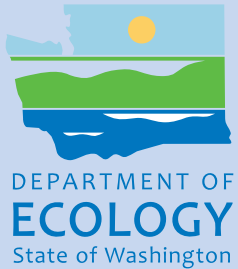




# Summary of Watershed Characterization and Analysis Project for Clark County

---



DEPARTMENT OF  
**ECOLOGY**  
State of Washington

January 2009  
Washington State Department of Ecology  
Ecology Publication No. 09-06-003

## Publication and Contact Information

This report is available on the Department of Ecology's website at [www.ecy.wa.gov/biblio/0906003.html](http://www.ecy.wa.gov/biblio/0906003.html)

For more information contact:

Publications Coordinator  
Shorelands and Environmental Assistance Program  
P.O. Box 47600  
Olympia, WA 98504-7600

E-mail: [tisc461@ecy.wa.gov](mailto:tisc461@ecy.wa.gov)  
Phone: (360) 407-6096

Washington State Department of Ecology - [www.ecy.wa.gov/](http://www.ecy.wa.gov/)

- Headquarters, Olympia (360) 407-6000
- Northwest Regional Office, Bellevue (425) 649-7000
- Southwest Regional Office, Olympia (360) 407-6300
- Central Regional Office, Yakima (509) 575-2490
- Eastern Regional Office, Spokane (509) 329-3400

*If you need this publication in an alternate format, call the Publications Coordinator at (360) 407-6096. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.*

# **Summary of Watershed Characterization and Analysis Project for Clark County**

---

Prepared for Ecology by  
Neil Aaland, Aaland Planning Services, Inc.

Shorelands and Environmental Assistance Program  
Washington State Department of Ecology  
Olympia, Washington 98504-7710



## Table of Contents

### Executive Summary

Introduction.....	1
Purpose.....	2
1. Watershed Characterization.....	3
1.1. What It Is.....	3
1.2. How It Can Be Used.....	4
1.3. How It Fits With Existing Planning Programs.....	5
2. Background.....	7
2.1. National.....	7
2.2. State.....	8
2.3. Local.....	10
3. Clark County Characterization.....	12
4. Other Recent Characterizations.....	18
4.1. Whatcom County.....	18
4.2. Jefferson County.....	19
5. Interviews with Characterization Participants.....	20
6. Conclusions and Recommendations.....	25

### Appendices

- A. List of Interview Questions
- B. List of Staff Interviewed

## Executive Summary

The Washington Department of Ecology (Ecology) has developed a “watershed characterization” tool. Watershed characterization is a method for assessing and understanding watershed processes at a broad scale. It allows communities to identify and prioritize areas within specific watersheds where aquatic resources can still be successfully restored or protected. To develop the tool, Ecology has been conducting watershed characterization pilot projects. The most recent pilot projects have been conducted in Clark, Jefferson, and Whatcom counties. Ecology wants to know how useful these watershed characterizations are in providing information that can help improve environmental mitigation.

This report was commissioned to interview recent participants in the pilot characterizations, evaluate the recent characterizations, and make recommendations to Ecology on the value of characterizations and any changes needed. Nine people were interviewed who had recently participated in characterizations. Seven respondents were from local government agencies and two were from consulting firms. The results of the interviews show strong support for watershed characterizations. There was nearly unanimous agreement that watershed characterizations are useful and Ecology should continue to develop the tool, and to support local governments as they conduct characterizations.

This report concludes:

- Watershed Characterization is a very useful tool for local governments at the “coarse-scale”, or broad scale.
- Watershed Characterization is limited in its ability to provide information at the site-specific level.
- Ecology’s watershed characterization model is not the tool to use for nearshore and habitat resources (but should be considered as part of an overall “toolbox” for developing watershed management plans).

Recommendations are:

- Ecology should continue to support watershed characterization.
- Ecology needs to help local governments take watershed characterization to the next level.
- Ecology should consider supplementing the existing guidance document on watershed characterizations.
- Ecology’s participation in the multi-agency work group will be important in further evolution of the watershed characterization tool.
- Ecology should specifically market watershed characterization as a tool to help with several products, including Shoreline Master Program (SMP) updates and wetland mitigation programs (including mitigation banking).

## **Introduction**

The Washington Department of Ecology (Ecology) is working to help local communities and natural resource managers better protect aquatic resources. To this end, Ecology has developed a “watershed characterization” tool. This tool allows communities to identify and prioritize areas within specific watersheds where aquatic resources can still be successfully restored or protected.

In the late 1990s, the Shorelands and Environmental Assistance Program in Ecology undertook a pilot watershed characterization working with Snohomish County. Since then, Ecology has continued to invest staff resources in further refining its watershed characterization approach.

In the past several years Ecology has conducted, or assisted in conducting, watershed characterization projects in Whatcom, Jefferson and Clark Counties. The most recent effort has been conducted in Clark County. Ecology’s goal in assisting with or conducting characterizations is to provide a relatively easy and inexpensive tool for local governments to use in:

- Developing watershed based land use plans and regulations, including comprehensive plans, Shoreline Master Program (SMP) updates, and Critical Areas Ordinances (CAOs).
- Developing better environmental mitigation and restoration plans.

With each characterization, Ecology’s approach has evolved. The characterization prepared for Snohomish County was done by a larger team of Ecology staff, with some assistance from Snohomish County. This initial characterization was comprehensive and required over a year to complete. The methods developed were then modified to address local government planning and permitting needs. This resulted in a method that was rapid and within the budget of most local governments.

The revised methods were next applied in Whatcom and Jefferson Counties. Ecology served in a support and assistance role, as part of the team rather than in the lead. Finally, a characterization was undertaken in Clark County. This effort was led primarily by Ecology staff, coordinating and getting review and comments from Clark County staff.

## **Purpose**

Ecology has begun the Mitigation That Works initiative to improve the success of environmental mitigation. The agency believes watershed characterization can be an important part of this initiative. This report evaluates how characterizations have been working and whether analyses conducted to date are proving to be useful to local communities.

The scope of this study was to:

- a. Interview local government staff regarding their experiences in working with Ecology to conduct or participate in the preparation of a characterization.
- b. Review and evaluate the process and product resulting from the Clark County characterization. This is not a detailed technical review, but rather a general evaluation aimed at determining how useful the product is for local planning efforts.
- c. Prepare an easy-to-read summary that will give decision-makers and local communities the information they need to determine whether to use watershed characterization in their planning and permitting programs.



# 1. Watershed Characterization

## 1.1 What It Is

Watershed characterization is a method for assessing and understanding watershed processes. Ecology produced a guidance document<sup>1</sup> on conducting watershed characterizations. This document defines watershed processes as “the delivery, movement, and loss of water, sediment, nutrients, toxins, pathogens, and large woody debris.” The delivery, movement and loss of water, sediment and woody debris, play a central role in determining the physical structure of wetlands and streams. This, in turn, controls the number and kinds of species that will be present. Therefore, understanding watershed processes at a broader scale, rather than a site scale, is key to sustaining aquatic resources.

There are different methods for conducting characterizations, as no singular standard exists. The methodology depends on the specific goals that an agency conducting a characterization has established. Generally, the goal of watershed characterization, as defined here, is to develop an understanding of where the important areas are that control watershed processes and the relative degree to which the processes have been altered. This provides a broader context for understanding the problems affecting a specific site.

Mitigation and restoration projects are often done on a site-specific scale without fully understanding the source of the problem. The source is often located upgradient within the contributing watershed. For example, if fine sediment build-up in one portion of a stream is removed in order to improve salmon spawning, but the source of the fine sediment is from upstream landslides due to improperly designed development, the sediment build-up will continue and the restoration effort will likely fail. By understanding watershed processes and the functions provided in the watershed, the likelihood for success increases.

