erosion caused by currents, tidal action, or waves. For properties with characteristics that vary (e.g., a portion of the parcel has trees or a geologically hazardous area, and other areas of the parcel do not), the size of required buffers and tree protection zones may vary, resulting in buffers and tree protection zones that are larger in some areas and smaller in others. (Note: SJCC 18.50.540 also contains setback standards for marine shorelines and lakes over 20 acres.)

[92] See Appendix A's SJCC 18.35.130's Figure 3.1, a flowchart used for determining buffer widths.

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b. Appropriate BMPs are used to minimize erosion, sedimentation, and soil disturbance;
c. No more than 40 percent of the volume of trees over six inches dbh are removed in any 10-year period;
d. Stocking levels for trees greater than or equal to six inches dbh will not be reduced to less than:
i. Softwood stands such as Douglas fir (greater than 66 percent softwood volume): 80-square-foot basal area per acre including the area covered by any structures (approximately equivalent to 21 percent canopy cover);
ii. Mixed wood stands (34 to 66 percent softwood volume): 70-square-foot basal area per acre including the area covered by any structures; and
iii. Hardwood stands such as maple (less than 34 percent softwood volume): 50-square-foot basal area per acre including the area covered by any structures;
e. The remaining forest consists of trees that are multi-aged and are well distributed across the tree protection zone;
f. All vegetation overhanging aquatic FWHCAs is retained; and
g. For primary structures to be located in Zone 2, there is a low probability of increased windthrow of trees within tree protection zones as determined by a qualified professional.[93]

Review of the tree protection zone buffers, together with required water quality buffers[94], and possible coastal geologic buffers, reflects consideration of the requirements of WAC 173-26-221(5)(b); the SMP addresses vegetation conservation/restoration, and includes regulatory provisions addressing conservation.

The Petitioner raised similar objections regarding the assembling, consideration and application of BAS to the County's Critical Areas Ordinance FWHCA buffer scheme in GMHB Case No. 13-2-0012c. In that proceeding it also argued the buffer widths and the activities allowed within FWHCA buffers failed to reflect the inclusion of BAS. While the Board initially found some buffer widths and activities failed to comport with BAS[95], the County was subsequently found in compliance[96]. In essence, the Petitioner now seeks to

[93] SJCC 18.35.130B, in part.
[94] See Appendix A which includes the methodology for determining applicable buffer widths.
[95] GMHB No. 13-2-0012c (Final Decision and Order, September 6, 2013) at 63.
[96] GMHB No. 13-2-0012c (Order Finding Compliance and Continuing Non-Compliance, August 20, 2014) at 18.

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reargue allegations previously raised and addressed. In ultimately finding the County's scheme GMA compliant in the prior case, the Board concluded that the FWHCA buffer scheme reflected the inclusion of BAS. Finally, it bears repeating that the SMP includes provisions requiring mitigation sequencing if it is determined a project will impact shoreline functions and values so as to ensure NNL.[97]

The Board finds and concludes that the Petitioner has failed to meet its burden of proof to establish the alleged violations set forth in Issue 3.

Issue No. 4

Does the Update's shoreline stabilization provisions at 2016 Ordinance New Sections 41-48 and Table X, which authorize actions like the armoring of feeder bluffs and forage fish spawning habitat and unreplaced shoreline vegetation removal, conflict with RCW 36.70A.020 goals 9 and 10, the policies of RCW 90.58.020, the requirements of RCW 90.58.100, the provisions of Chapter 43.21C RCW, and SMP Guidelines for new shoreline stabilization (WAC 173-26-211(5)(b)(ii)(E), -211(5)(f)(ii)(A), -231(3)(a)(iii)(B), -231(3)(a)(iii)(C), -231(3)(a)(iii)(E)), for using the most current, accurate, and complete scientific and technical information available (WAC 173-26-201(2)), and for protecting against site-specific and ecosystem-wide impacts (WAC 173-26-181, -186(8), -201(2)(c), -201(3)(d)(iii), -221(2), -221(5), -221(6))?

The Petitioner asserts in Issue 4 that the County's SMP allows the construction or replacement of both hard[98] and soft[99] shoreline stabilization measures in violation of the cited Guidelines. Beach erosion is a natural process and seeking to protect properties from that process is clearly understandable. However, "[t]he impacts of hardening any one property may be minimal but cumulatively the impact of this shoreline modification is

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[97] IR ECY 035948, Ordinance 11-2017, Section 8B at 21; Section 10A at 23.

[98] "Hard shoreline stabilization measures" means shore erosion control structures and measures composed of hard surfaces, arranged with primarily linear and vertical or near-vertical faces that armor the shoreline and prevent erosion. These measures include bulkheads, riprap, groins, retaining walls and similar structures composed of materials such as boulders, gabions, dimensional lumber, and concrete. Ordinance 01-2016 at 138. Bates 007657.

[99] "Soft shoreline stabilization measures" means shore erosion control structures and measures composed of primarily natural and semi-rigid or flexible materials, logs and vegetation, organized in a nonlinear, sloping arrangement, that dissipate wave energy and minimize erosion in a way that is similar to natural shoreline processes. Ordinance 11-2017 at 67. Bates ECY 036014.

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significant".[100] The Guidelines and the record set forth the potential negative results of shoreline stabilization.[101]

The County's SMP allows such measures to protect existing primary structures, an accessory dwelling unit, and utilities, driveways and roads which cannot feasibly be relocated.[102] New, replaced, or enlarged hard measures "may be allowed when damage to them[103] is expected within three (3) years.[104] New, replaced, or enlarged soft measures "may be allowed when there is a significant possibility that development will be damaged as a result of erosion caused by waves and currents".[105]

WAC 173-26-231(3)(a)(iii)(B) provides as follows:

> New structural stabilization measures shall not be allowed except when necessity is demonstrated in the following manner:
>
> (I) To protect existing primary structures:
>
> • New or enlarged structural shoreline stabilization measures for an existing primary structure, including residences, should not be allowed unless there is *conclusive evidence*, documented by a geotechnical analysis, that the structure is in danger from shoreline erosion caused by tidal action, currents, or waves. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not demonstration of need. The geotechnical analysis should evaluate on-site drainage issues and address drainage problems away from the shoreline edge before considering structural shoreline stabilization.
>
> • The erosion control structure will not result in a net loss of shoreline ecological functions.
>
> (II) In support of new nonwater-dependent development, including single-family residences, when all of the conditions below apply:
>
> • The erosion is not being caused by upland conditions, such as the loss of vegetation and drainage.

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[100] WAC 173-26-231(3)(ii).
[101] See WAC 173-26-231(3)(ii); IR 10114-10142; IR 009895-009897.
[102] IR 007518, Ordinance 01-2016 at pages 78, 79.
[103] The Board interprets use of the word "them" as a reference to primary structures, accessory dwelling units, etc.
[104] Ordinance 01-2016, Section 41B at 79, Bates 007598. The Board notes that Section 41B does not include the "significant possibility" qualifier although it does appear in Section 48A3, Bates 007603.
[105] Ordinance 01-2016, Section 41 C at 79. Bates 007598.

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> • Nonstructural measures, such as placing the development further from the shoreline, planting vegetation, or installing on-site drainage improvements, are not feasible or not sufficient.
> • The need to protect primary structures from damage due to erosion is demonstrated through a geotechnical report. The damage must be caused by natural processes, such as tidal action, currents, and waves.
> • The erosion control structure will not result in a net loss of shoreline ecological functions. (emphasis added)

The Board observes that the SMP's standards for allowance of new or enlarged[106] stabilization differ significantly from that of WAC 173-26-231(3)(a)(iii)(B). The Guideline states that new or enlarged stabilization measures to protect existing primary structures, whether soft or hard, "should not be allowed unless there is [documented] conclusive evidence that the structure is in danger from shoreline erosion . . .". The SMP, in contrast, allows new, replaced or enlarged hard and soft stabilization when there is a "significant possibility that the development will be damaged".[107] A "significant possibility" standard falls far short of "conclusive evidence" as required by the rule. The Petitioner has met its burden of proof to establish that the Update's shoreline stabilization provisions as specifically addressed above violate WAC 173-26-231(3)(a)(iii)(B).

The Petitioner also contends that the SMP's "soft" structural provisions actually authorize the use of "hard" materials. It cites Ordinance 01-2016, Section 45B, which provides: The soft shoreline stabilization design must include an arrangement of various sizes of gravels, cobbles, logs, and boulders to provide stability and dissipate wave and current energy. . ." The identical language appears in Ordinance 11-2017 at Section 19B. Logs and boulders would appear to qualify as elements of "hard measures" based on the continuum of soft to hard measures set out in WAC 173-26-231(3)(a)(ii).[108] That observation

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[106] The SMP treats the enlargement of structural stabilization structures as new structures. Ordinance 01-2016, Section 46, at 83, Bates 007602.
[107] Ordinance 01-2016, Section 41B and C, at 79, Bates 007598; and Section 48 at 84, Bates 007603.
[108] Vegetation enhancement, Upland drainage control, Biotechnical measures, Beach enhancement, Anchor trees, Gravel placement, Rock revetments, Gabions, Concrete groins, Retaining walls and bluff walls, Bulkheads; and Seawalls.

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is further supported by the SMP's own definition of "Hard shoreline stabilization measures", which includes boulders and dimensional lumber.[109]

The Petitioner further asserts that the SMP fails to require adequate vegetative replanting following clearing and installation of shoreline armoring as only 75% of the affected frontage is replanted to an average depth of ten (10) feet. While the Petitioner cites studies from the record, it fails to relate the allegation to specific statutory or Guideline requirements.

Finally, the Petitioner suggests that the SMP allows "hard armoring directly on forage fish spawning habitat and 'soft' armoring anywhere in or near fish spawning beaches".[110] The Board does not agree with the Petitioner's interpretation that the preclusion of hard stabilization measures "adjacent to documented forage fish spawning areas" allows such measures "on" spawning areas. However, the Petitioner appropriately takes exception to the County's statement that since "forage fish spawning areas are seaward of the OHWM, the SMP does not allow shoreline armoring "on" forage fish habitat". Armoring, whether it is hard or soft, and even when located above the OHWM, can result in impacts to shoreline ecological functions, including forage fish spawning areas, and it is those impacts which the SMA seeks to address.[111]

As discussed above in addressing Issue 1, the designation applied to the County's shorelines is not the sole method contemplated by the SMA to insure NNL of shoreline ecological functions. Rather, that is accomplished through a combination of the designations and the applicable regulatory scheme. The regulatory scheme must complement and supplement the designations assigned. The methodology employed by the County's

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[109] "Hard shoreline stabilization measures" means shore erosion control structures and measures composed of hard surfaces, arranged with primarily linear and vertical or near-vertical faces that armor the shoreline and prevent erosion. These measures include bulkheads, riprap, groins, retaining walls and similar structures composed of materials such as boulders, gabions, dimensional lumber, and concrete. Ordinance 01-2016 at 138. Bates 007657. The Board further notes that soft structural measures may use hard elements to "tie in" with hard structures on adjacent properties. Ordinances 01-2016, Section 45A at 82 and 11-2017, Section 19A at 37. The Board does not intend to indicate that exception violates the Guidelines.

[110] Petitioner Friends of the San Juans' Prehearing Brief at 29.

[111] WAC 173-26-231(3)(a)(ii).

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consultants to assist the County in designating its shorelines varied from the "drift cell" model often employed throughout Puget Sound, opting instead for consideration of geomorphic units.[112] As the I & C acknowledged, the methodology has some weaknesses.[113] Consequently, the regulatory scheme employed to assure NNL takes on greater importance. It is therefore imperative that the regulations be crafted carefully to achieve the NNL requirement[114] and that a process for periodically evaluating the cumulative effects, as addressed in Issue 7 below, be included.

The Board finds and concludes as follows:

1. San Juan County's decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, specifically those regulations relating to the standards applicable to the allowance of hard and soft shoreline structural modifications and the inclusion of hard materials in soft shoreline stabilization design as addressed above fail to comply with the policies of the Shoreline Management Act and Shoreline Master Program Guidelines.

2. The Petitioner has met the applicable burdens of proof, whether that be the clearly erroneous standard or the clear and convincing evidence in the record standard. The Growth Management Hearings Board finds and concludes that San Juan County's decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, specifically regulations relating to the standards applicable to the allowance of hard and soft shoreline structural modifications and the inclusion of hard materials in soft shoreline stabilization design, fails to comply with the policies of RCW 90.58.020 and the requirements of WAC 173-26-231(3)(a)(iii)(B)and WAC 173-26-231(3)(a)(ii).

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[112] IR 001479 at Bates 001510.

[113] IR 001479 at Bates 001512 and 001516.

[114] The Board notes that the allowance of both hard and soft shoreline stabilization in all designations other than Natural is subject to obtaining a Shoreline Substantial Development Permit pursuant to the criteria set forth in Ordinance 01-2016, Section 4 and WAC 173-27-150. The Board further observes that the San Juan County Code includes special protections for Fish and Wildlife Habitat Conservation Areas, which include feeder bluffs, kelp and eelgrass beds, and forage fish spawning areas. SJCC 18.35.110-18.35.135.

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3. The Petitioner has failed to meet its burden of proof to establish any other alleged violations set forth in Issue 4.

Issue No. 5

Does the Update's overwater structure provisions at 2016 Ordinance New Sections 29-39 and Table X, which authorize: (1) overwater structures in eelgrass and kelps; (2) overwater structures that would be expected to interfere with normal erosion-accretion; (3) boating facilities for 5 or more users without ensuring that existing facilities and alternative moorage are not adequate or feasible; and (4) docks instead of marinas if the marinas are more than 8 miles away, conflict with RCW 36.70A.020 goals 9 and 10, the policies of RCW 90.58.020, the requirements of RCW 90.58.100, the provisions of Chapter 43.21C RCW, and SMP Guidelines for boating facilities and docks (WAC 173-26-221(2)(iii)(C), -241(3)(c)), for using the most current, accurate, and complete scientific and technical information available (WAC 173-26-201(2)), and for protecting against site-specific and ecosystem-wide impacts to shoreline ecological functions (WAC 173-26-181, -186(8), -201(2)(c), -201(3)(d)(iii), -221(2),-221(5))?

The Petitioner alleges that the SMP authorizes the location of docks, mooring buoys and other over-water structures in or over critical habitats such as eelgrass and kelp beds and permits docks that would interfere with the erosion/accretion function of feeder bluffs.[115] The allegations are not well taken. As the County observes, the SMP requires that "all over-water structures, including new, modifications or replacements of existing facilities must meet the applicable design criteria established by the [Washington Department of Fish and Wildlife] WDFW in WAC 220-660-140 and 220-660-380 relative to materials, siting, disruption of currents, restrictions of tidal prisms, flushing characteristics, and fish passage to the extent that those criteria are consistent with protection of the shore process corridor and its operating systems".[116]

The WDFW rules provide, in part:

> (a) <u>The department requires that new structures are designed with a pier and ramp to span the intertidal beach, whenever feasible.</u>
> (b) The design and location of structures must follow the mitigation sequence to protect salt water habitats of special concern.

[115] Petitioner Friends of the San Juans' Prehearing Brief at 32.
[116] Citing IR 007518, Ordinance 01-2016, Section 29A.3 at 67. Bates 007584.

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(i) Design and locate structures to protect juvenile salmonid migration, feeding, and rearing areas.
(ii) Design and locate structures to protect documented Pacific herring, Pacific sand lance, and surf smelt spawning beds; and rockfish and lingcod settlement and nursery areas.
(iii) The department will require a seagrass/macroalgae habitat survey for all new construction unless the department can determine the project will not impact seagrass and kelp beds, and in herring spawning beds other macroalgae used as spawning substrate. A survey is not required for replacement of an existing structure within its original footprint.
(A) Structures must be located at least twenty-five feet (measured horizontally from the nearest edge of the structure) and four vertical feet away from seagrass and kelp beds (measured at extreme low water).
(B) In documented herring spawning areas, structures must be located at least twenty-five feet (measured horizontally from the nearest edge of the structure) and four vertical feet from macroalgae beds on which herring spawn (measured at extreme low water).[117] (emphasis added)

In addition, the SMP includes extensive regulations addressing all types of overwater structures, including mooring buoys.[118] Mooring buoys are required to avoid eelgrass beds and other critical habitat unless there is no feasible alternative.[119] Nor does the SMP allow interference with the natural functioning of feeder bluffs. The SMP includes the following provision: "Boating facilities that are expected to interfere with the normal erosion-accretion process associated with feeder bluffs are prohibited."[120] While there are allowances in the SMP for the intrusion of boating facilities, and single family/joint use docks into shoreline critical areas, those allowances must first satisfy extensive criteria.[121]

The Board finds and concludes that the Petitioner has failed to meet its burden of proof to establish the alleged violations set forth in Issue 5.

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[117] WAC 220-660-380(3)(a) & (b).
[118] IR 007518, Ordinance 01-2016, Sections 29-36.
[119] IR 007518, Ordinance 01-2016, Section 35C.
[120] The County insisted both in its brief and at oral argument that "Boating facilities" includes docks serving four or fewer residences notwithstanding a confusing definition of boating facilities in Ordinance 01-2016 at 130, Bates 007649, which appears to apply only to docks serving more than four residences. The Board suggests that the definition be clarified to avoid possible misinterpretation.
[121] IR 007518, Ordinance 01-2016, Sections 30-31, Bates 007587-007589.

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Issue No. 6

Does the Update's nonconforming development provisions at 2016 Ordinance New Section 14 conflict with RCW 36.70A.020 goals 9 and 10, the policies of RCW 90.58.020, the requirements of RCW 90.58.100, the provisions of Chapter 43.21C RCW, and SMP Guidelines for nonconforming development (WAC 173-26-191(2)(a)(iii)(A)), and for protecting and restoring shoreline ecological functions (WAC 173-26-181, -186(8), -201(2)(c),-201(3)(d)(iii), -201(2)(f), -221(2), -221(5), -221(6))?

Issue 6 raises concerns in regards to the SMP's regulations applicable to nonconforming uses. Specifically, the Petitioner references Section 14 of Ordinance 01-2016 which in part provides:

> A. Except for structural shoreline stabilization measures . . . <u>any use or structure legally located within shoreline jurisdiction that was established before October 30, 2017, may be moved, replaced, redeveloped, expanded, or otherwise modified on the same parcel</u> provided this work is consistent with the provisions of this section.
> B. Movement, replacement, redevelopment, expansion or modification of structures may be allowed if the applicant demonstrates that the proposed action will not:
> 1. Result in a net loss of shoreline ecological functions;
> 2. Increase adverse impacts on shoreline critical areas;
> 3. Create a new nonconformance or increase the degree of inconsistency with the provisions of this SMP; or
> 4. Result in a hazard to people or property.
> C. The applicant must demonstrate no net loss of shoreline ecological functions based upon an analysis that addresses any:
> 1. Increase in the quantity of pollutants from the site;
> 2. Increase in the quantity of surface runoff from the site;
> 3. Decrease in trees and other vegetation within buffers and tree protection zones;
> 4. Decrease in the stability of the site and other properties; and
> 5. Changes to the transport of sediment to and within nearshore areas.

It is the conditional allowance of movement, replacement, and expansion of uses and structures to which the Petitioner takes exception; it suggests that allowance fails to address the SMA goal of restoring shoreline health over time through the reduction of non-conforming uses or structures.

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The Guidelines include the following:

> It is recognized that shoreline ecological functions may be impaired not only by shoreline development subject to the substantial development permit requirement of the act but also by past actions, unregulated activities, and development that is exempt from the act's permit requirements.[122]
>
> While the master program is a comprehensive use regulation applicable to all land and water areas within the jurisdiction described in the act, its effect is generally on future development and changes in land use. Local government may find it necessary to regulate existing uses to avoid severe harm to public health and safety or the environment and in doing so should be cognizant of constitutional and other legal limitations on the regulation of private property. In some circumstances existing uses and properties may become nonconforming with regard to the regulations and master programs should include provisions to address these situations in a manner consistent with achievement of the policy of the act and consistent with constitutional and other legal limitations.[123]

While the County could have disallowed replacement and expansion of nonconforming uses so as to incrementally improve ecological functions, it was not required to do so by any of the cited statutes or Guidelines. The County has the legislative latitude to craft regulations addressing nonconformance so long as those regulations meet SMA requirements. Here, the nonconforming use/structure regulations conditionally authorize replacement or expansion but only upon the applicant's ability to establish compliance with the requirements of Ordinance 01-2016, Section 14 B and C.[124] Those code sections require the applicant to demonstrate that the proposal will not result in a net loss of ecological functions, increase adverse critical area impacts, or increase the degree of inconsistency with the SMP requirements. While other jurisdictions may elect to address nonconformance differently, the Petitioner is unable to meet its burden of proof to establish that the County's chosen methodology is non-compliant with the requirements of the SMA. The SMA goal of restoration may be accomplished through regulations other than those

[122] WAC 173-26-186(8).
[123] WAC 173-26-191(2)(a)(iii)(A).
[124] IR 007518, at 44-45.

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affecting nonconforming uses. The Petitioner fails to establish that the County's amended treatment of nonconforming uses and structures violates any applicable statute or Guideline.

Issue No. 7

Does the Update's lack of a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions conflict with the SMP Guidelines (WAC 173-26-191(2)(a)(iii)(D))?

The Petitioner asserts that the County's SMP violates WAC 173-26-191(2)(a)(iii)(D) as it fails to include a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions.

The Guidelines, in establishing the principles to be observed in the creation of master plans, require local governments to "evaluate and consider cumulative impacts of reasonably foreseeable future shoreline development."[125] Further, in laying out the basic requirements of an SMP, the Guidelines describe specific contents that are required to be included in the program. Those mandatory elements include "a mechanism for documenting all project review actions" along with "a process for periodically evaluating the cumulative effects of authorized development.[126]

The Petitioner points out that comments taken during the update process suggested

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[125] WAC 173-26-186(8)(d) establishes a guiding principle for master programs, stating in pertinent part: Local master programs shall evaluate and consider cumulative impacts of reasonably foreseeable future development on shoreline ecological functions and other shoreline functions fostered by the policy goals of the act. To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts among development opportunities.

[126] WAC 173-26-191(2)(a)(iii)(D). (2) Basic requirements. This chapter describes the basic components and content required in a master program. …

(a) Master program contents. Master programs shall include the following contents:
(iii) Administrative provisions.
(D) Documentation of project review actions and changing conditions in shoreline areas.
Master programs or other local permit review ordinances addressing shoreline project review shall include a mechanism for documenting all project review actions in shoreline areas. Local governments shall also identify a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions. This process could involve a joint effort by local governments, state resource agencies, affected Indian tribes, and other parties.

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ways of tracking and evaluating actions to ensure NNL over time.[127] For example, WDFW suggested a monitoring and adaptive management program with benchmarks to achieve no net loss "[b]ecause the shoreline environment is extraordinarily complex mitigation/compensation efforts have a high degree of uncertainty."[128] The County's own Cumulative Impacts Analysis identified several methods that could aid in tracking impacts, such as incorporating information into a permit database that could track change in vegetative cover or the dimensions or type of shoreline stabilization.[129]

However, the County neither included "a mechanism for documenting all project review actions" nor "a process for periodically evaluating the cumulative effects of authorized development," as required by WAC 173-26-191(2)(a)(iii)(D). In its defense, the County asserts that the "SMA and Guidelines do not require a mechanism to document and periodically evaluate cumulative effects of authorized development,"[130] and that the evaluation outlined in WAC 173-26-191(2)(a)(iii)(D) occurs as part of the I & C Report and cumulative impacts analysis that are required each time an SMP is updated.[131] The County cites as authority WAC 173-26-201(2)(c), which outlines the process to prepare or amend shoreline master programs, including the requirement that master programs contain "policies and regulations that assure, at minimum, no net loss of ecological functions necessary to sustain shorelines natural resources."[132] The County further asserts that WAC 173-26-201(3)(d)(E)(iii), which identifies the steps outlined for the preparation or amending of a master program,[133] requires that cumulative impacts be addressed programmatically.

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[127] Petitioner Friends of the San Juan's Brief Prehearing Brief at 36.
[128] IR 005694, Bates 005699 (comment 1).
[129] IR 003642, Bates 003712 (Excerpt of Cumulative Impacts Analysis).
[130] Brief of San Juan County, at 20.
[131] *Id*., at 21.
[132] *Id.,* at 20.
[133] (iii) Addressing cumulative impacts in developing master programs. The principle that regulation of development shall achieve no net loss of ecological function requires that master program policies and regulations address the cumulative impacts on shoreline ecological functions that would result from future shoreline development and uses that are reasonably foreseeable from proposed master programs. To comply with the general obligation to assure no net loss of shoreline ecological function, the process of developing the

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The County relies on the following language in the Guideline concerning the contents of the programmatic master plan:

> Complying with the above guidelines is the way that master program policies and regulations should be developed to assure that the commonly occurring and foreseeable cumulative impacts do not cause a net loss of ecological functions of the shoreline. For such commonly occurring and planned development, policies and regulations should be designed without reliance on an individualized cumulative impacts analysis.

The problem, of course, is that the County's defense relies on the programmatic action itself, the update of the SMP, to address documentation and evaluation of cumulative impacts. The County concludes that while it must complete the cumulative impacts analysis for the update, there is no requirement for any other evaluation of impacts for the duration of the SMP. The Board does not agree.

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policies and regulations of a shoreline master program requires assessment of how proposed policies and regulations cause and avoid such cumulative impacts.

Evaluating and addressing cumulative impacts shall be consistent with the guiding principle in WAC 173-26-186 (8)(d). An appropriate evaluation of cumulative impacts on ecological functions will consider the factors identified in WAC 173-26-186 (8)(d)(i) through (iii) and the effect on the ecological functions of the shoreline that are caused by unregulated activities, development and uses exempt from permitting, effects such as the incremental impact of residential bulkheads, residential piers, or runoff from newly developed properties. Accordingly, particular attention should be paid to policies and regulations that address platting or subdividing of property, laying of utilities, and mapping of streets that establish a pattern for future development that is to be regulated by the master program.

There are practical limits when evaluating impacts that are prospective and sometimes indirect. Local government should rely on the assistance of state agencies and appropriate parties using evaluation, measurement, estimation, or quantification of impact consistent with the guidance of RCW 90.58.100(1) and WAC 173-26-201 (2)(a). Policies and regulations of a master program are not inconsistent with these guidelines for failing to address cumulative impacts where a purported impact is not susceptible to being addressed using an approach consistent with RCW 90.58.100(1).

Complying with the above guidelines is the way that master program policies and regulations should be developed to assure that the commonly occurring and foreseeable cumulative impacts do not cause a net loss of ecological functions of the shoreline. For such commonly occurring and planned development, policies and regulations should be designed without reliance on an individualized cumulative impacts analysis. Local government shall fairly allocate the burden of addressing cumulative impacts.

For development projects and uses that may have anticipatable or uncommon impacts that cannot be reasonably identified at the time of master program development, the master program policies and regulations should use the permitting or conditional use permitting processes to ensure that all impacts are addressed and that there is no net loss of ecological function of the shoreline after mitigation.

Similarly, local government shall consider and address cumulative impacts on other functions and uses of the shoreline that are consistent with the act. For example, a cumulative impact of allowing development of docks or piers could be interference with navigation on a water body.

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It is a well settled rule of statutory construction that all provisions of a statute or regulation are to be given effect, if possible. Here, the regulation establishing the content of a program is separate from the regulations which govern the development of that program. While the program must be developed in such a way as to ensure NNL, the contents of that program are governed by WAC 173-26-191(2)(a), which includes a requirement for a "mechanism for documenting all project review actions in shoreline areas." In addition to this mechanism, the Guideline goes on to require local governments to identify "a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions." Clearly, the County neither identified a mechanism for documenting actions in shoreline areas nor a process for periodic evaluation.

In finding that the County has not complied with WAC 173-26-191(2)(a)(iii)(D), the Board makes no judgment as to what actions might suffice to meet the County's responsibilities under this Guideline. Various stakeholders made suggestions during the update process which may be of value to the County, but we do not suggest here that any of those suggestions creates an expectation of how the County will comply. During the hearing on the merits in this case, the County referred to the existence of a permit tracking system and suggested that some documentation of effects of authorized development may be occurring there.

The Board finds and concludes as follows:

1. San Juan County's decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, which failed to include a mechanism for documenting all project review actions in shoreline areas and failed to include/identify a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions fails to comply with the policies of the Shoreline Management Act and Shoreline Master Program Guidelines.

2. The Petitioner has met the applicable burdens of proof, whether that be the clearly erroneous standard or the clear and convincing evidence in the record standard. The Growth Management Hearings Board finds and concludes that San Juan County's

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decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, which failed to include a mechanism for documenting all project review actions in shoreline areas and failed to include/identify a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions fails to comply with the policies of RCW 90.58.020 and the requirements of WAC 173-26-191(2)(a)(iii)(D).

Invalidity

In this proceeding, the Petitioner also requests the imposition of invalidity based on alleged substantial interference with Goal 9 (Open space and recreation) and Goal 10 (Environment), arguing continued validity of specific sections of the SMP would allow long-term impacts to critical shoreline habitats and interfere with the County's ability to conserve fish and wildlife habitat or protect the environment.[134] Although the Board has determined that particular sections of the SMP are non-compliant, it declines to find the sections invalid as substantial interference with fulfillment of Goals 9 and 10 has not been shown.

V. ORDER

Based upon review of the Petition for Review, the briefs and exhibits submitted by the parties, the GMA, prior Board orders and case law, having considered the arguments of the parties, and having deliberated on the matter, the Board finds:

1. As to Legal Issue 2, relating to mitigation for adverse impacts to shoreline ecological functions beyond the watershed of the anticipated impacts, Legal Issue 4 relating to the standards applicable to the allowance of hard and soft shoreline structural modifications and the inclusion of hard materials in soft shoreline stabilization design, and Legal Issue 7, relating to the failure to include a mechanism for documenting all project review actions in shoreline areas and failure to include/identify a process for periodically evaluating the cumulative

[134] Petitioner Friends of the San Juans' Prehearing Brief at 39, 40.

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effects of authorized development on shoreline conditions, the Growth Management Hearings Board reverses San Juan County's adoption of and the Department of Ecology's decision approving San Juan County's Shoreline Master Program Update and remands this matter to the Department of Ecology and San Juan County for the purpose of complying with the Shoreline Management Act consistent with this Final Decision and Order.

2. As to Legal Issue 1 (designations), Legal Issue 3 (shoreline buffers), Legal Issue 5 (overwater structures and boating facilities), and Legal Issue 6 (nonconforming uses), the Board upholds the decision by San Juan County and the Department of Ecology.
3. As to all alleged violations in Legal Issues 2, 4, and 7 not specifically addressed in Paragraph 1 above, the Board upholds the decisions by San Juan County and the Department of Ecology.
4. The following schedule for further proceedings shall apply:

Item	Date Due
Compliance Due	October 11, 2018
Compliance Report/Statement of Actions Taken to Comply and Index to Compliance Record	October 25, 2018
Objections to a Finding of Compliance	November 8, 2018
Response to Objections	November 19, 2018
Telephonic Compliance Hearing 1 (800) 704-9804 and use pin code 7757643#	**December 3, 2018** **9:00 a.m.**

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SO ORDERED this 13th day of June, 2018.

William Roehl, Board Member

Deb Eddy, Board Member

Bill Hinkle, Board Member

Note: This is a final decision and order of the Growth Management Hearings Board issued pursuant to RCW 36.70A.300.[135]

[135] Should you choose to do so, a motion for reconsideration must be filed with the Board and served on all parties within ten days of mailing of the final order. WAC 242-03-830(1), WAC 242-03-840.A party aggrieved by a final decision of the Board may appeal the decision to Superior Court within thirty days as provided in RCW 34.05.514 or 36.01.050. The petition for review of a final decision of the board shall be served on the board but it is not necessary to name the board as a party. See RCW 36.70A.300(5) and WAC 242-03-970. It is incumbent upon the parties to review all applicable statutes and rules. The staff of the Growth Management Hearings Board is not authorized to provide legal advice.

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APPENDIX A

Figure 3.1
Procedure for Determining Buffers and Tree Protection Zones for Aquatic FWHCAs

Step 1. Location Relative to Aquatic FWHCAs. Is the proposed development, removal of vegetation or other site modification located in or over an aquatic FWHCA? Is it located within 110 feet of the bank full width (BFW) of a stream as defined in WAC 222-16-010? Is it located within 110 feet of the ordinary high water mark (OHWM) of a lake or pond? Is it located within 200 feet of the OHWM of a marine area designated as a FWHCA?

Step 2. Determination of Need for Coastal Geologic Buffer. If the response to any of the above questions is yes, determine whether a coastal geologic buffer is necessary. If proposed development, vegetation removal, or other site modification is within 200 feet of the OHWM of an erodible marine shoreline (any shoreline that is not bedrock), determine whether the site is a geologically hazardous area, or whether it may provide sediment to an area with eelgrass, shellfish, spawning or holding areas for forage fish, mudflats, or intertidal habitats with vascular plants. If the answer to either question is yes, a qualified professional must prepare a geotechnical report and determine an appropriate coastal geologic buffer and development conditions to prevent increased erosion and allow for natural erosive processes for life of structures (minimum 75 years). In all cases (yes or no response) continue with the buffer/tree protection zone sizing procedure.

If the response to all of the above questions is no, no further action is necessary for compliance with FWHCA protection requirements for aquatic FWHCAs. Proceed to evaluate compliance with protection requirements for other types of FWHCAs in SJCC 18.35.135.

↓

Step 3. Water Quality Buffer. Determine the size of the water quality buffer using Table 3.6 in Step 3 below.

↓

Steps 4 and 5. Tree Protection Zones. For areas with trees, identify tree protection zone(s). If desired, tree protection zones may be averaged.

↓

Step 6. Adjustments. Because they provide limited support of the habitat functions and values of aquatic FWHCAs, existing, lawfully established structures and impervious surfaces are excluded from these areas and are not labeled nonconforming with regard to buffer and tree protection zone requirements. In some cases, buffers are adjusted so they do not cross roads.

↓

Step 7. Proceed to evaluate compliance with protection requirements for other types of FWHCAs (see SJCC 18.35.135).

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Chapter 4
No Net Loss of Shoreline Ecological Functions

All phases
Shoreline Master Program Planning Process

Introduction

The Shoreline Management Act (SMA) provides a broad policy framework for protecting the natural resources and ecology of the shoreline environment. The SMP Guidelines establish the standard of "no net loss" of shoreline ecological functions as the means of implementing that framework through shoreline master programs. WAC 173-26-186(8) directs that master programs "include policies and regulations designed to achieve no net loss of those ecological functions." (The specific sections of the Guidelines addressing the NNL requirement are included at the end of this chapter.)

RCW 90.58.020: The legislature finds that the shorelines of the state are among the most valuable and fragile of its natural resources and that there is great concern throughout the state relating to their utilization, protection, restoration, and preservation…This policy contemplates 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, adopted in 2003, constitute the first actual rule (WAC) in Washington State to incorporate the no net loss requirement. The concept of no net loss in this State originated with earlier efforts to protect wetlands. In 1989, Governor Booth Gardner signed an Executive Order establishing a statewide goal regarding wetlands protection. "It is the interim goal...to achieve no overall net loss in acreage and function of Washington's remaining wetlands base. It is further the long-term goal to increase the quantity and quality of Washington's wetlands resource base." (E.O. 89-10).

What does no net loss mean?

Over time, the existing condition of shoreline ecological functions should remain the same as the SMP is implemented. Simply stated, the no net loss standard is designed to halt the introduction of new impacts to shoreline ecological functions resulting from new development. Both protection and restoration are needed to achieve no net loss. Restoration activities also may result in improvements to shoreline ecological functions over time.

Local governments must achieve this standard through both the SMP planning process and by appropriately regulating individual developments as they are proposed in the future. No net loss

should be achieved over time by establishing environment designations, implementing SMP policies and regulations that protect the shoreline, and restoring sections of the shoreline. Based on past practice, current science tells us that most, if not all, shoreline development produces some impact to ecological functions. However, the recognition that future development will occur is basic to the no net loss standard. The challenge is in maintaining shoreline ecological functions while allowing appropriate new development, ensuring adequate land for preferred shoreline uses and public access. With due diligence, local governments can properly locate and design development projects and require conditions to avoid or minimize impacts.

No net loss incorporates the following concepts:

- The existing condition of shoreline ecological functions should not deteriorate due to permitted development. The existing condition or baseline is documented in the shoreline inventory and characterization. (See Chapter 7.) Shoreline functions may improve through shoreline restoration.
- New adverse impacts to the shoreline environment that result from planned development should be avoided. When this is not possible, impacts should be minimized through mitigation sequencing.
- Mitigation for development projects alone cannot prevent all cumulative adverse impacts to the shoreline environment, so restoration is also needed.

Practices that help achieve no net loss

The following SMP update practices will help to meet the no net loss requirement:

- **Locate, design and mitigate development within a watershed context**. During the SMP update process, use the characterization of ecosystem processes and functions to identify the best areas for future development and mitigation. The characterization can provide important information regarding areas that have a high potential for restoration and can be used for offsite mitigation. Such an approach can use a combination of onsite and offsite mitigation that helps restore critical processes and generates a greater “lift” in ecosystem functions.
- **Prohibit uses** that are not water-dependent or preferred shoreline uses. For example, office and multi-family housing buildings are not water-dependent or preferred uses. There is no requirement to provide a place for all types of uses within shoreline jurisdiction.
- **Require that all future shoreline development**, including water-dependent and preferred uses, is carried out in a manner that limits further degradation of the shoreline environment. No uses or activities, including preferred uses, are exempt from the requirement to protect shoreline ecological functions.
- **Require buffers and setbacks.** Vegetated buffers and building setbacks from those buffers reduce the impacts of development on the shoreline environment.
- **Establish appropriate shoreline environment designations**. The environment designations must reflect the inventory and characterization. A shoreline landscape that is relatively unaltered should be designated Natural and protected from any use that would

degrade the natural character of the shoreline. (In practice, this would avoid future impacts, the first objective of no net loss.) New shoreline development in such environs is limited, resulting in avoidance of new impacts.)

- **Establish strong policies and regulations.** Policies and regulations will define what type of development can occur in each shoreline environment designation, determine the level of review required through the type of shoreline permit, and set up mitigation measures and restoration requirements.
- **Develop policies and requirements for restoration.** These should be consistent with the shoreline restoration plan prepared during the SMP planning process.
- **Recommend actions outside shoreline jurisdiction.** The master program or an SMP supporting document can recommend actions for properties that are outside shoreline jurisdiction but have impacts on shorelands. For example, the SMP could call for improved stormwater treatment of runoff from roads, or replacement of septic systems with sewers. Recommending these actions could help create awareness of problems and provide support for them, although outside the authority of the SMP. Such recommendations could be included in the shoreline management strategy or in a brief chapter within the SMP. This would also satisfy the SMA adjacent lands policy (RCW 90-58.340) that local governments are obligated to meet.
- **In all cases, require mitigation sequencing**. The SMP must include regulations that require developers to follow mitigation sequencing: avoid impacts, minimize impacts, rectify impacts, reduce impacts over time, compensate for impacts, monitor impacts and take corrective measures. Avoiding impacts means not taking an action or part of an action in order to prevent impacts to ecological functions. Impacts can be avoided in many different ways: structures may be sited further from properly functioning shoreline areas; different landscaping plants or techniques may be used; a less impactful use may be substituted; or a proposal may be redesigned altogether.

How to demonstrate no net loss

Local governments demonstrate no net loss at two levels -- through the comprehensive SMP update planning process and over time, during the project review and permitting processes (in other words, during SMP implementation).

No net loss in the SMP planning process

The following graphic provides a visual description of the role of the SMP update in achieving no net loss. Through mitigation and restoration, a jurisdiction would achieve no net loss of shoreline ecological functions.

SMP updates: Achieving no net loss of ecological function

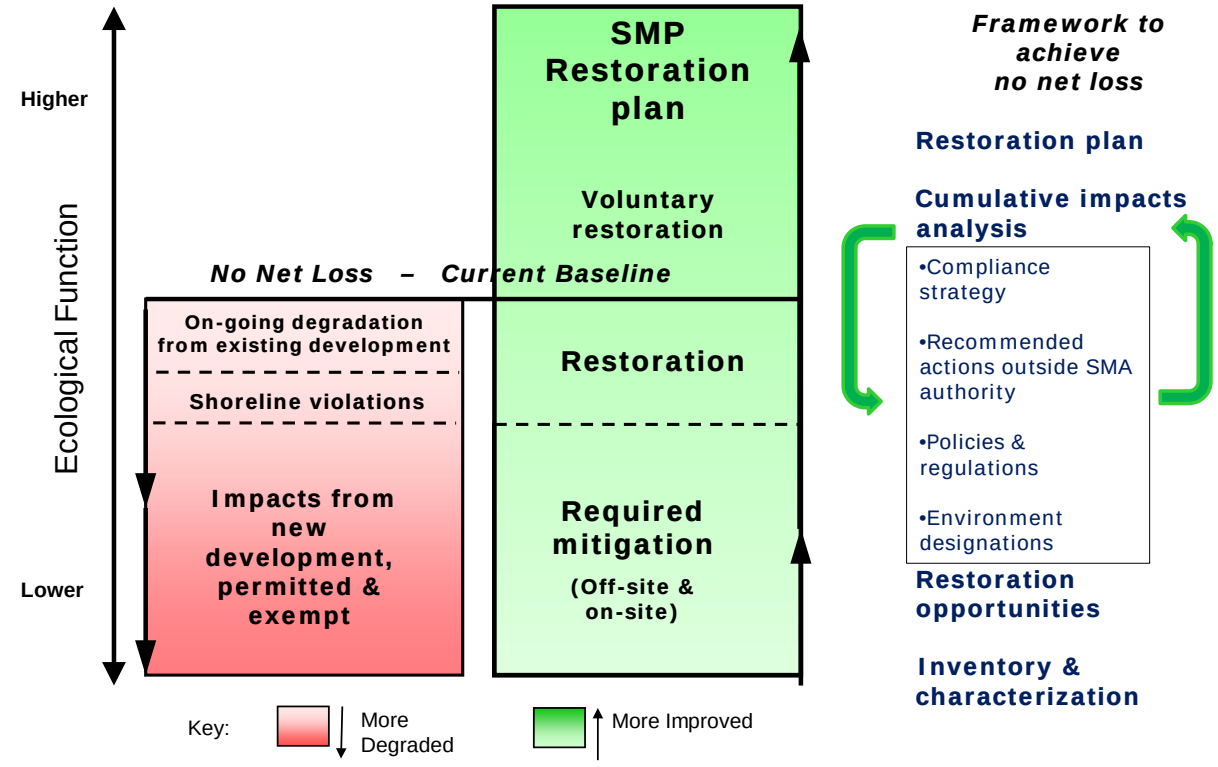


Figure 4-1: During the SMP update process, local governments should use existing shoreline conditions as the baseline for measuring no net loss of shoreline ecological functions.

Local governments show that their updated SMP will result in no net loss of ecological function by completing several tasks in the comprehensive SMP update process, including:

- **Shoreline inventory and characterization**. The shoreline inventory documents shoreline baseline conditions and the characterization analyzes shoreline functions and processes. (See SMP Handbook Chapter 7.
- **Shoreline use analysis.** The use analysis estimates the future demand for shoreline space and potential use conflicts over a minimum 20-year planning period and projects future trends.
- **Shoreline management recommendations.** Management recommendations translate the inventory and characterization findings into SMP policies, regulations, environment designations and protection strategies for each shoreline planning unit.
- **Restoration plan.** The restoration plan includes restoration opportunities, priorities and timelines for shoreline restoration.
- **Cumulative impacts analysis.** This analysis assesses the cumulative impacts on shoreline ecological functions from "reasonably foreseeable future development" allowed by the SMP, considering at a minimum habitat, hydrology and water quality functions.

Analyzing cumulative impacts is necessary to identify and compensate for the total predictable, incremental effects on shoreline functions after applying mitigation measures and restoration.

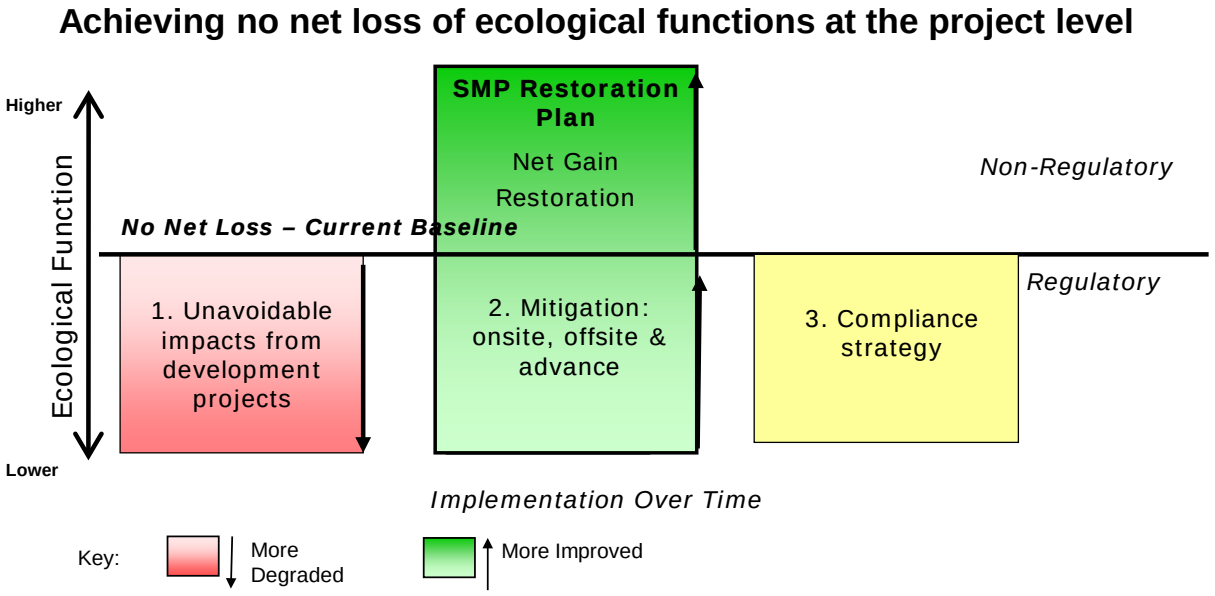
- **No net loss summary.** This narrative provides an overall picture of how the jurisdiction will meet the NNL requirement. This "executive summary" will explain how information from the supporting documents listed above was applied in developing and revising policies and regulations within the updated SMP. The summary should compare the conclusions of the supporting documents with the environment designations and use regulations to demonstrate how these provisions avoid, reduce, and mitigate reasonably foreseeable impacts in order to achieve NNL. This summary should provide a general chronology of the update while providing reference to the specific chronology captured in the SMP checklist. The purpose of this summary and other supporting documents is to ensure that the SMP environment designations, policies, regulations and shoreline restoration plan are based on the findings of the inventory and characterization and the cumulative impacts analysis and will achieve NNL. Documentation of this information will also provide a record of the jurisdiction's decisions on SMP policies and regulations in relation to NNL.

To approve a comprehensive SMP update, Ecology's Director must formally conclude that the proposed SMP, when implemented over its planning horizon, typically 20 years, will result in "no net loss of ecological functions necessary to sustain shoreline natural resources." This conclusion will be based upon the documents listed above, a completed SMP submittal checklist and supporting map portfolio.

No net loss in the permit process

When the SMP goes into effect, careful and thorough implementation will be necessary to achieve no net loss. For example, if the SMP prohibits office buildings and condominiums in the Conservancy environment, then your jurisdiction should not approve these uses in that environment. The cumulative impacts analysis would have shown that no net loss would be achieved if office buildings and condominiums are prohibited in the Conservancy environment. Allowing offices and condominiums under this scenario would result in a loss of shoreline functions.

When implementing the updated SMP, no net loss principles (first avoiding, then minimizing and compensating for ecological impacts) are applied again as individual shoreline project applications are reviewed and approved, conditioned, or denied. The following graphic demonstrates how the no net loss requirement is partially achieved during the permit process.



1. Impacts from shoreline development projects, after mitigation and restoration measures. SMP should encourage appropriate use of innovative measures such as clustering, TDRs, site specific BMPs, etc. to reduce impacts.

2. On-site, off-site and advance mitigation. SMPs should lay out the conditions when off-site mitigation will be allowed or preferred. Innovative techniques such as wetland banking (advance mitigation) should be addressed in SMPs. SMP restoration plans should help identify priority sites and types of sites for the most effective off-site restoration activities.

3. A compliance strategy should include a mechanism to document project review actions and a method to periodically evaluate the cumulative effects of authorized shoreline development. The compliance strategy should include inspection of development projects, and identify priorities for enforcement to improve protection of the most significant shoreline features and functions.

Figure 4-2: SMPs must include regulations that require developers to follow mitigation sequencing. Restoration will also be needed in order to achieve no net loss.

During the planning process, incomplete information about a potential future development and its impacts limits your ability to address no net loss. To close this information gap, unanticipated development impacts are identified through more detailed, site-specific information received at the permit review level.

Project review completes the Guidelines' combined planning and permit review framework for achieving no net loss. It assures that unanticipated impacts will still be subject to a cumulative impacts evaluation as applications for shoreline exemptions, conditional uses, and shoreline permits are reviewed.

WAC 173-26-201(3)(d)(iii):For development projects that may have unanticipatable or uncommon impacts that cannot be reasonably identified at the time of master program development, the master program policies and regulations should use the permitting or conditional use permitting processes to ensure that all impacts are addressed and that there is no net loss of ecological function of the shoreline after mitigation.

One way to comply with the SMP Guidelines requirement is to apply an established mitigation sequence such as that in the State

Environmental Policy Act (*SEPA* - *WAC 197-11-768*) on a case-by-case basis during project review.

Another way is through a conditional use permit (CUP). CUPs are automatically required for unanticipated types of development ("unclassified" uses). The SMP also may require CUPS for developments in which the impacts cannot be fully known at the planning level. Through the CUP review process, "consideration shall be given to the cumulative impact of additional requests for like actions in the area" [*WAC 173-27-160(2)*].

Potential no net loss indicators

Local planners working on SMP updates have asked for a tool to measure no net loss. In response, Ecology staff scientists and planners, with input from several state agencies and local governments, developed a list of potential No Net Loss indicators for Shoreline Master Programs (Table 4-1, below). This table of indicators can be used by local governments to help track the status of shoreline functions. Tracking several indicators can help to meet the "no net loss" of shoreline ecological functions standard of the SMP Guidelines.

The table shows 15 potential indicators and the type of measurement for each, such as acres, linear feet, number, percent cover, etc. The table shows the shoreline functions – water quality, water quantity and habitat – that are affected by the indicator, as well as specific impairments related to the indicator. Other columns include limitations for using the indicators, where the indicators are best used, and the availability of data. The indicators are limited to the area within shoreline jurisdiction where SMP regulations are implemented.

Figure 4-3: The linear length or area of bulkheads may be used as an indicator of no net loss of shoreline ecological functions. Photo by Hugh Shipman.

Measuring and continuing to track these indicators can give you a picture of shoreline conditions and ecological functions. The indicators can be measured to track loss or gain. For example, the length of shoreline stabilization may increase or decrease, or the acreage of riparian vegetation may increase or decrease. As conditions change over time, you may need to make changes to your SMP if tracking the indicators shows that your community is not achieving "no net loss" of shoreline ecological functions.

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
Forest cover: Acres converted from forest land to other land uses.	Water quality–sediment, nutrients & toxic filtration, conversion, and/or retention; temperature regulation. Water quantity–flow regulation. Habitat-structure for habitat life needs; input of organics & LWM*.	Reduces forest buffers and decreases filtering, conversion, and/or retention of pollutants from surface & subsurface flow; increases quantity of pollutants to aquatic habitats. Alters the delivery and timing of water to aquatic areas, increasing quantity of water delivered to aquatic habitats during high and low flows, which affects habitat structures. Increases water temperature. Loss of nesting sites, rearing, refuge & foraging areas.	Doesn't identify future land use. May be difficult to determine acres in shoreline jurisdiction without finer scale analysis.	Rural.***	Details of application available from DNR and local government. Class IV forest practice applications. CCAP data.
Shoreline stabilization: Linear length or area of bulkheads, revetments, bioengineering, seawalls, groins, retaining walls,	Habitat-Riparian and aquatic habitat, sediment supply. Input of organics, prey base, & LWM. Structure for habitat life needs.	Interrupts habitat-forming processes, such as beaches & channel migration, by impacting sediment supply and transport. Loss of nesting sites, rearing, refuge & foraging areas. Loss of prey base with	Combines different types of stabilization measures into one general category; impacts may vary.	Rural, urban.	Is data available from local government, including permits & SDP exempt projects? Can locals track over time? HPA information can supplement other data, but is not sufficient on

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
gabions. (Includes decrease in length, change to soft structure.)		associated loss of riparian vegetation.			its own. Detailed aerial photos may also show stabilization changes.
Marine & freshwater riparian vegetation: Linear measurement of mature native riparian vegetation of a given width (buffer width) or percent cover of different vegetation classes.	Water quality–sediment, phosphorus & toxic filtration, conversion, and/or retention; temperature regulation. Water quantity–flow regulation. Habitat-input of organics, prey base, & LWM. Structure for habitat life needs.	Removes capacity of riparian vegetation to filter surface flows, sediment, phosphorous and toxics; subsurface removal or conversion of nitrogen, pathogens. Increases overland and subsurface flows. Increases water temperature. Reduces prey base. Loss of LWM that provides instream structure. Loss of nesting sites, rearing, refuge & foraging areas.	No permit, so no record of change. Focused project needed to track. Useful only if a baseline exists. Methodology needs to be able to measure change. May be difficult to measure over short time frame.	Rural, urban.	Can locals measure and track? Use sample areas, aerial photos. Puget Sound LIDAR consortium has some data.
Acres of permanently protected areas, with no or limited development: Public ownership, current use/PBRS, conservation	Water quality–sediment, phosphorus & toxic filtration, conversion, and/or retention; temperature regulation. Water quantity-flow regulation.	Loss of nesting sites, rearing, refuge & foraging areas.	How measure degree of protection? Limit to protected areas with no development? Difficult to connect with specific functions.	Rural, urban.	Need info on ownership, PBRS, easements. Other info available from county auditor and assessor? Land trusts. NRCS and state agencies are also

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
easements, fee ownerships, NGOs.	Habitat- Riparian and aquatic habitat, sediment supply. Input of organics, prey base, & LWM. Structure for habitat life needs.				sources for permanently protected lands.
Piers/docks/floats, overwater structures: Number of structures, square footage of new and replacement. Or track grating, piling, construction materials.	Habitat. Water quality-toxics.	Increase in predation, reduction in light and aquatic vegetation and simplification of food web.	All docks not same – i.e. grating, materials vary, location affects impacts. New docks partially mitigate impacts.	Rural, urban.	Is data available from local government, including permits and SDP exempt projects? Can locals track over time? Use DNR data – number of and area over water. HPA information can supplement other data, but is not sufficient on its own. Good to monitor late spring/early summer.
Road lengths (feet) within 200 feet of water body.	Water quantity. Water quality. Habitat- connectivity.	Intercepts and changes timing of flows to aquatic habitat. Increases sediment and toxics.	Is there much new road development in shoreline jurisdiction?	Rural, urban.	Data available from DNR, local governments and WSDOT. CCAP data needs analysis to provide relevant information.
Number of road crossings of water bodies -bridges, culverts.	Habitat - Instream functions. Water quality.	Simplifies stream habitat structure, increases channel confinement and interrupts habitat forming processes.	Is there much new road development in shoreline jurisdiction? Distinguishing between fish friendly crossings	Rural, urban.	Culvert inventories vary in quality. WDFW has fish passage barrier data, but it is incomplete. Remote sensing data? SHIAPP

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
		Increases delivery of pollutants.	and others. Combining broad range of activities.		data? CCAP data needs analysis to provide relevant information.
Water quality: 303(d) list. All water quality parameters such as temperature, dissolved oxygen, fecal coliform, heavy metals, toxics, organics and biological indices (e.g., Biological Index of Biotic Integrity). Shellfish listings closures.	Water quality.	Impairment is specific to type of listed 303(d) issue (e.g. increased temperature, low dissolved oxygen, increased fecal coliform, heavy metals and toxic organics.)	How relate to functions? Some impacts from outside shoreline jurisdiction. Only impaired waters are listed & measured; no WQ improvement project in place. No criteria to remove from list. Sampling methodology changes, not always comparable. Marine & fresh water lists updated in alternating 2-year cycles. Some impacts from outside shoreline jurisdiction and municipality. Emergency closures updated regularly. Uneven data. Changes may be too frequent for NNL purposes. Limited to	Rural, urban.	Accessible data from Ecology. Is water body on or off list? In some cases, only a portion (e.g., reach) of a water body is listed. 303(d) – comprehensive, Dept of Health Shellfish Program.

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
			fecal coliform. Reflects impacts on human health, not shellfish health.		
Levees/dikes: Linear feet, floodplain area gained from levee setbacks.	Water quality –sediment removal, temperature regulation. Water quantity–water storage, flooding. Habitat–structure for habitat life needs (e.g., low LWM, stream bed aggradation, river mouth progradation).	Impairs natural flooding regime. Reduces floodplain sediment retention, denitrification and hyporheic functions. Decreases groundwater storage and base flows. Interferes with formation of habitat structure such as distributary channels in tidal and riparian and in-channel and off-channel habitat in freshwater settings. Removes habitat structure for nesting, rearing, refuge and foraging.	Can change in habitat quality as a result of levee/dikes be easily measured? Various types and locations of levees & dikes are lumped together. Types of openings in levees and dikes vary; impacts may vary.	Rural, urban.	Measure increase/decrease in lineal feet, quality of levee related to riparian vegetation & slope. Is data from local governments or FEMA?
Floodplain area: Acres allowed to flood –tidal and river (lack of flood control and lack of other structures such as houses.)	Water quality – removal of toxics, sediment, phosphorous and pathogens through adsorption, filtration and retention. Removal of nitrogen through	Impairment similar to that for levees & dikes with loss of floodplain from diking & filling.	Availability of data, maintenance of data.	Rural, urban.	Do local governments measure this for shoreline inventory? FEMA floodplain info available.

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS					
Indicator (all in shoreline jurisdiction)	**Functions affected – key categories – water quality, water quantity and habitat**	**Type of Impairment****	**Limitations of indicator**	**Where**	**Is data available or reasonable to obtain**
	denitrification. Temperature regulation. Water quantity – water storage and flow regulation and reduction in downstream flooding. Habitat - formation of habitat structure from LWM, vegetation communities and sediment type/channel configuration that support habitat life needs. Input of organics and prey base.				
Number of bald eagle & osprey nests & roosts & great blue heron rookeries.	Habitat – structure for habitat life needs.	Indicator of impaired habitat.	More suitable for counties than cities.	Rural.	WDFW data – most up-to-date for eagles.
Percent cover of invasive species in riparian zones.	Habitat – Riparian and aquatic habitat, sediment supply. Input of organics & LWM. Structure for habitat life needs.	Overwhelms native plants, compromising ecosystem. Potential effect on physical structure and food web dynamics.	Requires field work. May be useful if data set is available. Use Noxious Weeds list to define invasive species?	Rural, urban.	Is data available? Conservation districts? WA Invasive Species Council? (working on baseline assessment due in May 2011)
Impervious surface area.	Water quality – removal of toxics, sediment, phosphorous and	Reduces vegetative buffers and decreases filtering of	Covered by other indicators? Percentage increase in developed	Urban	Aerial photos or other remote sensing techniques show

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
	pathogens through adsorption, filtration and retention. Removal of nitrogen through denitrification. Temperature regulation. Water quantity – water storage and flow regulation and reduction in downstream flooding. Habitat - formation of habitat structure from LWM, vegetation communities and sediment type/channel configuration that support habitat life needs. Input of organics.	pollutants from surface & subsurface flow. Alters the delivery and timing of water to aquatic areas, increasing quantity of water and pollutants delivered to aquatic habitats during high and low flows, which affects habitat structure. Increases water temperature Reduces prey base (by associated removal of vegetation) Loss of nesting sites, rearing, refuge & foraging areas.	urban areas would be small and may not be useful indicator. Some land surface cover layers are inaccurate, e.g. showing impervious for clearcut forest.		impervious cover. Local governments require new impervious information in permit applications.
Wetlands acreage: Fill of natural wetlands and constructed or engineered wetlands. This includes nearshore tidal estuaries.	Water Quality – Wetlands filter pollutants and store sediment. Water Quantity – Affect groundwater storage and flow regulation. Habitat – Affects habitat structure, results in loss of wetland vegetation	Changes to natural hydrological, chemical, and physical regimes affect the production and succession of a wetland's ecology, and therefore its functions and values.	Difficult to track. Could be covered in other indicators (impervious surface and water quality), however other indicators don't get at wetland conversion to non-impervious land use such as landscaping or	Rural, urban	Is data available? Local permit tracking? Ecology? Core of Engineers?

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
	communities that support habitat life needs.		agriculture. May require field work.		
Area of seagrasses, kelp and emergent aquatic vegetation.	Habitat – structure for habitat life needs, including food and shelter for many species.	Decreases in aquatic vegetation such as eelgrass and kelp results in loss of food and shelter for many species.	Multiple factors affect growth and sustainability of aquatic vegetation.	Aquatic	Seagrass, kelp and emergent aquatic vegetation data along shoreline available from DNR Shorezone. (1994-2000) More recent local data available at those sites that are among the stratified randomly sampled sites.

* LWM – Large Woody Material

** For some indicators, decreasing the length or area of the indicator would result in a benefit to shoreline functions (e.g., shoreline stabilization, piers & docks.) For other indicators, increasing the length or area of the indicator would result in a benefit to functions (e.g. forest cover, riparian vegetation.)

*** Rural includes rural residential, agricultural and forestry areas.

CCAP – Coastal Change Analysis Program

NGO – Non-government organization

PBRS – Public Benefit Rating System

NRCS – National Resource Conservation Service

Inventory provides baseline

A baseline of shoreline ecological conditions is necessary in order to use indicators. You need a starting point. Fortunately, the shoreline inventory and characterization provide the baseline for measuring no net loss. The best time to collect data related to the indicators is during the shoreline inventory.

Some local governments have completed their inventory, and don't plan on collecting new data in the near future. Existing inventory data should provide good information for some of the indicators – impervious surfaces, levees and dikes, shoreline stabilization, floodplains, vegetation, overwater structures – as they are required as part of the inventory, to the extent that such information is available.

