Wetland Mitigation in Washington State
Part 1: Agency Policies and Guidance

Washington Department of Ecology

US Army Corps of Engineers
Seattle District

Environmental Protection Agency
Region 10

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This document is available on the Department of Ecology Wetlands web site (Mitigation Guidance Revisions) at www.ecy.wa.gov/biblio/0606011a.html. See this web page for instructions on receiving a printed copy.

This document updates and replaces the portions of the 1997 Ecology publication, *How Ecology Regulates Wetlands* (McMillan 1998), pertaining to wetland mitigation.

For *Part 2 - Developing Wetland Mitigation Plans* refer to publication #06-06-011b. Part 2 replaces and expands on the 1994 *Guidelines for Freshwater Mitigation Plans and Proposals* (Ecology 1994).

Make sure you have the most recent version of this document

Due to the dynamic nature of wetland science and regulatory frameworks, the guidance found in this document is subject to revision. Make sure you have the most recent version, plus any addendums. You can find the most up-to-date version at: http://www.ecy.wa.gov/biblio/0606011a.html. The document can also be found via the Seattle Corps Regulatory Branch and EPA Region 10 Wetlands home page (see *On-Line Resources*).

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Table of Contents

List of Acronyms and Abbreviations

BAS . . . . . Best Available Science

CFR. . . . . Code of Federal Regulations

Corps or USACE . . . United States Army Corps of Engineers

CWA . . . . . Clean Water Act (formerly known as Federal Water Pollution Control Act)

Ecology. . . . . Washington State Department of Ecology

ESA. . . . . Endangered Species Act

EPA. . . . . United States Environmental Protection Agency

FR . . . . . Federal Register

HGM. . . . . Hydrogeomorphic

ILF . . . . . In-Lieu Fee

NMFS . . . . . National Oceanic and Atmospheric Administration's (NOAA's) National Marine Fisheries Service

NWP . . . . . Nationwide Permit

PCC. . . . . Prior Converted Cropland

RCW . . . . . Revised Code of Washington

SEPA. . . . . State Environmental Policy Act

USC. . . . . United States Code

USFW . . . . . United States Fish and Wildlife Service

WAC . . . . . Washington Administrative Code

WDFW . . . . . Washington State Department of Fish and Wildlife

WDNR . . . . . Washington Department of Natural Resources

WSDOT . . . . . Washington State Department of Transportation

§ . . . . . Section (e.g., Section 404 of the CWA)

Acknowledgements

We'd like to thank all of those who helped develop this document, including the members of the Agency Advisory Team. Others, including wetland consultants and local government staff also provided much needed input. Thanks to their help, we hope that this document will prove valuable to both wetland professionals and those simply seeking a basic understanding of wetland mitigation in Washington State.

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This document was written by the Project Team of the Washington State Department of Ecology's Wetland Section with contributions from the Agency Advisory Committee. In addition, Gail Terzi, Joan Cabreza, and David Martin contributed to significant portions of the document. Dana Mock performed the critical role of managing the project as well as writing and editing portions of the document.

We especially would like to thank all those who took time out of their very busy schedules to respond to the agencies' requests for comments on this document. Please refer to Appendix A for a list of the individuals and organizations that reviewed the document and provided comments. Their suggestions and materials have greatly improved this document.

Thanks to all those who attended the focus groups and provided input on what technical and policy issues should be addressed or clarified and what tools would be desirable for reviewing, approving, writing, or implementing mitigation plans. Also, thanks to all those who attended the public meetings during the public-review period for the draft.

This project could not have been completed without the support and expertise of Ecology's Wetlands Technical Advisory Group. Please see Appendix C where they are listed. We would like to especially thank Tom Hruby for his review of the numerous drafts and his technical expertise, Richard Robohm for his thoughtful review and editing of Part 1, Teri Granger for her help in editing and reorganizing the document, and Erik Stockdale, Kim Harper, and Laura Casey for their technical contribution to portions of Part 2. In addition we would like to thank staff from the Washington Department of Transportation Wetland Mitigation Technical Group for their practical input on mitigation.

Key Messages

The U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology (the agencies) developed this two-part document cooperatively. This guidance aims at improving the quality and effectiveness of compensatory mitigation in Washington State.

Part 1, *Agency Policies and Guidance,* provides a brief background on wetlands, an overview of the factors that go into the agencies' permitting decisions, and detailed guidance on the agencies' policies on wetland mitigation, particularly compensatory mitigation. It outlines the information the agencies use to determine whether specific mitigation plans are appropriate and adequate. Part 2, *Developing Mitigation Plans,* provides technical information on preparing plans for compensatory mitigation.

Wetland mitigation is usually implemented as a sequence of steps or actions (i.e., mitigation sequencing). Compensatory mitigation is the step in the mitigation sequence that occurs after avoidance and minimization. It involves restoring (re-establishing, rehabilitating), creating (establishing), enhancing, or preserving wetlands to replace those lost or degraded through permitted activities.

Several key messages have emerged in reviewing the success of wetland compensatory mitigation in the last two decades. The single most important message is that compensatory mitigation should make ecological sense in the context of the landscape in which it is conducted. This entails using information about the landscape when making decisions about the type, location, and design of compensatory mitigation. Landscape information may include data accessed through geographic information systems and resource inventories, as well as local or regional plans that were developed using such information. This includes watershed, sub-basin, community, and restoration plans that are based on scientific information. These should be consulted when developing compensatory mitigation projects.

The following points should be considered when selecting, designing, and implementing compensatory mitigation to ensure that it is appropriate and complies with agency policies.

Consult With the Agencies If Proposed Work May Affect Wetlands

If your project may affect a wetland, contact your local government, the Corps, and Ecology before you begin work. The agencies, not applicants or their consultants, have the authority to determine whether or not a wetland is subject to any regulations. See Appendix C for agency contacts.

Apply Mitigation Sequencing

Applicants who propose to alter wetlands must apply mitigation sequencing before determining whether compensatory mitigation is appropriate. They must first avoid and minimize impacts to wetlands and their buffers as much as practicable before proposing compensation for the impacts.

A Conceptual Mitigation Plan is Highly Recommended

An applicant can save time and money by developing a conceptual approach to mitigation, including multiple options for how to compensate for an impact. Arrange a pre-application meeting with agency staff and present the conceptual mitigation plan. Get feedback from agency staff early before developing a final mitigation plan.

Assess Functions

If impacts are unavoidable and compensation is required, the agencies typically ask for an assessment of wetland functions to determine the most appropriate compensation for the impacts. An assessment of functions at the proposed compensation site (both before and after mitigation actions are completed) is usually required to determine the relative level of functions that would be provided as compensation.

Compensate for What Has Been Lost

Sites to be used for compensatory wetland mitigation should be designed to replace lost acreage and/or functions and to be sustainable in the landscape. Requirements for compensation are commensurate with the level and degree of impact.

Mitigation Area Required Is Generally Greater than the Area of Impact

Because of the length of time it takes to successfully create, restore, or enhance a wetland and due to the poor track record of compensatory mitigation, the agencies typically require greater acreage of mitigation to compensate for what was lost. Mitigation ratios provide guidance while specific requirements for compensation are determined by the agencies on a case-by-case basis.

Consider the Landscape

Land uses and the geomorphic setting of a landscape will influence how wetlands and sites used for mitigation perform functions. As a result, available information on the landscape and environmental (landscape) processes (e.g., surficial geology, hydrologic processes) should be used when selecting and designing mitigation sites.

Consider the Source of Water

Water is the most critical environmental variable in selecting and designing a wetland mitigation site. Available information on the source of water should therefore be used when selecting and designing them. Failure to establish an adequate and self-sustaining source of water is a major reason why wetland mitigation projects are unsuccessful.

On-Site Mitigation Isn't Always the Best Choice

Compensating for lost or degraded wetlands on-site is not always the best option. Preference should be given to a site that provides the highest ecological benefits, whether on-site, off-site, in-kind, or out-of kind. Compensatory mitigation projects that contribute to the functioning of a larger landscape are preferable to simply replacing acreage at the site of the impact.

Restore Wetlands and Environmental Processes When Possible

Re-establishment and rehabilitation are the preferred approaches for compensatory mitigation when available. Applicants should strive to compensate for wetland area and/or functions through re-establishment, rehabilitation, or creation before considering the use of enhancement or preservation.

Provide Adequate Buffers

Buffers are important to protect the functions provided by wetlands. They reduce the adverse impacts of adjacent land uses and provide important habitat for wildlife. The width of a buffer is based on the minimum distance necessary to protect the most sensitive functions provided by the wetland. Compensatory mitigation sites need buffers to adequately protect expected functions at the site.

A Mitigation Plan is the Document Agencies Rely on to Evaluate a Mitigation Project

Generally, mitigation plans should describe the rationale for the site selected, the project's goals and objectives, performance standards, construction specifications, monitoring and maintenance protocols, buffers, and mechanisms for long-term protection. Part 2 describes in detail what should be included in a mitigation plan.

Legal Requirements Change Over Time

Please contact the agencies and check the following web page for the most up-to-date guidance: A link to the document can also be found via the Seattle Corps Regulatory Branch and EPA Region 10 Wetlands home page (see *On-line Resources*).

Chapter 1 - Introduction to the Document

This document is the product of a joint effort between the Washington State Department of Ecology (Ecology), the Seattle District of the United States Army Corps of Engineers (Corps), and Region 10 of the United States Environmental Protection Agency (EPA), herein called the agencies. The agencies provide this guidance to help the regulated community comply with environmental laws and policies and to improve the quality and effectiveness of mitigation in Washington State.

Part 1 of this two-part document includes the following:

- A brief background on wetlands.
- Overview of the wetland regulatory process and requirements for wetland mitigation.
- Definitions and descriptions of *compensatory mitigation* types and approaches.
- Guidance on key decisions about mitigation such as buffers and the location, type, and amount of compensatory mitigation.
- Discussion of other considerations when mitigating for impacts to wetlands.

Part 1 replaces the portions of the 1997 Ecology publication, *How Ecology Regulates Wetlands* (McMillan 1998), pertaining to wetland mitigation.

Technical information needed for preparing compensatory mitigation plans is provided in Part 2 (*Developing Mitigation Plans*). Part 2 updates and replaces the 1994 *Guidelines for Developing Freshwater Mitigation Plans and Proposals* (Ecology 1994).

Clarification of Mitigation Terms

"Mitigation" literally means to reduce the severity of an action or situation.

"Wetland mitigation" is usually implemented as a sequence of steps or actions in order to reduce impacts to wetlands. So, *mitigation sequencing* refers to the prescribed order of the different mitigation steps (see Section 3.5.1, *Mitigation Sequencing*).

Wetland *compensatory mitigation* is the stage of the mitigation sequence, where impacts to wetland functions are offset (i.e., compensated for) through creation (establishment), restoration (re-establishment, rehabilitation), enhancement, or preservation of other wetlands. Because regulatory requirements and policies tend to focus on compensatory mitigation, the term "mitigation" is often used to refer to compensation, which is just one part of the overall mitigation sequence.

Throughout this document the term "mitigation" is used interchangeably with the term "compensation" unless referring to the entire mitigation sequence (i.e., "mitigation site," "compensatory mitigation site," or "compensation site" refers to the site that is being used for compensation).

1.1 Organization

The rest of this chapter discusses the purpose of the document and provides background information and an overview of recent changes in how wetland mitigation is viewed and practiced. Chapter 2, *Background on Wetlands*, discusses wetlands and their functions, the importance of water, and wetlands as part of the landscape. The contents of Chapter 3, *Overview of the Wetland Regulatory Process*; Chapter 4, *Approaches to Compensatory Mitigation*; and Chapter 5, *Types of Wetland Compensatory Mitigation*, are indicated by their titles. Chapter 6, *Determining Appropriate and Adequate Compensatory Mitigation*, provides detailed agency guidance on key mitigation decisions such as buffers and the location, type, and amount of compensatory mitigation. Chapter 7, *Other Mitigation Considerations*, discusses such things as stormwater issues related to wetland mitigation and agency policies on invasive species.

Part 2 provides technical information and guidance on developing wetland mitigation projects and plans anad documenting mitigation performance.

This document ranges from basic principles of wetland mitigation to more detailed information and guidance for wetland professionals. The guidance is general to allow for site-specific flexibility, and project-specific mitigation requirements may supersede this general guidance. Because wetland science and regulations change over time, the guidance is subject to revision. Make sure you have the most recent version of this document and any addenda (find the most up-to-date version at http://www.ecy.wa.gov/programs/sea/wet-updatedocs.htm or via the Seattle Corps Regulatory Branch and EPA Region 10 Wetlands home page [see *On-Line Resources*]).

Links to on-line references

The document contains many references to additional sources of information pertinent to wetland mitigation. If connected to the Internet use the external hyperlinks to referenced documents. Just press the CTRL key and click on the link.

See the *On-Line Resources* and *References* sections at the end of the document for a list of Internet addresses and references for hyperlinked documents.

Glossary

The first time a term defined in the glossary is used in a chapter it will be *italicized*. It may or may not be defined in the text. If not, go to the *Glossary* at the end of the document.

"Best Available Science" for Wetlands

Ecology and the Washington Department of Fish and Wildlife (WDFW) completed two documents in 2005 that compiled and synthesized the current science on freshwater wetlands and made recommendations for managing wetlands based on that scientific information (the documents are sometimes referred to as the "Best Available Science" for freshwater wetlands).

Wetlands in Washington State – Volume 1: A Synthesis of the Science (Sheldon et al. 2005)

Wetlands in Washington State – Volume 2: Guidance for Protecting and Managing Wetlands (Granger et al. 2005)

There are numerous references to these documents throughout the text. These documents can be found at http://www.ecy.wa.gov/programs/sea/bas_wetlands.

1.2 Background of the Document

In 1994, the Seattle District of the Corps, Ecology, Region 10 of the EPA, WDFW, and the U.S. Fish and Wildlife Service (USFWS) jointly published the *Guidelines for Developing Freshwater Mitigation Plans and Proposals* (Ecology 1994). Subsequently, Ecology published *How Ecology Regulates Wetlands* (McMillan 1998).

Over the past decade numerous studies of wetland mitigation have been conducted. By 2002 it had become clear that the documents cited above no longer reflected the current scientific information and policies being used by the agencies. Many studies have revealed that mitigation continues to have significant shortcomings. Recent research (Johnson et. al 2000 and 2002) suggests that the State of Washington is still experiencing a net loss of wetland acreage and functions due to failure of mitigation projects to adequately compensate for permitted impacts to wetlands. However, these studies (and others elsewhere in the U.S.) suggested several actions that could substantially improve the success of wetland mitigation. These include better site selection and design and more consistent compliance monitoring and *adaptive management*. For more information on the studies and their recommendations, see Chapter 6 of *Wetlands in Washington State - Volume 1: A Synthesis of the Science* (Sheldon et. al 2005).

In response to these studies, Ecology, the Corps, and EPA began a process to update and improve their guidance on wetland mitigation. The agencies held two public meetings and met with the Washington State Department of Transportation's compensatory mitigation technical group to gather suggestions and new information for the updated guidance. The agencies drew on the experience of staff from natural resource agencies and evaluated information from Ecology's *Washington State Wetland Mitigation Evaluation Study* (Johnson et. al 2000 and 2002), Ecology's "Best Available Science" for freshwater wetlands project (Sheldon et. al 2005, Granger et. al. 2005), a study by the National Academy of Sciences (NAS) called *Compensating for Wetland Losses under the Clean Water Act* (National Research Council 2001), and other research. The agencies also received many comments via the Internet and e-mail. The result is this substantially revised and expanded guidance.

1.3 Purpose of the Document

Ecology, the Corps, and EPA (the agencies) developed this document to clearly outline the agencies' requirements and expectations for wetland mitigation, particularly compensatory mitigation. This guidance does not itself set new requirements for wetland mitigation. Rather, it compiles current scientific information and incorporates the many changes in mitigation policy that have occurred in recent years. It also outlines how the agencies make permit decisions with regard to mitigation.

This guidance was prepared as part of the National Wetlands Mitigation Action Plan[1], which stems from the recommendations of the 2001 NAS study mentioned above. The plan aims at advancing the success of compensatory mitigation nationwide and improving the consistency of mitigation policy and requirements among the regulatory agencies. This guidance is consistent with the plan's *Model Compensatory Mitigation Plan Checklist*, national guidance on *Incorporating the National Research Council's Mitigation Guidelines Into the Clean Water Act Section 404 Program* (see Appendix B), and guidance from the Corps (e.g., Regulatory Guidance Letter (RGL) 02-02, *Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899*[2]*).*

The Corps and EPA regulations (33 CFR 320-331 and 40 CFR 230) and Ecology law and regulations (Chapter 90.48 RCW and Chapter 173-201A WAC) authorize these agencies to require compensatory mitigation for unavoidable impacts to wetlands and other waterbodies defined as *waters of the United States* or *waters of the state*. The agencies have noted the problems with past compensatory mitigation projects and are committed to improving the quality and success of future compensatory mitigation. *Wetland Mitigation in Washington State* will help the regulated public meet the mitigation requirements for federal and state permits and help ensure that future mitigation projects successfully compensate for lost or degraded wetland functions.

This document focuses on mitigation for impacts to freshwater wetlands

While both parts of this guidance focus on freshwater wetlands, some of the topics (such as the basic requirements for a mitigation project, mitigation sequencing, and compensating for area and/or functions) are relevant to estuarine and tidal wetlands. The guidance can apply generally to federal regulation of other *aquatic resources*, such as streams and upland buffers associated with these resources (see Section 7.1, *Compensatory Mitigation and Other Aquatic Resources*). Contact the agencies if you have questions about how this guidance might apply to a particular project (see Appendix C, *Agency Contacts*).

1 More information on the National Wetlands Mitigation Action Plan can be found at: http://www.mitigationactionplan.gov/.

2 RGL 02-02 can be found on-line at: http://www.usace.army.mil/inet/functions/cw/hot_topics/RGL_02-2.pdf

What are the objectives of this document?

The agencies developed this guidance to:

- Improve the quality and effectiveness of compensatory mitigation in Washington State.
- Provide more predictability by clearly outlining the requirements of state and federal agencies for compensatory mitigation.
- Provide guidance on compensatory mitigation that is consistent among several federal and state agencies in Washington (Corps, EPA, and Ecology) that regulate wetlands.
- Provide guidance on compensatory mitigation that is based on "Best Available Science" (BAS).
- Provide guidance that local governments can use to develop consistent mitigation requirements as they update their wetland regulations to include BAS under the Growth Management Act.
- Provide guidance in a format that is user-friendly, easy to update, and web-accessible.

This guidance will help in developing mitigation proposals for impacts to wetlands (primarily for individual projects) authorized under Section 404 of the Clean Water Act (33 USC § 1344) or the State of Washington's Water Pollution Control Act (Chapter 90.48 RCW).

Highlights of this guidance compared to previously published guidance?

- This guidance replaces and expands on the 1994 *Guidelines for Freshwater Mitigation Plans and Proposals* (Ecology 1994), with more details on environmental considerations for mitigation planning. The old document consisted of only an annotated outline of what should be in a mitigation plan. Part 2 of this document has an updated version of that outline.
- Previous guidance documents were published separately by the agencies. This document is a joint document, to provide guidance that is consistent among the Corps, Ecology, and EPA.
- This document incorporates key findings and recommendations related to mitigation policy. Examples include:
  - There has been a shift away from <u>always</u> requiring "on-site and in-kind" mitigation and having that preference drive site design (see Section 6.3, *Choosing the Location and Type of Compensatory Mitigation*). As a result, the recommended approach to compensation is to do what makes the most ecological sense and has the greatest potential to replace or improve upon what is being lost, especially in a landscape context.
  - Mitigation for individual projects often has not utilized landscape-scale information. If a watershed plan exists in the area of project development, considering the plan in site selection should be a priority.

- This document incorporates current scientific information related to technical approaches to mitigation. Examples include:
  - The emphasis of mitigation designs should be shifted from excessive engineering to designs that make ecological sense and are self-sustaining (i.e., long-term maintenance should not be required). This includes assuring that there is an ample and stable supply of water for the wetlands, that *invasive species* are minimized, and that the design is appropriate for its landscape location.
  - The emphasis of mitigation designs should be shifted from climax communities and complex planting schemes to paying attention to the basic principles of plant succession and keeping the planting scheme simple (see Part 2 for more discussion of vegetation).
  - The emphasis of mitigation designs should be on restoring environmental processes rather than structure.

The following section discusses in detail how some of the changes of the last decade have affected mitigation.

1.4 Changes in Wetland Mitigation

The practice of mitigating for impacts to wetlands has long been considered a mixture of science and art. The need to replace wetland functions lost to growth and development has always outpaced the scientific understanding of how wetlands function and how functions can be maintained or replaced. Scientists, landscape architects, consultants, and regulators have worked together for many years to develop ways to restore, create, or enhance wetlands to make up for those lost to human actions. However, virtually every study of wetland mitigation over the past two decades has shown that efforts to replace lost wetland acreage and functions have fallen short.

The recent evaluation by the National Academy of Sciences (National Research Council 2001), as well as detailed studies in Washington, confirms the results of past studies. However, it is believed that the overall success of wetland compensatory mitigation can be significantly improved. For one thing, there are examples of successful mitigation projects that can be emulated. For another, a growing understanding of how wetlands interact with landscape-scale processes has changed how the agencies look at mitigation.

The literature suggests many ways to improve compensatory mitigation:

- Use a landscape-scale approach to improve site selection.
- Improve goals, objectives, and performance standards so that they are measurable, meaningful, achievable, and enforceable.
- Increase maintenance and monitoring.
- Increase follow-up and enforcement.

For more information see *Wetlands in Washington State – Volume 1*: *A Synthesis of the Science* (Sheldon et al. 2005), Section 6.10.

Although wetlands are connected to and interact with a larger landscape, most regulatory programs and mitigation decisions have focused on individual sites, unrelated to the rest of

the landscape (see Section 2.3, *Wetlands as Part of the Landscape*). This site-scale approach results in fragmented wetland systems, disconnected from other habitats and the processes that maintain them in the larger landscape. Wetland scientists, policy-makers, regulators, and the regulated community are working together to develop approaches that reflect an understanding of landscape-scale processes. Mitigation projects that are located and designed this way will provide targeted functions that are sustainable. This holds great promise for more effective, efficient, and cost-effective mitigation of wetland impacts. For more information on approaches to compensatory mitigation, see Chapter 4.

New tools have been developed for assessing wetland functions. *Function assessments* are critical to deciding where to locate and how to design mitigation projects that can replace the functions being lost to development. Monitoring and maintenance are improving and new techniques of adaptive management are being introduced that will help improve on past practices. It is now better understood that successful mitigation requires a big investment of time and energy by applicants, their consultants, and the agencies to monitor and maintain wetland mitigation sites as they develop. Simply digging a hole, putting plants in the ground, watching it for a few years, and walking away simply does not work. Mitigation sites require more care and feeding for more time than was once thought. At the same time, the agencies are learning to be more realistic about what can be achieved, and to understand the limitations on what can develop in a given time.