Another example is the recent guidance on locating mitigation banks. The Mitigation Bank Review Team (MBRT), which includes Ecology, U.S. Army Corps of Engineers – Seattle District, and the U.S. Environmental Protection Agency, Region 10, have issued a guidance document intended to help locate appropriate areas for wetland mitigation banks. This guidance document “Guidance on Locating Mitigation Banks using a Landscape-Based Approach” (May 2007) is based on Ecology’s watershed characterization guidance. The MBRT document is “not a substitute for a full characterization of watershed processes, but it is adequate for the purposes of determining the most appropriate areas for mitigation banks. This illustrates that there are different methods of conducting watershed characterization, and the use of a particular method depends upon the end result desired.

---

<sup>1</sup>Page v, Stanley, S., J. Brown, and S. Grigsby. 2005. Protecting Aquatic Ecosystems: A Guide for Puget Sound Planners to Understand Watershed Processes. Washington State Department of Ecology. Publication #05-06-027. Olympia, WA.

Ecology is viewing watershed characterization as part of a “toolbox” approach. There are individual tools that work at different scales (broad/coarse, mid and fine or site scales), and applied together provide a more complete picture of what planning and regulatory measures should be. This information can help in the development of a comprehensive watershed management plan, as is presently being done for Birch Bay in Whatcom County.

The following table illustrates the different uses of tools in the “toolbox”:

Toolbox Approach to Watershed Characterization

(Figure modified from a presentation prepared by Stephen Stanley and Susan Grigsby)

	Tools	Application/Benefit
Broad scale (coarse scale)	Ecology Watershed Characterization Guidance	Describe, identify, and map processes that drive site functions
Mid Scale	Ecology Characterization Scoring Methods	Identify areas for protection and restoration
Fine scale	<ul style="list-style-type: none"> <li>• Ecology Wetland Assessment</li> <li>• WDFW Wildlife Method</li> <li>• Ecology Wetland Rating System</li> <li>• BAS Wetlands - Volume 2</li> </ul>	Assess functions, assure protection of wetland functions and no net loss, and determine guilds (groupings) of wildlife species

### 1.2 How It Can Be Used

Watershed characterization can help provide baseline information for a wide range of planning efforts, from mitigation plans for a specific site to broader plans aimed at guiding future mitigation requirements for multiple projects. At the broader planning level, this can include updates of comprehensive plans and critical areas ordinances and updates of shoreline master programs. In general, it can provide information at a broader, overview level that can then be used to guide work at a site-specific level.

**For site-specific plans** for compensatory mitigation, it is important to understand the setting in which the mitigation project will be conducted. This means understanding:

- Local conditions that may lead to either success or failure of mitigation projects.
- Ongoing environmental problems such as erosion and sediment deposition.
- The present status of habitat loss or protection.

Watershed characterization fits within the approach<sup>2</sup> recommended by Ecology and other agencies for preparing site-specific mitigation plans. This approach suggests that a

---

<sup>2</sup> Washington State Department of Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. March 2006. Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Version 1). Washington State Department of Ecology Publication #06-06-011b. Olympia, WA.

conceptual mitigation plan be prepared, describing goals, site locations, and design alternatives without identifying specific details. Watershed characterization can provide important background information for these conceptual plans. It can either help ensure the success of mitigation projects, or identify other more suitable (perhaps off-site) locations for compensatory mitigation.

**For broader mitigation plans and strategies**, watershed characterization is a good starting point. It provides a basic level of information that can be expanded upon as necessary. This is often referred to as a “coarse-scale approach”. Additional work can be done at a site-specific scale to gather detailed information. Watershed characterization can provide the background needed for comprehensive plans.

### **1.3 How It Fits with Existing Planning Programs**

Watershed characterization can provide useful information for many different planning programs. For example, the Growth Management Act (GMA) requires counties to meet certain growth rate and population criteria, and the cities within them, to prepare **comprehensive plans** meeting specified state guidelines. An early step in preparing a comprehensive plan is to gather baseline information and prepare inventories.

The typical background information used in preparing or revising comprehensive plans includes an inventory of existing land uses; parks; wetlands and streams. Watershed characterization can provide additional information about existing problem areas and potential causes, as well as identify key areas that should be considered for protection and/or restoration. It also can be useful when decisions are being made, for example, about future land uses; type, location, density and design of development.

Another requirement of the GMA, which applies to all cities and counties in the state, is the preparation of a **Critical Areas Ordinance (CAO)**. A CAO regulates development affecting critical areas within a jurisdiction. Critical areas are defined by statute to include wetlands, critical recharge aquifers, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas. A watershed characterization could inform the specific level of protections needed for a CAO.

For example, a watershed characterization for a city could show that the most important wetlands within a watershed are located outside of its jurisdictional boundary. That might mean that the jurisdiction should develop a program within its CAO to allow for off-site mitigation. It could direct mitigation to the wetland area identified as important.

Another example is a finding that there are headwater basins in the city critical to maintaining recharge and discharge to downstream aquatic resources. In this instance, based on that information, the city could enact more restrictive regulations to protect or preserve those areas. This could include development standards that require clustering of development through use of density bonuses and protection/restoration of forested areas in order to facilitate recharge.

In both of these cases, a watershed characterization could provide much of the information needed to make development decisions. Since it does not provide information on habitat, it would need to be paired with other information, such as that generated by the Washington Department of Fish and Wildlife's wildlife landscape tool (see Conclusions and Recommendations, Conclusion #3, for discussion of this tool).

**Shoreline Master Program (SMP) updates** are another planning program that can benefit from watershed characterization. Cities and counties are required, on a revolving schedule, to update their SMPs in conformance with the new Shoreline Guidelines (WAC 173-26) adopted by Ecology in 2003. Washington Administrative Code (WAC) 173-26-201 directs cities and counties to include a characterization of functions and ecosystem-wide processes for those areas under shoreline jurisdiction. This is intended to inform the decisions that must be made on what levels of development to allow in shoreline areas.

Although watershed characterization is likely to include a larger geographic scale than the areas under jurisdiction of the Shoreline Management Act (SMA), it does provide the larger watershed context for understanding the ecological systems within shoreline areas. This is useful in guiding decisions for development (such as environment designations, development standards and regulations) and for restoration programs. See Section 4 of this report for some examples of watershed characterization used in the SMP update process.

**Other planning programs** can also benefit from watershed characterization. For example, a jurisdiction may want to adopt a programmatic wetland mitigation program. A characterization can provide the necessary first step in identifying existing conditions that can, or have, resulted in degraded wetlands, the reasons for the degradation, and in identifying areas that are high priority for protection or restoration. Or, a salmon restoration plan would benefit from information on degraded watershed processes affecting stream conditions, and priorities for protection and restoration. This can mean a higher probability of success when designing follow-up implementation projects.

## 2. Background

### 2.1 National Level

Watershed characterization is supported as a component of environmental decision-making at the national level. A report issued by the National Academy of Sciences in 2001<sup>3</sup> made the following important findings:

- A watershed approach would improve permit decision making.
- Federal guidelines for permit decision-making express a strong preference for compensation as near to the permitted impact site as possible and for the same wetland type and functions.

One of the primary recommendations of the report related to watershed characterization is: “Site selection for wetland conservation and mitigation should be conducted on a watershed scale in order to maintain wetland diversity, connectivity, and appropriate proportions of upland and wetland systems needed to enhance the long-term stability of the wetland and riparian systems. Regional watershed evaluation would greatly enhance the protection of wetlands and/or the creation of wetland corridors that mimic natural distributions of wetlands in the landscape.”