If you are working on the inventory now or will be in the future

Look at the indicators list. Consider what you now know about your shorelines. Are you aware of extensive riparian vegetation, a large number of eagle nests, water quality problems or limited shoreline armoring? Would these indicators be able to be counted as part of the inventory and tracked over time? What about other indicators? As you work on the inventory, keep the potential indicators in mind. If you find out there aren't any eagle nests, they would not be a good indicator for your community. If you learn there are many feet of roads in shoreline jurisdiction, and there are also long-term plans to remove some road lengths, road length may be a good indicator. Keep in mind that data about the indicators needs to be available now and in the future.

If your inventory is complete

Look at the indicators list. Consider your shoreline conditions and the inventory information that you have available. Are several of the indicators on the list reflected in your inventory? Does your inventory include the amount of shoreline stabilization or overwater structures such as piers and docks (this information is commonly included in inventories.) If so, you can choose several indicators from the list. If Ecology's potential indicators are not applicable to your shorelines, what inventory information could be useful as one or more indicators?

Selecting other indicators

If Ecology's potential indicators are not appropriate for your shoreline, you may develop your own. Your local government may have data specific to your shorelines that could be useful for indicators. These indicators should be relevant to the regulatory authority that your local government has over factors that affect the indicators. If an upstream city's activities have significant effects on water quality along your shoreline, then water quality is not an appropriate indicator to measure net loss or gain that can be attributed to your local government's actions. When determining what indicators to use, consider the following criteria:

- Data are available, reliable and can be gathered in a consistent manner over time. Note that data may be specific for some areas and not available for other areas

within your jurisdiction. Example, current eelgrass data are available for some nearshore areas and not others.

- The data selected for measurement provide an indication of ecological function within shoreline jurisdiction.
- Indicators are relevant to implementation of local policies and regulations. The number of orcas that pass by offshore is not a reflection of your local SMP's effectiveness, as orcas can range through the waters of many jurisdictions, even going out of state or country.
- Data have the potential to show change over a relatively short time period.
- Indicators are used by other agencies such as the Puget Sound Partnership.

An indicator may be present throughout your shoreline jurisdiction, such as impervious surfaces in urban areas, or limited to one or several shoreline reaches, such as freshwater riparian vegetation. A small percent reduction of impervious surfaces throughout shoreline jurisdiction could have significant positive effects on shoreline functions. On the other hand, the loss of riparian vegetation in one or several reaches could have significant detrimental impacts on shoreline functions. You could choose one or two indicators that occur throughout shoreline jurisdiction and several other indicators that occur in one or several reaches where a gain or loss represents a substantial change to shoreline functions.

Choosing appropriate indicators

Choose indicators that represent habitat, water quantity and water quality in your community. For example, shoreline stabilization affects habitat; forest cover affects habitat, water quantity and water quality; and the 303(d) list reflects water quality. This combination of indicators, if they adequately represent your shorelines, would be good to track.

The indicators you choose should take into account the anticipated future development along your shorelines. Projecting "reasonably foreseeable future development and use of the shoreline" is part of the Cumulative Impacts Analysis. If you expect that urban, suburban or high intensity development will occur along the shoreline, consider indicators related to such development. These may include impervious surface area, shoreline stabilization, overwater structures, riparian vegetation, road lengths or invasive species, among others.

Figure 4-4: Riparian vegetation, overwater structures and impervious surfaces are potential indicators of no net loss.

Keep in mind any restoration that you expect to occur. If your plans call for removing bulkheads and restoring habitat, appropriate indicators might be riparian vegetation, eagle and osprey nests, and the length of shoreline armoring.

Avoid choosing an indicator that does not represent your shoreline, for example, forest cover if forest cover would not occur naturally. Avoid choosing several indicators that may represent the same impacts on ecological function – e.g., riparian vegetation in a relatively undeveloped area, and acres of permanently protected areas in the same location.

Tracking indicators

Develop a process and method to track the indicators. The SMP Guidelines state, "Master programs or other local permit review ordinances addressing shoreline project review shall include a mechanism for documenting all project review actions in shoreline areas. Local governments shall also identify a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions. This process could involve a joint effort by local governments, state resource agencies, affected Indian tribes, and other parties" **[**WAC 173-26-191(2)(a)(iii)(D)].

Tracking your indicators can help you determine whether you are achieving no net loss. Determine how often you will measure your indicators – annually, when you update your SMP, or something in between? What do the indicators tell you compared with the baseline? How will the information be analyzed? Figure out early what you will be looking for, how it will be measured, and what it might mean.

Some options for tracking indicators:

- Track through the permit process. This may work for some development features, such as impervious surface coverage, length of bulkheads, and vegetation clearing. Developments that are exempt from the requirements for a Shoreline Substantial Development permit usually need local building or other permits. How often will these be checked? Can you keep a running tally, or run a software program annually?
- Track through local data that is updated regularly.
- Track through state or federal or other data sources. Who in your department will follow up, and when should that happen? (Refer to the indicators table for potential data sources.)
- Track changes through aerial photos or shoreline field visits, on land and water. Identify the process you will use.

Reporting use of indicators

The SMP Guidelines require local governments to show how NNL will be achieved, although specific indicators are not required. However, you are required to show in the Cumulative Impacts Analysis and No Net Loss report how the SMP will achieve no net loss when implemented over time. Your choice of indicators, rationale for choosing them, and explanation of how they will be tracked and evaluated should be discussed in these reports. Your SMP also can discuss how you will use indicators to show whether you are achieving no net loss.

Shoreline Master Program Guidelines

SMP Guidelines specifically addressing No Net Loss

WAC 173-26-186

(8) Through numerous references to and emphasis on the maintenance, protection, restoration, and preservation of "fragile" shoreline "natural resources," "public health," "the land and its vegetation and wildlife," "the waters and their aquatic life," "ecology," and "environment," the act makes protection of the shoreline environment an essential statewide policy goal consistent with the other policy goals of the act. It is recognized that shoreline ecological functions may be impaired not only by shoreline development subject to the substantial development permit requirement of the act but also by past actions, unregulated activities, and development that is exempt from the act's permit requirements. The principle regarding protecting shoreline ecological systems is accomplished by these guidelines in several ways, and in the context of related principles. These include:

(a) Local government is guided in its review and amendment of local master programs so that it uses a process that identifies, inventories, and ensures meaningful understanding of current and potential ecological functions provided by affected shorelines.

(b) Local master programs shall include policies and regulations designed to achieve **no net loss** of those ecological functions.

(i) Local master programs shall include regulations and mitigation standards ensuring that each permitted development **will not cause a net loss** of ecological functions of the shoreline; local government shall design and implement such regulations and mitigation standards in a manner consistent with all relevant constitutional and other legal limitations on the regulation of private property.

(ii) Local master programs shall include regulations ensuring that exempt development in the aggregate **will not cause a net loss** of ecological functions of the shoreline.

SMP Guidelines generally addressing environmental protection and related to No Net Loss

Scientific and technical information

WAC 173-26-201(2)(a)
(a) **Use of scientific and technical information.** To satisfy the requirements for the use of scientific and technical information in RCW 90.58.100(1), local governments shall incorporate the following two steps into their master program development and amendment process.

First, identify and assemble the most current, accurate, and complete scientific and technical information available that is applicable to the issues of concern. The context, scope, magnitude, significance, and potential limitations of the scientific information should be considered. At a minimum, make use of and, where applicable, incorporate all available scientific information, aerial photography, inventory data, technical assistance materials, manuals and services from reliable sources of science….

Second, base master program provisions on an analysis incorporating the most current, accurate, and complete scientific or technical information available. Local governments should be prepared to identify the following:

(i) Scientific information and management recommendations on which the master program provisions are based;

(ii) Assumptions made concerning, and data gaps in, the scientific information; and

(iii) Risks to ecological functions associated with master program provisions. Address potential risks as described in WAC 173-26-201 (3)(d).

Shoreline ecological functions

WAC 173-26-201(3)(d)(i):
(C) Shoreline ecological functions include, but are not limited to:

In rivers and streams and associated flood plains:

Hydrologic: Transport of water and sediment across the natural range of flow variability; attenuating flow energy; developing pools, riffles, gravel bars, recruitment and transport of large woody debris and other organic material.

Shoreline vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, sediment removal and stabilization; attenuation of flow energy; and provision of large woody debris and other organic matter.

Hyporheic functions: Removing excessive nutrients and toxic compound, water storage, support of vegetation, and sediment storage and maintenance of base flows.

Habitat for native aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction; resting, hiding and migration; and food production and delivery.

In lakes:

Hydrologic: Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, recruitment of large woody debris and other organic material.

Shoreline vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, attenuating wave energy, sediment removal and stabilization; and providing woody debris and other organic matter.

Hyporheic functions: Removing excessive nutrients and toxic compound, water storage, support of vegetation, and sediment storage and maintenance of base flows.

Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery.

In marine waters:

Hydrologic: Transporting and stabilizing sediment, attenuating wave and tidal energy, removing excessive nutrients and toxic compounds; recruitment, redistribution and reduction of woody debris and other organic material.

Vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, attenuating wave energy, sediment removal and stabilization; and providing woody debris and other organic matter.

Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery.

Wetlands:

Hydrological: Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, recruiting woody debris and other organic material.

Vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, attenuating wave energy, removing and stabilizing sediment; and providing woody debris and other organic matter.

Hyporheic functions: Removing excessive nutrients and toxic compound, storing water and maintaining base flows, storing sediment and support of vegetation.

Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery.

(D) The overall condition of habitat and shoreline resources are determined by the following ecosystem-wide processes and ecological functions:

The distribution, diversity, and complexity of the watersheds, marine environments, and landscape-scale features that form the aquatic systems to which species, populations, and communities are uniquely adapted.

The spatial and temporal connectivity within and between watersheds and along marine shorelines. Drainage network connections include flood plains, wetlands, upslope areas, headwater tributaries, and naturally functioning routes to areas critical for fulfilling life history requirements of aquatic and riverine-dependent species.

The shorelines, beaches, banks, marine near-shore habitats, and bottom configurations that provide the physical framework of the aquatic system.

The timing, volume, and distribution of woody debris recruitment in rivers, streams and marine habitat areas.

The water quality necessary to maintain the biological, physical, and chemical integrity of the system and support survival, growth, reproduction, and migration of individuals composing aquatic and riverine communities.

The sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

The range of flow variability sufficient to create and sustain fluvial, aquatic, and wetland habitats, the patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows, and duration of flood plain inundation and water table elevation in meadows and wetlands.

The species composition and structural diversity of plant communities in river and stream areas and wetlands that provides summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of woody debris sufficient to sustain physical complexity and stability.

(E) Local governments should use the characterization and analysis called for in this section to prepare master program policies and regulations designed to achieve **no net loss** of ecological functions necessary to support shoreline resources and to plan for the restoration of the ecosystem-wide processes and individual ecological functions on a comprehensive basis over time.

Precautionary principle

WAC 173-26-201(3)(g)
The level of detail of inventory information and planning analysis will be a consideration in setting shoreline regulations. 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. If there is a question about the extent or condition of an existing ecological

resource, then the master program provisions shall be sufficient to reasonably assure that the resource is protected in a manner consistent with the policies of these guidelines.

Mitigation sequencing

WAC 173-26-201(2)
(e) **Environmental impact mitigation.**

(i) To assure **no net loss** of shoreline ecological functions, master programs shall include provisions that require proposed individual uses and developments to analyze environmental impacts of the proposal and include measures to mitigate environmental impacts not otherwise avoided or mitigated by compliance with the master program and other applicable regulations. To the extent Washington's State Environmental Policy Act of 1971 (SEPA), chapter 43.21C RCW, is applicable, the analysis of such environmental impacts shall be conducted consistent with the rules implementing SEPA, which also address environmental impact mitigation in WAC 197-11-660 and define mitigation in WAC 197-11-768. Master programs shall indicate that, where required, mitigation measures shall be applied in the following sequence of steps listed in order of priority, with (e)(i)(A) of this subsection being top priority.

(A) Avoiding the impact altogether by not taking a certain action or parts of an action;

(B) Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts;

(C) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

(D) Reducing or eliminating the impact over time by preservation and maintenance operations;

(E) Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and

(F) Monitoring the impact and the compensation projects and taking appropriate corrective measures.

(ii) In determining appropriate mitigation measures applicable to shoreline development, lower priority measures shall be applied only where higher priority measures are determined to be infeasible or inapplicable.

Consistent with WAC 173-26-186 (5) and (8), master programs shall also provide direction with regard to mitigation for the impact of the development so that:

(A) Application of the mitigation sequence achieves **no net loss** of ecological functions for each new development and does not result in required mitigation in excess of that necessary to assure that development will result in **no net loss** of shoreline ecological functions and not have a significant adverse impact on other shoreline functions fostered by the policy of the act.

(B) When compensatory measures are appropriate pursuant to the mitigation priority sequence above, preferential consideration shall be given to measures that replace the impacted functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive resource management plans applicable to the area of impact may be authorized. Authorization of compensatory mitigation measures may require appropriate safeguards, terms or conditions as necessary to ensure **no net loss** of ecological functions.

Shoreline inventory and characterization

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 water-oriented uses and related navigation, transportation and utility facilities.

(ii) Critical areas, including wetlands, aquifer recharge areas, fish and wildlife conservation areas, geologically hazardous areas, and frequently flooded areas. See also WAC 173-26-221.

(iii) Degraded areas and sites with potential for ecological restoration.

(iv) Areas of special interest, such as priority habitats, developing or redeveloping harbors and waterfronts, previously identified toxic or hazardous material clean-up sites, dredged material disposal sites, or eroding shorelines, to be addressed through new master program provisions.

(v) Conditions and regulations in shoreland and adjacent areas that affect shorelines, such as surface water management and land use regulations. This information may be useful in achieving mutual consistency between the master program and other development regulations.

(vi) Existing and potential shoreline public access sites, including public rights of way and utility corridors.

(vii) General location of channel migration zones, and flood plains.

(viii) Gaps in existing information. During the initial inventory, local governments should identify what additional information may be necessary for more effective shoreline management.

(ix) If the shoreline is rapidly developing or subject to substantial human changes such as clearing and grading, past and current records or historical aerial photographs may be necessary to identify cumulative impacts, such as bulkhead construction, intrusive development on priority

habitats, and conversion of harbor areas to nonwater-oriented uses.

(x) If archaeological or historic resources have been identified in shoreline jurisdiction, consult with the state historic preservation office and local affected Indian tribes regarding existing archaeological and historical information.

WAC 173-26-201(3)(d)
Analyze shoreline issues of concern. Before establishing specific master program provisions, local governments shall analyze the information gathered in (c) of this subsection and as necessary to ensure effective shoreline management provisions, address the topics below, where applicable.

(i) **Characterization of functions and ecosystem-wide processes.**
(A) Prepare a characterization of shoreline ecosystems and their associated ecological functions. The characterization consists of three steps:

(I) Identify the ecosystem-wide processes and ecological functions based on the list in (d)(i)(C) of this subsection that apply to the shoreline(s) of the jurisdiction.

(II) Assess the ecosystem-wide processes to determine their relationship to ecological functions present within the jurisdiction and identify which ecological functions are healthy, which have been significantly altered and/or adversely impacted and which functions may have previously existed and are missing based on the values identified in (d)(i)(D) of this subsection; and

(III) Identify specific measures necessary to protect and/or restore the ecological functions and ecosystem-wide processes.

Use analysis

WAC 173-26-201(3)(d)
(ii) **Shoreline use analysis and priorities.** Conduct an analysis to estimate the future demand for shoreline space and potential use conflicts. Characterize current shoreline use patterns and projected trends to ensure appropriate uses consistent with chapter 90.58 RCW and WAC 173-26-201 (2)(d) and 173-26-211(5).

If the jurisdiction includes a designated harbor area or urban waterfront with intensive uses or significant development or redevelopment issues, work with the Washington state department of natural resources and port authorities to ensure consistency with harbor area statutes and regulations, and to address port plans. Identify measures and strategies to encourage appropriate use of these shoreline areas in accordance with the use priorities of chapter 90.58 RCW and WAC 173-26-201 (2)(d) while pursuing opportunities for ecological restoration.

Cumulative Impacts

WAC 173-26-186

(d) Local master programs shall evaluate and consider cumulative impacts of reasonably foreseeable future development on shoreline ecological functions and other shoreline functions fostered by the policy goals of the act. To ensure **no net loss** of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts among development opportunities. Evaluation of such cumulative impacts should consider:

(i) Current circumstances affecting the shorelines and relevant natural processes;

(ii) Reasonably foreseeable future development and use of the shoreline; and

(iii) Beneficial effects of any established regulatory programs under other local, state, and federal laws.

It is recognized that methods of determining reasonably foreseeable future development may vary according to local circumstances, including demographic and economic characteristics and the nature and extent of local shorelines.

(e) The guidelines are not intended to limit the use of regulatory incentives, voluntary modification of development proposals, and voluntary mitigation measures that are designed to restore as well as protect shoreline ecological functions.

Restoration Planning

WAC 173-26-186(8)
(c) For counties and cities containing any shorelines with impaired ecological functions, master programs shall include goals and policies that provide for restoration of such impaired ecological functions. These master program provisions shall identify existing policies and programs that contribute to planned restoration goals and identify any additional policies and programs that local government will implement to achieve its goals. These master program elements regarding restoration should make real and meaningful use of established or funded nonregulatory policies and programs that contribute to restoration of ecological functions, and should appropriately consider the direct or indirect effects of other regulatory or nonregulatory programs under other local, state, and federal laws, as well as any restoration effects that may flow indirectly from shoreline development regulations and mitigation standards.

WAC 173-26-201(2)(f)
Shoreline restoration planning. Consistent with principle WAC 173-26-186 (8)(c), master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program. The approach to restoration planning may vary significantly among local jurisdictions, depending on:

- The size of the jurisdiction;

• The extent and condition of shorelines in the jurisdiction;

• The availability of grants, volunteer programs or other tools for restoration; and

• The nature of the ecological functions to be addressed by restoration planning.

Master program restoration plans shall consider and address the following subjects:

(i) Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration;

(ii) Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;

(iii) Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals;

(iv) Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs;

(v) Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals;

(vi) Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals.

Specific Shoreline Activity and Use Standards

Numerous additional specific references exist in the SMP Guidelines, requiring SMP regulations resulting in **no net loss** of shoreline ecological functions. Specific shoreline activity standards referencing NNL are located at:

WAC 173-26-221(2)(c)(ii)(C) and (D): Geologically hazardous areas.
WAC 173-26-221(2)(c)(iii)(C): Critical saltwater habitats
WAC 173-26-221(2)(c)(iv)(C): Critical freshwater habitats
WAC 173-26-221(3): Flood hazard reduction
WAC 173-26-221(4)(d): Public access
WAC 173-26-221(5): Shoreline vegetation conservation
WAC 173-26-221(6): Water quality, storm water and nonpoint pollution

WAC 173-26-231: Shoreline modifications, including shoreline stabilization, piers and docks, fill, breakwaters, jetties, groins and weirs, beach and dunes management, dredging and dredge material disposal, shoreline habitat and natural systems-enhancement projects.

Specific shoreline use standards referencing NNL are located at:

WAC 173-26-241(2)(a)(iv), addressing the following uses:
Agriculture
Aquaculture
Boating facilities
Commercial development
Forest practices
Industry
In-stream structural uses
Mining
Recreational development
Residential development
Transportation and parking
Utilities

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To: San Juan County Council and Planning Commission
From: Stephanie Buffum, Executive Director, Friends of the San Juans
Date: August 13, 2018
Re: August 17, 2018 San Juan County Council Special Meeting and Joint Public Hearing with the Planning Commission to Hear Testimony on Proposed Amendments to San Juan County Code Chapter 18.50 Shoreline Regulations

Friends of the San Juans respectfully submits the following comments on San Juan County's response to the Western Washington Region Growth Management Hearings Boards' Final Decision and Order Case No. 17-2-0009 (GMHB FDO) regarding compliance of San Juan County's Shoreline Master Program (SMP) update. Since 2011, Friends of the San Juans has been providing review and comment on all phases of the SMP update. In 2017 we appealed several provisions of the adopted SMP for its failure to comply with the law and to ensure no net loss of ecological functions.

From the beginning, our comments have advocated for getting it right, not just getting it done. Stewardship of the County's marine shorelines is among the most important actions we can take as a community to support the recovery of Chinook salmon and the Southern Resident Killer Whales, as well as preserving the physical and aesthetic qualities of the natural San Juan shorelines that are so integral to our sense of place for residents and visitors alike (see RCW 90.58.020). Since the 1998 SMP update, both Puget Sound Chinook salmon and Southern Resident Killer Whales have been listed under the Endangered Species Act.

This joint public hearing is taking place while the world is witnessing the plight of the critically endangered Southern Resident Killer Whales. We have witnessed J35 mourning for and carrying her dead calf. We witness J50 who is sick and emaciated. We know that Southern Resident Killer Whales don't have enough Chinook salmon to eat and that their ability to communicate and hunt for scarce prey is impacted by vessel noise and disturbance. We are working to reduce vessel traffic noise and disturbance impacts on of the Vessels Working Group of the Governor's Southern Resident Killer Whale Recovery and Task Force as they are out of the scope of the SMP. We are also advocating directly with the Task Force to address prey availability. However, there is much that San Juan County can do to address prey availability for Southern Resident Killer Whales in this SMP compliance process.

With over 400 miles of marine shorelines, the Shoreline Master Program provides the most significant opportunity for San Juan County to support the recovery of Chinook salmon and Southern Resident Killer Whales. The revisions to the SMP regulations will guide how San Juan County protects habitat and processes critical to local and regional ecosystem recovery for decades to come.

We thank Councilmember Jamie Stephens for his service on the Governor's Southern Resident Killer Whale Recovery and Task Force. At the August 7th task force meeting he said, "Nothing will get better with the status quo," and, "I would ask that we all step back, step out of your positions, and decide if you were the master of the universe what would you do to fix this situation."

The San Juan County Council, with recommendations from the Planning Commission, is the master of the universe in this SMP compliance process, and you have the ability to do better than the status quo. Your decisions in this SMP compliance process affect the most significant stressor to the Southern Residents: getting enough to eat. We urge you to take this task of achieving compliance seriously and do the required work to thoroughly address the three issues identified in the GMHB DFO as noncompliant.

Because San Juan County's beaches and eelgrass meadows support the forage fish that feed the Chinook salmon that feed the Southern Residents, we have spent over seven years advocating for their protection. We also were co-petitioners on the SRKW Endangered Species Act petition in 2001. We have been active on salmon recovery efforts since 1998. Twenty of twenty-two stocks of Puget Sound Chinook salmon and numerous stocks of Chinook from the Fraser River and the Georgie Strait rivers use the marine shorelines of the San Juan Islands as essential rearing and feeding habitat. Protecting and enhancing San Juan County's forage fish spawning beaches and forage fish and Chinook rearing habitats are critical to sustaining and increasing the Southern Resident Killer Whales' food availability.

Public comments throughout the SMP process were heavily weighted towards those seeking improved protections. The international spotlight is on our community, watching to see if bold action will be taken. While the areas of change demanded by the growth board are few in number, they do have the potential to significantly impact the success of the SMP to achieve or even attempt to achieve no net loss of ecological functions and values and avoid the incremental losses foreseen by the state's public when it was adopted by the people in 1972; "There is, therefore, a clear and urgent demand for a planned, rational, and concerted effort,…to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines." (RCW 90.58.020)

Friends of the San Juans is concerned that San Juan County doesn't fully appreciate or address the appropriate level of detail in the proposed ordinance revisions to comply with the primary requirement addressed in the GMHB FDO: ensure that there is no net loss (NNL) of ecological functions. For example, the July 2, 2018 staff briefing to the San Juan County Council and Planning Commission and the July 30, 2018 staff report includes no mention of no net loss. The GMHB FDO includes "no net loss" or the abbreviation "NNL" 31 times.

Friends of the San Juans recognizes that members of the Planning Commission and County Council cannot be expected to be immersed in the full details of the complex issues addressed in the GMHB FDO. You are faced with a voluminous record for this compliance process. We urge to first and foremost give your attention to the detail explanations of the relevant issues

provided in the GMHB FDO (Issue No. 2, pages 13 – 18; Issue No. 4, pages 22 – 27; Issue No. 7, pages 31 – 35).

Specific comments on the three substantive areas requiring revision are provided below, including the GMHB FDO findings of fact and suggested revisions to the draft ordinance to ensure compliance with the GMHB FDO, including:

A. GMHB FDO Issue No. 2 Environmental Impact Mitigation: requirement for alternative compensatory mitigation to occur within the same watershed as the impact (WAC 173-26-201(2)(e)(ii)(B)) as addressed in Section 3 of the draft ordinance;

B. GMHB FDO Issue No. 4 Shoreline Stabilization: requirement for tightening of both the allowance criteria for new or expanded soft armoring and the definition of soft shore armoring (RCW 90.58.020, WAC 173-26-231(3)(a)(iii)(B) and WAC 173-26-231(3)(a)(ii)) as addressed in Sections 1, 4, 5, and 6 of the draft ordinance; and

C. GMHB FDO Issue No. 7 Evaluation of the Cumulative Impacts of Authorized Development: requirement to develop and implement a mechanism for documenting all project review actions in shoreline areas and process for periodically evaluating the cumulative effects of authorized development on shoreline conditions (WAC 173-26-191(2)(a)) as addressed in Section 2 of the draft ordinance.

We look forward to San Juan County's timely and thorough completion of the required updates to the SMP.

Friends of the San Juans Comments on San Juan County's response to the Western Washington Region Growth Management Hearings Boards' Final Decision and Order Case No. 17-2-0009

A. ***GMHB FDO Issue No. 2 Environmental Impact Mitigation: requirement for alternative compensatory mitigation to occur within the same watershed as the impact (WAC 173-26-201(2)(e)(ii)(B))***. A***ddressed in Section 3 of the draft ordinance.***

The Growth Board order states that mitigation on the same island is not sufficient to meet the requirements of the WAC for mitigation sequencing:

> While the County's regulations do give "preferential consideration" to mitigation in the direct or immediate vicinity, the WAC does not authorize mitigation "on the same island" (unless that island was within a single watershed) or potentially at an in-lieu mitigation site not within the same watershed. As the Petitioner points out, the San Juan islands include numerous watersheds. DOE's statement that the Guidelines do not require mitigation within the same watershed is inaccurate. WAC 173-26-201(2)(e)(ii)(B) clearly provides that location within the same watershed is a fallback from siting mitigation directly or in the immediate vicinity.
> (GMHB FDO page 17 line 4)

> San Juan County's decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, specifically those regulations relating to mitigation for adverse impacts to shoreline ecological functions beyond the watershed of the anticipated impacts, failed to comply with the policies of the Shoreline Management Act and Shoreline Master Program Guidelines.
> (GMHB FDO page 17 line 15)

The board goes on to include the specific language that is not satisfied:

> WAC 173-26-201(2)(E)(ii)(B) provides:
>
> > When compensatory measures are appropriate pursuant to the mitigation priority sequence above, <u>preferential consideration shall be given to measures that replace the impacts functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed</u> that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive plans applicable to the area of impact <u>may be authorized</u>. … (emphasis added)
> > (GMHB FDO page 16 line 15)

The County's proposed solution, inclusion of a reference to a single, incomplete stormwater basin map is insufficient. The proposed map lacks basin delineations for major portions of the county, including all of the outer islands and Shaw Island, and revised language fails to reference any watershed or resource plans that will be used to ensure adequate mitigation is

selected within the watershed as required. As a result, additional changes to the ordinance beyond those currently recommended by the staff are needed to achieve compliance.

The County must provide an updated map, with similarly scaled basins delineated on all County islands where development can occur. Currently, only Lopez, Orcas, and San Juan are mapped. In addition, the WAC clearly states that these actions must address a critical need identified in a watershed or resource management plan. The county fails to address this component of the WAC and provides no evidence of such watershed plans. Plans must be specifically referenced in the ordinance along with a complete map. The County's watersheds for Lopez, Orcas, and San Juan Islands are identified in the San Juan County Stormwater Basin Planning report dated June 26, 2014.

The compliance process outlined in the July 2, 2018 staff briefing and the July 30, 2018 staff report identifies no additional work that has been completed or is in progress on the necessary watershed mapping in order to comply with Issue No. 2 of the GMHB FDO. This failure to fully address even this most straightforward and simple element of the GMHB FDO is further evidence of the County's lack of seriousness and sincere intent to achieve compliance and meet the required standards of no net loss in this compliance process.

Friends of the San Juans proposes changes to the draft ordinance, including the language from WAC 173-26-201 (2)(E)(ii)(B) which more accurately achieves compliance:

> Preferential consideration shall be given to measures that replace the impacts to functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive plans applicable to the area of impact may be authorized.

Recommended changes to Section 3 of the draft ordinance (in red):

Section 3. Amends SJCC 18.50.140 (C) Mitigation of adverse impacts to shoreline ecological functions:

C. Preferential consideration shall be given to measures that replace the impacts to functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive plans applicable to the area of impact may be authorized. ~~When feasible, adverse impacts are to be mitigated on site. If off-site mitigation is proposed, the mitigation site must be located on the same island, as close as feasible to within the stormwater watershed of the development site.~~ A map of the County's stormwater watersheds for all County islands where development could occur and watershed reports from the San Juan County Stormwater Basin Planning report dated ~~June 26, 2014~~ is available on the County's web portal for GIS data and maps.

B. Issue Four Shoreline Stabilization: requirement for tightening of both the allowance criteria for new or expanded soft shoreline stabilizations and the definition of soft shoreline stabilization (RCW 90.58.020, WAC 173-26-

231(3)(a)(iii)(B) and WAC 173-26-231(3)(a)(ii)). Addressed in Sections 1, 4, 5, and 6 of the draft ordinance.

> The Growth Management Hearings Board finds and concludes that San Juan County's decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, specifically regulations relating to the standards applicable to the allowance of hard and soft shoreline structural modifications and the inclusion of hard materials in soft shoreline stabilization design, fails to comply with the policies of RCW 90.58.020 and the requirements of WAC 173-26-231(3)(a)(iii)(B) and WAC 173-26-231(3)(a)(ii).
> (GMHB FDO page 26 line 17)

GMHB FDO Issue No. 4 Shoreline Stabilization part 1: Allowance of hard and soft shoreline structural modifications:

> The Board observes that the SMP's standards for allowance of new or enlarged[106] stabilization differ significantly from that of WAC 173-26-231(3)(a)(iii)(B). The Guideline states that new or enlarged stabilization measures to protect existing primary structures, whether soft or hard, "should not be allowed unless there is [documented] conclusive evidence that the structure is in danger from shoreline erosion . . .". The SMP, in contrast, allows new, replaced or enlarged hard and soft stabilization when there is a "significant possibility that the development will be damaged".[107] A "significant possibility" standard falls far short of "conclusive evidence" as required by the rule. The Petitioner has met its burden of proof to establish that the Update's shoreline stabilization provisions as specifically addressed above violate WAC 173-26-231(3)(a)(iii)(B).
> (GMHB FDO page 24, line 8)

The relevant WAC does not treat hard shoreline stabilization and soft shoreline stabilization differently with regard to the allowance criteria. San Juan County has not provided any rationale for doing so. The proposed solution of a geotechnical report required for soft shoreline stabilization needs to include a timeframe for the expected damage to occur, as is required for hard shoreline armoring. We also request that the county's ordinance update include all the text in the relevant section on allowance criteria, the proposed changes leave off the third criterion (Section 4.C.3. included below). It should also be noted that previous to this recently adopted SMP, the county's shoreline stabilization allowance criteria treated soft and hard shoreline stabilization the same and returning to this standard will achieve compliance without tightening restrictions as the recent update loosened the regulations regarding the allowance of soft shore projects.

Friends of the San Juans recommends text changes that include language taken directly from WAC 173-26-231(3)(a)(iii)(B) (addition of existing primary structure in 4C in the ordinance) as well as language to tighten the allowance criteria as ordered by the GMHB (Section 6. Amends SJCC 18.50.420(3) and (4)).

Recommended changes to Section 4 of the draft ordinance (in red):

Section 4. Amends SJCC 18.50.350 Hard and soft structural shoreline stabilization measures – General regulations:

C. New, replaced, or enlarged soft structural shoreline stabilization measures for an existing primary structure ~~may~~ are not ~~be~~ allowed unless there is conclusive evidence documented by a geotechnical analysis~~,~~ that the structure is in danger within three years as a result of ~~from~~ shoreline ~~when there is a significant possibility that development will be damaged as a result of~~ erosion caused by tidal action, waves ~~and~~ or currents.

1. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not demonstration of need.

2. The geotechnical analysis should evaluate on-site drainage issues and address drainage problems away from the shoreline edge before considering structural shoreline stabilization.

3. The erosion control structure will not result in a net loss of shoreline ecological functions.

As the relevant WAC provides no distinction between soft and hard armoring, Friends of the San Juans recommends that San Juan County's SMP also maintain that consistency for all shoreline stabilization projects by adding language to the soft shoreline stabilization Section 6.4. Alternatively, Section 6.3. and Section 6.4 could be reduced to one section, for all structural shoreline stabilization (hard and soft) projects to simplify the ordinance.

Friends has been making the point throughout the SMP comment period that all structural stabilization techniques have impacts, and the rationale that supports treating them the same in allowance sections of the code is addressed in the growth board order as well as the Washington Administrative Code (WAC):

> However, the Petitioner appropriately takes exception to the County's statement that since "forage fish spawning areas are seaward of the OHWM, the SMP does not allow shoreline armoring "on" forage fish habitat". Armoring, whether it is hard or soft, and even when located above the OHWM, can result in impacts to shoreline ecological functions, including forage fish spawning areas, and it is those impacts which the SMA seeks to address (WAC 173-26-231(3)(a)(ii)). (GMHB FDO page 25 line 14)

Recommended changes to Section 6 of the draft ordinance (in red):

Section 6. Amends SJCC 18.50.420(3) and (4) for consistency - Hard or soft shoreline stabilization measures – Additional submittal requirements:

3. A geotechnical analysis for hard structural shoreline stabilization measures documenting that without the proposal there is ~~a significant possibility~~ conclusive evidence that development will be damaged within three years as a result of erosion caused by waves and currents, or that postponing the work until the need is imminent (within three years) will result in the loss of opportunities to avoid greater impacts on shoreline ecological functions. New and enlarged

hard structural shoreline stabilization measures are allowed only when needed to protect the types of upland structures and infrastructure identified in SJCC 18.50.350(A);

4. A geotechnical analysis for soft structural shoreline stabilization measures documenting that without the proposal there is ~~a significant possibility~~ conclusive evidence that development will be damaged within three years as a result of erosion caused by waves and currents, or that postponing the work until the need is imminent (within three years) will result in the loss of opportunities to avoid greater impacts on shoreline ecological functions. New and enlarged soft structural shoreline stabilization measures are allowed only when needed to protect the types of upland structures and infrastructure identified in SJCC 18.50.350(A);

In addition to the sections of the ordinance proposed to be updated in the staff report, Friends recommends changes to 18.50.350 for consistency among sections of the ordinance and compliance of the GMHB FDO and the WAC (in red):

Additional changes needed to the San Juan County Code for consistency:

18.50.350 Hard and soft structural shoreline stabilization measures – General regulations.

B. New, replaced, or enlarged hard or soft structural shoreline stabilization measures may be allowed when damage to them is expected within three years.

GMHB FDO Issue No. 4: Shoreline Stabilization, Part 2: Inclusion of hard materials in soft shore addressed in Section 1 and Section 5 of the draft ordinance:

In addition to the failure to comply with the allowance criteria for soft shoreline stabilization projects, the GMHB FDO found that the inclusion of hard materials in soft shore projects was non-compliant. As a result, the draft ordinance includes multiple changes to SJCC 18.50.390 as well as to SJCC 18.20.190 (S) definitions. Friends supports the majority of these changes and offers slight additions to improve the consistency and clarity of the code as well as to ensure compliance with the Washington Administrative Code and the GMHB FDO.

In addition to removing language referencing hard elements in soft shoreline stabilization projects, the definition of soft shoreline stabilization should also be expanded to improve clarity and consistency between sections of the SMP. This is especially important given that the prescriptive language regarding materials has been removed and the site-specific nature of separating true soft shoreline stabilization projects from hard shoreline stabilization projects. The Washington Department of Ecology's March 2014 *Shoreline Master Program Planning and Implementation Guidance: Soft Shoreline Stabilization* that the County references in the proposed new section E. of SJCC 18.50.390 is actually intended as guidance for jurisdictions and is not necessarily the best resource for soft shoreline stabilization project applicants. This document does, however, provide extensive information for local jurisdictions on how to define and incorporate soft shoreline stabilization elements into SMPs. The overarching theme of the Ecology document is the need to include the intent of shoreline stabilization in both the definition and subsequent project review. Friends has relied on specific text from this Ecology document to make the recommended additions to the ordinance amendments provided below. Friends recommends that staff refer to the Washington Department of Ecology's March 2014

Shoreline Master Program Planning and Implementation Guidance: Soft Shoreline Stabilization as they continue work to achieve compliance with the GMHB FDO.

The Washington Department of Ecology's March 2014 *Shoreline Master Program Planning and Implementation Guidance: Soft Shoreline Stabilization* is a good reference for jurisdictions' policy development when updating their SMP. It is also a good reference document for the County to use when evaluating soft shoreline stabilization applications. This document is not necessarily a suitable resource for applicants who are planning and designing soft shoreline stabilizations as the document is written to inform jurisdictions and is heavily focused on the development of policy. In the email dated July 20, 2018 from Joe Burcar to Linda Kuller (as included in the record), the Washington Department of Ecology also recommended providing the Washington State Department of Fish and Wildlife's *Marine Shoreline Design Guidelines* (https://wdfw.wa.gov/publications/01583/) which is a far more relevant resource for applicants who are planning and designing shoreline stabilizations. We recommend that the proposed new section E. of SJCC 18.50.390 be expanded to include reference to the Washington State Department of Fish and Wildlife's *Marine Shoreline Design Guidelines*.

Recommended changes to Section 1 of the draft ordinance (in red):

Section 1. Amends SJCC 18.20.190 "S" definitions as follows:

"Soft shoreline stabilization ~~measures~~" means shore erosion control structures and measures that contain key attributes that maintain or enhance ecological functions and are composed of primarily natural and semirigid or flexible materials, ~~logs,~~ bio-engineering tailored to site-specific natural conditions, and vegetation, organized in a nonlinear, sloping arrangement, that dissipate wave energy and minimize erosion in a way that is similar to natural shoreline processes. The number, extent, and appropriate use of these key features within stabilization projects will strongly influence whether or not they are considered soft. Soft shoreline stabilization projects must balance the need to control erosion while also maintaining and enhancing shoreline ecological functions.

Recommended changes to Section 5 of the draft ordinance (in red):

Section 5. Amends SJCC 18.50.390 Soft structural shoreline stabilization design standards, items (A) and (B) and adds a new item (E) depicted below as suggested by the WA. Department of Ecology:

A. The project must be designed to prevent increased erosion of adjacent properties. Soft shoreline stabilization projects may not include hard structural shoreline stabilization elements ~~if needed to tie in with hard structural shoreline stabilization measures on adjacent properties. The need to use hard structural shoreline elements must be documented as required in SJCC 18.50.350. The length of the hard structural shoreline stabilization transition area to adjacent properties shall be the shortest distance possible and not more than 10 linear feet. The hard structural shoreline stabilization transition area must not extend waterward of the OHWM, except as needed to connect to the adjoining stabilization structure. It must not extend onto adjacent property~~.

B. The soft shoreline stabilization design must ~~include an arrangement of various sizes of gravels, cobbles, logs, and boulders to~~ provide stability and dissipate wave and current energy without presenting extended linear faces to oncoming waves or currents.

E. Applicants may use the Washington Department of Ecology's March 2014 Shoreline Master Program Planning and Implementation Guidance: Soft Shoreline Stabilization and revisions thereto as well as the Washington State Department of Fish and Wildlife's March 2014 Marine Shoreline Design Guidelines and revisions thereto to plan and design soft shoreline stabilization measures. County staff shall rely on these same documents in reviewing shoreline stabilization applications.

F. Soft shoreline stabilization projects must balance the need to control erosion while also maintaining and enhancing shoreline ecological functions.

C. *GMHB FDO Issue No. 7 Evaluation of the Cumulative Impacts of Authorized Development: requirement to develop and implement a mechanism for documenting all project review actions in shoreline areas and process for periodically evaluating the cumulative effects of authorized development on shoreline conditions (WAC 173-26-191(2)(a)). Addressed in Section 2 of the draft ordinance.*

The tracking and evaluation of impacts to shoreline conditions, as identified in the GMHB FDO Issue No. 7 and addressed in Section 2 of the draft ordinance, is the most important component of this compliance process. It addresses how the county will authorize, track, monitor and adaptively manage *all* development actions in the shoreline to ensure no net loss. Note that it is our understanding that unpermitted shoreline projects, once code enforcement action has been taken, these projects then track as authorized development and would therefore be included in the evaluation of cumulative effects to ensure no net loss.

> The Board finds and concludes as follows: San Juan County's decision to adopt, and the Department of Ecology's decision to approve, San Juan County's Shoreline Master Program Update, which failed to include a mechanism for documenting all project review actions in shoreline areas and failed to include/identify a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions fails to comply with the policies of the Shoreline Management Act and Shoreline Master Program Guidelines. (GMHB FDO page 34 line 21)
>
> Does the Update's lack of a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions conflict with the SMP Guidelines (WAC 173-26-191(2)(a)(iii)(D))? While the program must be developed in such a way as to ensure NNL, the contents of that program are governed by WAC 173-26-191(2)(a), which includes a requirement for a "mechanism for documenting all project review actions in shoreline areas." In addition to this mechanism, the Guideline goes on to require local governments to identify "a process for periodically evaluating the

> cumulative effects of authorized development on shoreline conditions. **Clearly, the County neither identified a mechanism for documenting actions in shoreline areas nor a process for periodic evaluation**.
> (GMHB FDO page 34 line 6 with emphasis added by the GMHB)

In both the staff report and the proposed revisions to the ordinance, the County fails to develop or define either the mechanism or the process as required by the Order and the WAC. A general statement about periodic review that lacks even a reference to the need for a mechanism or a clear process does not come close to meeting the county's obligations under the SMA.

The County needs to provide details, including indicators and an implementation timeline, to demonstrate how the County will comply with the required tracking of shoreline project actions and evaluation of shoreline conditions as well as the process for adjustments in response to the findings. While all elements of this required tracking mechanism, as well as the process of evaluating impacts and adaptive adjustments to ensure no net loss of ecological function may not ultimately be reflected in amended ordinance language, the County staff report provides no explanatory text, details, or any discussion at all to demonstrate that a system responsive to the GMHB FDO has been developed. The staff report fails to demonstrate any progress or timeline for completion that will achieve compliance with the GMHB FDO.

During the SMP update process, entities in addition to Friends, submitted substantive comments to assist in this effort. The Washington State Department of Fish and Wildlife (WDFW) offered Priority Habitat and Species resources which includes effectiveness monitoring data and technical assistance to the County from WDFW for applying the data. The San Juan County Marine Resources Committee (MRC) recommended that the County support funding and implementation of a database capable of tracking the effectiveness of the County's regulatory protections. The MRC found that the County's implementation of shoreline regulations is not reliably providing the protections necessary for no net loss. In addition, WA Ecology's SMP Handbook (Publication Number 11-06-010) Chapter 4 No Net Loss of Ecological Functions, with the section, Potential No Net Loss Indicators, on pages 7 - 19, including but not limited to the following: area of eelgrass, kelps, forest cover, marine riparian vegetation classes, wetlands, floodplains; restored and/or permanently protected areas (habitat type and area); water quality, shellfish closures; length of armor on forage fish spawning beaches; length of armor on feeder bluffs; percent change in armor by drift cell.

We encourage the County, as it works to comply with the GMHB FDO, to revisit the comment letters from the Washington State Department of Fish and Wildlife and the San Juan County Marine Resources Committee, and Ecology's SMP Handbook (Publication Number 11-06-010) Chapter 4 No Net Loss of Ecological Functions these comments, included here as attachments. Just as the SMP update in and of itself did not satisfy this requirement, likewise, the County's proposed ordinance amendments in and of themselves do not satisfy this requirement.

> The problem, of course, is that the County's defense relies on the programmatic action itself, the update of the SMP, to address documentation and evaluation of cumulative impacts. The County concludes that while it must complete the cumulative impacts analysis for the update, there is no requirement for any other evaluation of impacts for the duration of the SMP. The Board does not agree.
> (GMHB FDO page 33, line 8)

Friends recommends that the County not lump the cumulative impacts review in with the overall review/update of the SMP. The county goes many years between SMP updates, and as the GMHB FDO states, impacts need to be addressed with a different and more frequent process. Doing the review annually would also allow the County to correct procedural problems that may contribute to the failure of mitigation actions.

In addition, once the tracking system has been developed, other sections of the SMP may need to be revised to ensure consistency with this section. For example, if applicants are required to provide additional data in support of the tracking mechanism, that information may need to be included in the updated ordinance.

The following is a list of issues that must be addressed in order to comply with the GMHB FDO:

1. Indicators must be selected for their ability to meaningfully track and evaluate shoreline conditions, not just record what kinds of actions were authorized and they must cover all activities authorized in the shoreline.
    a. What categories of impacts will be assessed?
    b. What indicators will be used?
    c. Has the County Council allocated sufficient resources to comply with this component of the GMGB FDO?

2. Establishing this mechanism and process requires planning, a framework and clear implementation procedures, yet the County provides none of these.
    a. What information will be collected?
    b. Will the information include all shoreline code enforcement activities and associated mitigation actions?
    c. Who will collect or provide this information?
    d. How frequently will information be collected?
    e. How will information be recorded and stored so that it can be used in the evaluation of impacts to shoreline conditions?
    f. Has the County Council allocated sufficient resources to comply with this component of the GMGB FDO?

3. Identifying the process that will be used to evaluate cumulative impacts to shoreline conditions from all project actions in the shoreline?
    a. What staff will be involved?
    b. Does staff have the technical capacity to implement this requirement?
    c. What tribes and agencies will be engaged?

d. Has the County Council allocated sufficient resources to comply with this component of the GMGB FDO?

4. Identifying the process for making adjustments based on findings in 3 (above), to ensure no net loss
    a. Will the County address the impacts that are found by requiring the land owner to address the impacts (e.g. if approved mitigation actions were not successful)?
    b. Will the County address the impacts by requiring improvements in the same watershed (e.g. perhaps in conjunction with another development project - or as a stand-alone mitigation project)?
    c. Has the County Council allocated sufficient resources to comply with this component of the GMGB FDO?

In suggesting revisions to the county provided ordinance amendments below, Friends referenced and includes here the text of WAC 173-26-191(2)(a)(iii)(D).

> **Documentation of project review actions and changing conditions in shoreline areas.** Master programs or other local permit review ordinances addressing shoreline project review shall include a mechanism for documenting all project review actions in shoreline areas. Local governments shall also identify a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions. This process could involve a joint effort by local governments, state resource agencies, affected Indian tribes, and other parties.

As noted above, in addition to revising the proposed new language to better meet the WAC, more substantive changes are needed than mere tweaking of the overly general text additions proposed below in Section 2 of the draft ordinance.

Recommended changes to Section 2 of the draft ordinance (in red):

Section 2. Adds a new item SJCC 18.50.020 (E)(3):

E. Responsibilities of Department Director and Planning Commission.

3. The Shoreline Master Program shall include:

a. A mechanism for documenting all project review actions in shoreline areas

b. A process for annually evaluating the cumulative effects of authorized development on shoreline conditions. The following information shall be used in the periodic annual evaluation of the Shoreline Master Program:

i. The department's permit tracking system;

ii. Aerial photographs;

iii. Other available data; and

iv. Field observations.

c. A process for proposing new actions and amendments based on the results of 3.b. ~~be periodically reviewed and amendments be made~~ as are necessary to reflect changing local circumstances, new information, improved data and changes in state statutes and regulations. ~~This periodic review shall include an evaluation of project~~

~~review actions in shoreline areas and the cumulative effects of authorized shoreline development.~~

The annual evaluation of cumulative effects ~~impact review~~ shall be coordinated with the Tribes, relevant State agencies and interested parties.

When developing its system to achieve compliance with this tracking mechanism and process for evaluating cumulative impacts to shoreline conditions component of the GMHB FDO, the County must bear in mind that the tracking and evaluation of impacts is what is used to determine the SMP's compliance with the SMA's overarching directive to achieve no net loss of shoreline ecological function and is thus it is among the most essential and critical elements of the entire ordinance.

Compliance with the GMHB FDO, and more importantly, success of the overall SMP in meeting no net loss requirements and protecting and restoring marine shorelines in support of Chinook salmon and Southern Resident Killer Whale recovery, as well as the economy and quality of life of the San Juan County community, is NOT achieved by the addition of brief and vague text about the County's intent. Friends of the San Juans finds that the County's response to this section of the GMHB FDO is woefully inadequate and that substantive changes are required.

Friends of the San Juans Recommended Changes in Summary of Ordinance Sections (in red):

Section 1. Amends SJCC 18.20.190 "S" definitions as follows:
"Soft shoreline stabilization ~~measures~~" means shore erosion control structures and measures that contain key attributes that maintain or enhance ecological functions[1] and are composed of primarily natural and semirigid or flexible materials, ~~logs,~~ bio-engineering tailored to site-specific natural conditions, and vegetation, organized in a nonlinear, sloping arrangement, that dissipate wave energy and minimize erosion in a way that is similar to natural shoreline processes. The number, extent, and appropriate use of these key features within stabilization projects will strongly influence whether or not they are considered soft.[2] Soft shoreline stabilization projects must balance the need to control erosion while also maintaining and enhancing shoreline ecological functions.[3]

Section 2. Adds a new item SJCC 18.50.020 (E)(3):
E. Responsibilities of Department Director and Planning Commission.
3. The Shoreline Master Program shall include:

a. A mechanism for documenting all project review actions in shoreline areas

b. A process for annually evaluating the cumulative effects of authorized development on shoreline conditions. The following information shall be used in the periodic annual evaluation of the Shoreline Master Program:

i. The department's permit tracking system;
ii. Aerial photographs;
iii. Other available data; and
iv. Field observations.

c. A process for proposing new actions and amendments based on the results of 3.b. ~~be periodically reviewed and amendments be made~~ as are necessary to reflect changing local circumstances, new information, improved data and changes in state statutes and regulations. ~~This periodic review shall include an evaluation of project review actions in shoreline areas and the cumulative effects of authorized shoreline development.~~

The annual evaluation of cumulative effects ~~impact review~~ shall be coordinated with the Tribes, relevant State agencies and interested parties.

Section 3. Amends SJCC 18.50.140 (C) Mitigation of adverse impacts to shoreline ecological functions:
C. Preferential consideration shall be given to measures that replace the impacts to functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive plans applicable to the area of impact may be authorized. ~~When feasible, adverse impacts are to be mitigated on site. If off-site mitigation is proposed, the mitigation site must be located on the same island, as close as feasible to within the stormwater watershed of the development site.~~ A map of the County's stormwater watersheds for all County islands where development could occur and

watershed reports from the San Juan County Stormwater Basin Planning report dated ~~June 26, 2014~~ is available on the County's web portal for GIS data and maps.

Section 4. Amends SJCC 18.50.350 Hard and soft structural shoreline stabilization measures – General regulations:

C. New, replaced, or enlarged soft structural shoreline stabilization measures for an existing primary structure ~~may~~ are not ~~be~~ allowed unless there is conclusive evidence documented by a geotechnical analysis~~,~~ that the structure is in danger within three years as a result of ~~from~~ shoreline ~~when there is a significant possibility that development will be damaged as a result of~~ erosion caused by tidal action, waves ~~and~~ or currents.

1. Normal sloughing, erosion of steep bluffs, or shoreline erosion itself, without a scientific or geotechnical analysis, is not demonstration of need.

2. The geotechnical analysis should evaluate on-site drainage issues and address drainage problems away from the shoreline edge before considering structural shoreline stabilization.

3. The erosion control structure will not result in a net loss of shoreline ecological functions.

Section 5. Amends SJCC 18.50.390 Soft structural shoreline stabilization design standards, items (A) and (B) and adds a new item (E) depicted below as suggested by the WA. Department of Ecology:

A. The project must be designed to prevent increased erosion of adjacent properties. Soft shoreline stabilization projects may not include hard structural shoreline stabilization elements ~~if needed to tie in with hard structural shoreline stabilization measures on adjacent properties. The need to use hard structural shoreline elements must be documented as required in SJCC 18.50.350. The length of the hard structural shoreline stabilization transition area to adjacent properties shall be the shortest distance possible and not more than 10 linear feet. The hard structural shoreline stabilization transition area must not extend waterward of the OHWM, except as needed to connect to the adjoining stabilization structure. It must not extend onto adjacent property~~.

B. The soft shoreline stabilization design must ~~include an arrangement of various sizes of gravels, cobbles, logs, and boulders to~~ provide stability and dissipate wave and current energy without presenting extended linear faces to oncoming waves or currents.

E. Applicants may use the Washington Department of Ecology's March 2014 Shoreline Master Program Planning and Implementation Guidance: Soft Shoreline Stabilization and revisions thereto as well as the Washington State Department of Fish and Wildlife's March 2014 Marine Shoreline Design Guidelines and revisions thereto to plan and design soft shoreline stabilization measures. County staff shall rely on these same documents in reviewing shoreline stabilization applications.

F. Soft shoreline stabilization projects must balance the need to control erosion while also maintaining and enhancing shoreline ecological functions.[4]

Section 6. Amends SJCC 18.50.420(3) and (4) for consistency - Hard or soft shoreline stabilization measures – Additional submittal requirements:

3. A geotechnical analysis for hard structural shoreline stabilization measures documenting that without the proposal there is ~~a significant possibility~~ conclusive evidence that development will be damaged within three years as a result of erosion caused by waves and currents, or that postponing the work until the need is imminent (within three years) will result in the loss of opportunities to avoid greater impacts on shoreline ecological functions. New and enlarged hard structural shoreline stabilization measures are allowed only when needed to protect the types of upland structures and infrastructure identified in SJCC 18.50.350(A);

4. A geotechnical analysis for soft structural shoreline stabilization measures documenting that without the proposal there is ~~a significant possibility~~ conclusive evidence that development will be damaged within three years as a result of erosion caused by waves and currents, or that postponing the work until the need is imminent (within three years) will result in the loss of opportunities to avoid greater impacts on shoreline ecological functions. New and enlarged soft structural shoreline stabilization measures are allowed only when needed to protect the types of upland structures and infrastructure identified in SJCC 18.50.350(A);

In addition to the sections of the ordinance proposed to be updated, Friends recommends changes to 18.50.350 for consistency among sections of the ordinance and compliance of the GMHB FDO and the WAC (in red):

Additional changes needed to the San Juan County Code for consistency:

18.50.350 Hard and soft structural shoreline stabilization measures – General regulations.

B. New, replaced, or enlarged hard or soft structural shoreline stabilization measures may be allowed when damage to them is expected within three years.

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[1] WA Department of Ecology. March 2014. Soft Shore Stabilization: shoreline master program planning and implementation guidance. Pub. No. 14-06009 Executive Summary Pg. viii

[2] WA Department of Ecology. March 2014. Soft Shore Stabilization: shoreline master program planning and implementation guidance. Pub. No. 14-06009 Executive Summary Pg. viii

[3] WA Department of Ecology. March 2014. Soft Shore Stabilization: shoreline master program planning and implementation guidance. Pub. No. 14-06009 Executive Summary Pg. viii

[4] WA Department of Ecology. March 2014. Soft Shore Stabilization: shoreline master program planning and implementation guidance. Pub. No. 14-06009 Executive Summary Pg. vii and viii.

State of Washington
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December 8, 2015

Colin Maycock
San Juan County
Department of Community Development
P.O. Box 947
Friday Harbor, WA 98250

Re: San Juan County Draft Shoreline Master Program

Dear Mr. Maycock:

Thank you for the opportunity to comment on San Juan County's Draft Shoreline Master Program. The Washington Department of Fish and Wildlife (WDFW) acknowledges the hard work and countless hours that went into producing your draft Shoreline Master Program (SMP); we congratulate you on getting to the stage of final local adoption. We found many portions of your SMP to be excellent; we provide these comments to help you make it even better.

WDFW is strictly an advisor on shoreline issues. We provide land use decision makers, such as San Juan County, with science-based advice to assist you in your responsibilities to manage your shorelines consistent with local values and state laws. In a spirit of partnership and keeping with our mission to perpetuate fish and wildlife and their habitat, we provide these comments so that you can consider additional ways to retain the health of San Juan's marine ecosystem. While this letter contains no mandate to alter portions of your SMP, we hope you carefully consider these comments as we wish to work with you to achieve our common goals.

We have two primary suggestions. The first is about ways we can support you; the second explores ideas about implementing your SMP in a way that allow you to learn and make improvements over time.

WDFW's Priority Habitats and Species (PHS) resources. PHS has been a core initiative of our agency for more than 25 years and is the primary way we provide relevant information to land use decision makers, such as local governments and landowners. We urge you to explore these ever-evolving resources and utilize them to the greatest extent you find helpful. The WDFW PHS section consists of:

- **PHS Technical Assistance** is available from WDFW Regional Habitat Biologists, such as myself. We can help you apply the general PHS Management Recommendations in specific situations to specific pieces of land. Consider us a resource to help you resolve land use challenges related to fish and wildlife. We are available to participate in efforts to develop watershed plans and advise on challenging permit applications involving PHS.
- **PHS List** which identifies those species and habitats which are at risk of extinction, tend to aggregate in vulnerable gatherings, or are economically/culturally valuable. In many cases the PHS List narrows down the Priority Areas to specific key habitats such as nesting sites or spawning beaches. We recommend you consider designating and protecting all PHS Priority Areas through your SMP (and CAO).
- **PHS Maps** provide an ever evolving picture of where these Priority Areas are located. These maps reflect the latest surveys of known locations of PHS species. We recommend you consider relying upon these maps as your SMP is implemented.
- **PHS Management Recommendations** provide science-based advice about how to manage land use consistent with the needs of the species or habitat. This general advice represents a synthesis of scientific literature vetted by agency scientists for land use decision makers. We recommend you have applicants refer to PHS Management Recommendations when they prepare site-specific Habitat Management Plans.
- **PHS Effectiveness Monitoring Tools using High Resolution Change Detection,** the newest PHS component, provides Puget Sound local governments an easy-to-use method for self-evaluation of shoreline (and upland) land use management, as measured against your own goals and benchmarks. This can help us understand through monitoring and adaptive management how we can better achieve the goal of no net loss of ecological function.

Monitoring and Adaptive Management. Increasingly jurisdictions are relying on monitoring and adaptive management to improve their regulatory and non-regulatory land use efforts. We agree that science-based monitoring and adaptive management is the best way to accommodate various shoreline uses while maintaining no net loss of shoreline ecological function. We also know from our own efforts to apply principles of adaptive management to our own work that it can be both challenging and costly. We offer our services to help you explore ways you can increase your use of adaptive management as you implement your SMP. As stated above, we can offer you PHS Effectiveness Monitoring data and assistance applying the data.

We provide detailed suggestions in Enclosure (1) related to PHS and adaptive management, among other things.

We greatly value the work San Juan County does to protect fish and wildlife. We are committed to collaborating with you to provide land use advice that is helpful, science-based, and mindful of the needs of the county and its citizens as well as fish and wildlife. If you have any questions about my comments please contact me.

I look forward to working with you in the months and years ahead.

Sincerely,

Doug Thompson
Habitat Biologist

cc: Brendan Brokes, Regional Habitat Program Manager, WDFW
Keith Folkerts, PHS Section Manager, WDFW
Robert Warinner, Assistant Regional Program Manager, WDFW
Bob Fritzen, Shoreline Planner, Washington Department of Ecology

WDFW Detailed Comments on San Juan County Draft Shoreline Master Program

Goals and Policies

Page numbers and line items are from the August 2015 Public Hearing Draft (#6)

p. 3, 3.2.C, line 29: We recommend you consider adding a goal related to achieving no net loss of shoreline ecological function at a countywide scale and an adaptive management program that can help you meet that goal. (Alternatively this goal could also fit under 3.2.F on page 9.) Rationale: Shoreline environments are complex; determining the kind and extent of compensatory mitigation for impacts to ecological function is inexact. A carefully designed monitoring and adaptive management program can help provide information to inform success. WDFW recommends that critical area protection be implemented with monitoring and adaptive management. We are available to assist with planning out a monitoring framework that conforms with the county's available resources.

p. 3, 3.2.C, line 44: We recommend you consider adding a policy related to achieving and demonstrating no net loss of shoreline ecological function by establishing and implementing a scientifically sound adaptive management program that includes monitoring of benchmarks. (Alternatively, this policy could also fit under 3.2.F on page 9.) Rational: Same as above; benchmarks are necessary so that monitoring data can be compared to a standard to determine if goals and objectives are being met or if adjustments are in order.

p. 4, 3.2.C.ii, line 35. The WAC referring to Fish and Wildlife Habitat Conservation Areas has been re-codified as WAC 365-190-130 (vice WAC 365-190-080(5)).

p. 24, 3.3.I, line 8. To which species does criterion d apply?

p. 24, 3.3.I, line 12. We recommend you add another criterion for Marine Habitat Management Area Overlays: designated marine Priority Areas for marine Priority Species. Rationale: Species are deemed a *Priority Species* through a scientifically sound process. PHS Priority Areas include areas documented to be important for supporting listed, vulnerable, and economically/culturally important species.

p. 24, 3.3.I, line 19. We recommend management plans refer to PHS Management Recommendations where applicable. Rationale: PHS Management Recommendations reflect WDFW's evolving science-based management recommendations for Priority Habitats and Priority Species.

p. 24, 3.3.I, line 30. We recommend a regional Habitat Biologist from WDFW participate on the interdisciplinary team to serve in an advisory role on fish and wildlife issues and coordinate agency resources in support of local watershed plans.

p. 50, 3.5.A, line 37. We recommend you consider adding a policy stating that the ongoing benefits achieved by mitigation project required for breakwaters, jetties, and groins should accrue for as long as the impacts caused by such structures. Rationale: The negative impacts caused by these structures continue to accrue for as long as the structure is in place; the compensatory mitigation provided for such impacts should provide a similar long-term continuous environmental lift.

p. 52, 3.5.B.ii, line 4. We recommend inserting the following, "The use of mooring buoys should be encouraged in waters of adequate depth to avoid vessel groundings…" Rationale: grounding of moored boats can damage benthic invertebrates and eelgrass.

p. 52, 3.5.B.ii, line 34. We recommend you consider adding a policy stating that piers and docks be designed to avoid or minimize disruptions to alongshore sediment transport. Rationale: the individual and cumulative effects of piers and docks can disrupt sediment transport in some reaches.

p. 53, 3.5.B.iii, line 1. We recommend you consider the following addition, "Embayments with poor flushing action or sites with herring spawning habitat, or eelgrass beds should not be considered for marina sites." Rationale: These resources are particularly important to the marine ecosystem and are unlikely to persist if marinas are developed in close proximity.

p. 53, 3.5.B.iii, line 9. We recommend reordering item c. (use of boat launches and dry storage) as item a. Rationale: Boats stored in dry storage and launched at boat launches is least consumptive of shoreline resources.

p. 57, 3.5.D. (Policies). In support of your goal regarding evaluations for shoreline stabilization, we recommend you consider a policy (a) that need for such a structure be demonstrated via a geotechnical and site slope stability analysis and (b) that the selection of a shoreline stabilization method are consistent with our *Marine Shoreline Design Guidelines.*

Shoreline Designation Maps

1. We recommend that maps of shoreline resources reference the most recent update of WDFW's Priority Habitat and Species (PHS) mapping of Priority Habitats and Priority Species.
2. We recommend that documented spawning sites for herring, sand lance and surf smelt be mapped and protected.
3. Specific inconsistencies between SMP maps and PHS maps:
    a. On Stuart Island a beach at the head of Reid Harbor is not listed on SMP maps as having forage fish, but this beach is not listed on PHS map; review of this site is in order.
    b. PHS maps document herring spawning at the north end of East Sound on Orcas and on the west side of East Sound across from Rosario which are not reflected on SMP maps.
    c. PHS maps document herring spawning on the north and NE sides of West Sound on Orcas Island and on the west side of West Sound across from White Beach Bay.
    d. PHS maps show herring spawning on Roche Harbor/Westcott Bay south of Roche Harbor and along the south side of Mosquito Pass as well as at Westcott Bay and Garrison Bay. PHS maps document herring spawning on the southern tip of the Deer Harbor Peninsula and on the SE side of Deer Harbor Peninsula in West Sound.
    e. PHS maps document herring spawning in Blind Bay, Shaw Island.
    f. PHS maps document herring spawning on North Lopez, Shoal Bay.
    g. PHS maps document forage fish spawning at the east end of Jones Bay on southwest Lopez Island.
    h. PHS maps document herring spawning on Lopez, at Hunter Bay and Mud Bay.