Despite these advances in our understanding of wetland ecology and compensatory mitigation, the agencies cannot offer a cookbook approach to mitigating wetland impacts. With so many factors and such a variety of situations, the agencies must still make many site-by-site and case-by-case decisions. To provide greater consistency for applicants who must navigate a maze of laws, policies, and science, the agencies have tried to provide some sideboards. The agencies hope this guidance will steer applicants toward proposals that merit timely approval from federal and state regulatory agencies and that succeed at compensating for lost or degraded wetland functions.

Chapter 2 - Background on Wetlands

2.1 Wetlands and Their Functions

Wetlands are transitional areas between upland and aquatic environments where water is present long enough to form distinct soils and where specialized, water-tolerant plants grow. Several definitions of wetlands have been developed over the years. The National Academy of Sciences provided what they call a "reference definition": "A wetland is an ecosystem that depends on constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation at or near the surface and the presence of physical, chemical and biological features reflective of recurrent, sustained inundation or saturation. Common diagnostic features of wetlands are hydric soils and hydrophytic vegetation. These features will be present except where specific physiochemical, biotic, or anthropogenic factors have removed them or prevented their development."

A wetland function is something that a wetland does, regardless of whether it is valued by society or not. Wetland functions are often grouped into three broad categories:

- Improving water quality (i.e., the functions that trap and transform pollutants through biological, geological, and chemical processes).
- Maintaining the *water regime* (or *hydroperiod*) in a watershed (i.e., reducing peak flows and recharging groundwater).
- Habitat (i.e., supporting food webs and habitat for wildlife).

Not all wetlands perform all functions and wetlands provide functions to varying degrees (Novitzki et al. 1996). For example, a wetland with organic or clay soils may retain more heavy metals or toxic organic chemicals than wetlands without those types of soils. A *depressional wetland* without an outlet will remove sediment, nutrients, and toxicants more effectively than a wetland on a slope.

A wetland value, sometimes called a social function, is something that benefits, is worthwhile, or desirable to society (Novitzki et al. 1996). The value to society of each wetland function may vary. If a wetland provides habitat for birds, its value to society may be the opportunities it provides for bird watching or hunting. Society values the ability of wetlands to reduce peak flows during flood events. In an urban center, recreation and open space may be important; in an area prone to flooding, the flood-attenuation functions may be highly valued. In addition, the functions performed by a wetland and society's value of them are also relative to the landscape context in which they perform the functions (see Section 2.3, *Wetlands as Part of the Landscape*).

For a more detailed description of functions, see Part 2, Appendix I (*List and Description of Functions*) or Chapter 2 of *Wetlands in Washington State – Volume 1* (Sheldon et. al 2005).

2.2 The Importance of Water

Water is the most critical environmental variable in the wetland ecosystem. Without enough of it, a site will not be a wetland. With too much water, a site becomes a deep-water aquatic environment (i.e., a site ≥ 6.6 feet in depth) instead of a wetland.

The amount of water and how long it remains on a site (also called *hydroperiod*) determines the plant and animal species living there as well as the chemical and biological characteristics of the soil. Besides affecting the type of wetland that develops on a site, the hydroperiod influences the functions that a wetland provides. For more information on hydroperiod, see Part 2 of this document, Section 3.3.1.1 and 3.4.1.1.

Wetlands may have several sources of water: precipitation, surface flow, subsurface flow, groundwater, etc. Where hydrologic processes have not been substantially altered, the source of water and the hydroperiod generally depend on a wetland's position in the landscape. The type of soils, the permeability of the soils, and the landforms all affect how water moves through the landscape (Bedford 1996). Freshwater wetlands form where:

- The shape of the land allows water to pool at or near the surface of the ground (depressional wetlands).
- Water flows laterally between different soil layers near the surface due to differences in permeability (slope or depressional wetland).
- Breaks in the topography and subsurface flows are exposed (slope wetlands).
- Surface waters regularly flood in valleys (riverine wetlands).
- Large bodies of water are shallow enough to allow light penetration to the bottom (wetlands along the shores of lakes, also called lacustrine fringe wetlands).

2.3 Wetlands as Part of the Landscape

A wetland's position in the landscape, its source of water, and its hydroperiod (i.e., its hydrogeomorphic characteristics) collectively affect the functions that the wetland performs. These characteristics, and therefore the formation and the functions of wetlands, result from the interaction of climate, water, geology, and topography. The most important environmental or landscape factors that influence an individual wetland and its functions may occur outside the wetland boundary. For example, wetlands regularly inundated by river flooding are greatly affected by processes operating at the scale of the entire watershed. Conversely, an individual wetland may influence important environmental factors well beyond its boundaries. Riverine wetlands, for example, may affect such downstream processes as the movement of water, sediment, and nutrients.

The processes that affect a wetland occur mainly within the basin that supplies its water. The factors that control the structure and functions of a wetland occur at both the landscape scale (in the watershed where the wetland is located and beyond) and at the site scale (in and near the wetland). These factors should be considered when making decisions about activities affecting wetlands and associated mitigation opportunities.

For more about wetlands and the landscape, see Chapters 4 and 5 of *Wetlands in Washington State - Volume 2: Guidance for Protecting and Managing Wetlands* (Granger et al. 2005).

Chapter 3 - Overview of the Wetland Regulatory Process

3.1 Introduction

This chapter explains: generally, how the wetland regulatory process works; what agencies may require of applicants; and who applicants need to work with to develop a mitigation project successfully and get it approved. Following chapters provide more details on mitigation requirements.

You can think of the wetland regulatory process as a series of questions you need to answer:

1. Do you have a wetland on your property?
2. What type and size of wetlands are present?
3. What regulations apply?
4. Can you avoid impacts to the wetland?
5. What type of impacts are you proposing?
6. How much and what type of compensatory mitigation may be required?
7. How do you develop a mitigation plan?
8. What are the basic requirements for a compensatory mitigation project?

Consult With the Agencies Early in the Process

If proposed work may affect wetlands, applicants are encouraged to consult with the agencies early on. Rules and requirements change so it is important to contact your local government, the Corps, and Ecology before you begin work. For agency contacts refer to Appendix C.

3.2 Do You Have a Wetland on Your Property?

The first thing you need to know is whether you have a wetland on site that is subject to any wetland laws and rules. You also need to know how big it is, what type it is, and where it is located, relative to other water bodies.

A wetland has particular physical, biological and chemical characteristics. Wetlands are defined differently in various laws, but legal definitions of wetlands in Washington are relatively consistent. They all include the same basic language about having water present long enough to form distinctive soils and specialized vegetation (see Section 2.1, *Wetlands and Their Functions*).

The essential characteristics of a wetland are:

- Recurrent, sustained water above or near the surface of the soil.
- The presence of physical, chemical, and biological features, such as hydric soils and hydrophytic vegetation, which reflect this condition.

Not sure if your project site contains wetlands?

Hire a wetland consultant to delineate potential wetland areas on the property. See *Hiring a Qualified Wetland Professional* in Appendix D.

In Washington State, federal, state and local regulatory agencies are all required to use the same basic method of determining if wetland conditions are present. While the federal agencies use the 1987 *Corps of Engineers Wetlands Delineation Manual* (U.S. Army Corps of Engineers 1987) [3], and state and local agencies use the 1997 *Washington State Wetland Identification and Delineation Manual* (Ecology 1997), these two manuals are consistent. Accurate use of either manual will result in the same conclusion being drawn about whether a wetland is present and what its boundaries are. For more information on delineating wetlands see Part 2, Section 3.1, *Delineating Wetlands and Assessing Impacts*.

State definition of wetlands

The Corps (33CFR 328.3(b)), the EPA (40 CFR 230.3(t)), the Shoreline Management Act (Chapter 90.58.030 RCW (2)(h)), Washington's Water Quality Standards (WAC 173-201A-020), and the Growth Management Act (Chapter 36.70A.030(20) RCW) all define wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

The Shoreline Management Act, Washington's Water Quality Standards, and Growth Management Act definitions add: "Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas to mitigate the conversion of wetlands. (Water bodies not included in the definition of wetlands as well as those mentioned in the definition are still waters of the state.)"

3 At the time this document was written, an ongoing effort by the Corps to "regionalize" the 1987 delineation manual was underway. The Corps is working in collaboration with states, federal agencies, and others to develop supplemental regional criteria to refine the 1987 delineation manual. Two regions fall within the state of Washington: the Arid West (dry lands west of the Continental Divide, from Idaho and eastern Washington south to the U.S.–Mexico border) and the Western Mountains and Valleys. Check the web page of the Regulatory Branch of the Corps, Seattle District, for updated information on these regional manuals: http://www.nws.usace.army.mil (Regulatory).

3.3 What Type and Size of Wetlands Are Present?

Once you know a wetland is present, you usually need an accurate delineation of its boundary. For some projects, you may need only an approximate delineation of the wetland area, especially if no direct impacts (filling, clearing, grading, etc.) will occur in or near the wetland. For most projects, however, you need an accurate delineation of the wetland boundary to calculate how much wetland area will be lost or disturbed and to determine appropriate *buffers*.

While some wetlands are obvious and their boundaries easily determined, many other wetlands can be hard to recognize and to delineate accurately. In most cases, a wetland professional is needed to accurately identify and delineate wetland boundaries for regulatory purposes (see Appendix D, *Hiring a Qualified Wetland Professional*).

There is a great variation in the types of wetlands found in the state and there is an even greater variation in the functions they perform. In addition to the size and location of a wetland, information about the type of wetland is usually needed early in the regulatory process. Wetlands are regulated differently according to their rarity, sensitivity, functions, etc. There are many ways to rate or classify wetlands. Greater consistency is being achieved in the state through wider use of the Washington State wetland rating systems (eastern and western Washington versions) (Hruby 2004a and b). The federal and state agencies and many local governments use this rating system in Washington State. It is a qualitative tool for identifying key wetland attributes that are relevant to regulatory decisions. (Appendix G describes the rating systems and other methods used to analyze the functions of wetlands.)

Mitigation requirements are partly based on the wetland rating or category

A rating system sorts wetlands into categories based on an understanding of how wetlands function and how they are affected by human activities. In the Washington State systems, the categories are based on: the rarity of the type of wetland, our ability to replace it, its sensitivity to adjacent human disturbances, and the functions it performs.

The objective of the rating systems is to divide wetlands into groups that have similar needs for protection. This allows the regulations to be tailored to the protection needs of each type of wetland. Buffer widths and typical compensatory mitigation ratios provided in this guidance are partly based on the wetland rating (see Chapter 6).

In 2004, based on current wetland science, Ecology revised the wetland rating systems that were first developed in 1992 for eastern and western Washington. The revised wetland rating systems (Hruby 2004a and 2004b) are available at http://www.ecy.wa.gov/programs/sea/wetlan.html.

The Corps determines whether a wetland meets the federal requirements for being isolated

Applicants and consultants must coordinate all projects potentially affecting isolated wetlands with the Corps and receive a written jurisdictional determination.[5] Consultants can provide information to the agencies, but the final determination must be made by the Corps.

3.3.1 Isolated Wetlands

Some types of wetlands are regulated by state and local governments but not by the federal government. The most common type is isolated wetlands. *Isolated wetlands* generally have no surface water connections to other *aquatic resources*. Though not always protected under federal law, isolated wetlands often perform many of the same important environmental functions as other wetlands, including recharging streams and aquifers, storing flood waters, filtering pollutants from water, and providing habitat for a host of plants and animals (see Chapter 5 of *Wetlands in Washington State – Volume 1* (Sheldon et al. 2005). **These wetlands continue to be protected under state and local laws and rules.**

A 2001 Supreme Court decision (Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers et al., also known as the SWANCC decision[4]) excluded many isolated wetlands from federal regulation. The Supreme Court based this decision on a legal interpretation of jurisdiction under the federal Clean Water Act (CWA). The key factor was the language in the Act that relates to *navigable waters*. Under Section 404 of the CWA, federal protection extends to those wetlands located on or adjacent to navigable waters of the United States or their tributary systems. Wetlands that do not meet this requirement, such as isolated wetlands with no link to interstate commerce, are not regulated as waters of the United States and are therefore not protected under the CWA.

Prior to the SWANCC decision, the presence of migratory birds was considered enough to establish a link to interstate commerce, and thus CWA protection for isolated wetlands. In SWANCC however the Court ruled that the mere presence of migratory birds is not sufficient for asserting CWA jurisdiction over isolated, intrastate, non-navigable water bodies. As a result of this ruling, many isolated wetlands in Washington are no longer protected by federal law.

4 The SWANCC decision can be found on the EPA web page at: http://www.epa.gov/owow/wetlands/guidance/SWANCC/2001supremecourt.pdf .

5 *Jurisdictional Determination* is the evaluation of a piece of property for the presence of wetlands that would fall under the regulatory authority of the Corps of Engineers.

In general, the Corps considers isolated wetlands to be those of any size that are not adjacent[6] to or do not have a sufficient hydrologic connection to navigable waters. Corps policy regarding the definition and regulation of isolated wetlands is currently in flux, and future court or administrative decisions may further change how isolated wetlands are regulated by the federal government.[7]

The Supreme Court's SWANCC ruling does not change Washington State laws governing wetlands

The state Water Pollution Control Act (Chapter 90.48 RCW) and associated water quality regulations (Chapter 173-201A WAC) make no distinction between isolated and non-isolated wetlands. All *waters of the state,* including isolated wetlands, are covered by state law. The Shoreline Management Act and the Growth Management Act also regulate isolated wetlands (see Appendix E).

Ecology continues to regulate isolated wetlands and to apply the water quality standards prescribed by state law. However, Ecology's process for regulating projects involving isolated wetlands is now different from the process for federally regulated wetlands. The standards of review however, remain the same. For more information see Appendix F, *Focus: Isolated Wetlands – Changes in the Regulatory Process*.

3.3.2 Prior Converted Cropland

Prior Converted Cropland (PCC) is identified for the purpose of implementing the Food Security Act (FSA), and refers to wetlands that were converted from a non-agricultural use to production of a commodity crop prior to December 23, 1985. After 1985 these sites must continue to be in active agricultural use. This means a commodity crop that requires annual tilling must be produced at least once every five years.

In addition, PCCs must not have standing water present for more than 14 consecutive days during the growing season[8]. While many PCC areas have been extensively manipulated and drained, and some may no longer be wetlands, a PCC area may meet the Corps' wetland hydrology criterion. If the land changes to non-agricultural use, or is abandoned, a PCC may be regulated under the CWA.

Even if not abandoned, PCC wetlands, like isolated wetlands that meet the state's delineation criteria (Chapter 173-22-080 WAC) are still regulated under the state's Water

6 The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands" (33 CFR 328.3[c]).

7 Check the following web pages for updates http://www.ecy.wa.gov/programs/sea/pac/iso-wetlands.html or via the Corps regulatory web page at http://www.nws.usace.army.mil/ (Regulatory, Waters & Wetlands Information).

8 If an agricultural site has standing water for greater than 14 consecutive days it would be considered a "farmed wetland." Many farmed areas in valleys flood throughout the winter and would not be considered PCC. It is important to document surface water levels throughout the year. Determining the hydroperiod during the dry season alone is not adequate.

Pollution Control Act (Chapter 90.48 RCW), the Shoreline Management Act, and the Growth Management Act. Conversion of a PCC wetland to non-agricultural use requires state approval.

Joint Guidance on Conducting Wetland Delineations for the Food Security Act of 1985 and Section 404 of the Clean Water Act

In 1994, the Departments of Agriculture, Interior, and Army and the EPA entered into a Memorandum of Agreement (MOA), *Guidance on Conducting Wetland Determinations for the Food Security Act (FSA) and Section 404 of the Clean Water Act (CWA)*. The MOA was developed to streamline the wetland delineation process on agricultural lands, to promote consistency between the CWA and the FSA, and to provide predictability and simplification for U.S. Department of Agriculture program participants.

In January 2005 both the Natural Resources Conservation Service (NRCS) and Department of the Army withdrew from the MOA. The MOA was replaced with the Corps and NRCS *Joint Guidance on Conducting Wetland Delineations for the Food Security Act of 1985 and Section 404 of the Clean Water Act*, issued February 25, 2005[9]. This guidance addresses the responsibility of NRCS for performing wetland delineations for the FSA and the Corps for delineations for CWA Section 404 purposes.

The 2005 MOA also states that the identification of prior converted croplands (PCC) made by NRCS remains valid as long as the area is devoted to an agricultural use. If the land changes to a non-agricultural use, the PCC determination is no longer applicable and a new wetland determination is required for Clean Water Act purposes. Specific guidance will be provided by the Corps in the near future addressing how the Corps will treat PCC designations for land that changes from agricultural to non-agricultural use.[10]

Landowners, who intend to develop their land or conduct an activity that precludes use of the land for continued agricultural production, should contact the Corps to determine if the land meets the criteria for jurisdictional wetlands under the CWA. See Appendix C, Agency Contacts.

Important Note: The Corps of Engineers, not applicants or their consultants, has authority to determine whether or not a wetland is a water of the U.S. and thus regulated under the federal Clean Water Act (CWA). If the Corps determines that a wetland is not subject to regulation under the CWA, applicants should be aware that these wetlands are still regulated by Ecology as well as by local governments.

9 The joint guidance can be found on-line at http://www.nrcs.usda.gov/programs/compliance/pdf_files/COE_NRCS_wetland.pdf.

10 Check the following web page for updates http://www.ecy.wa.gov/programs/sea/pcc.html or via the Corps regulatory web page at http://www.nws.usace.army.mil/ (Regulatory, Waters & Wetlands Information).

3.4 What Regulations Apply?

Federal, state and local wetland regulations can vary in how they apply to different types of wetlands and different types of activities that can impact wetlands. Some types of wetlands or wetlands of a certain size are specifically exempted under some laws. Certain activities, such as forestry or agriculture, are exempted under some laws. It is important to determine whether and how a wetland is subject to each law that applies. The best way to do this is to consult with the appropriate agency. In general, the Corps is the agency to contact at the federal level; Ecology the agency to contact at the state level; and the city or county planning department at the local level. Tribes can also play an important role in wetland regulations when projects affect reservation land, *cultural resources*, traditional cultural properties, and tribal "usual and accustomed" areas[11] (see Section 3.4.3, *The Role of Other State Agencies*).

Regulatory authority regarding compensatory mitigation

Regulations (33 320-330 and 40 CFR 230) authorize the U.S. Army Corps of Engineers (Corps) and U.S. Environmental Protection Agency (EPA) to require compensatory mitigation for unavoidable impacts to wetlands and other jurisdictional waters of the U.S. The Corps and EPA have prepared policies and procedures to be used in determining the mitigation necessary to demonstrate compliance with the Clean Water Act 404 (b)(1) Guidelines (40 CFR 230). This information is set forth in the *Memorandum of Agreement (MOA) Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404 (b)(1) Guidelines*, dated February 7th, 1990.

The Washington State Department of Ecology's (Ecology) authority rests with the state Water Pollution Control Act (Chapter 90.48 RCW) and associated water quality regulations (Chapter 173-201A WAC). Based on the antidegradation policy (Chapter 173-201A-300 WAC), with adequate mitigation that effectively offsets the impacts, Ecology can permit projects that would not otherwise comply with the regulations.

A description of the laws and rules that may apply to proposed activities in or near wetlands can be found in Appendix E. A table in the appendix summarizes pertinent federal, state, and local laws and rules. The appendix also includes key policy and guidance documents used by the agencies to implement wetland regulations. It is important to note that policies and guidance have evolved over time as more has been learned about compensatory mitigation. If there appear to be conflicts between documents, contact the agencies for clarification. For more information on each law contact the responsible agency (see Appendix C).

11 Tribes can also have a significant role in coordination and consultation under Section 106 of the National Historic Preservation Act of 1966 to determine how a project may affect recorded or undiscovered cultural resources (see Appendix E for a description of the National Historic Preservation Act).

What activities are regulated?

Because of the complexity of laws and regulations that may apply to a particular activity, it is best to contact each agency that might have jurisdiction to find out if a wetland or activity is regulated by that agency's laws and regulations. Though the definitive answer needs to come directly from the agencies, qualified wetland professionals that work locally and are familiar with the different laws and how they apply can help save an applicant time and money (see Appendix D, *Hiring a Qualified Wetland Professional*).

3.4.1 Applying for Permits

Once an applicant understands the laws that might apply to a wetland they may be impacting, they should find out what the requirements and timelines are for filing a permit application to get approval for impacts to a wetland. To make the process easier for applicants, Washington State developed the Joint Aquatic Resource Permit Application (JARPA). The JARPA streamlines the permit-application process for water-related projects.

The JARPA application covers the most frequently required federal and state authorizations relating to wetlands. These include the state Shoreline permits, state Hydraulic Project Approval (HPA), state 401 Water Quality Certification, and Corps Section 404 and Section 10 permits under the Federal Clean Water Act. Rather than completing several separate forms, the applicant fills out one standard permit application for all.

The review process begins when the standard application is completed and submitted to each agency at the same time. The standardization, however, does not reduce the number of authorizations/permits required; it only makes the application process easier. The application still needs to be reviewed by each agency. Also, each agency still issues separate authorizations under its authority. Some local governments use the JARPA, combining some or all of their wetland-related permits on the JARPA form. Check with the local government to determine whether they use the JARPA format. You can get the JARPA form at the Office of Regulatory Assistance web page: http://www.ecy.wa.gov/programs/sea/pac/jarpa.html.

Washington State Office of Regulatory Assistance (ORA)

ORA provides one-stop assistance in navigating the regulatory process and determining which agency permits and authorizations may be needed. ORA staff will help applicants develop a plan for meeting environmental and land-use requirements. Contact ORA at (360) 407-7037, 800-917-0043, ecypac@ecy.wa.gov, or visit their web page: http://www.ecy.wa.gov/programs/sea/pac. To go directly to ORA's on-line Project Questionnaire, developed to help applicants determine which Washington State and Federal environmental permits will be needed for a project, go to http://www.ecy.wa.gov/opas/index.asp.

If the proposed work will take place in or near wetlands or other waters, applicants should also contact the Corps, the appropriate regional wetland specialist for Ecology, and the local government (see Appendix C, *Agency Contacts*). Contacting the appropriate wetland regulatory staff early can save time and money.

3.4.2 The Role of Other State Agencies

The Washington Department of Natural Resources (WDNR) and the Washington Department of Fish and Wildlife (WDFW) also implement regulations that apply to wetlands and other aquatic resources. WDNR is the manager of state-owned aquatic lands. If activities, including mitigation projects, are proposed on state-owned aquatic lands, authorization to use the lands must be issued from the WDNR. For any projects authorized on state-owned aquatic lands, WDNR's administrative rules (WAC 352-30-107(6)) dictate that all substantial or irreversible impacts must be fully mitigated. WDNR's Aquatic Resources Division is currently working on guidance for mitigation related to management of state-owned aquatic lands. Go to http://www.dnr.wa.gov/htdocs/aqr/or http://www.dnr.wa.gov/htdocs/aqr/mitigation/index.html.

