CLARK COUNTY COALITION SMP UPDATE

BATTLE GROUND | CAMAS | CLARK COUNTY | LA CENTER
RIDGEFIELD | VANCOUVER | WASHOUGAL | YACOLT

MONITORING AND ADAPTIVE MANAGEMENT FRAMEWORK

June 2012
City of Vancouver
Grant No. G1000058

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Table of Contents

List of Appendices

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1.0 Introduction

This Monitoring and Adaptive Management Framework grew from the Clark County Coalition's understanding that there are many unknowns about the level and intensity of development projected over the next 20 years and uncertainty about how effective the measures in the updated SMPs will be in responding to that development to meet the established environmental goals. Instead of waiting 8 years until the next required update, the Coalition recognized that the SMPs would benefit from continued assessment and management of the incremental, on-the-ground activities that affect the publics' use of the waters and shorelines in and around Clark County.

As stated under WAC 173-26-201(2)(b) and 173-26-191(2)(a)(iii)(D), local governments are required to monitor actions taken to implement their shoreline master programs and evaluate shoreline conditions. This framework is designed to facilitate the next update of SMP provisions and improve shoreline management over time. This monitoring framework is part of the proactive approach taken by the Clark Coalition to ensure that the SMPs meet their expected goals.

Performance of environmental programs generally takes three different levels of monitoring that cover different scales and geographies to address specific questions (Noss & Cooperrider 1994):

- Compliance Monitoring – are permit conditions being effectively implemented? Are mitigation projects adequately constructed and appropriately monitored?
- Effectiveness Monitoring – are the regulatory requirements effective in accomplishing management objectives?
- Validity Monitoring –is the SMP on-track to achieve overall goals of no net loss of shoreline ecological function?

Adaptive management at all three levels implies a commitment to make course corrections if monitoring results indicate that policy direction or regulatory measures are not performing as expected.

It is assumed that each Coalition member government will conduct its own **compliance monitoring**, such as in Clark County's Development Review Mitigation Monitoring Program. Because of its project-specific association, compliance monitoring is not included in this framework.

Strategic monitoring of specific regulatory requirements of the SMP and their cumulative effect on specified ecological functions is, however, a major focus of this monitoring framework. A process for making recommendations for course corrections for the next scheduled update or sooner if conditions warrant is integral to the adaptive management component outlined in this document. The results of this **effectiveness monitoring** will contribute to the **validation monitoring** inherent in each legislatively required update to ensure no net loss of shoreline ecological functions.

This document lays out the purpose and framework of an initial monitoring program. Additional work will need to be done to develop the specific methods and tools to execute this program in more detail, including the establishment of data protocols, development of a database

management system to be used by all jurisdictions, and/or potential development of a web-based application to consolidate and display data at a county-wide scale, as needed.

1.1 Purpose

The major purpose of the updated Coalition SMPs is to allow development to occur based on the preferred uses, goals and requirements outlined in the SMA while achieving the goal of "no net loss" of shoreline ecological function. The timeframe for achievement is from the baseline established with the inventory and characterization report over the planning horizon of 20 years. Monitoring development under the SMP will inform the next major update targeted for 2020 (RCW 90.58.080) and will help to identify mid-course corrective actions that could be undertaken to avert functional loss in order to ensure the SMP goal is met over the planning horizon.

1.2 Approach

The framework establishes an integrated approach for collecting data, evaluating outcomes, and recommending changes to the SMPs, specifically focused on the SMA criteria for evaluating shoreline ecological functions (WAC 173-26-201(3)(d):

- **Hydrologic functions** (transport of water and sediment across the natural range of flow variability, attenuating flow energy and developing structural complexity of the stream system)
- **Shoreline vegetation** (maintaining stream or lake water temperature, removing excessive nutrients and toxic compounds, sediment removal and bank stabilization, attenuation of high stream flow energy, and the provision of large woody debris for fish habitat).
- **Hyporrheic functions** (removing excessive nutrients and toxic compounds, water storage, sediment storage, and maintenance of base flows)
- **Habitat functions** (habitat for native fish, aquatic species, shoreline-dependent birds, and other wildlife, including space and conditions for reproduction, resting, migration and forage)

Whether there is loss or gain in each of these functions is the major management question associated with each of these functions. How to measure progress or regression in each of the functions in order to answer these questions is the focus of this monitoring framework.

The approach builds on work produced during the development of the SMP to:

- Establish baseline conditions through the Clark County Coalition Inventory and Characterization Report;
- Improve regulation of water and land disturbing activities within the shoreline jurisdiction under the SMPs; and
- Identify indicators that could affect shoreline ecological functions as assessed in the Cumulative Impacts Analyses.

The approach further capitalizes on existing data collection efforts and available data sources to reduce the need for additional expenditure of resources and facilitate the next required updates of the SMPs.

This monitoring and adaptive management framework strives to answer the following broad management questions related to the implementation of the Coalition SMPs:

1. Are the provisions of the SMP working to maintain "no net loss" of shoreline ecological function during shoreline permit review and approval?

2. Are the provisions of the SMP working to achieve "no net loss" of shoreline ecological functions as a result of shoreline exemption review and approval?

3. Is sufficient mitigation being required during shoreline permit or exemption review and approval in order to achieve "no net loss" of ecological function? This pertains to no net loss of riparian habitat, wetlands, and hydrologic functions.

4. Are changes in land use occurring that are affecting shoreline ecological functions which are within the purview of the SMA but not addressed sufficiently within the SMP?

1.3 Growth Management Act (GMA) Requirements

Under RCW 36.70A.215, the GMA requires that local governments monitor the progress of their comprehensive land use plans by developing and implementing a review and evaluation program to:

> *. . . determine whether a county and its cities are achieving urban densities within urban growth areas by comparing growth and development assumptions, targets, and objectives contained in the countywide planning policies and the county and city comprehensive plans with actual growth and development that has occurred in the county and its cities; and . . . provide for annual collection of data on urban and rural land uses, development, critical areas, and capital facilities to the extent necessary to determine the quantity and type of land suitable for development, both for residential and employment-based activities.*

Amendments to the Growth Management Act (GMA) in 1997 created a review and evaluation program requirement, which is often referred to as the Buildable Lands Program. It is required for six urban counties and the cities within their boundaries and is optional for all others. The six counties are Clark, King, Kitsap, Pierce, Snohomish, and Thurston.

1.4 Shoreline Management Act (SMA) Requirements

As a basic requirement, the SMA under WAC 173-26-191(2)(iii)(D) also requires local governments to document project review actions and changing conditions in shoreline areas as part of their master programs:

> *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 process for periodically evaluating the cumulative effects of authorized development on shoreline conditions.*

2.0 Existing Monitoring Activities

The Clark County Coalition is aware that there are many monitoring activities currently on-going and recognizes that several monitoring programs will be useful in understanding the condition of shoreline functions in this monitoring process. For example, Clark County's Clean Water Monitoring Program described under Section 2.2 will be helpful in the mid-cycle review to inform the assessment of water quality at the watershed scale. However, none of the existing programs were found to specifically achieve the monitoring required to determine the effectiveness of the SMPs.