The report noted that a preference for on-site and in-kind mitigation should not be automatic. Rather, it should follow from an assessment of the wetland needs in the watershed and the potential for the compensatory wetland to persist over time. It goes on to state that “Proper placement within the landscape of compensatory wetlands to establish hydrological equivalence is necessary for wetland sustainability. The ability to achieve desired outcomes within a specific location is also a function of the degree of degradation of the hydrological conditions, soils, vegetation, and fauna at the site.”

The report also discusses the general status of wetlands in the United States. It states that by the 1980s the area covered by wetlands in the contiguous United States had decreased to approximately 53% of what it had been in the 1780s. It then goes on to discuss the status of wetland losses as they relate to the permitting provisions of the federal Clean Water Act. Under these provisions, a “no net loss” goal exists. If impacts to wetlands are unavoidable, then compensatory mitigation is required. Compensatory mitigation specifically refers to restoration, creation, enhancement, and in exceptional cases, preservation of other wetlands as compensation for impacts to natural wetlands.

The report also highlights factors that compromise the success of wetland mitigation. These include a lack of information on whether required mitigation conditions are actually carried out, and the fact that where information is available, required mitigation projects often are not undertaken or fail to meet permit conditions.

---

<sup>3</sup> Board on Environmental Studies and Toxicology, National Academy of Sciences, 2001. *Compensating for Wetland Losses under the Clean Water Act*. National Academy Press, Washington, D.C.

## 2.2 State Level

### Department of Ecology “Mitigation That Works” Initiative

The Department of Ecology has begun an initiative to improve the performance and success of environmental mitigation in Washington. This initiative, called “Mitigation That Works”, aims to improve the success rate of wetlands mitigation.

The Department of Ecology conducted a multi-year study on the effectiveness of wetland mitigation<sup>4</sup>. This study showed that many mitigation measures required as a condition of various permits do not perform in a manner that replaces lost functions. In fact, some fail completely to meet their objectives or are never implemented. These findings have been validated by studies done in other states and at the national level.

Ecology’s initiative is aimed at improving how environmental mitigation is approached and implemented in Washington. According to a November 2006 fact sheet, the agency intends to “...build upon various approaches...to develop an environmental mitigation system that is more efficient and predictable for project proponents and that effectively and permanently restores and preserves high-value environmental resources within a watershed.”

Ecology’s adopted performance measures for this initiative are:

- Improve the success rate of wetlands mitigation from 50% to 100% (overall goal).
- Demonstrate Watershed Characterization as a promising standard for watershed-based mitigation by providing assistance to 3–4 local jurisdictions over the next biennium.
- Reduce wetland bank final decision from 2 years to 15–17 months.
- Improve compliance and monitoring by conducting site visits to 75% of completed mitigation projects within 18 months of receipt of as-built reports.
- Complete wetland mitigation banking rule in 2008.

The second performance measure focuses on watershed characterization as a “promising standard”. The two-year draft work plan implements this measure with the following actions:

- Participate in the Multi-Agency Watershed Group pilot project to develop an ecosystem-based watershed plan that will identify strategies for guiding future development, outline comprehensive mitigation strategies, and identify options for streamlining local development review.
- Apply the Watershed Characterization tool in Clark County to refine the County’s existing watershed-based mitigation plan, provide a planning framework for the selection of the best areas for mitigation banking sites, and to assist the City of

---

<sup>4</sup> Washington State Wetland Mitigation Evaluation Study, Phase 1: Compliance. Patricia A. Johnson, Dana L. Mock, Emily J. Teachout, and Andy McMillan. Washington State Department of Ecology, June 2000; Publication 00-05-016; and Washington State Wetland Mitigation Evaluation Study, Phase 2: Evaluating Success. Patricia Johnson, Dana L. Mock, Andy McMillan, Lauren Driscoll, and Tom Hruby. Washington State Department of Ecology, February 2002. Publication No. 02-06-009.

Ridgefield in identifying key resource areas to guide the development of the City's Comprehensive Plan.

- Apply Watershed Characterization tool in Snohomish County to assist the County in the development of an alternative mitigation plan, per the Governor's proviso in the 2006 budget.
- Complete 3–4 more applications of Watershed Characterization in the 2007–2009 biennium, possibly to include application of watershed characterization to alternative stormwater mitigation project in Juanita Creek basin.

Work on the first three actions is already underway.

### **Interagency Workgroup for Watershed Characterization**

A multi-agency task force of three state agencies has been working on the issues related to single-issue environmental plans. These agencies, the Washington State Department of Transportation (WSDOT), Washington Department of Fish and Wildlife (WDFW), and Ecology have all been working on their own methods to watershed characterization. They began discussing their mutual approaches and decided to establish a cooperative task force aimed at consolidating their efforts.

Each agency has its own goals and approach:

- WSDOT's approach is focused on mitigating impacts posed by construction of transportation projects on stormwater, wetlands, and other natural resources. It is aimed at the mid- to fine-scale level, providing site-specific information on the condition of wetlands and their potential for restoration.
- WDFW's approach is focused on habitat concerns. According to WDFW staff, the approach addresses landscape (broad), sub-basin (mid) and site (fine) scales. It consists of two parts: 1) a modified ecoregional analysis that assesses a watershed for areas that have a high, medium and low value for wildlife habitat; and 2) a sub-basin to site scale analysis that determines the groupings (guilds) of wildlife species that will be present at different zoning densities.
- Ecology's approach focuses on characterizing the watershed processes operating at the broad or landscape scale, and mid or sub-basin scale. This approach sets the framework within which the other analyses are "nested." For example, if the characterization identifies a portion of the watershed as a priority for restoration and the WSDOT analysis identifies several altered wetlands as candidates for restoration, then these wetlands would become a top priority for restoration within the entire analysis area. Further, if the characterization identifies another portion of the watershed as a priority for protection and the wildlife analysis also identifies this area as an important wildlife habitat, then this area would have added priority for protection.

The concerns resulting in this task force relate to duplicative and overlapping efforts, and the development of different methodologies for preparing watershed characterizations

that have resulted from these various efforts. As noted in a joint document<sup>5</sup> issued by the task force on April 12, 2006, “In developing a comprehensive action plan, a planner often has to review and interpret numerous studies and plans, each of which may be addressing different problems, using different methods and conducted at different scales. Overall, this has created confusion for resource planners on how to best meet agency mandates and often creates actions that in some cases overlap or are in conflict with one another.”

The task force notes that the focus on single-issue plans has resulted in the development of different methods. These differences have resulted in confusion about the appropriateness of one method over another for specific purposes. The April 12, 2006, document states that: “The purpose of the multi agency landscape task force is to develop and offer a tool that improves fact-based local planning and decision-making, reduces workload and cost, increases predictability while meeting multiple mandates and improving the health of local and regional ecosystems. This will be accomplished through a pilot project that brings together state and federal agencies, local and tribal governments, watershed groups, citizens, the development and agricultural communities and business leaders. The pilot project will integrate the best available watershed information so decision makers can know the full costs, benefits and risks involved in their decisions.”

The task force selected a pilot project in Birch Bay, Washington, which is building upon the Whatcom County Watershed Characterization conducted using the Ecology approach. Three agencies are working together to prepare a joint effort which will meld, to the extent possible, their three approaches to produce a more comprehensive characterization.

Based on early discussions with staff from the three agencies, it appears that there will be a good fit between the three approaches. The Ecology characterization will provide information at the broader, coarse-scale, which can then help guide the other two characterizations. In addition, the different foci (for example, WDFW’s emphasis on habitat connectivity and habitat in general, and WSDOT’s emphasis on site-specific wetland restoration sites) may help provide a more comprehensive approach than any of the three characterizations taken separately.