Boundaries of state-owned aquatic lands

A discussion on this topic can be found in a brochure prepared by WDNR. It can be found on-line at http://www.dnr.wa.gov/htdocs/aqr/pdfs/aqrland_bound.pdf.

WDNR is required by the Forest Practices Act (Chapter 76.09 RCW) to administer and enforce all rules adopted by the Forest Practices Board. The Forested Practices Act and its implementing rules (Chapter 222 WAC) apply the wetland provisions of the federal Clean Water Act and the State Water Pollution Control Act on state and private forest lands.

WDNR reviews applications for timber harvest and applies restrictions along streams and within wetlands and their buffers as detailed in the Forest Practices Manual (see the web page for the Forest Practices Division if you are proposing to impact wetlands in areas where WDNR has jurisdiction: http://www.dnr.wa.gov/forestpractices/index.html).

WDFW is responsible for preserving, protecting, and perpetuating all fish and shellfish resources of the state. To assist in achieving that goal, the state Legislature in 1949 passed a state law now known as the "Hydraulic Code" (Chapter 77.55 RCW). The law requires that any person, organization, or government agency wishing to conduct any construction activity that will use, divert, obstruct, or change the bed or flow of state waters must do so under the terms of a permit (called the Hydraulic Project Approval or HPA). This permit is issued by WDFW. State waters include all marine waters and fresh waters of the state (for more information if your activities may impact wetlands adjacent to, or in streams: http://wdfw.wa.gov/hab/hpapage.htm).

3.5 Can You Avoid Impacts to the Wetland?

Programs protecting wetlands on the federal, state, and local level generally require three basic actions for projects that are likely to affect wetlands:

1. Identify and describe potential impacts.
2. Follow the *mitigation sequencing* process (discussed below).
3. Provide compensatory mitigation for unavoidable impacts.

Before authorizing a project, the agencies require that the applicant demonstrate that impacts have been avoided and minimized to the greatest extent practicable (i.e., apply mitigation sequencing as described below). The applicant must determine the amount of unavoidable impacts and compensate for lost or degraded wetland area and/or function.

First, avoid and minimize impacts to wetlands

For most types of impacts, wetland laws require that applicants demonstrate a "need" for impacts to a wetland. The impacts must generally be "unavoidable." It is getting harder to find developable sites in areas that do not have wetlands or other types of natural resources (e.g., streams) or hazards (e.g., steep slopes). This can make it difficult to develop some properties in a pattern or at a density that is necessary or desired. However, many developers have found that they can save considerable time and money by completely avoiding wetland impacts and the associated mitigation requirements. In other cases, creative design and construction can significantly reduce impacts.

3.5.1 Mitigation Sequencing

The Washington State Environmental Policy Act (SEPA) (Chapter 43-21C RCW), administered by Ecology, and Section 404 of the federal Clean Water Act (CWA), administered by the Corps and EPA, both require that a sequence of actions be taken for proposals that will impact wetlands (mitigation sequence). The following are the steps in the mitigation sequence according to the implementing rules of SEPA (Chapter 197-11-768 WAC):

> *(1) Avoiding the impact altogether by not taking a certain action or parts of an action;*
>
> *(2) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;*
>
> *(3) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;*
>
> *(4) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;*
>
> *(5) Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or*
>
> *(6) Monitoring the impact and taking appropriate corrective measures.*

At the federal level, activities requiring a CWA Section 404 permit are usually subject to similar sequencing requirements as found in the implementing rules of SEPA. In 1990, the EPA and Corps entered into a Memorandum of Agreement (MOA) (*The Determination of*

Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines[12]) to clarify the type and level of mitigation required under Section 404 regulations. The agencies established a three-part process, also known as mitigation sequencing, to help guide mitigation decisions:

1. Avoid – In general, adverse impacts are to be avoided to the maximum extent practicable. (In most cases a proposed discharge may not be permitted if there is a practicable alternative to that discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. However, the 404(b)(1) Guidelines provide flexibility in applying the sequencing process, such as in cases when the environmental impact would be insignificant.)

2. Minimize – Take appropriate and practicable steps to minimize those adverse impacts that cannot be avoided.

3. Compensate – Provide appropriate and practicable compensation for the remaining impacts that cannot be avoided or further minimized.

This sequencing process is therefore required to comply with both state and federal laws.

Projects that require CWA authorization by the Corps must also comply with the Section 404(b) (1) guidelines. These guidelines presume, unless clearly rebutted by the applicant, that less environmentally damaging alternatives to filling special aquatic sites, such as wetlands, are available for non-water-dependent activities. Whether a project is water dependent or not, the guidelines presume that all practicable alternatives that do not involve a discharge into a special aquatic site, which includes wetlands, have less adverse impact on the aquatic ecosystem.

The Section 404(b)(1) guidelines prohibit the Corps from authorizing a project under an individual permit unless that project would use the "least environmentally damaging practicable alternative" (as determined by the Corps and EPA). If a less environmentally damaging alternative is available and practicable, then a permit would be denied. In some cases, the least environmentally damaging practicable alternative is the one that would relocate the project away from special aquatic sites, possibly to another site altogether. In the case of nationwide permits (NWP) (a collection of general permits), the Corps has already performed an alternatives analysis and determined that projects which meet the conditions of the NWP meet the test of "least environmentally damaging practicable alternative." For more information on NWP go to the Corps' Regulatory Program web page ("Permit and Applicant Information") via http://www.nws.usace.army.mil.

When determining the least environmentally damaging practicable alternative, other ecosystems and habitats should be considered. For example, it may be preferable to authorize an impact to a low-functioning, highly degraded wetland rather than damage a mature, forested upland that provides a high level of function.

12 The MOA can be found via the Seattle District regulatory home page http://www.nws.usace.army.mil/ (Regulatory Permit Program, Regulations and Guidance) or directly at: http://www.usace.army.mil/inet/functions/cw/cecwo/reg/moafe90.htm. See Appendix E for a description.

Avoid wetlands that are hard to replace

For certain wetlands that are rare, sensitive, or hard to replace (e.g., bogs, fens, mature forested wetlands, eelgrass beds, and habitats for unique species or endangered plant populations) *avoidance* is usually the only step in the mitigation sequence. For more information and further guidance see the *Federal Guidance on Protection and Mitigation of Difficult to Replace Aquatic Resources Under Section 404 of the Clean Water Act*, which was developed as part of the National Wetlands Mitigation Action Plan (http://www.mitigationactionplan.gov).

3.6 What Type of Impacts Are You Proposing?

The loss of an entire wetland is not the only type of impact that requires compensatory mitigation. The area of wetland affected, the degree of alteration, and the effects on functions can vary widely. All of these factors affect the requirements for compensatory mitigation. If an entire wetland is filled, all functions are lost and generally will need to be replaced. If only a portion of a wetland is filled, there will be changes in the degree to which it provides functions. Some functions may be affected only slightly and others eliminated completely. Likewise, a wetland may be degraded without any loss of area, as when removal of vegetation results in a change in the level of functioning.

Some impacts result in a permanent loss of wetland area and function (e.g., filling for a permanent structure), while others may be temporary (e.g., installing a utility line through an emergent wetland). Permanent changes typically require compensation for the functions lost or reduced. Compensatory mitigation may also be required for temporary (short or long term) or indirect impacts. Four types of impacts are defined below:

Permanent impacts result in the permanent loss of wetlands or waters of the state/United States. For example, placement of fill in a wetland to construct a road would be considered a permanent impact. Permanent impacts typically require compensatory mitigation.

Long-term temporary impacts affect functions in such a way that they can be restored, or will eventually be restored over time, but not within a year or so. Long-term temporary impacts or alterations carry a risk of permanent loss, such as when soil is compacted by equipment, deep excavation is required, or pipeline trenches alter the water regime. Clearing a *forested wetland* for a temporary access road changes the plant community and degrades functions, such as song bird habitat provided by the tree canopy. It will take many years to grow back and re-establish the previous level of function. Long-term temporary impacts normally require compensatory mitigation but at a lower ratio than permanent impacts (see Section 6.5.6, *Mitigation Ratios for Temporary Impacts and Conversions*).

Short-term temporary impacts last for a limited time, and functions return to pre-impact performance fairly soon (about one year or within one growing season of the impact). For example, clearing emergent vegetation (e.g., cattails, rushes, sedges, grasses, etc.) for temporary construction impacts associated with a road (e.g., for a short-term staging area), changes the functions performed by the

wetlands for a short time. Emergent vegetation may return within one growing season if the disturbance is not severe. Compensatory mitigation is often not required for short-term temporary impacts (see Section 6.5.6, *Mitigation Ratios for Temporary Impacts and Conversions*).

Indirect impacts can result from activities adjacent to or upslope from a wetland that affect how it functions. For example, constructing a road adjacent to or near a wetland may produce sediment that enters the wetland, burying vegetation, and altering functions.

Indirect impacts can also result from primary impacts within a wetland that have secondary (indirect) negative effects on functions. For example, placement of fill for a new road may cause indirect impacts within a wetland. The road crossing affects more than just the area of wetland under the road fill. The flow of water through the wetland changes, and the road forms a barrier to animal movement and causes ongoing disturbances from noise and light.

Another type of indirect impact occurs when so much of a wetland is filled that the remaining wetland area can't provide functions at its former levels. Some functions decline sharply as wetland size diminishes. In such cases, the agencies may consider the entire wetland to be adversely impacted, and compensatory mitigation will be required for both direct and indirect impacts to the wetland.

Avoid impacts to compensatory wetland mitigation sites

Impacts to sites containing compensatory wetland mitigation projects should be avoided whenever possible. If impacts are unavoidable, the agencies consider the following when calculating how much compensatory mitigation will be required (i.e., the mitigation ratio):

- If the project is still active (i.e., still under construction or being monitored) then the amount of required mitigation will be higher to address the additional *temporal loss* of the original wetland's functions and area. Specific mitigation ratios will depend on how the site is currently functioning, the level of impact, and how close the site is to meeting its goals.
- If the project has been completed (i.e., the monitoring period is over and the agencies have acknowledged that all permit requirements are fulfilled) then the compensation wetland will be viewed as any other natural wetland. The amount of required compensatory mitigation will be based on the existing wetland area, functions, type, and category, as well as the type and amount of impact.

3.7 How Much and What Type of Compensatory Mitigation Will Be Required?

Mitigation is typically required to compensate for the loss of wetland acreage and/or functions. Many factors, in addition to the type and degree of impact, determine the

appropriate form and amount of compensation. Chapter 6 contains detailed information on what the agencies use to guide their determination.

When compensatory mitigation is required, a plan must be developed and presented to the agencies for approval as part of the permit process. A conceptual plan should first be developed and discussed with the agencies, followed by draft and final plans that are revised as the mitigation proposal progresses. See the next section for a general description of the factors to consider in developing a mitigation plan.

3.8 How Do You Develop a Mitigation Plan?

A mitigation plan is the document that explains how a wetland impact will be compensated for and provides enough detail for the agencies to determine if the mitigation project is likely to succeed. The plan should describe:

- The nature of the proposed impacts (i.e., acreage of wetlands and functions lost or degraded).
- The goals, objectives, and performance standards.
- The rationale for the mitigation site that was selected.
- How the compensation will be accomplished.
- How it will be monitored to assess progress toward the goals and objectives.

Other elements that are addressed and implemented through a compensatory mitigation plan are:

- Site maintenance.
- Financial assurances.
- Long-term protection.

Once a plan has been developed and the agencies have reviewed the plan and permit application, it may be subject to public review and comment. After the mitigation project is installed, it will be monitored for compliance by the agencies.

More details on some of the elements of a mitigation plan can be found in Section 3.9 (*What Are the Requirements for a Compensatory Mitigation Project?*). Part 2 of this document provides detailed information and guidance on developing a mitigation plan and includes a recommended outline.

Mitigation plans are typically prepared by qualified wetland professionals, usually consultants hired by the applicant. The agencies strongly encourage applicants to hire experienced consultants who have successfully developed and implemented mitigation projects. Having an experienced consultant can save time and money in developing and implementing mitigation (see Appendix D, *Hiring a Qualified Wetland Professional*).

The agencies also urge applicants and their consultants to work with agency staff early in the process of developing a mitigation plan. An applicant can save time and money by first developing a conceptual mitigation approach and getting feedback from agency staff before developing draft and final plans. The conceptual plan should include potential options for

compensating for an impact. Many applicants have spent a lot of time and money on a detailed mitigation proposal, only to find that the location or design is not practicable or appropriate.

3.9 What Are the Requirements for a Compensatory Mitigation Project?

The detailed requirements for compensatory wetland mitigation tend to be site-specific and are handled on a case-by-case basis. Guidance provided in Chapters 4 through 6 addresses approaches to mitigation, types of wetland compensation, the location of the compensation project, the amount of compensation (mitigation ratios), and the widths of buffers needed to protect mitigation sites.

3.9.1 Goals, Objectives, and Performance Standards

A compensation project must formally identify its goals, the steps that will be taken to accomplish those goals (objectives), and measurable indicators to determine if the objectives have been achieved (performance standards). Goals, objectives, and performance standards are essential for determining the success and compliance of a project.

Goals should identify what the project is trying to accomplish – what the end product will be (e.g., what functions you want the project to provide). Objectives should identify specific elements of a goal that can be measured and that provide more detail on how that goal may be achieved. Performance standards, or success criteria, are specific conditions used to determine whether a mitigation project is achieving its objectives.

Every compensation project is unique and has its own site-specific considerations. Its goals, objectives, and performance standards should still include basic information like the amount of wetland acreage and the targeted functions. Part 2 of this document provides examples and more detailed information on goals, objectives, and performance standards.

3.9.2 Monitoring

Monitoring ensures that a mitigation project achieves its stated purpose and complies with permit obligations. It involves gathering and analyzing data about conditions at a mitigation site that is used to determine whether a project is achieving its performance standards. It also provides critical information about whether a site needs maintenance or whether contingency actions need to be taken.

A mitigation plan should include a monitoring plan. The duration, frequency, and methods of monitoring depend on a project's goals, objectives, and performance standards. In general, monitoring is required for at least five years. If a scrub-shrub or forested vegetation community is proposed, monitoring may be required for 10 years or more. Monitoring may be extended if interim performance standards are not being met.

3.9.3 Maintenance and Contingency Plans

Maintenance and *contingency plans* should be included in the overall plan for the compensatory mitigation project. Ideally, projects should be relatively maintenance

free to be considered successful. However, mitigation sites often require maintenance to help ensure that performance standards are achieved. Maintenance plans outline the activities that are regularly scheduled that prevent minor issues from becoming big problems. Ongoing maintenance activities could include removal of unwanted plant species, the upkeep of short-term irrigation systems, weeding trees and shrubs to the drip line, mulching, and removal of litter.

Contingency plans should outline actions that would be taken if monitoring revealed a problem that would prevent the site from attaining its performance standards. Contingency plans should both anticipate problems and identify specific actions that would be implemented to rectify each problem. Actions may be identified for problems such as failed plantings, invasion of non-native species (e.g., reed canary grass, bull frogs), damaged or missing structures, insufficient water supply or inappropriate water regime, and vandalism.

3.9.4 Adaptive Management

Adaptive management is a systematic process in which modifications to a compensatory mitigation plan, including monitoring, maintenance, and contingency plans, are made based on what has or has not been effective. It is most often implemented when unforeseen circumstances result in problems that a compensatory mitigation plan has not addressed. For example, a hundred-year flood could destroy vegetation planted at the site or bury the mitigation area with sediment. Or contingency measures identified in the plan might fail to rectify problems. Through adaptive management, the applicant and agencies should discuss any problems and possible solutions and site management should be adjusted accordingly.

3.9.5 Financial Assurances

Financial assurances may be required by the agencies to ensure that the potential risks of mitigation failure are minimized. Financial assurances protect the environment by providing the agencies with the financial resources necessary to ensure the success of a mitigation project should the responsible party be unable or unwilling to do so. Such assurances may be needed for construction of the compensation site, short-term management, and long-term management. Some financial assurances are held until after construction of the site, while others are held until it is determined that the goals, objectives, and performance standards have been met (i.e., the site is fully compliant).

Financial assurances may take the form of performance bonds or letters of credit. Applicants should check with their local planning department to determine if the local government will require performance bonds or other forms of financial assurances. A bond should estimate all costs associated with the entire compensatory mitigation project, including site preparation, plant materials, construction materials, installation oversight, maintenance, monitoring and reporting, and contingency actions expected through the end of the required monitoring period.

Agencies usually require that applicants provide a source of funding for the long-term management of larger compensation projects and those entrusted to another entity for long-term maintenance. This often includes the establishment of an endowment which

generates sufficient interest to fund ongoing management activities (e.g., weed control, repair of vandalism, monitoring).

3.9.6 Long-Term Protection

To ensure the successful compensation of wetland area and/or function lost to unavoidable impacts, applicants must provide a means of protecting the mitigation site for the long term. Wetland mitigation sites can be protected from future loss and degradation through the use of buffers, legal mechanisms, and other forms of physical protection.

3.9.6.1 Buffers

Buffers are a common and necessary element of compensatory mitigation. Buffers are protective vegetated areas along the perimeter of wetlands and other aquatic resources that reduce impacts from adjacent land uses through various physical, chemical, and biological processes.

The agencies require that compensation wetlands include a buffer of the minimum width necessary to protect the most sensitive functions performed by the wetland. The buffer width needed for the compensation site will be based on the projected level of functions. Surrounding land uses also help determine the width of the buffer. A mitigation site that is located next to land uses that have high impacts to adjacent wetlands, for example, is likely to need a larger buffer than one adjacent to land uses that have low impacts to adjacent wetlands. See Section 6.6, *Determining Adequate Buffers*, for detailed guidance on buffer requirements and determining appropriate buffer widths.

3.9.6.2 Legal Protection of the Site

Deed restrictions, *conservation easements*, or other legal mechanisms are generally required to protect compensatory mitigation projects from future development. This is especially true when existing wetlands are preserved to compensate for wetland losses. Such legal mechanisms are needed in addition to buffers to ensure that the wetlands will not be lost or degraded in the future. See Part 2 for more discussion of legal protection mechanisms.

For compensatory mitigation projects on state-owned aquatic lands, project proponents must apply for a use authorization from the Washington Department of Natural Resources (WDNR). Use authorizations can be issued for up to 50 years, depending on the land classification. WDNR is currently drafting its policy and guidelines for issuing use authorizations related to compensatory mitigation activities. (See Section 3.4.2, *The Role of Other State Agencies*.)

3.9.6.3 Physical Protection of the Site

Compensatory mitigation sites and their buffers may need physical protection from recreational vehicles, lawnmowers, cats and dogs, herbivores (e.g., geese, deer), and pedestrian traffic. The protection needed depends on the type of threat and the functions provided by the site. People can often be deterred by a split-rail fence or even signs indicating that the area is a wetland and should not be disturbed. Planting native thorny

shrub species in the buffer can also deter people from entering the wetland. Placing large boulders at key points can deter off-road vehicles.

Protection against browsing animals may need to target particular species. An 11-ft fence that excludes deer probably won't stop geese from grazing. Protective tubes may be needed on each seedling to keep mice from girdling trees and shrubs. For further discussion, see Part 2, *Site Planning and Design – Vegetation*.

Fences

Fence specifications should be tailored to address what is needed to protect a particular compensation wetland, based on both the potential for human impacts and the desired functions of a site. If the mitigation is to support larger mammals, fencing is discouraged. If a fence is necessary, it should allow wildlife to get into and out of the mitigation site. Examples include split-rail and smooth-wire fences.

Instead of fences, consider natural barriers to keep people out of a mitigation site. A buffer dominated by spiny or thorny native plants such as rose, salmonberry, gooseberry, hawthorn, or stinging nettles could be planted. The barrier could also be complemented with signage.

Chain-link or barbed wire fences around mitigation sites are discouraged unless a specific need for such a fence is established. If the main habitat functions are for small mammals, birds, amphibians, and fish, a chain-link fence may be acceptable for some situations or periods of time (e.g., to fence out herbivores until plants get established). Where mitigation sites are next to grazing lands, smooth wire fencing may not provide adequate protection and the greater protection of barbed wire fences may be needed.

3.9.7 Public Review and Comment

After a permit application and compensatory mitigation plans have been submitted, reviewed, and determined to be complete, there is usually an opportunity for public comment. Through their public notice process for standard individual permits, the Corps gives the public a chance to review and comment on the proposed project's impacts and mitigation strategy. Usually, the public notice contains a synopsis and drawings of the proposed mitigation, with details available upon request. When a Section 401 Water Quality Certification from the state is necessary, Ecology normally issues a separate public notice.

These processes afford the public only a limited opportunity to comment on compensatory mitigation plans, since most permit actions fall under the Corps Nationwide Permit program. There is no formal opportunity for the public to review and comment on mitigation plans when a Nationwide Permit applies. For more information on nationwide permits go to the Corps' Regulatory Program web page ("Permit and Applicant Information") via http://www.nws.usace.army.mil/.

On the local level, the public may get to comment on permits and plans for compensatory mitigation as a part of the public review process through the State Environmental Policy

Act. Those interested should contact their local government's planning department or office of community development for more information (see Appendix C, *Agency Contacts*).

Public notices are available on-line

Public Notices for proposed projects being reviewed by the Seattle District of the Corps of Engineers are available on-line at its Regulatory Branch web page via http://www.nws.usace.army.mil/. You can email the Seattle District (regulatory.nws@nws02.usace.army-mil) to request that your email address be added to its public notice mailing list.

Ecology maintains a list of active Public Notices at the following web page: http://www.ecy.wa.gov/programs/sea/fed-permit.

3.9.8 Compliance and Enforcement

The agencies must ensure, to the best of their abilities, that compensatory mitigation is not only appropriate and adequate, but also successful. To accomplish this, their regulatory programs include compliance and enforcement elements.

The purpose of compliance is to ensure that permittees meet the terms and conditions of their permits. Under their responsibilities relative to compliance, the agencies typically inspect mitigation sites, review project status and monitoring reports, and determine whether mitigation projects have met their performance standards. Permittees should expect the Corps, Ecology, and other regulatory agencies to take an active role in ensuring compliance. Recent research by Ecology found that compensatory mitigation projects that are reviewed for their compliance by regulatory agencies tend to be more successful (Johnson et al. 2002). A project proponent who fails to comply with the terms and conditions of a permit may be subject to judicial action or a civil penalty.

In contrast to compliance, enforcement deals with activities that have occurred without proper authorization. In addition to protecting the environment, enforcement actions help preserve the integrity of a regulatory program by ensuring that everyone is treated fairly and consistently. An effective enforcement program also helps eliminate unfair advantages that might accrue to someone who does not abide by environmental laws and regulations.

Enforcement normally involves working cooperatively with a violator to resolve the violation and includes remediation of its adverse environmental impact. When necessary, enforcement actions include civil or criminal procedures that can result in substantial fines and/or imprisonment. The Clean Water Act authorizes fines for enforcement actions of up to $25,000 per violation per day (33 USC § 1319).