2.1 GMA Monitoring

Clark Countywide Comprehensive Growth Management Plan Implementation Monitoring

This monitoring program was developed to comply with GMA requirements to annually collect data on urban and rural land uses to ensure adequate supply to meet specific county-wide population and employment targets. In addition to population and jobs, the annual reports track income, housing prices, commercial and industrial development, and housing densities among 10 others. Specific reports on residential and non-residential development and activities in critical areas are produced on a quarterly basis. This information supports the Buildable Lands Program as described below.

Clark Countywide Buildable Lands Program

The Buildable Lands Program offers the opportunity for local governments to coordinate and analyze land supply to make sure that they have enough land for development and to make sure that their comprehensive land use plans are performing as expected.

Under the Buildable Lands Program, local governments monitor the intensity and density of development to determine whether the county and its cities are achieving urban densities sufficient to meet assigned state growth projections. If development does not occur at planned levels, then reasonable measures, other than adjusting urban growth areas, need to be identified and appropriate actions taken.

City of Vancouver Comprehensive Plan Implementation Monitoring

The City's GMA monitoring measures a series of basic, quantifiable indicators within the city and urban growth area and tracks change on an annual basis. A total of 36 indicators are tracked in five different geographic areas in and outside the urban growth area. Development within

critical areas is derived from the Clark Countywide Buildable Lands Program and water quality in Vancouver lakes and streams relies on the Ecology 303(d) list.

2.2 Water Resources Monitoring

Clark County Clean Water Monitoring Program

As part of its NPDES permit Clark County monitors and assesses water quality in its surface waters. It uses a variety of sampling methods at targeted locations. By tracking this data the program assesses the health of county streams, rivers, and lakes.

Stream Health Report

The Stream Health Report is updated periodically by evaluating the chemical and physical condition of water bodies; biological health by determining the health of creatures living in the waterways; and stream flow to determine if there is adequate water quantity to sustain healthy conditions.

Stormwater Needs Assessment Program (SNAP)

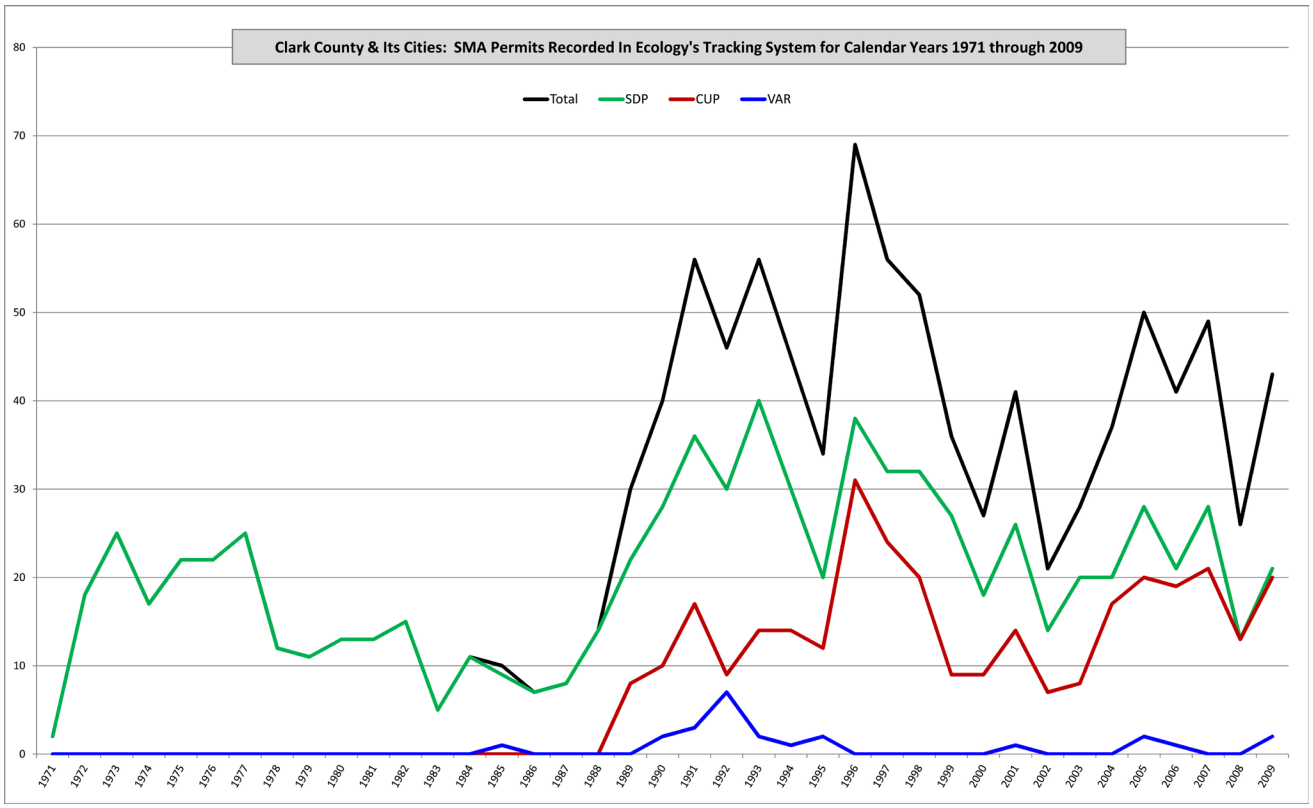
This program is the mechanism fulfilling the County's National Pollutant Discharge Elimination System permit requirement for monitoring the quality of stormwater entering county waterbodies. It assesses watershed conditions, identifies problems and opportunities for stormwater projects in particular, and recommends specific actions to protect and enhance the natural environment countywide. In the latest assessment, 80 miles of stream corridor were inventoried and evaluated for problems and potential solutions. The SNAP is being revised in 2012 to focus more on specific countywide analyses and provide information for more targeted geographic regions within Clark County.

2.3 Permit System Tracking

Clark County and the City of Vancouver are currently using a proprietary electronic permit tracking system known as Tidemark. The City of Vancouver is changing to a new system, Hansen. As with most permit tracking software, the systems allow development agencies to gather data for processing permit applications and enforcement actions. The Tidemark system allows for collection of various types of permits, including shoreline substantial development permits, shoreline variances, shoreline conditional uses, some shoreline exemptions; various critical areas; grading and clearing; as well as enforcement actions specific to shorelines and critical areas. The system is limited in providing information on square footage of land altering activity and specifically activity within the shoreline jurisdiction. Adjustments for new data sets may be possible, but may not be cost effective for the volume of shoreline activity on an annual basis.

The Washington State Department of Ecology has tracked the number of shoreline permits for Clark County and its cities from 1971 to 2009. It appears that on average there are 36 shoreline permits applied for annually (Figure 1). These numbers do not account for activity exempt from the requirements of a shoreline substantial development permit.