Proposed SMP Regulations

This is commenting on the 157-page CC Public Hearing Draft Ordinance (with alternatives) that adopts new SMP regulations and amends Comp Plan elements.

1. p. 12, 18.80.110 I.4.e. and f: We recommend these two provisions be retained. Rationale: Because the shoreline environment is extraordinarily complex mitigation/compensation efforts have a high degree of uncertainty. To reduce the risk, we recommend monitoring and adaptive management program with benchmarks to achieve no net loss over time.
2. Section 10; pages 22-32. We recommend Alternative 1. Rationale: Alternative 1 appears to more reliably protect shoreline ecological functions while providing other socially, culturally, and economically important shoreline uses. This alternative would reduce the need for compensatory mitigation.
3. p. 34-35. Section 14 Non-conforming structures. WDFW recommends retaining the standards contained in Section 5. Rationale: Section 5 standards allow for incremental improvement of ecological processes impacted by nonconforming structures over time while still allowing use of land. Perpetuating fish and wildlife species will likely be aided by reducing impacts by such structures over time. Providing no net loss of shoreline ecological functions would seem to be particularly challenging under provision E (p. 35, lines 11-15).
4. P. 36, Section 16.C. NOTE: WDFW's new PHS Effectiveness Monitoring using High Resolution Change Detection can help San Juan County identify instances of tree removal from shorelines and other critical areas. WDFW can provide scientifically sound tools to help you determine the implementation and effectiveness of your land use protection measures. Please contact WDFW for more information.
5. p. 40, Section 19.B. Mitigation, line 12. We recommend you add a sixth requirement related to monitoring and adaptive management. Rationale: Because the shoreline environment is extraordinarily complex mitigation/compensation efforts have a high degree of uncertainty. To reduce the risk, we recommend mitigation include a monitoring and adaptive management component with benchmarks.
6. p. 40, Section 19.C. Mitigation, line 12. We recommend you consider off-site mitigation that is consistent with mitigation options outlined in Ecology's *Wetlands & CAO Updates: Guidance for Small Cities* (Western Washington Version). Rationale: The Ecology guidelines provide science-based protections for fish and wildlife habitat.
7. p. 42, Section 20.F.14, items b and d. Recommend monitoring occur at completion of site construction and planting and at Years 1, 3 and 5, and when necessary, Years 7 and 10. Rationale: Three years of monitoring, especially of trees, is likely to not identify projects which for which corrective action should be taken.

8. p. 43, Section 21.A.2 Mitigation Plan, line 16: We recommend mitigation plans be consistent with best available science and include goals, objectives (including benchmarks), and monitoring methods (including sampling frequency). We also note that a fifty percent likelihood of achieving it purpose leaves a high risk of failure, which is inconsistent with PHS Management Recommendations and Ecology's wetland guidance.
9. P. 58, Section 19.A, 12, line 7. We recommend striking the phase "unless adverse impacts are mitigated." Rationale: impacts to erosion-accretion processes associated with feeder bluffs should be avoided as compensatory mitigation of such vital processes would be challenging and risky.
10. P. 58, Section 29, B. 1, lines 14-16. We recommend adopting language provided by Ecology. Rationale: Aquatic life is protected by avoiding to the extent possible and carefully minimizing wood with toxic compounds; in our Hydraulic Permit Approvals we often reference *Best Management Practices for the Use of Treated Wood in Aquatic Environments* by the Western Wood Preservers Institute.
11. P. 58, Section 29, B. 6-7, lines 26-35. We recommend retaining #6 and deleting #7. Rationale: Avoiding storage building helps minimize loss of shoreline ecological function such as loss of shading via tree removal.
12. P. 61, Section 31, table X, "Decking." Recommend referencing WDFW grating requirements for piers and floats from WAC 220-660-140 and WAC 220-660-380. Rationale: Consistency between local and state regulations helps applicants avoid confusion and unnecessary expense.
13. P. 70, Section 44, F., Lines 17-18. We recommend keeping F's original language. Rationale: this approach is most likely to minimize adverse impacts to forage fish.
14. P. 71, Section 45, C., line 13. We recommend adding a fifth element: When a proposal is on a shoreline reach with forage fish spawning habitat, applicants consider using sand and gravel that is suitable as spawning substrate.
15. Page 71, Section 47, B., line 31. We recommend establishing a lower threshold at which a project is considered a replacement versus repair. Rationale: requiring softer options (as is required for projects which replace 100% of a project but not 99.99%) provide opportunities to explore possible means of accomplishing the applicant's goal at a lower environmental cost. Establishing the threshold at 100% causes missed opportunities to achieve your SMP's goals and policies and improve habitat functions.
16. P. 78, Section 51.A. 2, lines 8-9. We recommend that when converting from forestry applicants be required to maintain a specified percentage of shade and large wood recruitment. Rationale: Maintaining shade and large wood recruitment functions are key to maintaining shoreline ecological functions (including bank stability and litterfall). Specifying a certain percentage, for example, 80% shade and 75% large wood recruitment, provides applicants a means of converting the land while minimizing function degradation.

17. P. 99, Section 65.A.3.a, line 23. We recommend striking (a). Rationale: This precludes potential restoration projects within important fish spawning areas.
18. P. 100, Section 65.C.2, lines 23-24. We recommend striking "by processes other than the erosion-accretion process." Rationale: No need to limit restoration projects based on the source of degradation; we want to encourage restoration regardless of the reason for the degradation.

Existing Critical Areas Ordinance

WDFW has not conducted a detailed review of San Juan County's Critical Areas Ordinance (CAO, which is largely incorporated by reference), so instead we provide general comments:

1. Primary functions that are provided by marine and freshwater riparian areas include bank stability, shading, recruitment of large wood, supplying nutrients in support of the food web, filtering of excess nutrients and pollutants, and providing fish and wildlife habitat. We recommend riparian areas provide these functions to the greatest extent practicable in keeping with local values and state laws and regulations. In general, riparian functions are provided to a high degree by a natural vegetated strip that is the width of one site potential tree (a wider area may be needed to accommodate natural rates of riparian large wood recruitment on steep slopes). While this general rule is backed by reliable science[1], when applied at a site scale this general rule must be ground-truthed with site-specific conditions.
2. When, for other legitimate social, cultural, or economic reasons, this degree of protection is not provided, we recommend monitoring and adaptive management to ensure the County meets its habitat-related goals and its goal of no net loss of ecological function. When a CAO provides a level of protection that is significantly less, it is all the more important to provide careful monitoring and adaptive management and for the jurisdiction to be willing to modify its management of riparian areas based on the outcome of such monitoring.
3. When determining what kind and amount of compensatory mitigation is "appropriate" we recommend that the site's historical range of natural variability be a data point that informs restoration and compensatory mitigation efforts.
4. We recommend jurisdictions consider protection at the watershed scale (watershed-scale processes, land use, and other factors) while identifying the level of riparian protection on a stream reach scale.
5. We recommend local jurisdictions designate species of local significance consistent with the PHS List. We also recommend that CAO's designate and protect PHS as Fish and Wildlife Habitat Conservation Areas. We recommend that PHS Management Recommendations be considered when developing site-specific habitat management plans.

[1] See Forest Ecosystem Management: An Ecological, Economic, and Social Assessment, Forest Ecosystem Management Team (FEMAT), US Forest Service, 1993. See the frequently referred to "FEMAT curves" on p. V-27.

We also recommend that jurisdictions within the Puget Sound utilize PHS Effectiveness Monitoring as part of their adaptive management program.

san juan county
marine stewardship area
our sea • our source • our future

SAN JUAN COUNTY
MARINE RESOURCES COMMITTEE
135 RHONE STREET, FRIDAY HARBOR, WA 98250

November 25, 2015

San Juan County Council
350 Court St. No. 1
Friday Harbor, WA 98250

Re: Shoreline Master Program Update – Monitoring Recommendations

In its work as the Citizen Advisory Committee for Salmon Recovery, the MRC worked closely with the San Juan Lead Entity on its monitoring and adaptive management process. The 2014 report identified findings regarding cumulative impacts from shoreline development activity on nearshore habitat functions. These included the following:

- Incremental but cumulative shoreline development activity is ongoing, and has the potential to affect habitats in the nearshore environment.
- Existing regulations and their implementation are not reliably providing the protections necessary for the state-mandated "no net loss" of habitat for juvenile salmon and forage fish.
- A permit database that is specifically designed to track the effectiveness of the County's regulatory protections for nearshore habitats is critical to the monitoring component of the local salmon recovery program.

The MRC recommends that the county council support funding and implementation of a permit database that is capable of serving this purpose. Without a robust monitoring tool such as this, the county's success in meeting the goal of "no net loss" of marine habitat functions will be very difficult to assure.

Sincerely,

Terry Turner, Chair
SJC Marine Resources Committee

Chapter 4
No Net Loss of Shoreline Ecological Functions

All phases
Shoreline Master Program Planning Process

Introduction

The Shoreline Management Act (SMA) provides a broad policy framework for protecting the natural resources and ecology of the shoreline environment. The SMP Guidelines establish the standard of "no net loss" of shoreline ecological functions as the means of implementing that framework through shoreline master programs. WAC 173-26-186(8) directs that master programs "include policies and regulations designed to achieve no net loss of those ecological functions." (The specific sections of the Guidelines addressing the NNL requirement are included at the end of this chapter.)

RCW 90.58.020: The legislature finds that the shorelines of the state are among the most valuable and fragile of its natural resources and that there is great concern throughout the state relating to their utilization, protection, restoration, and preservation…This policy contemplates 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, adopted in 2003, constitute the first actual rule (WAC) in Washington State to incorporate the no net loss requirement. The concept of no net loss in this State originated with earlier efforts to protect wetlands. In 1989, Governor Booth Gardner signed an Executive Order establishing a statewide goal regarding wetlands protection. "It is the interim goal...to achieve no overall net loss in acreage and function of Washington's remaining wetlands base. It is further the long-term goal to increase the quantity and quality of Washington's wetlands resource base." (E.O. 89-10).

What does no net loss mean?

Over time, the existing condition of shoreline ecological functions should remain the same as the SMP is implemented. Simply stated, the no net loss standard is designed to halt the introduction of new impacts to shoreline ecological functions resulting from new development. Both protection and restoration are needed to achieve no net loss. Restoration activities also may result in improvements to shoreline ecological functions over time.

Local governments must achieve this standard through both the SMP planning process and by appropriately regulating individual developments as they are proposed in the future. No net loss

should be achieved over time by establishing environment designations, implementing SMP policies and regulations that protect the shoreline, and restoring sections of the shoreline. Based on past practice, current science tells us that most, if not all, shoreline development produces some impact to ecological functions. However, the recognition that future development will occur is basic to the no net loss standard. The challenge is in maintaining shoreline ecological functions while allowing appropriate new development, ensuring adequate land for preferred shoreline uses and public access. With due diligence, local governments can properly locate and design development projects and require conditions to avoid or minimize impacts.

No net loss incorporates the following concepts:

- The existing condition of shoreline ecological functions should not deteriorate due to permitted development. The existing condition or baseline is documented in the shoreline inventory and characterization. (See Chapter 7.) Shoreline functions may improve through shoreline restoration.
- New adverse impacts to the shoreline environment that result from planned development should be avoided. When this is not possible, impacts should be minimized through mitigation sequencing.
- Mitigation for development projects alone cannot prevent all cumulative adverse impacts to the shoreline environment, so restoration is also needed.

Practices that help achieve no net loss

The following SMP update practices will help to meet the no net loss requirement:

- **Locate, design and mitigate development within a watershed context**. During the SMP update process, use the characterization of ecosystem processes and functions to identify the best areas for future development and mitigation. The characterization can provide important information regarding areas that have a high potential for restoration and can be used for offsite mitigation. Such an approach can use a combination of onsite and offsite mitigation that helps restore critical processes and generates a greater “lift” in ecosystem functions.
- **Prohibit uses** that are not water-dependent or preferred shoreline uses. For example, office and multi-family housing buildings are not water-dependent or preferred uses. There is no requirement to provide a place for all types of uses within shoreline jurisdiction.
- **Require that all future shoreline development**, including water-dependent and preferred uses, is carried out in a manner that limits further degradation of the shoreline environment. No uses or activities, including preferred uses, are exempt from the requirement to protect shoreline ecological functions.
- **Require buffers and setbacks.** Vegetated buffers and building setbacks from those buffers reduce the impacts of development on the shoreline environment.
- **Establish appropriate shoreline environment designations**. The environment designations must reflect the inventory and characterization. A shoreline landscape that is relatively unaltered should be designated Natural and protected from any use that would

degrade the natural character of the shoreline. (In practice, this would avoid future impacts, the first objective of no net loss.) New shoreline development in such environs is limited, resulting in avoidance of new impacts.)

- **Establish strong policies and regulations.** Policies and regulations will define what type of development can occur in each shoreline environment designation, determine the level of review required through the type of shoreline permit, and set up mitigation measures and restoration requirements.
- **Develop policies and requirements for restoration.** These should be consistent with the shoreline restoration plan prepared during the SMP planning process.
- **Recommend actions outside shoreline jurisdiction.** The master program or an SMP supporting document can recommend actions for properties that are outside shoreline jurisdiction but have impacts on shorelands. For example, the SMP could call for improved stormwater treatment of runoff from roads, or replacement of septic systems with sewers. Recommending these actions could help create awareness of problems and provide support for them, although outside the authority of the SMP. Such recommendations could be included in the shoreline management strategy or in a brief chapter within the SMP. This would also satisfy the SMA adjacent lands policy (RCW 90-58.340) that local governments are obligated to meet.
- **In all cases, require mitigation sequencing**. The SMP must include regulations that require developers to follow mitigation sequencing: avoid impacts, minimize impacts, rectify impacts, reduce impacts over time, compensate for impacts, monitor impacts and take corrective measures. Avoiding impacts means not taking an action or part of an action in order to prevent impacts to ecological functions. Impacts can be avoided in many different ways: structures may be sited further from properly functioning shoreline areas; different landscaping plants or techniques may be used; a less impactful use may be substituted; or a proposal may be redesigned altogether.

How to demonstrate no net loss

Local governments demonstrate no net loss at two levels -- through the comprehensive SMP update planning process and over time, during the project review and permitting processes (in other words, during SMP implementation).

No net loss in the SMP planning process

The following graphic provides a visual description of the role of the SMP update in achieving no net loss. Through mitigation and restoration, a jurisdiction would achieve no net loss of shoreline ecological functions.

SMP updates: Achieving no net loss of ecological function

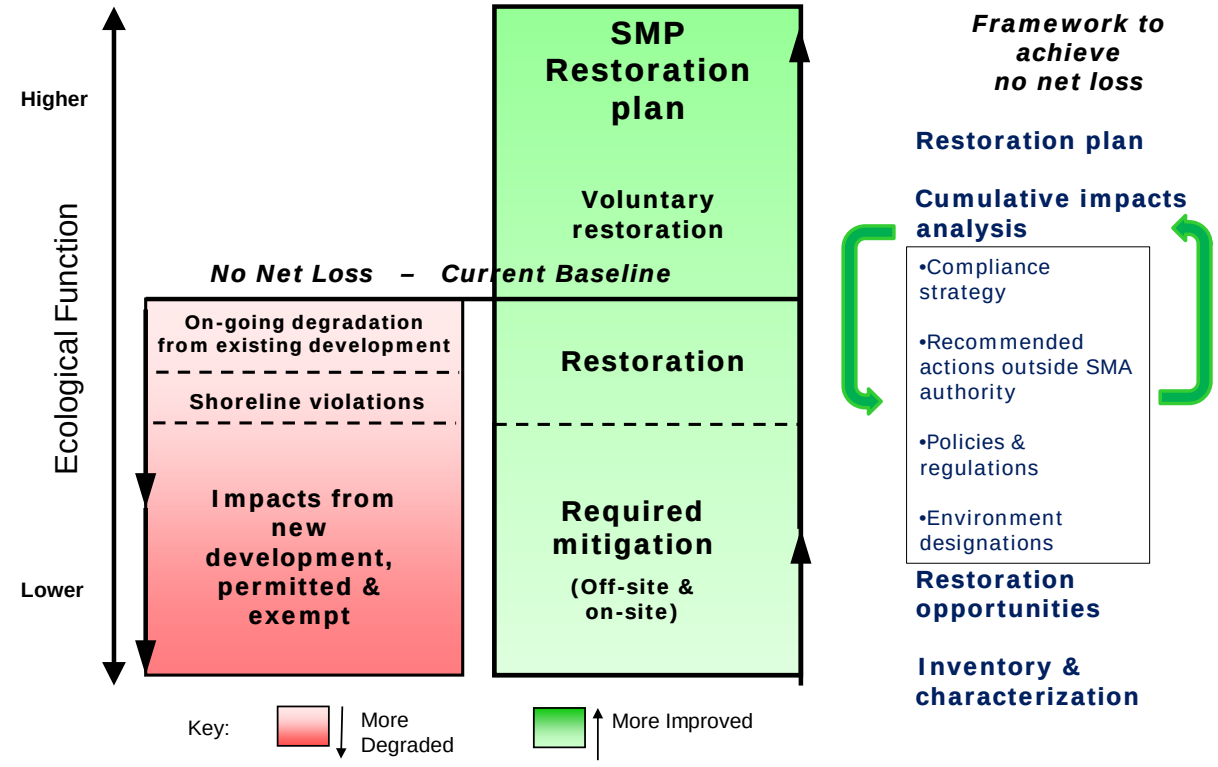


Figure 4-1: During the SMP update process, local governments should use existing shoreline conditions as the baseline for measuring no net loss of shoreline ecological functions.

Local governments show that their updated SMP will result in no net loss of ecological function by completing several tasks in the comprehensive SMP update process, including:

- **Shoreline inventory and characterization**. The shoreline inventory documents shoreline baseline conditions and the characterization analyzes shoreline functions and processes. (See SMP Handbook Chapter 7.
- **Shoreline use analysis.** The use analysis estimates the future demand for shoreline space and potential use conflicts over a minimum 20-year planning period and projects future trends.
- **Shoreline management recommendations.** Management recommendations translate the inventory and characterization findings into SMP policies, regulations, environment designations and protection strategies for each shoreline planning unit.
- **Restoration plan.** The restoration plan includes restoration opportunities, priorities and timelines for shoreline restoration.
- **Cumulative impacts analysis.** This analysis assesses the cumulative impacts on shoreline ecological functions from "reasonably foreseeable future development" allowed by the SMP, considering at a minimum habitat, hydrology and water quality functions.

Analyzing cumulative impacts is necessary to identify and compensate for the total predictable, incremental effects on shoreline functions after applying mitigation measures and restoration.

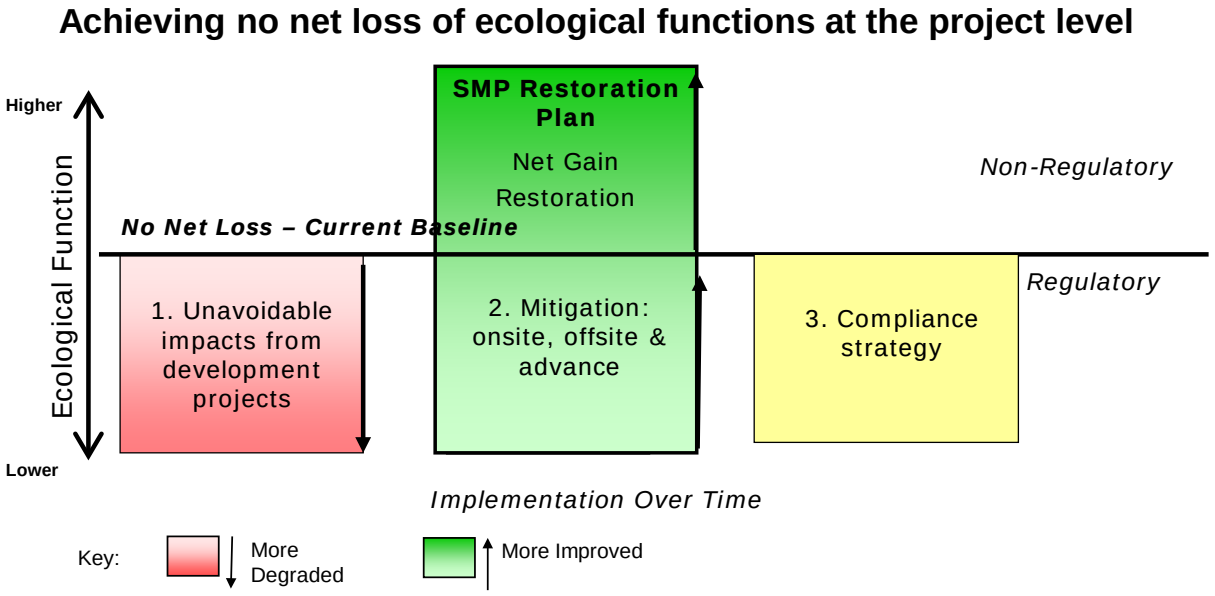
- **No net loss summary.** This narrative provides an overall picture of how the jurisdiction will meet the NNL requirement. This "executive summary" will explain how information from the supporting documents listed above was applied in developing and revising policies and regulations within the updated SMP. The summary should compare the conclusions of the supporting documents with the environment designations and use regulations to demonstrate how these provisions avoid, reduce, and mitigate reasonably foreseeable impacts in order to achieve NNL. This summary should provide a general chronology of the update while providing reference to the specific chronology captured in the SMP checklist. The purpose of this summary and other supporting documents is to ensure that the SMP environment designations, policies, regulations and shoreline restoration plan are based on the findings of the inventory and characterization and the cumulative impacts analysis and will achieve NNL. Documentation of this information will also provide a record of the jurisdiction's decisions on SMP policies and regulations in relation to NNL.

To approve a comprehensive SMP update, Ecology's Director must formally conclude that the proposed SMP, when implemented over its planning horizon, typically 20 years, will result in "no net loss of ecological functions necessary to sustain shoreline natural resources." This conclusion will be based upon the documents listed above, a completed SMP submittal checklist and supporting map portfolio.

No net loss in the permit process

When the SMP goes into effect, careful and thorough implementation will be necessary to achieve no net loss. For example, if the SMP prohibits office buildings and condominiums in the Conservancy environment, then your jurisdiction should not approve these uses in that environment. The cumulative impacts analysis would have shown that no net loss would be achieved if office buildings and condominiums are prohibited in the Conservancy environment. Allowing offices and condominiums under this scenario would result in a loss of shoreline functions.

When implementing the updated SMP, no net loss principles (first avoiding, then minimizing and compensating for ecological impacts) are applied again as individual shoreline project applications are reviewed and approved, conditioned, or denied. The following graphic demonstrates how the no net loss requirement is partially achieved during the permit process.



1. Impacts from shoreline development projects, after mitigation and restoration measures. SMP should encourage appropriate use of innovative measures such as clustering, TDRs, site specific BMPs, etc. to reduce impacts.

2. On-site, off-site and advance mitigation. SMPs should lay out the conditions when off-site mitigation will be allowed or preferred. Innovative techniques such as wetland banking (advance mitigation) should be addressed in SMPs. SMP restoration plans should help identify priority sites and types of sites for the most effective off-site restoration activities.

3. A compliance strategy should include a mechanism to document project review actions and a method to periodically evaluate the cumulative effects of authorized shoreline development. The compliance strategy should include inspection of development projects, and identify priorities for enforcement to improve protection of the most significant shoreline features and functions.

Figure 4-2: SMPs must include regulations that require developers to follow mitigation sequencing. Restoration will also be needed in order to achieve no net loss.

During the planning process, incomplete information about a potential future development and its impacts limits your ability to address no net loss. To close this information gap, unanticipated development impacts are identified through more detailed, site-specific information received at the permit review level.

Project review completes the Guidelines' combined planning and permit review framework for achieving no net loss. It assures that unanticipated impacts will still be subject to a cumulative impacts evaluation as applications for shoreline exemptions, conditional uses, and shoreline permits are reviewed.

WAC 173-26-201(3)(d)(iii):For development projects that may have unanticipatable or uncommon impacts that cannot be reasonably identified at the time of master program development, the master program policies and regulations should use the permitting or conditional use permitting processes to ensure that all impacts are addressed and that there is no net loss of ecological function of the shoreline after mitigation.

One way to comply with the SMP Guidelines requirement is to apply an established mitigation sequence such as that in the State

Environmental Policy Act (*SEPA* - *WAC 197-11-768*) on a case-by-case basis during project review.

Another way is through a conditional use permit (CUP). CUPs are automatically required for unanticipated types of development ("unclassified" uses). The SMP also may require CUPS for developments in which the impacts cannot be fully known at the planning level. Through the CUP review process, "consideration shall be given to the cumulative impact of additional requests for like actions in the area" [*WAC 173-27-160(2)*].

Potential no net loss indicators

Local planners working on SMP updates have asked for a tool to measure no net loss. In response, Ecology staff scientists and planners, with input from several state agencies and local governments, developed a list of potential No Net Loss indicators for Shoreline Master Programs (Table 4-1, below). This table of indicators can be used by local governments to help track the status of shoreline functions. Tracking several indicators can help to meet the "no net loss" of shoreline ecological functions standard of the SMP Guidelines.

The table shows 15 potential indicators and the type of measurement for each, such as acres, linear feet, number, percent cover, etc. The table shows the shoreline functions – water quality, water quantity and habitat – that are affected by the indicator, as well as specific impairments related to the indicator. Other columns include limitations for using the indicators, where the indicators are best used, and the availability of data. The indicators are limited to the area within shoreline jurisdiction where SMP regulations are implemented.

Figure 4-3: The linear length or area of bulkheads may be used as an indicator of no net loss of shoreline ecological functions. Photo by Hugh Shipman.

Measuring and continuing to track these indicators can give you a picture of shoreline conditions and ecological functions. The indicators can be measured to track loss or gain. For example, the length of shoreline stabilization may increase or decrease, or the acreage of riparian vegetation may increase or decrease. As conditions change over time, you may need to make changes to your SMP if tracking the indicators shows that your community is not achieving "no net loss" of shoreline ecological functions.

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
Forest cover: Acres converted from forest land to other land uses.	Water quality–sediment, nutrients & toxic filtration, conversion, and/or retention; temperature regulation. Water quantity–flow regulation. Habitat-structure for habitat life needs; input of organics & LWM*.	Reduces forest buffers and decreases filtering, conversion, and/or retention of pollutants from surface & subsurface flow; increases quantity of pollutants to aquatic habitats. Alters the delivery and timing of water to aquatic areas, increasing quantity of water delivered to aquatic habitats during high and low flows, which affects habitat structures. Increases water temperature. Loss of nesting sites, rearing, refuge & foraging areas.	Doesn't identify future land use. May be difficult to determine acres in shoreline jurisdiction without finer scale analysis.	Rural.***	Details of application available from DNR and local government. Class IV forest practice applications. CCAP data.
Shoreline stabilization: Linear length or area of bulkheads, revetments, bioengineering, seawalls, groins, retaining walls,	Habitat-Riparian and aquatic habitat, sediment supply. Input of organics, prey base, & LWM. Structure for habitat life needs.	Interrupts habitat-forming processes, such as beaches & channel migration, by impacting sediment supply and transport. Loss of nesting sites, rearing, refuge & foraging areas. Loss of prey base with	Combines different types of stabilization measures into one general category; impacts may vary.	Rural, urban.	Is data available from local government, including permits & SDP exempt projects? Can locals track over time? HPA information can supplement other data, but is not sufficient on

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
gabions. (Includes decrease in length, change to soft structure.)		associated loss of riparian vegetation.			its own. Detailed aerial photos may also show stabilization changes.
Marine & freshwater riparian vegetation: Linear measurement of mature native riparian vegetation of a given width (buffer width) or percent cover of different vegetation classes.	Water quality–sediment, phosphorus & toxic filtration, conversion, and/or retention; temperature regulation. Water quantity–flow regulation. Habitat-input of organics, prey base, & LWM. Structure for habitat life needs.	Removes capacity of riparian vegetation to filter surface flows, sediment, phosphorous and toxics; subsurface removal or conversion of nitrogen, pathogens. Increases overland and subsurface flows. Increases water temperature. Reduces prey base. Loss of LWM that provides instream structure. Loss of nesting sites, rearing, refuge & foraging areas.	No permit, so no record of change. Focused project needed to track. Useful only if a baseline exists. Methodology needs to be able to measure change. May be difficult to measure over short time frame.	Rural, urban.	Can locals measure and track? Use sample areas, aerial photos. Puget Sound LIDAR consortium has some data.
Acres of permanently protected areas, with no or limited development: Public ownership, current use/PBRS, conservation	Water quality–sediment, phosphorus & toxic filtration, conversion, and/or retention; temperature regulation. Water quantity-flow regulation.	Loss of nesting sites, rearing, refuge & foraging areas.	How measure degree of protection? Limit to protected areas with no development? Difficult to connect with specific functions.	Rural, urban.	Need info on ownership, PBRS, easements. Other info available from county auditor and assessor? Land trusts. NRCS and state agencies are also

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
easements, fee ownerships, NGOs.	Habitat- Riparian and aquatic habitat, sediment supply. Input of organics, prey base, & LWM. Structure for habitat life needs.				sources for permanently protected lands.
Piers/docks/floats, overwater structures: Number of structures, square footage of new and replacement. Or track grating, piling, construction materials.	Habitat. Water quality-toxics.	Increase in predation, reduction in light and aquatic vegetation and simplification of food web.	All docks not same – i.e. grating, materials vary, location affects impacts. New docks partially mitigate impacts.	Rural, urban.	Is data available from local government, including permits and SDP exempt projects? Can locals track over time? Use DNR data – number of and area over water. HPA information can supplement other data, but is not sufficient on its own. Good to monitor late spring/early summer.
Road lengths (feet) within 200 feet of water body.	Water quantity. Water quality. Habitat- connectivity.	Intercepts and changes timing of flows to aquatic habitat. Increases sediment and toxics.	Is there much new road development in shoreline jurisdiction?	Rural, urban.	Data available from DNR, local governments and WSDOT. CCAP data needs analysis to provide relevant information.
Number of road crossings of water bodies -bridges, culverts.	Habitat - Instream functions. Water quality.	Simplifies stream habitat structure, increases channel confinement and interrupts habitat forming processes.	Is there much new road development in shoreline jurisdiction? Distinguishing between fish friendly crossings	Rural, urban.	Culvert inventories vary in quality. WDFW has fish passage barrier data, but it is incomplete. Remote sensing data? SHIAPP

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
		Increases delivery of pollutants.	and others. Combining broad range of activities.		data? CCAP data needs analysis to provide relevant information.
Water quality: 303(d) list. All water quality parameters such as temperature, dissolved oxygen, fecal coliform, heavy metals, toxics, organics and biological indices (e.g., Biological Index of Biotic Integrity). Shellfish listings closures.	Water quality.	Impairment is specific to type of listed 303(d) issue (e.g. increased temperature, low dissolved oxygen, increased fecal coliform, heavy metals and toxic organics.)	How relate to functions? Some impacts from outside shoreline jurisdiction. Only impaired waters are listed & measured; no WQ improvement project in place. No criteria to remove from list. Sampling methodology changes, not always comparable. Marine & fresh water lists updated in alternating 2-year cycles. Some impacts from outside shoreline jurisdiction and municipality. Emergency closures updated regularly. Uneven data. Changes may be too frequent for NNL purposes. Limited to	Rural, urban.	Accessible data from Ecology. Is water body on or off list? In some cases, only a portion (e.g., reach) of a water body is listed. 303(d) – comprehensive, Dept of Health Shellfish Program.

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
			fecal coliform. Reflects impacts on human health, not shellfish health.		
Levees/dikes: Linear feet, floodplain area gained from levee setbacks.	Water quality –sediment removal, temperature regulation. Water quantity–water storage, flooding. Habitat–structure for habitat life needs (e.g., low LWM, stream bed aggradation, river mouth progradation).	Impairs natural flooding regime. Reduces floodplain sediment retention, denitrification and hyporheic functions. Decreases groundwater storage and base flows. Interferes with formation of habitat structure such as distributary channels in tidal and riparian and in-channel and off-channel habitat in freshwater settings. Removes habitat structure for nesting, rearing, refuge and foraging.	Can change in habitat quality as a result of levee/dikes be easily measured? Various types and locations of levees & dikes are lumped together. Types of openings in levees and dikes vary; impacts may vary.	Rural, urban.	Measure increase/decrease in lineal feet, quality of levee related to riparian vegetation & slope. Is data from local governments or FEMA?
Floodplain area: Acres allowed to flood –tidal and river (lack of flood control and lack of other structures such as houses.)	Water quality – removal of toxics, sediment, phosphorous and pathogens through adsorption, filtration and retention. Removal of nitrogen through	Impairment similar to that for levees & dikes with loss of floodplain from diking & filling.	Availability of data, maintenance of data.	Rural, urban.	Do local governments measure this for shoreline inventory? FEMA floodplain info available.

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS					
Indicator (all in shoreline jurisdiction)	**Functions affected – key categories – water quality, water quantity and habitat**	**Type of Impairment****	**Limitations of indicator**	**Where**	**Is data available or reasonable to obtain**
	denitrification. Temperature regulation. Water quantity – water storage and flow regulation and reduction in downstream flooding. Habitat - formation of habitat structure from LWM, vegetation communities and sediment type/channel configuration that support habitat life needs. Input of organics and prey base.				
Number of bald eagle & osprey nests & roosts & great blue heron rookeries.	Habitat – structure for habitat life needs.	Indicator of impaired habitat.	More suitable for counties than cities.	Rural.	WDFW data – most up-to-date for eagles.
Percent cover of invasive species in riparian zones.	Habitat – Riparian and aquatic habitat, sediment supply. Input of organics & LWM. Structure for habitat life needs.	Overwhelms native plants, compromising ecosystem. Potential effect on physical structure and food web dynamics.	Requires field work. May be useful if data set is available. Use Noxious Weeds list to define invasive species?	Rural, urban.	Is data available? Conservation districts? WA Invasive Species Council? (working on baseline assessment due in May 2011)
Impervious surface area.	Water quality – removal of toxics, sediment, phosphorous and	Reduces vegetative buffers and decreases filtering of	Covered by other indicators? Percentage increase in developed	Urban	Aerial photos or other remote sensing techniques show

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
	pathogens through adsorption, filtration and retention. Removal of nitrogen through denitrification. Temperature regulation. Water quantity – water storage and flow regulation and reduction in downstream flooding. Habitat - formation of habitat structure from LWM, vegetation communities and sediment type/channel configuration that support habitat life needs. Input of organics.	pollutants from surface & subsurface flow. Alters the delivery and timing of water to aquatic areas, increasing quantity of water and pollutants delivered to aquatic habitats during high and low flows, which affects habitat structure. Increases water temperature Reduces prey base (by associated removal of vegetation) Loss of nesting sites, rearing, refuge & foraging areas.	urban areas would be small and may not be useful indicator. Some land surface cover layers are inaccurate, e.g. showing impervious for clearcut forest.		impervious cover. Local governments require new impervious information in permit applications.
Wetlands acreage: Fill of natural wetlands and constructed or engineered wetlands. This includes nearshore tidal estuaries.	Water Quality – Wetlands filter pollutants and store sediment. Water Quantity – Affect groundwater storage and flow regulation. Habitat – Affects habitat structure, results in loss of wetland vegetation	Changes to natural hydrological, chemical, and physical regimes affect the production and succession of a wetland's ecology, and therefore its functions and values.	Difficult to track. Could be covered in other indicators (impervious surface and water quality), however other indicators don't get at wetland conversion to non-impervious land use such as landscaping or	Rural, urban	Is data available? Local permit tracking? Ecology? Core of Engineers?

TABLE 4-1: POTENTIAL NO NET LOSS INDICATORS for SHORELINE MASTER PROGRAMS

Indicator (all in shoreline jurisdiction)	Functions affected – key categories – water quality, water quantity and habitat	Type of Impairment**	Limitations of indicator	Where	Is data available or reasonable to obtain
	communities that support habitat life needs.		agriculture. May require field work.		
Area of seagrasses, kelp and emergent aquatic vegetation.	Habitat – structure for habitat life needs, including food and shelter for many species.	Decreases in aquatic vegetation such as eelgrass and kelp results in loss of food and shelter for many species.	Multiple factors affect growth and sustainability of aquatic vegetation.	Aquatic	Seagrass, kelp and emergent aquatic vegetation data along shoreline available from DNR Shorezone. (1994-2000) More recent local data available at those sites that are among the stratified randomly sampled sites.

* LWM – Large Woody Material

** For some indicators, decreasing the length or area of the indicator would result in a benefit to shoreline functions (e.g., shoreline stabilization, piers & docks.) For other indicators, increasing the length or area of the indicator would result in a benefit to functions (e.g. forest cover, riparian vegetation.)

*** Rural includes rural residential, agricultural and forestry areas.

CCAP – Coastal Change Analysis Program

NGO – Non-government organization

PBRS – Public Benefit Rating System

NRCS – National Resource Conservation Service

Inventory provides baseline

A baseline of shoreline ecological conditions is necessary in order to use indicators. You need a starting point. Fortunately, the shoreline inventory and characterization provide the baseline for measuring no net loss. The best time to collect data related to the indicators is during the shoreline inventory.

Some local governments have completed their inventory, and don't plan on collecting new data in the near future. Existing inventory data should provide good information for some of the indicators – impervious surfaces, levees and dikes, shoreline stabilization, floodplains, vegetation, overwater structures – as they are required as part of the inventory, to the extent that such information is available.

If you are working on the inventory now or will be in the future

Look at the indicators list. Consider what you now know about your shorelines. Are you aware of extensive riparian vegetation, a large number of eagle nests, water quality problems or limited shoreline armoring? Would these indicators be able to be counted as part of the inventory and tracked over time? What about other indicators? As you work on the inventory, keep the potential indicators in mind. If you find out there aren't any eagle nests, they would not be a good indicator for your community. If you learn there are many feet of roads in shoreline jurisdiction, and there are also long-term plans to remove some road lengths, road length may be a good indicator. Keep in mind that data about the indicators needs to be available now and in the future.

If your inventory is complete

Look at the indicators list. Consider your shoreline conditions and the inventory information that you have available. Are several of the indicators on the list reflected in your inventory? Does your inventory include the amount of shoreline stabilization or overwater structures such as piers and docks (this information is commonly included in inventories.) If so, you can choose several indicators from the list. If Ecology's potential indicators are not applicable to your shorelines, what inventory information could be useful as one or more indicators?

Selecting other indicators

If Ecology's potential indicators are not appropriate for your shoreline, you may develop your own. Your local government may have data specific to your shorelines that could be useful for indicators. These indicators should be relevant to the regulatory authority that your local government has over factors that affect the indicators. If an upstream city's activities have significant effects on water quality along your shoreline, then water quality is not an appropriate indicator to measure net loss or gain that can be attributed to your local government's actions. When determining what indicators to use, consider the following criteria:

- Data are available, reliable and can be gathered in a consistent manner over time. Note that data may be specific for some areas and not available for other areas

within your jurisdiction. Example, current eelgrass data are available for some nearshore areas and not others.

- The data selected for measurement provide an indication of ecological function within shoreline jurisdiction.
- Indicators are relevant to implementation of local policies and regulations. The number of orcas that pass by offshore is not a reflection of your local SMP's effectiveness, as orcas can range through the waters of many jurisdictions, even going out of state or country.
- Data have the potential to show change over a relatively short time period.
- Indicators are used by other agencies such as the Puget Sound Partnership.

An indicator may be present throughout your shoreline jurisdiction, such as impervious surfaces in urban areas, or limited to one or several shoreline reaches, such as freshwater riparian vegetation. A small percent reduction of impervious surfaces throughout shoreline jurisdiction could have significant positive effects on shoreline functions. On the other hand, the loss of riparian vegetation in one or several reaches could have significant detrimental impacts on shoreline functions. You could choose one or two indicators that occur throughout shoreline jurisdiction and several other indicators that occur in one or several reaches where a gain or loss represents a substantial change to shoreline functions.

Choosing appropriate indicators

Choose indicators that represent habitat, water quantity and water quality in your community. For example, shoreline stabilization affects habitat; forest cover affects habitat, water quantity and water quality; and the 303(d) list reflects water quality. This combination of indicators, if they adequately represent your shorelines, would be good to track.

The indicators you choose should take into account the anticipated future development along your shorelines. Projecting "reasonably foreseeable future development and use of the shoreline" is part of the Cumulative Impacts Analysis. If you expect that urban, suburban or high intensity development will occur along the shoreline, consider indicators related to such development. These may include impervious surface area, shoreline stabilization, overwater structures, riparian vegetation, road lengths or invasive species, among others.

Figure 4-4: Riparian vegetation, overwater structures and impervious surfaces are potential indicators of no net loss.

Keep in mind any restoration that you expect to occur. If your plans call for removing bulkheads and restoring habitat, appropriate indicators might be riparian vegetation, eagle and osprey nests, and the length of shoreline armoring.

Avoid choosing an indicator that does not represent your shoreline, for example, forest cover if forest cover would not occur naturally. Avoid choosing several indicators that may represent the same impacts on ecological function – e.g., riparian vegetation in a relatively undeveloped area, and acres of permanently protected areas in the same location.

Tracking indicators

Develop a process and method to track the indicators. The SMP Guidelines state, "Master programs or other local permit review ordinances addressing shoreline project review shall include a mechanism for documenting all project review actions in shoreline areas. Local governments shall also identify a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions. This process could involve a joint effort by local governments, state resource agencies, affected Indian tribes, and other parties" **[**WAC 173-26-191(2)(a)(iii)(D)].

Tracking your indicators can help you determine whether you are achieving no net loss. Determine how often you will measure your indicators – annually, when you update your SMP, or something in between? What do the indicators tell you compared with the baseline? How will the information be analyzed? Figure out early what you will be looking for, how it will be measured, and what it might mean.

Some options for tracking indicators:

- Track through the permit process. This may work for some development features, such as impervious surface coverage, length of bulkheads, and vegetation clearing. Developments that are exempt from the requirements for a Shoreline Substantial Development permit usually need local building or other permits. How often will these be checked? Can you keep a running tally, or run a software program annually?
- Track through local data that is updated regularly.
- Track through state or federal or other data sources. Who in your department will follow up, and when should that happen? (Refer to the indicators table for potential data sources.)
- Track changes through aerial photos or shoreline field visits, on land and water. Identify the process you will use.

Reporting use of indicators

The SMP Guidelines require local governments to show how NNL will be achieved, although specific indicators are not required. However, you are required to show in the Cumulative Impacts Analysis and No Net Loss report how the SMP will achieve no net loss when implemented over time. Your choice of indicators, rationale for choosing them, and explanation of how they will be tracked and evaluated should be discussed in these reports. Your SMP also can discuss how you will use indicators to show whether you are achieving no net loss.

Shoreline Master Program Guidelines

SMP Guidelines specifically addressing No Net Loss

WAC 173-26-186

(8) Through numerous references to and emphasis on the maintenance, protection, restoration, and preservation of "fragile" shoreline "natural resources," "public health," "the land and its vegetation and wildlife," "the waters and their aquatic life," "ecology," and "environment," the act makes protection of the shoreline environment an essential statewide policy goal consistent with the other policy goals of the act. It is recognized that shoreline ecological functions may be impaired not only by shoreline development subject to the substantial development permit requirement of the act but also by past actions, unregulated activities, and development that is exempt from the act's permit requirements. The principle regarding protecting shoreline ecological systems is accomplished by these guidelines in several ways, and in the context of related principles. These include:

(a) Local government is guided in its review and amendment of local master programs so that it uses a process that identifies, inventories, and ensures meaningful understanding of current and potential ecological functions provided by affected shorelines.

(b) Local master programs shall include policies and regulations designed to achieve **no net loss** of those ecological functions.

(i) Local master programs shall include regulations and mitigation standards ensuring that each permitted development **will not cause a net loss** of ecological functions of the shoreline; local government shall design and implement such regulations and mitigation standards in a manner consistent with all relevant constitutional and other legal limitations on the regulation of private property.

(ii) Local master programs shall include regulations ensuring that exempt development in the aggregate **will not cause a net loss** of ecological functions of the shoreline.

SMP Guidelines generally addressing environmental protection and related to No Net Loss

Scientific and technical information

WAC 173-26-201(2)(a)
(a) **Use of scientific and technical information.** To satisfy the requirements for the use of scientific and technical information in RCW 90.58.100(1), local governments shall incorporate the following two steps into their master program development and amendment process.

First, identify and assemble the most current, accurate, and complete scientific and technical information available that is applicable to the issues of concern. The context, scope, magnitude, significance, and potential limitations of the scientific information should be considered. At a minimum, make use of and, where applicable, incorporate all available scientific information, aerial photography, inventory data, technical assistance materials, manuals and services from reliable sources of science….

Second, base master program provisions on an analysis incorporating the most current, accurate, and complete scientific or technical information available. Local governments should be prepared to identify the following:

(i) Scientific information and management recommendations on which the master program provisions are based;

(ii) Assumptions made concerning, and data gaps in, the scientific information; and

(iii) Risks to ecological functions associated with master program provisions. Address potential risks as described in WAC 173-26-201 (3)(d).

Shoreline ecological functions

WAC 173-26-201(3)(d)(i):
(C) Shoreline ecological functions include, but are not limited to:

In rivers and streams and associated flood plains:

Hydrologic: Transport of water and sediment across the natural range of flow variability; attenuating flow energy; developing pools, riffles, gravel bars, recruitment and transport of large woody debris and other organic material.

Shoreline vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, sediment removal and stabilization; attenuation of flow energy; and provision of large woody debris and other organic matter.

Hyporheic functions: Removing excessive nutrients and toxic compound, water storage, support of vegetation, and sediment storage and maintenance of base flows.

Habitat for native aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction; resting, hiding and migration; and food production and delivery.

In lakes:

Hydrologic: Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, recruitment of large woody debris and other organic material.

Shoreline vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, attenuating wave energy, sediment removal and stabilization; and providing woody debris and other organic matter.

Hyporheic functions: Removing excessive nutrients and toxic compound, water storage, support of vegetation, and sediment storage and maintenance of base flows.

Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery.

In marine waters:

Hydrologic: Transporting and stabilizing sediment, attenuating wave and tidal energy, removing excessive nutrients and toxic compounds; recruitment, redistribution and reduction of woody debris and other organic material.

Vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, attenuating wave energy, sediment removal and stabilization; and providing woody debris and other organic matter.

Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery.

Wetlands:

Hydrological: Storing water and sediment, attenuating wave energy, removing excessive nutrients and toxic compounds, recruiting woody debris and other organic material.

Vegetation: Maintaining temperature; removing excessive nutrients and toxic compound, attenuating wave energy, removing and stabilizing sediment; and providing woody debris and other organic matter.

Hyporheic functions: Removing excessive nutrients and toxic compound, storing water and maintaining base flows, storing sediment and support of vegetation.

Habitat for aquatic and shoreline-dependent birds, invertebrates, mammals; amphibians; and anadromous and resident native fish: Habitat functions may include, but are not limited to, space or conditions for reproduction, resting, hiding and migration; and food production and delivery.

(D) The overall condition of habitat and shoreline resources are determined by the following ecosystem-wide processes and ecological functions:

The distribution, diversity, and complexity of the watersheds, marine environments, and landscape-scale features that form the aquatic systems to which species, populations, and communities are uniquely adapted.

The spatial and temporal connectivity within and between watersheds and along marine shorelines. Drainage network connections include flood plains, wetlands, upslope areas, headwater tributaries, and naturally functioning routes to areas critical for fulfilling life history requirements of aquatic and riverine-dependent species.

The shorelines, beaches, banks, marine near-shore habitats, and bottom configurations that provide the physical framework of the aquatic system.

The timing, volume, and distribution of woody debris recruitment in rivers, streams and marine habitat areas.

The water quality necessary to maintain the biological, physical, and chemical integrity of the system and support survival, growth, reproduction, and migration of individuals composing aquatic and riverine communities.

The sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

The range of flow variability sufficient to create and sustain fluvial, aquatic, and wetland habitats, the patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows, and duration of flood plain inundation and water table elevation in meadows and wetlands.

The species composition and structural diversity of plant communities in river and stream areas and wetlands that provides summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of woody debris sufficient to sustain physical complexity and stability.

(E) Local governments should use the characterization and analysis called for in this section to prepare master program policies and regulations designed to achieve **no net loss** of ecological functions necessary to support shoreline resources and to plan for the restoration of the ecosystem-wide processes and individual ecological functions on a comprehensive basis over time.

Precautionary principle

WAC 173-26-201(3)(g)
The level of detail of inventory information and planning analysis will be a consideration in setting shoreline regulations. 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. If there is a question about the extent or condition of an existing ecological

resource, then the master program provisions shall be sufficient to reasonably assure that the resource is protected in a manner consistent with the policies of these guidelines.

Mitigation sequencing

WAC 173-26-201(2)
(e) **Environmental impact mitigation.**

(i) To assure **no net loss** of shoreline ecological functions, master programs shall include provisions that require proposed individual uses and developments to analyze environmental impacts of the proposal and include measures to mitigate environmental impacts not otherwise avoided or mitigated by compliance with the master program and other applicable regulations. To the extent Washington's State Environmental Policy Act of 1971 (SEPA), chapter 43.21C RCW, is applicable, the analysis of such environmental impacts shall be conducted consistent with the rules implementing SEPA, which also address environmental impact mitigation in WAC 197-11-660 and define mitigation in WAC 197-11-768. Master programs shall indicate that, where required, mitigation measures shall be applied in the following sequence of steps listed in order of priority, with (e)(i)(A) of this subsection being top priority.

(A) Avoiding the impact altogether by not taking a certain action or parts of an action;

(B) Minimizing impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts;

(C) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

(D) Reducing or eliminating the impact over time by preservation and maintenance operations;

(E) Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and

(F) Monitoring the impact and the compensation projects and taking appropriate corrective measures.

(ii) In determining appropriate mitigation measures applicable to shoreline development, lower priority measures shall be applied only where higher priority measures are determined to be infeasible or inapplicable.

Consistent with WAC 173-26-186 (5) and (8), master programs shall also provide direction with regard to mitigation for the impact of the development so that:

(A) Application of the mitigation sequence achieves **no net loss** of ecological functions for each new development and does not result in required mitigation in excess of that necessary to assure that development will result in **no net loss** of shoreline ecological functions and not have a significant adverse impact on other shoreline functions fostered by the policy of the act.

(B) When compensatory measures are appropriate pursuant to the mitigation priority sequence above, preferential consideration shall be given to measures that replace the impacted functions directly and in the immediate vicinity of the impact. However, alternative compensatory mitigation within the watershed that addresses limiting factors or identified critical needs for shoreline resource conservation based on watershed or comprehensive resource management plans applicable to the area of impact may be authorized. Authorization of compensatory mitigation measures may require appropriate safeguards, terms or conditions as necessary to ensure **no net loss** of ecological functions.

Shoreline inventory and characterization

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 water-oriented uses and related navigation, transportation and utility facilities.

(ii) Critical areas, including wetlands, aquifer recharge areas, fish and wildlife conservation areas, geologically hazardous areas, and frequently flooded areas. See also WAC 173-26-221.

(iii) Degraded areas and sites with potential for ecological restoration.

(iv) Areas of special interest, such as priority habitats, developing or redeveloping harbors and waterfronts, previously identified toxic or hazardous material clean-up sites, dredged material disposal sites, or eroding shorelines, to be addressed through new master program provisions.

(v) Conditions and regulations in shoreland and adjacent areas that affect shorelines, such as surface water management and land use regulations. This information may be useful in achieving mutual consistency between the master program and other development regulations.

(vi) Existing and potential shoreline public access sites, including public rights of way and utility corridors.

(vii) General location of channel migration zones, and flood plains.

(viii) Gaps in existing information. During the initial inventory, local governments should identify what additional information may be necessary for more effective shoreline management.

(ix) If the shoreline is rapidly developing or subject to substantial human changes such as clearing and grading, past and current records or historical aerial photographs may be necessary to identify cumulative impacts, such as bulkhead construction, intrusive development on priority

habitats, and conversion of harbor areas to nonwater-oriented uses.

(x) If archaeological or historic resources have been identified in shoreline jurisdiction, consult with the state historic preservation office and local affected Indian tribes regarding existing archaeological and historical information.

WAC 173-26-201(3)(d)
Analyze shoreline issues of concern. Before establishing specific master program provisions, local governments shall analyze the information gathered in (c) of this subsection and as necessary to ensure effective shoreline management provisions, address the topics below, where applicable.

(i) **Characterization of functions and ecosystem-wide processes.**
(A) Prepare a characterization of shoreline ecosystems and their associated ecological functions. The characterization consists of three steps:

(I) Identify the ecosystem-wide processes and ecological functions based on the list in (d)(i)(C) of this subsection that apply to the shoreline(s) of the jurisdiction.

(II) Assess the ecosystem-wide processes to determine their relationship to ecological functions present within the jurisdiction and identify which ecological functions are healthy, which have been significantly altered and/or adversely impacted and which functions may have previously existed and are missing based on the values identified in (d)(i)(D) of this subsection; and

(III) Identify specific measures necessary to protect and/or restore the ecological functions and ecosystem-wide processes.

Use analysis

WAC 173-26-201(3)(d)
(ii) **Shoreline use analysis and priorities.** Conduct an analysis to estimate the future demand for shoreline space and potential use conflicts. Characterize current shoreline use patterns and projected trends to ensure appropriate uses consistent with chapter 90.58 RCW and WAC 173-26-201 (2)(d) and 173-26-211(5).

If the jurisdiction includes a designated harbor area or urban waterfront with intensive uses or significant development or redevelopment issues, work with the Washington state department of natural resources and port authorities to ensure consistency with harbor area statutes and regulations, and to address port plans. Identify measures and strategies to encourage appropriate use of these shoreline areas in accordance with the use priorities of chapter 90.58 RCW and WAC 173-26-201 (2)(d) while pursuing opportunities for ecological restoration.

Cumulative Impacts

WAC 173-26-186

(d) Local master programs shall evaluate and consider cumulative impacts of reasonably foreseeable future development on shoreline ecological functions and other shoreline functions fostered by the policy goals of the act. To ensure **no net loss** of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts among development opportunities. Evaluation of such cumulative impacts should consider:

(i) Current circumstances affecting the shorelines and relevant natural processes;

(ii) Reasonably foreseeable future development and use of the shoreline; and

(iii) Beneficial effects of any established regulatory programs under other local, state, and federal laws.

It is recognized that methods of determining reasonably foreseeable future development may vary according to local circumstances, including demographic and economic characteristics and the nature and extent of local shorelines.

(e) The guidelines are not intended to limit the use of regulatory incentives, voluntary modification of development proposals, and voluntary mitigation measures that are designed to restore as well as protect shoreline ecological functions.

Restoration Planning

WAC 173-26-186(8)
(c) For counties and cities containing any shorelines with impaired ecological functions, master programs shall include goals and policies that provide for restoration of such impaired ecological functions. These master program provisions shall identify existing policies and programs that contribute to planned restoration goals and identify any additional policies and programs that local government will implement to achieve its goals. These master program elements regarding restoration should make real and meaningful use of established or funded nonregulatory policies and programs that contribute to restoration of ecological functions, and should appropriately consider the direct or indirect effects of other regulatory or nonregulatory programs under other local, state, and federal laws, as well as any restoration effects that may flow indirectly from shoreline development regulations and mitigation standards.

WAC 173-26-201(2)(f)
Shoreline restoration planning. Consistent with principle WAC 173-26-186 (8)(c), master programs shall include goals, policies and actions for restoration of impaired shoreline ecological functions. These master program provisions should be designed to achieve overall improvements in shoreline ecological functions over time, when compared to the status upon adoption of the master program. The approach to restoration planning may vary significantly among local jurisdictions, depending on:

- The size of the jurisdiction;

• The extent and condition of shorelines in the jurisdiction;

• The availability of grants, volunteer programs or other tools for restoration; and

• The nature of the ecological functions to be addressed by restoration planning.

Master program restoration plans shall consider and address the following subjects:

(i) Identify degraded areas, impaired ecological functions, and sites with potential for ecological restoration;

(ii) Establish overall goals and priorities for restoration of degraded areas and impaired ecological functions;

(iii) Identify existing and ongoing projects and programs that are currently being implemented, or are reasonably assured of being implemented (based on an evaluation of funding likely in the foreseeable future), which are designed to contribute to local restoration goals;

(iv) Identify additional projects and programs needed to achieve local restoration goals, and implementation strategies including identifying prospective funding sources for those projects and programs;

(v) Identify timelines and benchmarks for implementing restoration projects and programs and achieving local restoration goals;

(vi) Provide for mechanisms or strategies to ensure that restoration projects and programs will be implemented according to plans and to appropriately review the effectiveness of the projects and programs in meeting the overall restoration goals.

Specific Shoreline Activity and Use Standards

Numerous additional specific references exist in the SMP Guidelines, requiring SMP regulations resulting in **no net loss** of shoreline ecological functions. Specific shoreline activity standards referencing NNL are located at:

WAC 173-26-221(2)(c)(ii)(C) and (D): Geologically hazardous areas.
WAC 173-26-221(2)(c)(iii)(C): Critical saltwater habitats
WAC 173-26-221(2)(c)(iv)(C): Critical freshwater habitats
WAC 173-26-221(3): Flood hazard reduction
WAC 173-26-221(4)(d): Public access
WAC 173-26-221(5): Shoreline vegetation conservation
WAC 173-26-221(6): Water quality, storm water and nonpoint pollution

WAC 173-26-231: Shoreline modifications, including shoreline stabilization, piers and docks, fill, breakwaters, jetties, groins and weirs, beach and dunes management, dredging and dredge material disposal, shoreline habitat and natural systems-enhancement projects.

Specific shoreline use standards referencing NNL are located at:

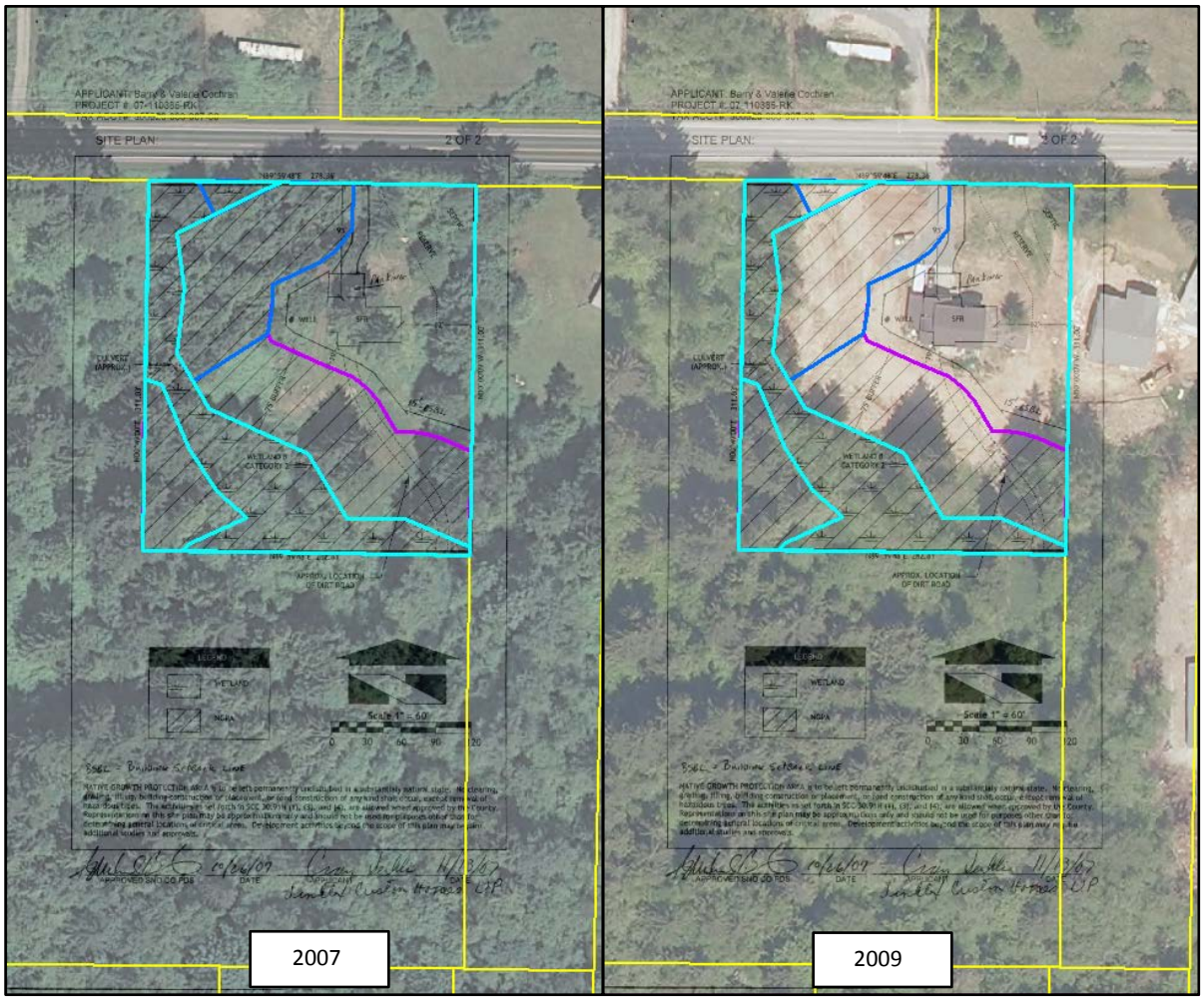
WAC 173-26-241(2)(a)(iv), addressing the following uses:
Agriculture
Aquaculture
Boating facilities
Commercial development
Forest practices
Industry
In-stream structural uses
Mining
Recreational development
Residential development
Transportation and parking
Utilities

Snohomish County

Critical Areas Monitoring Report

Analysis of the Effectiveness and Implementation of Permitting and Enforcement to Protect Critical Areas in Snohomish County

December 2014



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Executive Summary

This report provides the results and recommendations of the second phase of the Critical Areas Monitoring and Adaptive Management Plan that began in 2008 in accordance with the requirements contained in the Monitoring and Adaptive Management provisions of Part 700 of Snohomish County Code[1], and the "no net loss" policies contained in the County's comprehensive plan[2] and the Growth Management Act[3].