Chapter 4 - Approaches to Compensatory Mitigation

Mitigation can be provided for the impacts of a single project or in conjunction with the impacts of other projects. Many mitigation proposals however are individual or project specific; they aim to satisfy permit requirements for only one project. In most cases, an applicant is required to implement a *compensatory mitigation* project at the same time that wetland impacts occur (i.e., concurrently) or soon thereafter (see Section 6.2, *Determining When Mitigation Actions Should Occur*).

Because project-specific, *concurrent mitigation* is by far the most common approach to compensating for wetland losses at this time, discussion of other approaches in this document is limited. Other options to compensating for wetland impacts are being developed and encouraged, however. These include advance mitigation and other programmatic approaches, such as mitigation banking, which are briefly discussed in this chapter. Individuals interested in pursuing these approaches should contact the agencies to find out more (see Appendix C, *Agency Contacts*).

4.1 Advance Mitigation

Advance mitigation is compensatory mitigation in which the mitigation project is implemented before, and in anticipation of, future known impacts to wetlands. Advance mitigation has been used most for large mitigation projects that are constructed in distinct phases where the impacts to wetlands are known. Advance mitigation lets an applicant provide all of the compensation needed for the entire project affecting wetlands at one time. If the mitigation is successful, the approach will often result in lower mitigation ratios for later phases of the project. This is because the impacts have already been compensated for and the *temporal losses* and the risk of failure are reduced or eliminated (see Section 6.5, *Identifying the Amount of Compensation [Mitigation Ratios]*).

Although similar to mitigation banking (see Section 4.2.1), advance mitigation is different in several ways. Most important, advance mitigation is used only to compensate for a **specific project (or projects) with pre-identified impacts to wetlands**. In contrast, the use of a mitigation bank does not require that specific impacts or debit projects be determined in advance. Also, if the intended project is not built, advance mitigation is generally not transferable to other projects. In other words, advance mitigation is implemented at the applicant's own risk.

If the project (or projects) planning to use the advance mitigation do not occur, the project proponent in some limited cases may be able to gain certification for a mitigation bank, which would let agencies permit the use of this mitigation for other projects. In this case, pre-project baseline studies and post-construction monitoring are important to document initial conditions and subsequent development of the mitigation project. This type of documentation would be necessary for certification as a mitigation bank. However, the approval process for advance mitigation cannot substitute for the review and approval process for mitigation banking. Advance mitigation that is not for specific wetland impacts will need to follow the procedures and requirements for mitigation banking.

"Excess" Compensatory Mitigation

Sometimes permittees voluntarily or accidentally provide more mitigation than required. Permittees ask to apply this "excess" mitigation to another project affecting wetlands in the same vicinity. At times applicants have requested that excess mitigation be reserved or acknowledged for future projects. Since there are formal processes for mitigation banks and advance mitigation, the agencies generally do not support creating unofficial banks for excess mitigation. Allowing applicants to unofficially "bank credits" or perform advance mitigation circumvents the federal and state processes set up for these actions.

If applicants perform compensation beyond what is required in the hope of using it for future projects, they do so at their own risk. The agencies are under no obligation to accept it as compensation for the impacts of other projects, but they may consider it in certain situations. Baseline conditions at the mitigation site should be thoroughly documented in order for any excess mitigation to be considered for other projects.

Applicants should consider consolidating compensatory mitigation for projects beyond the one being authorized before starting the permit process. That way, the applicant and agencies can decide on the correct approach first, and the applicant can receive assurance that the proposed compensatory mitigation can be used for future projects.

4.2 Programmatic Mitigation

Programmatic mitigation generally involves combining compensatory mitigation for two or more projects affecting wetlands or other *aquatic resources*. Programmatic approaches include *mitigation banking*, *in-lieu fees*, programmatic mitigation areas at the local level, and "consolidated" mitigation. These approaches often involve compensatory mitigation projects designed to restore and maintain *environmental processes* in a larger landscape context. Some of these approaches however have not yet been widely used in the State of Washington.

4.2.1 Mitigation Banking

Although *mitigation banking* has been around since the 1970s, it has only recently become widely used. The 1995 federal guidance on mitigation banking[13] defines it as "wetland restoration, creation, enhancement, and in exceptional circumstances, preservation undertaken expressly for the purpose of compensating for unavoidable wetland losses in advance of development actions, when such compensation cannot be achieved at the development site or would not be as environmentally beneficial." Typically a public agency, organization, or private entrepreneur establishes a large mitigation site. Credits (see Section 4.2.1.2. for definition) from a bank are then withdrawn to compensate for a number of smaller impacts to wetlands in the future. Public agencies such as transportation departments typically use the banks only for their projects, whereas private entrepreneurs

13 Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (60 FR 58605-58614, November 28, 1995). (See Appendix E for a description.)

sell the bank credits to private developers or public agencies to use as mitigation for their projects.

Mitigation banks provide an opportunity to compensate for impacts at a regional scale and provide larger, better-connected blocks of habitat in advance of impacts. Mitigation banks generate "credits," that can then be sold to permit applicants who need to offset the impacts of projects within a designated "service area" of the bank (see Section 4.2.1.2 for definitions).

Because mitigation banks are developed in advance of the majority of impacts for which they compensate, this ensures that the banks are ecologically successful before being used to offset such impacts. Properly developed mitigation banks offer improved functions, lower mitigation costs to permit applicants, and a more streamlined permit process for projects using the bank.

Bank sites are normally protected in perpetuity by a legally binding protective covenant such as a conservation easement that is held by a long-term manager. Bank sponsors must also provide one or more temporary financial assurances to ensure the successful ecological development of the bank and establishment of an endowment to fund long-term management of the bank site.

To date, few mitigation banks have been approved in Washington. The agencies however are developing and implementing a state process (see Section 4.2.1.3) for reviewing and approving banks. As they gain experience in evaluating proposals, mitigation banks are likely to become more common in Washington.

4.2.1.1 Washington's Mitigation Banking Law

In 1998, the Washington State Legislature adopted Chapter 90.84 RCW, Wetlands Mitigation Banking (see Appendix E for a description). Through this law the state legislature recognized mitigation banking as an important tool for compensating for wetland impacts. The law notes that banking may provide benefits over concurrent mitigation such as reduction of temporal losses, consolidation of smaller individual projects, etc. The law however does not change the way wetlands are regulated, and *mitigation sequencing* (*avoidance*, *minimization*, and *compensation*) still applies (see Section 3.5.1, *Mitigation Sequencing*).

The law directs Ecology to develop and adopt rules for a statewide wetland banking certification program through a collaborative process involving the interested public and private entities. The rules are to focus on procedures for certifying banks as well as the process for implementing banks. The law also requires that the rules must be consistent with the 1995 federal guidance on wetland banking.

Ecology used a collaborative approach to develop a draft rule (Chapter 173-700 WAC). In 1999, an 18-member advisory team was formed to develop the rule. The team consisted of representatives from local, state, and federal agencies; environmental organizations; agriculture; business; and private bank developers. This team developed and published a draft rule for public review and comment in 2001, but it was withdrawn in 2001 due to budget shortfalls.

The 2004 and 2005 state budgets funded a pilot program to test the draft rule. The pilot program lets Ecology test the draft rule, make changes, improve it if necessary, and eventually adopt it. With input from the advisory committee and pilot program participants, improvements to the pilot rule may be made before it is formally adopted. If funds are allocated to finalize the banking rule, Ecology will refile a draft of the revised rule for public comment and then proceed to final adoption. For current information on the state Wetland Mitigation Banking Program go to http://www.ecy.wa.gov/programs/sea/wetmitig.

4.2.1.2 Terms Used in Mitigation Banking

- **Mitigation Bank Instrument (MBI) and Memorandum of Agreement (MOA).** These are legally binding documents that include all details of the bank development and operation, including credit generation, service area, monitoring, and long-term maintenance provisions.
- **Bank site**. The physical site where mitigation banks are constructed and operated.
- **Bank sponsor (Banker)**. An organization or individual operating under the provisions of a mitigation banking instrument that: 1) markets and sells credits; 2) tracks available credits through a bank ledger; 3) monitors and reports on the development of the bank site; and 4) provides for perpetual protection, management, and other services for the bank site.
- **Mitigation Bank Review Team (MBRT)**. An interagency oversight committee that reviews and approves the mitigation bank instrument and provides oversight of the bank's operation.
- **Debit projects**. Projects located within the service area of the bank that use bank credits to compensate for their unavoidable wetland impacts.
- **Service area**. The "market area" or the geographic area in which credits may be sold (if determined to be appropriate by the permitting agencies).

4.2.1.3 Planning a Mitigation Bank and Getting it Approved

The following steps must generally be completed while planning a mitigation bank and getting it approved and on the ground. The circumstances of a specific bank may require additional tasks or a slightly different sequence of activities.

- Determine if there is a market/demand for a proposed mitigation bank in a particular area.
- Identify the specific mitigation needs of the area in terms of aquatic resources and functions, and then locate sites where this could be accomplished effectively (economically and ecologically). In other words, determine the general categories of projects and types of impacts that may use a potential bank for compensation and identify potential bank sites that match the general activities expected to be compensated for.
- Contact local governments near the potential bank and see if there are any statutory barriers to using a compensatory wetland mitigation bank (e.g., wetland mitigation is limited to on-site or same *sub-basin*, provisions of critical areas ordinances, etc.).

- Develop a conceptual design and short proposal that, at a minimum identifies the location of the project and its goals and objectives for specific functions to be achieved at the bank site.
- Request that the MBRT convene a pre-application meeting to discuss the proposal, tour the project area, and determine whether further consideration of the bank proposal is appropriate.
- If further consideration of the proposal is warranted, prepare a "prospectus" for the bank as required by the draft state rule (Chapter 173-700 WAC) and the 1995 federal guidance.
- Once preliminary approval of the prospectus is granted, the agencies will issue a public notice that includes the prospectus and requests comments from the public and other interested parties on the proposed bank.
- Work with the MBRT to refine the bank design, service area, crediting issues, long-term management, and other items that make up the banking instrument as outlined in the draft state rule (Chapter 173-700 WAC) and 1995 federal guidance.
- With the agencies, develop and finalize a negotiated mitigation banking instrument (MBI), which details the legal and physical characteristics of the bank and describes how it would be established and operated.
- The Corps and Ecology develop a legal memorandum of agreement (MOA) for the bank.
- The agencies complete their review and issue a permit that authorizes construction of the bank and requires full implementation of the provisions of the MBI and MOA.
- After completing baseline studies construct the bank site and monitor it for success.
- The agencies and the MBRT monitor the operation and ecological success of the bank, and approve the release of credits for sale or use.

For detailed guidance on the planning and approval process and requirements for a mitigation bank, see the federal guidance on mitigation banking and the state's draft mitigation banking rules (see Appendix E for a description).

4.2.1.4 Using Banks for Mitigation

Once released for use or sale, bank credits are used to compensate for impacts that generally occur within the service area of the bank. As credits are used, bankers debit them from the bank's ledger. Once all credits in a bank have been used, the bank is closed.

After a permit applicant has taken all necessary steps to avoid and minimize a project's likely impacts on the aquatic environment, the agencies will then determine whether buying credits from a particular bank would provide appropriate and practicable compensation for a proposed impact. The agencies will consider:

- Whether any other opportunity for mitigation is available and environmentally preferable.
- How closely a bank's credits match the functions affected by a proposed action.

- Whether using a bank to compensate for the impacts would be in the best interest of the aquatic environment, particularly in light of the needs of the watershed.

4.2.2 In-Lieu Fees

In-lieu fees (ILFs) are gradually being recognized as a viable option for consolidating compensatory mitigation projects. In this approach to mitigation, a permittee pays a fee to a third party in lieu of conducting project-specific mitigation or buying credits from a mitigation bank. ILF mitigation is used mainly to compensate for minor impacts to wetlands when better approaches to compensation are not available, practicable, or when the use of an ILF is in the best interest of the environment. Compensation for larger impacts is usually provided by project-specific mitigation or a mitigation bank.

In 2000, federal guidance on the use of in-lieu fee arrangements[14] clarified how in-lieu fee mitigation "may serve as an effective and useful approach to satisfy compensatory mitigation requirements and meet the Administration's goal of no overall net loss of wetlands." It elaborated on the previous discussion of in-lieu fees found in the 1995 federal guidance on mitigation banks[15].

An ILF represents the expected costs to a third party of replacing the wetland functions lost or degraded as a result of the permittee's project. ILFs are typically held in trust until they can be combined with other ILFs to finance a mitigation project. The entity operating the trust is typically a nonprofit organization such as a local land trust, private conservation group, or government agency with demonstrated competence in natural resource management.

4.2.2.1 Establishing an In-Lieu Fee Program in Washington State

The agencies are discussing a framework for an ILF program in Washington. Such a framework would not by itself establish any local or regional ILF trust fund. Rather it would establish a process for managing collected fees, procedures for evaluating, approving, and funding ILF activities, and rules for coordinating among program participants. Once a framework is established, a wide variety of individual ILF trust funds could be developed as the need arises throughout the state. The basic goals of a Washington ILF program would be: 1) to increase the overall quality of mitigation for projects with minor impacts; and 2) to give permit applicants another way to compensate for the impacts of their projects when better approaches are unavailable.

Though there currently is no specific framework for the use of ILFs, ILF mitigation may be considered appropriate when:

- The impacts of a project are too small to justify the cost of designing and implementing project-specific mitigation.

14 Federal Guidance on the Use of In-Lieu-Fee Arrangements for Compensatory Mitigation Under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (65 FR 66914-66917, November 7, 2000). (See description in Appendix E.)

15 Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (60 FR 58605-58614, November 28, 1995). (See description in Appendix E.)

- Opportunities to do project-specific mitigation or to buy credits from an approved mitigation bank are not available.
- Project-specific mitigation that could be implemented would likely result in a low-performing system, have a high risk of failure, be incompatible with adjacent land uses, or fail to address the needs of the watershed.
- A minor amount of additional mitigation is needed to supplement project-specific mitigation that does not fully compensate for a project's impact.

In Washington, the agencies have approved case-by-case use of ILF mitigation, generally when other forms of compensation are not available, practicable, or appropriate. In such situations, a third-party recipient of the fee must be identified and the agencies enter in to a contract with them. The contract generally should identify how fees will be collected and when the fees will be used, and include specific mitigation plans that describe how the ILF-funded mitigation will compensate for impacts.

The following criteria must usually be met before the agencies will approve an ILF arrangement:

1. The fees will be used to fund a clearly defined mitigation project.
2. The entity responsible for spending the money has a proven track record in such matters.
3. The project being funded would result in an increase in acreage and function that adequately compensates for the permitted impacts.
4. There is a clear timeline for completing the mitigation project.
5. The permitted impacts for which the ILF compensates are small (generally less than ½ acre) and minor, unless the ILF is a portion of a compensatory mitigation package (mitigation requirements are met by combining several different approaches).
6. There are provisions for long-term protection and management (including mechanisms such as conservation easements) and funding for long-term management of the site.
7. No approved mitigation bank or other form of compensatory mitigation is available and environmentally preferable.
8. The ILF-funded mitigation project is within the same watershed as the impact.

Comparing in-lieu fees and mitigation banks

ILF mitigation and mitigation banking share many features. Both allow permittees to meet mitigation requirements by paying a fee to a third party who accepts responsibility for successfully implementing the required compensatory mitigation. Both must also comply fully with federal mitigation guidance and policy, including a requirement for a written implementing agreement. The agreement normally includes construction plans, performance standards, monitoring and reporting provisions, a long-term management plan, financial assurances, a protective real-estate agreement (e.g., conservation easement), and other measures to ensure the ecological success of a project.

The main differences between mitigation banking and ILF mitigation are: 1) the timing of the mitigation activities that compensate for project impacts; and 2) determining the amount of ecological benefit and the appropriate fee. With mitigation banks, mitigation is done in advance of the impacts; ILF mitigation is normally conducted afterwards. With banks, the ecological benefits and the financial costs of mitigation are known, so an appropriate fee for credits is easily established. With ILF projects, the ecological benefits and financial costs often must be estimated, so determining appropriate fees is more difficult. While specific ILF-funded mitigation projects may not always be identified in advance of project impacts, spending ILFs quickly to fund mitigation projects is generally a high priority. The agencies may adjust the amount of the ILF to compensate for expected delays in spending them. Because of their advantages over ILFs, the agencies generally prefer the use of mitigation banks.

4.2.3 Programmatic Mitigation Areas at the Local Level

A programmatic mitigation area is one or more sites identified, by a local government or a state or federal agency, as a preferred location for wetland mitigation. The regulatory entity then directs applicants to mitigate for projects affecting wetlands at the programmatic mitigation area. Mitigation projects are constructed separately on the site, but all are part of a common design. Using a programmatic mitigation area is like doing an individual concurrent mitigation project except that the site location and design have already been identified. The programmatic mitigation sites are subject to the same minimum requirements as other mitigation sites, such as long-term protection and monitoring.

Programmatic mitigation allows the restoration of larger wetland areas that are important to the functioning of a stream basin or watershed because of where they are. Many projects require relatively small mitigation areas, and a programmatic mitigation area allows their consolidation into a larger area.

A programmatic mitigation area works as follows:

1. The lead regulatory entity (e.g., city, county, or state or federal agency) identifies one or more priority restoration areas.
2. The regulatory entity develops a mitigation plan for the entire site and either buys the land or buys an easement on the property.

3. As projects needing compensatory mitigation arise, applicants are directed to perform actions that contribute to the overall site plan.

This approach has rarely been used in Washington, but the agencies support programmatic mitigation areas that are integrated with watershed planning and focus on high-priority sites. One example is along Clear Creek in Kitsap County, where several adjacent mitigation projects have been completed. The county has actively directed mitigation projects to this area. Another example is along Mill Creek in Auburn, where the Emerald Downs Race Track and Washington State Department of Transportation (WSDOT) located their mitigation sites in an area identified in the draft Mill Creek Special Area Management Plan. A third example can be seen in the lower Snohomish River estuary, which has elements of a programmatic mitigation area supported by the inventory and restoration priorities identified in the Snohomish Estuary Wetland Integration Plan (SEWIP). Several compensation wetlands lie adjacent to the river and sloughs within the SEWIP area. Together, these sites are expected to provide significant benefits to the watershed and its wildlife. WSDOT has also developed a programmatic mitigation agreement with Ecology to provide consolidated compensation for small, ongoing impacts to wetlands in the Willapa Bay watershed.

4.2.4 "Consolidated" Mitigation

The programmatic approaches already mentioned in this chapter could all be considered consolidated mitigation in that they involve combining (or consolidating) compensatory mitigation for two or more individual projects affecting wetlands or other aquatic resources. Another scenario where mitigation can be consolidated is as follows: There are two or more proposed projects, by the same or different entity, which have identified wetland impacts. The projects will be permitted separately and both will require mitigation. The mitigation for the two projects can be combined and developed together as one project or phased in at different times on a single site either concurrently with, or in advance of project impacts. This approach can be done by a single entity, such as a public works department with multiple projects affecting wetlands in a general area, or by two or more entities that cooperate to share costs and resources.

This approach therefore can provide some of the economic and environmental benefits of mitigation banking such as economies of scale and resulting larger blocks of wetland area than can benefit wildlife. Timing and coordination between projects using the consolidated site however can be difficult. This option has not yet been widely used in Washington.

If considering this approach or any other approach mentioned in this chapter, it is important to contact the agencies early to determine if it will be considered appropriate given the specific circumstances (see Appendix C for agency contacts).

Chapter 5 - Types of Compensatory Mitigation

This chapter describes the types of *compensatory mitigation* (e.g., re-establishment, rehabilitation) and discusses the agencies' preferences for each type.

5.1 The Different Types of Compensatory Mitigation

Compensatory mitigation entails one or more of the following basic actions:

- *Restoring* wetland acreage and functions to an area where those functions formerly occurred.
- Creating new wetland area and functions in an area where they did not previously occur.
- *Enhancing* functions at an existing wetland.
- *Preserving* an existing high-quality wetland to protect it from future loss or degradation.

Compensatory mitigation is not evaluated until appropriate and practicable *avoidance* and *minimization* has been accomplished (see Section 3.5.1, *Mitigation Sequencing*).

Until recently, compensatory mitigation has been divided into four categories: restoration, creation, enhancement, and preservation. In 2002, in Regulatory Guidance Letter (RGL) 02-02, the Corps of Engineers redefined the types of compensatory mitigation based on the mitigation activity and whether it offers the potential for a net gain in acres and/or functions. The terms used by the Corps are: *restoration* (divided into two categories - *re-establishment* and *rehabilitation*), *establishment*, *enhancement*, and *protection/maintenance*. See Figure 1 for a comparison of old and new terms.

For consistency, the agencies are using the Corps's terminology and definitions. However, the terms "creation" and "preservation" are used throughout this document in lieu of "establishment" and "protection/maintenance," respectively, since the former terms are widely understood and used in wetland compensatory mitigation. The terms for compensatory activities are defined in RGL 02-02 as follows (text added for this document is within [brackets]):

> **Restoration**: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former or degraded wetland. For the purpose of tracking net gains in wetland acres, restoration is divided into:
>
> > **Re-establishment**: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former wetland. Re-establishment results in rebuilding a former wetland and results in a gain in wetland acres [and functions]. [Activities could include removing fill, plugging ditches, or breaking drain tiles.]

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural or historic functions [and processes] of a degraded wetland. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres. [Activities could involve breaching a dike to reconnect wetlands to a floodplain or returning tidal influence to a wetland.]

Creation (called "Establishment" in the guidance letter): The manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deepwater site, where a wetland did not previously exist. Establishment results in a gain in wetland acreage [and function]. [A typical action is the excavation of upland soils to elevations that will produce a wetland *hydroperiod* and hydric soils, and support the growth of hydrophytic plant species (Gwin et al. 1999).]

Enhancement: The manipulation of the physical, chemical, or biological characteristics of a wetland to heighten, intensify or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes such as water quality improvement, flood water retention, or wildlife habitat. Enhancement results in a change in wetland function(s) and can lead to a decline in other wetland functions, but does not result in a gain in wetland acres. [Examples are planting vegetation, controlling non-native or *invasive species*, and modifying site elevations to alter hydroperiods.]

Preservation (called "Protection/Maintenance" in the guidance letter): The removal of a threat to, or preventing the decline of, wetland conditions by an action in or near a wetland. This term includes the purchase of land or easements, repairing water control structures or fences, or structural protection. Preservation does not result in a gain of wetland acres [but may result in a gain in functions over the long term].