Figure 1. Ecology SMA Permit Tracking System – Clark County & Its Cities 1971-2009



2.4 Washington Department of Fish and Wildlife (WDFW)

The County will include habitat and species data from WDFW where applicable. WDFW monitors fish and wildlife and provides periodic updates to the Priority Habitat and Species data available statewide. The PHS data is updated every three years and could be used to indicate general trends in the habitat for priority species in the watershed.

2.5 Lower Columbia Fish Recovery Board (LCFRB)

The LCFRB was established in 1998 through state law (RCW 77.85.200) to oversee and coordinate salmon and steelhead recovery in the Lower Columbia region, including WRIAs 27 and 28 in Clark County. More specifically the LCFRB "coordinates efforts aimed at recovering ESA-listed Chinook, coho, chum, steelhead and bull trout and managing water resources in the Lower Columbia Region." While the LCFRB monitors many of the restoration projects funded with state and federal grant dollars, they also monitor the overall program through a set of sophisticated activities for recovery of the anadromous species listed above. The monitoring is conducted under each of the following program elements:

- Biological Status and Trends Monitoring

- Habitat Status and Trends Monitoring
- Implementation and Compliance Monitoring
- Action Effectiveness Monitoring
- Uncertainty and Validation Research
- Programmatic Evaluation/Adaptive Management

LCFRB anticipates implementation of a habitat status and trends monitoring program, particularly associated with anadromous fish, among other species, which could provide a useful tool for use with the shoreline program monitoring effort.

2.6 Other Programs

There are many other on-going efforts in the region that monitor a wide variety of specific indicators. Since they are not specifically targeted to implementation within the shoreline jurisdiction, their ability to determine effectiveness of the SMP is limited to informing shoreline functional assessment during mid cycle evaluations. Most will be helpful in better understanding health of waterbodies at a watershed scale. Additional monitoring programs and activities can be incorporated into this section in the future should they be found to be helpful for SMP monitoring. To be useful for use during the mid-cycle and legislatively mandated update cycles, such programs and activities should be able to meet the following criteria:

- Must have long-term history;
- Must be consistently conducted; and
- Must be conducted over the same geography.

3.0 Monitoring Component

The monitoring component of this framework is designed to detect changes in shoreline conditions on a periodic basis to determine both short- and long-term trends and to identify immediate course corrections as appropriate.

Planning and permitting agencies generally have limited resources and funds to carry out mandated activities, let alone non-mandated activities. The Clark County Coalition local governments recognized the value in periodic monitoring to facilitate the next mandated update of their SMPs. The Coalition's Monitoring Framework emphasizes the use of existing data collection mechanisms, for ease and consistency, targeted toward priority indicators.

The Clark County Coalition Shoreline Inventory and Characterization Report assessed the condition of each shoreline waterbody by reach, using the functions identified in the shoreline guidelines (WAC 173-26-201(3)(d)) as the basis for the assessment. The characterization examined various indicators in which to make a qualitative assessment to establish the baseline condition of each reach. Of these indicators six were selected from those used in the characterization report as significant attributes of shoreline function.

In order to assess shoreline conditions over the planning horizon, local government monitoring efforts will focus on seven major indicators of change for four major benchmarks: hydrologic, functions, shoreline vegetation, hyporrheic functions, and habitat functions. While these indicators are interrelated among the functions, their categorization serves to increase understanding of the relationship to shoreline functions. The Coalition also selected specific measurements for their ease in data collection by which to gauge the expanse and/or intensity of activity. At the watershed scale, changes in these indicators within the shoreline jurisdiction will help to focus the assessment of waterbodies and adjacent shorelands. These seven indicators, their measurement data to be collected, and their relationship to functions are as follows:

Function	Indicators	Measurement
Hydrologic Functions	• In-water/over water structures • Shoreline structural stabilization	• Sq.ft. increase/decrease of over-water structures • Linear ft. increase/decrease of structural stabilization
Shoreline Vegetation	• Vegetative cover; • Impervious surface	• Acres increased/decreased of vegetative cover • Sq.ft. increase/decrease of impervious surface area
Hyporrheic Functions	• Water quality trends; • Fill in floodplain/wetlands	• County water quality monitoring and State 303d list improved/impaired • Acreage increase/decrease of fill in both floodplains and wetlands
Habitat Functions	• Vegetative cover; • Impervious surface • Habitat trends (salmon recovery)	• Acres increased/decreased of vegetative cover • Sq.ft. increase/decrease • Overall trend data from County, WDFW and LCFRB

Water quality and habitat trends will only be assessed at the watershed level during the mid-SMP update cycle and required 8-year SMP update cycles, from information released by the state, until such time as more frequent information is available locally. Information on the remaining indicators will be collected by the local governments at the time of permit activity and reviewed bi-annually.

Ideally, the monitoring component would consist of four main tasks:

1. Permit Data Collection – The information will assist in assessing changes in shoreline conditions through shoreline permits, exemptions and enforcement actions. This task would be conducted bi-annually to spread the level of effort over the 8-year time frame rather than all at once in 2020 in preparation for the SMA-required update cycle;

2. Bi-annual Data Consolidation and Review – Consolidation of permit data will reflect incremental changes in shoreline areas countywide and will highlight areas to be more closely observed;
3. Mid-SMP Cycle Consolidation and Analysis – Consolidation of permit data and assessment of land cover data through remote sensing techniques, and use of other GIS data sources will begin to identify landscape-scale changes. This analysis will point to the strengths and weaknesses of SMP provisions in a broad context;
4. Required 8-year SMP Update – Consolidation of information gathered and assessed over the 8-year time frame will facilitate assessment of shoreline function and identify effectiveness of the SMPs.

Permit data is one of the basic avenues for acquiring information on development activity. Shoreline permit data would preferably be collected in an automated system that could be immediately accessed by all jurisdictions within the county. This type of on-line database would allow each jurisdiction to contribute information using the same methods and protocol and therefore summary information related to shoreline permits would be consistent and accessible across the county. Automated data collection was originally investigated for this task, however the variety of systems used by the member governments, the complexity of modifying the systems for uniform data sets, and the low volume of permit activity in Clark County suggests that permit **data collection** could initially be conducted manually. As additional resources are made available, use of a web-based database or on-line management system could be explored. Task 1 is proposed to be conducted by each of the Coalition member governments.

The **consolidation and analysis** of the permit data, Tasks 2, 3, and 4 would benefit from being conducted by an entity that could consolidate and assess information at a countywide level. The ability for the Coalition to implement these tasks will depend on available resources and funding. To reduce costs and maintain consistency, these tasks might best be conducted by a college or educational institution or other long-standing non-profit organization. For purposes of this discussion the entity responsible for tasks 2, 3, and 4 is referred to as the Non-Government Organization (NGO).