The objectives of this phase of the monitoring project were to analyze effectiveness and implementation of permits and enforcement in protecting critical areas[4] and their buffers by;

- measuring and summarizing clearing, grading, and construction related land cover change impacts on properties with development permits and enforcement cases in the period between November 1, 2007 and April 2013,
- summarizing and evaluating the critical areas review processes in the County's permit tracking system (AMANDA),
- summarizing the critical areas monitoring data recorded in AMANDA,
- and providing recommendations for improving critical protection in permitting and enforcement.

The first phase investigated changes in land cover, shoreline conditions along major rivers and lakes at a county-wide scale that occurred between 2007 and 2009; and an assessment of select ecological indicators to evaluate the effectiveness of code provisions in protecting aquatic environments. The results were published in the "Critical Areas and Shorelines Monitoring Status Report" (SWM, March 2012). That report did not analyze the effectiveness or implementation of permitting or enforcement in any depth.

The primary difference between the current effort and the earlier study is that the former was designed to detect county-wide changes in critical areas, while this effort investigated land cover change impacts in connection with permits and enforcement cases only.

The analysis of permitting and enforcement was divided into five Tasks;

I. Review of permits subject to the County's Critical Areas Regulations (CAR) with recorded Critical Areas Site Plans[5] (CASPs).
II. Review of permits subject to CAR without CASPs.
III. Review of forest practices permits subject to CAR.

[1] Part 700 of Chapter 30.62A of Snohomish County Code
[2] Natural Environment policies: NE 3.B.10, NE 5.A.7(c) and NE 7.B.1
[3] RCW 36.70A
[4] Wetlands, streams, lakes, marine shorelines and habitat for threatened and endangered species
[5] A CASP is a site development plan recorded with the County Auditor that identifies all critical areas, buffers and restricted areas occurring in close proximity to a development activity.

IV. Review of enforcement cases subject to CAR.
V. Review of critical areas monitoring data collected from permit applications.

Key Findings and Recommendations

- The total estimated area of land cover change impacts to critical areas and buffers on all of the properties reviewed for this study was 108.58 acres, which is a little more than 1 percent of the combined estimated total area of critical areas and buffers on the properties reviewed, and 0.35% of the total parcel area on these properties [Table 1].

- The majority occurred on properties with enforcement case investigations with 76.63 acres (70.3%[6]), followed by properties with critical areas site plans - 15.65 acres (14.3%), properties with forest practices permits - 13.67 acres (12.5%), and properties without CASPs - 3.11 acres (2.9%) [Table 1].

- The majority of the land cover change impacts occurred in wetlands with 55.94 acres (50.59%), followed by critical areas-buffer combinations – 27.48 acres (24.85%), buffers – 21.81 acres (19.72%), geologic hazard areas – 5.29 acres (4.78%), and lakes and marine shorelines each with less than $1/10^{th}$ of an acre each (<1% each).

- Impacts to non-CASP wetland buffers were not evaluated or included in this report due to the difficulty of classifying them to establish the buffer widths. However, given that the wetland impacts were >50% of the total, it's fair to assume that the non-CASP wetland buffer impacts would add significantly to the overall buffer impacts, exceeding the total documented wetland impacts.

- Annual permit applications subject to CAR[7] declined dramatically between November 2007 and April 2013, from a high of 1,555 in 2009 to a low of 606 in 2011, totaling just over 5,900 (fig. 1). No subdivisions were applied for and recorded during this time period. This limited the investigation to single family residential properties and a small number of commercial properties.

- A comparison of the wetlands mapped and recorded on Critical Areas Site Plans with 3 other wetland map sources; National Wetland Inventory (NWI) wetlands (USFWS, 2007), Snohomish County Department of Planning and Development Services wetlands (PDS, 2011) and Snohomish County Department of Public Works – Surface Water Management wetlands (SWM Wetlands, 2014) found that there was "agreement" on the presence of wetlands 69.3% of the time when all 3 map sources are used together. "Agreement" is used rather than "accuracy" due to the unknown accuracy of the wetlands from the 4 sources (CASPs, NWI, PDS & SWM). However for this study it was assumed that the wetlands on the CASPs were generally more accurate than the other 3 sources[8].

[6] Percent of total impacts
[7] CAR [30.62A SCC] applies to all *development activities, actions requiring project permits, clearing and agricultural Activities,*
[8] See Appendix C for comparison analysis

Specific Task Findings and Recommendations

- CASP document accuracy is generally poor. Problems with the accuracy of the scale, dimensions, structure locations, and the locations of critical areas, create difficulties with the interpretation and application of the CASP requirements by the permit applicants and the County without conducting additional research.

  Recommendations

  i. *Provide clear written CASP document instructions for staff and applicants.*
  ii. *Develop aerial photo template with parcel boundaries to assist staff and applicants.*
  iii. *Develop consistent method of documenting recorded CASPs in AMANDA.*

- Apparent misunderstandings of the applicability and exemptions in CAR and other development codes have been inconsistent and have led to, at minimum, cases where critical areas and buffers were present that should have been identified and recorded on CASPs, and others where the critical areas or buffers have been impacted without any reviews by the Department of Planning and Development Services (PDS).

  Recommendations

  i. *Provide additional Critical Areas Regulations training to staff on development permit thresholds, exemptions and applicability, particularly for CAR (30.62A, 30.62B, and 30.62C SCC[9]) Shorelines (30.44 SCC) and LDA (30.63B SCC) type permits.*

- For the non-CASP permits, Forest Practices permits and enforcement cases, there were 119 wetlands close enough (within 300 feet[10] of the *sites*[11]) to the observed land cover impacts to have had potential buffer impacts. Thirty six of the 119 impact areas occurred within an average calculated wetland buffer of 75 feet[12], and therefore are more likely to have had impacts.

  Recommendations

  i. *Provide additional Critical Areas Regulations training to staff on development permit thresholds, exemptions and applicability, particularly for CAR (30.62A, 30.62B) Shorelines (30.44 SCC) and LDA (30.63B SCC) type permits.*

- Forty one percent of the 300 properties with permits subject to CAR without CASPs had critical areas on or close enough to the properties to at least require critical areas site reviews and potentially CASPs and impact mitigation. Of the 41% that had critical areas

[9] Snohomish County Code
[10] 300 feet is the maximum buffer
[11] *Site* means lands within 200 feet of site disturbance 30.91S.350 SCC
[12] The 75 foot wetland buffer was derived by averaging the known buffers from all of the CASPs selected for this project.

or buffers on or close to the *sites*, 42% had no data entries in any of the CAR review process lines, making assessments of the permit review histories difficult.

Recommendations

i. *Provide additional Critical Areas Regulations training to staff on development permit thresholds, exemptions and applicability, particularly for CAR (30.62A, 30.62B) Shorelines (30.44 SCC) and LDA (30.63B SCC) type permits.*
ii. *Improve documentation in AMANDA of CAR review; including but not limited to; consistent use of CAR review and other relevant process lines, and vesting dated documentation.*

- Of the 53 enforcement case properties with impacts, there were 20 cases with approximately 13 acres of impacts where the resolution of the case may not have been consistent with the strict application of the code. Most of these cases were either closed, settled via a Notice of Violation or Voluntary Compliance Agreements, allowing property owners to avoid obtaining permits or approvals when they should have been required. Some of the enforcement cases were closed based on apparent misunderstandings of the applicabilities and exemptions contained in CAR (30.62A SCC), LDA (30.63B SCC) and State Forest Practices regulations.

  Recommendations

  i. *Provide additional training on development permit thresholds, exemptions and applicability, particularly for CAR (30.62A, 30.62B, and 30.62C SCC) Shorelines (30.44 SCC) and LDA (30.63B SCC) type permits.*
  ii. *Provide additional subject matter experts to support code enforcement staff with critical areas code interpretation and critical areas identification.*
  iii. *Improve documentation in AMANDA on the reasons cases are closed.*

- Inconsistent and poor documentation in the permit tracking system AMANDA made it difficult to draw conclusions why many of the permits were not reviewed for critical areas, or what transpired in the reviews that did occur.

  Recommendations

  i. *Improve documentation in AMANDA of CAR review; e.g., consistent use of process lines, vesting dates.*

- CAR monitoring data collected in AMANDA documenting impacts and mitigation was inconsistently provided. Missing and misunderstandings of how to input the data created unreliable information on critical area and buffer impacts that could not be used to summarize impact trends over time.

  Recommendations

  i. *Provide additional staff training to assure permit technicians, planners, engineers and environmental reviewers understand the data needs for CAR Monitoring.*
  ii. *Review and refine data monitoring fields in AMANDA.*

Table 1 - Land cover change summary for all Tasks

Task categories	Acres					Percent	
	Total parcel area	Est. area of wetlands on the parcels	Est. area of critical areas impacts[a]	Est. area of buffer impacts[b]	Est. area of land cover impacts to critical areas and buffers	Est. area of total land cover impacts /parcel area[d]	Est. area of total land cover impacts /total area of impacts for all Tasks[e]
permits w/ CASPs	4,907.31	978.68	6.67	8.98	15.65	0.32	14.3
permits w/out CASPs	23,261.81	3,658.05	2.92	0.19	3.11	0.01	2.9
forest practices permits	2,799.81	115.38	13.42	0.25	13.67	0.49	12.5
enforcement cases	5,308.67	1,284.60	65.80	10.84	76.63	1.44	70.3
Total	31,289.21	5,039.56	88.80	20.26	**108.58**[c]	0.35	100.0

[a] wetlands, streams, lakes, marine shorelines, and geologic hazard areas (geologic hazard areas are from CASPs only).

[b] buffers of streams, lakes, marine shorelines and wetlands (wetland buffers are from CASPs only).

[c] the actual overall total is 109.06 acres, but due to a small amount (0.48 acres) of overlap between the Task categories the total is 108.58 acres.

[d] (*Estimated total land cover impacts by Task*/*Total parcel area by Task*) x 100.

[e] (*Estimated total land cover impacts by Task*/*Total area of land cover impacts for all Tasks*) x 100.

In summary, the 108.58 acres of land cover change impacts to critical areas and buffers represent only 0.35% of the total area of the parcels investigated. Wetland impacts were less than 2% of the total area of wetlands on the same parcels. In comparison, the monitoring report published by the Department of Public Works in 2012 (SWM, March 2012) found that 0.4% of the wetlands throughout incorporated Snohomish County had been impacted in the period between 2007 and 2010. Neither of the wetland impact findings approaches the 3% threshold that was recommended in the County's Monitoring and Adaptive Management Plan (SWM, 2008) for an adaptive management action.

There were no specific causes that would indicate that code changes are necessary. All of the recommendations in this report to improve critical areas protection are administrative, including changes to permit review processes, improving the collection of monitoring data and providing additional staff training.

Background

In October of 2007, Snohomish County adopted new Wetlands and Fish &Wildlife Habitat Conservation Areas regulations [30.62A SCC]. The regulations provide one element of a *multifaceted approach* for the protection of critical areas including both regulatory and non-regulatory programs. This multifaceted approach includes "planning; intergovernmental coordination; development of regulations; enforcement; and improved protection of ecological functions and values through non-regulatory incentive-based means, such as voluntary enhancement and restoration, public education and voluntary activity"[13].

This approach and the monitoring program that followed were primarily designed and implemented in response to two specific elements of the regulations with assumed or unknown potential impacts:

- Development on small, existing single family lots that cannot comply with the standard buffer and protection requirements, AND
- The unknown potential impacts associated with on-going agricultural activities.

Critical Areas Regulations Adoption Stay

Shortly before the adoption of the new county Critical Areas Regulations, the State of Washington stayed their application state-wide to agricultural activities pending a conflict resolution process mediated by the Ruckelshaus Center. The Ruckelshaus mediation culminated with the May 2011 adoption of a Volunteer Stewardship Program for the protection of critical areas[14].

In the time period between the stay and the publication of the new Volunteer Stewardship Program by the Ruckelshaus Center, Snohomish County was required to continue applying the prior versions of the County's Critical Areas Regulations to agricultural activities. On July 10, 2013, the County adopted new agricultural activities provisions into Chapters 30.62A SCC (Wetlands and Fish & Wildlife Habitat Conservation Areas) and 30.62B SCC (Geologic Hazard Areas).

Although the County originally intended to monitor the effectiveness of the new agricultural activities provisions contained in Chapter 30.62A and 30.62B SCC, the legislative stay created a new focus on monitoring the impacts associated with single family development.

Adoption of Monitoring Plan

A monitoring plan was developed to monitor the effectiveness and implementation of the County regulations, policies and programs by the Department of Planning and Development Services (PDS) and the Surface Water Management (SWM) division of the Department of Public Works.

[13] Chapter 30.62A SCC Adopting Ordinance; Sect. 2.L. – pages 12-13
[14] ESHB 1886

Chapter 30.62A SCC includes a requirement[15] that the "Executive develop and implement a monitoring and adaptive management program to establish a baseline and provide performance measures to determine whether the County is achieving no net loss through its policies and programs affecting wetlands and fish and wildlife habitat conservation areas, in conformance with the Natural Environment Element of the General Policy Plan of the comprehensive plan"[16].

In September 2008, PDS and SWM developed and the County Council adopted the Critical Area Monitoring and Adaptive Management Plan (SWM, 2008). The Plan provides the framework for assessing the effectiveness of the County's regulations, non-regulatory environmental programs, and policies at achieving no net loss of the functions and values of wetlands and fish and wildlife habitat conservation areas. The Plan includes an adaptive management framework to increase certainty of achieving the conservation goal of preventing a net loss of critical area functions and values. The plan consists of four main components:

- Land cover characterization and change detection analysis
- Shoreline conditions assessment;
- Paired catchment of functional headwater stream assessment, and
- Evaluation of code compliance and implementation for permits issued after adoption of CAR in 2007.

A status report was published in March, 2012 (SWM, March 2012). The report summarized progress and results from 2007 through 2010 on Snohomish County's critical area monitoring program. Some of the key findings were:

- The total area of identified wetland impacts was 97 acres, or 0.4% of the total area of wetlands estimated to be present in the area analyzed for the project.
- The total area of identified impacts to an assumed minimum wetland buffer of 25 feet was 105 acres.
- The percent of impacted critical areas and buffers was below the 3% trigger established in the monitoring plan for initiating an adaptive management action.
- Accuracy of the wetland prediction model is not certain.
- More field verification is needed to verify accuracy and determine causes of impacts.
- Improved documentation in AMANDA would improve the accuracy of future analysis.
- The 3 years of data collected for the headwater stream analysis was insufficient to make any conclusions regarding the effectiveness of CAR.
- The one time bank modification river and lake survey was insufficient to make any conclusions regarding the effectiveness of CAR.

[15]SCC 30.62A SCC PART 700
[16]GPP NE Objectives 3, 5 and 7; policies 3.B.10, 3.F.1, 5.A.6, and 7.B.1

CAR Monitoring - 2013

For this phase the emphasis was on analyzing the effectiveness and implementation of permitting and enforcement using high resolution aerial photography[17] at a parcel scale[18]. To accomplish this, 5 specific tasks were developed and investigated. For each of the tasks listed below there is a description of the task, methods, results, discussion and recommendations.

Tasks

I. Evaluate land cover changes in critical areas and buffers on properties with permits subject to the County's Critical Areas Regulations that have recorded Critical Areas Site Plans.
II. Evaluate land cover changes in critical areas and buffers on properties with permits subject to the County's Critical Areas Regulations that have do not have recorded CASPs.
III. Evaluate land cover changes in critical areas and buffers on properties with Class IV forest practices permits.
IV. Evaluate land cover changes in critical areas and buffer on properties with clearing, grading, drainage or building code enforcement complaints.
V. Evaluate the implementation and effectiveness of the monitoring procedures in the County's permit tracking system AMANDA used to track the presence and impacts to critical areas.

Properties with Permits Subject to CAR

Background

CAR Applicability

Chapters 30.62A SCC (Wetlands and Fish and Wildlife Habitat Conservation Areas) 30.62B SCC (Geologic Hazard Areas) applies to all *development activities*[19], *actions requiring project permits*[20], *and clearing*[21]. All of these permits or approvals either directly authorize some kind of land disturbing activity, like grading or building permits, or authorize a pattern, extent or type of development, like subdivisions or conditional use permits[22]. Most of the exemptions are for non-ground disturbing interior or exterior maintenance and repair of existing structures or ground disturbing activities that have very little or no ground disturbance associated with them.

Permit Application Reductions

Shortly after the adoption of the new critical areas regulations in October of 2007, new permit applications declined significantly due to economic conditions associated with recession (Figure

[17] 1 foot resolution digital ortho photography
[18] The earlier monitoring investigation used 8-foot resolution CIR 2007 QuickBird satellite imagery
[19] See definition in Appendix B
[20] See definition in Appendix B
[21] See definition in Appendix B
[22] See Appendix A for full list of permits subject to CAR

A). During the period between 2005 and 2011 overall permit applications were down more than 50%, from a high of approximately 8,000 to a low of approximately 3,000 permit applications. In fact, there were no subdivisions applied for between October 31, 2007 and April 1, 2013 that were completed and recorded by April 1, of 2013. Therefore, the primary emphasis for several of the Tasks of this analysis was on single family residential and commercial type permits.

Permit Tracking System - AMANDA

AMANDA is the permit tracking system used by the Department of Planning and Development Services that automates the steps involved with getting a permit including application, review, approval, issuance and inspections. AMANDA was used to identify and analyze numbers and types of permits, reviews, approvals, critical areas types and impacts from the effective date of the current Critical Areas Regulations on November 1 2007 until April 1, of 2013.

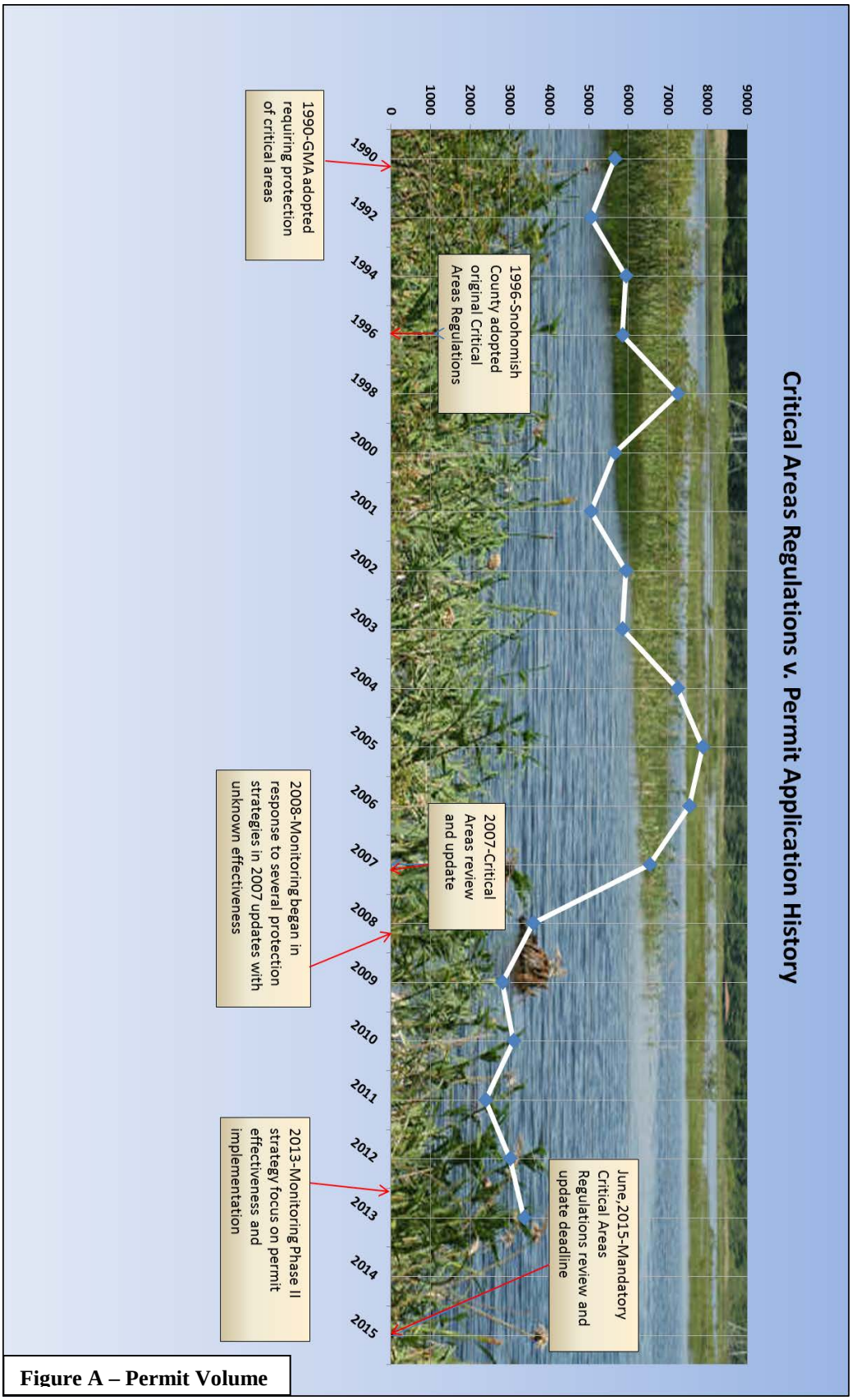


Figure A – Permit Volume

Methods

This section describes the general methods used in each of the analyses described and summarized in this report. Unless otherwise noted, the methods described here apply to all of the analysis conducted for this report. All GIS maps and analysis were created using Arc Map 10.1.

Geo-referencing Critical Areas Site Plans

Critical Areas Site Plans are scanned and recorded with the County Auditor available as PDF or TIFF image documents. The Critical Areas Site Plans are drawn at various scales and with varying accuracies. In order to spatially align or relate the images to the County's parcel and critical area data sets, they must be geo-referenced.

To georeference the CASP raster data[23], the CASP location is established using map coordinates and assigned to the coordinate system of the data frame. Georeferencing the raster data allows it to be viewed, queried, and analyzed with other geographic data.

Figures B and C (below) provide a typical example of a property before and after a geo-referenced CASP depicting a wetland, buffer and proposed development is overlaid onto an aerial photo.

[23] Geographic grid of color pixels

Figure B – undeveloped property without CASP

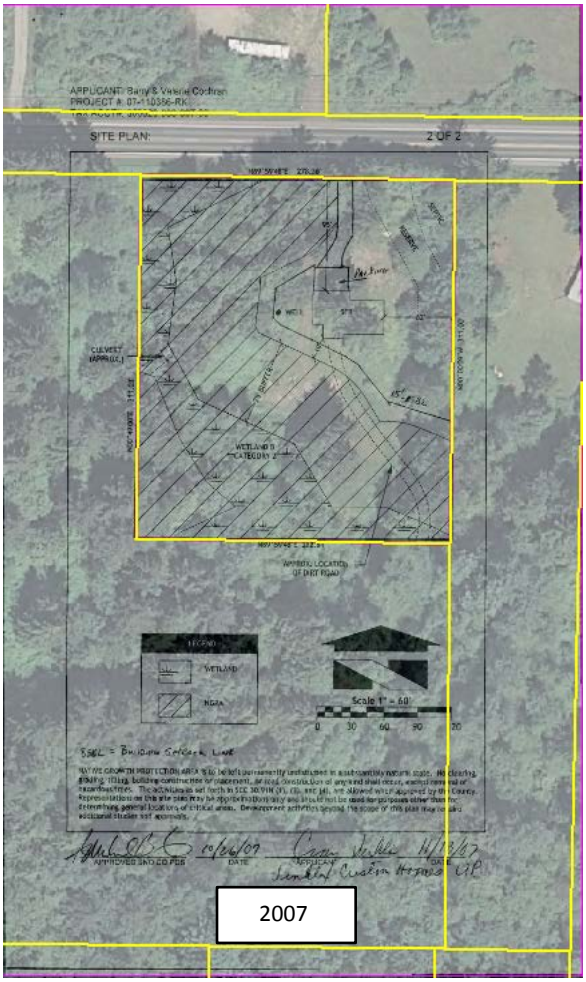


Figure C – undeveloped property with georeferenced CASP

Sampling Properties for Analysis[24]

Due to the large number of properties, a statistical sampling approach was utilized. This section describes the detailed methodology for selecting permit properties subject to CAR with CASPs. The same methods were used for permit properties without CASPs and enforcement properties. Due to the relatively small number of forest practices permit properties, all were analyzed.

There were 1,278 CASPs recorded with the County Auditor between November 1, 2007 and April 1, 2013. The CASP data were geocoded by Parcel ID to spatially locate them on a map. After eliminating duplicate CASPs, permits with CASPs applied after July 2012[25], and properties with CASPs that were subsequently annexed into cities, 986 CASPs remained on 839 unique parcels.

[24] See Appendix C for additional discussion
[25] There were aerial photos available for 2012

Land Cover Change Identification

After the CASPs are geo-referenced, the critical areas and buffers are digitized and classified. The selected CASPs with their digitized critical areas and buffers were then analyzed for changes in land cover that had occurred in the protected areas since the recording date of the CASP. Using 1 foot resolution color digital ortho photography for the years 2007, 2009, 2011 and 2012, the photo year closest to the recording date of the CASP was compared to later photo years. All land cover changes in the critical areas and buffers were identified and digitized. Data were collected for each of the selected CASPs that included the presence and types of land cover changes, types of critical areas altered, and the year of the change based on observations from the photos (Figures D & E).

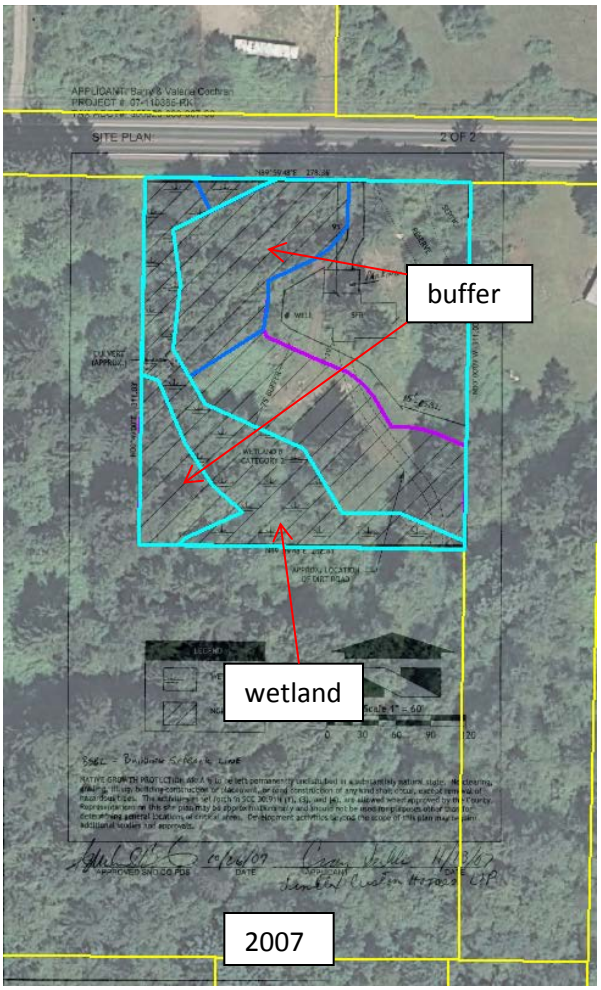


Figure D – property with geo-referenced CASP prior to development showing wetland & buffers

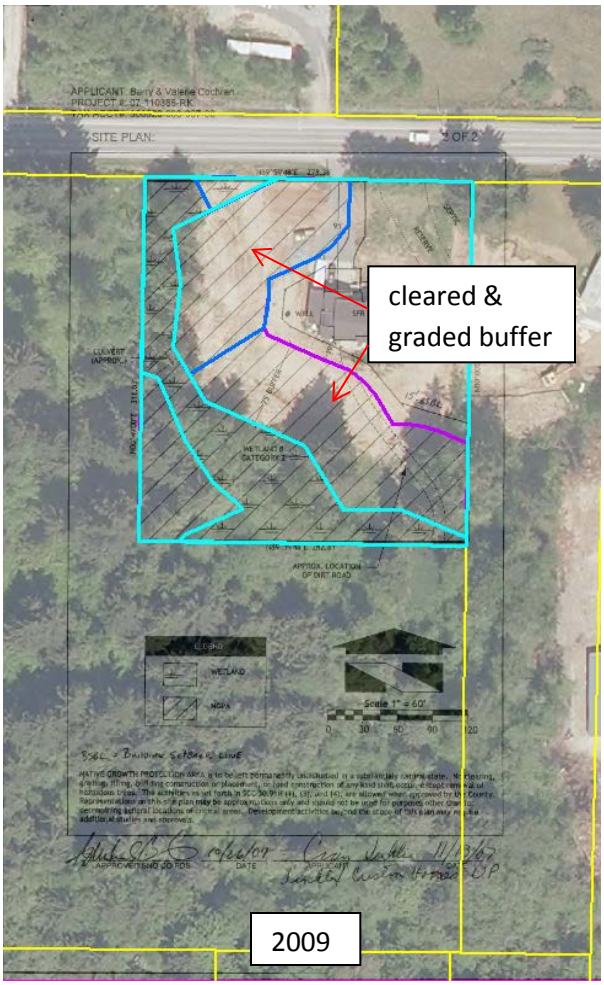


Figure E – property with georeferenced CASP after development with cleared & graded buffer

Wetland Identification

One of the largest challenges in monitoring impacts to wetland functions and values is first knowing where the wetlands exist on the landscape. Unlike on Critical Areas Site Plans where critical areas, buffers and setbacks are mapped and their buffers established, identifying the exact locations of critical areas and their buffers outside the limited area covered by CASPs is a difficult and expensive endeavor. Several efforts to classify wetlands remotely on a large scale (NWI wetlands, PDS wetlands, and CCAP[26]) have increased the numbers of mapped wetlands across Snohomish County. While these wetland datasets have been useful for many different purposes over the years, they were commonly known to not have uniformity in geographic extent or data resolution and there was often disagreement between these datasets that could not easily be explained.

As part of the initial CAR monitoring effort from 2007 to 2010, Surface Water Management (SWM) and Battelle developed a spatial model that combined remotely sensed land cover data,

[26] Coastal Change Analysis Program, NOAA

ancillary GIS data and multi-parameter terrain modeling to identify and map likely wetland areas within Snohomish County. This data was used to identify wetlands and estimate potential impacts to wetlands between 2007 and 2009 and these results were reported in the 2012 CAR monitoring status report (Snohomish County, 2012).

For this project, wetland impacts were measured more directly by using their known locations from properties with CASPs and comparing them to aerial photos. For properties without CASPs, wetland land cover change impacts were estimated using visual observation of 1-foot resolution digital ortho color photography and three wetland map sources, NWI, PDS and SWM. Accuracy of the three map sources outside of the CASP properties was determined by comparing the known locations of the wetlands from the CASPs to the three map sources. It was found that when using all three sources there was "agreement" between them and the CASPs 69.3% of the time. That is, 69.3% of the time, one or more of the map sources was coincident or overlapped wetlands identified on the CASPs[27]. While it was assumed that CASPs are more accurate than the three map sources, it was clear after reviewing many CASPs that the wetlands mapped within them were not always accurate. For example, there were wetlands readily identifiable on high resolution photos that didn't appear on the CASPs. The reasons for the CASP mapping errors vary from CASP to CASP. See Appendix C for additional discussion on accuracy.

Estimating Wetland Buffer Impacts

Standard wetland buffers range between 25 and 300 feet.[28] To accurately determine wetland buffer impacts in each of the non-CASP evaluations tasks, the wetlands must first be mapped on the ground using an adopted detailed wetland delineation methodology (Department of Ecology, 1997)[29], and then classified using a detailed classification methodology (Department of Ecology, 2004)[13] that requires field data collection and analysis.

In lieu of classifying the wetlands on each of the permit properties to determine the buffers and impacts, which was beyond the scope of this project, the distances between the *sites* and the closest wetlands were measured from aerial photos and recorded and assumptions made about the potential for wetland buffer impacts. For each of the non-CASP tasks, the distances to the wetlands were grouped and summarized into 2 distance ranges: 0 to 75 feet and 76 to 300 feet. An average wetland buffer of 75 feet was derived by averaging the known buffer from the recorded CASPs. Each of impact summaries for the non-CASP tasks uses the 75 average buffer width as a measure of the number of wetlands that are most likely to have buffer impacts based on the proximity of the land cover changes identified. This analysis does not include the area of wetland buffer impacts, only a count of the wetlands within each of the distances ranges.

[27] For more discussion on the accuracy assessment see Appendix C
[28] Wetland buffers 30.62A.320 SCC
[29] 30.62A.140(1) SCC

Task I. Properties with Permits Subject to CAR that had Recorded Critical Areas Site Plans

Description

A random sample of 335 of the 839 properties with CASPs that were recorded between 11/1/2007 and 4/1/2013 were reviewed to determine if the protection measures that restrict clearing and other development recorded on the CASPs are being implemented and remain effective over time.

Critical Areas Site Plans Requirements

One of the conditions of approval for permits subject to the county's Critical Areas Regulations when there are critical areas on or near the site is the requirement to record a site plan with the County Auditor[30]called a Critical Areas Site Plan. The CASP identifies all critical areas, buffers and restricted areas occurring in close proximity to the development area. A CASP provides the existing landowner, future owners and the County with a readily accessible public record that contains a map of the critical areas and their restrictions. There are exemptions for recording CASPs for projects in ROWs, utility corridors and for restoration projects. The CASP is only required when the critical area or its buffer or setback overlaps on to the *site*[31] (Figure F). The CASP site plan drawing includes the locations of property lines, structures, critical areas, buffers, setbacks and the required restrictions on clearing and other development in these areas.

CASPs take two forms: For all subdivisions, the critical areas, buffers and restrictions are added to the subdivision map (Figure G). For permits other than subdivisions, an 8½ x 14 inch site plan is used as the CASP (Figure H).

[30] See requirements in 30.62A.160 SCC

[31] Whenever the word *site* is used in italics, its meaning is as defined in section 30.91S.350 SCC and in Figure B - See Appendix B for definition

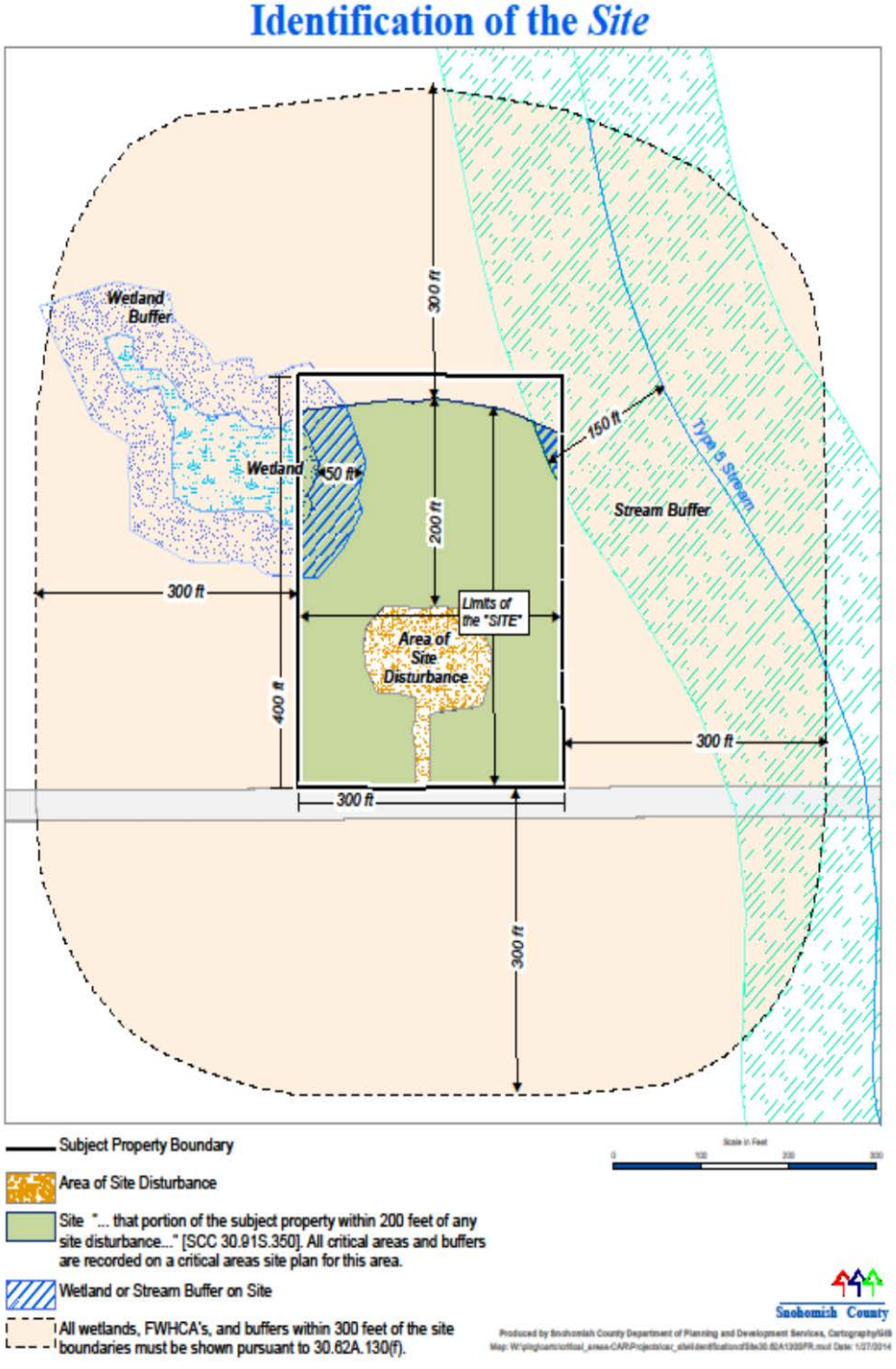


Figure F – "site"

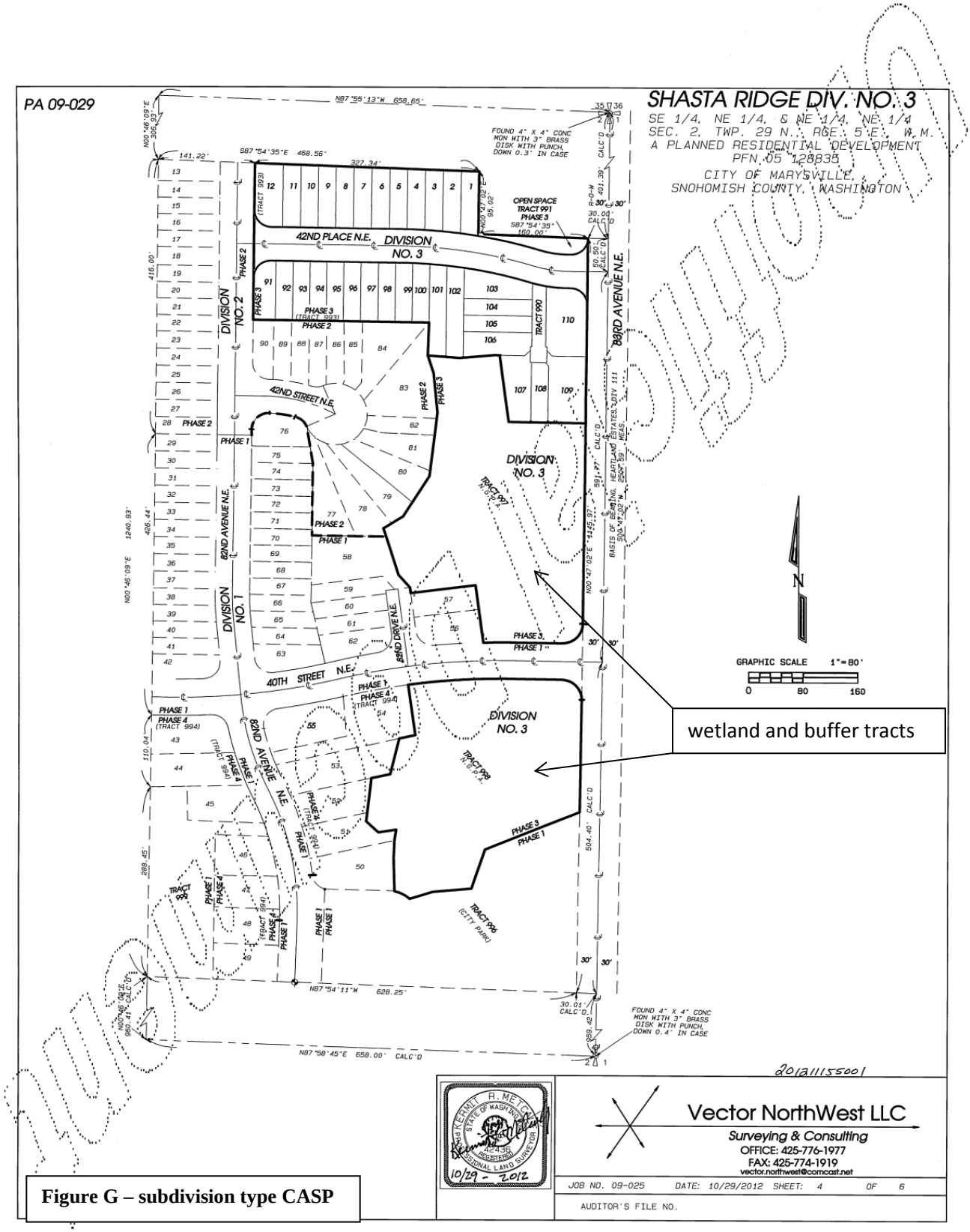


Figure G – subdivision type CASP

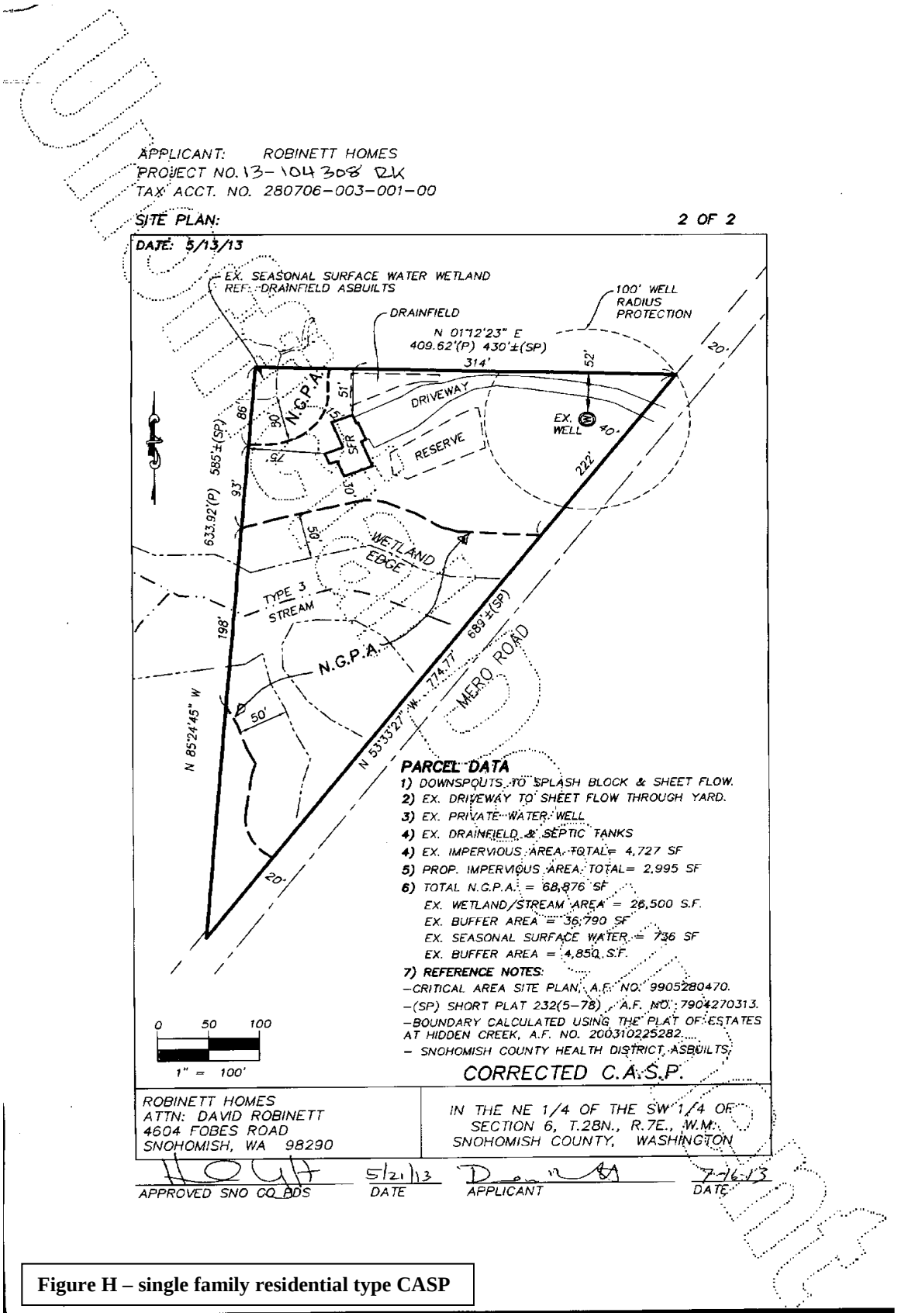


Figure H – single family residential type CASP

Results/Discussion

There were 839 parcels with Critical Areas Site Plans that were recorded between November 2007 and April of 2013. From the pool of 839, 335 were randomly selected for further analysis.

There were a total of 572.83 acres of critical areas and buffers recorded on the CASPs and digitized in the sample set of 335 CASPs (Table 2). Out of these, there were 73 land cover changes identified in critical areas and buffers, covering 5.47 acres or 0.95 % of the total area of critical areas and buffers in the CASP sample. The largest area of land cover change impacts occurred in stream, lake and marine shoreline buffers with 3.14 acres (57.4%); followed by geologic hazard areas (1.85 acres/33.8%); wetlands (0.39 acres/7.3%); critical area/buffer combinations[32] (0.06 acres/1.1%) and marine shorelines (0.2%). Based on the sample, it's estimated that approximately 15.65 acres of impacts to critical areas and buffers occurred in the entire population of 839 CASPs.

The majority (84.9%) of land cover changes resulted from clearing and grading, but also included garbage (9.6%) and structures (5.5%). It's assumed that most of the impacts were not authorized by the County based on the reviewed documentation, but some may have been verbally approved without documentation.

[32] Multiple critical areas and their buffer frequently overlap, and rather than separating them, they were grouped and analyzed has one category

Table 2 – Permits with CASPs - Land cover changes

Critical Area Type	Acres			
	Area of critical area and buffer area in CASP sample[14]	Est. area of critical area and buffer area on all CASPs	Area of critical area and buffer impacts in CASP sample	Est. area of critical area and buffer impacts on all CASPs / % total of impacts on all CASPs
wetlands	149.12	373.47	0.4	1.14/7.3%
streams	1.79	4.48	0	0/0%
marine shorelines	0.71	1.78	0.01	0.03/0.18%
open water	35.58	89.11	1.85	5.29/33.82%
lakes	2.27	5.69	0.01	0.03/0.18%
geologic hazard areas	1.98	4.96	0	0/0%
critical area combos	4.76	11.92	0	0/0%
buffers	116.75	292.4	0.06	0.17/1.1%
critical area/buffer combos	259.87	650.84	3.14	8.98/57.40%
totals	572.83	1,434.64	5.47	15.65/100%

While the overall area of land cover change impacts was relatively low at less than one percent (0.95[33]) of the total combined area of the critical areas and buffers recorded on the CASPs, 14% (48) of the CASPs had one or more identifiable land-cover change impacts. Further, based on limitations resulting from poor CASP accuracy, poor aerial photo resolution, ground shadows effects, the inability to see through the overhead tree canopy, and anecdotal evidence, this may be an underestimate of the actual amount of land cover change impacts.

Some of the land cover change impacts may have been approved by the County, but not documented on the CASP documents. For example, it's not uncommon for clearing to have been allowed in a buffer to allow for temporary construction related impacts for a utility connection and then later restored. Most CASPs don't document this type of "temporary" clearing, so all we were able to see on an aerial photo from a later year is the clearing in the buffer. Without

[33] (5.47 acres of impacts in sample population/572.83 total acres of critical areas and buffers in sample pop) x 100

researching the entire permit case files there is no way to know whether these were permitted and restored.

Critical Areas Site Plan Accuracy

Many of the Critical Areas Site Plans have accuracy problems sufficient to create difficulties in the interpretation or enforcement of the CASP requirements. While most of the errors can be resolved after some additional analysis and research, a small percentage could not. The most common mapping errors included:

- No north arrow or arrow not correct.
- No property line dimensions.
- No property lines.
- CASP split on the same page, creating difficulties with geo-referencing of the image.
- Scale is incorrect, inconsistent. N-S scale different from E-W scale or at some other non-typical scale.
- No dimensions to property lines or break lines.
- Not all tax account numbers shown for all the parcels on the CASPs.
- Too much unnecessary clutter, e.g. cross hatching or other tightly spaced patterns.
- Lacks dimensions on various key features, e.g., buffer widths, distance to wetland from structures or other identifiable features, distance to buffers from readily identifiable features.
- Unclear where existing legally established uses are located.

All of these mapping errors undermine the purpose of having a Critical Areas Site Plan. The consequences can include, difficulty in pursuing and enforcing cases, misinformation passed on to potential buyers, misunderstandings by property owners about what they can and can't do, and of course, difficulty in implementing, tracking and monitoring the effectiveness of the County's Critical Areas Regulations.

The benefits of the Critical Areas Site Plans shouldn't be underestimated. Despite the accuracy issues, having thousands of recorded CASPs over the last two decades saves the public and county government immeasurable time, money and resources. Knowing that there is a CASP on or near a property of interest provides some measure of information about the property, albeit not always accurate.

Recommendations

- Develop clear written CASP document instructions for staff and applicants.
- Develop aerial photo reference template with parcel boundaries to assist staff and applicants in developing more accurate CASP documents.
- Develop process for all permits with CASPs to have the CASPs imported as GIS shapefiles and geo-referenced to parcel lines for use by the county and applicants.

Implement a workflow change so that each critical area site plan is geo-referenced before recording.

- Develop consistent method of documenting recorded CASPs in AMANDA.
- All allowed clearing or other impacts to critical areas and buffers should be clearly documented on the CASPs.

Task II. Properties with Permits Subject to CAR that did not have Recorded Critical Areas Site Plans.

Description

A random sample of 300 of the 797 properties with permit types subject to CAR[34] that were applied for on or after 11/1/07 and issued prior to 4/1/2013 were reviewed to identify and quantify any negative land cover changes to aquatic critical areas and buffers. In addition, the AMANDA permit processes were analyzed and summarized.

Results/Discussion

Critical areas site plans are only required when there are critical areas or buffer on or near the *site*[35]. There were a total of 5,903 permits types subject to CAR which were applied for and issued during the specified time period. From the pool of 5,903 permits, all permits were eliminated that either met one or more of the exemptions listed in in Chapter 30.62A SCC (e.g. remodels, 2nd story additions, fire damage repair, and other non-ground disturbing permit types), were occurring on properties with pre-existing CASPs, or were occurring subdivision recorded after April 1995. From the remaining pool of 797 permits, a random sample of 300 permits was chosen for further analysis.

Only six of the 300 permit properties in the sample had identifiable land cover change impacts to critical areas or buffers. Five of the six were direct impacts to wetlands totaling 1.1 acres, and one to a small Type N stream and its 50 foot buffer totaling 0.07 acres, for an overall total of 1.17 acres. It's estimated that in this group of 797 permits, that there were 3.11 acres of wetland and buffer impacts (Table 3).

Using an average wetland buffer width of 75 feet that was derived from known buffers on existing recorded CASPs, it's estimated that there are 22 wetlands with 75 foot buffers overlapping onto the *sites* of the sample set of properties (Table 3). Combined with the 79 wetlands observed on the *sites* of the selected permit properties, there were a total of 101 wetlands on or close enough to the selected *sites* to at minimum create the need for further investigation, CASPs, and potentially mitigation.

[34] See appendix A for full list of permit types subject to CAR there were applied for between 11/01/07 & 03/20/13
[35] See Task I for analysis and discussion of Critical Areas Site Plans

Table 3 – Permits without CASPs - Land cover changes and critical and buffer proximity

Critical Area Type	Number present on the *site*	Number of wetlands between 1 and 75 feet of the *site*	Number of wetlands between 76 and 300 feet of the *site* only	Total number of critical areas and buffers on & within 300 feet of the *site*	Area (Ac) Critical Area and Buffer Area Impacts	Est. area (Ac) / % of total of Critical Area and Buffer impacts on all permit *sites*[36]
wetlands	48	22	60	130	1.10	2.92/93.89%
lakes/ponds	5	--	--	5	0	0/0%
streams/rivers	10	--	--	10	0	0/0%
buffers	13[a]	--	--	13	0.07	0.19/6.11%
Misc.[37]	3	--	--	3	0	0/0%
Totals	79	22	60	161	1.17[a]	3.11/100%

[a] stream, lake and marine shoreline buffers only, wetland buffers are unknown

AMANDA Permit Processing Summary Results and Discussion

Most critical areas reviews are documented in one or more AMANDA process lines that must be filled out or deleted before a permit can be issued. For most permits, the process lines are automatically inserted into the review process based on the permit type. Others are inserted if they're relevant to the permit requirements or conditions. Some of the automatically inserted process lines are subsequently deleted. The CAR relevant process lines include but are not necessarily limited to:

- *Residential Site Visit* – documents whether or not a site visit occurred.
- *Residential Site Clearance* – documents whether or not all on-site issues like setbacks, and critical areas are satisfactorily addressed.
- *Pre Review Bio* – documents permits forwarded to a reviewer with critical areas expertise to determine if critical areas review is warranted.
- *Critical Areas Study* – documents when critical areas studies are required to assess potential impacts and mitigation.
- *Final Review Bio* – documents the final review from a reviewer with critical areas expertise.
- *Critical Areas Site Plan* – documents when a CASP is required prior to permit issuance due to the presence of critical areas or buffers on the *site*.

[36] See appendix D for description of methods for estimating impacts across entire population of permits without CASPs

[37] Unknown critical area types

- *Critical Areas Management Program* – when critical areas are present on or near a *site*, used to document the types of critical areas and impacts (e.g., clearing or grading) to wetlands and buffers.

If properly used, these process lines will inform whether or not a review occurred and why. The presence of a CAR related process line associated with a permit doesn't necessarily mean that a review occurred. Process lines can be left blank, closed with no explanation, "NA", or document that a review actually occurred. In practice, our analysis found that the use of the process lines for documentation is often inconsistent, making it difficult to determine what actually occurred without reviewing the complete permit case file.

All of the permits in the sample of permit properties were technically subject to CAR, though many had little or no CAR reviews. The reasons are varied and can be due to one or more of the following reasons:

- The type of permit by its nature has a very low potential for significantly impacting critical areas; e.g., repair & maintenance, driveway access permits.
- There were insufficient staffing resources to conduct full reviews on all permits, particularly those with low potential impacts.
- A permit screener conducted a limited CAR review prior to assigning the permit to a Project Manager and didn't document the findings of the review
- Previous reviews have occurred on or in close proximity to the property.
- Property was subdivided after April 1 of 1995; therefore it's assumed that a CAR review previously occurred.
- There is an existing Critical Areas Site Plan on the property.
- The property was evaluated in conjunction with another permit related to the same project.

"CAR Reason" Process Line Summary (Table 4)

Generally, although not consistently, the *CAR Reason* process line is used to document why a permit is "cleared" with respect to critical areas. At the time these permits are taken in by the Department, a decision was made by a staff person they did not need a detailed CAR review and therefore were not assigned to a staff person with some critical areas review expertise to conduct any detailed critical areas investigation.

Of the 300 permits selected for analysis, 37% were "cleared" based on reviews of earlier permits, such as a building permit. Twenty one percent were "cleared" by a staff person based on in-office reviews of critical areas maps or some other undocumented decision criteria. And last, 36% were NULL, meaning they had no data at all entered into this process line. For these permits there is no easy way of determining why a review didn't occur.

Of the 123 of the 300 permit sites that were randomly selected that had streams, lakes or marine shorelines or their buffers overlap onto the *sites*, or wetlands within 300 feet of the *sites*, the majority (41.5%) had no entry [NULL] in the *CAR Reason* process lines at all. The next largest set are permits that were documented as previously reviewed under a land use (LU[38]), commercial (CP[39]), model home or mobile home park (26.9% - combined total). Many (26.9%) were cleared by a staff person without any documentation other than the name of the staff person and the date the decision was made. Without further research of the LU, CP, model home and mobile park permits, its unknown if any of these earlier reviews actually investigated critical areas.

Table 4 – *CAR Reason* Process Lines summary

How cleared (*CAR Reason*)	Number of permits in sample selected for analysis / % of total permits in sample population of 300 permits	Number of permits in sample/ % of total that had streams, lakes or marine shorelines or their buffers overlap onto the *site*, or wetlands on or within 300 feet of the *site*
cleared by staff person	6/21%	32/26.9%
cleared under CP file	14/4.7%	0/0%
cleared under LU file	86/28.7%	23/18.7%
cleared under model home	10/3.3%	6/4.9%
cleared – in mobile home park	7/2.3%	4/3.3%
misc.	11/3.7%	7/5.7%
NULL (blank field)	108/36%	51/41.5%
	300/100%	123/100%

Other CAR Review Process Lines (Table 5)

These process lines are automatically created in AMANDA based on the permit type and are used to document when critical areas data is collected and the type and rationale for the level of critical areas review conducted for a permit. As is the case with the *CAR Reason* process lines, the presence of these process lines doesn't mean that a detailed review actually occurred, only that a staff person made a decision on whether or not to require a review. For example, the "Res Site Visit" process line used to assign and document a site visit is present on only 79 of the 300

[38] Land Use (LU) type permits are generally those that don't directly authorize construction or site disturbance and include but are not limited to, rezones, conditional use permits, and variances.

[39] Commercial Permit (CP) type permits are associated with a commercial business and can include permits for structures and uses.

permits in the sample of permits that were reviewed. However, only 35 of the 79 permit records that had the process line "Res Site Visit" assigned actually had a site visit. The rest were "cleared" in-office by staff for various reasons. Most (27) were "cleared" for no documented reason other than the name of the staff person that cleared the permit. The others were cleared based on previous reviews of earlier permits (13) or no documented reason at all (4).

Out of the 44 permits that had "Res Site Visit" cleared without an actual site visit, more than half (25) had mapped critical areas or buffers that overlapped onto the *site* or wetlands within 300 feet of the *site.* Again, these 25 permit records were not ones that had previous reviews under other permits, these were permits that had no previous site reviews, yet had potential critical areas or buffers on or close enough to the *sites* to potentially warrant site reviews. If after the site review, Critical Areas or buffers were found to be present on the *site,* at a minimum a Critical Areas Site Plan would be required to document their presence. If the critical areas or buffers had been close enough to the site-development related impacts, mitigation may have been required in addition.

Table 5 - Other CAR related process lines

AMANDA Process Line Name	Number of permits / % of total permits in sample population of 300	Number of permits / % of total permits in sample population that had streams, lakes or marine shorelines or their buffers overlap onto the *site,* or wetlands within 300 feet of the *site*
Critical Area Study	1/<0.1%	1/0.8%
Critical Areas	1/<0.1%	1/<0.8%
CA Data Collection	6/2%	3/2.4%
Prelim Water Resources	1/<0.1%	1/<0.8%
Res Site Clearance	181/60.3%	65/52.9%
Res Site Visit	79/26.3	44/35.8%
misc.	31/10.3%	8/6.5%
Total	300/100%	123/100%

Recommendations

- Provide training to staff on consistent use of all CAR related process lines in AMANDA.
- Review and revise as necessary CAR related process lines to ensure consistent reviews and documentation.
- Over 40% of permits analyzed had critical areas on or close enough to the *site* to warrant further investigations, if not the need for CASPs. Provide additional training and guidance to staff on the requirements regarding this issue.

- Provide additional Critical Areas Regulations training to staff on development permit thresholds, exemptions and applicability, particularly for CAR (30.62A, 30.62B, and 30.62C SCC) Shorelines (30.44 SCC) and LDA (30.63B SCC) type permits.
- Improve documentation in AMANDA of CAR review; e.g., consistent use of process lines, vesting dates.