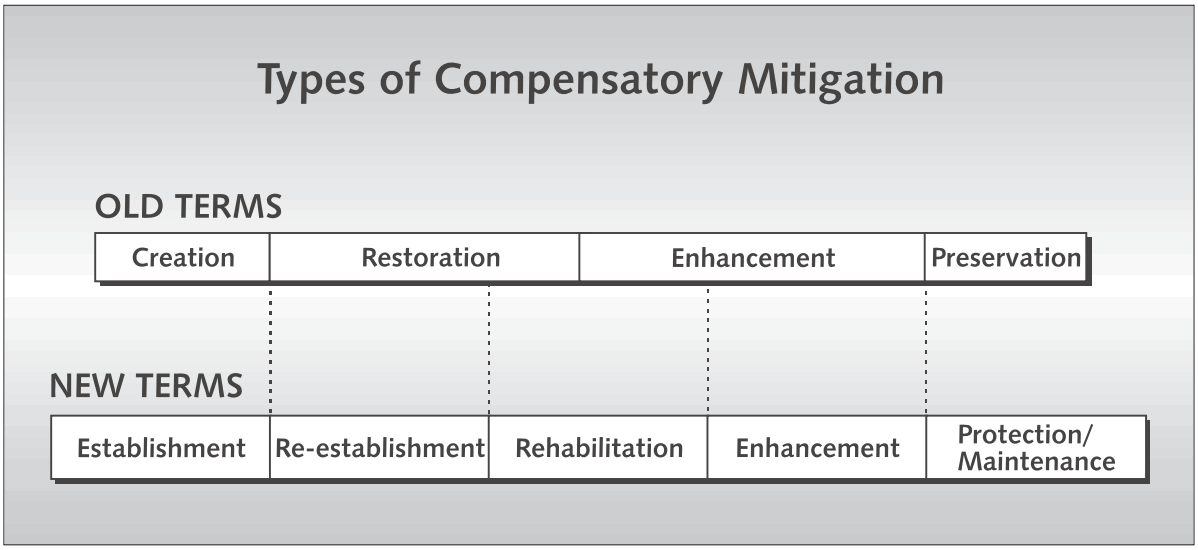

Figure 1. Old and new terms for types of compensatory mitigation.

5.1.1 The Difference between Rehabilitation and Enhancement

Rehabilitation and enhancement are similar in that they both involve existing wetlands and, when used to compensate for filling wetlands, result in a net loss of wetland acreage. Some activities that were called enhancement in the past are now considered rehabilitation (a form of restoration), and may generate a more favorable (lower) mitigation ratio. The distinction between rehabilitation and enhancement as defined above is not clear-cut and can be hard to understand. Actions that rehabilitate or enhance wetlands span a continuum and cannot be strictly defined as one or the other.

In general, rehabilitation involves actions that are more sustainable and that reinstate *environmental processes*, at both the site and landscape scales (e.g., reinstating hydrologic processes in a floodplain by breaching dikes). Such actions often restore environmental processes that have been disturbed or altered by human activity. The agencies further define rehabilitation as actions that restore the original *hydrogeomorphic (HGM) class*, or subclass, to a wetland whose current HGM class, or subclass, has been changed by human activities.

Enhancement typically involves gains in only one or a few functions and can lead to a decline in other functions. Enhancement actions often focus on structural improvements to a site and generally do not address larger-scale environmental processes or even processes at the site scale.

Take a former forested, riverine wetland that was changed to an emergent, *depressional wetland* by diking and grazing. Rehabilitating the wetland would involve breaching the dike and ending the grazing. In this case the hydrologic processes are reinstated so the wetland becomes a riverine wetland again. Reforesting the wetland without reconnecting it to the riverine system would be considered enhancement because this change is structural and does not reinstate environmental processes.

Because of the range that the two terms span, rehabilitation and enhancement activities may overlap. Both rehabilitation and enhancement can provide ecological benefits that compensate for project impacts, depending on specific circumstances. When the distinction between rehabilitation and enhancement is not clear-cut, the agencies are responsible for determining what term to use for a proposal's compensatory mitigation. See Appendix H for more information.

5.2 Agency Preferences for Each Type of Compensatory Mitigation

This section describes the advantages and disadvantages of different types of compensation and the reasons why some are preferred by the agencies. Which type is best depends on the circumstances of a given project (see Chapter 6, *Determining Appropriate and Adequate Compensatory Mitigation*).

The general order of preference for the types of wetland compensation is:

1. Restoration (re-establishment or rehabilitation).
2. Creation (establishment).
3. Enhancement.
4. Preservation (protection/maintenance).

5.2.1 Restoration

Restoration, including both re-establishment and rehabilitation, is generally the agencies' first choice for compensation. The *Operational Guidelines for Creating or Restoring Self-Sustaining Wetlands* (Chapter 7 in National Research Council 2001) state that restoration "has been observed to be more feasible and sustainable than creation of wetlands. In restored sites the proper substrate may be present, seed sources may be on-site or nearby, and the appropriate hydrological conditions may exist or may be easily restored." A 1990 Memorandum of Agreement[16] between the Corps and EPA declares, "Because the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, restoration should be the first option considered."

In reality, restoration of freshwater wetlands has not been used as much as creation in Washington. This may be because many wetland impacts are relatively small (generally <1/2 acre) and it is more difficult to find cost-effective restoration opportunities for small sites. Restoration is typically most feasible and cost effective when done over a large area. In addition, previous regulatory requirements directed applicants to provide compensation on-site, which often excluded opportunities for restoration (Sheldon et al. 2005).

There may be more opportunities for rehabilitation than re-establishment. Re-establishment involves restoring processes and functions to an area that was formerly a wetland. Rehabilitation involves improving or repairing the performance of processes and functions in an existing wetland, usually highly degraded because one or more environmental processes supporting it have been disrupted. Rehabilitation often involves actions that substantially improve the hydrologic processes (i.e., previous patterns of water flow) that have been altered by human activities. Rehabilitation might involve breaking drain tiles and plugging ditches to stop the rapid removal of water from a degraded wetland and to restore wetland functions such as groundwater recharge. Although re-establishment and rehabilitation both provide a gain in functions, only re-establishment will provide a gain in acreage as well.

16 Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404 (b)(1) Guidelines, issued February 6, 1990. (See Appendix E for a description.)

5.2.2 Creation (Establishment)

Creation, like re-establishment, results in a gain in both wetland area and function but not in areas that were once wetland. Creation is less likely to succeed than restoration and, thus, is less preferred by the agencies than restoration. But this applies only when the created wetland is in an appropriate position in the landscape and would not be established at the cost of another high functioning habitat.

Landscape position and proximity to a reliable water source are critical for the successful creation of wetlands. This cannot be over emphasized.

In Washington State, a recent study found that wetlands created from uplands were relatively successful. Sixty percent of created wetlands were either fully or moderately successful, while only 11% of enhanced wetlands were moderately successful, and none were fully successful (Johnson et al. 2002). Many created wetlands resulted in significant gains in water quality and quantity functions (Johnson et al. 2002).

The National Research Council made recommendations to increase the success of wetland creation (National Research Council 2001). Two of them are:

1. "Avoid over-engineered structures in the wetland design." These include water-control structures such as berms and weirs that will require repairs and intensive maintenance. Bioengineered structures of logs or rocks that create contours and mimic natural structures along rivers and shorelines are better than highly engineered structures like walls of riprap or bulkheads. To be successful, creation projects need to be self-sustaining and relatively maintenance free.

2. "Restore or develop naturally variable hydrological conditions." Water inputs for compensation wetlands should take advantage of natural patterns of water flow, such as overbank flooding in a riverine setting or groundwater discharge in a slope or depressional setting.

5.2.3 Enhancement

The enhancement of existing wetlands has been widely used in compensatory mitigation. It is less preferred than restoration (re-establishment and rehabilitation) or creation (establishment). Enhancement activities usually attempt to change plant communities from non-native emergent to native scrub-shrub or forested communities. Frequently, it includes attempts to remove and control undesirable *invasive species* such as reed canarygrass (*Phalaris arundinacea*), blackberry (*Rubus discolor* [= *R. procerus*]), and purple loosestrife (*Lythrum salicaria*) and the planting of native woody species. Occasionally, enhancement includes changing the site's water regime through excavation, construction of weirs, or removal of ditches and drains. Enhancement has historically focused on habitat, but other wetland functions can also be enhanced.

Using enhancement alone to compensate for wetland loss and degradation is cause for concern because it results in a net loss of wetland area. A recent study of mitigation in Washington State (Johnson et al. 2002) raised concerns about the value of enhancement:

- Most enhancement actions focus on improving vegetation structure and ignore improving environmental processes that support wetland systems and functions.
- There is a net loss of water quality and quantity functions and only modest gains in habitat functions.
- The use of enhancement as a primary means of compensatory mitigation contributes to a loss of wetland acreage.

A range of activities with widely varying ecological benefits have been lumped under the heading of enhancement. It is important to differentiate between different kinds of enhancement and determine the level of benefit from each. Enhancement could be more effective if it were geared to improve functions that are limiting in a region or *watershed*. It is important to identify whether enhancement activities will result in any tradeoffs in functions. If any tradeoffs will occur the net ecological benefits should be identified. Enhancement has a place in the mitigation toolbox, but the agencies generally prefer to see it used in combination with re-establishment or creation.

The agencies prefer that enhancement be used in combination with re-establishment or creation, not alone.

5.2.4 Preservation

Preservation of wetlands to compensate for impacts to wetlands is appropriate only in limited circumstances. The practice can be controversial because it always results in a net loss of wetland area and is perceived as trading one wetland for another one that is already protected. The reality is that some wetland types are not adequately protected and can benefit from being placed in public ownership or protected by a *conservation easement*.

Many *forested wetlands* can be logged under current state laws, and wetlands with significant habitat value are very difficult to protect without large *buffers* and *corridors* to connect them to other habitats. Preservation of large tracts of wetlands and uplands can provide benefits that are impossible to achieve using typical regulatory approaches. One way to think about net loss with respect to preservation is that some wetlands are going to experience unmitigated impacts unless they are protected. Preservation can therefore provide a net gain in functions over what would otherwise occur. For example, preventing trees from being logged provides a potential net gain in forested wetland functions in the future.

Preservation has the following advantages as a compensatory mitigation tool:

- Preservation can ensure protection for high-quality, high-functioning aquatic systems that are critical for the health of the watershed.
- Preservation does not involve the uncertainty of success inherent in restoration, creation, or enhancement.

- Larger mitigation areas can be set aside due to the higher mitigation ratios required for preservation.

As with other forms of mitigation, preserving wetlands as compensation is allowed only after following the standard mitigation sequence of avoiding and minimizing impacts first. Preservation projects are also subject to the same requirements as other types of wetland mitigation (e.g., monitoring and long-term protection; see Section 3.9). Generally significantly higher ratios are required to offset impacts than for wetland restoration (re-establishment and rehabilitation) or creation (establishment) because there is a net loss of wetland area and limited gains in wetland functions (see Section 6.5, *Identifying the Amount of Compensation (Mitigation Ratios)*).

For more criteria and guidance on using wetland preservation for compensatory mitigation see Section 6.4, *Using Preservation*.

Chapter 6 - Determining Appropriate and Adequate Compensatory Mitigation

The agencies normally authorize wetland impacts only if the permit applicant compensates for lost wetland acreage, functions, or both. Compensatory mitigation should be customized for the specific impacts of a project and the qualities of the mitigation site. This document cannot offer detailed guidance for specific projects, which must be handled case by case. However, this chapter will help applicants understand what makes a compensatory mitigation plan appropriate and proportionate to the expected loss of wetland acreage and function – and ecologically successful.

To determine the compensatory mitigation needed, you must answer the following questions:

- What are the types and extent of wetlands (area and function) affected by the project?
- How will the proposed mitigation compensate for the impacts (i.e., how will the project contribute to the goal of no net loss of wetland area, functions, or both)?
- Will the proposed mitigation be successful and sustainable?

To help answer these questions, this chapter discusses:

- When and where compensatory mitigation should occur.
- What type of compensatory mitigation should be used.
- How much mitigation is required compared to what has been lost (mitigation ratio).
- What buffer widths are needed to protect the mitigation site.

Compensatory mitigation should be proportionate to the impact

The agencies must determine the mitigation requirements for specific wetland impacts to ensure that they are proportionate to the proposed loss or degradation of wetland area, functions, or both. This is consistent with the opinion of the U.S. Supreme Court that government permit requirements must have "rough proportionality" with development impacts (*Dolan v. City of Tigard,* 512 U.S. 374, 114 S.Ct. 2309, 129 L.Ed.2d 304 [1994]).

6.1 Compensating for Wetland Losses

6.1.1 No Net Loss

In 1988 the National Wetlands Policy Forum published recommendations on how wetland policies could be improved to better protect and manage the country's wetland resources (Conservation Foundation 1988). The principal recommendation was to establish a national wetlands protection goal, specifically, to "establish a national wetlands protection policy to achieve no overall net loss of the nation's remaining wetlands base, as defined by acreage and function, and to restore and create wetlands, where feasible, to increase the quality and quantity of the nation's wetland resource base."

This goal did not necessarily need to be applied on every permit decision; no net loss is a programmatic rather than a permit-specific goal. Compensatory mitigation must replace area, functions, or both to achieve this goal, but not on every individual project. The forum also recommended that the ultimate goal should be to increase both the quantity and quality of the nation's wetland resource base, rather than just compensate for wetland losses. Non-regulatory restoration should contribute to overall wetland gains. Though "no-net-loss" was never formally adopted as federal policy, it remains a national goal, established by President George H.W. Bush in 1989. Governor Booth Gardner formally adopted this goal for Washington State with Executive Order 89-10 (see Appendix E for a description), and it remains in effect.

6.1.2 Compensating for Lost or Degraded Area

Compensatory mitigation has traditionally focused on the wetland acreage needed to offset the loss or degradation of wetland area and/or functions. A report by the National Research Council (2001) recommended that both wetland functions and area be considered. The Corps' Regulatory Guidance Letter 02-02 also emphasizes the replacement of area, functions, or both.

Area has been used to account for authorized impacts and compensation for several reasons:

- It is fairly easy to determine the area of a wetland.
- Methods for assessing functions have limited use in accounting for the amount of loss and the amount of compensation necessary.
- Measuring wetland functions can be time consuming and expensive, and not always warranted for minor impacts.

The amount of compensation required is determined case by case, often using a replacement or mitigation ratio (see Section 6.5, *Identifying the Amount of Compensation [Mitigation Ratios]*).

6.1.3 Compensating for Lost or Degraded Functions

Since 1989 numerous studies have evaluated whether no net loss of acreage is being achieved, but determining whether a net loss of functions is occurring has been more difficult (see Section 2.1, *Wetlands and Their Functions*). A study of compensation projects

in Washington State (Johnson et al. 2002) found that many projects did not adequately compensate for functions lost from authorized impacts. The National Research Council (2001) concluded that a net loss of functions has been occurring nationally. Based on the National Research Council (2001) recommendations, the Corps' Regulatory Guidance Letter 02-2 re-emphasizes the idea that wetland impacts be addressed with "at a minimum, one-to-one functional replacement, i.e., no net loss of functions." Therefore, the agencies will increasingly focus on compensating for wetland functions.

6.1.3.1 Analyzing Wetland Functions

When an applicant proposes to alter a wetland, it is important to know what wetland functions will be lost or reduced and their importance in the landscape (see Section 2.3, *Wetlands as Part of the Landscape*). This information helps the applicant and agencies understand what may be lost and lets them make more informed decisions about mitigation.

To make informed decisions about wetland impacts and replacement of lost functions, wetland functions must be analyzed at both the wetland impact site and the compensation site, both before and after the project is completed. The same analysis of the proposed mitigation site, pre- and post-mitigation, provides an estimate of the expected gain in functions, or "functional lift," that is expected. This lift must then be compared to the functions to be lost at the impact site. The mitigation would be sufficient, in most cases, only if the expected "lift" at the mitigation site equals or exceeds the loss at the impact site. Trade-offs in functions may be allowed, but this may affect the amount of compensation

Examples of Wetland Functions

Improving Water Quality

- Removing Sediment
- Removing Nutrients (Phosphorous and Nitrogen)
- Removing Metals and Toxic Organic Compounds
- Removing Pathogens

Maintaining the Water Regime in a Watershed (Hydrologic Functions)

- Reducing Peak Flows
- Decreasing Erosion
- Recharging Groundwater

Maintaining Habitat

- Providing General Habitat
- Providing Habitat for Invertebrates
- Providing Habitat for Amphibians
- Providing Habitat for Anadromous Fish
- Providing Habitat for Resident Fish
- Providing Habitat for Wetland-Associated Birds
- Providing Habitat for Wetland-Associated Mammals
- Richness of Native Plants
- Supporting Food Webs

From Freshwater Wetlands in Washington State Volume 1: A Synthesis of the Science (Sheldon et al. 2005).

(i.e., mitigation ratios) required (see Section 6.5, *Identifying the Amount of Compensation* [Mitigation Ratios]).

A number of tools to analyze wetland functions are reviewed in Appendix G. The appendix also includes guidance on which tools are recommended for use with compensatory mitigation.

Using Analyses of Functions

- When a project involves impacts to wetlands, a description of the functions provided by the wetlands is required.
- The level of analysis depends on the type and scale of the proposed impacts. If wetland impacts would be significant, the agencies may ask an applicant to use the Methods for Assessing Wetland Functions (also known as the Washington State wetland function assessment methods, or WFAM; Hruby et al. 1999, Hruby et al. 2000) (see Appendix G).
- If Ecology is involved in a project, the agencies usually require the applicant to use the Washington State wetland rating system (Hruby 2004a, 2004b) to determine the category of the wetland and how well it performs three general categories of functions.
- Functions should be analyzed both before designing any mitigation and during the monitoring period after the mitigation has been installed. The agencies will use these analyses to help determine whether a project provides the proposed level of functions.

6.2 Determining When Mitigation Actions Should Occur

Mitigation can occur at the same time as or before project impacts. *Concurrent mitigation* refers to compensation that occurs at about the same time as the impact. *Advance mitigation* refers to compensation that is implemented before the impact. While the agencies prefer advance compensation, in reality, many compensation projects are implemented as much as one to two years after the impact occurs.

The amount of compensation required may be influenced by the timing of compensatory mitigation. If a compensation project is completed before wetland impacts, the *temporal loss* of functions is less. If a compensation project is implemented far enough in advance of wetland impacts, the agencies can determine if it has met all of the goals, objectives, and performance standards. Therefore, the risk of failure and temporal loss is reduced, and mitigation ratios will be lower.

Activities to implement a compensation project can be scheduled before, during, and after site construction begins. However, a baseline assessment of the compensation site must precede any such work. This baseline information is essential for comparisons with later site performance.

Completion schedules may vary, depending on the goals of the project and the types of activities to be performed. If the goal of a project is to create a new wetland with a specific

hydroperiod (or water regime) and a variety of plant communities, it may help to wait a year after the site is graded to make sure that the water regime is appropriate before planting. This can help avoid plant mortality from too much or too little water.

Phased planting may be appropriate in establishing a forested wetland. Deciduous species can be planted initially to provide a canopy, and shade-tolerant conifers can be underplanted after the deciduous trees are established.

Notify the agencies before starting construction at compensation sites

Most permits and approvals require applicants to notify the agencies before starting construction. For large projects, the applicant should plan an on-site, preconstruction meeting with the agencies and the contractor implementing the compensatory mitigation plan. This helps to ensure that the contractor understands the site goals and design, the permit conditions, and the expectations of the regulatory agencies.

6.3 Choosing the Location and Type of Compensatory Mitigation

Selecting the location for the compensation action and deciding the type of wetland that will be restored, created, etc. are two of the most critical aspects in determining appropriate and adequate wetland compensation. The type and location of wetland compensation should provide sustainable ecological benefits that are important to the functioning of the *watershed*.

6.3.1 Choosing the Location

6.3.1.1 Background

The location of a compensation wetland is one of the first issues that a project proponent faces. The location of a wetland affects its structure (or morphology), the types of functions it provides, and the relative value of those functions. For example, a *depressional wetland* in the upper portion of a watershed can reduce flooding downstream by detaining surface waters and delaying the runoff from storm events into streams. The same wetland located in the lower portion of a watershed would not do as much to reduce flooding.

The Corps, EPA, and Ecology consider multiple factors when reviewing and approving proposals for the location of compensation projects. These factors include the surrounding land uses and ecological conditions. The landscape and land uses surrounding and upgradient from a compensation site affect how well it functions and whether the performance of functions is likely to be degraded over time. The agencies encourage applicants and local governments to use available information on the landscape and large-scale environmental processes when selecting and designing mitigation sites (see Section 2.3, *Wetlands as Part of the Landscape,* as well as Section 3.3 in Part 2 on site selection).

Questions the agencies consider when evaluating on- vs. off-site and in- vs. out-of-kind options

The agencies consider the following questions when evaluating the location and type of compensatory mitigation proposals. These criteria are consistent with Washington State's *Alternative Mitigation Policy Guidance Interagency Implementation Agreement* (Ecology 2000; see Appendix E).

- What are the functions, habitat types, and species that would be adversely affected?
- Is replacement or reintroduction of the functions, habitat type, or species vital to the health of the watershed? If so, do they need to be replaced on site to maintain the necessary functions?
- If on-site, in-kind replacement is not necessary, are there priority areas for restoring species, habitat types, or functions that are important or limited in the watershed? Are the affected wetland type and its functions fairly common in the watershed, while other types and functions are relatively rare or limited due to historic losses?
- If both on- and off-site mitigation is available, will the functions, habitat type, or species proposed as off-site compensatory mitigation provide greater value to the landscape than those proposed as on-site?
- How will the proposed mitigation maintain, protect, or enhance impaired functions or *environmental processes* that are critical or limiting in the watershed?
- Does the proposed mitigation have a high likelihood of success?
- Will the proposed mitigation be sustainable in light of expected future land uses?

Historically, applicants were directed to locate compensation wetlands on or near the impact site. A 1990 Memorandum of Agreement (MOA) (*The Determination of Mitigation Under the Clean Water Act Section 404 (b) (1) Guidelines*) between the Corps and EPA on wetland mitigation documented a strong preference for compensation wetlands that were *on-site* and *in-kind*. On-site means the compensation site is near the wetland to be lost or degraded (i.e., normally on the same property). In-kind means compensating with the same type of wetland or aquatic resource that is impacted (see Section 6.3.2 for more on in-kind compensation). Many city and county wetland regulations still embody a preference for locating wetland compensation on-site.

Formerly, it was widely held that locating the compensation on the same site as the lost wetland would provide the greatest opportunity to replace the functions. Since then, studies on compensatory mitigation (National Research Council 2001, Johnson et al. 2002) and observations by the agencies have shown that these policies often result in atypical, low-quality wetlands in locations without an appropriate water regime, some of which are incompatible with the surrounding landscape.

In its 2001 compensatory wetland mitigation study, the National Research Council found that many mitigation areas were not sustainable because they were incorrectly positioned in

the landscape. The authors determined that this occurred, in part, because of the preference for on-site mitigation. The National Research Council also found that some sites, although in appropriate landscape positions, were threatened by future development in the watershed.

Federal guidance on implementing a watershed approach to compensatory mitigation

The federal agencies working on the National Mitigation Plan are working on guidance to address compensatory mitigation in a watershed context. For updated information go to http://www.mitigationactionplan.gov/watershed_context.html.