## **2.3 Local Level**

### **Clark County Integrated Permit Review and Mitigation Tools Project**

Several state, federal, and local government agencies, and city and county associations, have embarked upon a pilot permitting and mitigation project. The goal of the project is to improve the timing and performance of mitigation and permitting decisions. This is being accomplished by the development of a database that will function as a “decision support tool” for use by Clark County and Vancouver permit staff, as well as by cooperating state and federal agencies.

---

<sup>5</sup> “Developing a Watershed Characterization & Analysis Approach for Meeting Multiple Mandates in Washington State”, Multi Agency Watershed Task Force, April 12, 2006



A development activity, such as placing a fill in a wetland in order to widen a road, may require permits from local, state, and federal agencies. When the applicant cannot avoid impacts to wetlands, all three agencies may require mitigation for the impacts. The permitting tool will allow agencies to input data about the permits they are reviewing, track and coordinate decision-making on environmental mitigation, and help identify appropriate mitigation measures, including potential off-site mitigation sites. It will provide a standardized list of Best Management Practices (BMPs) that the permit writer can choose from and document the steps taken in determining mitigation requirements. It is aimed at providing a faster and more consistent way to review permit applications and issue permits with appropriate conditions.

The Clark County permitting tool is designed to:

- Decrease the amount of time required to process and evaluate individual permits;
- Create a repeatable structure to identify and address environmental impacts; and
- Identify potential mitigation sites that address impacts (permit objectives), restore ecosystem functions and processes (watershed plan objectives); and
- Be expanded to other government agencies in Washington as success in meeting its goals is demonstrated.

The watershed characterization being completed for Clark County is being used as part of the decision support tool. The spatial data created for the watershed characterization is being included, thus allowing queries to be made through the database. These queries will help identify the best possible parcels for offsite mitigation.

In its present form, the permit tool will provide information on which parcels with wetlands are available, identify the hydrogeomorphic (HGM) classification of the wetland, and note which parcels are located within “priority” areas based on the watershed characterization.

The developers of the “permit tool” are also working on a “comparison” function that will eventually become part of the tool. This will allow the user to look at proposed off-site mitigation parcels and the kind of mitigation being proposed, and be able to see the watershed goals for the area. Again, this would be using information generated by the watershed characterization, and would allow the user to compare the two levels (site-specific and watershed levels). This will allow the user to determine if a proposed mitigation site will meet both site-specific and watershed goals.

### 3. Clark County Characterization

The 2006 Legislature adopted a budget proviso that earmarked funding for a wetland mitigation program in Clark County<sup>6</sup>. Ecology used a portion of this funding to conduct a watershed characterization for Clark County. This is a separate project from the Integrated Permit Review and Mitigation Tools Project discussed above, but the two projects complement each other.

There are two stated goals for this characterization:

- Provide better long-term protection of wetland functions.
- Reduce permitting time and mitigation costs through increased specificity on type and location of required mitigation.

As previously discussed, watershed characterization can be targeted to specific watershed processes, depending upon the needs of the jurisdiction. The goal for the Clark County characterization is to build on already-available information, primarily the county's 2004 wetland inventory<sup>7</sup>, and focus on two primary watershed processes: hydrologic and nutrient processes. These are two of the key processes that affect aquatic resources. The methodology used to characterize these two processes is described in the report and in the Ecology guidance manual.

The Ecology guidance document describes watershed characterization as a five-step process. The characterization is conducted by a team with input from technical professionals (such as GIS analyst, geologist, hydrologist, aquatic ecosystems specialist). The team collects and assesses the available information before beginning analysis, and then proceeds with the following steps:

1. *Define the purpose of the analysis.* In the case of Clark County, the purpose was to understand wetland functions, and develop more specific information on where and what type of mitigation should occur.
2. *Delineate the study area.* The characterization divided the study area into 82 sub-basins for analysis. These sub-basins were then grouped into 4 hydrogeologic units (a refinement of an existing Clark County division into 8 different units). These units were established based on precipitation type, landform, geology, and surface water/groundwater patterns. They are a way to divide the landscape into sub-watersheds with common attributes, to compare analysis results among like units. The four hydrogeologic units are:
  - a. Rain-on-snow and snow-dominated Mountainous unit;
  - b. Rain-dominated Mountainous unit;
  - c. Terrace unit; and
  - d. Columbia River unit.

---

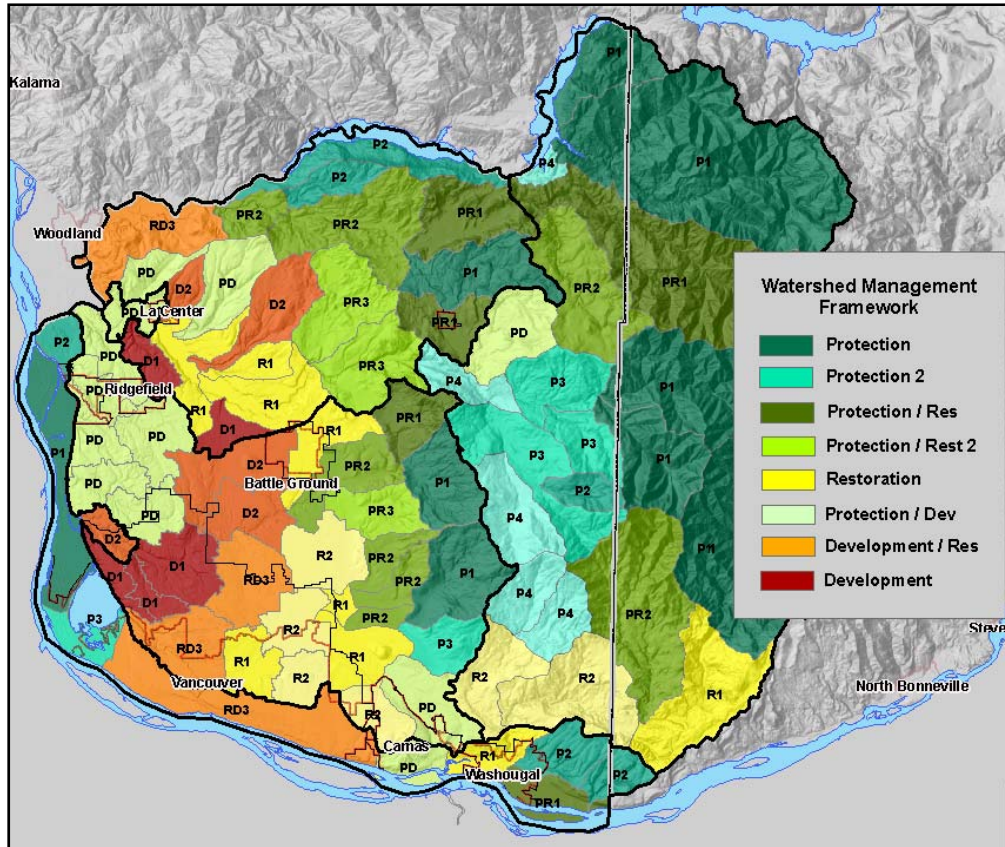
<sup>6</sup> Proviso Language: "\$340,000 of the general fund state appropriation for fiscal year 2007 is provided solely to support development of a wetland mitigation program in Clark County. The program will engage local, state, and federal agencies, private investors, property owners and others in the creation of one or more wetland banks, and other measures to protect habitat function and values while accommodating urban growth in the region."