Task III. Properties with Class 4G, IVS & COHP Forest Practices Permits

Description

Forest Practices permit types subject to CAR[40] that were applied for on or after 11/1/07 and issued prior to 4/1/2013 were reviewed to identify and quantify any negative land cover changes to aquatic critical areas and buffers.

Results/Discussion

There were 92 Class 4 General (4G), 4 Special (4S) and Conversion Option Harvest Permit (COHP) type forest practices permits tracked in AMANDA with submittal dates between 11/1/2007 and 4/1/2013. Of those, there were 10 properties that had land cover change impacts in critical areas or buffers (Table 6). There were a total of 13.67 acres of land cover change impacts to wetlands and to the buffers of streams. Ninety eight percent of the land cover change impacts were to wetlands and the remainder were buffer impacts. Seven of the 10 impacted sites were to wetlands all located on one large property under one forest practices permit. The remaining 4 occurred on small single family lots.

Table 6 – Forest Practice permits - Land cover changes and critical area and buffer proximity

Critical Area Type	Number present on the *site*[41]	Number of wetlands between 1 and 75 feet of the *site*	Number of wetlands between 76 and 300 feet of the *site* only	Total number of critical areas and buffers on and wetlands within 300 feet of the *site*	Area (Ac) / % of total critical area and buffer area Impacts
wetlands	8	5	3	16	13.42/25%
lakes/ponds	0			0	0/0%
streams/rivers	0			0	0/0%
buffers[a]	6			6	0.25/1.8%
Totals	14	5	3	22	13.67/100%

[a] stream, lake and marine shoreline buffers only, wetland buffers are unknown

Recommendations

Due to the relatively small number of sites, drawing conclusions is difficult. In fact, most of the properties with forest practice permits had no clearing at all. The lack of any clearing on many of the permitted properties may be related to the economic recession.

[40] Forest Practices permit types: Class 4 General (4G), Class 4 Special (4S) and Conversion Option Harvest Plans (COHP)

[41] The total count is different from total sites with impacts because some sites have more than 1 feature present

Task IV. Properties with Clearing, Grading and Drainage Enforcement Complaints

Description

A random sample of 2,916 of properties with, grading, building, drainage and miscellaneous enforcement cases filed between 11/1/07 and 4/1/13 were reviewed to determine and document impacts to critical areas and buffers. Also under this Task documentation in AMANDA and the hard-copy case files was reviewed, summarized and analyzed in order to determine how the cases with impacts were resolved.

Successfully pursuing, proving and ultimately achieving restoration on an impacted code enforcement site can be time consuming, taking years in some cases. Property access, evidence collection, the costs and benefits of pursuing minor or "de minimis" cases, legal risks, and issues of interpreting and applying sometimes unclear regulations all play a role in the way cases are resolved. And while code enforcement officers ultimately decide how to resolve the cases, they do so by consulting with subject matter experts from the Department of Planning and Development Services.

Burden of Proof

Before a report or an allegation of a violation gets to the point where impacts to a critical area or buffer are restored, the county has the burden of proving that a violation actually occurred. With few exceptions, most enforcement case properties have had no prior reviews by the County, therefore historical site conditions can sometimes be difficult to determine. There must be clear and convincing legally gathered evidence of the violation. Gathering evidence can be hindered by a lack of physical, visual or legal property access. Evidence gathered by viewing a property from an aerial photo without the benefit of a thorough site investigation is often inadequate for proving that a violation has occurred. Cases without adequate evidence cannot be pursued. Those that are pursued often take years to resolve before actual restoration occurs, with appeals, hearings, extensions, and permit applications submitted and issued.

Minor or "de minimis" Cases

Some cases are closed based on the principle of a "de minimis" finding. That is, while it's technically a violation of county code and that the county may be able to prove the case, it's so minor in terms or scope, scale, volume or impacts that the "value" of pursuing the case is not worth the time, money, or effort, particularly in light of the numbers of more egregious cases and available staff resources.

Results

There were a total 5,150 enforcement cases filed and tracked in AMANDA with case filing in-dates between 11/1/2007 and 4/1/2013. Of those, there were 2,916 that included the key words;

building, *drainage*, *grading*, and *misc.*, in the field that describes the type of case. A random sample of 900 of these was chosen for further analysis.

Impact Summary (Table 7)

Six percent (53) of the sampled properties had critical areas or buffers (not including wetland buffers) directly impacted by a development activity, or had critical areas close enough to the properties that there may have been buffers impacted. There were a total of 28.71 net acres of critical area and buffer impacts on the sampled properties. Eighteen percent (5.07 acres) of the impacts occurred within the protected areas of existing CASPs in mapped wetlands, and buffers. There were 14.41 acres (50.19%) of impacts in wetlands, 10.23 acres (35.63%) in critical area/buffer combinations, and 4.06 acres (14.14%) in stream, lake and marine shoreline buffers, stream, lake and marine shoreline buffer impacts. It's estimated that there were 28.71 acres of impacts to wetlands, and stream, lake and marine shoreline buffers in the total group of 2,916 enforcement cases.

Of the 53 sites with critical areas impacts, approximately 17% (9) were apparently unrelated to the activity that triggered investigation by code enforcement officers under the case file associated with the properties.

Table 7 – Enforcement - Land cover changes and critical area and buffer proximity

Critical Area Type	Number present on the *site*	Number of wetlands between 1 and 75 feet of the *site*	Number of wetlands between 76 and 300 feet of the *site* only)	Total number of critical areas and buffers on & within 300 feet of the *site*[a]	Area (Ac) critical area and buffer Area Impacts[a]	Est. area (Ac) / % of total of critical area and buffer impacts on all permit *sites*[a,42]
wetlands	53	9	20	82	14.41	38.46/50.19%
lakes/ponds	5			5	0.01	0.03/0.03%
streams/rivers	24			24	0	0/0%
buffers	45			45	4.06	10.84/14.14%
critical area/buffer combo	14			14	10.23	27.31/35.63%
Totals	141	9	20	170	28.71	76.63/100%

[a] stream, lake and marine shoreline buffers only, wetland buffers are unknown

*AMANDA – Violation Status/Case Resolution Summary (*Table 8)

[42] See appendix D for description of methods for estimating impacts across entire population of enforcement cases

There is no single field or document in AMANDA that consistently describes the resolution of the enforcement cases. The details of how any given case is resolved are not always evident in AMANDA, which is only a summarized version of the case file. For a complete analysis and summary it would be necessary to review the original case files which was outside the scope of this project. All of the complete case files were reviewed for this project.

The "Violation Status" as described and summarized here comes from several source fields and documents in AMANDA and the case files. The AMANDA sources are from; the **status** field on the **folder** page, the **description** field on the **folder** page, one or more fields on the **process** page, the Voluntary Compliance Agreement (VCA)[43] document and the **Complaint Investigation Report (CIR)** document[44].

The ninety enforcement case properties with direct observable or potential buffer impacts were grouped into several categories that explain why or how the cases were resolved. The categories were taken either directly from documentation in AMANDA, or where not clear, categorized based on assumptions made about the intent of the case manager in resolving the case based on the totality of the evidence in the files.

- *appealed* – pending legal appeal
- *exempt* – exempt from CAR (30.62A SCC) or one or more of the other development codes, primarily LDA and building codes and Washington State law pre-emptions:
    1. right to farm (30.63B.070(4), & 30.62A. 600 SCC)
    2. < 100 yards (LDA - 30.63B(1)(g) SCC)
    3. maintenance (LDA – 30.63B(3) SCC)
    4. non-conversion commercial forest practices (RCW 76.09)
    5. stream enhancement (RCW 77.55.181)
- *extended* – compliance deadline extended
- *no violation* – investigation found no code violation
- *NULL* - no documentation in AMANDA or unable to determine
- *penalty* – open, in penalty phase
- *permitted or permit pending*
- *settled/VCA*- informally or formally (VCA) settled and closed
- *un-related* – cases that were not related to the observed land cover changes

On the Y axis of table 8 the violation status types are grouped based on an assessment of the rationale for resolving the case. If for example, a case is closed based on an apparent misunderstanding of the applicability or exemptions contained in CAR (30.62A SCC) or one of the development codes, the case is grouped under the heading "cases with concerns".

[43] The use of VCA's was ended in early 2008
[44] The use of the CIR in AMANDA began to be used more consistently later in the monitoring period of this report

Table 8 – Enforcement – Case resolution summary analysis

Status	Cases with no concerns on how cases were resolved/ area (ac) of critical area and buffer impacts	Cases with concerns with how these were resolved/ area (ac) of critical area and buffer impacts	Total number of cases/ total area (ac) of critical area and buffer impacts
appealed	1/1.9	0/0	1/1.9
exempt	5/4.61	3/1.01	8/5.62
extended	2/0.76	0/0	2/0.76
no violation	3/0.26	8/1.03	11/0.29
penalty	1/0.14	0/0	1/0.14
permitted	6/0.63	0/0	6/0.63
permit pending	3/5.44	0/0	3/5.44
settled/VCA[a]	3/0.30	9/10.81	12/11.21
unrelated viol.	9/1.83	0/0	9/1.83
Totals	33/15.86	20/12.95	53/28.71

[a] VCA - Voluntary Compliance Agreement

Discussion

The overall number and area of impacts was significantly greater than in each of the other tasks. This is to be expected. The clearing, grading and building enforcement cases that were selected were chosen because of the higher probability of having critical area impacts. Also, the CASP, non-CASP, and forest practices properties with permits had some degree of review for compliance with county code and therefore less were likely to exhibit impacts.

Enforcement case resolution

Out of the 53 enforcement properties with impacts, there were 20 cases with 12.95 acres of impacts (Table 8) where there are concerns about whether or not they were properly resolved based on a strict application of the code. Most of these were either settled informally or formally with a written Voluntary Compliance Agreement (9), or were closed based on findings that there were no violations (8). Some of the cases were documented as having no violations appear to be

based on misunderstandings of the applicability and exemptions in CAR and several of the development codes.

Voluntary Compliance Agreements (VCA)

The VCA was a written agreement between a property owner and the county to resolve an enforcement case. The agreements can include but were not limited to, requirements for obtaining proper permits and restoring environmental damage. Informal settlements are also common, particularly for minor or "de minimis" violations. In these situations, it may allow a property owner to restore or abate the violation without the need for permits.

Applicability and Exemptions

Apparent misunderstandings of the applicability and exemptions in CAR (30.62A & 30.62B SCC), Land Disturbing Activity (LDA – 30.63B SCC) and the State Forest Practices Act, appear to have contributed to the way in which some of the cases were resolved and closed. These are some of the more common:

CAR – 30.62A SCC

It's a common misunderstanding that the County's Critical Areas Regulations only apply if there is a land disturbing development activity that requires a permit, e.g., building, grading or other construction. While this was true prior to the adoption of the current version of the critical areas regulations in 2007, after that date the applicability was broadened to include *actions requiring project permits*[45] and *clearing*[46]. *Actions requiring project permits* includes, but is not limited to, shoreline, flood hazard, rezones and conditional use permits. *Actions requiring project permits* do not authorize ground-disturbing activities by themselves, and are usually accompanied with building, LDA or some other construction permit.

Clearing is very broadly defined[47] and includes all forms or methods, mechanical and chemical. The only clearing exemptions in CAR are for the removal of noxious weeds and routine ornamental landscape maintenance[48]. The removal of hazardous trees, while allowed (and exempt from an LDA permit), is not exempt.

Agricultural activities are not exempt from CAR, only subject to a unique set of regulations adopted specifically for agriculture[49].

The restrictions on CASPs apply in addition to the development permit requirements, thresholds, applicabilities and exemptions. CASPs typically restrict all new development, not just

[45] 30.62A.010 SCC
[46] 30.62A.010(2) SCC
[47] 30.91C.112 SCC
[48] 30.62A.010(2)(ii) & (iv) SCC
[49] PART 600 of 30.62A SCC

development activities and other actions that require permits or approvals. Buildings less than 200 square feet for example, may be exempt from a building permit outside of the protected areas of a CASP, but won't be exempt from the restrictions that apply inside the protected areas of the CASP.

LDA – 30.63B SCC

Most of the LDA permit exemption thresholds don't apply in critical areas buffer or geologic hazard area setbacks. (Typical LDA exemption language):

> *The land disturbing activity occurs outside all critical areas, together with the buffers of and setbacks from these critical areas, except that such activities may occur within floodplains and aquifer recharge areas of low or moderate sensitivity to groundwater contamination;*[50]

For example, the standard 100 yard grading[51] and 7,000 square foot site disturbance[52] permit thresholds don't apply if the activity occurs in a critical area, buffer, or geologic hazard area or its setback. Also, many of the agricultural exemptions listed in the LDA code don't apply if the activity is occurring in a critical area, buffer or geologic hazard area setback.

Removal of hazardous trees is exempt from an LDA permit as a "maintenance activity"[53], but not from CAR.

Forest Practices – RCW 76.09 & WAC 222-16-050

While Class 2 and 3 forest practices (non-conversion forest practices) are exempt from local government regulations pursuant to the State Forest Practices Act, Class 4 General permits are not exempt. Class 4 permits, while issued by the Department of Natural Resources (DNR), are forwarded to local governments to conduct the environmental review. Local governments condition the permits to ensure compliance with local government regulations, including critical areas regulations.

In Urban Growth Areas there are no exempt Class 3 commercial forest practices; all are by definition Class 4 General forest practices and therefore subject to local government regulation. Also, most permanent conversions from a forested condition to a developed condition are by definition a Class 4 General forest practices subject to local government regulation.

Some of the enforcement cases that listed forest practice exemptions based on the existence of forest practice permits appeared to be Class 4 General type permits subject to local government

[50] 30.63B.070(1)(a) SCC
[51] 30.63B.070(1)(c) SCC
[52] 30.63B.070(1)(d) SCC
[53] 30.91M SCC

regulations. This conclusion is based on observations of permanent areas of clearing and structures that are present, with no visible evidence that the sites had been re-planted, as is required for Class 3 type commercial forestry activities.

Recommendations

- Provide training on development permit thresholds, exemptions and applicabilities, particularly for CAR (30.62A & 30.62B SCC) Shorelines (30.44 SCC), LDA (30.63B SCC) and Forest Practices (RCW 76.09 & WAC 222-16).
- Provide additional training on the identification of critical areas, particularly wetlands and geologic hazard areas.
- Improve documentation in AMANDA on the reasons why cases are closed.

Overall Change Analysis Summary

The overall merged estimated land cover change total for Tasks I thru IV is 108.58 acres (Table 9). The majority (70.27%) of the impacts came from enforcement properties, followed by permit properties with CASPs (14.34%), properties with forest practices permits (12.54%), and permit properties without CASPs (2.85%). Approximately 51% of the impacts occurred in wetlands, followed by critical area/buffer combinations (24.85%), buffers (19.72%), geologic hazard areas (4.78%) and lakes/ponds (<1%).

It's important to reiterate that the land cover change totals, with the exception of CASP buffers noted in Task I, do not include wetland buffer impacts. As discussed above, without knowing the wetland categories, the buffers cannot be determined. Notwithstanding the problems of estimating wetland buffer impacts, given that the direct wetland impacts were greater than 50% of the total, wetland buffer impacts are undoubtedly the largest of the land cover change impact areas (Tables 9 & 10).

Table 9 – Land cover change estimates for all Tasks

	Acres			Acres	
Task Category	Area of critical area and buffer impacts in sample by Task	Est. total area of critical area and buffer impacts by Task	% of total CA & buffer impacts by Task	Area critical area and buffer impacts in samples merged from all Tasks	Est. area of critical area and buffer impacts merged from all Tasks
permits w/CASPs	5.47	15.64	14.34%		
permits w/out CASPs	1.17[b]	3.11[b]	2.85%		
forest practices permits	13.67[b]	13.67[b]	12.54%		
enforcement cases	28.71[b]	76.63[b]	70.27%		
Totals	49.02[a]	109.05[a]	100%	48.91[a]	108.58[a]

[a] the actual merged totals are lower than the totals in columns 1 & 2 due to some overlap of the Task categories

[b] does not include wetland buffers

Table 10 – Land cover change estimates by critical area type

Critical Area Type	Acres				
	Est. total area Permits w/CASPs	Est. area permits w/out CASPs	Est. total area Forest practices permits	Est. total area Enforcement cases	Est. total area / % of total
wetlands	1.14	2.92	13.42	38.46	55.94/50.59%
critical area/buffer combo	0.17	0	0	27.31	27.48/24.85%
buffers	8.98	0.19[a]	0.18[a]	10.84[a]	21.85/19.72%[a]
geologic hazard areas	5.29	0	0	0	5.29/4.78%
lakes/ponds	0.03	0	0	0	0.03%
marine shorelines	0.03	0	0	0	0.03%
streams/rivers	0	0	0	0	0%
Totals	15.65	3.11	13.60	76.63	109.06/100%

[a] stream, lake and marine shoreline buffers only, wetland buffers are unknown

Task V. AMANDA Critical Areas Review Tracking & Monitoring Data Collection

Description

The purposes of this task is to provide a summary and analysis of the CAR Monitoring data that was collected in AMANDA under the process sub-heading title of *Critical Areas Data Collection* and the CAR review related process lines that are used to track when and how reviews are conducted.

Critical Areas Data Collection

Whenever there are critical areas or buffers of any kind on or near the property of a permit application subject to CAR, critical areas data should be collected in the *Critical Areas Data Collection* section of AMANDA. The primary objective of collecting the data is to classify the types of critical areas and quantify the total area of allowed wetland and buffer impacts. These data are intended to be used as one of the county's measures of success at achieving the goal of balancing the policies, regulations and programs at achieving "no net loss" of the functions and values of critical areas as required under the Growth Management Act.

The data collected includes a checklist of the types of critical areas that are present on or near a property (Figure I), and whenever there are allowed alterations to buffers or wetlands, a checklist of the types of allowed alterations and the areas in square feet (negative or positive) that were allowed (Figures J & K).

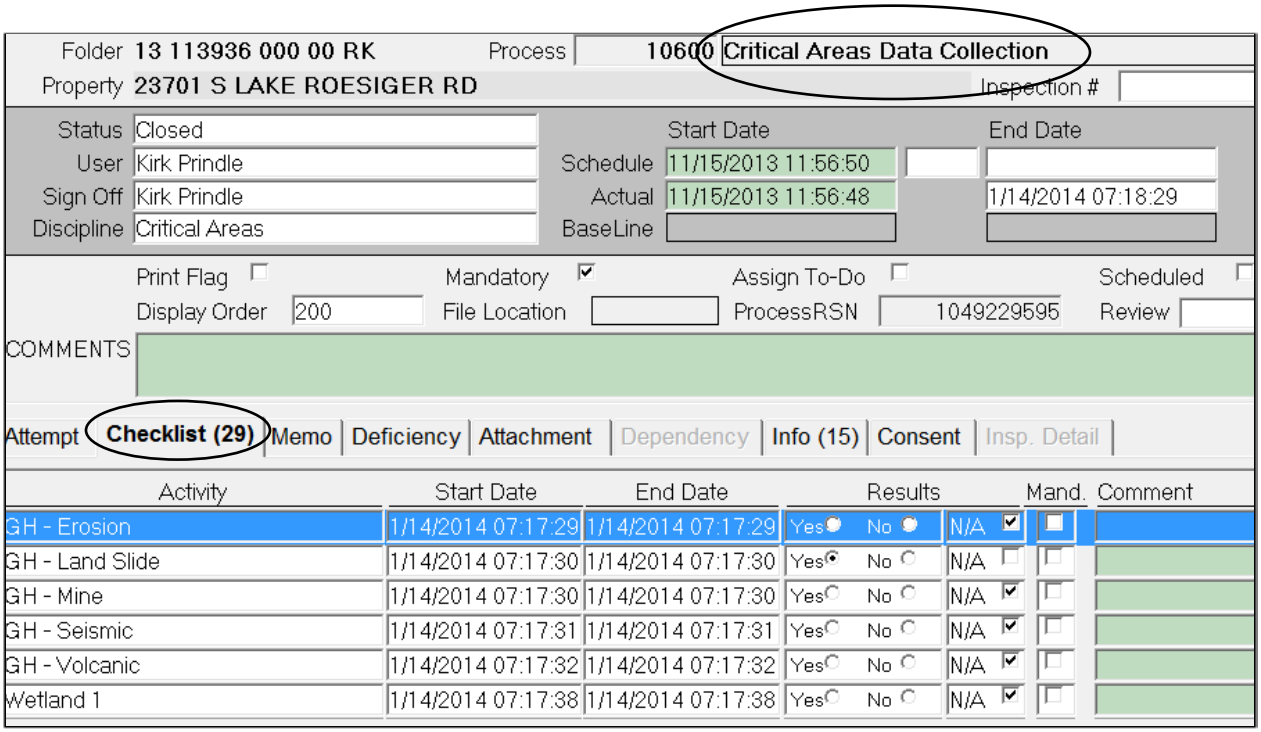


Figure I – Critical Areas Checklist Tab

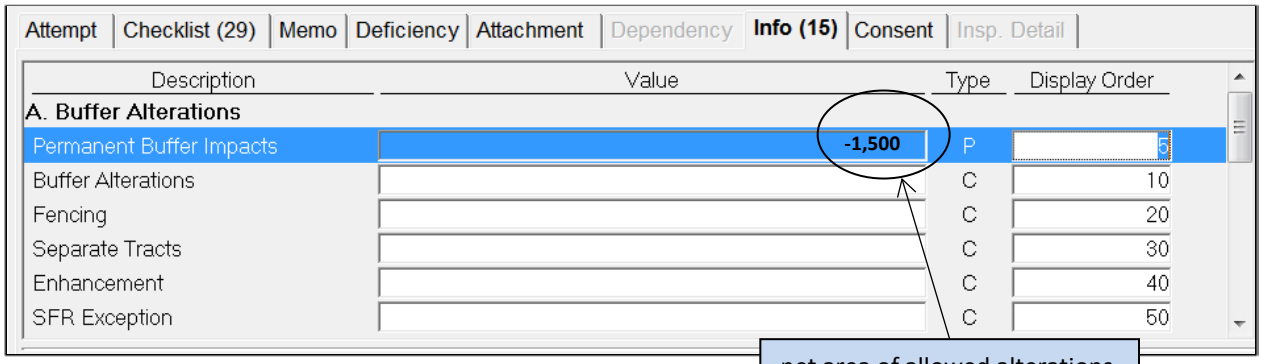


Figure J - Buffer alterations - Info tab

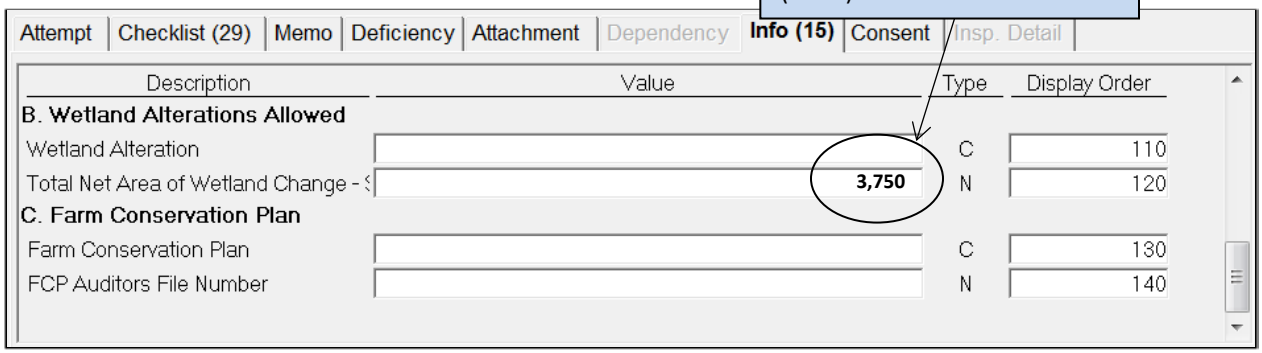


Figure K - Wetland alterations - Info tab

Data are collected on wetland and buffer alterations whenever there is any deviation from the standard buffer width or standard wetland protection requirements. For example, standard single width buffers can be reduced using a variety of methods[54] including but not limited to reductions for; buffer enhancement, fence installation, creating separate tracts for the buffers and critical areas, or utilizing agricultural best management practices. The buffer reductions require varying degrees of mitigation to compensate for the losses.

Results/Discussion

Between November of 2008 and April 2013 buffer and wetland area alteration options were used 485 times on 642 permit properties that had critical areas or buffers documented on properties (Table 11). Most of the allowed alterations (75.2%) were related to buffer reductions using one or more of the listed methods including, fencing, separate tracts, enhancement, and the single family residential (SFR) buffer exception. The net total area of change in buffers was a positive 12.97 acres and net change in wetland area of a positive 11.76 acres.

[54] 30.62A.330 SCC & 30.62A.520 SCC

Table 11 – Critical Area and Buffer Alteration Counts

Reduction category	Number of times used/% of total	Reduction category	Number of times used/% of total
fencing	96/19.8%	mitigation bank	0/0%
separate tracts	15/3.1%	minor development	44/9.1%
enhancement	167/34.4%	agricultural BMPs	4/0.8%
SFR exceptions	87/17.9%	farm conservation	0/0%
innovative development	35/7.2%	reasonable use exceptions	37/7.6%
Totals	400	--	85

Data Entry/Collection Issues

Tracking critical area and buffer impacts in AMANDA didn't start until 11/21/08, a little more than one year after the effective date of the new regulations. The time between the adoption of the new codes and the start of data collection was spent designing the data collection fields in AMANDA and training staff. The late start created a gap in the data that was collected. Further, a review of the data that was collected found that even after 11/21/08, not all permits with critical areas or buffers had data collected and entered into AMANDA. This was due to several factors; a perceived lack of time by some staff to enter the data, incomplete follow-up oversight to ensure that the data was being collected, and a lack of training and inconsistencies in how the data was being collected.

In addition to the issue of inconsistent and incomplete CAR data collection, there were a number of problems that were identified that caused difficulty with data analysis, interpretation and accuracy.

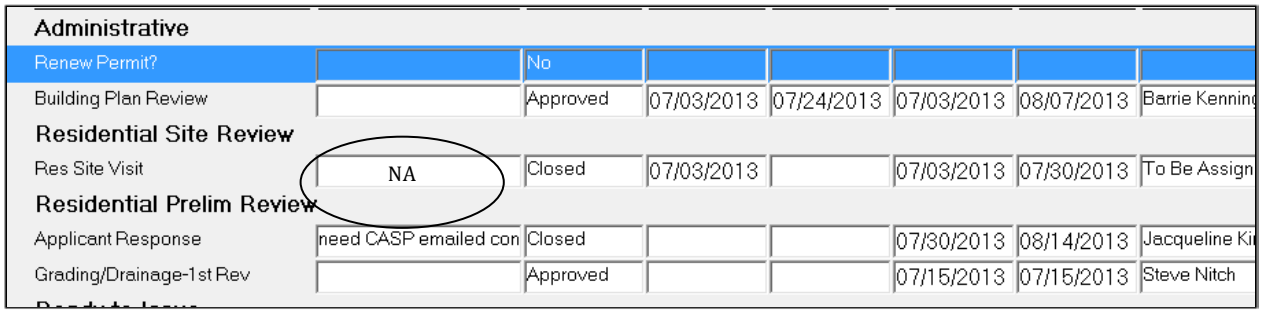
- The most significant data entry problem was the inconsistency in how the buffer and wetland change area data were documented. The numbers can be entered as positive for a net gain in area or as a negative for a net loss (Figure J & K). It's clear that some of the projects that had positive gain numbers recorded should have been negative. This may account for the overall positive net area gains that should have been net area losses. Without reviewing each hard copy case file, the summary data are unreliable.

- As a matter of Department policy, all development on properties that were subdivided after April 1 1995 have been exempted from any further CAR review. The hypothesis is that all critical areas issues were adequately addressed at the time of the original permit. There are several potential problems with this: Environmental conditions are not static, wetlands can change, threatened and endangered species can come and go from a site or

be listed or de-listed, geologic hazards can present themselves. That said, there is little or no evidence on the post 1995 subdivision properties analyzed in Task II of any new wetland or streams impact. What were missed were critical areas and buffers that were close enough to the *sites* that they should have been recorded on critical areas site plans.

- Use of "NA" in Critical Areas process lines is confusing. On the **Checklist** tab of the Critical Areas Data Collection process line it's not clear if "NA" means that there are no critical areas, if the permit is exempt from regulation and review, or that it had a previous critical areas review (Figure L).

- **Res Site Visit** process line is inconsistently used. It's variously filled out with "NSR" (no site review) or "NA" per staff person, subject matter expert or supervisor, or left blank. It's not clear what the differences are between NA, NSR and blank are (Figure L).



Administrative							
Renew Permit?		No					
Building Plan Review		Approved	07/03/2013	07/24/2013	07/03/2013	08/07/2013	Barrie Kenning
Residential Site Review							
Res Site Visit	NA	Closed	07/03/2013		07/03/2013	07/30/2013	To Be Assign
Residential Prelim Review							
Applicant Response	need CASP emailed con	Closed			07/30/2013	08/14/2013	Jacqueline Ki
Grading/Drainage-1st Rev		Approved			07/15/2013	07/15/2013	Steve Nitch

Figure L - AMANDA process line Res Site Review

- Critical Areas related data in the **Info** and **Condition** parts of the **Property** tab are outdated and not consistently used (Figure M). The list of critical areas needs to be updated in the info tab, as several of critical area types do not currently exist in the critical areas codes. Not all permits that had CAR review had any data entry into the "Info" fields and not all permits with CASPs had a CASP Auditor File (AF) numbers entered into the "Condition" field. There should be one field that's used exclusively for recording the CASP AF number.

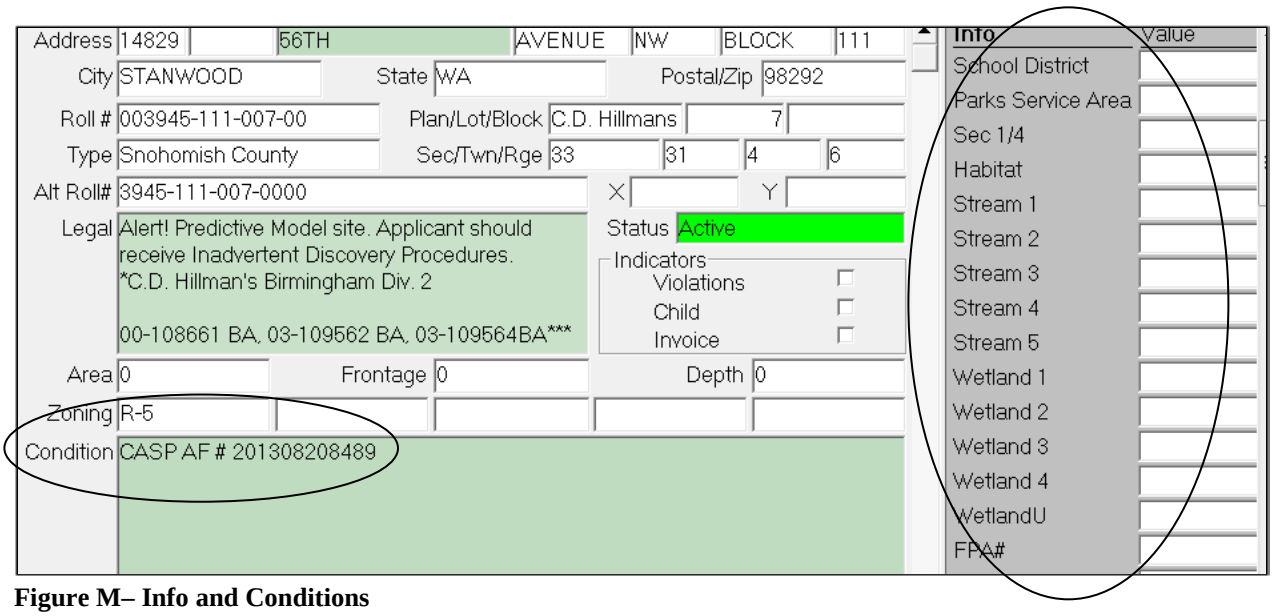


Figure M– Info and Conditions

- Some permit types with a low probability of causing impacts, as a matter of policy, do not normally receive CAR reviews; e.g., ROW permits, signs and other minor development activities[55]. Although these are minor development activities, it's likely that are some impacts associated with them.
- There is no consistent method of determining what version of the County Critical Areas Regulations applies to any given permit. This is also true for other regulations as well, but it's not always accurate to assume that a permit application date is the vesting of a permit. This makes evaluating CAR compliance after the fact more of a challenge.

Recommendations

- Provide written guidance for deciding when to conduct a review on a project subject to CAR.
- Need consistent data entry rules and use of terms in the CAR related process fields: Res Site Visit, Res Site Clearance e.g., "NA", "NSR", or a blank field entry.
- Provide a field to document the vesting dates for permit applications.
- Provide a field for CASP Auditor File Number (AFN) in the property record.
- Review and update the CAR Monitoring Program process fields.
- Define CAR data collection rules for projects that have more than one AMANDA folder, or for properties that have more than one permit.
- Provide rules and training for when to use positive and negative numbers in the buffer and wetland net area change fields.

[55] See Task II for additional discussion

Appendix A – Permits applications subject to CAR (30.62A SCC)

Permits Applications Subject to CAR – 11/01/2007 to 03/20/2013

Permit type abrev.	Permit type name	#	Permit type abrev.	Permit type name	#
AA	Accessory apartment	101	GC	Garage/ comm	6
AB	Accessory bldg	1513	GL	Grading/LU	46
AP	Antenna	13	GP	grading	95
BA	Boundary line adj	13	GR	Grading/res	60
BLA	Boundary line adj	6	GS	Grading/shoreline	2
BR	Bridge/res	1	KA	Addition/comm	2
CB	Bridge/comm	3	KC	Carport/comm	20
CBP	Commercial bldg	34	KO	Other/comm	13
CG	Grading/comm	112	KS	Sign/comm	223
CH	Coach/comm	8	LDA	Land disturbing activity	511
CP	Structure/comm	71	LU	Land use	35
D1	Access/ROW	473	MH	Mobile home	287
D2	Access/ROW	0	RC	Retaining wall	48
D3	Access/trail	0	RK	Combo/res	4,154
D4	Access/trail	5	RW	Retaining wall/res	25
D5	major const/ROW	43	SC	Pool/comm	1
D6	minor const/ROW	32	SD	Subdivision	25
D8	Utility/ ROW	17	SIGN	Sign	93
DC	Demolition/comm	45	SM	Shoreline	43
DEMO	demolition	52	SP	Short plat	36
DO	Dock/res	8	SW	Pool/res	3
DP	Dock/comm	1	TD	Threshold det	23
DR	Demolition/res	2	TW	Tower/comm	1
FC	Fence/comm	4	VP	Vault	17
FP	Forest practices	33	WS	WSDOT constr	2
FZ	Flood hazard	297	WT	Water tank	4
	sub total	539		sub total	5,775
	Grand Total	6,314			

Appendix B - Definitions

Clearing [30.91C.112 SCC]
"Clearing" means the destruction or surface removal of vegetation by cutting, pruning, limbing, topping, and relocating, manually or mechanically, application of herbicides or pesticides or other chemical methods, or any application of hazardous or toxic substance that has the effect of destroying or removing the vegetation.

Development Activity [30.91D.240 SCC]
“Development activity" means any construction, development, earth movement, clearing, or other site disturbance which either requires a permit, approval or authorization from the county or is proposed by a public agency.

Project Permit [30.91P.350 SCC]
"Project permit" or "project permit application" means any land use or environmental permit, approval or license required from a local government for a project action, including but not limited to building permits, subdivisions, binding site plans, planned residential developments, conditional uses, administrative conditional uses, variances, shoreline substantial development permits, site plan review, permits or approvals required by critical area ordinances, site-specific rezones authorized by a comprehensive plan or subarea plan, but excluding the adoption or amendment of a comprehensive plan, subarea plan, or development regulations.

Site [30.91S.350 SCC]
"Site" means that portion of the subject property within 200 feet of the development activity provided, however, that for subdivisions, short subdivisions, planned residential developments, and projects with binding site plans, the "site" shall include the entire subject property.

Appendix C – Wetland accuracy assessment using Critical Areas Site Plans

Snohomish County has three wetlands data sources used for various environmental and engineering assessments: (1) NWI Wetland Inventory, (2) PDS Wetlands, and (3) CAR Wetlands. During phase-II of the Critical Area Regulation (CAR) program, the Critical Area Site Plans (CASPs) were sampled and wetlands from the selected CASPs were digitized. CASP wetlands data were used as a tool to provide an accuracy measure on the three wetland data sources. This document summarizes the findings on the wetlands accuracy assessments for the three wetland sources in comparison with the digitized wetland polygons from the CASPs.

During the CASP wetland digitization, we found that the CASPs are frequently not accurate. In many cases, CASP parcel property boundaries were not properly scaled or drawn resulting in parcel registration issues, and wetland boundaries were not accurately delineated. Other factors affecting accuracy can be natural environmental changes over time and anthropogenic related changes. Regardless of these CASP accuracy issues, because the wetland maps are based on site visits, it's assumed that the wetland data from CASPs are generally more accurate than any other sources. While exact boundaries of the wetlands from the CASPs may not always be inaccurate, the presence and/or absence of wetlands within a parcel are highly accurate.

Two accuracy tests were performed: (1) the traditional error matrix analysis and (2) the hit and miss wetland counts. The former provides accuracy in three levels: user's accuracy, producer's accuracy, and overall accuracy. Kappa statistics will determine the statistical significance on the error matrix. The latter will introduce an additional tool to check the quality of wetland data. If wetland data from the sources coincides with the wetlands mapped on the CASPs, it assures that even though wetland boundaries are not matched, the chance of finding existing wetlands is high within a parcel.

Producer accuracy v. user's accuracy

Producer's accuracy is a reference-based accuracy that is derived by looking at the predictions produced for a class and determining the percentage of correct predictions. In other words, if I know that a particular area is wetland (I've been out the on the ground to check), what is the probability that the digital map will correctly identify that pixel as wetland.

User's accuracy is a map-based accuracy that is derived by looking at the reference data for a class and determining the percentage of correct predictions for these samples. For example, if I select any wetland pixel on the classified map, what is the probability that I'll be standing in a wetland when I visit that pixel location in the field.

Results

For this analysis, all three wetland data sources were clipped to the county-wide spatial extent of the PDS's wetland map coverage. Initially, 246 CASPs were randomly selected and digitized. After clipping CASP samples by the PDS wetland extent area, the number of samples became

84. There were 72.24 acres of wetlands and 272.47 acres uplands digitized. The resulting error matrix and hit-and-miss wetland count tables are shown in Table 1 and 2, respectively. Accuracies of the three wetland sources (SWM, PDS, and NWI) were assessed as well as SWM+PDS and all three combined. The entire CASP wetland area was used instead of discrete points for the assessment. Table 1 shows that user's accuracy for the SWM CAR wetlands is 54.5%, producer's accuracy is 46.5%, and overall accuracy is 80.7%. This means 46.5% of the wetlands have been correctly identified as "wetlands" and 54.5% of the areas identified as "wetlands" within the classification are truly wetlands. When accounting for both wetlands and uplands, 80.7% of wetlands and uplands have been correctly identified. Kappa statistics[56] indicates the accuracy has a medium-high confidence. The same interpretation can be made to PDS, NWI, SWM+PDS, and All 3. The other accuracy measure was the hit and miss wetland counts (Table 2). Table 2 suggests that 50 out of 84 parcels share wetlands delineated by CASP with SWM CAR wetlands data, 37 out of 84 parcels with PDS wetlands, and 33 out of 84 wetlands.

For the purpose of estimating wetland impacts in this report, all three wetlands (NWI, PDS, SWM) were combined. The user's accuracy of the combined wetland coverage is 46.4%, the producer's accuracy is 69.3%, and the overall accuracy is 76.8%. The kappa statistics is 0.72, which indicates the accuracy has a medium-high confidence. Hit and miss wetland counts show that the combined wetland polygons accounted for 77% CASP wetlands (65 out of 84 parcels). Overall producer's accuracy of 69.3% was used as the basis for estimating non-CASP wetland impacts for this project.

In conclusion:

- The different wetland data sources that have been used by the county have medium to medium low accuracy when used alone.
- The wetlands identified on CASPs are not always accurate but are assumed to be more accurate than the other 3 sources.
- Sources of inaccuracy on the CASPs can be poor initial mapping, natural changes over time and anthropogenic changes.
- The accuracy assessment reveals that SWM wetland data is better in terms of users and producer's accuracies and hit and miss counts than the PDS and NWI data.
- When all three wetland data are used together they have a producer's accuracy of 69.3 percent.
- User accuracy of the combined sources of 46.4% was used to estimate wetland impacts on non-CASP permit properties, forest practices properties and enforcement case properties.
- For improving wetland accuracy, wetland mapping data must be ground-truthed. In addition, manual editing should be performed whenever necessary.

[56] Kappa statistic is used in assessing the degree to which two or more raters, examining the same data, agree when it comes to assigning the data to categories.

Table 1. Error matrix of three wetland data available in Snohomish County in comparison to CASP-digitized wetlands.

		Reference									
		Wetland					Upland				
		SWM	PDS	NWI	SWM+PDS	All 3	SWM	PDS	NWI	SWM+PDS	All 3
Classification	Wetland	33.60	30.20	25.76	46.28	50.07	28.05	25.78	24.30	49.03	57.83
	Upland	38.64	42.04	46.48	25.96	22.17	244.42	246.69	248.17	223.44	214.64
	Column Total	72.24					272.47				
User's Accuracy		54.5%	53.9%	51.5%	48.6%	46.4%	86%	85%	84%	90%	91%
Producer's Accuracy		46.5%	41.8%	35.7%	64.1%	**69.3%**	90%	91%	91%	82%	79%
Overall Accuracy		80.7%	80.3%	79.5%	78.2%	76.8%					
Kappa hat		0.77	0.77	0.75	0.74	0.72					

Table 2. Hit and miss table

	# CASPs	SWM	PDS	NWI	SWM+PDS	All
Wetland Hit	84	50	37	33	62	65
% Hit		60%	44%	39%	74%	77%

Appendix D – Sampling for Impact Analysis Methods

Contents

Stationarity and Ergodicity

A random process is a collection of random variables, one for each time/space instant under consideration. Typically this may be continuous time/space ($\infty < t < \infty$) or discrete time/space (all integers n, or all time/space instants nT where T is the sample interval). A stationary process is a stochastic process whose statistical properties do not change with time/space. An ergodic process is one where its statistical properties, like variance, can be deduced from a sufficiently long sample. The average value or DC component of a sample path converges to the mean value of the process if the sample path is observed long enough, provided the process is ergodic and stationary.

Reviewing and digitizing thousands of CAR applications to estimate the CAR impact is time-consuming and expensive. To save time and money, we adopted a statistical sampling approach to estimate the impacted areas countywide. To accomplish this, we must prove stationarity and ergodicity applied to the samples of CAR application parcels. For the CAR permit process, we can assume the CAR application is a random process and the CAR impacts are random variables. This means any violations occur randomly for a given set of CAR permit parcels (stationarity). In addition, the CAR process is assumed to be spatially random (ergodicity). This guarantees that the average of a subset of random process tends to the ensemble mean. Once stationarity and ergodicity are met, the countywide impact can be estimated based on the sample impact.

Impact Analysis of Permits with CASPs

The total number of CASP parcels was 839 (4,907.49 acre). The number of randomly selected CASP parcels from the total was 335 (1,716.35 acre).

CASP Sampling

We assumed an equal probability of selection (EPS) in selecting samples, which means each CASP has the same probability of selection. To determine the number of sample size, we chose 95% confidence level with a confidence interval (margin of error) of 5%, which means our

CASP analysis results will be 95% certain within ±5% error. The desired sample size (ss) was calculated using Equation (1).

$$ss = \frac{Z^2 p(1-p)}{c^2} \quad (1)$$

where Z is Z value (1.96 for 95% confidence interval), p is percentage picking a choice in decimal, c is confidence interval in decimal. As our CASP data has only 986 samples, we corrected the sample size for a finite populationpop, using Equation (2).

$$ss_{cor} = \frac{ss}{1+\frac{ss-1}{pop}} \quad (2)$$

We chose Z=1.96 (95% confidence level), p = 0.5, c = 0.05. As a result, ss = 385 and ss_{cor} = 277. The number of random samples was increased to 335. This means that the 335 selected CASPs represent all CASPs 95% of the time with ±5% error margin.

The random sample selection method is described in I:\pw\swm\spwgca\Proj\CAR\CASP\Summary of CASP Sampling Methodology for CAR.docx.

The 335 CASPs were selected using the random selection tool from Hawth's Tool in ArcGIS 10.1.

Null Hypothesis

"The CASP impacts are random with zero mean."

T-test

A T-test is a statistical hypothesis test to determine if two sets of data are significantly different from each other.

One-sample T-test

A one sample T-test compares the CASP impact data with a hypothetical normal distribution with zero mean at the 5% significance level.

1. Remove mean from the CASP impact data
2. Perform T-test of the hypothesis
3. Test if the impact is significantly different from a normal distribution with mean zero

One-sample T-test by simulation

Also, a one-sample T-test can be applied to a randomly selected sample set (n = 30) and compared with a normal distribution with mean zero. The random selection is iterated 1,000 times to count the number of acceptance of the null hypothesis at the 5% significance level.

Two-sample T-test by simulation

A two-sample T-test compares two random selection sets from the CASP impacts data to determine if they are significantly different from one another.

1. N = 335 (UGA = 131 and Non-UGA = 204)
2. Use CASP impacts greater than 0 (acre) → 49 parcels
3. Remove the mean from the selected CASP data set → m = 0.1117
4. Randomly select two sets of 30 CASP impact events
5. Perform T-test
6. Iterate steps 4 and 5 1,000 times and check H to test if the random selection sets are significantly different from each other

The CASP impacts can be considered as stationary and ergodic if the one-sample T-test and two-sample T-test pass the null hypothesis.

Test Results for CASP Data

The number of samples to characterize the CASP impacts is sufficient to test stationarity and ergodicity. A T-test is also suitable test method when the number of samples is small. Figure 1 shows the distribution of the impacts of permits with CASPs.

One-sample T-test

$$m = 0.1117\ (acre)$$

$$H = 0, p = 1.0$$

One-sample T-test by random simulation

A one sample T-test by simulation was performed for 30 randomly selected samples. The random selection was repeated 1,000 times. The simulation results show that the selection set has a normal distribution with zero mean for 78.7% of the time as shown in Figure 2 (a).

Two-sample T-test by random simulation

The two-sample T-test was performed for two sets of 30 randomly selected samples. The random selection was repeated for 1,000 times. The simulation results showed that they had the same distribution with equal mean for 97.6% of the time as shown in Figure 2 (b).

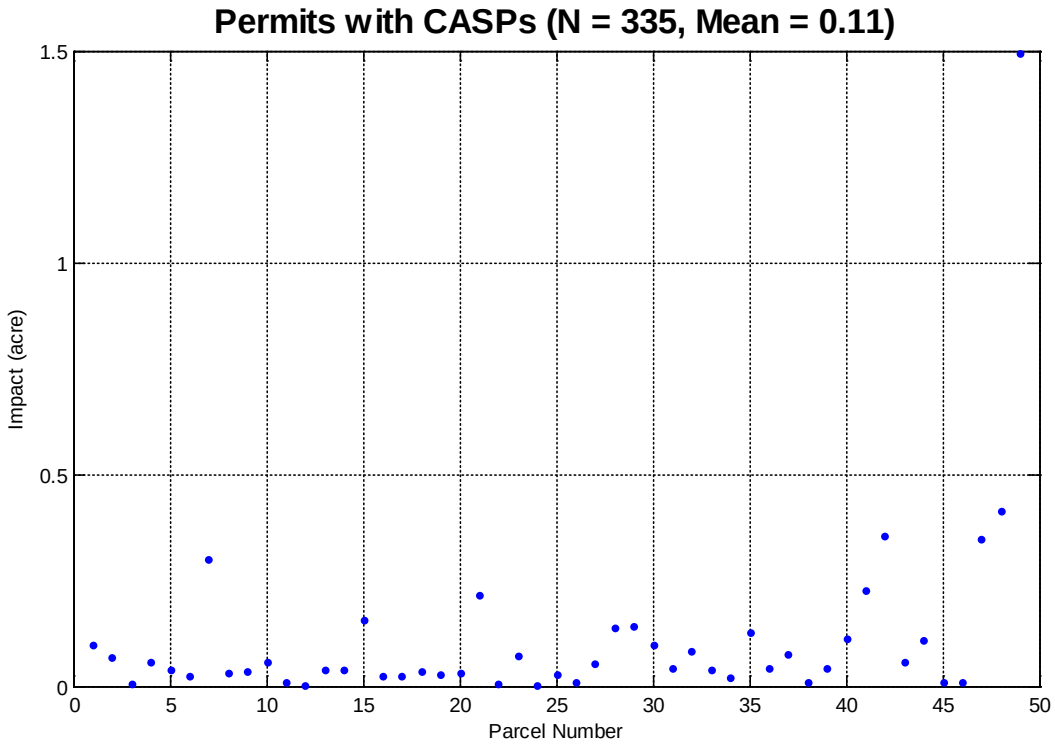


Figure 1. Plot of CASP impacts for the 49 digitized impact areas.

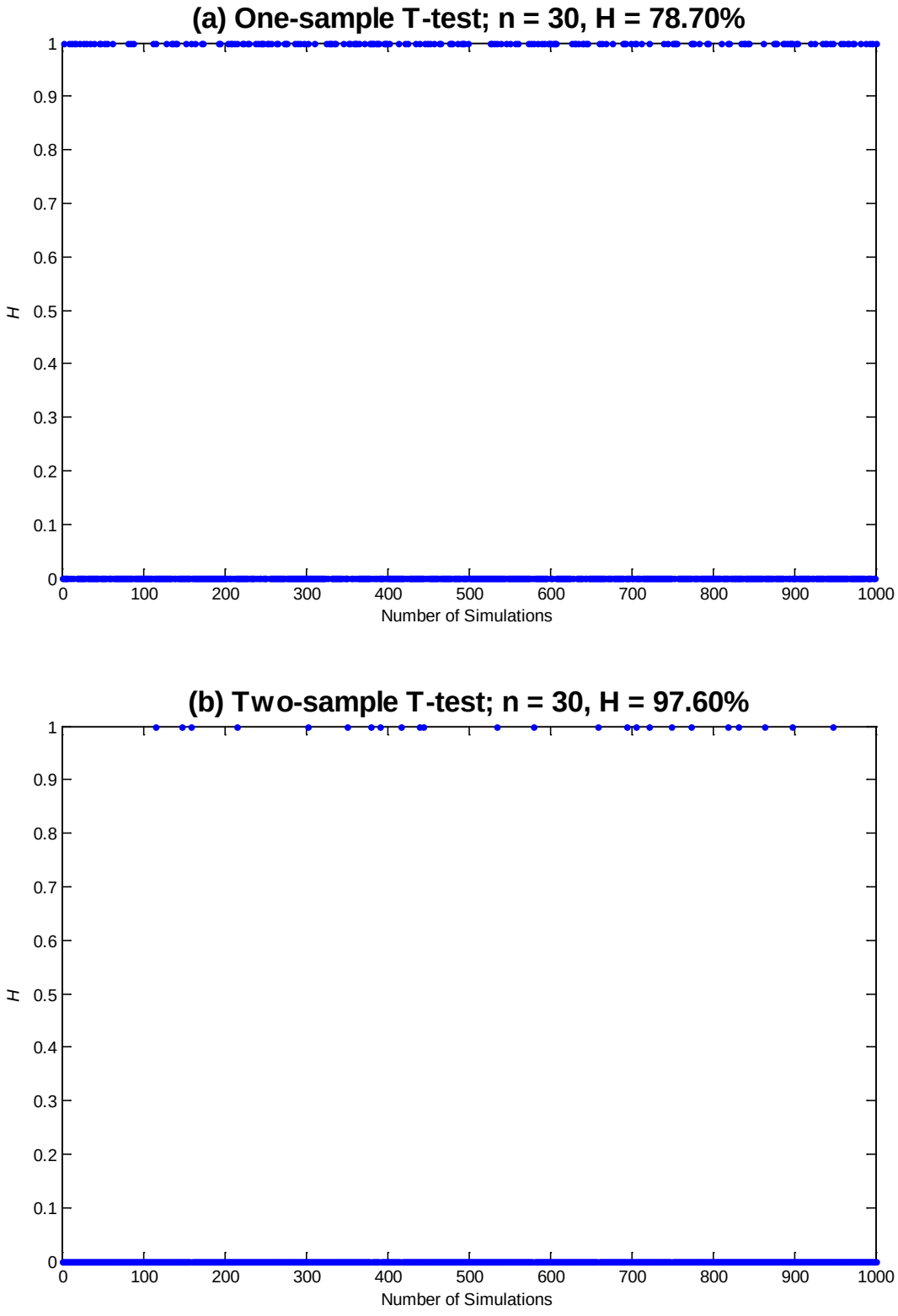


Figure 2. Simulated CAR impacts. For each simulation, a pair of 25 impact parcels was selected.

In conclusion, the number of samples to characterize the CASP impacts is sufficient to test stationarity and ergodicity. The one-sample and two-sample T-tests show that the CASP impacts are stationary and ergodic.

For the 335 randomly selected CASPs, there were 5.47 acres of impacts between 2007 and 2013. Also, there were 839 unique parcels applied for CASPs between 2007 and 2013. The T-test implies that a countywide estimate of CASP impacts between 2007 and 2013 is 15.65 acre with 78.7% and 97.6% accuracies for a one-sample T-test and a two-sample T-test, respectively:

$$\hat{I}_{CASP} = \frac{5.472 \times 4{,}907.49}{1{,}716.35} = 15.65\ (acre)$$

Impact Analysis of the Enforcement Cases

There were 2,748 enforcement cases (5,308.67 acres). Of the 2,748 cases, 900 cases (1,988.89 acres) were randomly selected to examine the CAR impacts. Figure 3 shows the distribution of the impacts of the enforcement cases.

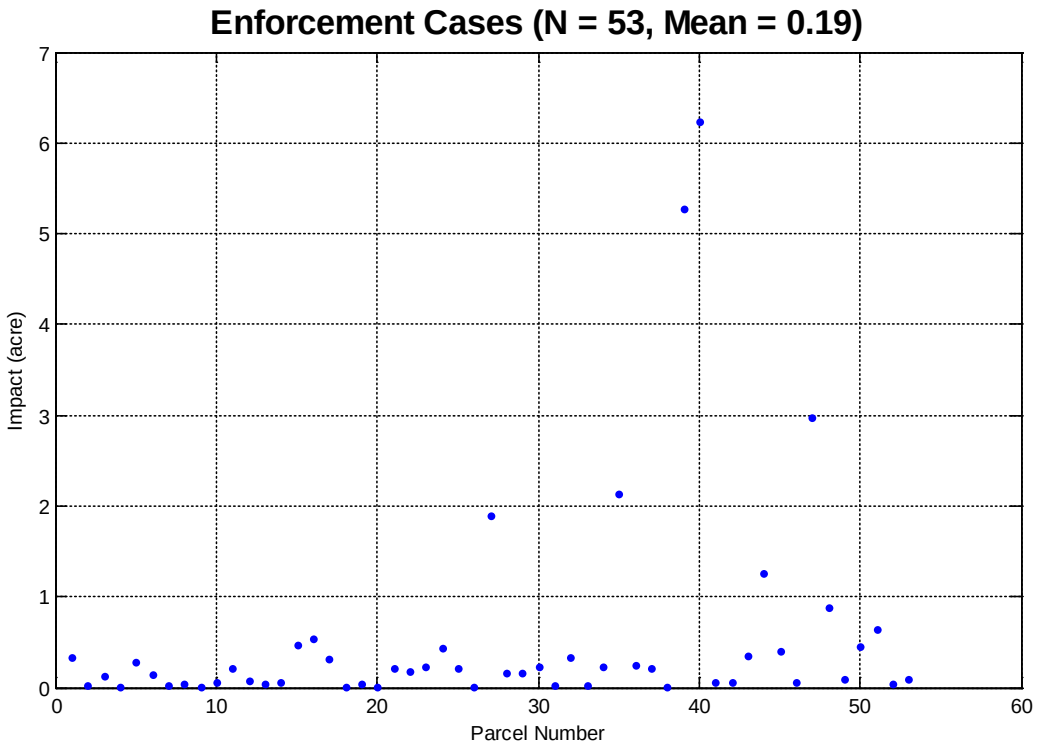


Figure 3. Plot of the impacts of the enforcement cases for the 53 digitized impact areas.

Null Hypothesis

"The impacts of the enforcement cases are random with zero mean."

T-test

The same T-test method applied to the CASP impact analysis was also used to analyze the enforcement cases.

One-sample T-test

$$m = 0.5416\ (acre)$$

$$H = 0, p = 0.9114$$

One-sample T-test by random simulation

A one sample T-test by simulation was performed for 30 randomly selected samples. The random selection was repeated 1,000 times. The simulation results show that the selection set has a normal distribution with zero mean for 83.6% of the time.

Two-sample T-test by random simulation

A two-sample T-test was performed for two sets of 30 randomly selected samples. The random selection was repeated 1,000 times. The simulation results show that the two random sets had the same distribution with an equal mean for 96.3% of the time.

Test Results for Enforcement Cases

For the 900 randomly selected enforcement cases, there were 28.71 acres of total impacts between 2007 and 2013. The T-test implies that a countywide estimate of enforcement impacts between 2007 and 2013 is 76.63 acres, with 83.1% and 96.3% accuracies for one-sample T-test and two-sample T-test:

$$\hat{I}_{Enforcement} = \frac{28.71 \times 5{,}308.67}{1{,}988.89} = 76.63\ (acre)$$

Estimating the Area of Critical Area and Buffer Impacts from All Tasks

There are four tasks in the 2013 CAR project:

(1) Permits with CASPs
(2) Permits without CASPs
(3) Forest Practices
(4) Enforcement Cases

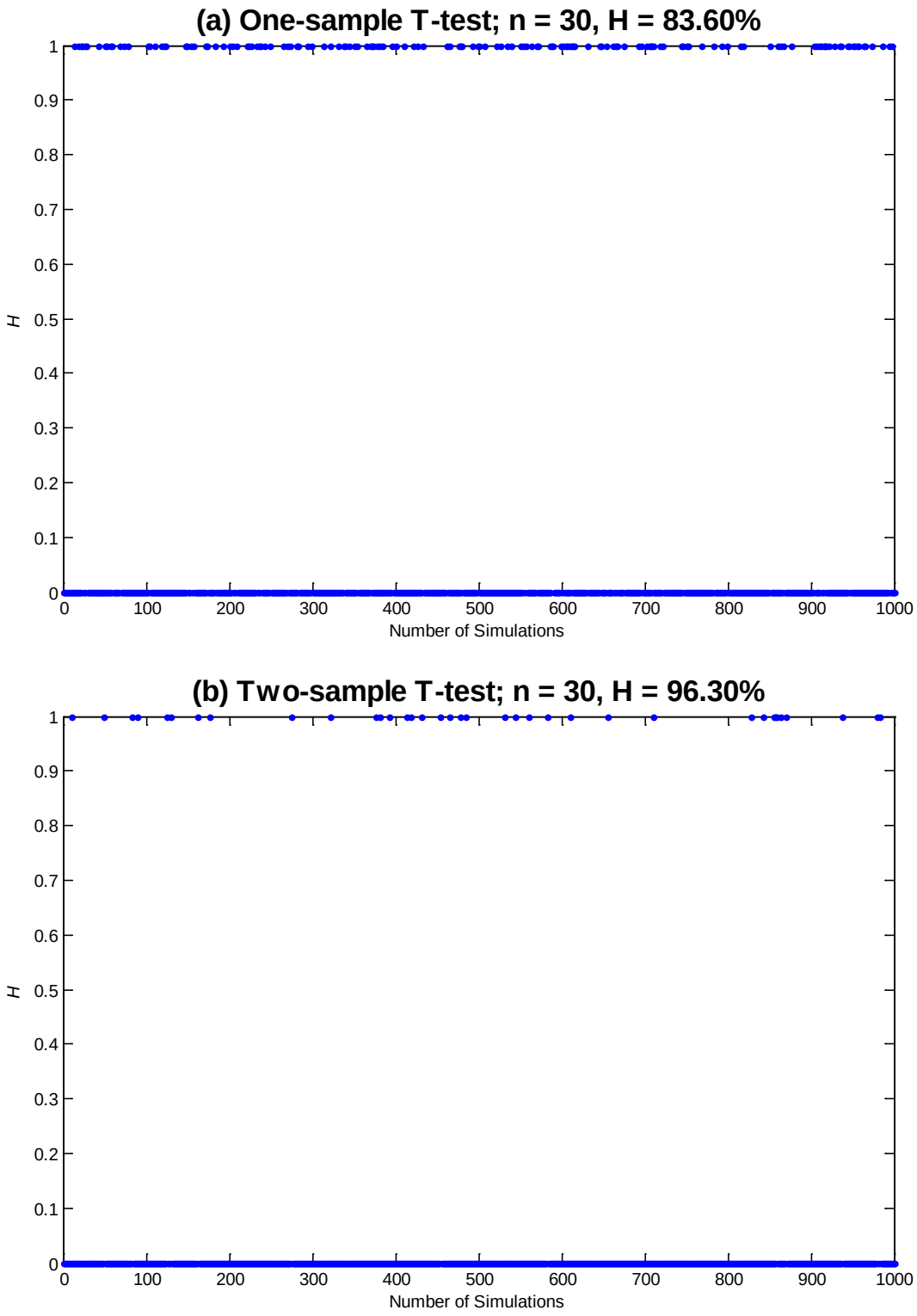


Figure 4. Simulated CAR impacts. For each simulation, a pair of 30 impact parcels was selected.

Of 839 CASP parcels (4,907.49 acres), 335 randomly selected (1,716.35 acres) to estimate the CASP impacts. Of 2,748 enforcement cases (5,308.67 acres), 900 cases (1,988.89 acres) were randomly selected to estimate the CAR impacts. Among the random selection sets of the four tasks, only the permits with CASPs and the enforcement cases have a minor correlation. In order to estimate the area of critical area and buffer impacts from all tasks, correlation analysis with tasks overlapped with each other needed to be performed. The stationarity and ergodicity test proves that the impacts of both permits with CASPs and enforcement cases were random and normally distributed. In probability theory, the sum of normally distributed random variables is normally distributed as well:

$$X_{CASP} \sim N\left(\mu_{X_{CASP}}, {\sigma^2}_{X_{CASP}}\right)$$

$$X_{enforcement} \sim N\left(\mu_{X_{enforcement}}, {\sigma^2}_{X_{enforcement}}\right)$$

$$\hat{X} = X_{CASP} + X_{enforcement}$$

$$\sim N\left(\mu_{X_{CASP}} + \mu_{X_{enforcement}}, {\sigma^2}_{X_{CASP}} + {\sigma^2}_{X_{enforcement}}\right)$$

where μ and σ are mean and standard deviation.