Other research has shown that the location of a wetland can affect it in variable ways. King (1997) found that fish and wildlife habitats generally benefit from being surrounded by healthy ecological landscapes that are relatively inaccessible to humans. Other wetland functions such as sediment and nutrient trapping often provide more benefit when located in or near disturbed landscapes. In other words, wetlands in disturbed areas often have a greater opportunity to provide certain functions. Some of the *values* (social functions) that wetlands provide, such as aesthetics, recreation, education, and flood protection, do not occur in the absence of people. (For a detailed discussion of wetland functions and the difference between the potential and opportunity for a wetland to perform specific functions see *Methods for Assessing Wetland Functions* [Hruby et al. 1999 and 2000].)

Based on regulatory experience and scientific research, the agencies are allowing more flexibility in determining the best locations for mitigation. The agencies will use multiple factors to evaluate the appropriate location for each proposed compensation project. Landscape position, proximity to disturbance, availability of appropriate hydrology, and the needs of the watershed and larger landscape are the primary considerations.

Local requirements for the location of compensatory mitigation sites

Some local governments have requirements for the location of mitigation sites in their regulations. Applicants should contact the local planning department to see if there are any restrictions on off-site compensation.

Authorizations for use of state-owned aquatic lands

Whether on- or off-site, if activities, including mitigation projects, are proposed on state-owned aquatic lands, authorization to use the lands must be issued from the WDNR (see Section 3.4.2, *The Role of Other State Agencies*).

6.3.1.2 Considerations for Choosing a Location

Applicants are encouraged to seek compensation sites as close to the impact area as practicable, but not necessarily on the same site. To maximize the replacement of lost functions, compensatory wetlands should be located in a similar hydrogeomorphic position

in the landscape as the affected wetlands. The order of preference starts in the immediate drainage basin as the impact, then the next higher level basin, then other *sub-basins* in the watershed with similar geology, and finally, the river basin (i.e., the upper, middle, and lower portions, which are also referred to as the source, transport, and receiving portions of a river basin). Compensation should occur in a location where the targeted functions can reasonably be performed and sustained and should not be atypical for that location (refer to the shaded box in Section 6.5.2, *Defining Atypical Wetlands*). (Also see Section 3.3 in Part 2 for a discussion of site selection.)

Defining watershed

The term *watershed* can be confusing because it can be defined and interpreted at a variety of scales. Generally, a watershed is defined as a geographic area of land bounded by topographic high points in which water drains to a common destination. A watershed can be as large as that of a large river (Columbia River), a Water Resource Inventory Area (WRIA), or a major Hydrologic Unit (as classified by a U.S. Geological Survey Hydrologic Unit Code, or HUC), or as small as a river basin or reach.

A *sub-basin* is part of a larger drainage basin or watershed. For example, the watershed of a large river may be composed of several sub-basins, one for each of the river's tributaries.

For the purposes of mitigation, the "boundaries" of the watershed will depend upon the resource, functions, and landscape conditions. Off-site mitigation is generally not authorized beyond the WRIA. When mitigation is required to occur in an area smaller than a WRIA, the terms basin and sub-basin are used.

The agencies are likely to require on-site compensation when:

- The location is critical for replacing location-dependent functions (e.g., water quality and quantity functions and certain habitats).
- The location plays a critical role in watershed-scale processes and functions (e.g., the site provides a connection to other habitat areas and open spaces, or the site is located along a stream).
- The location has a high probability of success and is sufficiently protected from off-site pressures (e.g., the site has an adequate buffer).

The agencies may prefer off-site compensation when:

- The adversely affected functions are of low-quality and the project proponent can demonstrate that compensatory mitigation at an off-site location will provide functions that are critical or limiting in the watershed.
- On-site compensation is not feasible or unlikely to succeed due to adjacent land uses, excessive site disturbances, or the presence of highly invasive plant species.
- The off-site option is an approved wetland mitigation bank, *advance mitigation* site, programmatic mitigation area, or *in-lieu fee* program, and on-site compensatory

mitigation is not environmentally preferable (see Chapter 4, *Approaches to Compensatory Mitigation*).

Off-site compensation must usually be located in the same watershed as the site experiencing the impact. However, occasionally the agencies may agree to compensation outside of the watershed for minor impacts. Considerations include:

- Whether the impact site is located near the boundary of the watershed and suitable sites for compensation are not located in the watershed.
- Whether the geology, topography, plant communities, and climate are similar between watersheds.

Acceptable compensation (whether on-site or off-site) should be a part of a network or *corridor* connecting significant habitat areas or other open space areas whenever possible. When evaluating proposals, agencies keep in mind the natural patterns and corridors in the watershed. As described earlier, rivers and streams function as freeways for the movement of wildlife, water, sediments, and nutrients. Where applicable, compensatory mitigation should contribute to and preserve these corridors to support and maintain the functions of the watershed.

In some cases, as in urbanized areas, connections to other habitat areas are not feasible. However, small wetlands may provide the only available habitat in an area, even though they are surrounded by large paved areas, buildings or lawns. Loss of these wetlands could further isolate the plant and animal communities of other small wetlands in the area by limiting the amount of habitat available for them to expand into (i.e., limiting the possibilities for dispersal and genetic exchange).

In addition, these small wetlands and their buffers may provide the only open, natural area. As these areas become increasingly rare their ecological importance tends to increase. **In such cases, the most ecologically preferable alternative for compensation may be to permanently protect other small, on-site urban wetlands that are susceptible to loss and further degradation (rather than compensating for the unavoidable wetland impacts off-site)** (see Section 6.4, *Using Preservation*). Decisions on alternative mitigation proposals are made on a case-by-case basis and are at the discretion of the agencies.

Consider the Federal Aviation Administration (FAA) rules when choosing a location

Compensatory mitigation projects located near airports, that have the potential to attract waterfowl and other bird species which might pose a threat to aircraft, require a location that is consistent with current FAA guidance. In a 1997 Memorandum or Agreement (MOA) and Advisory Circular (AC), the FAA provided guidance on locating certain land uses, including wetlands, having the potential to attract hazardous wildlife to or in the vicinity of public-use airports. One of the three major activities of most concern is "development of conservation/mitigation habitats or other land uses that could attract hazardous wildlife to airports or nearby areas." When determining the location of compensation sites the criteria in the FAA AC 150/5200-33 should be considered. If you choose a site that is affected by FAA rules this may result in design constraints, including limiting wildlife habitat and use of the site. The MOA can be accessed at: http://wildlife-mitigation.tc.faa.gov/public_html/moa.pdf.

6.3.2 Providing In-Kind Versus Out-of-kind Compensation

Another important issue that must be resolved early when planning a wetland compensation project is whether the compensation will be in-kind or out-of-kind. *In-kind mitigation* is compensatory mitigation that involves the same wetland type and functions as the lost or degraded wetland, for example, the same *hydrogeomorphic (HGM)* subclass (e.g., riverine flow-through, depressional outflow, *flats*, etc.), plant community, and *Cowardin class* (e.g., palustrine emergent, palustrine forested or *estuarine wetlands*). *Out-of-kind mitigation* therefore refers to compensatory mitigation that involves wetland types and functions which are different from the lost or degraded wetland.

In the February 6, 1990 Memorandum of Agreement between the Corps and EPA[17], in-kind compensatory mitigation is generally preferable to out-of-kind compensatory mitigation. The preference was based on the assumption that similar wetland types provide similar functions. When compensation is out-of-kind, the compensation wetland and wetland that was lost or degraded may perform different functions, therefore net losses of some functions can occur. If, however, compensatory mitigation projects are designed to replace the same type of wetland and functions that are lost, potential net losses of functions are minimized.

As previously discussed, different wetlands perform different functions and at different levels. This is reflected in the wetland class under the HGM classification system (e.g., depressional, riverine, slope, etc.). This classification groups wetlands with similar hydrogeomorphic characteristics. The hydrogeomorphology of a wetland determines, in part, which functions a wetland will perform and the level at which those functions are performed. Therefore, *riverine wetlands* provide different functions from, and perform functions differently than, depressional closed wetlands. For example, a depressional closed wetland may retain all sediments that enter it, while a riverine flow through wetland

17 *The Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines*. See Appendix E for a description.

may only detain sediment temporarily because annual flooding moves sediment downstream. If a riverine wetland is used to compensate for impacts to a depressional wetland, then a loss of some of the functions provided by depressional wetlands would be expected.

With a greater awareness of the role that wetlands play in watersheds and larger landscapes, the agencies are now more likely to approve out-of-kind wetland mitigation projects when it provides an overall net gain in functions that are critical or limited in a watershed. The agencies strongly consider what will provide the greatest ecological benefits for the landscape when making a decision about in- or out-of-kind compensation. The following sections describe how the agencies determine whether in- or out-of-kind compensation is appropriate.

6.3.2.1 In-kind Compensatory Mitigation

In-kind compensatory mitigation is required when the greatest ecological benefits for the watershed can be obtained by replacing adversely affected functions. The following are some circumstances when in-kind compensation is environmentally preferable:

- The affected wetlands and functions are limited or rare within a watershed and are critical for replacement.
- Replacement of the affected functions is important to the maintenance of environmental processes that affect the larger landscape.
- The wetlands affected are high quality or rare (refer to Section 6.4.2[#4] for characteristics of high-quality wetlands).
- Replacement of the same wetland type and functions is needed to satisfy requirements for sensitive or listed species.

In-kind compensation is usually required for impacts to estuarine wetlands

Impacts to *estuarine wetlands* are usually compensated in-kind (i.e., with another estuarine wetland). Freshwater wetlands are rarely acceptable as compensation for impacts to estuarine systems. Estuarine wetlands are important because of their rarity, their landscape position, and the functions they provide.

Other considerations include:

- The extensive, historic loss and conversion of estuarine wetlands in Washington.
- The important habitat they provide for some threatened and endangered species.

6.3.2.2 Out-of-kind Compensatory Mitigation

Out-of-kind compensatory mitigation may provide far greater environmental benefits to the watershed than in-kind replacement, if it is appropriate for its landscape location and connects into a system of natural areas and aquatic corridors. Generally, small impacts to degraded wetland systems may be offset using out-of-kind mitigation. The agencies also

accept out-of-kind mitigation when the affected wetlands are dominated by reed canary grass and other *invasive species*. In these cases, the agencies prefer to replace the lost wetlands with ones that are appropriate for their landscape setting, support native communities, and maintain environmental processes.

Out-of-kind mitigation may also be acceptable if the functions or habitats lost are relatively abundant in the area and the compensation project will provide functions and habitats that are limited in the watershed. For instance, while estuarine wetlands provide critical habitat areas for fish and wildlife, much of the original estuarine wetlands in Washington have been lost. As a result, estuarine habitat and shoreline functions are very limited in some river basins, particularly in the Puget Sound area. Because restoration of these habitats is a priority to the agencies, it may be determined that the loss of reed canary grass pastureland in the lower watershed can be adequately offset through the removal of dikes to restore tidal flows and estuarine wetlands habitats.

Out-of-kind compensation may be considered when:

- The lost or degraded wetland provides minimal functions and is not considered limited in the landscape or critical for a special species.
- It is demonstrated that the proposed out-of-kind compensation will provide an overall net gain in functions or habitats that are critical, rare, or limited in a watershed.
- It is not possible to replace the wetland type in-kind. For example, coastal lagoons and *bogs* are considered irreplaceable wetlands because they perform some special functions that have not been proven to be successfully replaced through compensatory mitigation. Impacts to such wetlands would therefore result in a net loss of some functions no matter what kind of compensation is proposed. In general, impacts to irreplaceable wetland types are strongly opposed by the agencies. When it is unavoidable, it is recommended that compensation involve rehabilitation of degraded wetlands of a similar type. Where rehabilitation is not an available option, out-of-kind compensation may be considered.

Federal guidance on off-site and out-of-kind compensatory mitigation

For more information and further guidance on off-site and out-of-kind compensatory mitigation please refer to the *Federal Guidance on the Use of Off-Site and Out-of-Kind Compensatory Mitigation Under Section 404 of the Clean Water Act*, which was developed as part of the National Mitigation Action Plan (http://www.mitigationactionplan.gov).

6.3.2.3 Out-of-Kind Resource Trade-Offs

Out-of-kind resource trade-offs involve replacing an affected wetland with habitats or ecosystems other than wetlands. This could include upland riparian restoration; stream rehabilitation; enhancement or protection of stream or wetland buffers; or preservation of mature forest lands, dune systems, or shrub/steppe communities.

As described above, mitigation requirements for wetland impacts generally involve the restoration, creation, etc. of wetland functions similar to those that are lost or degraded. In some limited cases, however, the agencies have allowed applicants to meet some of their compensatory requirements with non-wetland resources, such as riparian restoration. The agencies may consider tradeoffs if the functions provided by non-wetland resources are limited in the watershed or are critical for restoring the health and functioning of key environmental processes. When agencies allow resource trade-offs, wetland compensation is generally required on a 1 to 1 basis, and then the non-wetland resources are used to make up the difference in the mitigation ratios (see Section 6.5, *Identifying the Amount of Compensation [Mitigation Ratios]*). For example, a one-acre wetland fill may require the creation or re-establishment of two acres of wetland. However, in some circumstances it may be appropriate to create or restore one acre of wetland, along with five acres of riparian restoration. Each request for compensation with non-wetland resources is evaluated on a case-by-case basis (see also Section 6.5.7, *Uplands Used as Compensation*).

Out-of-kind resource tradeoffs may be allowed when:

- Wetland impacts occur to a highly degraded wetland which provides low levels of wetland functions.
- It can be demonstrated that the greatest environmental benefits in a basin can be achieved by restoring, rehabilitating, or preserving non-wetland resources. Options for meaningful wetland compensation are limited or non-existent.
- The non-wetland resource contributes to and enhances the overall functioning of the wetland system. For example, stream and riparian rehabilitation adjacent to a riverine wetland.
- When the non-wetland habitats contribute to the restoration of habitats for sensitive or endangered species.

To make reasonable and appropriate decisions on resource trade-offs for wetland compensation, agencies need to have information on the condition and functioning of the watershed or basin in order to determine if the net effect of the trade-off will be positive. In areas where watershed planning is underway, some of the information may already be available. Some of that information includes:

- Identification of limiting resources or functions in the area.
- The degree of permanent disruptions to environmental processes such as the way water moves through the landscape.
- Key areas identified for restoration.
- Key areas identified for protection and preservation.

No matter what type of compensatory mitigation being proposed, whether it is in- or out-of-kind, on- or off-site, or a proposed resource trade-off, it is important to contact the agencies early to determine whether it will be appropriate and adequate compensation for the lost or degraded wetland and its functions (see Appendix C, *Agency Contacts*).

6.4 Using Preservation

6.4.1 Why is Preservation Acceptable for Mitigation?

The preservation of a high-quality wetland, such as a mature forested wetland, native sedge community, or *vernal pool*, can provide significant ecological benefits. Preserving high quality and well-functioning wetlands protects the functions being performed by those wetlands from being lost in the future. Native species disperse from mature wetland areas into adjacent habitats, particularly restored and created wetlands. Seeds dispersed from a preserved site can colonize adjacent created wetlands and animals may move on to the site from the preservation area. When preservation is part of a compensatory mitigation project, the preserved wetland can help to increase the quality of the created wetland and reduce the time for the compensation wetland to start to provide functions. In urban areas where wetlands are under considerable threat of loss and degradation, the preservation of wetlands and riparian areas can protect travel corridors for wildlife and provide natural areas.

The agencies have accepted mature forested wetlands, mature scrub/shrub systems and open native meadows for preservation credit[18]. Under existing federal and state laws, trees can be legally harvested from forested wetlands. While the harvest does not result in a loss of wetland area, it does result in a loss of wetland functions. Vernal pool complexes in Eastern Washington may also be suitable for preservation, particularly if they are small enough to meet the exemption criteria in local wetland ordinances. In the case of vernal pools, the applicant would need to preserve the adjacent uplands as part of the mitigation package to protect their habitat and hydrologic functions.

When evaluating preservation sites, it is important to consider the anticipated future land uses around the preservation site to ensure that the preserved wetland won't be degraded over time. Things that can degrade the preservation site and its ability to function include:

- Storm water runoff – water level fluctuations and pollution.
- Lack of *connectivity* – isolation from other habitat areas.
- Clearing.
- Dumping.

Preservation proposals need to include adequate buffer areas. Buffer width must be sufficient to protect the wetland and its functions from encroachment and degradation. Future land use dictates the size and composition necessary for a buffer that is adequate to protect the wetland and its functions (refer to Section 6.6, *Determining Adequate Buffers*). The following section provides criteria to help determine when preservation is an acceptable form of compensatory mitigation.

18 See the 1998 *Guidelines for Implementation of Compensatory Mitigation Requirements for Conversion of Wetlands to Cranberry Bogs* (Washington State Department of Ecology, U.S. Environmental Protection Agency Region 10, U.S. Army Corps of Engineers Seattle District, and U.S. Fish and Wildlife Service. 1998. Special Public Notice), which can be found at the Seattle District regulatory home page http://www.nws.usace.army.mil (Regulatory, Waters & Wetland Information, Mitigation) or directly at: http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/ACF101C.pdf .

6.4.2 Acceptable Uses of Preservation

The agencies evaluate proposals to use preservation as part of a compensation package on a case-by-case basis. Preservation is an acceptable form of compensatory mitigation when used in combination with other forms of compensation such as re-establishment or creation (establishment). In limited cases, preservation may also be used by itself, but more restrictions will apply. Areas which provide important habitats and functions as well as those areas contributing to the wetland functions, may be included as part of a preservation package (see also Section 6.5.7, *Uplands Used as Compensation*).

Preserving at-risk, high-quality wetlands and habitat may be an acceptable part of a mitigation plan when the following criteria are met:

1. Preservation is used for compensation only after the standard sequencing of mitigation (i.e., avoid and minimize impacts first and then compensate). Refer to *Mitigation Sequencing* (Section 3.1.1).
2. Restoration (re-establishment and rehabilitation), creation (establishment), and enhancement opportunities have also been considered, and preservation is approved by the permitting agencies as the environmentally preferable option.
3. The preservation site is determined to be under demonstrable threat[19] of destruction or substantive degradation; that is, the site is likely to suffer serious negative impacts from on-site or off-site activities that are not regulated (e.g., logging of forested wetlands).
4. The area proposed for preservation is of high quality or critical for the health of the watershed or sub-basin. Some of the following features may indicate high-quality sites:
    a. Category I or II wetland rating (using the wetland rating system for eastern or western WA [Hruby2004a and 2004b]).
    b. Rare or irreplaceable wetland type (e.g., bogs, mature forested wetlands, estuaries) or aquatic habitat that is rare or a limited resource in the area.
    c. Habitat for threatened or endangered species.
    d. Provides biological and/or hydrologic connectivity[20].
    e. High regional or watershed importance (e.g., listed as priority site in a watershed or basin plan).

19 Demonstrable threat: Clear evidence of destructive land use changes that are consistent with local and regional land use trends, and that are not the consequence of actions under the permit applicant's control.

20 Sites isolated from other habitat areas are generally not good candidates for preservation. However, in some cases agencies may support preservation of sites in urban areas in order to protect open space and habitat if the area is under demonstrable threat.

f. Large size with high species diversity (plants and/or animals) and/or high abundance of native species.

g. A site that is continuous with the head of a watershed, or with a lake or pond in an upper watershed that significantly improves outflow hydrology and water quality.

High-quality wetlands

In general a high-quality wetland is important to the ecosystem or landscape, supports an appropriate native community, and performs important functions.

Features of high-quality wetlands are listed in Section 6.4.2[#4]. Not all of the features are required for a wetland to be considered high quality. For instance, you may have a forested riparian wetland system that may not be rare or irreplaceable, but it may still be worth preserving if it contributes to the maintenance of environmental processes such as over-bank flooding, movement of sediments, and recruitment of large woody debris.

6.4.2.1 Preservation in Combination With Other Forms of Compensation

Using preservation as compensation is generally acceptable when done in combination with restoration, creation, or enhancement, provided that a minimum of 1:1 acreage replacement is provided by re-establishment or creation and the criteria below are met:

1. All criteria listed in Section 6.4.2 are met.
2. The impact area is small (generally < ½ acre) and/or impacts are occurring to a low- functioning system (Category III or IV wetland).
3. Preservation of a high-quality system occurs in the same watershed or basin as the wetland impact.
4. Preservation sites include buffer areas adequate to protect the habitat and its functions from encroachment and degradation.
5. Mitigation ratios for preservation in combination with other forms of mitigation will generally range from 10:1 to 20:1, as determined on a case-by-case basis, depending on the quality of the wetlands being lost or degraded and the quality of the wetlands being preserved.

6.4.2.2 Preservation as the Sole Means of Compensation for Wetland Impacts

Preservation alone should only be used as compensatory mitigation in exceptional circumstances. Preservation alone should not apply if impacts are occurring to functions that must be replaced on site, such as flood storage or water quality treatment that need to be replicated by water quality measures implemented within the project limits. Preservation of at-risk, high-quality wetlands and habitat (as defined in Section 6.4.2 [#4])

may be considered as the sole means of compensation for wetland impacts when the following criteria are met:

1. All criteria listed in Section 6.4.2.1 are met.
2. The wetland impacts will not have a significant adverse impact on habitat for listed fish, or other ESA listed species.
3. There is no net loss of habitat functions within the watershed or basin.
4. Higher mitigation ratios are applied. Mitigation ratios for preservation as the sole means of mitigation shall generally start at 20:1. Specific ratios should depend upon the significance of the preservation project and the quality of the wetland resources lost (see Section 6.5, *Identifying the Amount of Compensation [Mitigation Ratios]*).

Federal guidance on the use of preservation as compensatory mitigation

For more information and further guidance on preservation see the *Federal Guidance on the Use of Preservation as Compensatory Mitigation Under Section 404 of the Clean Water Act*, which is being developed as part of the National Mitigation Action Plan (http://www.mitigationactionplan.gov).

6.5 Identifying the Amount of Compensation (Mitigation Ratios)

A key issue in achieving the goal of no net loss is the amount of compensation (square feet or acres) that is required compared to what has been lost. When the acreage required for compensatory mitigation is divided by the acreage of impact, the result is a number known variously as a "replacement," "compensation," or "mitigation" ratio.

The mitigation ratio reflects the area of a particular type of compensatory mitigation (e.g., creation, restoration, enhancement, or preservation) needed to make up for the loss of one unit of area of wetland (King et al. 1993). For example, a permitted loss of a one-acre wetland that requires six acres of enhancement in order to adequately compensate for the loss of functions is said to have a 6:1 mitigation ratio.

Mitigation ratios are used to help ensure that compensatory mitigation actions are adequate to offset unavoidable wetland impacts. A greater area of mitigation than the area of impact is almost always required. The greater area of mitigation helps offset (or "to balance") the risk that compensatory mitigation will fail (completely or partially or be "less than fully successful") and the temporal loss of functions that may occur. Many studies have documented that it can take anywhere from 5 to 100 years to achieve a fully-functioning restored or created wetland (see Chapter 6 of *Wetlands in Washington State – Volume 2* [Granger et. al 2005]).