<sup>7</sup> Clark County. 2004. Regional wetland inventory and strategy. 51 pages.

3. *Map the key areas for each process being analyzed.* This mapping is done based on current knowledge of the physical characteristics of the watershed that govern the specific watershed process. The available data are reviewed and compared to the physical characteristics of the units to understand where the key processes are occurring. For some of the processes, this step involves mathematical modeling. This includes the two processes being analyzed in the Clark County project: hydrologic and denitrification processes. For further details on the modeling required for this step, see the Ecology Guidance Manual “Protecting Aquatic Ecosystems”.
4. *Map the types of alterations in each watershed process* This mapping is done primarily using indicators of the locations of the human activities that impair watershed processes. For example, for nutrient inputs, agricultural activities are a strong indicator that extra nutrients are entering the system.
5. *Locate areas for protection and restoration.* This step is the integration of the previous two steps, involving compiling and overlaying the information on identified key areas and identified alterations to processes. The data and maps generated during the previous steps are reviewed and synthesized into a final representation of areas identified for restoration and protection.

The Clark County watershed characterization resulted in the preparation of three key maps. The first two maps show the areas suitable for protection and restoration for water processes, and the same information for nutrient processes. The final map is a combination of the other two showing a proposed mitigation and development framework.

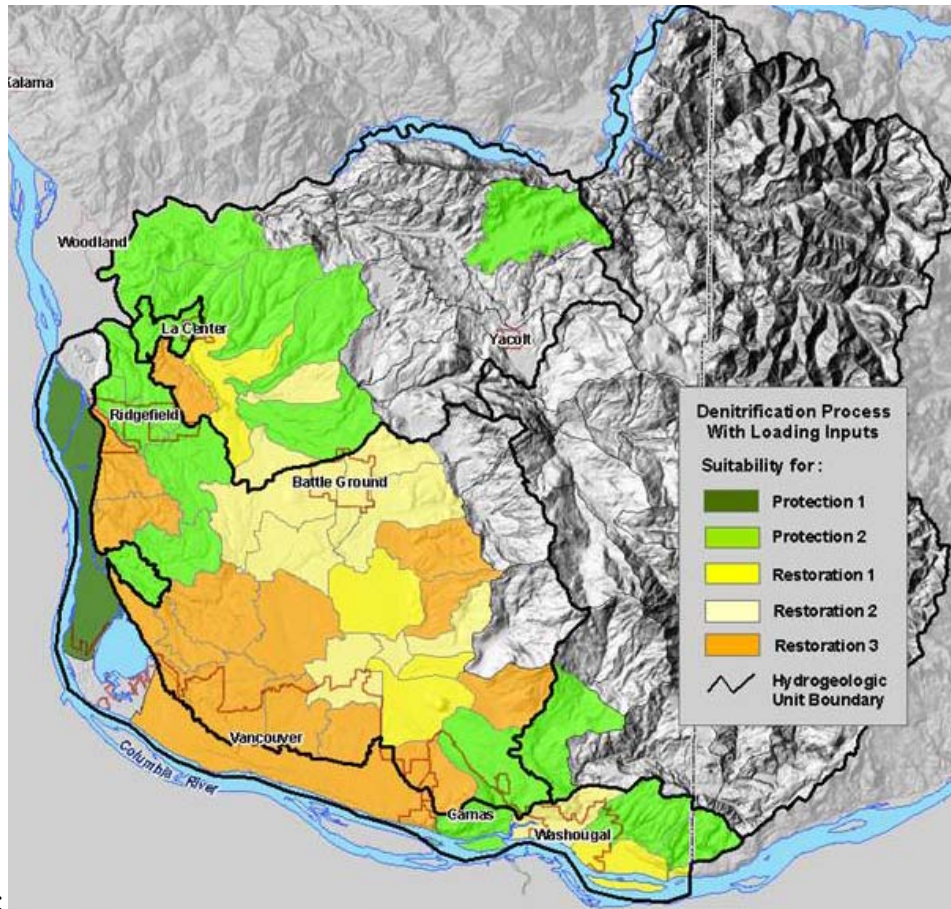
Following is the first map (identified as figure 9 by the Clark County characterization) showing suitability related to water processes:



**Figure 9.** Priorities for suitability of areas for protection and restoration for the water process.

The map shows grading from green to red, or from areas needing protection (green) to areas more suitable for development (red). As an example of how to use this information, the map indicates that the areas in the upper basins (shown in dark green) are in need of particular protection. Since these are areas primarily used for timber production and harvesting, the use of sustainable logging practices should be promoted.

The next map shows the areas suitable for protection and restoration for denitrification processes:

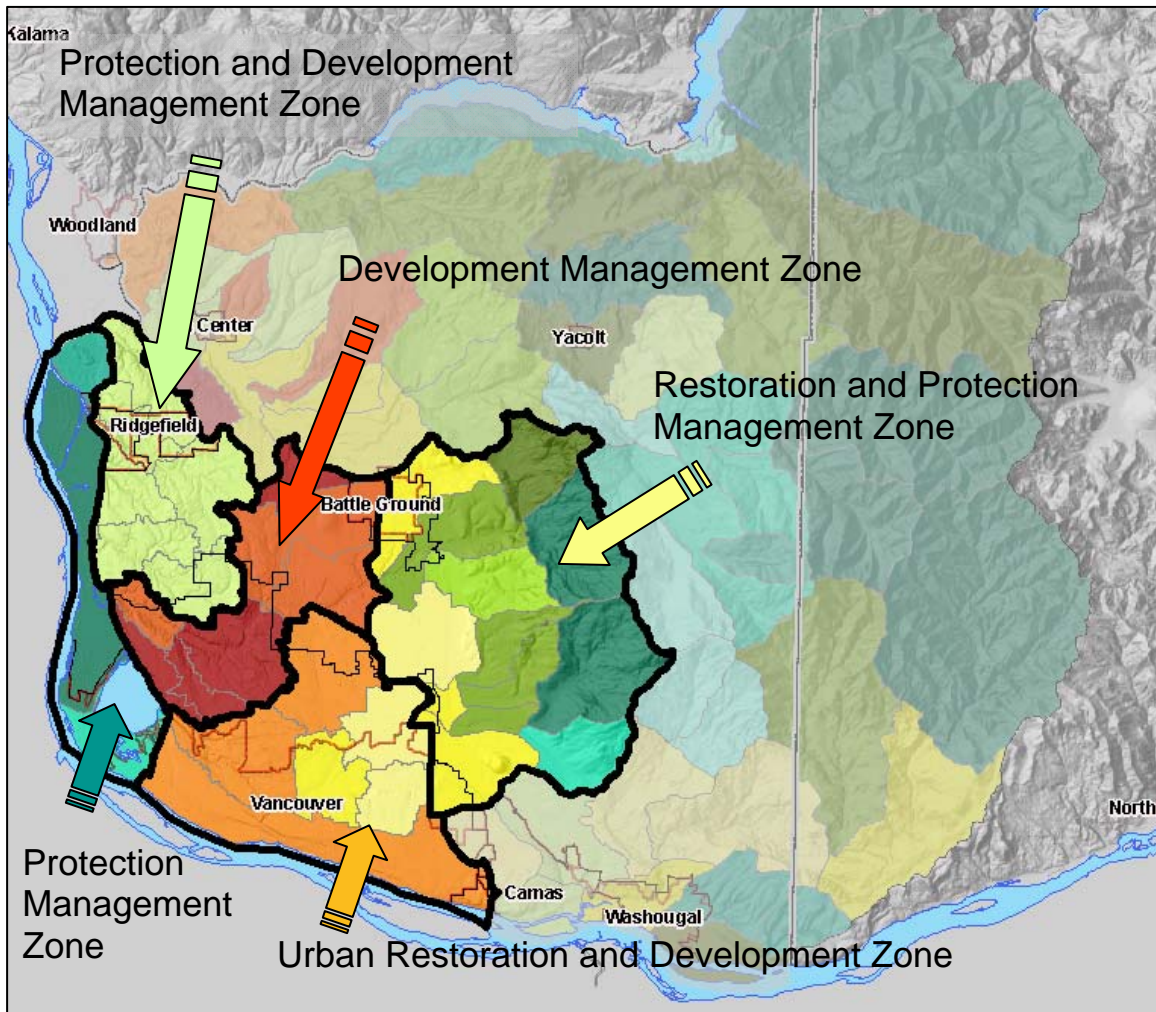


**Figure 10.** Areas for protection and restoration for the denitrification process. Areas that are not colored are not presently of regional importance for the denitrification process.