Therefore, we can combine CASP and enforcement cases to avoid double counting in the total impact estimate. The total area of the two cases is 9,864.05 acres and the total area of randomly selected parcels is 3,656.43 acres. When the two impacts for the randomly selected sets are combined, the total impact is 34.03 acres. The area of critical area and buffer impacts from the permits with CASPs and enforcement cases can be estimated as follows:

$$\hat{I}_{CASP+Enforcement} = \frac{34.03 \times 9{,}864.05}{3{,}656.43} = 91.8\ acre$$

In the case of forest practices, the entire population was used. In addition, impact from permits without CASPs was minor and we determined that a correlation analysis for the permits without CASPs was not necessary. In conclusion, the area of critical area and buffer impacts from all tasks was estimated to be 108.58 acre as follows:

$$\hat{I}_{All\ Tasks} = 91.8 + 13.67 + 3.11 = 108.58\ acre$$

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Department of Commerce

Critical Areas Handbook

Chapter 7

Monitoring and Adaptive Management of Critical Areas Regulations

June 2018
Brian Bonlender, Director

Chapter Contents

Appendices

Introduction: Why Monitoring and Adaptive Management?

All counties and cities in the state have adopted critical areas regulations and permitting procedures under the Growth Management Act and the Shoreline Management Act, respectively. They have adopted these regulations to facilitate protection of critical areas. But, a local government has no way of knowing if they are achieving that goal without looking at the permit process and the on-the-ground results of critical areas regulation. They need a feedback loop to help determine whether goals are being met, and if the goals are not being met, how to improve the process.

This chapter provides a suggested process for starting a permit monitoring program that can help local governments begin to address that gap in knowledge, and to improve permit implementation to protect critical areas. The chapter also provides a number of case studies of counties and cities (and state and federal agencies) that have adopted and are implementing monitoring programs – why they set up a program, what they are monitoring, and what changes they are making in response to the information they have gathered.

Increasing Fairness, Transparency, Accountability and Ecological Outcomes

Adaptive Management, for purposes of this handbook, is a systematic process for continually improving management policies and practices by learning from the outcomes of implementation.

All interest groups have a common interest in a critical areas regulatory process that is fair, effective and efficient. Residents want to know that regulations are achieving their goals for the community. Developers and consultants want to improve the quality and speed of the permit process. Advocacy groups, whether environmental or private property rights, want transparency in the process. Tribes seeking to assert their treaty rights want to reduce risk from land use impacts.

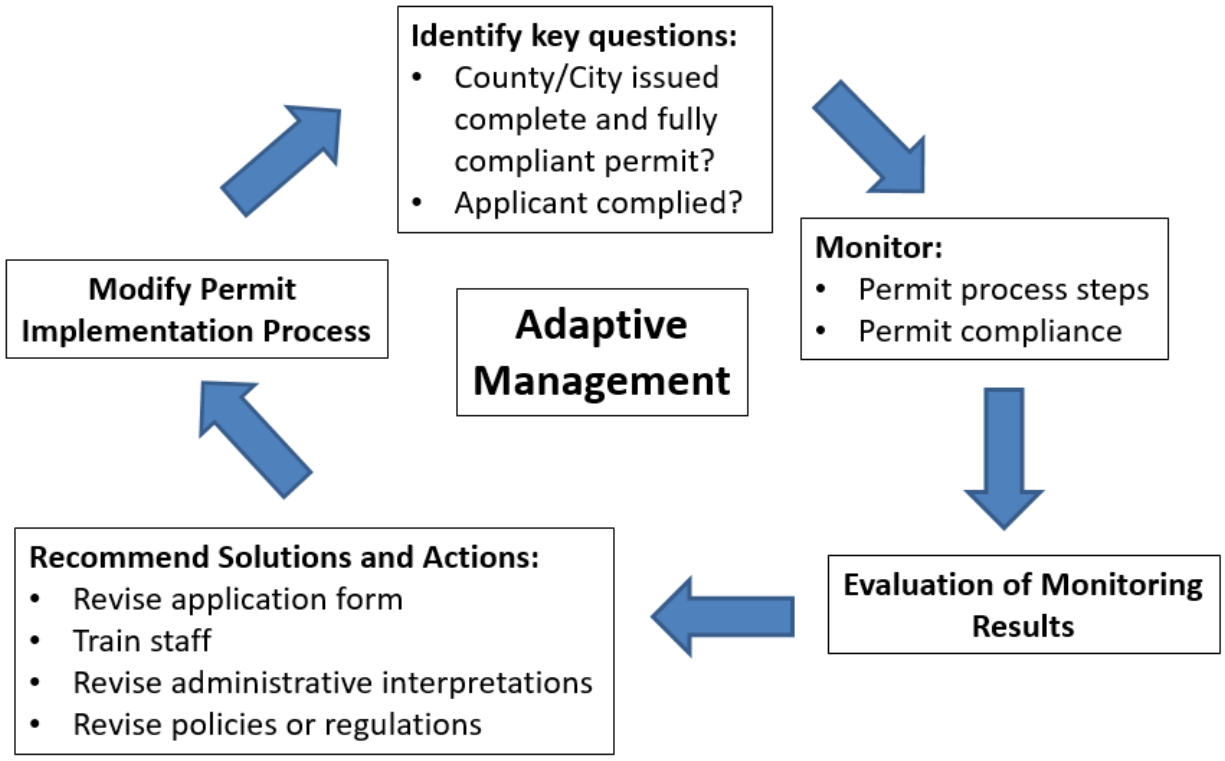
The goals of a monitoring and adaptive management program are increased fairness, transparency, accountability and improved ecological outcomes from regulations for critical areas protection. Monitoring tracks whether application requirements are being applied consistent with the regulations. This ensures applicants are being treated consistently and therefore fairly. Monitoring allows a local government to track the implementation of the permit system and to produce regular status reports for the public to review. It provides accountability to the public and applicants when they see that all applicants are being treated fairly and consistently in compliance with the regulations. Effectiveness monitoring determines if the intended outcomes or goals of fairness, transparency and accountability are being achieved over time.

Adaptive management is a commitment by a local government to respond to monitoring and effectiveness results by changing approaches for protecting and managing critical areas, and to redirect resources as warranted by new information. A willingness to make improvements to address issues identified through this process is important.

Monitoring and adaptive management are often low on the list of priorities for local jurisdictions. Lack of funding, staff capacity, and technical issues can make developing and implementing a program difficult. It can also expose perceived failures in the permit system, and may require changes that are difficult or unpopular. However, the benefits of a successful critical areas monitoring and adaptive management program can be substantial, and even a modest program can be worthwhile.

Assessing permit implementation and effectiveness of critical areas regulations under the Growth Management Act (GMA) and the Shoreline Management Act (SMA) can help counties and cities determine if their permit system is reaching desired outcomes for protecting critical areas and accommodating appropriate uses.

Monitoring and adaptive management can improve the delivery of government services around critical areas protection. The focus of a monitoring and adaptive management program is to evaluate the effectiveness of solutions identified to protect critical areas and actions taken, and to make changes as needed. The process is iterative as shown in the figure below. Such a program can result in recommended process improvements in implementing the critical areas regulations.



Conceptual representation of how implementation monitoring can be used to improve the permit process

This chapter describes different levels of monitoring, outlines the components of a monitoring program, and provides local and state examples of permit monitoring programs. Permit monitoring for purposes of this guidance means any version of review that includes application of regulations to development regardless of whether a separate permit for shoreline or critical areas is required under the development regulations.

Regulatory Context

For monitoring purposes, no distinction is made in this document between critical areas regulations adopted under the Growth Management Act versus the Shoreline Management Act. Critical areas protection is required by both acts, and many jurisdictions have adopted their critical areas ordinance by reference in their Shoreline Master Program (SMP).[1] The information gathered from monitoring should inform critical areas protection regardless of where critical areas are located. For example, the lessons learned from wetlands mitigation monitoring is beneficial, regardless of whether wetlands are in shoreline jurisdiction. The rules for both of these closely related statutes recognize the importance of monitoring as described below.

Counties and cities may choose to adaptively manage critical areas or shoreline programs under either the GMA or the SMA as part of their periodic reviews, though there is no requirement to follow that schedule, and no reason to wait for scheduled reviews to improve permit processes.

Growth Management Procedural Criteria

Critical areas protections adopted under the Growth Management Act have been in place in most jurisdictions for decades. Most jurisdictions have reviewed and updated, where needed, their regulations at least once. Monitoring and adaptive management can help to ensure these regulations achieve no net loss of critical areas functions and values. Commerce recognizes the importance of no net loss in the protection of functions and values in the Procedural Criteria:

> Although counties and cities may protect critical areas in different ways or may allow some localized impacts to critical areas, or even the potential loss of some critical areas, development regulations must preserve the existing functions and values of critical areas. If development regulations allow harm to critical areas, they must require compensatory mitigation of the harm. Development regulations may not allow a net loss of the functions and values of the ecosystem that includes the impacted or lost critical areas.[2]

The Department of Commerce's Best Available Science rules help local governments determine which information is the "best available science." The rule encourages counties and cities to monitor and evaluate their efforts in critical areas protection and incorporate new scientific information, as it becomes available.[3] Where there is an absence of valid scientific information, or incomplete scientific

[1] RCW 36.70A.480; RCW 90.58.610
[2] WAC 365-196-830(4
[3] WAC 365-195-905(6)

information, the rule recommends using a "precautionary approach," or an effective adaptive management program as an interim approach.[4]

No court decisions have held that local governments are required to adopt a monitoring and adaptive management program. However, the Supreme Court found that if Skagit County were to rely on monitoring and adaptive management to protect critical areas in agricultural lands, it needed to establish benchmarks for monitoring.[5] The Growth Management Hearings Boards have addressed the value of a monitoring and adaptive management program, and required it in certain circumstances as follows:

- Jefferson County was required to adopt a monitoring strategy that includes stricter development regulations that will be implemented at once if less stringent protection standards prove to be inadequate to protect against seawater intrusion. The County adopted less stringent protection standards that balance the need for protection of potable water supplies against the chilling effect of regulation against development after considering the best available science.[6]
- When Skagit County chose a less-than-precautionary approach for protection, the Board found that approach requires an effective monitoring and adaptive management program that relies on scientific methods to evaluate how well regulatory and non-regulatory actions the County adopted to achieve their objectives.[7]
- San Juan County was required to adopt an adaptive management program recommended by an advisory group because limitations in its ground water model and the data assembled to date did not conclusively show that increased densities in the urban growth area would not result in saltwater intrusion into the water supply.[8]

Voluntary Stewardship Program

Many counties have opted in to the Voluntary Stewardship Program (VSP) to protect critical areas from existing and ongoing agricultural activities. The VSP requires local watershed groups to develop a work plan to protect critical areas while maintaining the viability of agriculture in designated priority watersheds.[9] The work plan must include a monitoring and adaptive management program with goals and benchmarks for the protection and enhancement of critical areas. The Voluntary Stewardship Program is a non-regulatory alternative that does not rely on permits, but the principles of monitoring are the same and could be modified for VSP. Also, VSP monitoring is not the level of monitoring that is most of the focus of this chapter. This chapter encourages permit implementation monitoring, and VSP requires a form of validation monitoring. See Levels of Monitoring below for a description of each type of monitoring. For more information about the Voluntary Stewardship Program see Chapter 5.

[4] WAC 365-195-920.
[5] *Swinomish Indian Tribal Community. v. W. Washington Growth Management Hearings Board*, 161 Wn.2d 415 (2007)
[6] *Olympic Environmental Council, et al. v. Jefferson County*, 01-2-0015 (Compliance Order, 12-4-02).
[7] *Swinomish Indian Tribal Community et al. v. Skagit County*; 2-2-0012c (Compliance Order, 12-8-03).
[8] *Stephen F. Ludwig v. San Juan County*, Case No. 05-2-0019c (FDO, Compliance Order, April 19, 2006).
[9] RCW 36.70A.720

Shoreline Management Rules

In approving a comprehensive SMP update, Ecology formally concludes that the SMP will result in "no net loss of ecological functions necessary to sustain shoreline natural resources." [10] Monitoring can help a local government determine whether implementation of their Shoreline Master Program is achieving no net loss requirements, as well as the policy goal to plan for and foster reasonable and appropriate uses. Monitoring can do this by demonstrating that permits are being issued consistent with the approved SMP requirements.

Ecology shoreline rules call on local governments to "monitor actions taken to implement the master program and shoreline conditions to facilitate appropriate updates of master program provisions to improve shoreline management over time." The key "actions and conditions" are those associated with authorized developments. The shoreline rule also directs local governments to identify a process for periodically evaluating the cumulative effects of authorized development on shoreline conditions, which could involve a joint effort by local governments, state resource agencies, affected Indian tribes, and other parties.[11] An example of a joint effort would be a local government working with Ecology and WDFW to employ High Resolution Change Detection data to track cumulative land use changes over time. The rules pledge that Ecology will "compile information concerning the effectiveness and efficiency of the guidelines and SMPs" and this may inform future updates to state rules. [12]

Levels of Monitoring

Monitoring does not have to be complicated. Simply choosing to monitor permit implementation can provide key information for permit process improvement. Generally speaking, there are three levels of monitoring discussed in this chapter:

Permit implementation monitoring asks: (1) whether the local government issued a permit consistent with the regulations; and (2) whether the projects as built comply with all of the conditions noted in the permit. Data is about individual permits.

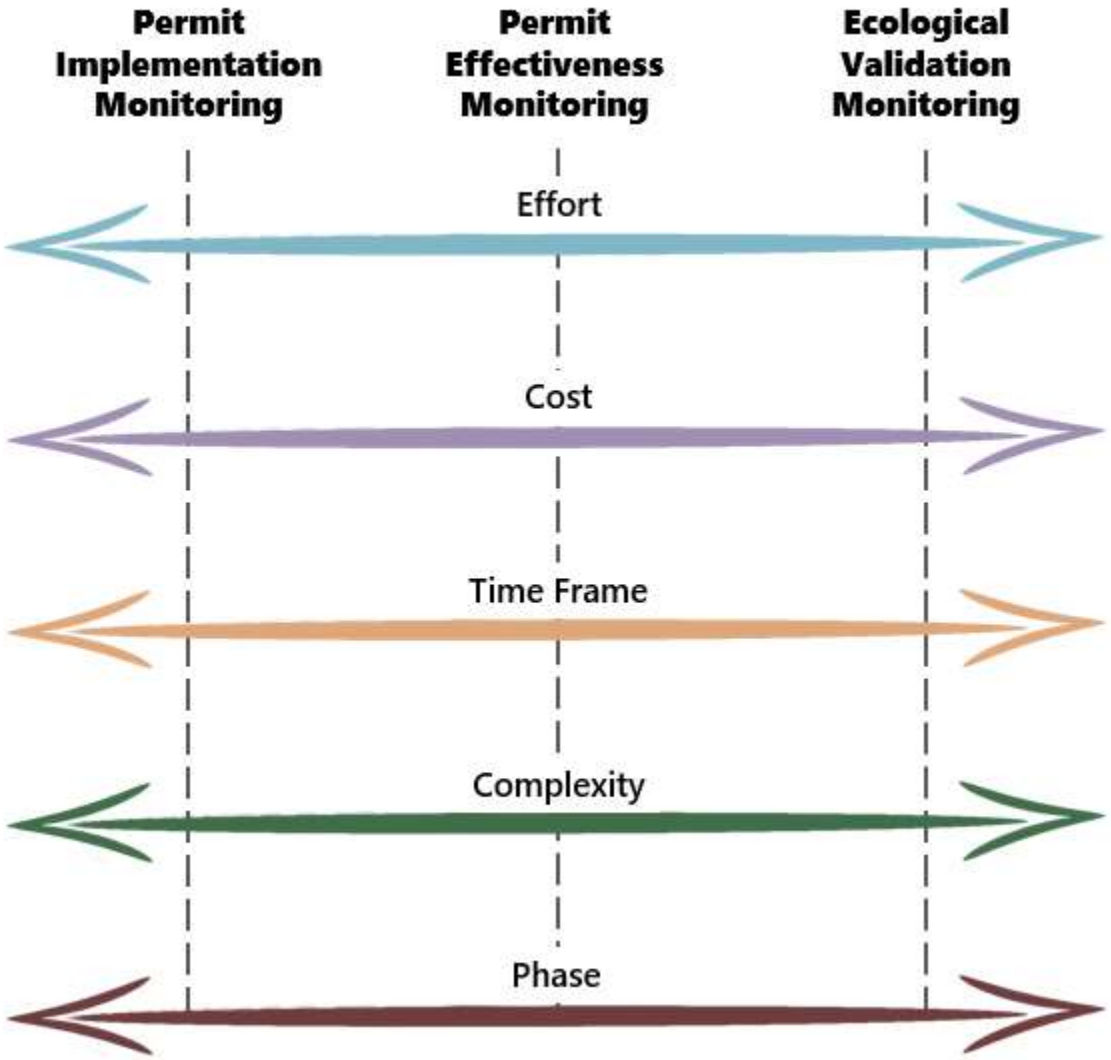
Effectiveness monitoring continues to ask the two permit implementation monitoring questions noted above over a longer period of time – are permits being issued that are consistent with all regulatory requirements and are projects continuing to meet permit requirements. Effectiveness monitoring can also address procedural improvements to improve efficiency of the permit system. The data is not about the individual permit, but whether and how to adaptively manage the system.

Validation monitoring asks general ecosystem questions about whether critical areas functions and values are being protected, and whether we are achieving no net loss of the ecosystem. Another term

Monitoring does not have to be complicated. Simply choosing to monitor permit implementation can provide key information for permit process improvement.

[10] WAC 173-26-18 6(8)
[11] WAC 173-26-201(2)(b); WAC 173-26-191(2)(a)(iii)(D)
[12] WAC 173-26-171(3)(d) and WAC 173-26-201(2)(b)

for this type of monitoring is status and trends monitoring. Validation monitoring requires extensive scientific research that is probably beyond the resources of most local governments.[13]



Levels of Monitoring

It is easiest to think og levels of monitoring as a continuum. Implementation monitoring is easier, can be done in a short time frame, and can eventually lead to effectiveness monitoring. This document focuses primarily on these first two levels, because there is not always a bright line between implementation and effectiveness monitoring. Many jurisdictions do them together.

This chapter does not focus on validation monitoring, which is typically conducted regionally or as part of a particular scientific study. One example is the Puget Sound Ecosystem Monitoring Program (PSEMP). PSEMP is a collaboration of state, federal, tribal, local government agencies, non-

[13] As noted above, the Voluntary Stewardship Program relies on a form of validation monitoring. Participation in the program is dependent upon funding, which is currently being provided by the state.

governmental organizations, watershed groups, business, academic researchers, local integrating organizations, and other private and volunteer groups and organizations. PSEMP has a number of work groups that monitor various populations and environmental conditions in Puget Sound, such as birds, mammals, salmon, and freshwater and marine waters. Over time, monitoring results should eventually be able to link observed changes in natural resources more closely with regulatory systems.

Steps in Developing a Monitoring and Adaptive Management Program

Step 1. Determine the Reasons for Monitoring

Clarify the reasons for monitoring and how monitoring results will provide feedback for adaptively managing permit implementation. A decision to develop a monitoring program should start with a review of core plans or policy documents. Has the local government adopted specific direction to conduct certain kinds of monitoring? If not, determine the area of focus by addressing community concerns. Reasons for monitoring could include:

- Are there specific critical areas that the jurisdiction is concerned are not adequately protected or that appear to have a high level of unpermitted activity?
- Are there complaints from the community that compliance or enforcement is not adequate or is perceived as unfair?
- Is there a desire to improve permit transparency, accountability and speed of permit processing?

Step 2. Establish Key Objectives and Study Questions

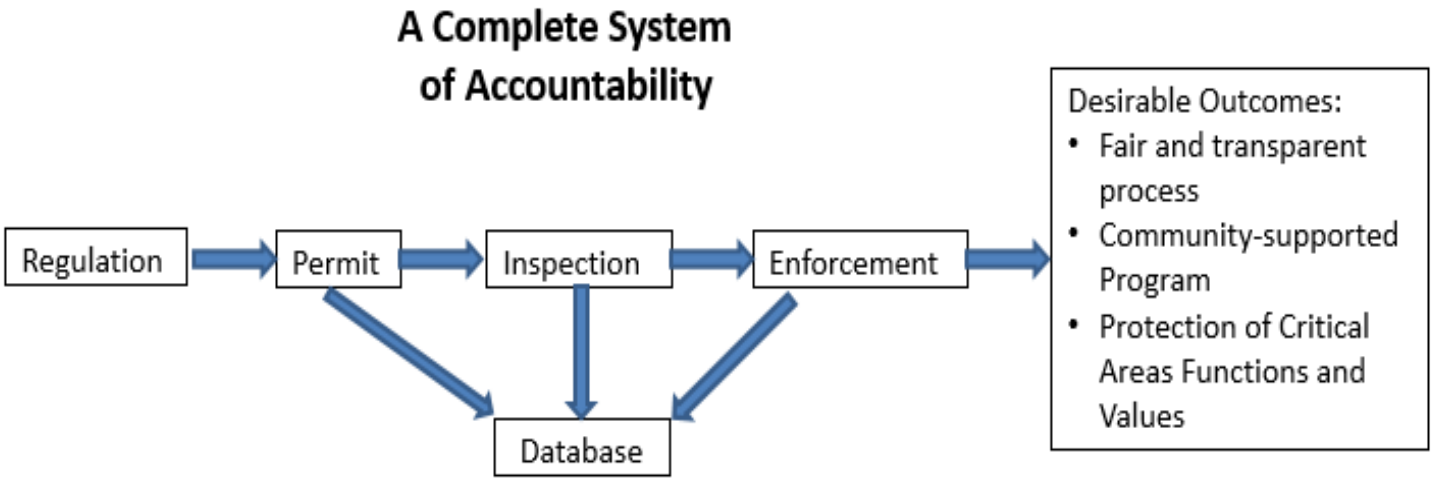
To be effective, a local government needs to establish clear objectives for the monitoring and adaptive management program, and develop questions that address those objectives. Is the objective to determine whether permits are being correctly issued in compliance with the regulations, and to refine the process if that objective is not being met? If so, an example of a clear objective might look like "permit provisions will be applied consistently and in compliance with the shoreline regulations;" or "applicants are complying with permit requirements." The objectives will help determine which level of monitoring is required.

A local government should choose to monitor permit implementation if process improvement is the objective. Two entities are involved in implementation of a development permit, the local government and the applicant. The success or failure of permit implementation depends on the performance of both entities. Permit implementation monitoring collects information that improve the performance of the local government and the actions of the applicant.

The success or failure of permit implementation depends on the performance of both the local government and the applicant.

Effectiveness monitoring looks at permit implementation over time. Monitoring the outcome of permitting and enforcement of critical areas regulations over time begins to answer the question of whether regulations are applied accurately and consistently, and whether permit conditions are maintained.

Monitoring of any of the stages of the permit process - permit, inspection, or enforcement of permit conditions and requirements - can help evaluate implementation and effectiveness of a critical areas regulatory program, depending on identified goals and resources. A database for gathering information on each stage is a critical tool for creating a complete system of accountability. Each stage is worth evaluating.



For each stage of the permit process, some basic questions are recommended. The questions would be the same for all critical areas that require protection (versus critical areas that require risk management, e.g., landslide hazard areas).

Stage in Critical Areas Permit/Review Process	**Key study questions to evaluate permit implementation**
Permit	Did the local government issue a complete and fully compliant permit: 1. Does the permit identify the critical area and what needs to be protected? 2. Does the permit follow the code? 3. If a variance has been granted, is the reason for the variance clearly stated? 4. Does the permit provide all the specific information necessary for the applicant to be in compliance? 5. Does the permit clearly state and quantify the work being authorized? Does the permit clearly state and quantify any critical areas impacts authorized by the permit decision?
Inspection	1. Pre Visit: Were all of the required technical reports, documentation, and information submitted? 2. Post-Visit: Did the applicant comply with the permit? This may require field measurements of permit provisions or requirements. If the permit requires quantifiable measures and the permit provisions are not measurable (quantitative), then the local government issued an incomplete permit.
Enforcement	1. Are enforcement actions resulting in compliance with the permit and/or the regulations?

An example of the types of questions that might be asked for monitoring of frequently flooded areas based on this framework might include the following.

Permit: Are permits being properly documented per the building code?

- Were buildings required to be elevated properly?
- Has development been required to be properly flood vented?
- Were the utilities required to be properly elevated or flood proofed?
- For development in the Puget Sound Region, was compliance with the Puget Sound Biological Opinion for the NFIP documented in the permit via a Habitat Assessment or other means?

Inspection: Did the applicant comply with the permit?

- Have buildings been elevated properly?
- Has development been properly flood vented?
- Were the utilities properly elevated or flood proofed?
- For development in the Puget Sound Region, were Habitat Assessment requirements in permits followed?

Step 3. Design the Monitoring Program

There are a number of considerations for designing a monitoring program to ensure that the results are unbiased and actionable.

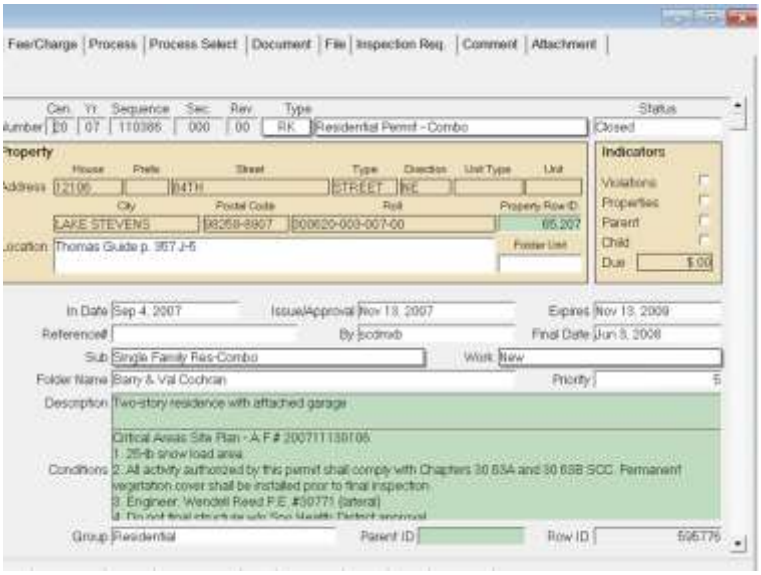
Design of the permit system: An initial consideration is the design of the permit system itself. For example, does it sort actions into discrete enough categories that they can be reasonably compared to each other?

An effective permit tracking system: Is the permit tracking system set up to collect the information that will be used to evaluate its effectiveness? An essential foundation for a monitoring program is a thorough and reliable way of tracking permits and permit conditions. It will be impossible to implement an effective monitoring system without such a system.

Ideally, the permit tracking system should be reviewed for whether it provides the information needed to answer the key monitoring questions. Each step of the permit process should be documented. A basic spreadsheet or database should be set up to track the permit process and provide data that answers these questions regarding permits, inspections and enforcement. Planning and enforcement staff should be trained to gather and enter data in a consistent manner.

An example of a very simple tracking system is an Excel spreadsheet used by the City of Kirkland. Kirkland monitors compliance with the Shoreline Master Program by tracking a number of permit requirements, such as shoreline setback, vegetation, stabilization, overwater coverage, lighting, and uses. For a template based on Kirkland's Excel spreadsheet, click here.

Other jurisdictions use database software available on the market, such as Snohomish County. Snohomish County tracks every step of the permit process in its database, including permit requirements and copies of documents.



Snohomish County permit tracking database

Sample size: Is the sample size large enough to be of value to monitor? Some jurisdictions issue a very limited number of permits for some activities. Knowing that you improperly issued 50 percent of a given type of permit doesn't help much if only two were issued during the monitoring period.

Random sample selection: If a jurisdiction issues a large number of permits each year, the monitoring question can be answered by reviewing some subset of the total number of permits for consistency in application of and compliance with the regulations. Implementation and effectiveness monitoring programs generally do not sample all permits, and in fact sampling all units may be inefficient unless only a small number of permits are issued each year.[14] Most permit monitoring programs focus on sampling a limited number of permits in order to make inference to all permits. To say something about all permits (those that you can sample and those you cannot), you need to employ some type of random selection process of all permits. A random selection of permits avoids bias. Randomization can be achieved by adding a random element to the selection process. The cardinal rule is to make inference to all permits - each individual permit must have an equal chance of being chosen to review.

An approach to choosing the sample permits you want to monitor could involve the following:

- What is the specific question you want answered?
- How are you defining your study population - i.e., how are you defining all permits? For example, all permits issued in 2014? Or, all building permits between 2010 and 2015?
- If you have large numbers of different development permit types, you may want to consider sampling by permit type – e.g., agriculture, forest practices, or single-family residence versus commercial or subdivision. (See the Snohomish County case study for an example of this.)
- How will you add a randomization element to the sample of permits that you choose from all permits? For example, will you choose the first permit issued each month over the last 5 years?
- Which permit stages are to be monitored – permit, inspection or enforcement?
- What types and sources of data are to be collected? Of all the things that could be measured, what exactly will be measured? For example, permit conditions for land cover, water quality, shoreline conditions, etc.
- What sampling methodology will be used? What defined criteria will be used to review each permit type?
- Determine if there is baseline monitoring that can be used to measure results against. What will the jurisdiction compare ongoing results against? This is not always applicable to all monitoring types - it may not be applicable to permit implementation. But to understand progress, establishing a baseline and monitoring over time will be helpful.

Selection bias/access to information: Are there provisions in the program to allow equal access to sampling results? For example, if the program relies on landowners willing to grant access to their property to perform follow up inspections it may not produce reliable results. Unless post-permit monitoring inspections are required by binding permit conditions or code requirements to compel access, the results will be biased toward access by willing landowners.

[14] This is in the context of monitoring for permit implementation or effectiveness. If a jurisdiction is monitoring for mitigation compliance, prioritization of permits and/or monitoring of all permits will be more effective. See the Wetlands Compliance Mitigation and USACE Compliance Mitigation examples on pages 47 and 48.

Step 4. Determine the Monitoring Time Frame

In some cases, a monitoring and evaluation program is an ongoing effort, though there should be specific periods for reporting. If a monitoring effort has a defined period, the number of years before a report is generated should be informed by the scope of the monitoring questions. To have sample sizes big enough to summarize, several years at a minimum should be monitored prior to reporting. A county or city may want to prepare a report on a priority area every eight years to inform their periodic reviews under the Growth Management or Shoreline Management Acts.

Step 5. Evaluate Results and Make Recommendations

Local governments using a monitoring program should produce periodic reports that clearly answer the questions and objectives identified at the start of the program. The report should also identify any weaknesses in the program that could affect the quality of the results.

Examples of the kinds of results a monitoring effort can identify:

i) Are accurate, complete and clear permits being issued?
ii) Are critical area requirements being applied consistently in permits?
iii) How are data summarized to provide useful feedback to interested stakeholders?

Results from a monitoring study should include recommendations for revising or adaptively managing the permit process to increase critical areas protection effectiveness or compliance with the regulatory requirements.

Local and State Case Studies of Implementation and Effectiveness Monitoring

A number of counties and state agencies have conducted monitoring of their critical areas programs. For many of them, the focus of monitoring was on both implementation and effectiveness. Implementation and effectiveness monitoring are very closely related, and often overlap. The case studies presented here provide some ideas for what a local government might choose to monitor, and the types of process improvement recommendations that could result from monitoring.

Snohomish County Monitoring and Adaptive Management Program

1. Determine the Reasons for Monitoring

The County adopted a critical area protection program in 2007 consisting of three principal tools: regulations, non-regulatory environmental programs, and a monitoring and adaptive management

program. The monitoring plan outlined an approach for measuring indicators of critical area functions and values (for wetlands and fish and wildlife habitat conservation areas), evaluating changes, and informing adaptive management decision-making regarding what adjustments may be needed to regulations or other County programs to protect critical area functions and values.

Snohomish County chose to include a monitoring element as a precautionary approach, taking into consideration growth management hearing board rulings regarding critical area protection and monitoring in other counties. The County developed an adaptive management approach for sections of their critical areas regulations. This effort began in 2008 in accordance with the requirements contained in the Monitoring and Adaptive Management provisions of Part 700 of Snohomish County Code,[15] the "no net loss" policies contained in the County's comprehensive plan,[16] and the Growth Management Act. The monitoring program was primarily intended to monitor wetlands and fish and wildlife habitat conservation areas.

The second phase[17] of the Monitoring and Adaptive Management Plan analyzed the effectiveness and implementation of permits and enforcement in protecting certain critical areas and their buffers (Critical Areas Monitoring Report: Analysis of the Effectiveness and Implementation of Permitting and Enforcement to Protect Critical Areas in Snohomish County, December 2014[18]). The study was to provide data on whether the County was meeting its no net loss goals, and to provide recommendations for improving the permit process to meet those goals. This case study focuses on this second phase of the program.

2. Establish Key Objectives and Study Questions

Snohomish County was interested in understanding how well its critical areas regulations were being implemented. The County uses a Critical Areas Site Plan (CASP) to identify all critical areas, buffers and restricted areas occurring in close proximity to the development area. The County's study looked at properties with a number of permit types subject to the critical areas regulations and clearing, grading and building enforcement cases.

Two of the key questions that the County asked were:

- What were the land cover change gains or losses in wetlands, fish and wildlife habitat conservation areas and their buffers?
- If loss is occurring, what adaptive management adjustment are needed to protect functions and values in fish and wildlife habitat conservation areas, wetlands, and their buffers?

The guiding principles for the monitoring and adaptive management plan are:

- Develop and implement the monitoring program using peer-reviewed best available science.

[15] Part 700 of Chapter 30.62A of Snohomish County Code.
[16] Natural Environment Policies: NE 3.B.10, NE 5.A.7© and NE 7.B.1.
[17] The first phase investigated changes in land cover, shoreline conditions along major rivers and lakes at a countywide scale that occurred between 2007 and 2009; and an assessment of select ecological indicators to evaluate the effectiveness of code provisions in protecting aquatic environments. The results were published in the "Critical Areas and Shorelines Monitoring Status Report" (SWM, March 2012). That report did not analyze the effectiveness or implementation of permitting or enforcement in any depth.
[18] https://snohomishcountywa.gov/DocumentCenter/View/22692/2014-CAR-Monitoring-Report

- Focus the program on the functions of fish and wildlife habitat conservations areas, wetlands, and their buffers.
- Test hypotheses with indicators.
- Use random sampling.
- Adaptively manage the monitoring program.

3. Design the Monitoring Program

For this phase of Snohomish County's program, the emphasis was on analyzing the effectiveness and implementation of permitting and enforcement using high-resolution aerial photography at a parcel scale. Specific tasks were developed and investigated pertaining to the study questions:

- Evaluate land cover changes in critical areas and buffers on a random sample of 335 of the 839 properties with permits subject to the County's critical area regulations that have critical areas site plans (CASPs).
- Evaluate land cover changes in critical areas and buffers on all 900 of the clearing, grading and building code enforcement properties subject to the County's critical area regulations.
- Evaluate land cover changes in critical areas and buffers on all 49 of the properties with Class IV forest practices permits subject to the County's critical area regulations.
- Evaluate land cover changes in critical areas and buffers on a random sample of 300 of the 797 properties with permits subject to the County's critical area regulations that did not have critical areas that were documented.
- Evaluate the implementation and effectiveness of the monitoring procedures in the County's permit tracking system (AMANDA) used to track the presence and impacts of critical areas. Buffer and wetland area alteration options were used 485 times on 642 permit properties that had critical areas or buffers documented.

Adaptive Management Triggers

Indicator	Threshold 1 (increase outreach, enforcement, mitigation)	Threshold 2 (Add programmatic adjustments)	Threshold 3 (Add code revisions)	Change detection and adjustment of time frame
Wetland Area	<5% change* in one watershed	5-10% change* in 2+ watersheds	>10% change* countywide	4 years
Riparian forest quantity/quality index	<3% change* in one watershed	3-5% change* in 2+ watersheds	>5% change* countywide	2 years
*Change is measures relative to baseline				

The County established a series of adaptive management triggers for each indicator based on local values. Without science upon which to base them, they selected targets that seemed appropriate. These triggers may need to be adjusted.

The County used land cover data from aerial photography to map critical areas as part of the permit process. It then used subsequent land cover data to determine whether applicants met critical area site plan requirements with respect to the area of critical area and buffer requirements.

The County also evaluated its permit process through its permit tracking system (AMANDA). Most critical areas reviews are documented in one or more AMANDA process lines that must be filled out or deleted before a permit can be issued. The County used AMANDA process line information to determine whether or not a permit review occurred, and why. This information was also used to determine whether critical areas reviews were being done consistently.

4. Determine the Monitoring Time Frame

The time frame for the study was November 2007 through April 2013. The County has adopted an eight-year ongoing monitoring cycle consistent with the statutory review schedule under GMA. The next report will be completed one year prior to the next review deadline in 2023.

5. Evaluate Results and Make Recommendations

Some specific conclusions and recommendations related to the permit process for this report were:

- Critical area site plan (CASP) documentation was generally poor. There were problems with the accuracy of the scale, dimensions, structure locations, and locations of critical areas that create difficulties with the interpretation and application of CASP requirements by permittees.
  Recommendations
  - Provide clear written CASP document instructions for staff and applicants.
  - Develop aerial photo template with parcel boundaries to help staff and applicants.
  - Develop consistent method of documenting recording CASPs in AMANDA.

- Apparent misunderstandings of the applicability and exemptions in the critical areas regulations and other development codes have led to inconsistencies – e.g., cases where critical areas and buffers were present that should have been identified and recorded on CASPs, and others where the critical areas or buffers have been impacted without any reviews by the Department of Planning and Development Services (PDS).
  Recommendations
  - Provide additional critical areas regulations training to staff on development permit thresholds, exemptions and applicability.

- Inconsistent and poor documentation in AMANDA made it difficult to draw conclusions why many of the permits were not reviewed for critical areas, or what transpired in the reviews that did occur.
  Recommendations
  - Improve documentation in AMANDA of critical areas regulation review; e.g., consistent use of process lines, vesting dates.

- Critical areas regulation monitoring data collected in AMANDA documenting impacts and mitigation was inconsistently provided. Missing data and misunderstandings of how to input the data created unreliable information on critical area and buffer impacts that could not be used to summarize impact trends over time.
  Recommendations

- Provide additional staff training to assure permit technicians, planners, engineers and environmental reviewers understand the data needs for critical areas regulation monitoring.
- Review and refine data monitoring fields in AMANDA.

Douglas County Shoreline Critical Areas Monitoring and Adaptive Management

1. Determine the Reasons for Monitoring

Douglas County does not have a lot of upland critical areas, but it does have a lot of shoreline along the Columbia River. While monitoring is not required under GMA or SMA, enforcement is required under the SMA[19]. Douglas County adopted a monitoring and adaptive management program in its SMP in 2009. The 2009 SMP.[20] defines "monitoring" as:

> [E]valuating the impacts of development proposals over time on the biological, hydrological, pedological, and geological elements of such systems and/or assessing the performance of required mitigation measures throughout the collection and analysis of data by various methods for the purpose of understanding and documenting changes in natural ecosystems and features, and includes gathering baseline data

Appendix H[21] to the County SMP contains the County Shoreline Critical Areas Regulations. Section 4, Chapter 1, 1.060 and 070 require monitoring and adaptive management. Performance standards and specifics for monitoring wetlands are in Chapter 3, Section 2.035, and fish and wildlife habitat conservation areas are in Chapter 4, Section 3.037.

2. Establish Key Objectives and Study Questions

The key objective of the program is no net loss of ecological functions and values under the SMP.

3. Design the Monitoring Program

Douglas County has set up a problem solving process designed to achieve no net loss. County staff created a "child" permit in their permitting software that they call a "performance assurance permit" to ensure compliance. The performance assurance permit is the same as a performance bond used by public works. The financial "set-aside" is 125 percent of the project mitigation cost. It is a very specific document that is financially vested. It provides an incentive for compliance. The County prefers that people post a bond to assure no net loss, rather than requiring them to pay a fine for violations.

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[19] RCW 90.58.210

[20] Douglas County Shoreline Master Program, page 133. http://www.douglascountywa.net/docs/default-source/tls/planning/growth-management/smp/chapter_1-9_final_8-27-09.pdf?sfvrsn=6

[21] http://www.douglascountywa.net/docs/default-source/tls/planning/growth-management/smp/appendix_a-h_final_8-27-09.pdf?sfvrsn=6, start on page 161 of the PDF.

All shoreline development permits require a performance assurance and a monitoring process (see citation in paragraph 1 above). Staff track shoreline development permits through a software system. Staff tracks Performance Assurances (PERFs) through the same software system using "child" permits.

Mitigation site monitoring reports must be created and submitted by a qualified biologist of record. As stages of compliance are achieved, funds are release sequentially from the financial set-aside. Shoreline development permits may be revoked if improvements are not executed. If monitoring reveals that installation and monitoring of mitigation improvements has been completed as required, remaining amounts of the financial surety are released.

A portion of permit fees fund the monitoring program. It is mostly an unfunded requirement code enforcement absorbed (partially funded by county solid waste fees).

The monitoring program also encompasses investigations of complaints, as well as joint river patrols with other state and local agencies. When the County identifies critical areas violations such as conducting work without the required permit and mitigation plan, it requires that the resolution be memorialized through the Shoreline Development Permit and PERF permit process, rounding out the process of ensuring no net loss.

4. Determine the Monitoring Time Frame

The 2009 SMP requires a five-year monitoring period for permits, with biologist monitoring reports submitted in years one, three and five.. The monitoring reports must be prepared and submitted by a qualified professional biologist. This ensures that a professional who is trained in the local area Best Available Science is certifying there is no net loss of ecological functions and values. (SMP Appendix H[22], Section 2.035.J and Section 3.037.I)

5. Evaluate Results and Make Recommendations

The County generates a report to track the submittal and verification of the biologist's monitoring reports. Staff looks at the biologist's assurance of no net loss versus the potential net loss under the Shoreline Development Permit.

If the biologist's report reflects a failure of the mitigation plantings to meet the conditions required by the SMP or the specific permit, the monitoring period is extended. Once all of the reports reflect the site meets the mitigation requirements, the PERF is closed and the monies are released. A closed PERF corresponding to a completed Shoreline Development Permit means "no net loss" is validated.

The County is evaluating when to execute the PERF during the permit process. Staff are evaluating whether five years is long enough to monitor, or too long. Staff are also looking at how to enforce non-compliant PERFs – whether they should revoke the permit or enter the property and complete the improvements.

[22] http://www.douglascountywa.net/docs/default-source/tls/planning/growth-management/smp/appendix_a-h_final_8-27-09.pdf?sfvrsn=6

The County is continuing routine monitoring and identifying difficulties. For example, staff are looking at how to maintain a fire-adapted community and protect critical areas. They are also looking at the issue of how to provide code-compliant accessibility in shorelines of significance.

San Juan County Initiative

San Juan County looked at the effectiveness of its shoreline permit process. The San Juan Initiative, a partnership of the Puget Sound Partnership, Surfrider Foundation, and San Juan County formed in 2006 to determine what was working and what was not in protecting sensitive shoreline resources (See Amy H. Windrope, Timothy Quinn, Kurt L. Fresh, Andrea J. MacLennan & Joseph K. Gaydos (2016): *Marine Shoreline Management – A 35-Year Evaluation of Outcomes in San Juan County, Washington*, US, Coastal Management[23]). The goal of the Initiative was to provide a scientifically defensible, community-based process to evaluate and improve shoreline protection through citizen-supported changes to local and state policy.

1. Determine the Reasons for Monitoring

The Initiative conducted this study to determine whether shoreline management requirements were adequately protecting feeder bluffs, shoreline vegetation and forage fish beaches.

2. Establish Key Objectives and Study Questions

The study had two components: shoreline characterization and policy/permit review. The shoreline characterization asked the following questions:

- What construction had occurred along the shoreline that would likely have impacted shoreline vegetation, feeder bluffs or forage fish beaches?
- Was there a difference in on-the-ground outcomes from permitted or non-permitted structures and was there a difference in the impact of structures over time as shoreline regulations became more protective?

The evaluators also reviewed County permit databases for all records of overwater and shore armor permits after 1977. County permit review asked four questions:

- Was there a permit for the activity?
- Were sensitive resources identified (i.e., eelgrass beds, feeder bluffs, or forage fish beach spawning habitat) that could be negatively impacted by the activities?
- Did permits contain provisions to protect those sensitive resources?
- Did dimensions of field-measured armor and overwater structures comply with permit conditions?

3. Design the Monitoring Program

The study describes how state and local policies were implemented in San Juan County, particularly how ecological outcomes relate to implementation challenges. Because counties must comply with the

[23] https://www.tandfonline.com/doi/full/10.1080/08920753.2017.1237242

Growth Management Act and the Shoreline Management Act, the Initiative did not differentiate between the requirements of the two acts. Five elements of the initiative were reported on:

- Characterization of shoreline construction during three time periods reflecting three different regulatory regimes;
- Review of policy, regulations, and permitting processes;
- Evaluation of the affected publics' perceptions on shoreline protection;
- Documentation of actions taken by the San Juan County Council in 2008 in response to Initiative findings; and
- Measuring of changes in shoreline management in 2012 after implementation of Initiative recommendations in 2008.

4. Determine the Monitoring Time Frame

The evaluators reviewed the County permit databases for all records of overwater and shore armor permits in three time periods: pre-SMA, post-SMA and post- 1993 which reflected post –GMA changes. These time periods were chosen because they reflected significant changes in shoreline regulations.

5. Evaluate Results and Make Recommendations

Among other findings, the study found issues with county implementation under the Shoreline Management Act (SMA), and with permit tracking. Permit process findings included:

- The county lacked basic maps showing the location of sensitive resources;
- Permit information was stored in three separate databases and was not easily searchable, and more recent permits were recorded on note cards; and
- Permits lacked essential information necessary to determine compliance.
- There was no significant difference between permitted and non-permitted shoreline structures impact (size, location)
- The permitting rate for shoreline armor, after 1977, was less than 10 percent (meaning that greater than 90 percent of the armor did not have a permit record) and for docks it was 78 percent.
- There was no enforcement mechanism nor inspections.
- Many community members believed the permitting and enforcement system to be arbitrary and unfair.

Recommendations at the local government and state levels:

- Establish clear and unambiguous decision criteria;
- Develop effective tracking databases and inspection programs; and
- Monitor for compliance and effectiveness.

Another critical component of adaptive management is adequate community engagement. The San Juan Initiative actively engaged shoreline property owners with neighborhood meetings. They also held lunches several times a year for builders, landscapers and contractors who work along the shoreline to understand their concerns and to develop solutions through collaboration.

Jefferson County Shoreline Permitting

1. Determine the Reasons for Monitoring

Jefferson County received an EPA grant through Clallam County. The purpose of the overall grant to Clallam and Jefferson Counties was to enhance shoreline protection through shoreline permitting. Under this grant, Clallam County developed policies and regulations pertaining to no net loss of shoreline functions during its Shoreline Master Program (SMP) update process, while Jefferson County assessed implementation of policies and regulations intended to achieve no net loss that had been incorporated into the updated SMP. And, Jefferson County wanted to develop indicators of shoreline function to determine whether it was achieving no net loss.

This case study is based on the Jefferson County work to develop tools for implementing and monitoring the County's SMP. The grant allowed the County Department of Community Development (DCD) to evaluate permit activity under the County's updated SMP for use in future decision-making, and provided an opportunity to determine whether the County's SMP implementation was achieving no net loss of shoreline functions. Work completed under this grant also allowed the County to identify ways to improve permitting outcomes through adaptive management.

2. Establish Key Objectives and Study Questions

The overall goal of the grant was to develop tools for implementing and monitoring adopted SMPs. The objectives were:

- Identify and monitor indicators of shoreline function;
- Develop tools to help planners review shoreline applications;
- Develop a database to track shoreline permitting applications, permitting decisions, and monitoring results;
- Prepare a standardized shoreline monitoring field form;
- Conduct monitoring site visits to verify compliance with shoreline permit conditions and the approved site plan, as well as post development conditions for no net loss indicators;
- Prepare written guidance and templates for applying no net loss indicators that could be used by other local jurisdictions; and
- Provide technical assistance to property owners and some local professionals, including realtors, contractors, and consultants.

The study asked two basic questions:

- Are shoreline application proposals complying with the SMP policies and regulations?
- Are shoreline permittees complying with the shoreline permit requirements?

The study was based on two assumptions:

- The monitoring program should be designed for use in showing compliance during periodic review and update of the SMP.
- Permits issued in compliance with the SMP should result in no net loss of natural shoreline functions and values.

3. Design the Monitoring Program

Technical Assistance: Jefferson County DCD used the grant to improve its technical assistance to shoreline property owners through guidance and outreach. To identify the most effective outreach strategy, DCD and the consulting team made 24 monitoring site visits during summer 2015. Monitoring site visits evaluated permit compliance with permit conditions and assessed no net loss indicators of shoreline function on a Shoreline Development Field Form. The 24 monitoring site visits represented approximately 50 percent of the shoreline applications that had been approved at that time, and the information collected from these site visits were then used to target outreach activities in the County.

Compliance Monitoring/Enforcement: To ensure that shoreline applications were consistent with all applicable shoreline regulations, DCD prepared a No Net Loss Checklist for use in planner review.[24] Checklists prepared for each application recorded the application number, application information, project information, and shoreline permitting information. The planner reviewing the shoreline application used the checklist to confirm that all supporting information was submitted and that the proposal complied with all applicable SMP regulations. Completed checklists were entered into a database that tracked all shoreline permits issued under the updated SMP.

Monitoring site visits were made to prperties in which the permitted work had either started or had recently been completed. As noted above, monitoring information was recorded on a Shoreline Development Field Form. This form evaluated the pre-development conditions and the post-development conditions for each applicable indicator of shoreline function. The results of this assessment would indicate whether or not permitted projects were affecting shoreline functions. The form was also used to record whether or not the implemented project was consistent with approved plans. The data collected during monitoring site visits were also entered into a database that tracked the following for each shoreline permit:

- No Net Loss Checklist Information: application number, landowner name, project address, parcel number, type of land ownership, development type, development summary description, shore type, waterbody name, shoreline reach, and shoreline designation;
- No Net Loss Indicators: identified each indicator by shore type, pre-development conditions, and post-development conditions;
- Monitoring Site Visit Information: describe any variations from permit, describe mitigation (if required), identify whether or not application was for restoration, describe development implications for no net loss, and general comments.

Shoreline Permit Review: Shoreline applications received by DCD and compiled in the database were also used to track shoreline permitting and no net loss indicators, and to evaluate this activity relative to future shoreline permitting decisions in Jefferson County.

4. Determine the Monitoring Time Frame

The updated Jefferson County SMP went into effect in February 2014, and all shoreline permits issued between the SMP effective date and December 2016 (grant end date) were tracked in a database. During this timeframe, Jefferson County received 142 shoreline applications. County planners completed 118 No Net Loss Checklists, issued 105 shoreline permits, and monitored 64 projects for compliance with permit conditions and the approved site plan.

[24] See Appendix 7.A.

5. Evaluate Results and Make Recommendations

A compilation of the monitoring results of permitted shoreline projects showed that planners generally reviewed proposals consistent with the SMP, and that the majority of the applicants complied with permit conditions. The indicators of shoreline function used by the county suggest that permitted projects are not likely to negatively affect shoreline ecological processes. These results indicate that county permitting is generally effective at maintaining baseline shoreline conditions. There were a few cases where there was (1) insufficient or inadequate information submitted by the applicant, (2) insufficient or inadequate review of the application by the project planner, or (3) lack of compliance with permit condition by the applicant (or hired workers).

Monitoring showed that, for the most part, the no net loss provisions of the SMP are being met and that the indicators evaluated demonstrate that baseline shoreline ecological conditions are not being negatively affected by permitting activities. That said, monitoring did indicate that additional or better enforcement may be needed in some cases to achieve full compliance with SMP requirements. A list of key issues below identifies some actions that the county could take to improve the permit review process and achieve better permit compliance during project implementation.

- Issue: Shoreline approval for repair of existing modifications/uses where repair to original condition results in impacts to ecological functions.
  Potential options:
  - Encourage planners to carefully review maintenance and repair exemptions relative to the exemption requirements.
  - Encourage planners to pull old files (when available) from archiving to better compare what was previously approved with the current proposal.
  - Encourage planners to make more site visits to review existing site conditions relative to the proposed work shown on submitted site plans.

- Issue: Unauthorized expansion of existing modifications/uses that commonly occur through maintenance/repair requires shoreline exemption approval.
  Potential options:
  - Actions to address this key issue are similar to those listed above.
  - New mapper tool with better imagery may help planners review on-site conditions.

- Issue: Loss of canopy cover and vegetation beyond approved clearing limits.
  Potential options:
  - Require all site plans to show limits of clearing.
  - Require all site plans to show trees to be removed during construction.
  - Require submittal of a stormwater worksheet that states how much clearing is proposed with each shoreline application. Require all applications to include photographs of project area.
  - Encourage better communication between DCD planner and Jefferson County Environmental Health sanitarian (who ultimately issues septic permits).
  - Add permit conditions requiring applicants to install orange construction barrier fencing at clearing limits and require a site visit to review the location of the fencing prior to beginning any earthwork.
  - Provide additional training to septic designers and septic installers (to increase consistency between county-approved plan sheets and site development activities).

- Consider using performance bonds for permitted projects to encourage greater compliance with permit conditions.

- Issue: Mitigation approved without maintenance/monitoring requirements.
  Potential options:
  - Encourage planners and staff biologist to review mitigation plans more thoroughly.
  - During next SMP update, provide regulatory requirements for preparing "No Net Loss" reports; add specific reporting criteria that must be addressed to show that the proposal complies with all regulatory requirements and ensure that no net loss of shoreline ecological functions is met for all permitted projects.

- Issue: Permitted building setbacks and other allowed modifications adjacent to coastal geologically hazardous areas, with immediate or future risk to shoreline ecological functions. DCD does not have geologists on staff and the department currently relies on information in geotechnical reports prepared by geologists (or engineers) with a state stamp to make permitting decisions. Work completed during the course of this grant indicates that, in some cases, the reports may need further evaluation by an independent third-party expert prior to issuing a shoreline permit.
  Potential options:
  - Send reports out for third-party review, as needed (mapper tool guidance provided by the consulting team will help DCD determine if third-party review may be appropriate).
  - Encourage DCD planners to provide handouts pertaining to slope stability and vegetation retention to property owners to increase understanding of potential hazards to human health and safety as well as the shoreline environment.

Thurston County/WDFW Shoreline Master Program

In 2015, Thurston County Long Range Planning and Washington Department of Fish and Wildlife (WDFW) used a National Estuary Program (NEP) grant to quantify shoreline vegetation and land cover change and evaluate land use permit compliance within Thurston County's shoreline regulatory jurisdiction. Thurston County has over 400 miles of shoreline.

Thurston County measures and monitors no net loss based on existing conditions remaining the same as when the SMP was implemented. Protection and restoration are needed to offset new development. The County finds both function and acreage are important.

1. Determine the Reasons for Monitoring

Thurston County partnered with WDFW and Ecology to pilot use WDFW's High Resolution Change Detection (HRCD) data[25] to monitor compliance and effectiveness within the County's Shoreline Master Program (SMP) jurisdiction. This project developed a protocol manual for using HRCD that could be used by any jurisdiction within the Puget Sound region.[26]

[25] See more about WDFW's High Resolution Change Detection on page 51.
[26] See Appendix 7.B: Recommendations for Applying the HRCD Data Set to Track Land Cover Change.

2. Establish Key Objectives and Study Questions

The project was designed as a pilot to answer several related sets of questions for both Thurston County and WDFW.

For Thurston County, key questions were:

- What land cover change is happening within designated marine SMP areas? What change is happening throughout the Deschutes River watershed (WRIA 13)?
- How does the change known by Thurston County permit records compare with detected changes by the HRCD? I.e., is change that occurred permitted and appropriate?
- Can the County use HRCD to monitor no net loss?
- What changes, if any, can be made to the land use permits or process that could increase the relevancy or effectiveness in using the HRCD in compliance monitoring?

For WDFW, the questions were:

- How well can the HRCD detect changes relative to land use permit records?
- Using Thurston County's marine SMP area as an example test area, what land cover changes are happening not captured by the HRCD?
- With the development of a HRCD user manual, can other entities use the HRCD effectively in the absence of further assistance by WDFW?

3. Design the Monitoring Program

The exercise was designed to quantify the increase in impervious surfaces and decrease in canopy within Thurston County's marine SMP area. The project consisted of five phases:

Phase 1: Initial SMP Change Analysis: WDFW Habitat program staff and Thurston County's long-range planning staff intersected the HRCD dataset with Thurston County's marine SMP area and parcel data for the three time periods of HRCD available (2006 to 2009, 2009 to 2011, and 2011 to 2013) within ArcGIS. With known areas of change found, those locations were compared with land use permit records from Thurston County. The intent was to find locations of observed change via HRCD without any permit record. This wasn't meant to be a direct means of enforcement, but an initial analysis of undocumented change that could provide a pared-down set of locations for further investigation. This phase would also produce land cover change statistics, including area of change and counts of land cover change events, by SMP designation and parcel.

Phase 2: Learning What the HRCD Misses: Using the SMP marine area in Thurston County, WDFW staff manually looked for land cover changes not captured by the HRCD. This was intended to help WDFW understand rates of omission in the HRCD using an area under some developmental pressure with relatively small changes. This was done by manually finding and digitizing changes using the (National Agriculture Imagery Program) NAIP[27] imagery that were not captured by the HRCD dataset.

Phase 3: Developing a Standardized Method for Utilizing the HRCD: A major goal of this project was to develop support materials for others to utilize the HRCD to answer their land use management questions in the absence of in-person WDFW staff assistance. Using the lessons learned in Phases 1 and 2, WDFW and Thurston County cooperated on composing a manual for a recommended method to

[27] https://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/naip-imagery/

apply the HRCD to a specific land use management question. This phase also included the development of a web-based service for users to download the HRCD dataset, detail the methodology of HRCD construction, find contact information, and more. This is located at www.pshrcd.com.

Phase 4: Testing the Manual through Remaining SMP Analysis in WRIA 13: Using only the HRCD dataset and the manual produced in Phase 3, Thurston County planning staff developed an application and utilized the HRCD successfully. For their application, they examined the land cover change within the remaining SMP areas within WRIA 13 for the three time periods of HRCD data available.

Phase 5: Training and Outreach: With the lessons learned and products derived from Phases 1 through 4 of the project, WDFW and Thurston County staff, working in conjunction with the Coastal Training Program, developed a workshop for planning staff with other state agencies, local governments, and some non-governmental organizations. WDFW also used this opportunity to train internal staff on the benefits, limitations, and uses of HRCD.

4. Determine the Monitoring Time Frame

The evaluators analyzed land cover change within Thurston County's SMP area between 2006 and 2013. At the time of the project (2015), three iterations of the HRCD dataset were available for analysis for the study area, 2006 to 2009, 2009 to 2011, and 2011 to 2013. Permit records that corresponded to these timeframes were pulled.

5. Evaluate Results and Make Recommendations

Currently, the only way the County has knowledge of unpermitted activity is through public complaints (i.e., neighbor complaining about the construction of something). This is an unreliable way to assess compliance. The county found that HRCD data, while not perfect, can be used to assess compliance and find above-ground unpermitted activity.

HRCD-identified change by environment designation

Environment Designation	Sum of Total Change*	Sum of Canopy Loss	Sum of Impervious Gain	Sum of Semi-Impervious Gain
Rural	7.2 acres	4.3 acres	2.7 acres	0.5 acres
Conservancy	4.3 acres	3.4 acres	0.8 acres	0.3 acres
Natural	0.02 acres	0.02 acres	0.02 acres	0 acres
Grand Total	11.5 acres	7.8 acres	3.5 acres	0.8 acres

Source: Thurston County, WDFW

* *With restoration acreage from the Nisqually Restoration Project removed, which includes:*
- *22.85 acres from 2006-2009*
- *2.69 acres from 2009-2011*

Overall, the data showed that less than half of one percent (0.39%) of the marine SMP area had change identified by HRCD from 2006 to 2013.[28] Approximately two-thirds of this was due to canopy loss, with one-third due to new impervious surfaces. The project did not find any developments that were out of compliance, though it did find unpermitted events in each of the time periods (e.g., tree removal).

The Thurston HRCD project demonstrated the utility of the HRCD in analyzing the patterns of land cover change in a specific geographic area of concern. However, Thurston County found that measuring compliance with HRCD data was "tedious and difficult" because of the capacity of the county's current AMANDA database. In many cases land use permits did not include enough information to determine conclusively that a parcel with observed change via HRCD was out of compliance or determine that the parcel had a permit record during the study's timeframe in question.

Improvements in methods of development permit tracking could improve the capacity to use HRCD data in pairing with permitting to track compliance. This result was not entirely unexpected, as the HRCD can serve as a starting point and help local governments find otherwise unknown changes, understand patterns, and investigate unexpected changes more closely. Furthermore, the HRCD proved to be a relatively simple dataset to use. With the development of standard application methods, Thurston County was able to complete an analysis of its remaining SMP area without any further help from WDFW.

[28] The land use change excludes over 25 acres of change occurring in the Billy Frank Jr Nisqually National Wildlife Refuge, because the loss of vegetation there was due to a saltmarsh restoration project.

Island County Critical Areas Permit Implementation and Effectiveness Monitoring

1. Determine the Reasons for Monitoring

Island County chose to monitor critical areas permit implementation and effectiveness because it often imposes strict conditions of approval on permits that impact critical areas or the shoreline. They also impose requirements for applicants to address critical areas violations.

2. Establish Key Objectives and Study Questions

Two of the key questions the County asks are:

- How do we ensure that these conditions are implemented? (Permit Implementation Monitoring)
- How do we know if performance standards are met over time? (Permit Effectiveness Monitoring)

The County sees these two questions as dependent on each other – without one, you don't have the other.