In addition to the risk of failure and the temporal loss, a higher or lower mitigation ratio may be required based on the nature and effectiveness of the mitigation itself and tradeoffs associated with out-of-kind and off-site mitigation.

Definition of temporal loss

Temporal loss is the loss of functions between the time an impact occurs and the time the functions are re-established. In the context of wetland mitigation, it is the loss of functions that occurs between the time functions are lost at an impact site and the time those functions are fully replaced at a mitigation site.

The agencies determine the amount of compensation necessary to mitigate wetland impacts on a case-by-case basis to ensure that the loss of wetland acreage and functions is adequately addressed. In general, compensatory mitigation proposals should:

- Replace wetland impacts with the same or higher category of wetland.
- Provide equal or greater area of wetlands through re-establishment or creation.
- Be located in areas where the compensation can contribute to ecosystem functioning at a large scale (e.g., part of river corridors and green space networks).
- Clearly identify how the compensation actions will replace the functions lost or provide measurable gains in other functions important in the area (refer to Appendix H, for more information on different compensation actions).

Section 6.5.1 describes the rationale for using mitigation ratios. Section 6.5.2 provides a set of mitigation ratios that approximates the amount of compensatory mitigation which is likely to be required for a particular impact. It also provides guidelines for using the ratios.

6.5.1 Rationale for Mitigation Ratios Greater Than 1:1

When compensatory wetland mitigation was first required, the loss of one unit of area (acre) of wetland generally would require one unit of area (acre) of compensation (a 1:1 ratio). However, a 1:1 mitigation ratio is generally no longer considered sufficient (Castelle et al. 1992, King et al. 1993, National Research Council 2001, Granger et al. 2005) due to the risk of failure and temporal loss:

- **Risk of failure.** It is possible that compensation sites will not perform as proposed (King and Bohlen 1994) and therefore may fail to compensate for wetland loss and degradation (Castelle et al. 1992, Johnson et al. 2002, Sheldon et al. 2005).
- **Temporal loss.** It may take many years for a compensation site to achieve the "ecological equivalency" (National Research Council 2001) and develop the proposed/required wetland structures and/or functions (Castelle et al. 1992, Johnson et al. 2002, Sheldon et al. 2005).

Other factors that support the case for mitigation ratios greater than 1:1 include:

- **Some types of compensation result in a net loss.** Some types of compensation result in a net loss of wetland acreage and/or function (e.g., enhancement, preservation). One way to minimize this loss is to require larger amounts of compensation. For example, the use of enhancement results in a net loss of wetland area and may result in a very limited increase in wetland functions or a trade-off in functions (Johnson et al. 2002). Therefore, in order to compensate for the loss of

functions, wetland functions would need to be increased (improved , enhanced) over a larger area. Thus, enhancement typically requires higher mitigation ratios than re-establishment or creation (establishment).

- **Type of wetlands and their functions.** There are many types of wetlands with varying functions. Mitigation ratios must take into account the type of wetland and the functions that would be lost or degraded. For example, the loss of a high-functioning forested wetland would require a higher mitigation ratio than the loss of a highly degraded, low-functioning wet pasture (Breaux and Serefiddin 1999). This is because of the much higher risk of failing to replace the forested wetland and the greater time needed to establish a forested wetland as compensation.
- **The location and kind of compensation**. Additional wetland area may be required to offset losses if out-of-kind compensation is proposed or the replacement wetland is located quite a distance from the impact area.
- **Permanence or degree of impact or alteration.** In some cases a wetland may only be temporarily disturbed (see Section 3.6, *What Type of Impact Are You Proposing?*). For example, when a new pipeline crosses through a wetland the vegetation, soil, and hydroperiod are usually only temporarily altered. Impacts that are relatively short in duration generally require lower mitigation ratios than permanent impacts. In some cases an alteration may be a conversion from one wetland type to another, such as converting a forested or scrub-shrub wetland to an emergent wetland for overhead utility lines or buried pipelines. Such conversions may require lower ratios than permanent wetland losses (refer to Section 6.5.6, *Mitigation Ratios for Temporary Impacts and Conversions*).

(For more discussion about the rationale for ratios refer to Appendix 8-F, *Rationale for Guidance on Ratios*, in Granger et. al 2005.)

6.5.2 Typical Mitigation Ratios for Compensatory Mitigation

This section contains tables that provide typical ratios for compensatory mitigation. The ratios provide a starting point for discussion. They are based on evaluations of mitigation success and risk at a programmatic level, and do not represent the specific risk of any individual project.

Typical mitigation ratios for projects in western Washington are shown in Table1a, and mitigation ratios for projects in eastern Washington are shown in Table 1b. Refer to Section 6.5.2.1 (*Background and Basic Assumptions for Using the Mitigation Ratios in Tables 1a and 1b*) before reading the tables. Note that preservation is not included in the tables and is discussed separately in Section 6.5.5**.**

One basic assumption for using the ratios is that the hydrogeomorphic (HGM) classification and category of the affected

The ratios are partly based on the rating (category) of the affected wetland

The ratios found in Tables 1a and 1b are based on the category of the wetland or special characteristics. You must rate the affected wetland using the rating systems for eastern or western Washington (Hruby 2004a and 2004b) before using the tables (refer to Section 3.3, *What Type and Size of Wetlands Are Present?*).

wetland will be the same as the compensation wetland. The category is determined by the wetland rating systems for eastern or western Washington (Hruby2004a and 2004b).

The proposed HGM classification, category, and functions of the compensation site can be compared to those of the impact site and this information may be used as a basis for determining mitigation ratios. On a case-by-case basis, it is possible to use the scores from the wetland rating systems to compare functions between the compensation wetland and the affected wetland. This information may be used to adjust mitigation ratios. For example, ratios may be lower if impacts to a Category IV wetland are to be mitigated by creating a Category II wetland. The same is true for impacts to wetlands that currently would be considered *atypical* (see definition below).

Scores from the *Methods for Assessing Wetlands* (Hruby et al. 1999 or 2000) may also be used if the impact site and the site used for compensation will be the same HGM class and subclass. The ratios may be adjusted either up or down if the category or HGM class or subclass of the wetland proposed for compensation is different. Scores from the methods for assessing wetland functions (Hruby et al. 1999) provide another option to establish whether the functions lost will be replaced if both the affected wetland and the wetland used for compensation are of the same HGM class and subclass.

Defining atypical wetlands

Compensatory mitigation should not result in the creation, restoration, or enhancement of an *atypical wetland*. An atypical wetland is defined as a wetland whose "design" does not match the type of wetland that would normally be found in the geomorphic setting of the proposed site (i.e., the water source and hydroperiod proposed for the mitigation site are not typical for the geomorphic setting). In addition, any designs that provide exaggerated morphology or require a berm or other engineered structures to hold back water would be considered atypical.

Creating a depressional wetland by excavating a depression in a riverine overflow channel or creating a depression in an existing slope wetland using an engineered berm to hold water, would both produce atypical wetlands. These would be considered atypical HGM locations for depressional wetlands and, as such, they would be less likely to provide the same functions. Excavating a permanently inundated pond in an existing seasonally saturated or inundated wetland would also result in an atypical wetland.

Note: This is different than the "atypical wetland" defined in the Corps 1987 wetland delineation manual.

6.5.2.1 Background and Basic Assumptions for Using the Ratios in Tables 1a and 1b.

This following list provides important background information and assumptions for the use of the ratios in the tables. Read these prior to using Tables 1a and 1b.

- Each column in Tables 1a and 1b is a different type of compensatory mitigation (restoration, creation, and enhancement). The types of compensation are defined in Section 5.1.
- Separate tables are provided for eastern and western Washington because these areas vary substantially in landscape setting, geology, climate, and wetland types and functions.
- The ratios shown represent a compensatory mitigation project that is constructed concurrent with wetland impacts. If mitigation is constructed well after the impacts (i.e., a year or more of delay) the ratios will increase due to added temporal loss.
- If impacts are to be mitigated by using an approved and established mitigation bank, the rules and ratios applicable to the individual bank should be used.
- The ratios are based on the assumption that the category and hydrogeomorphic (HGM) class or subclass of the compensation wetland and affected wetland are the same (e.g., impacts to a Category II riverine wetland are compensated by creating, restoring, or enhancing a Category II riverine wetland).
- Ratios for projects in which the category and HGM class or subclass of wetlands proposed as compensation are not the same as that of the wetland affected will be determined on a case-by-case basis using the ratios in the tables as a starting point. The ratios could be higher in such cases.
- The ratio for using rehabilitation as compensation is 2 times that for using re-establishment or creation (R/C) (2 acres of rehabilitation are equivalent to 1 acre of R/C). The ratio for using enhancement as compensation is 4 times that for using R/C (4 acres of enhancement are equivalent to 1 acre of R/C).
- Re-establishment or creation can be used in combination with rehabilitation or enhancement. For example, 1 acre of impact to a Category III wetland would require 2 acres of R/C. If an applicant provides 1 acre of R/C (i.e., replacing the lost acreage at a 1:1 ratio), the remaining 1 acre of R/C necessary to compensate for the impact could be substituted with 2 acres of rehabilitation or 4 acres of enhancement.
- Generally the use of enhancement alone as compensation is discouraged. Using enhancement in combination with the replacement of wetland area at a minimum of 1:1 through re-establishment or creation is preferred.

The fourth and fifth columns in Tables 1a and 1b list two sets of ratios when different types of compensation are used as part of a mitigation package, specifically “re-establishment or creation and rehabilitation” or “re-establishment or creation and enhancement.” See the footnote to the table as well as the discussion in Section 6.5.4, *Combining Different Types of Compensation*, for an explanation.

The mitigation ratios provided in this section are guidance

The ratios provided as guidance in this document represent what a permit applicant should expect as requirements for compensation, thereby providing some predictability for applicants. However, regulatory agencies may deviate from the guidance. They must make an individual determination on the mitigation ratios required for specific wetland impacts to ensure that the compensation is proportionate to the proposed loss or degradation of wetland area and/or functions. In other words, the required compensation represents a roughly proportional exchange for the proposed impacts (Dolan v. City of Tigard, 512 U.s. 374, 114 S. Ct. 2309, 129 L.Ed.2d 304 (1994)) to provide and ensure the adequate compensation of wetland area and functions.

Table 1a. Mitigation ratios for western Washington.

Category and Type of Wetland Impacts	Re-establishment or Creation	Rehabilitation Only[21]	Re-establishment or Creation (R/C) and Rehabilitation (RH)[21]	Re-establishment or Creation (R/C) and Enhancement (E)[21]	Enhancement Only[21]
All Category IV	1.5:1	3:1	1:1 R/C and 1:1RH	1:1 R/C and 2:1 E	6:1
All Category III	2:1	4:1	1:1 R/C and 2:1 RH	1:1 R/C and 4:1 E	8:1
Category II Estuarine	Case-by-case	4:1 Rehabilitation of an estuarine wetland	Case-by-case	Case-by-case	Case-by-case
Category II Interdunal	2:1 Compensation must be interdunal wetland	4:1 Compensation must be interdunal wetland	1:1 R/C and 2:1 RH Compensation must be interdunal wetland	Not considered an option[22]	Not considered an option[22]
All other Category II	3:1	6:1	1:1 R/C and 4:1 RH	1:1 R/C and 8:1 E	12:1
Category I Forested	6:1	12:1	1:1 R/C and 10:1 RH	1:1 R/C and 20:1 E	24:1
Category I - based on score for functions	4:1	8:1	1:1 R/C and 6:1 RH	1:1 R/C and 12:1 E	16:1
Category I Natural Heritage site	Not considered possible[23]	6:1 Rehabilitation of a Natural Heritage site	R/C Not considered possible[23]	R/C Not considered possible[23]	Case-by-case
Category I Coastal Lagoon	Not considered possible[23]	6:1 Rehabilitation of a coastal lagoon	R/C not considered possible[23]	R/C not considered possible[23]	Case-by-case
Category I Bog	Not considered possible[23]	6:1 Rehabilitation of a bog	R/C Not considered possible[23]	R/C Not considered possible[23]	Case-by-case
Category I Estuarine	Case-by-case	6:1 Rehabilitation of an estuarine wetland	Case-by-case	Case-by-case	Case-by-case
NOTE: Typical ratios for preservation are discussed in Section 6.5.5.					

21 These ratios are based on the assumption that the rehabilitation or enhancement actions implemented represent the average degree of improvement possible for the site. Proposals to implement more effective rehabilitation or enhancement actions may result in a lower ratio, while less effective actions may result in a higher ratio. The distinction between rehabilitation and enhancement is not clear-cut. Instead, rehabilitation and enhancement actions span a continuum. Proposals that fall within the gray area between rehabilitation and enhancement will result in a ratio that lies between the ratios for rehabilitation and the ratios for enhancement (see Appendix H for further discussion).

22 Due to the dynamic nature of interdunal systems, enhancement is not considered an ecologically appropriate action.

23 Natural Heritage sites, coastal lagoons, and bogs are considered irreplaceable wetlands because they perform some functions that cannot be replaced through compensatory mitigation. Impacts to such wetlands would therefore result in a net loss of some functions no matter what kind of compensation is proposed.

Table 1b: Mitigation ratios for eastern Washington.

Category and Type of Wetland Impacts	Re-establishment or Creation	Rehabilitation Only[24]	Re-establishment or Creation (R/C) and Rehabilitation (RH) [24]	Re-establishment or Creation (R/C) and Enhancement (E)[24]	Enhancement Only[24]
All Category IV	1.5:1	3:1	1:1 R/C and 1:1 RH	1:1 R/C and 2:1 E	6:1
All Category III	2:1	4:1	1:1 R/C and 2:1 RH	1:1 R/C and 4:1 E	8:1
Category II Forested	4:1	8:1	1:1 R/C and 4:1 RH	1:1 R/C and 6:1 E	16:1
Category II Vernal pool	2:1 Compensation must be seasonally ponded wetland	4:1 Compensation must be seasonally ponded wetland	1:1 R/C and 2:1 RH	Case-by-case	Case-by-case
All other Category II	3:1	6:1	1:1 R/C and 4:1 RH	1:1 R/C and 8:1 E	12:1
Category I Forested	6:1	12:1	1:1 R/C and 10:1 RH	1:1 R/C and 20:1 E	24:1
Category I based on score for functions	4:1	8:1	1:1 R/C and 6:1 RH	1:1 R/C and 12:1 E	16:1
Category I Natural Heritage site	Not considered possible[25]	6:1 Rehabilitation of a Natural Heritage site	R/C Not considered possible[25]	R/C Not considered possible[25]	Case-by-case
Category I Alkali	Not considered possible[25]	6:1 rehabilitation of an alkali wetland	R/C Not considered possible[25]	R/C Not considered possible[25]	Case-by-case
Category I Bog	Not considered possible[25]	6:1 Rehabilitation of a bog	R/C Not considered possible[25]	R/C Not considered possible[25]	Case-by-case
NOTE: Ratios for preservation are discussed in Section 6.5.5.					

24 These ratios are based on the assumption that the rehabilitation or enhancement actions implemented represent the average degree of improvement possible for the site. Proposals to implement more effective rehabilitation or enhancement actions may result in a lower ratio, while less effective actions may result in a higher ratio. The distinction between rehabilitation and enhancement is not clear-cut. Instead, rehabilitation and enhancement actions span a continuum. Proposals that fall within the gray area between rehabilitation and enhancement will result in a ratio that lies between the ratios for rehabilitation and the ratios for enhancement (see Appendix H for further discussion).

25 Natural Heritage sites, alkali wetland, and bogs are considered irreplaceable wetlands because they perform some functions that cannot be replaced through compensatory mitigation. Impacts to such wetlands would therefore result in a net loss of some functions no matter what kind of compensation is proposed.

6.5.3 Guidelines on Using Mitigation Ratios

6.5.3.1 Increasing or Reducing Ratios

The preceding tables provided typical ratios for permanent impacts to particular wetland types and categories. As noted earlier, they are based on programmatic evaluations of mitigation and are not intended to reflect individual site conditions. Therefore, the following guidance is provided to assist the agencies in deciding whether a project requires an increase (provide more compensation) or a decrease (provide less compensation) in mitigation ratios.

Increases in mitigation ratios are appropriate under the following circumstances:

- Success of the proposed compensation project is uncertain.
- A long time will elapse between the loss of wetland functions at the impact site and establishment of wetland functions at the mitigation site.
- Proposed compensatory mitigation will result in a lower category wetland or reduced functions relative to the wetland being impacted.
- The impact was unauthorized.

Reductions in mitigation ratios are appropriate under the following circumstances:

- Documentation by a qualified wetland professional (see Appendix D) demonstrates that the proposed mitigation actions have a very high likelihood of success based on prior experience.
- Documentation by a qualified wetland professional demonstrates that the proposed actions for compensation will provide functions and values that are significantly greater than the wetland being affected.
- The proposed actions for compensation are conducted in advance of the impact and are shown to be successful.

Determining ratios for impacts to wetlands that have multiple hydrogeomorphic (HGM) classes

In wetlands where several HGM classes are found within one delineated boundary, the areas of the wetlands within each HGM class can be scored and rated separately and the ratios adjusted accordingly (e.g., a Category II slope wetland and a Category III depressional wetland), if **all of the following apply**:

- The wetland does not meet any of the criteria for wetlands with "Special Characteristics" as defined in the rating system (Hruby 2004a and 2004b).
- The rating and score for the entire wetland is provided along with the scores and ratings for each area with a different HGM class.
- All wetland impacts are within an area that has a different HGM class from the one used to establish the initial category.
- The proponents provide adequate hydrologic and geomorphic data to establish that the boundary between HGM classes lies at least 50 feet outside of the footprint of the impacts.

For more information on classifying and rating wetlands refer to the rating systems for eastern and western Washington (Hruby 2004a and b).

6.5.4 Combining Different Types of Compensation

Establishing a mitigation ratio is straightforward when compensation projects involve one type of compensation and replace the wetland area lost (e.g., re-establishment, creation). However, when a proposal for compensation includes re-establishment or creation along with enhancement, two ratios are used to determine the total amount of compensation required. The fourth and fifth column in both Tables 1a and 1b list the ratios required when these types of compensation are used in conjunction. Ratios are provided for each wetland category and type. When using these ratios, both the re-establishment/creation and the enhancement ratios listed are per area (acre) of impact. For example, when the column lists the ratios as “1:1 R/C and 6:1 E” it means that for every acre of impact an applicant would be required to provide 1 acre of re-establishment or creation and 6 acres of enhancement. Thus, for a 3-acre impact to a Category II forested wetland in eastern Washington, the amount of compensation necessary would be 3 acres of creation/re-establishment plus 18 acres of enhanced wetland for a total area of 21 acres. Alternatively, in this scenario, the applicant could provide 12 acres of re-establishment or creation (4:1 from Table 1b) to offset the three-acre loss.

When rehabilitation is used with creation or re-establishment, the ratio for rehabilitated area will be determined based on the projected level of improvement of functions or degree of restoration of ecological processes. In most cases, the ratios for rehabilitation will be less than those for enhancement (see Appendix H for further discussion).

6.5.5 Mitigation Ratios for Preservation

In some cases, preservation of existing wetlands may be acceptable as compensation for wetland losses and degradation. Acceptable sites for preservation include those that:

- Are important due to their landscape position.
- Are rare or limited wetland types.
- Provide high levels of functions.

Preservation is sometimes combined with other forms of compensation to form a mitigation package. In exceptional circumstances it is used by itself. The use of preservation as the sole means of compensating for loss of a wetland is generally not allowed because of the net loss in wetland area.

Ratios for preservation in combination with other forms of mitigation generally range from 10:1 to 20:1. Specific ratios will be determined on a case-by-case basis, depending on the quality of the lost or degraded wetlands and the quality of the wetlands being preserved. Ratios for preservation as the sole means of mitigation generally start at 20:1. Specific ratios will depend upon the significance of the preservation project and the quality of the wetland resources lost.

See Sections 5.2.4 and 6.4 for more information on preservation and the criteria for its use as compensation.

6.5.6 Mitigation Ratios for Temporary Impacts and Conversions

When impacts to wetlands are not permanent, the agencies often require some compensation for the temporal loss of wetland functions. Long-term temporary impacts refer to impacts to functions that will eventually be replaced, but which will take a long time. As opposed to short-term temporary impacts in which functions are replaced quickly; usually within a growing season or two (see Section 3.6, *What Type of Impact Are You Proposing?*).

For long-term temporary impacts, agencies typically require some compensation to account for the risk and temporal loss of wetland functions, in addition to restoring the affected wetland to its previous condition. Generally, the ratios for long-term temporary impacts to forested and scrub-shrub wetlands are one-quarter of the typical ratios for permanent impacts (refer to Tables 1a and 1b), provided that the following measures are satisfied:

- An explanation is provided on how hydric soil, especially deep organic soil, is stored and handled in the areas where the soil profile will be severely disturbed for a fairly significant depth or length of time.
- Surface and groundwater flow patterns are maintained or can be restored immediately following construction.
- A 10-year monitoring and maintenance plan is developed and implemented for the restored forest and scrub-shrub wetlands.
- Disturbed buffers are re-vegetated and monitored.

- Where appropriate, the hydroseed mix to be applied on re-establishment areas is identified.

For long-term temporary impacts that last for greater than two years, the Corps considers the impacts to be of a more permanent nature even if the area will eventually be restored. The ratios therefore would be closer to those found in Tables 1a and 1b. Ecology will also review these case-by- case and the amount of mitigation will be commensurate with the expected length of impacts.

When impacts are to a native emergent community and there is a potential risk that its re-establishment will be unsuccessful (generally due to invasive species), compensation for temporal loss and the potential risk may be required in addition to restoring the affected wetland and monitoring the site. If the impacts are to wetlands dominated by non-native vegetation (e.g., blackberry, reed canarygrass, or pasture grasses), restoration of the affected wetland with native species and monitoring after construction is generally all that is required.

Loss of functions due to the permanent conversion of wetlands from one type to another also requires compensation. For example, when a forested wetland is permanently converted to an emergent or shrub wetland (e.g., for a utility right-of-way) some functions are permanently lost or reduced.

The ratios for conversion of wetlands from one type to another will vary based on the type and degree of the alteration, but they are generally one-half of the typical ratios for permanent impacts (refer to Tables 1a and 1b).

Mitigation guidance for the conversion of wetlands to cranberry bogs

Specific guidance has been developed for conversions of wetlands to cranberry bogs. Please refer to the 1998 *Guidelines for Implementation of Compensatory Mitigation Requirements for Conversion of Wetlands to Cranberry Bogs* for information on ratios associated with this activity (Washington State Department of Ecology, U.S. Environmental Protection Agency Region 10, U.S. Army Corps of Engineers Seattle District, and U.S. Fish and Wildlife Service. 1998. Special Public Notice: http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/ACF101C.pdf).

6.5.7 Uplands Used as Compensation

Uplands may be used for compensatory mitigation in certain situations providing they are protected from future uses that are incompatible with the compensation project goals. Normally, approval for using upland areas will only be granted after a minimum of 1:1 replacement of wetland area is provided.