This map uses the same color scheme, grading from green (areas needing protection) to yellow and orange (areas more suitable for restoration). The characterization report provides a detailed explanation of the assumptions used in applying these designations. As noted in the chart label above, if there is no color applied, then the areas are not deemed to be of regional important for the denitrification process. The report does point out, however, that at the site-specific scale it would still be important to conduct a wetland functional assessment (if wetlands are present) to determine the local importance of the site.

This information from the characterization of processes can then be used to identify individual management zones and their management objectives (Figure 11). For example, based on this information specific management zones are recommended for the terrace and Columbia River unit (Figure 11).





**Figure 11** Management zones for the Terrace and Columbia River Units. These zones help establish protection, restoration and development framework for Clark County based on results of characterization presented in Figures 9 and 10.

The management zones for the Terrace Unit are addressed in the characterization and consist of:

1. Restoration and Protection Management Zone for the foothills and adjacent lowlands. This is an area of importance for delivery of water and its recharge and denitrification. Future development should be of low intensity in order to protect processes and functions. This may also be an appropriate area to receive mitigation from adjacent development zone located to the west.
2. Development Management Zone. Concentrate new urban development west and south of the City of Battleground. Water flow processes have a lower relative importance here, but emphasis should be placed on restoring the denitrification function within degraded wetlands and floodplains.
3. Protection and Development Management Zone. West of I-5 creek corridors should be protected given their significance as areas of discharge and denitrification. New development should be sited and designed to minimize

- impacts to the surface hydrology of these creek corridors and protection denitrification functions of wetlands and floodplains.
4. Urban Restoration and Development Zone. This is an area of high importance to the water flow (recharge) and denitrification processes. However, the level of impairment from existing urban development is high. Development should consist of infill in upland areas with restoration of floodplains, including degraded wetlands and creeks.
  5. Protection and Management Zone. This area has high importance and relatively low impairment for both water and denitrification processes. Protection from activities that permanently alter processes and functions is recommended.

In addition to these general suggestions based on the final map, all three of these synthesis maps can be useful for various needs. For example, Patrick Lee of Clark County said: “The Watershed Characterization’s synthesis map for water process and related narrative of the most promising protection, restoration, and development opportunities within each of the four hydrogeologic units may be most useful in guiding watershed-based mitigation programs in Clark County.”

## **4. Other Recent Characterizations**

Ecology has participated in two other recent characterizations, one for Whatcom County and one for Jefferson County. Both of these characterizations were prepared with the primary goal of providing information for the SMP update process. As mandated by WAC 173-26-201, SMP updates must include a characterization of functions and ecosystem-wide processes for those areas under shoreline jurisdiction. In both of these efforts, Ecology staff was in a support and assist role, providing guidance to county staff and consultant teams as needed.

### **4.1 Whatcom County**

The geographic areas included in this characterization were for an area much larger than the area under jurisdiction of the SMA. This area included the surface water drainage boundaries identified in the Water Resources Inventory Area (WRIA) 1 Watershed Management Plan (2004), and similar drainage boundaries for WRIA 3.

The following five processes were characterized:

- Hydrology
- Sediment
- Water Quality
- Organic Matter
- Heat/Light

Using the information generated by the characterization, project analysts identified general or regional opportunities for shoreline restoration and/or conservation (protection). This was used with the shoreline inventory required under the SMP update guidelines to identify additional site-specific or reach-scale opportunities for restoration/conservation. This information is further discussed in the SMP restoration plan.

This characterization is similar to that of the Clark County effort, but tailored to the specific requirements of the SMP update guidelines. The characterization information is for a larger watershed, but used primarily to identify protection and restoration opportunities for a smaller geographic area (the area under SMA jurisdiction). It is then used as one component in the required inventory, which describes ecological functions as well as existing and planned land uses. It is also being used to develop recommended shoreline environment designations. According to the characterization: “In evaluating each reach, ecological processes and functions were considered first and existing and planned land use were considered second, in the context of each shoreline environment designation purpose and criteria.”

A final note on the role that characterization is playing in the Whatcom county SMP update: Whatcom County has a significant amount of marine shorelines. Since Ecology’s watershed characterization model is targeted to freshwater systems, Whatcom County conducted a separate, but similar, process to characterize marine system processes. Thus,



the Ecology type of characterization was one piece in a larger system designed to provide information on protection and restoration opportunities.

This illustrates an important point about the relationship between Ecology's characterization process and how it connects with marine ecosystems. The characterization provides important information for how freshwater processes may affect estuarine and some marine ecosystems. This primarily involves the nutrient, sediment and pathogen processes. These processes have a significant effect on marine ecosystems. The delivery of nitrogen plays a large role in harmful algal blooms in estuarine systems, and the delivery of pathogens has resulted in the closure of many shellfish beds. It is land use activities in freshwater watersheds that generate and transport these constituents to the marine system.

The freshwater characterization does not deal with processes specific to nearshore areas and immediately adjacent upland areas (such as shoreline bluffs) and do not have a significant linkage to processes operating in larger riverine watersheds many miles inland. This would include, for example, longshore movement of sediment through drift cells, and the effect of alterations such as shoreline armoring and groins.

#### **4.2 Jefferson County**

The geographic area included in the characterization was the eastern portion of the county. Hydrology was the only process characterized.

The characterization was very similar to that of Clark County. The study area was divided into hydrogeomorphic units, determined using the same methodology. Criteria used to identify the HG units were precipitation type, subsurface and surface water flow patterns, and geology and landform. Four units were ultimately distinguished.

Finally, the same types of synthesis maps were developed. A map was prepared showing important areas to the water process; areas of alteration; and a synthesis map used to designate areas of protection and restoration for the water process.

## 5. Interviews with Characterization Participants

One of the goals of this project was to interview people from local agencies and consulting firms who had participated in characterizations. The interviews focused on their experience with, and conclusions regarding the usefulness of, the products. Interviews were held with nine people<sup>8</sup>, either in person or on the telephone, who participated in the Clark County, Jefferson County, or Whatcom County watershed characterization efforts. Seven of the respondents were local government staff; two of the respondents were consultants who participated in one or more of the characterizations. Questions were developed in advance and approved by the project manager. The list of questions is shown in Appendix A, and the list of persons interviewed is shown in Appendix B.

The questions, a summary of the responses to each question, and representative answers to some of the questions are listed in the order the questions were asked.

### General questions

1. *Please describe in your own words: what was the purpose of the watershed characterization?*

Respondents had a good sense of the purpose of the watershed characterization, commenting that it was a coarse-scale review of watershed problems and opportunities. Some noted it was helpful for the required inventory for SMP updates, and a good first step for the restoration component. Several noted that it also has applicability beyond SMPs.