3. Design the Monitoring Program

<u>Permit Implementation Monitoring</u>

The County monitors all critical areas permits that are issued. It is time consuming to monitor every permit. Common conditions or requirements that are monitored include:

- Notice to title
- Conservation easements
- Protective buffers
- Buffer averaging
- Restoration
    - Includes performance standards
    - Takes time
- Mitigation
    - Includes performance standards
    - Takes time

The County uses separate denotations for wetlands projects, shoreline projects, and code violations. The denotations allow staff to track each type of permit separately. This allows the County to track each project separately. And, it allows staff to easily sort through the various projects.

The County uses the permit database, "parent" and "child" permit conditions[29], installation inspections, and as-built reports to conduct implementation monitoring. They have created child permits in the database to track implementation and effectiveness of parent conditions. Using the County's SmartGov database, they generate automatic alerts for inspections, monitoring reports, document submittals, etc.

A typical child permit condition that is generated for parent mitigation requirements states:

> The Critical Areas Planner shall be notified within seven days of mitigation installation to schedule an installation inspection. This inspection is required prior to final building inspection of the building permit.

This child permit condition puts the project on the County's radar. It creates the necessary physical files associated with the project, and adds the project to the database. It ensures that mitigation is implemented by sending an email notices that triggers an installation inspection.

Once an inspection is requested, county staff visit the site for conformance with the approved mitigation plan. The planner then issues a field inspection report. Once the project has passed inspection, the County requires the applicant to submit an "As-Built" report that gives the County a baseline document for comparison with future monitoring reports.

An As-Built report typically includes:

- A short narrative of the project and the goals;
- A species list and number of plants that were installed;
- The date the planting was complete; and
- Photo documentation.

Once an As-Built report is submitted and approved, staff starts the "monitoring clock".

<u>Permit Effectiveness Monitoring</u>

A typical mitigation project has a five-year monitoring period. Island County uses a number of tools for monitoring. For example, permit conditions include annual reporting requirements. A typical condition with mitigation associated permits states "Annual monitoring reports shall be submitted to Island County Planning and Community Development by October 31st for a period of five years".

Staff use monitoring reports and periodic inspections to compare current conditions with the As-Built report, determine if projects are meeting their performance standards, and trigger periodic permit inspections. The County then uses information gathered from these activities to adaptively manage projects that aren't meeting their performance standards by working with the landowner, and/or enforcing permit conditions when necessary.

Final inspections are similar in scope to installation inspections. Staff use them to verify that performance standards have been met. If standards have not been met, the inspection is used to identify problems, implement revisions, and continue to monitor, if needed.

[29] Planners create a "child" permit to generate notices for monitoring implementation after the "parent" permit with conditions has been issued and closed out.

Funding

Mitigation implementation and effectiveness monitoring is mostly funded through the permit fee system. When someone submits for a Reasonable Use Determination Permit (RUD) they have to pay not only the base permit fee(s), but also $100 for each year of monitoring that is required for the mitigation project. Projects typically span five years. Therefore, applicants are required to pay $500 (sometimes more if the project needs additional years).

4. Determine the Monitoring Time Frame

Staff monitoring and adaptive management of permit implementation and effectiveness is ongoing. No reports have been generated to date.

5. Evaluate Results and Make Recommendations

The County has not been monitoring long enough to have comprehensive results for evaluation. However, early results have revealed difficulties with implementation of planning requirements, and plant mortality. Challenges with the database have also been identified.

Island County Wetland Monitoring and Adaptive Management Program

1. Determine the Reasons for Monitoring

Island County adopted the Wetland Monitoring and Adaptive Management Program (WMP) in 2008 as part of its critical areas ordinance update.[30] The program assesses and monitors changes in wetland "health" to evaluate the effectiveness of the critical areas regulations in protecting wetlands health. It requires compliance assessment when thresholds of decline in wetland health are met. It is used to resolve non-compliant uses or initiate legislative changes to the critical areas ordinance.

The Island County Code specifically states:

> Purpose. The primary purpose of the county's wetland monitoring program will be to determine the overall health of a wetland. To do so, the county will track both chemical indicators through measuring water quality and biological indicators by sampling wetland vegetation. These measures will be used to evaluate the effectiveness of county regulations.[31]

[30] ICC 17.02A
[31] ICC 17.02A.080.A

2. Establish Key Objectives and Study Questions

The County has identified three key study questions and objectives for the program:

- Question: What is the status of wetland health in Island County?
  - Objective: Determine wetland health through baseline sampling
- Question: Is wetland health changing?
  - Objective: Track wetland health through monitoring.
- Question: Is Island County's critical areas ordinance effectively protecting wetlands?
  - Objective: Evaluate the effectiveness of critical area regulations through compliance assessment where declines are found.

3. Design the Monitoring Program

The program was designed as follows:

- Conduct baseline monitoring from 2008 - 2012.
- Conduct monitoring to assess change from 2013 - 2017.
- Initiate adaptive management actions where thresholds of decline are met.

Contributing Area Category	Dominant Land Use in Contributing Area	Buffer Width and Degree of Intrusion
1	Forested	>100 feet forested
2	Forested	Slight buffer intrusion (75-100 feet)
3	Forested	Moderate to intense intrusion (0-75 feet forested buffer)
4	Ag or Developed	> 100 feet
5	Ag or Developed	75-100 feet
6	Ag or Developed	Moderate to intense intrusion (0-75 feet forested buffer)

Wetlands Sampling Selection

The County chose a sample size of approximately 60 wetlands with approximately 15 wetlands sampled annually. Wetlands were selected to represent a range of contributing areas, buffer widths, and levels of intrusion.

The parameters for sampling vegetation (herbaceous) were percent cover of non-native species, percent cover of native species, and species richness (diversity of species). The water quality parameters were dissolved oxygen, fecal coliform, nitrate, pH, phosphorus, temperature, turbidity, conductivity, and hardness.

4. Determine the Monitoring Time Frame

As previously noted, the county monitored baseline conditions for four years, then conducted monitoring over the next four years to assess change. Change is analyzed at five-year intervals.

The code requires the County to produce reports, including all baseline monitoring data, summary statistics, an assessment of the accuracy and completeness of the data, and a description of data collection issues, if any, identified during the reporting period as well as the following additional information:

- A description of any identified trends and all compliance assessments and source identification actions taken during the reporting period.
- A description of educational outreach actions as well as enforcement actions taken during the reporting period.
- A discussion of wetland monitoring priorities for the next reporting period.
- A description of enforcement actions relating to wetlands.
- A summary characterization of wetland health and the effectiveness of CAO regulations in implementing comprehensive plan goals and policies for wetlands.[32]

The County completed four years' worth of baseline data collection and four years' worth of monitoring, concluded in 2017.

5. Evaluate Results and Make Recommendations

The thresholds for adaptive management are set out in the code:

- Greater than 10 percent increase in percentage cover of non-native species
- Greater than 10 percent increase in percentage change in species richness
- "Signficant elevation of water quality contaminants"[33]

Adaptive management actions identified as a result of exceeding these thresholds are:

- Compliance assessment/Source identification
- Education/Voluntary compliance
- Enforcement
- Modification of critical area regulations

While the County has completed five years of baseline data collection and five years of monitoring, adaptive management actions are on hold while the County assesses the need for revisions to the WMP. The County has identified a number of challenges to implementation of the program. These include staff turnover, inconsistencies in data collection, and inconsistent access to monitoring sites that require willing landowners.

The County has also had challenges with environmental conditions. Seasonally dry wetlands are difficult for conducting water quality sampling. Some wetlands have little herbaceous vegetation. There have been changes in hydrology. And there have been issues with distinguishing between natural change

[32] ICC 17.02A.080.G
[33] ICC 17.02!080.B.5

versus change resulting from land use practices. Finally, this has been a time and resource-intensive program with limited staff and resources to devote.

Future recommendations for modifying the WMP include:

- Taking a watershed approach to monitoring instead of analyzing individual wetlands. This would be less time intensive, would allow the county to analyze larger tracts of land, and would provide more holistic data representative of larger ecosystems;
- Focusing on the Surface Water Management Plan and incorporating wetland compliance in priority watersheds; and
- Using High Resolution Change Detection to monitor vegetation loss remotely instead of on the ground.

Island County Surface Water Quality Monitoring

1. Determine the Reasons for Monitoring

Island County's impetus for monitoring surface water quality is to determine whether exemptions to the critical areas regulations (e.g., existing and ongoing agriculture) and permitted uses are adversely affecting critical areas.[34]

The Island County Code specifically states:

> Purpose. The primary focus of the county's water quality monitoring program is to detect and respond to potential sources of contamination of surface water that are adversely affecting critical areas. The sources of concern are primarily non-point source contaminants from uses allowed in the rural area of the county.[35]

The Island County surface water quality monitoring program establishes baseline water quality and trends. The County uses the program to detect water quality impairments, and to initiate compliance assessment, source identification, and other adaptive management actions to address water quality impairments.

2. Establish Key Objectives and Study Questions

The County's surface water quality monitoring program establishes the following questions:

- Are permitted and exempt uses (e.g., agriculture) adversely affecting critical areas?
- Are water quality standards being exceeded?
- What are the sources of surface water contamination?
- Are exceedances attributable to non-compliance with the critical areas ordinance?
- Are site-specific modifications to Best Management Practices (BMPs) or legislative changes to the critical areas ordinance needed to address water quality impairments?

[34] ICC 17.02.040.L
[35] ICC 17.02.040.L.1

3. Design the Monitoring Program

The County has established a baseline for water quality monitoring, and it has initiated adaptive management actions where water quality exceedances are identified. The County has established sampling the following parameters with standards and thresholds, and is tracking them for trends:

- Dissolved oxygen
- Fecal coliform
- Nitrate
- pH
- Phosphorus
- Temperature
- Turbidity

4. Determine the Monitoring Time Frame

Island County began monitoring surface water quality in 2006. The program is ongoing.

5. Evaluate Results and Make Recommendations

The results of baseline water quality monitoring are used to prioritize watersheds for future monitoring and adaptive management actions in an effort to resolve water quality exceedances.

The County has the ability to initiate a number of adaptive management actions based on water quality data. They include:

- Compliance assessment and source identification
- Education
- Enforcement
- Site specific changes to BMPs for existing and ongoing agriculture
- Modification of the critical areas ordinance

King County

King County has also done monitoring of their critical areas ordinance under GMA and Puget Sound shoreline under SMA. For more information, see Critical Areas Ordinance Monitoring[36], WRIA 9 Marine Shoreline Monitoring and Compliance Pilot Project[37], and Improving Environmental Outcome: An Evaluation of Compliance and Recommendations for Improvement[38]. Commerce hopes to add more detailed case studies on King County's work in future iterations of this chapter.

[36] https://www.kingcounty.gov/depts/dnrp/wlr/sections-programs/science-section/critical-areas.aspx
[37] https://www.kingcounty.gov/services/environment/watersheds/central-puget-sound/nearshore-environments/shoreline-monitoring.aspx
[38] http://www.govlink.org/watersheds/8/committees/1003/KCPermitComplianceMasterReport-COMPLETE.pdf

City of Kirkland Shoreline Tracking

The City of Kirkland tracks shoreline permits and exemptions, building permits, and enhancement projects to ensure compliance with Shoreline Master Program permit conditions and maintain an ongoing record of shoreline changes.

1. Determine the Reasons for Monitoring

Kirkland adopted a new Shoreline Master Program (SMP) in August 2010 that covers approximately 10 miles of Lake Washington shoreline. The City wanted to track how the program is achieving "no net loss of ecological functions." The City also wanted to develop useable data to track successes and failures, as well as meet Ecology periodic review requirements.

2. Establish Key Objectives and Study Questions

Key study objectives and questions are:

- Data collection: What are all the values, figures, and other possible data the City may want to collect?
- Goals: What are the short-term and long-term goals the SMP codes are intended to achieve?
- Purpose and Intent: Do the figures being collected capture the required information to show whether or not the City is maintaining ecological function and following the purpose and intent of the SMP?
- Administration: Can code administrators apply the code and collect the data without being unnecessarily burdened?
- Build consensus: Will the data be useful in future discussions with citizens, council, or commission members?

3. Design the Monitoring Program

The key question is how SMP requirements are being met. The city maintains checklists for key indicators of ecological function. For example:

- Shoreline stabilization: How many linear feet of hard shoreline have been added, removed, repaired, or altered? Was a geotechnical report and needs assessment required. How much "soft stabilization" was added, removed, or used to replace hard structures?
- Shore setbacks: How many square feet of structures have been removed from shore setbacks through mitigation?
- Overwater structures: How many new piers or docks were added? How much new grating has been installed?
- Vegetation: How many trees were removed, retained, planted for mitigation? How many square feet of lawn have been replaced with native plants?
- In-water enhancement projects: Are spawning gravels added? Have structures been removed?

The City fills in simple Excel spreadsheets[39] for each indicator area through the permit review process. The City confirms final project numbers at final inspection, reviews "as-built" plans, and ensures any recorded agreements are placed on title. City staff also have permit software (EnerGov) for tracking:

- Developed reviews and holds for specific project types.
- Long-term data collection.
- Reporting.
- Fee, security, inspection, and plan tracking.

4. Determine the Monitoring Time Frame

The City maintains a programmatic on-going permit monitoring system that began in August 2010 with adoption of the City's new SMP. Reports are required every eight years, with interim internal check-ins.

5. Evaluate Results and Make Recommendations

The City's interim tracking over the last seven years has revealed overall improvements in function accompanying development and redevelopment.[40] An example of measurable results generated from tracking spreadsheets for 2010 -2016:

- In water:
    - Approximately half an acre of solid decking removed.
    - 50 old piles removed.
    - Over 6000 square feet of in-water enhancement established
- In the riparian area:
    - 230 feet of bulkhead removed and replaced with soft shorelines.
    - 10,300 square feet of structures removed from the shoreline setback.
    - 149 native trees planted.
    - Over half an acre of native vegetation planted.

[39] Template for Kirkland SMP Tracking Sheet.

[40] The City of Kirkland uses landowner recording agreements for shoreline improvements. See Appendix 7.C for Kirkland's landowner agreement templates.

Annual evaluations of the interim tracking results have been used to make sure project data has been properly entered and checked on accuracy. For example:

- Individuals entering data have helped in clarifying the fields in the Excel spreadsheet.
- Inclusion of data in the EnerGov software tracking system.
- Modification of the spreadsheet at varying intervals to make sure data is clear and measurable.

The final eight-year results in 2019 will generate a work program, and long-range and current planning coordination. Recommendations for adaptive management will address:

- Review of code administration – administrative recommendations based on internal staff review include:
    - Are we achieving the key objectives and study questions?
    - What internal steps are working or could be improved to maximize compliance with the purpose and intent the SMP and SMA?
    - Have we installed any roadblocks to educating the public on the benefits of a healthy shoreline?
    - Are there any ways to incentivize additional shoreline enhancements? Are there any roadblocks to homeowners to propose voluntary shoreline enhancement plans?
- Update of tracking system. Are our permit processes helping or hindering the recording of this data?
- Possible code amendments.
- Report results.

One key to the City's success with this program is that the planner who led the 2010 SMP update developed the monitoring and adaptive management program.

City of Bainbridge Island Shoreline Monitoring Program

1. Determine the Reasons for Monitoring

Both Bainbridge Island elected officials and community members had an interest in monitoring efforts to collect recent, local, and scientifically appropriate data with which to review and assess the effectiveness of the City's SMP. Planning staff developed an SMP monitoring program based on City Council direction in April 2015. While there has been little implementation of the program to date due to lack of staff time and funding, lessons learned will be useful for the critical areas ordinance update. This case study focuses on how the SMP monitoring program was envisioned and planned to work. The primary goals of the SMP monitoring program include:

- Meet regulatory requirements.
- Document compliance with SMP regulations.
- Quantify and characterize environmental change in the shoreline.
- Expand knowledge and understanding of SMP goals, policies, and regulations.
- Establish a common understanding of shoreline resources and regulatory framework.
- Provide feedback for the next SMP update.

2. Establish Key Objectives and Study Questions

The monitoring program was designed to help answer several key questions:

- Is effective compliance with SMP regulations being achieved?
- Are gains or losses of ecological functions and processes occurring in the shoreline environment?
- If losses are occurring, what are the drivers?
- What are the programmatic and/or regulatory adjustments needed to achieve no net loss of shoreline functions and processes?

3. Design the Monitoring Program

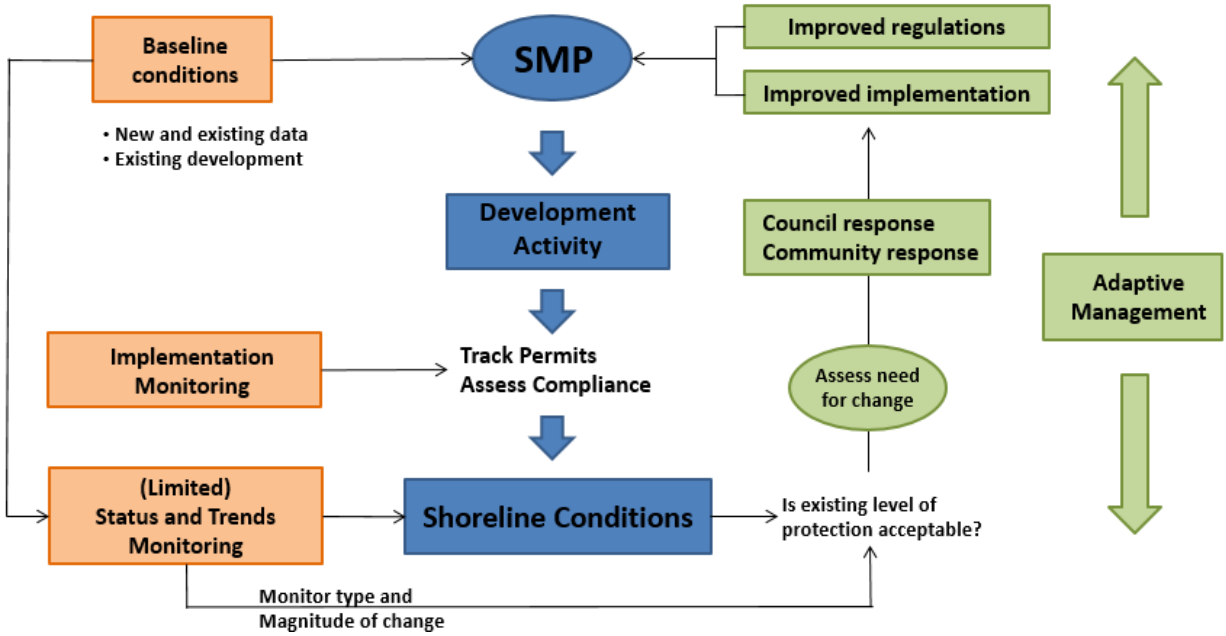
The monitoring program was designed based upon a series of general steps:

- Conduct extensive research and discussion by the City's Environmental Technical Advisory Committee and others.
- Convene a peer workshop with shoreline research and regulatory professionals for review and refinement.
- Gather input from shoreline, monitoring and outreach experts.
- Develop a specific monitoring strategy.
- Gain Council acceptance.
- Develop a first-year program.

The monitoring program is designed to measure a number of shoreline functions, including:

- Eelgrass and kelp - Monitoring important nearshore subtidal habitats.
- Intertidal beach sediment supply, sediment distribution, and shoreline position - monitoring critical habitat for juvenile salmonids, forage fish, shellfish and eelgrass, including changes to major shoreline features.
- Marine riparian vegetation – monitoring shading, and food supply to the nearshore.
- Water quality – Monitoring for adequate water quality for fish and nearshore resources.
- Estuarine emerging vegetation (salt marsh) – monitoring for changes in critical salt marsh habitats.

The monitoring program includes two types of monitoring that will provide data to inform adaptive management actions. In general, implementation monitoring is intended to (a) capture and track permit activity; and (b) ensure compliance with permit-level mitigation measures and performance standards. Status and trend monitoring is intended to monitor change in established ecological parameters.



Monitoring Approach

Monitoring results will inform an adaptive management process aimed at improving both regulations and program implementation as needed.

4. Determine the Monitoring Time Frame

The monitoring program was initiated in 2015, and was planned to extend through the City's next SMP update in 2020. Year 1 was to conclude at the end of 2015. Monitoring results were to inform the City's next SMP update, due in 2020.

The first year of funding was anticipated to include only allocation/dedication of current planning staff. Subsequent years would require additional funding dependent on the results of Year 1 and recommendations for adaptive management and program growth.

5. Evaluate Results and Make Recommendations

As of early 2018, some activity has occurred. LiDAR data and air photos had been collected and converted to land use/land cover data through a WDFW grant. A DNR eelgrass monitoring effort has expanded the scope of data collection to include the south shore of the island. The City is exploring a potential partnership with the Western Washington University Huxley College of the Environment in Poulsbo.

The City is developing a permit tracking framework to capture project data consistent with typical impacts as outlined in its Single Family Residence Shoreline Mitigation Manual: vegetation removal, new impervious surface area, placement of fill, and new overwater structure coverage.

Bainbridge Island has learned a number of lessons from this effort:

- Motivation and funding is limited when there is no mandate.
- Scientists and planners need to collaborate on the feasibility of data collection and database management.
- It is important to look for all available resources (e.g., other ongoing monitoring efforts, and grant and partnership opportunities).
- It is difficult to develop a permit tracking system "after the fact".
- It is important to consider how permit tracking will occur when writing code.
- Permit tracking expectations for staff at "onboarding" need to be developed.
- It may be more effective to have dedicated staff for compliance monitoring.

The effort informed the City's update of its critical areas regulations. It has created a minor critical area permit for tracking/monitoring purposes. Previously, many activities within critical areas were not captured. There was no review, or review in conjunction with clearing or building permits. There is no fee or intake appointment required, and it often can be approved at the counter.

In addition, the City is setting up a permit database to begin tracking as of the effective date of its newly updated critical areas ordinance. Planning has added a new critical areas review workflow step, attaching it to the "parent permit" where possible to streamline the process while still being able to track the permit. The planner must enter critical area project details (e.g., area of wetland buffer reduction, area of buffer mitigation) before a permit can be closed out of the system, which allows the City to generate reports on permitted activities within critical areas.

Bellingham Critical Areas Permit Implementation and Effectiveness Monitoring

1. Determine the Reasons for Monitoring

The City of Bellingham monitors critical areas through permits but also for its own restoration projects in critical areas and shorelines because Bellingham places a high value on the environment. The City has not only adopted a critical areas ordinance (CAO) but has adopted goals and policies aimed specifically at protecting and restoring critical areas. These goals and policies are part of the Environment Chapter (Bellingham Comprehensive Plan) and are also reflected in Bellingham's "Legacies", the long-term goals adopted by the City Council in 2009. Together these form the foundation that supports the monitoring, protection, and restoration of critical areas. Two of the key Legacy goals are: protect and improve the health of lakes, streams and Salish Sea; and protect and restore ecological functions and habitat

The regulatory protections embodied in the CAO are the foundation of critical area permit conditions, and they sprout from the purpose section of the CAO. One such purpose: *Prevent cumulative adverse environmental impacts to water quality, wetlands, and fish and wildlife habitat, and the overall net loss of wetlands, frequently flooded areas, and habitat conservation areas*.[41]

2. Establish Key Objectives and Study Questions

The City regularly monitors critical areas permits (shoreline permits are not discussed here specifically but monitoring is similar). The key objective of monitoring is to determine if the mitigation is meeting goals, objectives, and performance standards that are based on code requirements (i.e. should result in no net loss of functions and values). The required annual monitoring report indicates if maintenance has occurred and lists the deficiencies so that the City can require corrections before any financial surety is released annually.

In addition, monitoring provides new evidence for adaptive management. For mitigation, it tells staff what is working and not working with regard to plants, techniques, timing, etc. For general monitoring, it can help prioritize restoration actions or determine when restoration will not yield ecological lift.

3. Design the Monitoring Program

The City has mapped and characterized many of its critical areas, and this GIS mapping (called "CityIQ") greatly enables monitoring. GIS staff map each wetland delineation received as part of a development application and these are layered on top of past citywide wetland inventories giving the public and staff a good planning tool. Knowing where critical areas are is essential to being able to monitor them. A

[41] BMC 16.55.010D(4)

good example of the City's mapping and characterization is the 2015 Habitat Restoration Technical Assessment in which four habitat types—wetlands, forest, meadows, streams—were assessed for ecological function and rated for restoration potential.

These "road maps" enhance monitoring done for a variety of reasons and from a variety of funding sources. Some monitoring is done because of adopted total maximum daily loads (TMDLs), some because of strong community interest, and others because it is a piece of a robust stream and marine restoration program. The city also monitors on a systematic level all critical area and shoreline permits.

Permit-based monitoring starts with critical area permits written with a list of legal "findings and conclusions" on which the permit conditions are based. One of the standard conditions requires a minimum of five consecutive years of monitoring and maintenance.

In addition to monitoring (and maintenance) the applicant is required to submit a financial surety based on a line-item estimate of all mitigation costs multiplied by 150 percent. The financial surety is held for a minimum of five years and released annually only when the performance standards for mitigation are met as described in the annual monitoring report. All critical areas remaining onsite, such as wetlands, streams, and their buffers, are protected in perpetuity through a recorded conservation easement that is added to the City's GIS layer.

Tracking permits and permit conditions is done through TRAKiT, the City's permit software program. Staff also uses an Excel spreadsheet to track monitoring status for each monitoring year for all critical area and shoreline permits.

The city monitors its own restoration projects, such as the "Whatcom Creek Red Tail Reach", a major stream channel improvement project. Monitoring this restoration project will use high-resolution change detection in order to monitor the ecological changes after restoration. The City also has access to drone technology for such projects.

Monitoring permittee mitigation is part of the permit staff's job, so permit fees fund the work in part. Funding for city-sponsored restoration projects comes from a variety of sources, including grants and a settlement fund from the 19999 Whatcom Creek fire.

4. Determine the Monitoring Time Frame

The City has monitored critical area permit mitigation requirements since adopting the first wetland regulations in 1992. However, both tracking and mitigation results have improved with updated permit software tracking, consistent permit writing, improved mitigation plans and implementation, and regulatory tools aimed at mitigation success. Each critical area permit has a monitoring period of five years, or later if the performance standards are not being met.

Non-permitted monitoring carried out by the City is ongoing, and in many cases long term. Some examples of annual monitoring are:

- Urban Streams Monitoring Program Report since 1989
- Lake Whatcom Monitoring Project Report for decades
- Great Blue Heron Colony Annual Reports since 2000

5. Evaluate Results and Make Recommendations

The City's non-permit related monitoring projects have resulted in a broad spectrum of adaptive management. Urban streams monitoring helps prioritize restoration projects aimed at lowering stream temperature. Lake Whatcom monitoring has resulted in new regulations, land acquisition, and major stormwater retrofits because the lake is the City's sole water supply. A major construction project adjacent to the heron colony was managed to avoid the most vulnerable periods in the nesting season.

Permit-related monitoring also results in adaptive management. In updates to the City's CAO, a number of protection measures have been codified, including the requirement for financial surety for each mitigation project. Adaptive management was put into place when the City started requiring in permits that mitigation plants be installed by specialists, after witnessing failures due to lack of expertise. A small industry of ecological restoration specialists is now established because there is a market for their expertise.

A local "wetland study group" composed of wetland biologists and agency staff hold periodic meetings focused on an identified topic. The problem solving and communication have gone a long way to help all who participate in some way with the evaluating and the protecting of critical areas.

Tacoma Critical Area and Shoreline Monitoring Program

1. Determine the Reasons for Monitoring

The Growth Management Act and the City of Tacoma's critical area preservation ordinance require "no net loss" to preserve the existing functions and values of critical areas. The City's Shoreline Master Program (SMP) policy requires "no net loss" and an overall "net gain" of ecological function, as well as preservation of existing functions and values. The City's use preferences have a requirement that non-preferential uses maintain vegetated buffers to address net gain. The City's use preferences require redevelopment or development for uses other than a water-dependent use to maintain a vegetated marine buffer even in areas where the buffer is currently not vegetated.

2. Establish Key Objectives and Study Questions

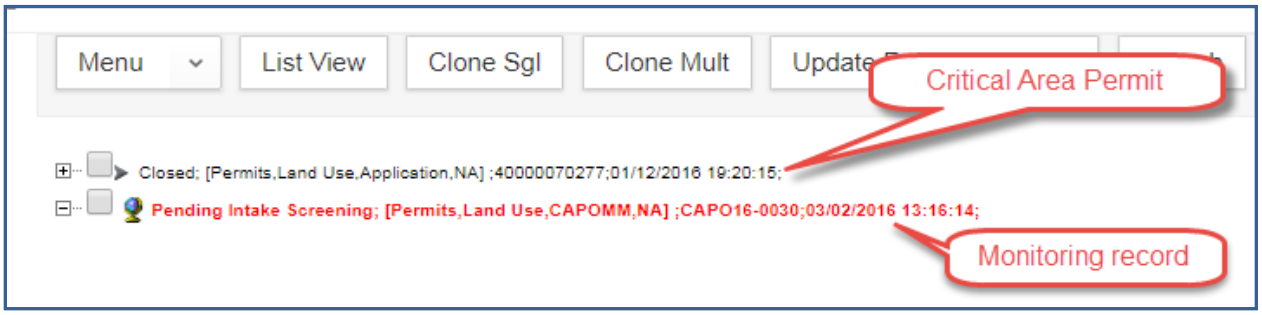
The objectives for permit implementation monitoring are to track compliance with the goals of the CAPO and SMP for each approval. The two permit implementation questions are:

- Does the permit provide clear conditions to ensure compliance?
- Is the project consistent with the regulations?

Permit compliance questions are:

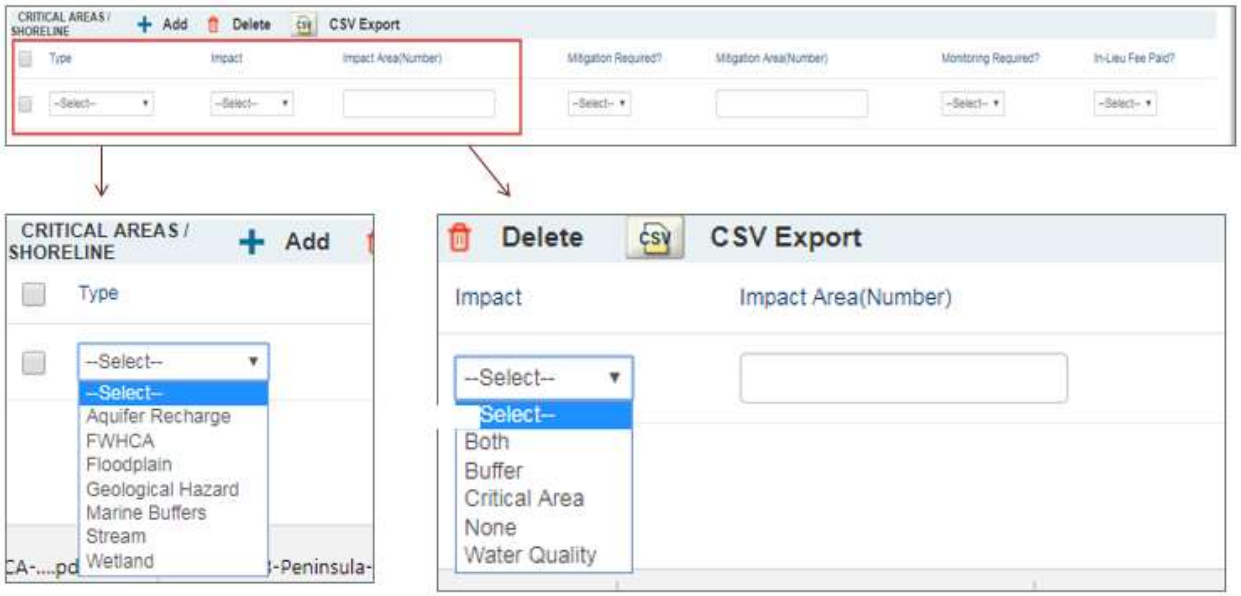
- Was the project constructed consistent with the permit? A site visit is conducted to verify construction is in compliance with the permit. Staff look at whether BMPs are installed to minimize impacts, fencing and signage are installed, and notice is recorded on the title.
- Was the required mitigation installed? Bonding is required to ensure compliance. Site visits are conducted to verify planting installation complies with As-Built requirements. Site visits are also used to verify annual monitoring reports regarding the percent of plant survival, and to measure and report on compliance with goals and performance standards.

3. Design the Monitoring Program

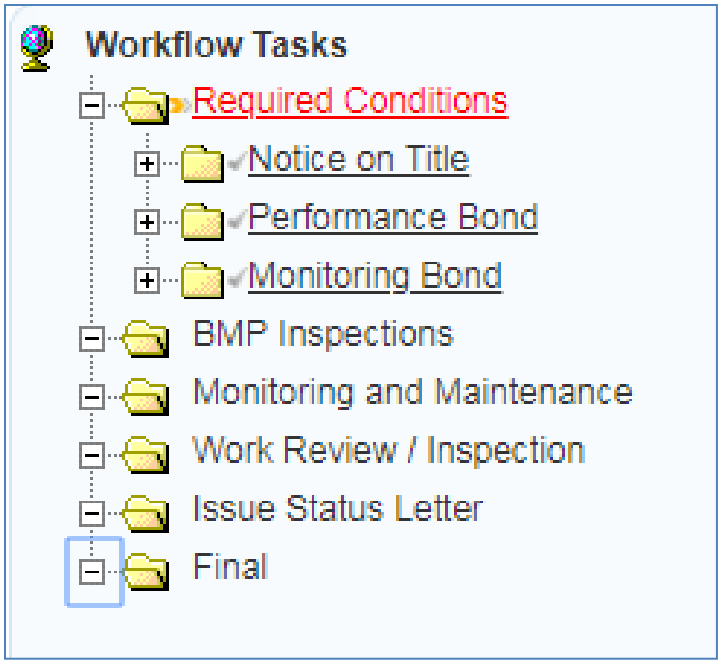


Tacoma uses the Accela permitting database for permits and monitoring. The City keeps separate records for each permit approval and for long term monitoring.

Parent Permit -Metrics for Impacts and Mitigation.



Staff use the parent permit to establish the metrics for monitoring impacts and mitigation. They use a child permit to create a separate critical areas monitoring record.



General Schematic for Monitoring Record

The City has unique compensatory mitigation conditions that are monitored separately. This includes the long-term monitoring of the overall success of vegetation and mitigation performance standards.

4. Determine the Monitoring Time Frame

The City monitors on an ongoing basis. Reports can be produced for any time period. However, the City is not currently issuing reports on a regular basis.

5. Evaluate Results and Make Recommendations

The City is always monitoring projects to ensure they meet permit requirements. They look at whether mitigation sites are meeting performance standards as required by the permit. If requirements are not being met, staff review whether critical area code requirements are sufficient to ensure protection. Staff also look at whether better enforcement or financial sureties are needed.

Washington State Department of Fish and Wildlife Hydraulic Project Approvals

The Washington State Department of Fish and Wildlife (WDFW) is monitoring its hydraulic project approval (HPA) program. WDFW's Year-One Progress Report: Implementation and Effectiveness

Monitoring of Hydraulic Projects[42], February 2015, addresses implementation monitoring for process improvement and effectiveness monitoring for desired habitat conditions.

1. Determine the Reasons for Monitoring

WDFW is monitoring its HPA program to help ensure that hydraulic projects are compliant with current rules, and that current rules effectively protect fish habitats. The main purpose of monitoring is to provide information that, over time, helps the department improve both implementation of the hydraulic code rules and the effectiveness of those rules at protecting fish life.

2. Establish Key Objectives and Study Questions

The focus of WDFW's implementation monitoring is on improvement of the performance of both WDFW as the permittor, and permittees (applicants). In 2013 WDFW limited the scope of its monitoring to new and replacement culverts on fish-bearing streams in western Washington and new and replacement marine shoreline armoring in Puget Sound. The study asked four key questions:

- Did the permittor issue a complete permit, that is, one that contains provisions and/or project plans for all critical structural dimensions?
- Did the permit or application materials contain the information needed to determine consistency with Chapter 220-660 WAC?
- Did the permittee comply with the permit?
- Does the completed hydraulic project comply with the hydraulic code rules?

3. Design the Monitoring Program

In 2013 WDFW conducted implementation monitoring on 54 culverts in Western Washington. Implementation monitoring focused on four critical structural dimensions: culvert width at streambed, culvert slope, countersunk depth at outlet, and culvert length. The department also estimated bankfull width at each site. The 2013 monitoring attempted to answer two questions about the HPA permitting process: 1) Did permittees comply with their HPA permits; and 2) Did hydraulic structures comply with hydraulic code rules?

4. Determine Monitoring Time Frame

The monitoring study is ongoing. The one-year progress report was issued in February 2015, and results from 2014 and 2015 will be available in July 2017.

5. Evaluate Results and Make Recommendations

Key findings from monitoring culverts were:

- The most important parameter for culvert design is channel width. Yet, it appears that many permittees do not know what they should be measuring or how they should be measuring it.
- A significant proportion of HPA permits lacked information necessary to determine whether the culvert's dimensions will be consistent with rules and/or design guidelines.
- Basic information essential to the HPA process was difficult to find in the permit, plans, Joint Aquatic Resources Permit Application (JARPA), and other materials submitted by the applicant.

[42] https://wdfw.wa.gov/publications/01746/

- The permittee compliance rate for the four critical structural dimensions was 76 percent.
- The permit accordance rate – number of permits that are in accordance with the hydraulic code rules – varied greatly and was found to be unreliable. The lack of a widely accepted, standard procedure for measuring channel width is the likely cause of the variance. There was a discrepancy between the rate of permittee compliance with the HPA permit (76 percent) and the permit accordance rate (50 percent). Accordance with the rules is the responsibility of the permittor issuing the permit. The size of this discrepancy may be largely due to different methods for estimating channel width as noted above.

Recommendations and follow up from the report:

- Language referring to stream channel width should be identical in hydraulic code rules, permit provisions, and culvert design guidelines.
- Standard procedures for estimating mean bankfull width and channel slope should be developed by WDFW and widely distributed for use by HPA applicants. The WDFW Habitat Program Science Division is currently developing these procedures.
- Key information – such as bankfull width, channel slope, culvert design type, and culvert dimensions – should be reported and easy to find. We recommend a mandatory form for all HPA applications to be completed by the applicant. Standard permit provisions effective July 1, 2015, now require this information.
- WDFW or some other credible organization should check bankfull width measurements submitted by HPA applicants. Habitat biologists are now encouraged to confirm all information contained in the plans for fish passage culverts.
- For no-slope culverts, WDFW or some other credible organization should check channel slope submitted by HPA applicants. Habitat biologists are now encouraged to confirm channel information contained in the plans for fish passage culverts.
- Standard permit provisions for culverts used by WDFW habitat biologists should be reviewed for consistency with hydraulic code rules and design guidelines. Standard permit provisions effective July 1, 2015, were reviewed for consistency with Chapter 220-660 WAC.

State and Federal Mitigation Monitoring Programs

If local governments are also interested in compliance monitoring, two examples from Ecology and the U.S. Army Corps of Engineers are provided.

Washington State Department of Ecology Wetland Regulatory Effectiveness Program

The Washington State Department of Ecology (Ecology) performs compliance reviews of compensatory wetland mitigation projects (i.e., when wetlands are replaced to mitigate for unavoidable fill) to ensure compliance with wetland permit conditions.[43]

1. Reasons for Monitoring Compliance

The goal of compliance is to improve the success rate of wetland mitigation projects, ensure that wetland mitigation is implemented according to permit conditions, and to work collaboratively with applicants to achieve compliance and success at individual sites. At each site, the goal is to identify problems with wetland mitigation sites early, and determine corrective actions and adaptive management necessary to ensure a successful mitigation site.

The compliance program was developed after a series of evaluations between 2001 and 2003 found mitigation projects were not consistently replacing wetland acreage and functions, and compliance tracking and follow-up was incomplete and sporadic.

2. Key Program Questions/Objectives

The wetland mitigation compliance program's priority is wetland mitigation projects where Ecology issued a Section 401 Water Quality Certification or Administrative Order for wetland impacts. Key questions include:

- Are compensatory mitigation sites meeting goals, objectives and performance standards?
- Are sites being maintained? Are site conditions improving over time after initial construction?
- Are sites meeting acreage requirements for wetland and buffer?

3. Monitoring Program Design

The program is ongoing. From 2004 – 2016, the program tracked 220 projects with permittee-responsible mitigation requirements, and 60 projects using alternative mitigation such as mitigation bank credits, advance mitigation, or in-lieu fees.

Ecology provides recommendations in formal follow-up letters from site inspections; reviews reports (as-built and monitoring reports), tracks deadlines, and ensures reports have complete information per Ecology's Order.

[43] https://ecology.wa.gov/Water-Shorelines/Wetlands/Mitigation/Compliance

The program includes site inspections at several stages: "As-built" stage, after the mitigation project is first completed; midway through the monitoring period; and at project closeout (typically 10 years). At closeout, the site inspection informs whether the site has met its goals, objectives, and performance standards.

4. Monitoring Program Time Frame

This is an on-going program that began in 2006. Ecology prepared reports to the Washington State Office of Financial Management on two basic performance measures:

- Within 2 years of permit issuance, determine the status of 100 percent of wetland mitigation projects.
- For at least 75 percent of wetland mitigation projects, conduct a site inspection within 18 months of receipt of the "as-built" report (i.e., a site visit should be conducted soon after the project is complete).

5. Evaluation of Results and Recommendations

The wetland mitigation compliance team has identified numerous benefits to date, including:

- Ecology finds an increase in voluntary compliance because applicants know there is oversight (less time needed checking up on every project)
- Key to the improvements is the ability to work with applicants early to address issues that would result in site failure. It is essential to have the consultant or applicant on-site during site reviews. Early follow-up is important.
- Mitigation plans need to have well thought-out goals, objectives, performance standards, monitoring, and contingency plans to begin with. However, evaluations must also be flexible and acknowledge that sites are not always going to turn out as planned.
- Coordination between regulatory agencies including the U.S. Army Corps of Engineers and local governments is vital.
- The evaluation program created a feedback loop to improve permitting decisions – lessons learned during site visits can be applied to review of current mitigation proposals. The results of the compliance program have improved consistency and predictability through better standardized requirements (401 conditions, requirements for plans)
- The program has helped target improvements needed in guidance and training.

U.S. Army Corps of Engineers Mitigation Compliance Program

1. Reasons for Monitoring Compliance

There are multiple goals for this program, including

- Protect human health and safety by ensuring permit conditions are being met.
- To work toward no net loss of aquatic function, wetland acreage, or river/stream miles.
- To level the playing field by ensuring that everyone complies with their respective permit conditions equally.
- To improve the permitting process by closing the feedback loop between what impacts and mitigation are permitted and how effective and efficient that mitigation is over time at replacing lost functions and values.

2. Key Program Questions/Objectives

Compensatory mitigation for Section 10 permits might include riparian planting, bulkhead removal, pocket beach creation, removal of old pilings, other structures, or debris, and more. Compensatory mitigation for Section 404 permits includes wetland or stream creation, restoration, enhancement, and/or preservation. This program looks at permittee-responsible mitigation. Compliance for mitigation banks and in-lieu fee programs is handled separately. The three key questions are:

- Was the mitigation installed according to the approved drawings and plans?
- Is the mitigation meeting performance standards? If not, what contingency actions must occur to bring the site into compliance with performance standards?
- Has the required documentation been submitted, such as proof of site protection mechanisms?

3. Compliance Monitoring Program Design

With hundreds of projects permitted each year that require compensatory mitigation, Corps staff prioritizes projects for compliance reviews. Various factors go into prioritization, including project size, complexity, location, and history, the rareness of the resource impacted, and others. Corps staff coordinates with the Washington State Department of Ecology Wetland Regulatory Effectiveness Program staff, as time allows, to share information and avoid overlap of efforts. Corps staff reviews and approves compliance documents such as as-built reports, monitoring reports, and proof of site protection mechanisms such as deed recordings and protective easements. Corps staff also conducts compliance inspection site visits. Recommendations are provided in emails and letters following reviews and inspections.

4. Monitoring Program Time Frame

Compliance has been ongoing since the inception of the Regulatory Program. However, wetland and stream mitigation started in the mid-1980s, and in 2008. With the implementation of the Federal Mitigation Rule, compliance efforts have increased.

5. Evaluation of Results and Recommendations

The Corps' compliance program has varied over the years. The Corps has hired contractors or term staff to complete compliance reviews but its compliance program mainly is the responsibility of project managers. The Corps does not have a permanent compliance team that evaluates the compliance program's effectiveness or develops recommendations. Instead, as workload allows, project managers meet together and discuss compliance issues, failures, and successes, and internal protocols are developed to improve the effectiveness of the compliance program.

Data Resources for Implementation Monitoring

Local governments and state agencies generate data that may be useful to local governments for implementation monitoring. One local government example and some state data collection programs are provided here.

Local Government Permit Databases or Spreadsheets

Many local governments maintain a permit tracking database or spreadsheet. Some sort of permit tracking system is essential for monitoring permit implementation. It need not be complex, and can be as simple as maintaining a spreadsheet. For one example based on the City of Kirkland's tracking program that uses an Excel spreadsheet, click here.

ADDRESS	PERMIT OR DATE	APPLICANT NAME	PLANNER	PROJECT DESCRIPTION	SDP EXEMPT (Y/N)	SF	MF	COMM OFFICE/INST	PUBLIC PARK	PIER SF
XXXX Lake Washington Blvd	BLD10-00500	DOE	CPG	NSFR/W/SUB DEMO	Y	X				
XXX Lake Ave West	BLD10-00314	SMITH	CPG	PIER REPAIR	Y	X				X
XXXX Lake Ave West	BLD11-00181	JONES	CPG	NSFR/W/SUB DEMO	Y	X				
XXXXX Holmes Point Road	BLD11-00431	JOHNSON	CPG	NSFR	Y	X				
XXXXX Champagne Pt Rd SE	BLD11-00534	TAYLOR	CPG	SF ADD/ALT	Y	X				
XXXX NE 154th St	BLD11-00351	JACKSON	CPG	PIER REPAIR	Y	X				X
XXXX SW 166th	BLD11-00350, SHR	JAMES	CPG	BOATHOUSE REPAIR	Y	X				
XXXXX Champagne Pt Rd NW	MIS11-00006	DAWES	CPG	PIER REPAIR	Y	X				X
XXX Lake Ave West	SHR11-00004	BAILEY	CPG	NEW BOATLIFT	N	X				
XXX Lake Ave West	BLD11-00109	BRONSON	CPG	PIER REPAIR	Y	X				X
XXXXX Holmes Point Road	1/10/2012	GLASS	CPG	PIER REPAIR	Y	X				X
XXX Lake Ave West	BLD11-00462	SIMS	STL	NSFR W/SUB DEMO	N	X				X
XXXX Rose Point Lane	BLD11-00689	RIVERA	CPG	PIER REPAIR	Y	X				X
Marina Park Pier		City	TJS	PIER REPAIR	Y					

TUTORIAL | DEVELOPMENT OR ACTION | PROJECT DETAILS & MISC. | SHORELINE SETBACK | VEGETATION | STA

City of Kirkland Shoreline Tracking

Washington Department of Fish and Wildlife High Resolution Change Detection

WDFW has produced a spatial dataset (GIS layer), High Resolution Change Detection, that shows where change has occurred over a two-year period.

WDFW High Resolution Change Detection

The minimum size of change is 0.05 acres. The data has been developed for Puget Sound as follows:

- 2006 – 2009
- 2009 – 2011
- 2011 – 2013

WDFW is currently seeking funding for 2013 – 2015. For more information, go to WDFW's web site at [High Resolution Aerial Imagery Change Detection].

Washington Department of Natural Resources LiDAR

The Washington State Legislature mandated that the Department of Natural Resources (DNR), Washington Geological Survey collect, analyze, and publicly distribute detailed information about our state's geology using the best available technology, Light Detection and Ranging (LiDAR). The main focus of this new push for LiDAR collection is to map landslides, but there are innumerable additional benefits and applications of these data both inside and outside of the field of geology. For more information about DNR's LiDAR program, go to the [LiDAR web site].

Department of Ecology Wetland Change Analysis

Ecology's Wetland Change Analysis project developed a method for more accurately mapping wetlands. The resulting wetland maps will be used as a wetlands status and trends inventory to help determine if the goal of No Net Loss of wetlands is being achieved in Washington State. For more information on wetlands change analysis and the Wetland Inventory Map, go to Ecology's Wetland Change Analysis web site.

Department of Ecology Environmental Information Management

Ecology maintains an Environmental Information Management (EIM) database. The database contains data collected by Ecology and affiliates such as local governments and cleanup sites. Users can submit and access discrete and time-series environmental data for air, water, soil, sediment, aquatic animals, and plants at the EIM web site.

Ecology and Federal Emergency Management Agency Risk MAP

Ecology partners with the Federal Emergency Management Agency (FEMA) to run the Risk Mapping, Assessment and Planning (Risk MAP) program in Washington. This program delivers high-quality data, risk assessment tools and mitigation expertise to communities, tribes, and State and local agencies in their efforts to reduce the risks from natural hazards including floods, earthquakes, wildfire and landslides. Washington information can be accessed at the Ecology Risk MAP web site.

Critical Areas Monitoring and Adaptive Management Workshops

Commerce, Ecology and WDFW conducted a series of workshops around the state in early 2018 to provide tools for and get feedback from counties and cities on how to build local and state monitoring and adaptive management programs for protecting critical areas. Over 230 people have participated, with positive reviews. The local government and other presentations generated rich conversations around the barriers and solutions to developing and implementing effective monitoring programs. Many of the local government presentations are included in the case studies in this chapter.

Benefits of Monitoring

Participants identified many benefits to monitoring and adaptive management of critical areas regulations. Monitoring provides certainty by ensuring regulations are being implemented consistently.

It provides data rather than anecdotes. Monitoring data educates the public, applicants, and elected officials about efforts to protect critical areas. It provides area-wide trend data about progress on no net loss.

Monitoring the permit process and tracking performance standards and mitigation identifies areas for improvement. Monitoring provides information to update the critical areas inventory and status. It creates consistent application of the regulations over time, and can lead to code clarifications and improvements. The results inform the inter-relatedness of regulations and cross-team improvements.

Challenges of Monitoring

Conversations about barriers identified common concerns such as lack of staff resources and funding. Changes in leadership and staff contribute to inconsistent application of the regulations. Balancing diverse community interests such as jobs and the environment, as well a lack of political will, creates implementation challenges for staff. Changing state mandates make it difficult to keep the code updated.

Many expressed a general frustration with database challenges of sorting, monitoring, and transferring information. Baseline data is lacking, and there are delays in acquiring data from other departments or agencies. Other challenges were the loss of institutional knowledge, concerns with private property rights, and discrepancies between jurisdictions.

Problem Solving – Peer Consultation

Participants discussed challenges they are facing or might face in starting a monitoring program, and discussed with their peers on how they might address those challenges. With respect to staff and resource issues people discussed:

- Copying another jurisdiction's system;
- Conducting collective monitoring for an area;
- Working with Ecology on enforcement issues;
- Time investment in a monitoring program with state grants;
- Having the state provide technical training and support;
- Taking advantage of state tools like HRCD;
- State provision of one-stop shops for guidance and data to educate planners;
- Charging for monitoring and use performance bonding;
- Partnering with conservation districts to leverage resources.

Some ideas for addressing issues of political will included:

- Communicate the economic functions and values of critical areas, such as fisheries, tourism;
- Use monitoring to reduce lawsuits and liability;
- Develop partnerships with the state, federal agencies, and tribes to provide political support and help communicate the message.

Conclusions

Monitoring and adaptive management is a logical next step to critical areas protection after years of developing and implementing critical areas and shoreline regulations. All interest groups have a common interest in critical areas permit processes that are transparent, fair and effective. Permit applicants want to be treated fairly. Advocacy groups, whether from an environmental or private property rights perspective, want to know if the process is being applied consistently. Consultants want the opportunity to improve the quality and speed of permits. Tribes that have asserted their treaty rights are at risk from inadequate land use management want to know if the permits are being applied effectively.

We can know if we are achieving no net loss only through examining implementation over time. We should proceed with humility, recognizing that there is always uncertainty in the face of the complexity of both natural science and human nature. Curiosity should be our guide – we should be open to trying different approaches. We should respect the perspectives of all involved. The natural resources that we manage have many layers, so we must make sure to build partnerships to take advantage of our different roles and expertise.

A feedback loop provides the information a local government needs to determine whether permit requirements are being written consistent with regulations, whether process improvement is needed, or whether staff need training. We hope the information provided in this chapter will help local and state efforts to assess and improve critical areas and shoreline protection permit processes.

APPENDIX 7.A

JEFFERSON COUNTY NO NET LOSS CHECKLIST

JEFFERSON COUNTY

DEPARTMENT OF COMMUNITY DEVELOPMENT

Jefferson County No Net Loss Checklist

The purpose of completing this checklist is to show consistency between the policies and regulations in the Jefferson County Shoreline Master Program and the implications for shoreline ecological functions, as it pertains to the no net loss (NNL) requirement. This checklist is to be completed by the Planner reviewing the proposal for all development and use applications within shoreline jurisdiction.

Is the proposal within shoreline jurisdiction? ____ Yes (Complete this form) _____No (Form not required)

Planner _____ Date _____

Application Information

MLA # _____ SDP # _____ or Case # _____

(If case number is used, has the 'Special Conditions tab/Shorelines' been checked in Tidemark? Yes _____ No____)

Applicant Information

Landowner Name _____

Applicant (if different from landowner) _____

Representative _____

Project Information

Project Address _____

Parcel Number _____ Type of Ownership (if other than Private) _____

Proposed Project Description _____

_____

Shoreline Information

Shoreline Type: Marine _____ River _____ Lake _____

Waterbody Name _____ Shoreline Reach _____

Shoreline Use (based on Table 18.25.220)_____

Environmental Designations: Priority Aquatic _____ Aquatic _____ No in-water components _____

Natural_____ Conservancy_____ Shoreline Residential _____ High Intensity____

Type of shoreline approval: Shoreline Exemption _____ Shoreline Substantial Development _____

Conditional administrative _____ Conditional discretionary _____Variance____

PRELIMINARY NNL REVIEW

Answer all Preliminary NNL Review questions on this page. For any 'Yes' responses, also complete the Detailed NNL Review questions (with the corresponding number 1 through 13) on the following pages.

GENERAL SHORELINE MASTER PROGRAM (SMP) REGULATIONS:

1. Will the proposed project be constructed within a standard shoreline buffer and setback (JCC 18.25.270(4)(e) and 18.25.300(2)(a)) for conforming lots or exceed the provisions of JCC 18.25.270(5) for non-conforming lots?
   No _____ Yes _____ (If yes, answer Detailed Review questions on page 3)

2. Will any portion of the proposed project be constructed in a geologically hazardous area, a landslide hazard area buffer, or a setback for a landslide hazard area or a high-risk channel migration zone (Article V, Chapter 18.22 JCC.)?
   No _____ Yes _____ (If yes, answer Detailed Review questions on page 4)

3. Will any portion of the proposed project be constructed in a fish and wildlife habitat conservation area, buffer, or setback (Article VI, Chapter 18.22 JCC)?
   No _____ Yes _____ (If yes, answer Detailed Review questions on page 5)

4. Will any portion of the proposed project be constructed in a wetland or wetland buffer (Article VII, Chapter 18.22 JCC)?
   No _____ Yes _____ (If yes, answer Detailed Review questions on page 6)

5. Will any portion of the proposed project be constructed in a frequently flooded area (Article IV, Chapter 15.15 JCC)?
   No _____ Yes _____ (If yes, answer Detailed Review questions on page 7)

SHORELINE MODIFICATION REGULATIONS:

6. Does the proposal include Beach Access Structures (JCC 18.25.340)?
   No _____ Yes_____ (if yes, answer Detailed Review questions on pages 8-9)

7. Does the proposal include Boating Facilities (JCC 18.25.350)?
   No _____ Yes _____ (If yes, answer Detailed Review questions on page 10-11)

8. Does the proposal include Dredging or Disposal of Dredged Materials (JCC 18.25.360)?
   No _____ Yes_____ If yes, answer Detailed Review questions on page 12)

9. Does the proposal include Filling and/or Excavation (JCC 18.25.370)?
   No _____ Yes _____ (If yes, answer Detailed Review questions on page 13)

10. Does the proposal include Flood Control Structures (JCC 18.25.380)?
    No _____ Yes _____ (If yes, answer Detailed Review questions on page 14)

11. Does the proposal include In-stream Structures (JCC 18.25.390)?
    No _____ Yes _____ (If yes, answer Detailed Review questions on page 15)

12. Does the proposal include Restoration (JCC 18.25.400)?
    No _____ Yes _____ (If yes, answer Detailed Review questions on page 16)

13. Does the proposal include Structural Shoreline Armoring and/or Shoreline Stabilization (JCC 18.25.410)?
    No _____ Yes _____ (If yes, answer Detailed Review question on pages 17-19)

If the answer is 'No' to all of the above, the likelihood of the project negatively affecting shoreline ecological functions is minimal and it is assumed that the 'No Net Loss' requirement is met. Sign page 20.

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 1.

1. The proposed project will be constructed within a shoreline buffer (and 10-foot building setback) for conforming lots or will not meet the modest home provisions for non-conforming lots.

a. How much impervious surface will be created? _____ square feet

b. How much ground disturbance will occur?_____ square feet

c. Does the proposal avoid removal of forest habitats? Yes_____ No ____

If no, how much forest cover will be removed?_____ square feet

If no, describe the mitigation measures proposed to minimize impacts to the forest canopy within shoreline jurisdiction. _____

_____

_____

_____

d. Does the site plan show the area of "active use" within the shoreline buffer meeting the threshold of either 20 percent of the required buffer area or at least 15 linear feet of water frontage?

Yes No

_____ _____

If no, describe how the shoreline protection requirements ofJCC 18.25.310(2)(c)(ii) are met. _____

_____

_____

_____

d. Describe the potential impacts to shoreline functions and processes and corresponding mitigation to show NNL of shoreline functions (based on special reports and agency comments).

_____

_____

_____

_____

_____

_____

Any additional comments relevant to shoreline buffer requirements and NNL for this proposal:

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 2.

2. The proposed project will be located partially or entirely within a geologically hazardous area, a landslide hazard area buffer, or a setback for a landslide hazard area or a high-risk channel migration zone (Article V, Chapter 18.22 JCC).

e. If the proposed project will be constructed within a geologically hazardous area, describe the existing conditions, such as dominant plant community (forest, shrub, herbaceous, unvegetated), percent vegetated, and native or non-native plant species present (dominant species). If proposal will not be constructed within a geologically hazardous area, fill in 'N/A'. _____

f. If the proposed project will be constructed within a landslide hazard area buffer or setback (35 feet for landslide hazard area or 5 feet for high-risk channel migration zone, unless indicated otherwise in the geotechnical report), describe the existing conditions, such as dominant plant community (forest, shrub, herbaceous, unvegetated), percent vegetated, and native or non-native plant species present (dominant species). _____

g. Provide the name of the professional who prepared the report and the date of the report.

h. Describe measures proposed to minimize impacts to shoreline functions based on development location, project design, construction methods, ongoing uses, and maintenance activities (JCC 18.25.270(2)).

i. Describe any impacts to shoreline stability and natural processes that may occur due to permitting of the proposed use or development. _____

Any additional comments relevant to geologically hazardous area requirements and NNL for this proposal: _____

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 3.

3. *The proposed project will be located partially or entirely within a fish and wildlife habitat conservation area (FWHCA), buffer, or setback (Article VI, Chapter 18.22 JCC).*

a. If the proposed project will be constructed within a FWHCA, describe the existing conditions, such as habitat type (e.g., sandy/gravely intertidal zone, freshwater lake, mature forest), dominant plant community cover type (forest, shrub, herbaceous, unvegetated), percent vegetated, and dominant native or non-native plant species present. If proposal will not be constructed within a FWHCA, fill in 'N/A'.

b. If the proposed project will be constructed within a FWHCA buffer or setback, describe the existing conditions, such as dominant plant community (forest, shrub, herbaceous, unvegetated), percent vegetated, and native or non-native plant species present (dominant species).

j. Describe any existing structures or other modifications currently existing on the parcel.

k. Summarize the measures proposed by the applicant to minimize impacts to shoreline functions based on development location, project design, construction methods, ongoing uses, and maintenance activities (JCC 18.25.270(2)).

l. Describe any impacts to shoreline habitats and functions that may occur due to permitting of the proposed use or development.

Any additional comments relevant to FWHCA requirements and NNL for this proposal:

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 4.

4. The proposed project will be located partially or entirely within a wetland or wetland buffer (Article VII, Chapter 18.22 JCC).

a. If the proposed project will be constructed within a wetland, describe the existing conditions, such as dominant plant community (forest, shrub, herbaceous, unvegetated), percent vegetated, and dominant native or non-native plant species present. If the proposal is entirely outside of the wetland boundary, enter 'N/A'.

c. If the proposed project will be constructed within a wetland buffer, describe the existing conditions, such as dominant plant community (forest, shrub, herbaceous, unvegetated), percent vegetated, and dominant native or non-native plant species present.

m. Describe any existing structures or other modifications currently existing on the parcel.

n. Describe measures proposed to minimize impacts shoreline functions based on development location, project design, construction methods, ongoing uses, and maintenance activities (JCC 18.25.270(2)).

o. Describe any impacts to shoreline habitats and functions that may occur due to permitting of the proposed use or development.

Any additional comments relevant to wetland requirements and NNL for this proposal:

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 5.

5. *The proposed project will be located partially or entirely within a frequently flooded area (Chapter 15.15 JCC).*

p. Does the proposal comply with Chapter 15.15 JCC? Yes _____ No_____

If no, explain: _____

_____

q. Has the applicant submitted a Habitat Assessment or documents submitted to the U.S. Army Corps of Engineers (such as Biological Evaluation or Biological Assessment)? Yes _____ No_____

_____ _____

If no, explain: _____

r. Describe the measures proposed by the applicant to minimize impacts to shoreline functions and habitats potentially used by federally-listed threatened and endangered species._____

_____

_____

s. Identify the species for each 'Effects Determination':

_____

No effect:

May affect, not likely to adversely affect:_____

_____

Likely to adversely affect: _____

_____

_____

For any 'Likely to Adversely Affect' determination, have the Federal Services been contacted?