At this time, the Coalition is only able to commit to Task 1 Permit Data Collection and the required 8-year update under Task 4. In the meantime, the Coalition will continue to seek assistance with the interim measures of implementing Tasks 2 and 3 either through additional resources and funding or through association with other interested entities.

3.1 Permit Data Collection

The term "permit data" in this context is used generally to describe information generated by local government to document water or land-altering activities or proposals at the parcel level, whether an actual "permit" is issued; i.e., permits, letters of exemption, enforcement actions are included in the use of this term. Permit data will be collected to determine the nature and extent of activities conducted or proposed within the shoreline jurisdiction. These data will be designed to answer questions such as:

1. How many shoreline permit applications were filed and issued?
2. How many letters of exemption were filed and issued?

3. How many shoreline permits resulted from a code enforcement action?
4. How many shoreline permits or exemptions were issued in specific shoreline areas?
5. How many new buildable lots were created within shoreline jurisdiction?

For these and other questions, information related to the location of the action should also be collected. Spatial information would answer questions for each action such as:

1. Specifically where is the project located to the parcel?
2. Along which shoreline waterbody is the project located?
3. Within which WRIA and sub-basin is the project located?

This type of data collection could be entered as the activity occurs or at a minimum documented on a bi-annual cycle (2014, 2016, 2018, and 2020). Each local government would be responsible for documenting permit, exemption or violation locations and specifics associated with the compliance review, including maps. The information identified in the forms in Appendix A, Tracking Matrices were selected because they are readily available from standard permit submittal information and consistent with indicators used in evaluating current performance in the Coalition Inventory and Characterization Report. For example "in-water" and "shoreline stabilization" data can assist with understanding changes to hydrologic functions; the "fill", "clearing and grading", and " impervious surface" data will assist in understanding changes in both hyporrheic and habitat functions.

3.2 Bi-Annual Data Consolidation, Review and Reporting

The purpose of this task is to capture site-specific changes that have occurred in specific shoreline areas due to development activities, in context with its larger geographic setting. It is recommended that information collected under Task 3.1 be consolidated on a countywide basis for review by the NGO. This would facilitate a systematic approach to understanding cumulative impacts on shoreline resources in a later phase. The information from the Tracking Matrices (Appendix A) collected by each of the local governments under Section 3.1 would be consolidated and transferred into GIS format for review every two (2) years (2014, 2016, 2018, and 2020). The NGO would then prepare a summary report for each local government with information answering questions such as those listed in Section 3.1, translated into maps and data tables for quick review. The report would assist each member government with status briefings to their planning commissions consistent with the administrative requirements in their updated SMPs.

3.3 Mid-cycle Data Consolidation and Analysis

At the mid-SMP Update cycle stage (four years after SMP adoption or 2016), a preliminary "no net loss assessment" should be conducted countywide by the NGO on the waterbodies where the majority of changes are evident. The purpose of this task is to capture changes that may have occurred at the watershed scale from permitted development (from the bi-annual input under Section 3.2), permit exempt activities, ongoing activities (agriculture) or activities exempt from the SMP (forest practices), and illegal activities not captured through enforcement. Restoration activities, conservation covenants and other information not otherwise documented through

permit tracking would also be collected and analyzed during this mid-cycle task. This data consolidation and analysis will focus on effects to ecological functions and involves the following steps:

- Examining updated aerial photos to identify major, obvious land cover or waterbody changes for additional focus;
- Gathering updated information from key data sources identified in Appendix C and new data as appropriate from other sources as well to detect large-scale changes from baseline conditions and incorporation into Appendix B Inventory and Characterization Tables.

Data gathered under this task will be incorporated into tables similar to those included as samples in Appendix D for those specific waterbodies with obvious change along with data collected under Task 3.2 and analyzed to determine change from 2010 conditions. Large-scale changes from review of air photos, permit activity, and/or other changes in baseline conditions will be analyzed to determine the performance of the selected waterbodies. The assessment will be categorized as follows and documented in the last column of the sample tables included in Appendix D:

- Area of improvement;
- No change;
- Area of concern; and
- Impairment.

The following are suggested criteria for determining the performance of each waterbody reach:

Area of Improvement: To categorize a waterbody and shoreline designation an Area of Improvement, several of the following conditions would apply:

1. Large restoration project was put into place
2. Increase in native vegetative cover
3. Decrease in impervious surface cover
4. Decrease in shoreline structural stabilization
5. Clark County SNAP data documents improvement in indicator functions

No Change: To categorize a waterbody and shoreline designation an area of No Change, several of the following conditions would apply:

1. Large restoration project was put into place while new development occurred
2. No change in native vegetative cover
3. No change in impervious surface cover
4. No change in shoreline structural stabilization
5. No change in Clark County SNAP data
6. No change in Ecology water quality 303(d) listing

Area of Concern: To categorize a waterbody and shoreline designation an Area of Concern, several of the following conditions would apply:

1. Minor net decrease (generally less than 5%) or potential for net decrease in native vegetative cover
2. Minor net decrease (generally less than 5%) or potential for net increase in impervious surface cover
3. Minor net decrease (generally less than 5%) or potential for net increase in shoreline structural stabilization
4. Clark County SNAP documents declining trend in indicator functions
5. Ecology water quality 303(d) listing identified as water of concern

Impairment: To categorize a waterbody and shoreline designation an area of Impairment, several of the following conditions would apply:

1. Decrease in native vegetative cover (indicating or leading to degraded habitat)
2. Increase in impervious surface cover (indicating or leading to diminished capacity of soils to retain water)
3. Increase in shoreline structural stabilization (indicating or leading to reduced shoreline diversity)
4. Clark County SNAP documents impaired indicator functions
5. Ecology water quality 303(d) listing indicates polluted waters

The results of the mid-cycle data consolidation and analysis task would be summarized and provided to each Coalition member government along with any recommended course corrections. The analysis would assess the health of shoreline functions for specific, targeted waterbodies and reaches where permit activity occurred. City/County staff would present the information as status briefings to their planning commissions consistent with the administrative requirements of their updated SMPs and where warranted, incorporate the adaptive management decision process described in Section 4.0 to determine the extent of course corrections are needed, if any. If needed, the course corrections could range widely from educating property owners about vegetation management, to additional training for permit intake staff, to a requirement for an SMP amendment. Technical assistance at these briefings could be provided by the NGO at the request of the local government.

3.4 Required 8-year SMP Update

In preparation for the SMA-required update in 2020, an assessment of shoreline functions modeled after the 2012 Coalition Cumulative Impacts Analysis would be conducted. The purpose of this effort would be to determine if implementation of the individual SMPs resulted in "no net loss" of ecological functions and to determine if amendments to the SMPs would be warranted. This assessment should be conducted early in the update process to inform any needed goal, policy and/or regulatory changes.

The mid-cycle process identified in Section 3.3 would again be repeated in 2020 to assess the health of shoreline functions and incorporate the adaptive management decision process described in Section 4.0 as appropriate.