- “This is very valuable. It facilitates meeting the requirement of updating the shoreline master program. But it also has applicability beyond shorelines...watershed plan, GMA.”

2. *Have you considered other approaches to identifying areas for environmental restoration and protection? If yes, how does this approach compare?*

Several respondents had considered other approaches, and either believed this type of characterization was more cost-effective, or commented that this process fit well with other approaches they were using. Clark County staff noted that it fit well with their existing wetland inventory, and was also a similar approach to that used for the local salmon recovery plan. Other responses indicated that there are other tools, and the choice depends on the specific context. It was also noted that this tool is not geared for marine resources.

- “I think the characterization tool is a great way to identify restoration sites/needs at a coarse scale. I also like that it’s based on assessing processes, so it gets away from more traditional site scale restoration planning.”

---

<sup>8</sup> One of the interviews, with Patrick Lee of Clark County, was not conducted in person or on the telephone, but by Mr. Lee returning the list of questions with his responses filled out.

- “One drawback of the approach is that it doesn’t work very well for nearshore resources since it’s geared for freshwater resources...something different may need to be done to address the nearshore component.

### **Process**

3. *Describe how the process of conducting the characterization worked and your role in it.*

The process was different for Clark County versus the other two counties. The Clark County characterization was conducted with Ecology staff in the lead, and county staff serving in a review and comment capacity. With the other two characterizations, county staff members were in the lead and Ecology staff participated on the team and provided guidance.

4. *Did enough coordination happen between the County and Ecology? If not, what should have been done differently?*

Respondents generally indicate the process went well, and several noted that they appreciated the team aspect of the work. The major point brought up by more than one commenter was a desire for more up-front coordination. In the case of Clark County, in particular, with Ecology in the lead some county staff felt that initially they were not as involved as they would have preferred. They did indicate, however, that the process itself went well and were appreciative of the final product. In general, it seems that communication throughout the different processes went pretty well.

Based on the interviews, it appears that the different county staff members appreciated the open demeanor with which Ecology staff members Stephen Stanley and Susan Grigsby operated. That probably allayed the initial concerns about up-front coordination.

### **Results**

5. *Do the results have the level of detail expected? If not, what additional detail do you think is needed?*

The comments generally indicate the results have the level of detail expected. Most respondents knew that the watershed characterization is intended to provide coarse-scale information. One commenter noted that although it met their expectations, some of their community members were hoping for more site-specific information, and thus wanted more. This same commenter pointed out that this was more of an issue of their expectations rather than the characterization not providing enough information. There was a suggestion that Ecology provide more guidance on the expectations people should have for the results.

- “As with any modeling-based analysis the tool is only as good as the calibration put into it. The outputs are not sufficient for site-specific analysis, but do establish a reasonable context within which to delve further when faced with specific project analysis.”

- “Sometimes more detail will be needed; one of the purposes of this scale is to identify those situations.”

6. *How do you think this will be used in your jurisdiction for other planning efforts?*

Clark County is using their characterization to establish service areas for regional mitigation banks. Other respondents indicate this will be used as a starting point for some more detailed work. For example, work is ongoing on a project to do a multi-approach characterization with three state agencies (Ecology, WSDOT, and WDFW), using their initial characterization as a starting point and taking it to a more detailed scale. Other respondents indicated that they could envision a number of additional uses but did not have specific ones identified yet.

7. *Do you feel your needs are being met with this product?*

In general, respondents believed their needs were being met, given their expectations for a coarse-grained tool. Several respondents were still reviewing the product and determining its usefulness for their needs.

- “This product is useful and informs the broad hydrogeologic context within the county. The approach of distilling information down to protection, restoration and development opportunities is an effective framework for considering policy and project options relating to environmental programs.”

8. *If they are not being fully met, how could this approach be changed to better meet your needs?*

Several specific comments and suggestions were received:

- As the county uses this for BAS, it needs peer review to be considered as such...and to identify limitations and uses
- It would be good to decouple this from the SMP inventory requirements
- Additional guidance on other uses of characterization would be useful
- Additional guidance on how to use characterization to inform the development of SMP policies and regulations
- How will Ecology use this information when acting in its local project and program review role?

Because the guidance was peer reviewed (Ecology Publication #06-06-009) all characterizations based on the guidance should constitute BAS.

(<http://www.ecy.wa.gov/biblio/0606009.html>)

9. *Have elected officials or planning commission members reviewed the product? What is their reaction?*

In the instances where elected officials or planning commissioners have been introduced to the topic, they seemed to be interested and see value. Some elected officials have been introduced to the characterization as a part of presentations on the

overall scope of SMP updates. In the case of Whatcom County, the County Council reviewed it and it was well received. Other respondents indicated that this has not happened in their jurisdiction. One respondent expressed concern that the characterization is not written for general public review, and that may need to be taken into account in the funding for future characterizations.

- “The comments we heard [resulting from the County Council review] were that it was thoughtful, comprehensive, well received. It’s a weighty document with lots of maps, not the type of thing the average citizen will pick up.”

### **Large-scale Mitigation Planning**

*10. How do you think this characterization helps develop larger-scale mitigation and development planning, and to a more programmatic approach to mitigation?*

In general, respondents thought that characterizations are a helpful first step to larger-scale mitigation and development planning. They see this as having great potential in helping design mitigation programs.

- “I highly endorse this process; it brings a scientific basis and understanding to solving restoration problems. It’s the next step that will be difficult, the decisions will not always be decided based on science. Ecology has to be there working side by side with local staff. Next step is the regulatory step, and that’s the hard part.”
- “This allows us to focus the efforts on the most important areas, where there can be long-term benefits.”

*11. In your view, would it be possible to use this information to develop some type of general permit for a watershed-based mitigation plan, or a memorandum of understanding with other regulatory agencies?*

About half of respondents provided input on this question. They uniformly believed that this is possible, as a component of an overall program. They also noted that other steps need to be taken, and additional detail would need to be provided. The characterizations are not detailed enough on their own to provide the information need.

*12. If your answers to 9 and 10 support using this information in a broader context, do you think this information could be useful across jurisdictional lines?*

The comments received generally noted that the jurisdictional issues are political, not technical. Several pointed out that having this type of information might make the political discussions easier, with technical information to inform the discussion. Also, a characterization might point out the presence of high priority resources in a jurisdiction that previously was not aware of their significance. Finally, one commenter used an analogy to GMA planning for the built environment, and said this is the first step toward doing that type of interjurisdictional coordination for the natural environment.

## **Final**

### *13. What do you think of this approach to understanding problems and opportunities for restoration in a watershed?*

It was a nearly unanimous opinion that this approach is good and should be continued. One respondent indicated a preference for computer modeling, rather than this approach. Several other comments were made that it is necessary to figure out a way to approach the habitat information, since this approach does not address habitat.

- “This approach is absolutely the right way to go...it’s based in scientific literature, population dynamics, looking at large scale hydrogeomorphic processes and how they affect the land and wetlands...”
- “I think it’s a very strong tool. It’s simple but firmly based, using data that’s readily available. It’s a logical approach. It’s straightforward enough to describe to a lay audience.”

### *14. What role should Ecology play in future characterizations – actually conducting them or assisting local governments as you conduct them?*

Respondents were divided on this question. Several believe that Ecology should “be in the trenches with the locals, as advisers”; others thought Ecology should be in the lead to assure statewide consistency; still others thought it depended on the funding available (and made the point that if less funding available, would be good for Ecology to be in the lead). The comments were probably slightly tipped in favor of Ecology serving as an adviser and not being in the lead.