Yes No

_____

If yes, who was contacted and when: _____

If no, explain: _____

t. Describe any impacts to shoreline functions and processes that may occur due to permitting of the proposed use or development. _____

_____

Any additional comments relevant to frequently flooded area requirements and NNL for this proposal:

_____

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 6.

6. The proposal includes Beach Access Structures.

a. Will any beach access structure be constructed on a feeder bluff? Yes _____ No _____

If yes, explain how proposal complies with JCC 18.25.340(2). _____

b. Will the beach access structure be a private or public use? Private _____ Public _____

If public, was the proposal reviewed against regulations in JCC 18.25.290 and was the access restriction in JCC 18.25.340(4)(h) added to the plat? Yes No ____

If no, explain: _____

a. Will the proposed project meet the requirements of JCC 18.25.340(4)(e), (4)(f), and (4)(g)?
Yes No

If no, explain: _____

b. Was any information received during the course of the review indicating that the proposal should be prohibited (JCC 18.25.340(4)(j))? Yes _____No ____

If yes, was the permit denied? Yes _____ No

If the permit was not denied, describe how the NNL requirement will be met. _____

c. Summarize information from the Special Reports submitted by the applicant that shows compliance with JCC 18.25.340(4)(k):

i (existing conditions)_____

ii (potential slope stability effects)_____

iii (shoreline processes) _____

iv (potential future stabilization) _____

CONTINUED **4 4**

v (long-term slope stability measures) _____

_____

f. Summarize measures to be implemented that are intended to result in NNL of shoreline functions.

_____

_____

_____

d. Describe anything in the case file that indicates that bank stabilization or shore defense work would be needed in the future to protect this proposal._____

_____

_____

Any additional comments relevant to beach access structures and NNL for this proposal:

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 7.

7. The proposal includes Boating Facilities.

a. The proposed project includes:

- ○ public boat launches _____ (answer questions a.1, and b through f)
- ○ private boat launches _____ (answer questions a.2, and b through f)
- • non-residential docks, piers, and floats (answer questions a.3, and b through f)
- • residential (accessory) docks, piers, floats, lifts, float plane moorage _____ (answer questions a.4, a.5, and b through f)
- ○ marinas _____ (answer questions a.6, a.7, and b through f)
- • mooring buoys _____ (answer questions b through f)

a.1 Has the applicant for a **public boat launch** submitted documentation to show that JCC 18.25.350(3)(a), (3)(b), and (3)(c) are met? Yes _____No _____

If no, describe how proposal meets the NNL requirement. _____

_____

_____

a.2 Describe the documents submitted by the applicant for a **private boat launch** that show compliance with JCC 18.25.350(4)(b). _____

a.3 Has the applicant for a **non-residential dock, pier, and/or float** submitted documentation to show that JCC 18.25.350(5)(a), (5)(d), (5)(e), and (5)(f)? Yes _____ No_____

If no, describe how the proposal meets the NNL requirement. _____

_____

a.4 Describe the documents submitted by the applicant for a **dock, pier, float, and/or lift accessory to residential development** that show compliance with JCC 18.25.350(6)(d). _____

a.5 Does the proposal for a **dock, pier, float, and/or lift accessory to residential development** include dredging to construct or maintain? Yes _____ No _____

If yes, describe how proposal complies with JCC 18.25.350(6)(n). _____

CONTINUED 4 4

a.6 Describe the information submitted by the applicant for a **marina** that shows compliance with JCC 18.25.350(7)(a). _____

_____

_____

_____

a.7 Summarize the avoidance and minimization measures proposed by the applicant to construct a **marina.**

_____

_____

_____

c. Is the proposal to construct an entirely new structure or an expansion of an existing structure? Describe: _____

_____

_____

e. Will any existing man-made overwater structures be removed (and not replaced) as part of the proposal? Yes_____ No ____

If yes, how much (provided dimensions and square footage):_____

f. Identify all Special Reports prepared for this proposal:_____

_____

g. Summarize measure to be implemented that are intended to result in NNL of shoreline functions (include mitigation measures from Special Reports). _____

_____

h. Describe anything in the case file that indicates that bank stabilization or shore defense work would be needed in the future to protect this proposal. _____

_____

Any additional comments relevant to boating facilities and NNL for this proposal:

_____

_____

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 8.

8. The proposal includes dredging or dredge material disposal in shoreline jurisdiction.

u. Is there any feasible alternative to the proposal? Yes _____ No_____

If yes, state how proposal complies with JCC 18.25.360(3)(b) and 18.25.360(4)(a).

_____

_____

v. If dredging is proposed, describe how the proposal minimizes the need for new dredging and/or maintenance dredging (JCC 18.25.360(3)(a)). _____

_____

_____

_____

w. If dredging is proposed, identify the use or development in JCC 18.25.360(3)(c) that the proposal meets (proposal must meet use or development i. through x., specify which one is met): _____

x. If dredging is proposed for flood management purposes, identify which of the criteria in JCC 18.25.360(3)(d) applies: i (comp plan requirement) _____ii (long-term ecological benefit)_____

y. If dredging is proposed, will the primary purpose of obtaining the materials be for use in landfill, upland construction, or beach nourishment? Yes _____ No ____

If yes, state how proposal complies with JCC 18.25.360(3)(f).

_____

_____

z. If disposal of dredged materials is proposed, indicate which reason meets JCC 18.25.360(4)(d):

i (restore) _____ ii (reestablish) _____ iii (nourish) _____ iv (remediate) _____

aa. If disposal of dredge materials is proposed, has the applicant met all three requirements of JCC 18.25.360(4)(e)? Yes _____ No_____

If no, describe how the NNL requirement is met. _____

_____

_____

bb. Summarize measure to be implemented that are intended to result in NNL of shoreline functions (include mitigation measures from Special Reports). _____

_____

_____

_____

Any additional comments relevant to dredging or disposing of dredged materials and NNL for this proposal:

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 9.

9. The proposal involves filling and/or excavation in shoreline jurisdiction.

cc. Does the proposal meet all three requirements of JCC 18.25.370(3)(c)?
Yes _____ No _____

If no, describe how the NNL requirement is met. _____

_____

_____

dd. Describe the source of the fill materials and how the applicant is ensuring that contaminated materials will not be used (JCC 18.25.370(3)(d)). _____

_____

_____

_____

ee. Does the proposal comply with Flood Damage Prevention regulations (Title 15.15 JCC, including the FEMA BiOp requirements)? Yes _____ No _____

If no, describe how the requirement in JCC 18.25.370(3)(f) is met._____

_____

_____

_____

ff. Has the applicant fully addressed all eight requirements in JCC 18.25.370(3)(g)?

Yes No

If no, describe how the NNL requirement is met. _____

_____

_____

gg. Summarize measure to be implemented that are intended to result in NNL of shoreline functions (include mitigation measures from Special Reports). _____

_____

_____

_____

Any additional comments relevant to fill or excavation and NNL for this proposal:

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 10.

10. The proposal includes Flood Control Structures in shoreline jurisdiction.

a. Does the proposal meet all four requirements in JCC 18.25.380(3)(a)? Yes _____ No____

If no, describe how the NNL requirement is met._____

_____

_____

d. Does the proposal meet all six requirements in JCC 18.25.380(3)(b)?
Yes No

_____ _____

If no, describe how the NNL requirement is met. _____

_____

hh. Will the proposal be constructed in an estuary, embayment, point bar, channel bar, or in salmonid spawning areas (JCC 18.25.380(3)(d))? Yes _____No _____

If yes, describe how the NNL requirement is met. _____

ii. Has any information from federal or state fish and wildlife agencies, tribes, or other qualified professionals been received indicating that fish and wildlife resources may be damaged or that high stages and velocities have the potential to occur as a result of the proposal? Yes _____No _____

If yes, describe how the JCC 18.25.380(3)(e) requirement is met. _____

_____

jj. List the technical reports that were submitted to comply with JCC 18.25.380(3)(k).

_____

_____

_____

kk. Describe the mitigation measures to be implemented for meeting the NNL requirement.

_____

_____

Any additional comments relevant to flood control structures and NNL for this proposal:

_____

_____

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 11.

11. The proposal includes in-stream structures.

ll. Does the proposal include construction of a dam or associated power generating facilities?
Yes _____ No _____

If yes, describe how the proposal meets JCC 18.25.390(3)(a). _____

mm. Summarize information submitted by the applicant that shows how JCC 18.25.390(3)(c) is met.

nn. Describe the measures the applicant is proposing to address natural transport of bedload materials (JCC 18.25.390(3)(d)). _____

oo. Describe the measure the applicant is proposing to address fish migration (JCC 18.25.390(3)(e)).

pp. Name and firm for project engineer: _____

qq. Summarize how the applicant complies with JCC 18.25.390(3)(i):

i (site suitability analysis) _____

ii (engineered hydraulic analysis) _____

iii (biological reports) _____

iv (hydropower, if proposed) _____

v (public access/on-site recreation) _____

vi (mitigation) _____

vii (construction debris) _____

Any additional comments relevant to in-stream structures and NNL for this proposal:

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 12.

12. The proposal includes Restoration.

a. Summarize the restoration work proposed in the restoration plan. _____

_____

_____

_____

_____

d. Does the proposal comply with all other SMP policies and regulations? Yes _____ No _____

If no, describe how the proposal complies with JCC 18.25.400(3). _____

_____

_____

i. Is the proposed development or use part of an approved plan? Yes _____ No _____

If yes, name of document: _____

_____

Any additional comments relevant to restoration and NNL for this proposal:

DETAILED NNL REVIEW

Complete the questions below if the answer is 'Yes' to Preliminary NNL Review Question 13.

13. The proposal includes shoreline armoring and/or shoreline stabilization.

a. If armoring is proposed, has the applicant submitted documentation (including environmental assessments) showing that non-structural alternatives are infeasible (JCC 18.25.410(10)(c) and 18.25.410(1)(b))? Yes _____ No ____

If no, explain how the policies and regulations of JCC 18.25.410 are met. _____

_____

_____

_____

e. Indicate the person or firm that prepared biological inventory and resource document (JCC 18.25.410(10)(f):_____

j. Is the proposal in-kind replacement of existing shoreline armoring (no expansion)?
Yes (complete question below, then proceed to question f) No ____ (proceed to question d)

What information was submitted to show compliance with JCC 18.25.410(3)(a) and (3)(b)?_____

_____

_____

k. Is the proposal is for a subdivision or an existing lot without any structures?
Yes_____ (complete question below, then proceed to question f) No ____ (proceed to question e)

What information was submitted to show compliance with JCC 18.25.410(4)(a) through (4)(c)? _____

_____

l. The proposal is for new or expanded shoreline armoring. Complete the three bulleted items below, then proceed to question f.

- Identify the waterbody, indicate the shore form type, and specify whether or not this shore form type is prohibited in JCC 18.25.410(5)(a): _____
- Based on permitting criteria specified in JCC 18.25.410(5)(b), check all that apply (the proposal must meet one or more of the following):
  i ii iii iv

CONTINUED 4 4

_____ _____ _____ _____

- Summarize how the criteria in JCC 18.25.410(5)(c) are met:
  i (erosion) _____

  _____

  ii (alternatives)_____

  iii (flood damage)_____

  iv (mitigation) _____

  _____

  v (alternatives evaluated) _____

  _____

g. Has the proposal been designed to meet U.S. Army Corps of Engineers requirements and/or Washington State Department of Fish and Wildlife Aquatic Habitat Guidelines? Yes_____ No

If no, indicate how JCC 18.25.410(6)(a) requirements are met: _____

m. Summarize the measures the applicant will be implementing to prevent degradation of water quality._____

_____

n. Are gabions proposed? Yes _____ No ___

If yes, indicate how the NNL requirement in JCC 18.25.410(6)(g) will be met._____

_____

o. Are bulkheads proposed?
Yes No

If yes, describe the bank toe protection proposed (JCC 18.25.410(7)(b)(i)). _____

_____

p. If a revetment is proposed, will it be located in a wetland, point or channel bar, or in a salmonid spawning areas?
Yes_____ No _____ Revetments are not proposed _____

If yes, describe how the requirements of JCC 18.25.410(8)(b) are met._____

_____

_____

CONTINUED 4 4

_____

_____

k. If a breakwater, jetty, or seawall is proposed, indicate which of the three criteria from JCC 18.25.410(9)(b) applies:

i _____ ii _____ iii _____ Breakwaters, jetties, and seawalls are not proposed _____

I. Summarize the information submitted by the applicant to address the following requirements in JCC 18.25.410(10), as it pertains to NNL:

c (alternative and environmental impacts) _____

_____

_____

d (revegetation)_____

_____

e (hydraulic analysis)_____

f (biologist report) _____

_____

h (materials disposal) _____

_____

_____

Any additional comments relevant to shoreline armoring/stabilization and NNL for this proposal:

_____

_____

SUMMARY

Applicant:

I agree with the responses to the completed sections of this 'No Net Loss' form.

Signature _____ Date: _____

County Reviewer (signs after applicant has returned form with his/her signature):

Based on available information, the project is not expected to result in a net loss of shoreline ecological functions. Yes _____ No _____

Signature _____ Date: _____

APPENDIX 7.B

THURSTON COUNTY SMP-HRCD PROJECT
RECOMMENDATIONS FOR APPLYING THE HRCD DATA SET TO TRACK LAND COVER CHANGE

Thurston SMP-HRCD Project

Recommendations for Applying the HRCD Data Set to Track Land Cover Change

Background

Land cover is a vital element to environmental management in both science and land-use planning. Land cover, which is what is covering the land (e.g., forest, impervious surface, grassland), is distinct from land use, which is how the land is used (e.g., residential, forestry, row crops). Landscape ecologists often use land cover as a coarse filter evaluation of habitat quantity, quality, and configuration.

Most current land cover products are derived from Landsat satellite data that lack resolution to capture land cover elements smaller than ~2 hectares. Human dominated landscapes, like those of the Puget Sound region, change through many small events over time that are not effectively observed by Landsat. Standard 30-meter resolution Landsat data is useful for large extents of homogenous landscapes. With more than 30 years of data available, Landsat data still remains an important source of land cover information, yet its low resolution limits applicability to heterogeneous landscapes.

Overview of the HRCD Data

Funded by multiple grants from EPA (2012, 2013), WA Dept. of Ecology (2010), and the Salmon Recovery Funding Board (2009), the HRCD dataset is based on a process that compares high-resolution (1 m) National Agriculture Imagery Program (NAIP) aerial photography between two time periods. NAIP imagery was first available for Washington statewide in 2006 serving as the baseline for the dataset. Once the next set of imagery was available in 2009, comparisons between the two could then be made. The procedure, developed by Dr. Ken Pierce (WDFW), of generating the land cover changes has two primary phases: a set of automated processes meant to assign the segmented landscape with a prescribed chance of change and a manual process that confirms the change event and assigns attributes.

What the computer does

The automated phase of generating the HRCD data is complex and it is beyond the scope of this report to describe the process in detail. To summarize, through a process known as segmentation, the computer divides the georeferenced imagery into polygons by homogenous pixels. The computer takes these segmented polygons and assesses the probability that the images are different (i.e. the area experienced a land cover change event). The polygons with a probability of change higher than the prescribed minimum probability threshold for change are then sent to an analyst to verify if the area has indeed changed.

What the WDFW Staff does

The segmented polygons that are identified as likely to have changed are checked by an analyst to confirm that the area has indeed changed. This is done by visually inspecting each polygon through a custom built viewer that loads the potential change event to compare with its baseline image. The

analyst also assigns attributes to each confirmed change event including the amount of the change within the polygon (0, 25, 50, 75, or 100%), the initial land class, and likely change agent (Table 1).

Table 1. List of initial land classes (left) and change agents (right) in the HRCD dataset.

Initial Land Class	Change Agents
Built Impervious (>90%)	Development
Bare Ground (>90%)	Forestry
Mixed built (<25% or >25% tree cover)	Tree Removal
Mixed Non-built (including natural rock)	Stream/Hydrologic change
Tree/Shrub (>90%)	Redevelopment
Grass/Herb (>90%)	Retention Pond
	Other – Natural
	Other – Non-Natural

What the data do

The completed HRCD dataset quantifies land cover change through time in Puget Sound. Specifically, the HRCD quantifies total land cover change, including canopy loss, impervious surface increase and semi-pervious increase. Currently, the data does not quantify tree growth or identify restoration events. The extent is the entire Puget Sound Watershed separated by Watershed Resource Inventory Areas (WRIAs) 1 through 19 in Washington State. There are currently two iterations of the HRCD data available for distribution, 2006 to 2009 and 2009 to 2011 with 2011 to 2013 available late 2015. The data can be readily manipulated in ArcGIS and intersected with other spatial data.

HRCD Limitations

HRCD error assessment

There are two types of error associated with HRCD, commission error (locations mapped as change that did not actually change) and omission error (locations that actually changed but not mapped as change). Commission error is virtually eliminated by the analyst visually inspecting each location predicted to be change based on the prescribed minimum probability threshold in the computer model. Omission error rates are estimated by sampling and manually interpreting a large number of polygons below the minimum probability threshold. Lowering the minimum probability threshold will push more error into the commission side and increase accuracy. Lowering the probability threshold however exponentially increases the number of polygons reviewed by analysts and therefore has a point of diminishing returns.

For a more detailed looked at the HRCD generation process, definitions for land class, change agents, change types, error assessment:

Final Report on High Resolution Change Detection Project (2011):
http://wdfw.wa.gov/publications/01454/wdfw01454.pdf

Quality Assurance Project Plan: Puget Sound High Resolution Change Detection (2013):

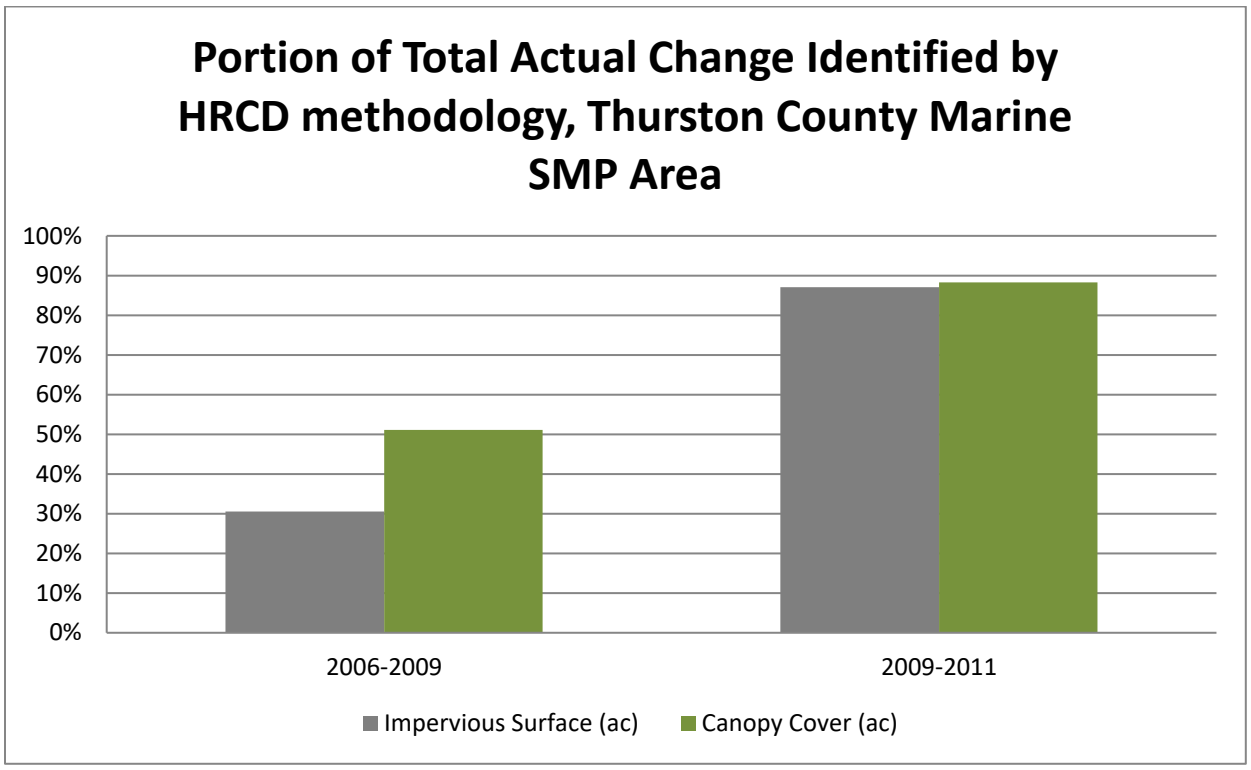
http://www.ecy.wa.gov/programs/eap/qa/docs/NEPQAPP/SampleQAPPHighDefChangeAnalysis.pdf

Accuracy Optimization for High Resolution Object-Based Change Detection: An Example Mapping Regional Urbanization with 1-m Aerial Imagery (2015):

http://www.mdpi.com/2072-4292/7/10/12654

HRCD omission rate case: Thurston County Marine SMP

Independent of the HRCD Quality Assurance Project Plan that estimated omission rates, the Thurston County marine Shoreline Master Program area was manually assessed for omissions from the HRCD data set. The results showed a significant improvement between the 2006 to 2009 and 2009 to 2011 iterations in omission rates.



In the Thurston marine SMP area, the HRCD captured approximately 51% of the canopy loss and 31% of new impervious surface between 2006 and 2009. However, the HRCD captured approximately 88% of the canopy loss and 87% of the new impervious surface between 2009 and 2011. Manual assessment of the latest iteration, 2011 to 2013, is currently underway.

Generally, the HRCD data set captures larger events (greater than 1/5th acre) with more reliability than smaller events. Small land cover changes, such as house additions, driveways, individual tree removals, and other changes less than 1/5th of an acre, are routinely missed, especially as change polygons smaller than 2000 ft^2 (about a 1/20th acre) are removed from analysis prior to modeling. Also, the HRCD is not designed to capture some other change events such as demolitions, tree or greenspace restorations, over-water structures (e.g. docks), and vertical structures (i.e. bulkheads).

Even though the HRCD does not track restoration events or tree growth, interested users can submit spatial data for known restoration events or other areas of interest to WDFW via the HRCD website (available late 2015). These locations will be monitored for change with each new iteration of the NAIP photography. A corresponding report will be generated summarizing the land cover change, including any activity observed outside of the regular HRCD attributes such as canopy gain.

How to Get the HRCD Data Set

There are currently two primary means of data distribution:

1) ArcGIS Online Map Service (http://arcg.is/1KltjEU) allows users to view and filter the HRCD dataset in a web browser.

2) A shared folder with invitations manually sent by WDFW staff upon request. This folder contains the most current HRCD editions ready for download via a shapefile.

For more information on this report, the HRCD dataset, applications, local partner full-reports, or to receive the data itself, please contact:

Keith Folkerts
Priority Habitat and Species Land Use Policy Lead
Habitat Program
Washington Department of Fish and Wildlife
600 Capital Way N
Olympia, WA 98501
Phone: (360) 902-2390
Email: keith.folkerts@dfw.wa.gov

Simple HRCD Application Method

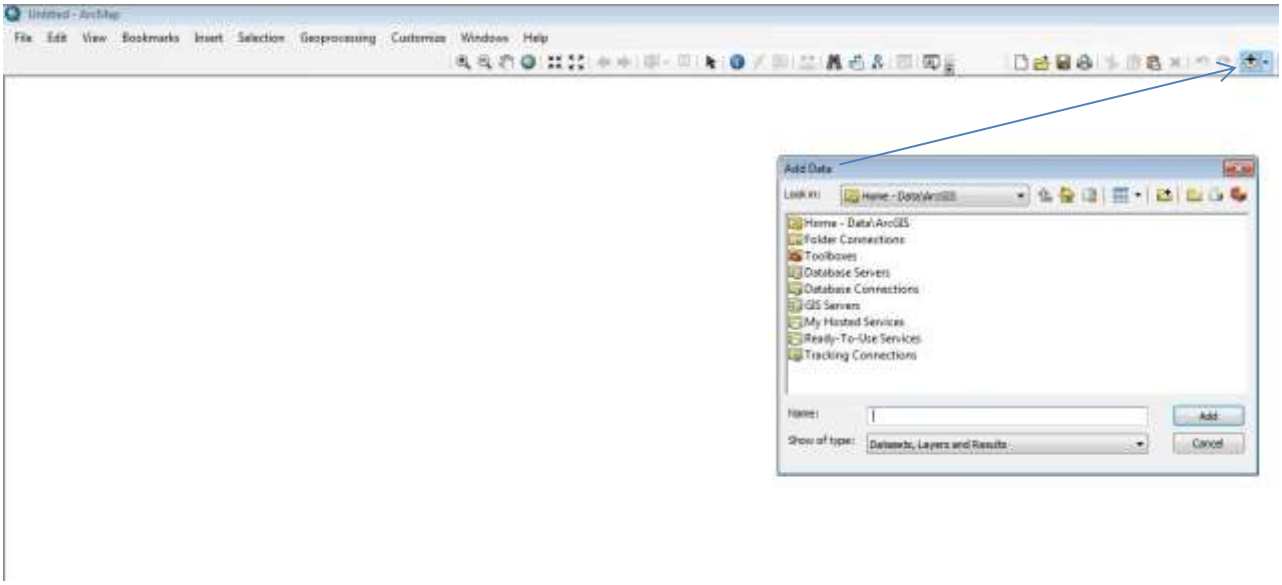
While there are many ways to analyze the HRCD dataset with other spatial data, one of the more simple methods is an intersection in ArcGIS then exporting to a spreadsheet program like Excel. The following method uses ArcGIS 10.2.2 and Microsoft Excel.

Steps:

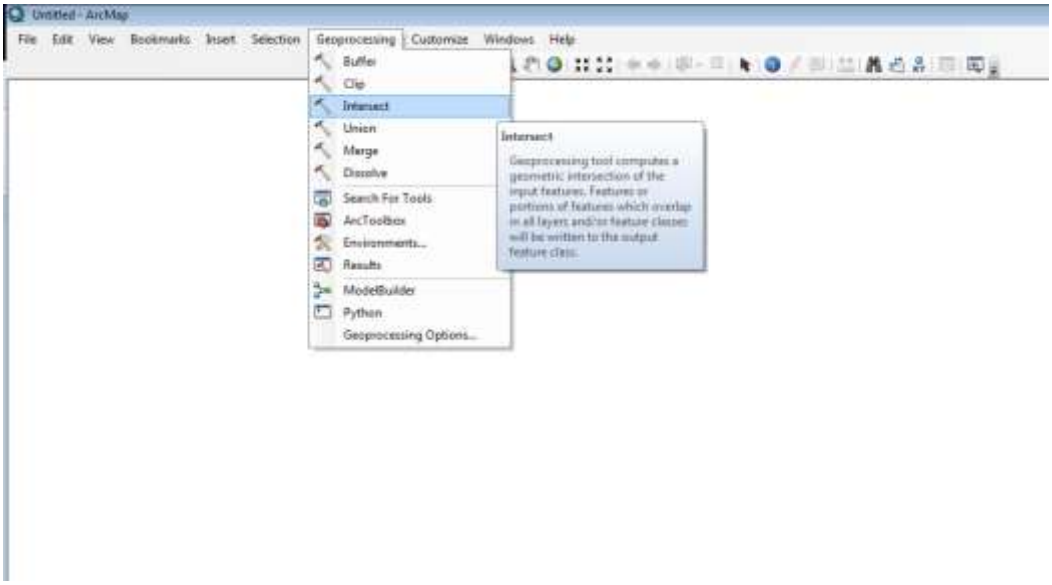
1. Request access to the WDFW HRCD folder by contacting WDFW Staff, then download HRCD data from the folder.

***In ArcGIS*:**

2. Add HRCD data and other relevant spatial data using the "Add Data" button on the "Standard" tool bar (also available on the File drop-down menu);



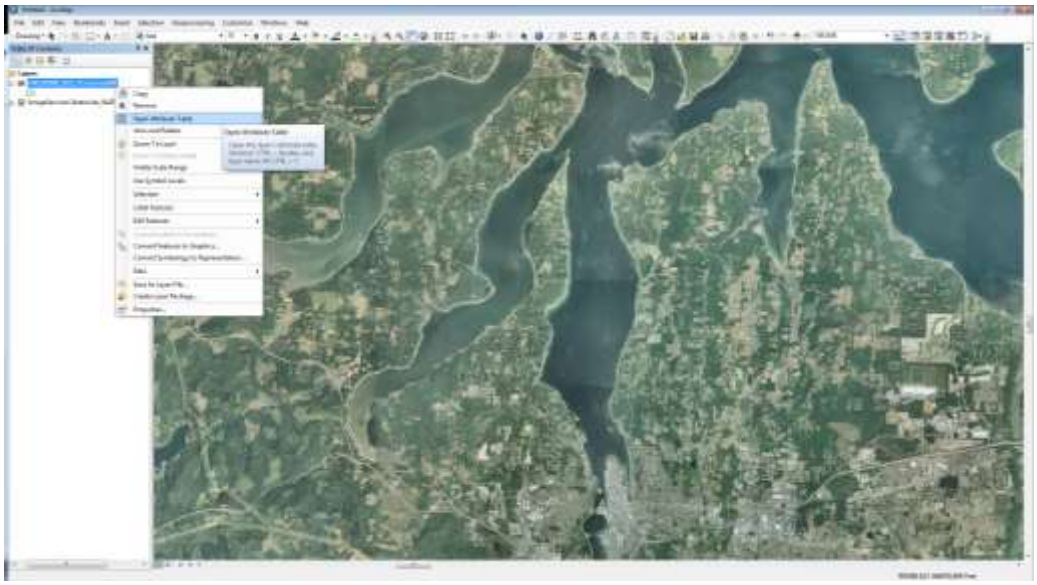
3. Under the "Geoprocessing" drop-down, select "Intersect";



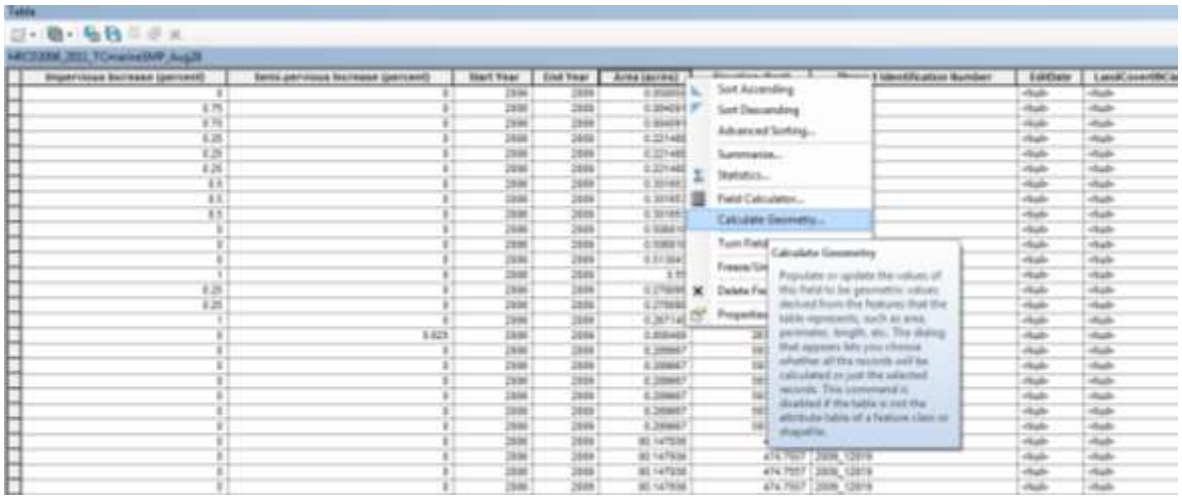
4. In “Input Features” select HRCD and other spatial data. Select where to store the new file in “Output Feature Class”. Select “OK”.

5. Because the Intersection function will create HRCD change event polygons spliced by the spatial data used, new area of the HRCD polygons need to be calculated.

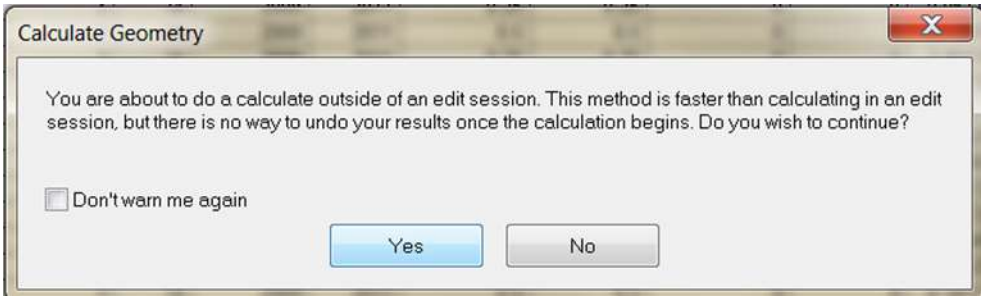
    a. Right-click on the HRCD layer in the table of contents and open the Attribute Table.



    b. Right-click the “Area (acres)” button on the attribute labels, and select “Calculate Geometry”. Select “Acres” in the dropdown list. Select “Ok”.

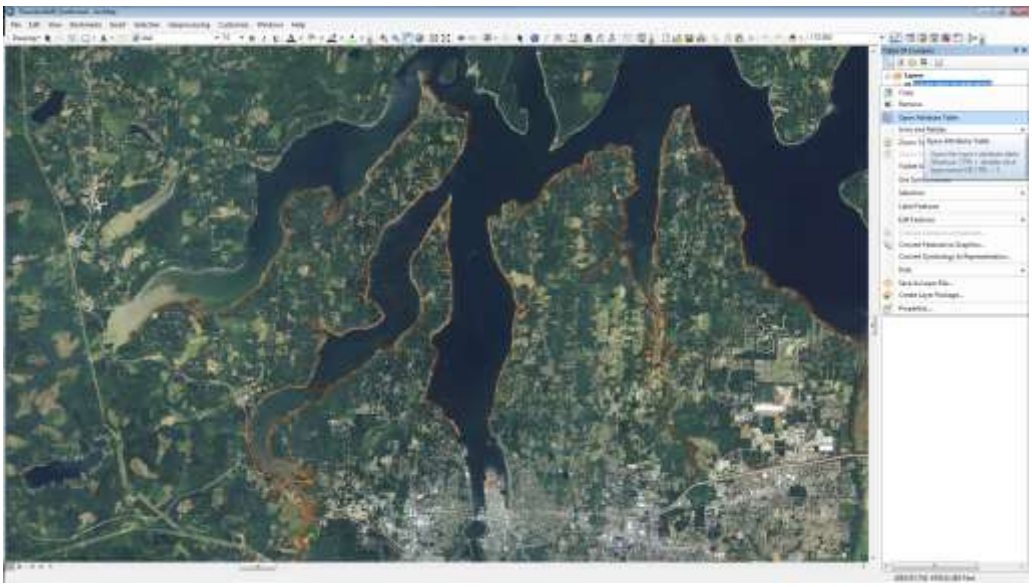


a. If you get a dialogue box saying you are about to edit outside of an edit session, click yes to continue.

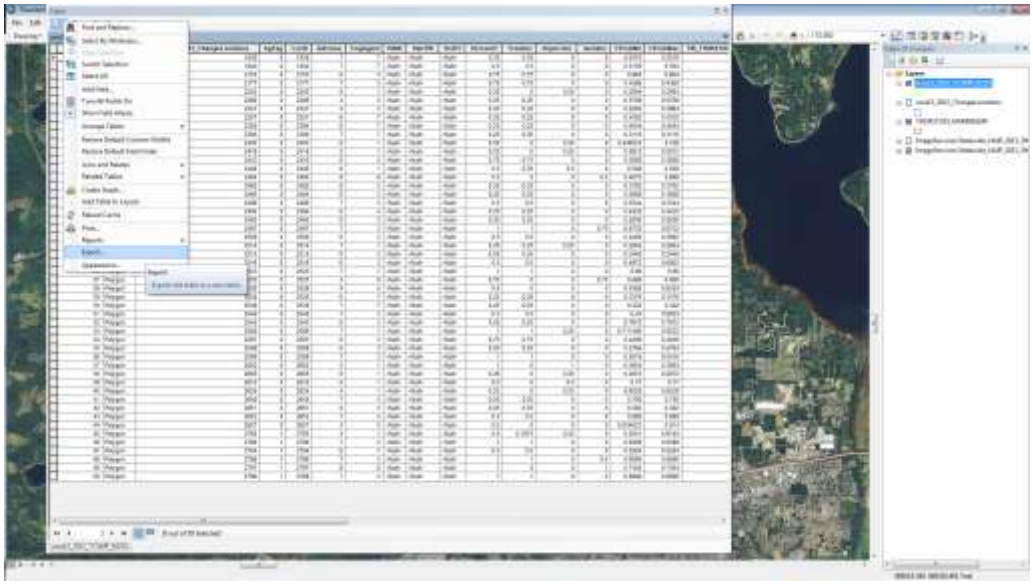


***Export the data to Excel*:**

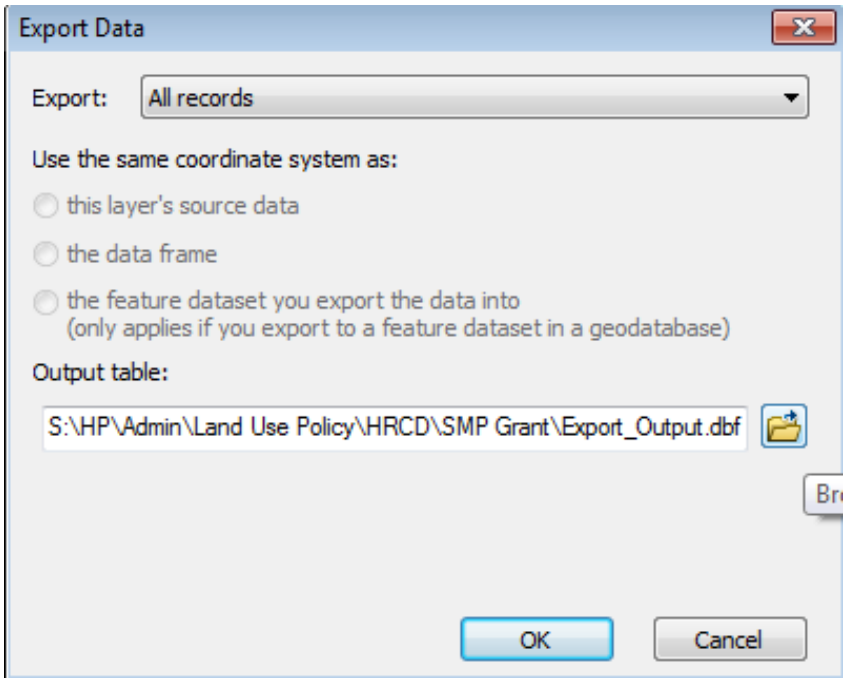
6. Right-click the newly created layer in the "Table of Contents" window and select "Open Attribute Table"

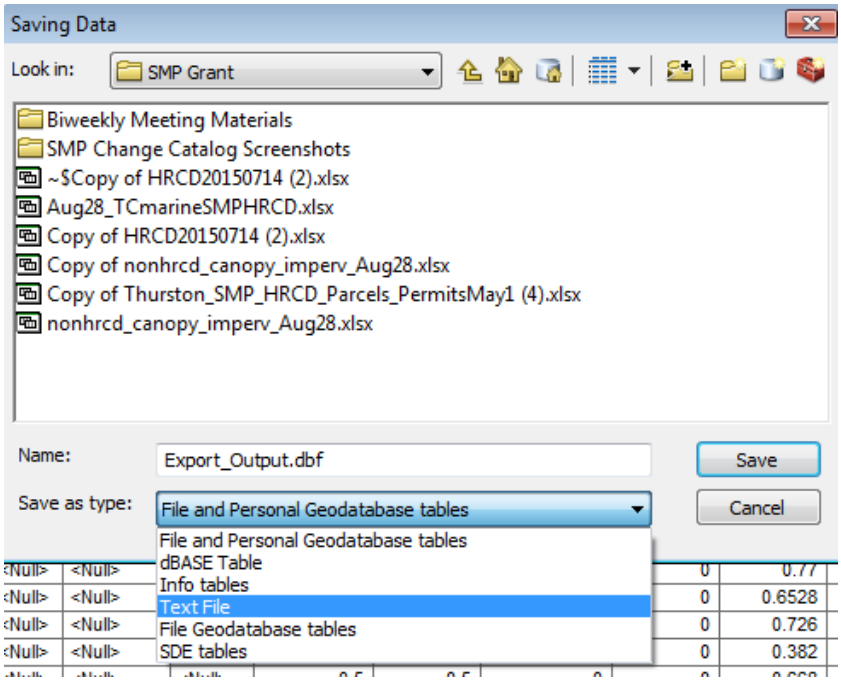


7. On the “Table Options” button, select “Export”;



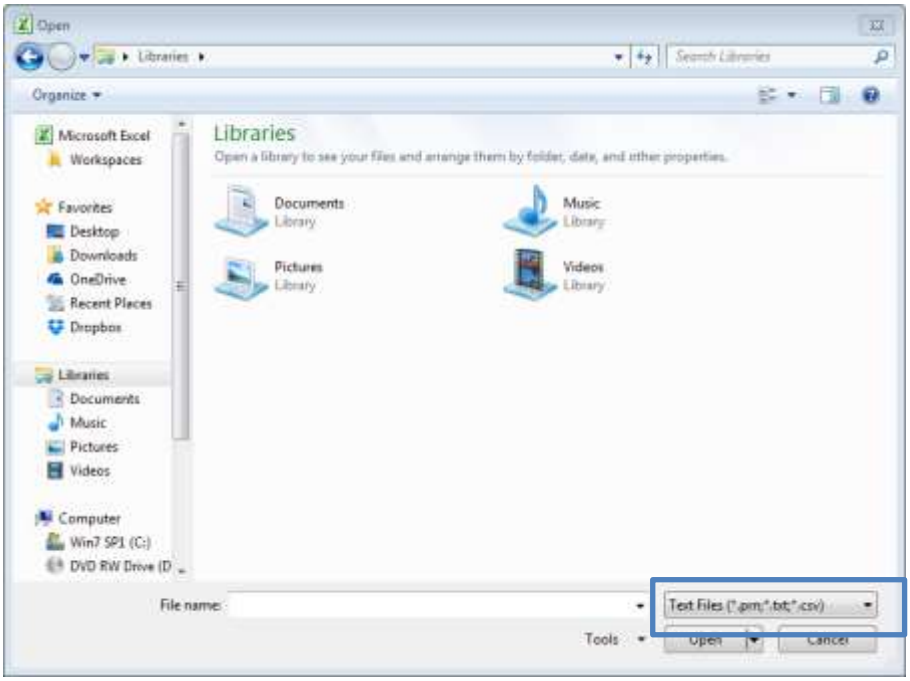
8. Select the browse button next to the “Output table” box. Select where to store the exported data and change the file type to “Text File”.



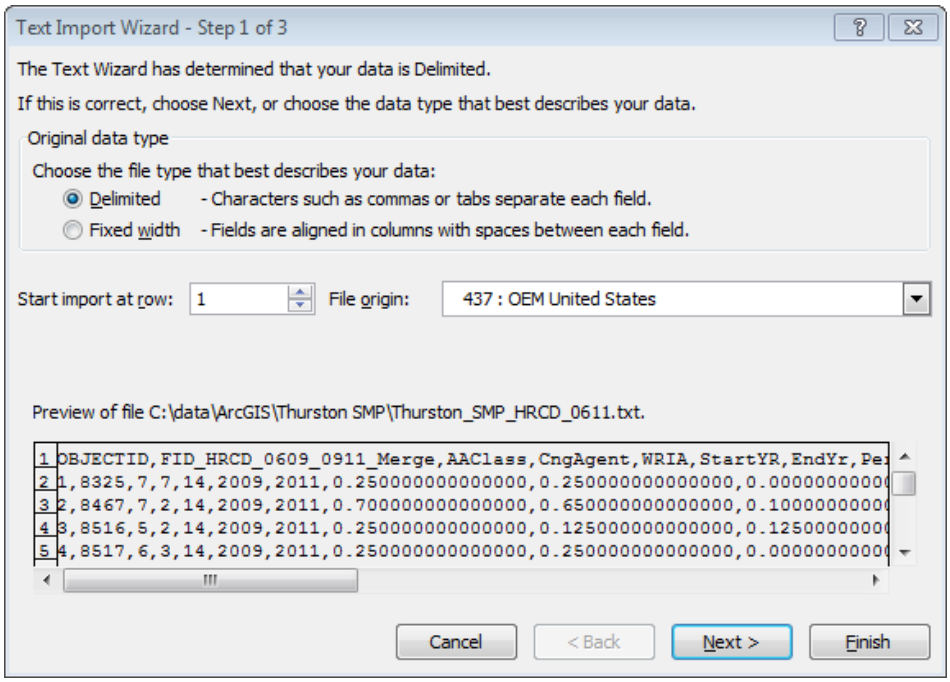


***In Excel*:**

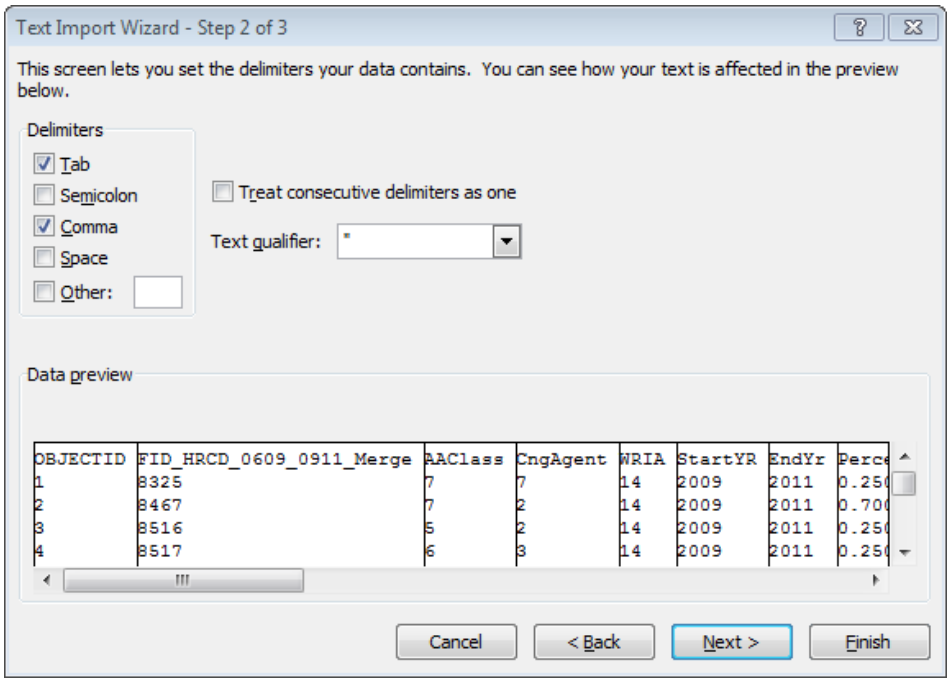
9. Open the file (be sure to select either “All File types” or “Text File types” in the dropdown menu adjacent to file name).



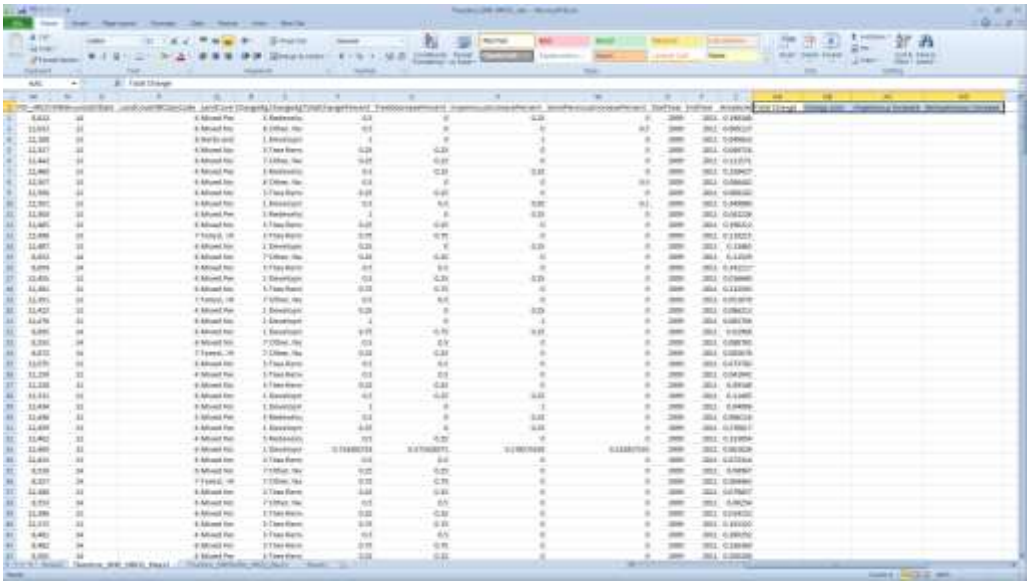
10. On Step 1 of 3 in the Text Import Wizard, select “Next”.



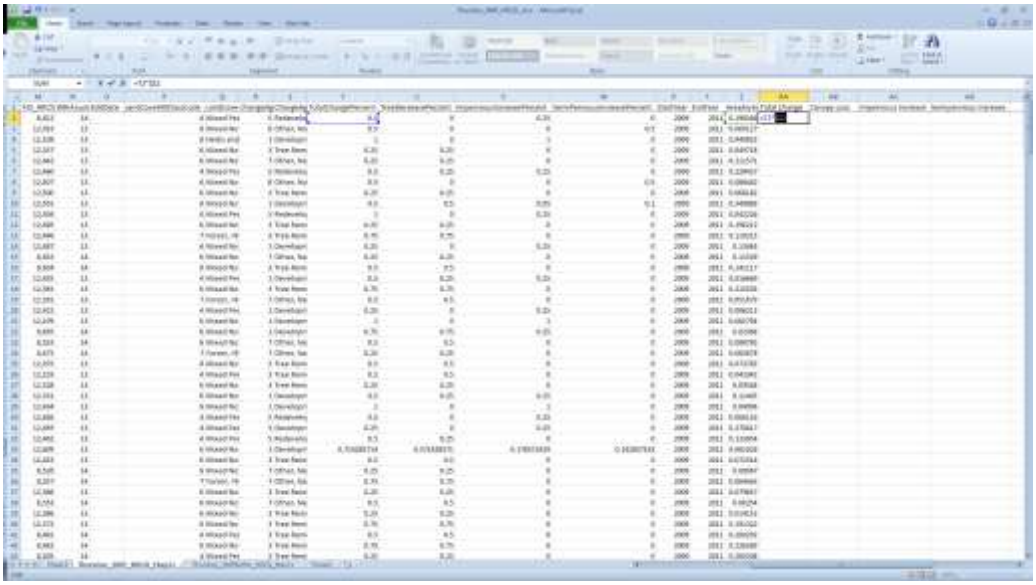
11. On Step 2 of 3 in the Text Import Wizard, check the “Comma” box, select Finish



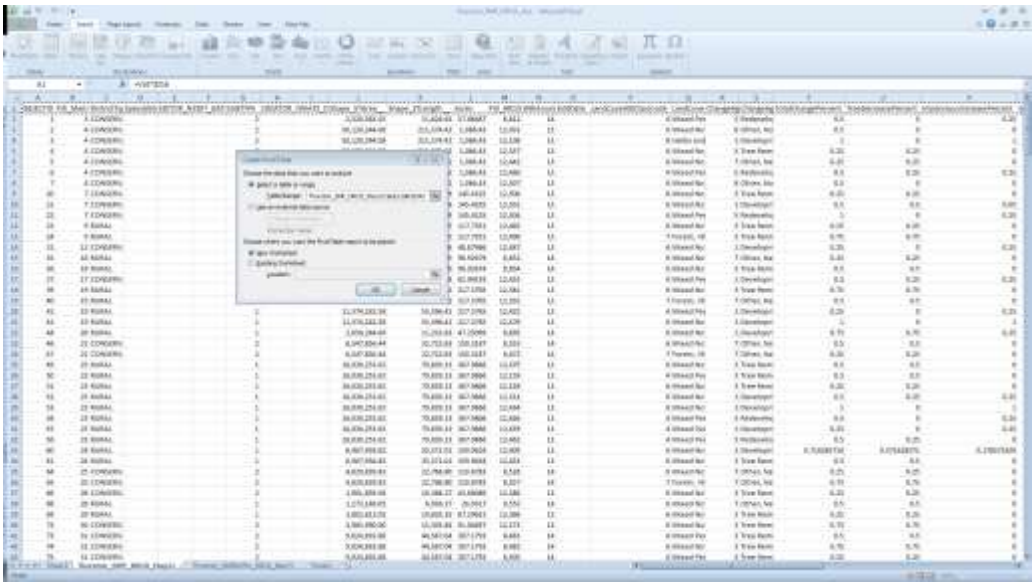
12. To account for the change percentages (0, 0.25, 0.5, 0.75, or 1.0) for each change type (total, canopy loss, impervious surface increase, and semi-pervious increase), multiply the change percentages by the Area (acres) column.
    a. Create new columns 4 new columns and label them: Calculated Total Change, Tree Decrease, Impervious Increase, and Semi-pervious Increase.



    b. Multiply the respective change percentage type by the Area (acres) column.



13. Under the Insert ribbon, select Pivot Table and select the data range of interest for analysis.



14. Sort and filter the data as needed.

By using this simple method of intersecting the HRCD, each change event is combined with the attributes of the other spatial data used in the intersection. In Excel, the pivot table function is extremely useful for filtering and sorting the intersected HRCD data by the attributes found in the other spatial data used in the analysis

Using HRCD for Program Implementation

HRCD data should prove useful for counties and cities implementing critical area programs adopted under the Growth Management Act (GMA) and Shoreline Master Programs (SMPs) adopted under the Shoreline Management Act (SMA).

Intersecting the HRCD with the appropriate spatial data can show rates of land cover change. The data can give insight into the effectiveness of environmental policies and regulations, their implementation, and/or enforcement practices. For example, jursidictions can intersect the HRCD with SMP areas and sort by environmental designation to determine if the observed rates of change are acceptable as per their land use management goals.

One example is to cross-reference the HRCD with critical area or shoreline layers together with relevant land use permits to understand where permitted and non-permitted activities took place. In the past, most local governments relied solely on complaints to determine the extent of non-permitted activity. The HRCD has potential to provide a neutral and objective base of information to inform evaluations of program compliance.

The data could also be used to help prepare forward-looking projections of change. For example, rates of change calculated for given periods in the past can be projected into the future to inform cumulative impact assessments.

The HRCD data may also be useful for regional or watershed entities to compare rates of change between different areas subject to different regulatory regimes or different rates of growth. For example, jurisdictions can gain insight into how efficiently they manage growth by measuring new impervious surface area per new person over a specified time.

It is important to note that while the HRCD quantifies canopy loss, the dataset does not record tree growth and restoration and thus does not provide information on mitigation or restoration improvements.

Spatial Data Resources

Some resources with downloadable spatial data:

- Public Lands Database (USGS)
    - Official inventory of protected open space in the United States. With over 715 million acres in thousands of holdings, the spatial data in PAD-US include public lands held in trust by national, State, and some local governments, and by some nonprofit conservation organizations.
    - http://gapanalysis.usgs.gov/padus/data/download/
- National Wetland Inventory (USFWS)
    - http://www.fws.gov/wetlands/NWI/Overview.html
- WA Department of Ecology
    - Ecology maintains the spatial datasets described here in order to better describe the diverse natural and cultural environment that we live and work in.

- http://www.ecy.wa.gov/services/gis/data/data.htm

APPENDIX 7.C

KIRKLAND LANDOWNER TEMPLATES

The City of Kirkland has two landowner agreements that it records on projects along the shoreline. The "Perpetual Maintenance Agreement Native Shoreline Vegetation" is a standard vegetation maintenance agreement completed with all new single-family development, major remodels, or Substantial Development Permit along the shoreline. The "5-Year Maintenance Agreement for Shoreline Structural Stabilization" is for those few projects that have installed new soft shoreline stabilization.

PERPETUAL MAINTENANCE AGREEMENT NATIVE SHORELINE VEGETATION

Parcel No:

Project Name:

Project Address:

This agreement is entered into between each of the undersigned owners of real property, and the City of Kirkland, in consideration of approval by the City of a permit under City of Kirkland File/Permit No. for the hereinafter described real property in Kirkland, King County, Washington.

Each undersigned owner hereby agrees to regularly maintain the required native shoreline vegetation as illustrated on the landscape plan contained in Exhibit A, as approved by the City, on the real property described below in Exhibit B, owned by such owner, pursuant to Chapter 83 of the Kirkland Zoning Code. Vegetation that dies or is removed must be replaced in kind or with similar plants contained on the City's Native Plant List or other native species approved by the City Planning Official.

For the application of pesticides, herbicides and fertilizers, each undersigned owner hereby agrees to follow the measures in Section 83.480 of the Kirkland Zoning Code, including the use of best management practices (BMPs) outlined in the BMPs for Landscaping and Lawn/Vegetation Management Section of the 2005 Stormwater Management Manual of Western Washington to prevent contamination of surface and ground water and/or soils, and adverse effects on shoreline ecological functions and values.

Each of the undersigned agree to defend, pay, and save harmless the City of Kirkland, its officers, agents, and employees from any and all claims of every nature whatsoever, real or imaginary, which may be made against the City, its officers, agents, or employees for any damage to property or injury to any person arising out of the maintenance of said native shoreline vegetation on said owner's property or out of the actions of the undersigned in carrying out the responsibilities under this agreement, excepting therefrom only such claims as may arise solely out of the negligence of the City of Kirkland, its officers, agents, or employees.

This Agreement shall be binding upon the heirs, successors and assigns of each of the undersigned and shall run with the land. This Agreement shall, at the expense of the undersigned owners, be recorded by the City of Kirkland with the King County Department of Elections and Records.

The approved shoreline vegetation plan on the subject property of this Agreement is described as follows:

See Exhibit A

The real property owned by the undersigned and the subject property of this Agreement is situated in Kirkland, King County, Washington and described as follows:

See Exhibit B

DATED at Kirkland, Washington, this _____ day of _____, _____.

(Sign in blue ink)

(*Individuals Only*)

OWNER(S) OF REAL PROPERTY (INCLUDING SPOUSE)

_____

_____

_____

(*Individuals Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____to me known to be the individual(s) described herein and who executed the Perpetual Maintenance Agreement Native Shoreline Vegetation and acknowledged that _____ signed the same as _____free and voluntary act and deed, for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington,
Residing at: _____
My commission expires: _____

(*Partnerships Only*)

OWNER(S) OF REAL PROPERTY

_____

(Name of Partnership or Joint Venture)

_____

By General Partner

_____

By General Partner

_____

By General Partner

(*Partnerships Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____ to me, known to be general partners of _____, the partnership that executed the Perpetual Maintenance Agreement Native Shoreline Vegetation and acknowledged the said instrument to be the free and voluntary act and deed of each personally and of said partnership, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____

Notary's Signature

_____

Print Notary's Name
Notary Public in and for the State of Washington,
Residing at: _____
My commission expires: _____

(Corporations Only)

OWNER(S) OF REAL PROPERTY

_____

(Name of Corporation)

_____

By President

_____

By Secretary

(*Corporations Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____ to me, known to be the President and Secretary, respectively, of _____, the corporation that executed the Perpetual Maintenance Agreement Native Shoreline Vegetation and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____

Notary's Signature

_____

Print Notary's Name
Notary Public in and for the State of Washington,
Residing at: _____
My commission expires: _____

5-YEAR MAINTENANCE AGREEMENT FOR SHORELINE STRUCTURAL STABILIZATION

Parcel No:

Project Name:

Project Address:

This agreement is entered into between each of the undersigned owners of real property, and the City of Kirkland, in consideration of approval by the City of a permit under City of Kirkland File/Permit No. for the hereinafter described real property in Kirkland, King County, Washington.

Each undersigned owner jointly and severally hereby agrees to maintain the shoreline structural stabilization measures installed on the real property described below, in accordance to the final approved shoreline stabilization plan contained in the City's official file, pursuant to Chapter 83 of the Kirkland Zoning Code ("KZC"), for a period of five (5) years after the date of final occupancy of the site or final inspection of the shoreline stabilization measure, which is [enter date]. Thereafter, maintenance will continue pursuant to Chapter 83 KZC requirements.

Each of the undersigned agree to defend, pay, and save harmless the City of Kirkland, its officers, agents, and employees from any and all claims of every nature whatsoever, real or imaginary, which may be made against the City, its officers, agents, or employees for any damage to property or injury to any person arising out of the maintenance of said shoreline structural stabilization measure on said owner's property or out of the actions of the undersigned in carrying out the responsibilities under this agreement, excepting therefrom only such claims as may arise solely out of the negligence of the City of Kirkland, its officers, agents, or employees.

This Agreement shall be binding upon the heirs, successors and assigns of each of the undersigned and shall run with the land. This Agreement shall, at the expense of the undersigned owners, be recorded by the City of Kirkland with the King County Department of Elections and Records.

The real property owned by the undersigned and the subject property of this Agreement is situated in Kirkland, King County, Washington and described as follows:

Exhibit A

DATED at Kirkland, Washington, this _____ day of _____, _____.

(Sign in blue ink)

(*Individuals Only*)

OWNER(S) OF REAL PROPERTY (INCLUDING SPOUSE)

_____

_____

_____

(*Individuals Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____to me known to be the individual(s) described herein and who executed the 5-Year Maintenance Agreement For Shoreline Structural Stabilization and acknowledged that _____ signed the same as _____free and voluntary act and deed, for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington,
Residing at: _____
My commission expires: _____

(*Partnerships Only*)

OWNER(S) OF REAL PROPERTY

_____
(Name of Partnership or Joint Venture)

_____
By General Partner

_____
By General Partner

_____
By General Partner

(*Partnerships Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____ to me, known to be general partners of _____, the partnership that executed the 5-Year Maintenance Agreement For Shoreline Structural Stabilization and acknowledged the said instrument to be the free and voluntary act and deed of each personally and of said partnership, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington,
Residing at: _____
My commission expires: _____

(Corporations Only)

OWNER(S) OF REAL PROPERTY

_____

(Name of Corporation)

_____

By President

_____

By Secretary

(*Corporations Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____ to me, known to be the President and Secretary, respectively, of _____, the corporation that executed the 5-Year Maintenance Agreement For Shoreline Structural Stabilization and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____

Notary's Signature

_____

Print Notary's Name
Notary Public in and for the State of Washington,
Residing at: _____
My commission expires: _____