3.5 Schedule and Task Summary

The following table summarizes the overall schedule and task assignment for the various steps described above.

Year	Task Description	Task Lead	Monitoring Framework Section Reference
2014	Collect permit information and input into tracking matrices	City / County	Section 3.1 Appendix A
	Transfer matrices into GIS	NGO	Section 3.2
	Map permit activities, create data tables, and prepare summary report	NGO	Section 3.2
	Report to Planning Commission	City / County	Section 3.2
2016	Collect permit information and input into tracking matrices	City / County	Section 3.1 Appendix A
	Transfer matrices into GIS	NGO	Section 3.2
	Gather GIS data sources and input results into inventory and characterization tables	NGO	Section 3.3 Appendix B; Appendix C
	Incorporate permit information, data sources, and aerial analysis into CIA tables	NGO	Section 3.3 Appendix D
	Conduct analysis; assign performance category, prepare summary report	NGO	Section 3.3 Appendix D
	Report results to Planning Commission	City / County	Section 3.3
	Initiate adaptive management decision process as appropriate	City/County	Section 4
2018	Repeat tasks from Year 2014	City/County/NGO	Section 3.1 and 3.2
2020	Repeat tasks from year 2016	City/County/NGO	Section 3.4 and Section 4.0

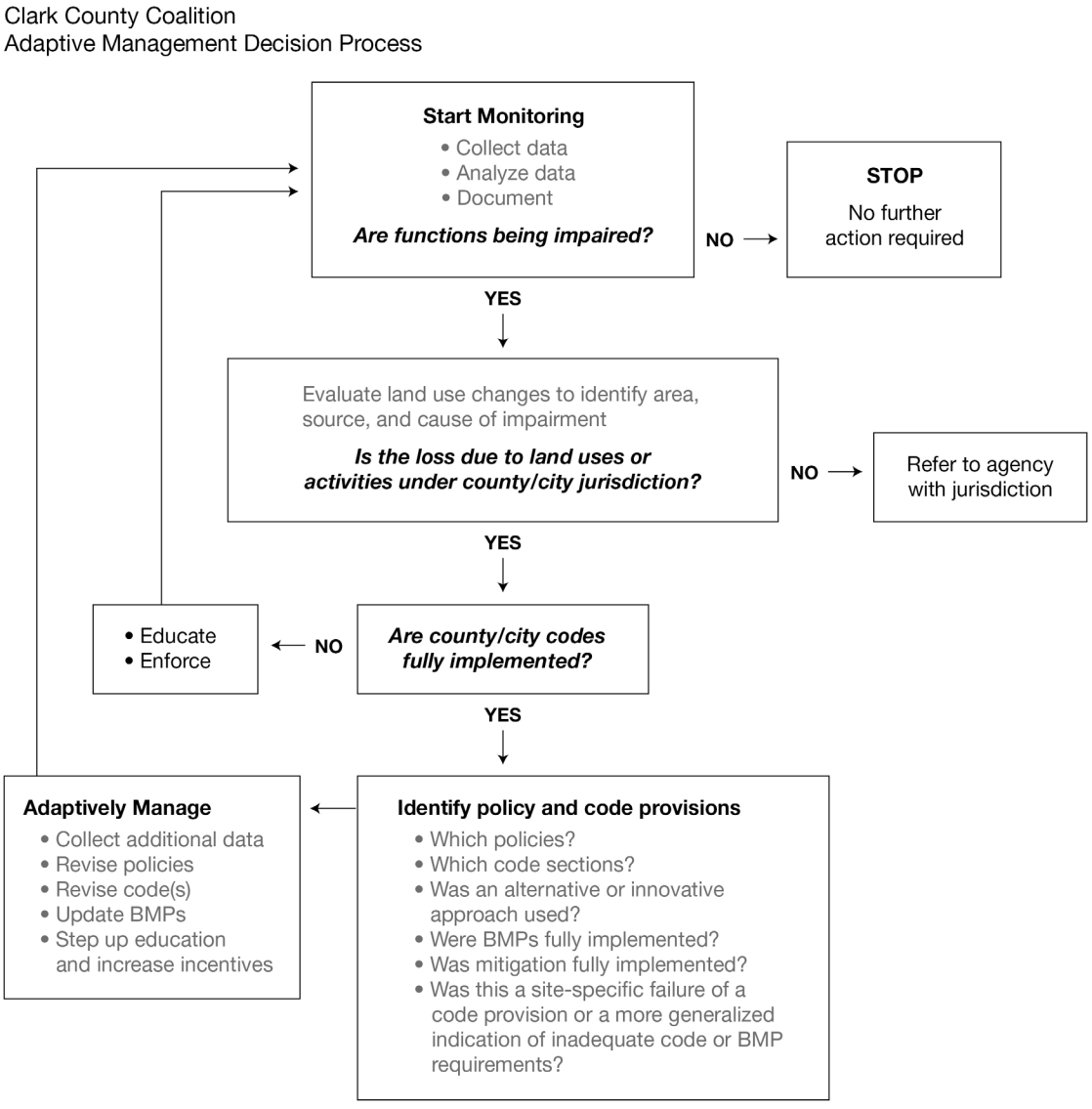
4.0 Adaptive Management Component

The monitoring component of this framework is observation and assessment. The adaptive management component is the process that promotes decision making informed by those observations and assessments. It is an approach that acknowledges that unknowns and uncertainties are inherent in any natural resource management effort, and recognizes the importance of adjusting policies and decisions as part of an iterative process to meet SMP goals.

Based on the changes and assessment of shoreline functions from the bi-annual and mid-SMP Update Cycle monitoring, waterbodies/reaches categorized as Areas of Concern and Impairment

will be evaluated for potential changes in regulations, policies, or other management actions that may or may not be a result of implementing the SMP. Management action could also include the continuation of monitoring to determine a longer-term trend. Oversight for the adaptive management process is provided by the local government, initiated by the Shoreline Administrator or other designated official responsible for the administration of the SMP. The adaptive management decision process is illustrated in Figure 2, below:

Figure 2. Adaptive Management Decision Process



5.0 Summary

The Clark County Coalition Monitoring and Adaptive Management Framework provides an initial approach to monitoring and assessing changes in the shoreline landscape and provides a system for measuring the effectiveness of the SMPs. The monitoring component informs decision makers on which changes to policies and regulations are needed to maintain the overall SMP goal of no net loss of shoreline ecological functions. In some cases this may not require amendments to policy and/or regulations but may only involve clarifying legislative intent or instituting changes in protocols or processes. The Clark County Coalition Inventory and Characterization report established the baseline reference conditions, the Coalition Cumulative Impacts Analysis identified potential indicators for observation; the bi-annual and mid-SMP Update Cycles will provide adequate checkpoints to make course corrections as appropriate and will facilitate and validate the next update of Clark Coalition SMPs required in 2020.