- “Ecology should be an advocate for the process; this is not a one size fits all. Ecology should NOT do it for a community; useful for a community to do it and get ownership.”
- “This depends on funding support. If Ecology only has enough funding to be in a support and assistance role, that’s okay. It’s nice to have Ecology do it, if funding is available. It’s more of a financial issue.”

### *15. Do you have suggestions for changes to the product or process for future efforts?*

Most indicated their comments were already reflected in earlier comments; additional comments include:

- Have a better defined framework up front
- More information on the “middle of the process” – analysis of the data that resulted in the maps
- Continue to collaborate in taking the approach to the next level
- “This may be the most important thing Ecology is working on related to wetlands work”
- Consider having USGS develop a model, or review and approve the template.

## 6. Conclusions and Recommendations

**Conclusion #1: Watershed Characterization is a very useful tool for local governments at the “coarse-scale”, or broader level. It should be viewed as the first step in a multi-step process, as described in the “toolbox” approach discussed earlier in this report.**

- For **plan-level projects**, watershed characterization is a useful first step in assessing and understanding watershed processes in a larger area, and as part of broad planning documents (such as a comprehensive watershed management plan). For example, it can:
  - Point out where land use plans should provide protection and/or restoration of important areas for watershed processes or suitable areas for development; and/or
  - Provide an indication of the type of programs needed (for example, a wetland mitigation banking program) to properly implement a Critical Areas Ordinance.
- For **Shoreline Master Program updates**, the pilot projects show that watershed characterization can serve as a major component of the required characterization of functions and ecosystem-wide processes for those areas under shoreline jurisdiction. Since this characterization framework is intended for freshwater ecosystems, additional work would need to be done on characterizing functions and processes for nearshore resources. In both Jefferson and Whatcom Counties, such additional work on marine resources was done as a corollary to the Ecology watershed characterization project.
- Watershed characterization can be used as one factor to weigh in deciding when **offsite mitigation** may be more appropriate. For example, if an impact is occurring in an area determined by a characterization to be a lower priority for protection or restoration (such as a high-density urban area), and another area is identified as a higher priority, any required mitigation could be focused in the higher priority areas.

**Conclusion #2: Watershed Characterization is limited in its ability to provide information at the site-specific level. This is due to its very design as a broader-level, rapid assessment tool.**

For **site-specific proposals**, watershed characterization can help provide overview and context information on processes and problems but does not provide enough detail on its own to design specific projects or to identify specific mitigation sites. Additional analysis will be needed at the site level to verify that conditions identified through characterization apply at a given site, and to design any specific projects. However, a watershed management plan approach that uses a suite of tools, including characterization and functional assessment, can provide the most effective means of maintaining functional aquatic ecosystems.

**Conclusion #3: Ecology’s watershed characterization model is not the tool to use for nearshore and habitat resources (but should be considered as part of an overall “toolbox” for developing watershed management plans).**

- For **nearshore resources**, the Ecology watershed characterization model does not completely fit. This model can provide important information on how freshwater processes may affect estuarine and some marine ecosystems, as discussed in Section 4 (description of the Whatcom County characterization). However, it does not deal with processes that are specific to nearshore areas and immediately adjacent upland areas. Another inventory method will be needed to characterize processes affecting these areas. Ecology should assist in reviewing and recommending approaches, and perhaps providing this information as part of a supplement to its guidance document, although this does not have to be strictly an Ecology focus.
- For **habitat resources**, the Ecology model does not provide this type of information. As with nearshore resources, another characterization method should also be used if habitat information is needed. Information on habitat functions, for example, is provided by Ecology’s wetland assessment methods (Ecology publications #99-116 and # 00-06-47) and wetland rating system (Ecology publications #04-06-025 and #04-06-015). The WDFW is also developing a landscape scale habitat characterization process, and expects to publish a draft describing their process during summer or fall of 2007.
- For **water quality and quantity resources**, the wetland functional assessment methods and rating system developed by Ecology provide site specific information on water quality and quantity functions.

**Recommendations**

1. **Ecology should continue to support watershed characterization.** The interviews showed significant support for the approach and an acknowledgement that it can provide useful information. The interviews did not show a clear opinion on whether Ecology should be in the lead or should be in a support role. This role should be determined for each specific characterization, based on the desires and capacities of the local government.
2. **Ecology needs to help local governments take watershed characterization to the next level.** In its “Mitigation That Works” program, Ecology set performance goals of participating in three to four more characterizations during the 2007–2009 biennium. It is equally important that Ecology help local governments provide support and guidance for using existing characterizations. This might require allocating staff resources to be available upon request to local governments as they seek to use completed watershed characterizations.
3. Ecology should consider **supplementing the existing guidance document** on watershed characterizations and include:
  - a. How to use information from a characterization to develop SMP policies and development regulations for freshwater areas under SMA jurisdiction;



- b. How to use information from a characterization as a basis for other planning functions, including GMA comprehensive plans and CAOs;
  - c. References to other characterization methods to obtain similar information on nearshore resources and habitat;
  - d. How a characterization can be considered as Best Available Science (BAS).
4. Ecology's participation in the **multi-agency work group** will be important in further evolution of the watershed characterization tool. Working with other agencies and seeking common ground with other characterization approaches is a logical next step, along with providing information on how to decide which tools to use for a given product.
5. Ecology should specifically market watershed characterization as a tool to help with several products, including:
  - **Shoreline Master Program updates.** This is an area where there is great need over the next several years as jurisdictions work to meet the update requirements. To be most effective, this will require the supplemental guidance discussed above.
  - **Developing a framework for wetland mitigation programs.** Watershed characterization is an effective first step in identifying priority areas for mitigation, as well as areas that may not be a priority. Local governments can then use this to design their programs and priorities for wetland mitigation projects.

## APPENDIX A

### Interview Questions

#### General

1. Please describe in your own words: what was the purpose of the watershed characterization?
2. Have you considered other approaches to identifying areas for environmental restoration and protection? If yes, how does this approach compare?

#### Process

3. Describe how the process of conducting the characterization worked and your role in it.
4. Did enough coordination happen between Jefferson County and Ecology? If not, what should have been done differently?

#### Results

5. Do the results have the level of detail expected? If not, what additional detail do you think is needed?
6. How do you think this will be used in your jurisdiction for other planning efforts?
7. Do you feel your needs are being met with this product?
8. If they are not being fully met, how could this approach be changed to better meet your needs?
9. Have elected officials or planning commission members reviewed the product? What is their reaction?

#### Large-Scale Mitigation Planning

10. How do you think this characterization helps develop larger-scale mitigation and development planning, and to a more programmatic approach to mitigation?
11. In your view, would it be possible to use this information to develop some type of general permit for a watershed-based mitigation plan, or a memorandum of understanding with other regulatory agencies?
12. If your answers to 9 and 10 support using this information in a broader context, do you think this information could be useful across jurisdictional lines?

#### Final

13. What do you think of this approach to understanding problems and opportunities for restoration in a watershed?
14. What role should Ecology play in future characterizations – actually conducting them or assisting local governments as you conduct them?
15. Do you have suggestions for changes to the product or process for future efforts?

## **APPENDIX B**

### **List of Persons Interviewed**

1. Hal Hart, Director of Community Development, Whatcom County
2. Jeff Chalfant, Senior Planner, Whatcom County
3. Rod Swanson, Clark County
4. Ron Wierenga, Clark County
5. Brent Swanson, Clark County
6. Patrick Lee, Clark County (no formal interview, provided form)
7. Michelle McConnell, Jefferson County
8. Jennifer Thomas, Consultant
9. Margaret Clancy, Consultant