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Appendix A

Permit Tracking Matrices

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Table A-1. Clark County Coalition SMP Monitoring Program - City of _____ 20XX Permit Tracking

	Permit No.	**Type** (SSDP, CU, Var)	**Shoreline Waterbody**	**Shoreline Designatn**	**Assessor Parcel No.**	**General Description** (attach map)	**In-Over-water** (Dock/Float:sq.ft; Piles: no.)	**Shoreline Stabilztn** (Bulkhead/Rip Rap/Soft: lin.ft)	**Fill** (Fldpln/ Wetland :sq.ft)	**Clring/ Grding** (sq.ft)	**Imperv Surface** (sq.ft.)	**Mitigation** On/Off-site: parcel number & sq./lin.ft.
A												
B												
C												
D												
E												
F												
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W												
X												
Y												
Z												

Table A-2. Clark County Coalition SMP Monitoring Program - City of _____ 20XX Exemption Tracking

	Exemption Letter No.	**Building Permit No.**	**Shoreline Waterbody**	**Shoreline Designatn**	**Assessor Parcel No.**	**General Description** (SingleFamily; Maintenance; Replacement in-kind; Restoration; Other) attach map	**In-Over-water** (Dock/Float:sq.ft; Piles: no.)	**Shoreline Stabilization** (Bulkhead/RipRap/Soft: lin.ft)	**Fill** (Fldpln/Wetland :sq.ft)	**Clring/Grding** (sq.ft)	**Imperv Surface** (sq.ft.)	**Mitigation** (On/Off-site: address & sq./lin.ft)
A												
B												
C												
D												
E												
F												
G												
H												
I												
J												
K												
L												
M												
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Table A-3. Clark County Coalition SMP Monitoring Program - City of _____ 20XX Violation Tracking

	Violation No.	**Type** (zng; CAO; bldg;)	**Shoreline Waterbody**	**Shoreline Deisgntion**	**Assessor Parcel No.**	**General Description** (attach map)	**In-Over-water** (Dock/Float:sq.ft; Piles: no.)	**Shoreline Stabilization** (Bulkhead/RipRap/Soft: lin.ft)	**Fill** (Fldpln/ Wetland :sq.ft)	**Clring/ Grding** (sq.ft)	**Imperv Surface** (sq.ft.)	**Remedy** (On/Off-site: address & sq/lin ft.)
A												
B												
C												
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Appendix B

Bi-annual and Mid-SMP Cycle Countywide Characterization - Sample (I&C Table)

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Reach	Watershed Characterization (Ecology)	Integrated Watershed Assessment (IWA)	EDT Model Tier	CMZ, Hazards, Critical Aquifers	Associated Wetlands	Water Quality Assessment	Priority Habitat and Species Data	Riparian Habitat Quality	Modifications	Existing Uses in Shoreline Planning Areas	Land Cover	Ecological functions
Waterbody: Lower Columbia River												
COLU_RV_01 (1,678 ac)	Priority Protection and Restoration Management Zone – Important area for discharge, storage and nitrogen removal processes. Processes are relatively intact and restoration has a high level of success. **Mid-SMP update cycle review:**	n/a	Tier 4 Lake River and tidal section of E Fork Lewis River **Mid-SMP update cycle review:**	Area flooded in 1996 Flood, Flood hazard, no critical aquifer	399 acres; (75% High Quality) **Mid-SMP update cycle review:**	Impaired temperature, dissolved oxygen, fecal coliform Impaired by Invasive Exotic Species **Mid-SMP update cycle review:**	m,r – all anadromous salmonid species; eulachon, white sturgeon, green sturgeon, mountain whitefish and coastal cutthroat trout. Waterfowl concentrations; great blue heron. Multiple nest sites – bald eagle and osprey **Mid-SMP update cycle review:**	Forested zone varies from non-existent to 200 feet or wider. Ranges from degraded to moderate quality. High quality riparian on northern half of Bachelor Island **Mid-SMP update cycle review:**	1 mapped dock/pier Dredging **Mid-SMP update cycle review:**	SF – Residential; 100%	0% Developed 4% Agricultural pastures 11% Beach shore and sand 37% Marsh or swamp 48% Floodplain and riparian **Mid-SMP update cycle review:**	Hydrologic: High Riparian: Moderate Hyporheic: Moderate Habitat: High Tidal influence, major migratory route for salmonids, high quality wetlands, multiple PHS, and next to Ridgefield National Wildlife Refuge
COLU_RV_02 (7,489 ac)	Priority Protection and Restoration Management Zone – Important area for discharge, storage and nitrogen removal processes. Processes are relatively intact and restoration has a high level of success. **Mid-SMP update cycle review:**	n/a	No Tier **Mid-SMP update cycle review:**	Area flooded in 1996 Flood	1,735 acres; (16% High Quality) **Mid-SMP update cycle review:**	Polluted sediments; PCB, bioassay Temperature is a concern Invasive Exotic Species in Caterpillar Slough **Mid-SMP update cycle review:**	m,r – all anadromous salmonid species; white sturgeon, green sturgeon, mountain white fish and coastal cutthroat trout. Waterfowl concentrations; great blue heron; dusky Canada goose; Multiple nest sites – bald eagle and osprey. 1 rare plant species documented by WNHP. **Mid-SMP update cycle review:**	Forested zone varies from non-existent to 200 feet or wider. Ranges from degraded to moderate quality. **Mid-SMP update cycle review:**	Conversion to agricultural and industrial lands Roadways and railways Hard armoring 27 mapped docks/piers and 1 mapped buoy Kadow's Marina – 100 slips for recreational moorage and 18 slips for floating homes Sand/gravel mining **Mid-SMP update cycle review:**	Vacant: 40% SF Residential: 35% Mobile Home: 13%	8% Developed 67% Agricultural pastures 19% Marsh or swamp 6% Floodplain and riparian **Mid-SMP update cycle review:**	Hydrologic: High Riparian: Low to Moderate Hyporheic: High Habitat: High Tidal influence, large expanses of floodplain and wetlands along river. Multiple PHS species indicating habitat is provided.

COLU_RV_03 (3,930 ac)	Restoration and Development Management Zone – Moderate importance for hydrology and nitrogen removal processes with High impairment. **Mid-SMP update cycle review:**	n/a	Tier 1 Tidal section of Washougal River **Mid-SMP update cycle review:**	Springs along a 6 mile stretch of the river from hillsides	593 acres (7% High Quality) **Mid-SMP update cycle review:**	Impaired: temperature, dissolved oxygen TMDL (by Lady Island): Dioxin **Mid-SMP update cycle review:**	All species of anadromous fish; Multiple nest sites – bald eagle and osprey; peregrine falcon; purple martin. Leopard dace. 1 rare plant species documented by WNHP. **Mid-SMP update cycle review:**	Degraded and lacks vegetation through Port of Vancouver and downtown Vancouver. Forested vegetation at the Water Resources Center and scattered patches to the east. **Mid-SMP update cycle review:**	69 mapped docks/piers Port of Vancouver operations Steamboat Landing Marina has 153 slips (uncovered moorage) 9 bridges cross the river Roadway and railway parallel majority of shoreline Hard armoring Conversion to industrial and residential lands **Mid-SMP update cycle review:**	MF Residential: 38% Industrial: 28% Public facility: 8%	40% Developed 30% Agricultural pasture 22% Coniferous forest, mixed 4% Marsh or swamp **Mid-SMP update cycle review:**	Hydrologic: High Riparian: Low Hyporheic: Moderate Habitat: Moderate Developed shoreline through downtown Vancouver to Camas. Tidal influence at mouth of Washougal River.

Appendix C

Data Sources for Countywide Monitoring

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Theme	Data Layer	Description	Source	Date(s)	Plans to update	Additional Comments/Links
Shoreline Modifications	WDNR Overwater Structures	The Overwater Structures River layer is made up of thousands of digitized overwater structures such as docks, bridges, floats, structural support fill, and other structures such as floating homes. Structures were digitized from three (3) foot/one (1) meter resolution color orthophotos taken between 2002 to 2006. Mapping is completed for Marine, Lakes and River systems.	WDNR	2009	unknown	http://fortress.wa.gov/dnr/app1/dataweb/metadata/OWS_Marine_metadata.htm
Forest Cover / Impervious Surface	CCAP Land Use/Land Cover	Regional land cover information from 2006 at a 30m spatial resolution cell size. This layer provides over 20 cover types (classes) including forest cover and impervious surface.	NOAA	2001, 2006 (provided in 2009)	Yes (2012)	http://www.csc.noaa.gov/crs/lca/pacificcoast.html
Forest Cover/Impervious Surface	GAP Analysis Land Cover	Land cover mapping for the NW region using 30m spatial resolution cell size. The purpose of this research was to map provide seamless landcover information for the NW region that included natural and semi-natural vegetation classes derived from NatureServe's Ecological System Classification.	GAP	2009	unknown	http://lc.gapanalysisprogram.com/landcoverviewer/Map.aspx
Critical Areas	Local Wetland Inventories	This layer provides regularly updated information on the spatial extent of wetlands delineated in the county. The layer can be queried by date to determine if there have been changes to the wetland areas over time.	County/Cities	Updated regularly	Yes	Are wetlands impacted by development activities remapped to include new boundaries? Are mitigation sites mapped and included in this inventory as well?
Critical Areas	Priority Habitats and Species (PHS)	WDFW PHS information on priority habitats and species.	WDFW	Updated regularly	Yes	http://wdfw.wa.gov/conservation/phs/

Theme	Data Layer	Description	Source	Date(s)	Plans to update	Additional Comments/Links
Water Quality	303D listed waterbodies	Washington State's 2008 Water Quality Assessment (WQA) is produced in the Environmental Protection Agency's "Integrated Report" format. The WQA consists of both the 303(d) List and the 305(b) Report. The 303(d) List is comprised of only Category 5 listings. The 305(b) Report lists all waters and all categories. The 2008 WQA is presented on the 1:24k LLID (Longitude/Latitude ID) hydro layer.	Ecology	2008	Yes (4-year cycle)	http://www.ecy.wa.gov/programs/wq/303d/index.html
Air Photo	NAIP Imagery	Ortho-photo (1-m resolution)	USDA (NAIP Program)	2009	Yes (4-year cycle)	http://www.fsa.usda.gov/FSA/apfoapp?area=home&subject=prog&topic=nai
Ecosystem Diagnosis and Treatment (EDT)	EDT Reaches	Prioritization for protection/restoration efforts (Tiers) for fish-bearing stream reaches.	Lower Columbia River Fish Recovery Board	2005, 2006, 2008	unknown	http://www.lcfrb.gen.wa.us/default1.htm
Stormwater Needs Assessment Program (SNAP)	SNAP geodatabase (feature inventory)	Identifies water quality, CIP and restoration activities in select areas in the County	Clark County	2009/2010	unknown	

Appendix D

Shoreline Functions Assessment - Sample (CIA Table)

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WRIA 28 Draft Current and Future Performance of Shoreline Ecological Functions

The following table describes the existing performance of shoreline ecological functions along Clark County shorelines as described in the Shoreline Inventory and Characterization Report (ESA Adolfson, 2010). Regulations from the Clark County Coalition Draft SMP (June 2011) that protect ecological functions are identified along with programmatic opportunities from the Draft Restoration Plan (ESA Adolfson, 2011). The future performance is then assessed based on the type and amount of expected development (foreseeable development) in the shoreline, the level of protection the proposed SMP regulations provide, and restoration opportunities. Specific opportunities for restoration are outlined in the Restoration Plan. Current performance of shoreline ecological functions are ranked "low", "moderate", and "high" depending on the level of alteration along the shoreline. Future performance is ranked "No Loss" and "Potential for Loss" depending on the expected changes from existing conditions over the next twenty years. TO BE UPDATED

Waterbodies and Shoreline Designations	**2010 Conditions** *Shoreline Inventory and Characterization Report - ESA Adolfson, June 2010*	**2010 Performance** *Shoreline Inventory and Characterization Report - ESA Adolfson, June 2010*	**Foreseeable Development**	**Development and Restoration Activities - 2014**	**Development and Restoration Activities - 2016**	**Development and Restoration Activities - 2018**	**Performance Category per Framework** *(no change, area of concern, area of impairment, area of improvement)*
Columbia River							
Natural Natural	**Reach 1**: Tier 4, tidal influence; flood hazard; wetlands; water quality impaired for temperature, dissolved oxygen, fecal coliform and invasive exotic species; waterfowl concentrations, great blue heron, multiple nest sites for bald eagle and osprey; forested riparian zone varies from non-existent to 200 feet or wider, high quality riparian on northern half of Bachelor Island; dredging. **Reach 3**: Tier 1; tidal; wetlands; impaired water quality for temperature and dissolved oxygen and dioxin; forested riparian zone with some cleared areas; Marine Park. **Reach 5**: Wetlands; flood hazards; impaired water quality for temperature and dioxin; waterfowl concentrations, purple martin and wood duck nesting sites; developed areas with impervious surfaces; conversion to industrial lands. **Mid-SMP update cycle review:** **[THIS IS WHERE THE CHANGES DOCUMENTED IN THE ICR TABLE WOULD BE TRANSFERRED OVER]**	Reach 1: High hydrology and habitat; moderate riparian and hyporheic Reach 3: High hydrology; moderate riparian, hyporheic and habitat. Reach 5: High hydrology and habitat; Moderate hyporheic; Low riparian. **Mid-SMP update cycle review:** **[THIS IS WHERE THE CHANGES DOCUMENTED IN THE ICR TABLE WOULD BE TRANSFERRED OVER]**	Vacant Residential: 184 ac (17%) 3 potential residential units Under Public ownership: 624ac (59%) Exempt lands: 238ac (22%)	**Number and type of shoreline permits:** **Number and type of enforcement actions:** **Number and type of restoration activities:** **Amount of property under enforcement action or permit activity (in acres and number of parcels):** **Amount of properties restored (in acres and number of parcels):** **Amount of native vegetation removed (include percent high quality):** **Amount of native vegetation planted:**	**Number and type of shoreline permits:** **Number and type of enforcement actions:** **Number and type of restoration activities:** **Amount of property under enforcement action or permit activity (in acres and number of parcels):** **Amount of properties restored (in acres and number of parcels):** **Amount of native vegetation removed (include percent high quality):** **Amount of native vegetation planted:**	**Number and type of shoreline permits:** **Number and type of enforcement actions:** **Number and type of restoration activities:** **Amount of property under enforcement action or permit activity (in acres and number of parcels):** **Amount of properties restored (in acres and number of parcels):** **Amount of native vegetation removed (include percent high quality):** **Amount of native vegetation planted:**	**Mid-SMP Update Cycle Review:** **2020 Required 8-Year SMP Update:**

Waterbodies and Shoreline Designations	**2010 Conditions** *Shoreline Inventory and Characterization Report - ESA Adolfson, June 2010*	**2010 Performance** *Shoreline Inventory and Characterization Report - ESA Adolfson, June 2010*	**Foreseeable Development**	**Development and Restoration Activities - 2014**	**Development and Restoration Activities - 2016**	**Development and Restoration Activities - 2018**	**Performance Category per Framework** *(no change, area of concern, area of impairment, area of improvement)*
				Amount of wetland impacts (include percent high quality): **Amount of wetland buffer impacts:** **Amount of wetland creation:** **Amount of new impervious surface:** **Amount and type of new structural stabilization (lineal feet):** **Amount and type of new overwater structures:**	**Amount of wetland impacts (include percent high quality):** **Amount of wetland buffer impacts:** **Amount of wetland creation:** **Amount of new impervious surface:** **Amount and type of new structural stabilization(lineal feet):** **Amount and type of new overwater structures:**	**Amount of wetland impacts (include percent high quality):** **Amount of wetland buffer impacts:** **Amount of wetland creation:** **Amount of new impervious surface:** **Amount and type of new structural stabilization (lineal feet):** **Amount and type of new overwater structures:**	
High Intensity	**Reaches 2 and 3**: Tier (reach 3); tidal influence; flood hazards; polluted sediments: PCB and bioassay, temperature is a concern (reach 2) or impaired (reach 3), invasive exotic species in Caterpillar Slough, impaired for dissolved oxygen and dioxin (reach 3); waterfowl concentrations, oak woodlands; wetlands; riparian zone varies with some areas entirely developed with impervious surface, others in pasture lands (near Vancouver Lake) or forested (Lady Island); numerous	Reach 2 and 3: High hydrology; Moderate hyporheic; Low to moderate habitat and riparian Reach 4: Moderate hydrology; Low hyporheic, riparian and habitat	Vacant Commercial: 15 ac (1%) Vacant Industrial: 1,573 ac (63%)	**Number and type of shoreline permits:** **Number and type of enforcement actions:**	**Number and type of shoreline permits:** **Number and type of enforcement actions:**	**Number and type of shoreline permits:** **Number and type of enforcement actions:**	**2014 Bi-annual Review:** **Mid-SMP Update Cycle Review:**

Waterbodies and Shoreline Designations	**2010 Conditions** *Shoreline Inventory and Characterization Report - ESA Adolfson, June 2010*	**2010 Performance** *Shoreline Inventory and Characterization Report - ESA Adolfson, June 2010*	**Foreseeable Development**	**Development and Restoration Activities - 2014**	**Development and Restoration Activities - 2016**	**Development and Restoration Activities - 2018**	**Performance Category per Framework** *(no change, area of concern, area of impairment, area of improvement)*
	docks and piers, conversion to agricultural and industrial lands, hard armoring, and multiple roadway and railway bridge crossings. **Reach 4**: limited wetlands; impaired water quality for temperature; little to no vegetation; Port of Camas-Washougal Boat Ramp and Marina (356 moorage slips-most covered, 1,200 linear feet of linear moorage, boat launch, armoring) **Reach 5**: Wetlands; flood hazards; impaired water quality for temperature and dioxin; waterfowl concentrations, purple martin and wood duck nesting sites; developed areas with impervious surfaces; conversion to industrial lands. **Mid-SMP update cycle review:** **[THIS IS WHERE THE CHANGES DOCUMENTED IN THE ICR TABLE WOULD BE TRANSFERRED OVER]**	Reach 5: High hydrology and habitat; Moderate hyporheic; Low riparian. **Mid-SMP update cycle review:** **[THIS IS WHERE THE CHANGES DOCUMENTED IN THE ICR TABLE WOULD BE TRANSFERRED OVER]**	Underutilized Industrial: 1114 ac (5%) Under Public ownership: 129 ac (6%)	**Number and type of restoration activities:** **Amount of property under enforcement action or permit activity (in acres and number of parcels):** **Amount of properties restored (in acres and number of parcels):** **Amount of native vegetation removed (include percent high quality):** **Amount of native vegetation planted:** **Amount of wetland impacts (include percent high quality):** **Amount of wetland buffer impacts:** **Amount of wetland creation:**	**Number and type of restoration activities:** **Amount of property under enforcement action or permit activity (in acres and number of parcels):** **Amount of properties restored (in acres and number of parcels):** **Amount of native vegetation removed (include percent high quality):** **Amount of native vegetation planted:** **Amount of wetland impacts (include percent high quality):** **Amount of wetland buffer impacts:** **Amount of wetland creation:**	**Number and type of restoration activities:** **Amount of property under enforcement action or permit activity (in acres and number of parcels):** **Amount of properties restored (in acres and number of parcels):** **Amount of native vegetation removed (include percent high quality):** **Amount of native vegetation planted:** **Amount of wetland impacts (include percent high quality):** **Amount of wetland buffer impacts:** **Amount of wetland creation:**	**2018 Bi-annual Review:**

Waterbodies and Shoreline Designations	**2010 Conditions** *Shoreline Inventory and Characterization Report - ESA Adolfson, June 2010*	**2010 Performance** *Shoreline Inventory and Characterization Report - ESA Adolfson, June 2010*	**Foreseeable Development**	**Development and Restoration Activities - 2014**	**Development and Restoration Activities - 2016**	**Development and Restoration Activities - 2018**	**Performance Category per Framework** *(no change, area of concern, area of impairment, area of improvement)*
				Amount of new impervious surface: **Amount and type of new structural stabilization (lineal feet):** **Amount and type of new overwater structures:**	**Amount of new impervious surface:** **Amount and type of new structural stabilization(lineal feet):** **Amount and type of new overwater structures:**	**Amount of new impervious surface:** **Amount and type of new structural stabilization(lineal feet):** **Amount and type of new overwater structures:**	