The ratio used for uplands that are part of a compensation package is in the range of 10:1 to 20:1 and will be determined based on the following criteria:

- Degree to which the upland provides connectivity through corridors or adjacency to other habitat areas.

- Quality of the upland area.
- Ability to increase the performance of aquatic resource functions.
- Ability to provide additional ecological functions.

6.6 Determining Adequate Buffers

Generally, buffers are vegetated areas adjacent to an aquatic resource that can, through various physical, chemical, and/or biological processes, reduce impacts from adjacent land uses. The scientific literature recognizes that buffers provide important functions that protect wetlands and provide essential habitat for many species that depend on wetlands (refer to Chapter 5 in *Wetlands in Washington State - Volume 1* (Sheldon et. al 2005)). Buffers protect and maintain the wide variety of functions provided by wetlands. The physical characteristics of buffers-slope, soils, vegetation, and width-determine how well buffers reduce the adverse impacts of adjacent land uses and provide the habitat needed by wildlife species that use wetlands and habitats adjacent to them. For wildlife that use wetlands, but also require uplands to meet their life-history needs, buffers provide necessary terrestrial habitats.

Compensation wetlands generally need a buffer in order to protect the wetland from the impacts of adjacent land uses and, in most cases, to provide habitat necessary for the survival of wetland-dependent wildlife species. The necessary physical characteristics (e.g., width, vegetation type and density) of the required buffer will depend to a large degree on the functions that the compensation site and the buffer itself are intended to provide. Protecting wildlife habitat functions of wetlands generally requires larger buffers than protecting the water-quality functions of wetlands. However, the width necessary to protect a compensation site from adjacent impacts is contingent upon a number of other criteria, such as:

- The functions and sensitivity of the compensatory wetland to be protected by the buffer.
- The characteristics of the watershed contributing to the compensatory wetland.
- The characteristics of the buffer itself.
- The nature of the adjacent land use (or proposed land use) and the expected impacts from the land use.
- The specific functions that the buffer is intended to provide.[26]

In the past, the agencies did not consistently require buffers around compensatory mitigation sites. In fact, in some cases, agencies allowed buffer area to count toward the fulfillment of compensation area requirements, thereby giving credit for the protection of buffers. However, new federal guidance (RGL 02-02), Ecology's evaluation of wetland mitigation sites in Washington (Johnson et. al 2000 and 2001), and the recent state review

26 The above section was adapted from *Wetlands in Washington State Volume 1: A Synthesis of the Science* (Sheldon et al. 2005). The text has been modified slightly to apply to compensatory mitigation.

of the best available science on wetlands (Sheldon et al. 2005), have led the agencies to revise their views on the necessity of buffers around compensation sites.

The agencies now require that most compensatory wetlands have a buffer based on the minimum width necessary to protect the most sensitive functions being performed. In most cases, the acreage provided by the buffer will not contribute toward compensation acreage, because the buffer is necessary to protect the functions of the compensatory wetland.

Buffers around compensation wetlands should be well marked with signs and/or fencing to help protect the buffer. This is a particular concern when wetlands are adjacent to residential areas or other lands with "active" uses. These types of land uses can result in reductions in buffer width and quality over time (refer to *Wetlands in Washington State - Volume 1* (Sheldon et. al 2005), Section 5.5.5, *Buffer Maintenance and Effectiveness Over Time*). These impacts can result from several causes, including:

- Removal of native vegetation and conversion to lawn or non-native plantings.
- Use of the buffer as a dumping ground for lawn and yard waste and garbage.
- Human and pet intrusions.
- Filling to extend uplands into wetlands.

Use of semi-permanent boundary markers (e.g., signs, large rocks, wildlife friendly fencing[27]) can help reduce intrusions into the buffer (see Section 3.9.5, *Long-term Protection*, for more information).

6.6.1 Buffer Widths for Compensation Sites

The width and character of buffers needed around compensation sites will be determined on a case-by-case basis depending on project and site-specific factors. The primary factors that will be considered in determining what type and width of buffer is necessary include:

- The goals and objectives of the proposed compensation site.
- The functions or special characteristics the proposed compensation site is expected to provide.
- The current and expected future land uses adjacent to the compensation site.
- The presence of connecting corridors between the compensation site and other habitats important to species expected to use the compensation site.

In order to give applicants some predictability regarding buffers that may be required for a compensation site, the agencies have outlined more specific guidance below.

The buffer widths in the following tables were developed based on the review of scientific information done for *Wetlands in Washington State Volume 1: A Synthesis of the Science* (Sheldon et al. 2005) and are adapted from *Volume 2: Guidance for Protecting and Managing Wetlands* (Granger et. al. 2005). The tables represent a synthesis of the

27 Chain link fences are not recommended due to their disruptions to wildlife movement (see note on fencing in Chapter 3).

information about the type and size of buffers needed to protect functions and specific wetland characteristics of concern. For detailed rationale for the buffer widths refer to Appendix 8-E of Volume 2 (Granger et. al 2005).

The fact that not all land uses have the same level of impact has been incorporated into the buffer widths in Tables 3-6b. For example, a compensation wetland established adjacent to a single family residence on 5 acres is expected to experience a smaller impact than a compensation wetland next to 20 houses on the same 5 acres. Three categories of impacts are outlined - changes to land-uses that create high impacts, moderate impacts, and low impacts. Categories for impacts and definitions of land-uses are provided in Table 2, which follows.

Basic Assumptions for Recommended Buffer Widths

Recommendations for buffer widths assume that:

- A proposed category for the compensatory wetland has been identified using the wetland rating system for eastern or western Washington (Hruby 2004a or 2004b).
- The buffer is vegetated with native plant communities that are appropriate for the ecoregion or with a plant community that provides similar functions [28]. *Ecoregions* denote areas with similar ecosystems and types, quality, and quantity of environmental resources. The classification is hierarchical and Level III ecoregion subdivisions currently mapped for Washington are: Coast Range, Puget Lowland, Cascades, Eastern Cascades Slopes and Foothills, North Cascades, Columbia Plateau, Blue Mountains, and Northern Rockies. The U.S. Environmental Protection Agency maintains updated maps of ecoregions that are available at http://www.epa.gov/naaujydh/pages/models/ecoregions.htm.
- If the buffer vegetation is disturbed (grazed, mowed, etc.), it needs to be revegetated with native plant communities that are appropriate for the ecoregion, or with a plant community that provides similar functions (see footnote 28, next page).
- The width of the buffer is measured in horizontal distance (see drawing below) for determining appropriate widths on slopes.

- The buffer will remain relatively undisturbed in the future.

A compensatory wetland may fall into more than one category. For example, if the proposed compensatory wetland is intended to be a forested, riparian wetland it may be rated a Category II wetland because it is a riparian forest, but it may be rated a Category I wetland based on its anticipated score for functions. If a wetland meets more than one of the characteristics listed in Tables 3 through 6b, the buffer recommended to protect the compensatory wetland is the widest one.

28 Generally this means planting native plant species. Many buffers, however, have been disturbed and will be vegetated with non-native species. The agencies understand that it may be difficult or undesirable to try to control all non-native species and, therefore, will consider the condition of the buffer on a case-by case basis. The emphasis will be on providing vegetation in the buffer that will meet the needed buffer functions

Table 2. Types of land uses that can result in high, moderate, and low levels of impact to adjacent wetlands.

Level of Impact from Proposed Change in Land Use	Types of Land Use Based on Common Zoning Designations
High	• Commercial • Urban • Industrial • Institutional • Retail sales • Residential (more than 1 unit/acre) • Conversion to high-intensity agriculture (dairies, nurseries, greenhouses, growing and harvesting crops requiring annual tilling and raising and maintaining animals, etc.) • High-intensity recreation (golf courses, ball fields, etc.) • Hobby farms
Moderate	• Residential (1 unit/acre or less) • Moderate-intensity open space (parks with biking, jogging, etc.) • Conversion to moderate-intensity agriculture (orchards, hay fields, etc.) • Paved trails • Building of logging roads • Utility corridor or right-of-way shared by several utilities and including access/maintenance road
Low	• Forestry (cutting of trees only) • Low-intensity open space (hiking, bird-watching, preservation of natural resources, etc.) • Unpaved trails • Utility corridor without a maintenance road and little or no vegetation management

Table 3. Width of buffers needed to protect Category IV wetlands.

(For wetlands scoring less than 30 points for all functions using the rating system [Hruby 2004a and b])

Wetland Characteristics	Buffer Widths by Impact of Proposed Land Use	Other Measures Recommended for Protection
Score for all 3 basic functions is less than 30 points	Low - 25 ft Moderate – 40 ft High – 50 ft	No recommendations at this time.*

Table 4. Width of buffers needed to protect Category III wetlands.

(For wetlands scoring 30 – 50 points for all functions using the rating system [Hruby 2004a and b])

Wetland Characteristics	Buffer Widths by Impact of Proposed Land Use	Other Measures Recommended for Protection
Moderate level of function for habitat (score for habitat 20 - 28 points)	Low - 75 ft Moderate – 110 ft High – 150 ft	No recommendations at this time.*
Not meeting above characteristic	Low - 40 ft Moderate – 60 ft High – 80 ft	No recommendations at this time.*

* No information on other measures for protection was available at the time this document was written. The Washington State Department of Ecology will continue to collect new information for future updates to this document. This applies to Tables 4 through 6b as well.

Table 5a. Width of buffers needed to protect Category II wetlands in eastern Washington

(For wetlands scoring 51-69 points for all functions or having the "Special Characteristics" identified in the rating system [Hruby 2004a])

Wetland Characteristics	**Buffer Widths by Impact of Proposed Land Use** (apply most protective if more than one criterion is met)	**Other Measures Recommended for Protection**
High level of function for habitat (score for habitat 29 - 36 points)	Low – 100 ft Moderate – 150 ft High – 200 ft	Maintain connections to other habitat areas
Moderate level of function for habitat (score for habitat 20 - 28 points)	Low - 75 ft Moderate – 110 ft High – 150 ft	No recommendations at this time *
High level of function for water quality improvement and low for habitat (score for water quality 24 - 32 points; habitat less than 20 points)	Low - 50 ft Moderate – 75 ft High – 100 ft	No additional surface discharges of untreated runoff
Vernal pool	Low - 100 ft Moderate – 150 ft High – 200 ft OR Develop a regional plan to protect the most important vernal pool complexes – buffers of vernal pools outside protection zones can then be reduced to: Low - 40 ft Moderate – 60 ft High – 80 ft	No intensive grazing or tilling in the wetland
Riparian forest	Buffer width to be based on score for habitat functions or water quality functions	Riparian forest wetlands need to be protected at a watershed or sub-basin scale (protection of the water regime in the watershed) Other protection based on needs to protect habitat and/or water quality functions
Not meeting above characteristics	Low - 50 ft Moderate – 75 ft High – 100 ft	No recommendations at this time *

* No information on other measures for protection was available at the time this document was written. The Washington State Department of Ecology will continue to collect new information for future updates to this document. This applies to Tables 4 through 6b as well.

Table 5b. Width of buffers needed to protect Category II wetlands in <u>western</u> Washington.

(For wetlands scoring 51-69 points for all functions or having the "Special Characteristics" identified in the rating system [Hruby 2004b])

Wetland Characteristics	**Buffer Widths by Impact of Proposed Land Use** (Apply most protective if more than one criterion is met.)	**Other Measures Recommended for Protection**
High level of function for habitat (score for habitat 29 - 36 points)	Low - 150 ft Moderate – 225 ft High – 300 ft	Maintain connections to other habitat areas
Moderate level of function for habitat (score for habitat 20 - 28 points)	Low - 75 ft Moderate – 110 ft High – 150 ft	No recommendations at this time *
High level of function for water quality improvement and low for habitat (score for water quality 24 - 32 points; habitat less than 20 points)	Low - 50 ft Moderate – 75 ft High – 100 ft	No additional surface discharges of untreated runoff
Estuarine	Low - 75 ft Moderate – 110 ft High – 150 ft	No recommendations at this time *
Interdunal	Low - 75 ft Moderate – 110 ft High – 150 ft	No recommendations at this time *
Not meeting above characteristics	Low - 50 ft Moderate – 75 ft High – 100 ft	No recommendations at this time *

* No information on other measures for protection was available at the time this document was written. The Washington State Department of Ecology will continue to collect new information for future updates to this document. This applies to Tables 4 through 6b as well.

Table 6a. Width of buffers needed to protect Category I wetlands in eastern Washington.

(For wetlands scoring 70 points or more for all functions or having the "Special Characteristics" identified in the rating system [Hruby 2004a])

Wetland Characteristics	**Buffer Widths by Impact of Proposed Land Use** (apply most protective if more than one criterion is met)	**Other Measures Recommended for Protection**
Natural Heritage Wetlands	Low - 125 ft Moderate – 190 ft High – 250 ft	No additional surface discharges to wetland or its tributaries No septic systems within 300 ft Restore degraded parts of buffer
Bogs	Low - 125 ft Moderate – 190 ft High – 250 ft	No additional surface discharges to wetland or its tributaries Restore degraded parts of buffer
Forested	Buffer size to be based on score for habitat functions or water quality functions	If forested wetland scores high for habitat, need to maintain connectivity to other natural areas Restore degraded parts of buffer
Alkali	Low – 100 ft Moderate – 150 ft High – 200 ft	No additional surface discharges to wetland or its tributaries Restore degraded parts of buffer
High level of function for habitat (score for habitat 29 - 36 points)	Low – 100 ft Moderate – 150 ft High – 200 ft	Maintain connections to other habitat areas Restore degraded parts of buffer
Moderate level of function for habitat (score for habitat 20 - 28 points)	Low – 75 ft Moderate – 110 ft High – 150 ft	No recommendations at this time *
High level of function for water quality improvement (24 – 32 points) and low for habitat (less than 20 points)	Low – 50 ft Moderate – 75 ft High – 100 ft	No additional surface discharges of untreated runoff
Not meeting any of the above characteristics	Low – 50 ft Moderate – 75 ft High – 100 ft	No recommendations at this time *

* No information on other measures for protection was available at the time this document was written. The Washington State Department of Ecology will continue to collect new information for future updates to this document. This applies to Tables 4 through 6b as well.

Table 6b. Width of buffers needed to protect Category I wetlands in western Washington

(For wetlands scoring 70 points or more for all functions or having the "Special Characteristics" identified in the rating system [Hruby 2004b])

Wetland Characteristics	**Buffer Widths by Impact of Proposed Land Use** (Apply most protective if more than one criterion is met)	**Other Measures Recommended for Protection**
Natural Heritage Wetlands	Low - 125 ft Moderate – 190 ft High – 250 ft	No additional surface discharges to wetland or its tributaries No septic systems within 300 ft of wetland Restore degraded parts of buffer
Bogs	Low - 125 ft Moderate – 190 ft High – 250 ft	No additional surface discharges to wetland or its tributaries Restore degraded parts of buffer
Forested	Buffer width to be based on score for habitat functions or water quality functions	If forested wetland scores high for habitat, need to maintain connections to other habitat areas Restore degraded parts of buffer
Estuarine	Low - 100 ft Moderate – 150 ft High – 200 ft	No recommendations at this time *
Wetlands in Coastal Lagoons	Low - 100 ft Moderate – 150 ft High – 200 ft	No recommendations at this time *
High level of function for habitat (score for habitat 29 - 36 points)	Low – 150 ft Moderate – 225 ft High – 300 ft	Maintain connections to other habitat areas Restore degraded parts of buffer
Moderate level of function for habitat (score for habitat 20 - 28 points)	Low – 75 ft Moderate – 110 ft High – 150 ft	No recommendations at this time *
High level of function for water quality improvement (24 – 32 points) and low for habitat (less than 20 points)	Low – 50 ft Moderate – 75 ft High – 100 ft	No additional surface discharges of untreated runoff
Not meeting any of the above characteristics	Low – 50 ft Moderate – 75 ft High – 100 ft	No recommendations at this time *

* No information on other measures for protection was available at the time this document was written. The Washington State Department of Ecology will continue to collect new information for future updates to this document. This applies to Tables 4 through 6b as well.

6.6.1.1 Reducing Buffer Widths

In the following situations, buffer widths for compensatory wetlands will generally be smaller than the recommended width. A narrower buffer may be acceptable when it will not result in reduced functions in the compensatory wetland. Buffer reductions are also appropriate when the intensity of impacts from adjacent land uses are reduced, or when there is a natural barrier to providing a full buffer.

Reduction in Buffer Width Based on Reducing the Intensity of Impacts from Existing or Proposed Adjacent Land Uses

The buffer widths recommended for land uses with high-intensity impacts can be reduced to those recommended for moderate-intensity impacts under the following conditions:

- For compensatory wetlands that are intended to score moderate or high for habitat in the wetland rating system or other *function assessment*, the width of the buffer around the compensatory wetland can be reduced if both of the following are met:

  1) A relatively undisturbed, vegetated corridor[29] at least 100 feet wide is protected between the compensatory wetland and any other Priority Habitats as defined by the Washington State Department of Fish and Wildlife. Priority Habitats in Washington include (for current definitions of Priority Habitats see http://wdfw.wa.gov/hab/phshabs.htm):

     - Wetlands
     - Riparian zones
     - Aspen stands
     - Cliffs
     - Prairies
     - Caves
     - Stands of Oregon White Oak
     - Old-growth forests
     - Estuary/estuary-like
     - Marine/estuarine shorelines
     - Eelgrass meadows
     - Talus slopes
     - Urban natural open space

     The corridor must be protected for the entire distance between the compensatory wetland and the Priority Habitat by some type of legal protection such as a conservation easement.

  2) Measures to minimize the impacts of different land uses on wetlands, such as the examples summarized in Table 7, are applied.

- For compensatory wetlands that will score low for habitat (less than 20 points for habitat in the rating system), the buffer width can be reduced to that required for moderate land-use impacts by applying measures to minimize the impacts of the proposed land uses (see examples in Table 7).

29 "Relatively undisturbed" and "vegetated corridor" are defined in questions H 2.1 and H 2.2.1 of the wetland rating system for eastern and western Washington (Hruby 2004a, 2004b).

Table 7. Measures to minimize high-impact land use on wetlands[30].

Examples of Disturbance	Activities and Uses that Cause Disturbances	Examples of Measures to Minimize Impacts
Lights	• Parking lots • Warehouses • Manufacturing • Residential	• Direct lights away from wetland
Noise	• Manufacturing • Residential	• Locate activity that generates noise away from wetland
Toxic runoff*	• Parking lots • Roads • Manufacturing • Residential areas • Application of agricultural pesticides • Landscaping	• Route all new, untreated runoff away from wetland while ensuring wetland is not dewatered • Establish covenants limiting use of pesticides within 150 ft of wetland • Apply integrated pest management
Stormwater runoff	• Parking lots • Roads • Manufacturing • Residential areas • Commercial • Landscaping	• Retrofit stormwater detention and treatment for roads and existing adjacent development • Prevent channelized flow from lawns that directly enters the buffer
Change in water regime	• Impermeable surfaces • Lawns • Tilling	• Infiltrate or treat, detain, and disperse into buffer new runoff from impervious surfaces and new lawns
Pets and human disturbance	• Residential areas	• Use privacy fencing; plant dense vegetation appropriate for the ecoregion to delineate buffer edge and to discourage disturbance; place wetland and its buffer in a separate land ownership tract
Dust	• Tilled fields	• Use *best management practices* to control dust
* These examples are not necessarily adequate for minimizing toxic runoff if threatened or endangered species are present at the site.		

30 This is not a complete list of measures. Other measures may be proposed by an applicant or be determined to be relevant to a specific site.

Reduction in Buffer Widths For a Site Adjacent to a Parcel with an Individual Rural Stewardship Plan

When a compensation wetland is proposed in a location adjacent to a parcel where a Rural Stewardship Plan (RSP) is in place, the buffer around the compensation wetland can be reduced to a width appropriate for a low-impact land use. A Rural Stewardship Plan is the product of a collaborative effort between rural property owners and a local government to tailor a management plan specific for a rural parcel of land. The goal of a RSP is better management of wetlands than would be achieved through strict adherence to regulations. In exchange, the landowner gains flexibility in the widths of buffers required, in clearing limits, and in other requirements found in the regulations. For example, dense development in rural residential areas can be treated as having a low level of impact when the development of the site is managed through a locally approved RSP. The voluntary agreement includes provisions for restoration, maintenance, and long-term monitoring and specifies the widths of buffers needed to protect each wetland within the RSP.

Reduction in Buffer Widths Where Natural Limits Exist

Cliffs and very steep slopes are one example of site-specific conditions that may allow reduced buffers. If a compensation site is situated at the base of a 100-ft bluff, the bluff itself may provide a buffer for the portion of the wetland that is adjacent to it, and agencies are not likely to require additional buffer area at the top of the bluff. Similarly, wetlands adjacent to open water areas generally won't need buffers on the open water side.

6.6.1.2 Increasing the Width of, or Enhancing, the Buffer

If necessary, agencies may require a wider buffer than those listed in Tables 3 through 6b to ensure that the compensatory wetland and its functions are adequately protected. The agencies may also require that a buffer area be enhanced to further protect the compensatory wetland.

Buffer is Not Vegetated with Plants Appropriate for the Region

The recommended buffer widths are based on the assumption that the buffer is vegetated with a native plant community appropriate for the ecoregion or with one that performs similar functions [31]. If the existing buffer is unvegetated, sparsely vegetated, or vegetated with invasive species that do not perform needed functions, the buffer should either be planted to create the appropriate plant community or widened to ensure it provides adequate functions. Generally, improving the vegetation will be more effective than widening the buffer.

31 Generally this means planting native plant species. Many buffers, however, have been disturbed and will be vegetated with non-native species. The agencies understand that it may be difficult or undesirable to try to control all non-native species and, therefore, will consider the condition of the buffer on a case-by case basis. The emphasis will be on providing vegetation in the buffer that will meet the needed buffer functions.

Buffer Has a Steep Slope

The effectiveness of buffers at removing pollutants before they enter a wetland decreases as the slope increases (refer to Chapter 5 in *Wetlands in Washington State - Volume 1* (Sheldon et. al 2005)). If a buffer is to be based on the score for its ability to improve water quality (see Tables 5a through 6b) rather than habitat or other criteria, then the buffer should be increased by 50% if the slope is greater than 30% (a 3-foot rise for every 10 feet of horizontal distance).

Buffer Is Used by Species Sensitive to Disturbance

If the compensatory wetland is intended to provide habitat for a plant or animal species that is particularly sensitive to disturbance (such as a threatened or endangered species), the width of the buffer should be increased to provide adequate protection for the species based on its particular, life-history needs. Some buffer requirements for priority species are available on the Washington State Department of Fish and Wildlife web page (http://wdfw.wa.gov/hab/phsrecs.htm). The list of priority vertebrate species is located at http://wdfw.wa.gov/hab/phsvert.htm; and invertebrates listed at http://wdfw.wa.gov/hab/phsinvrt.htm. (Information on the buffer widths needed by some threatened, endangered, and sensitive species of wildlife is provided in Appendix 8-H of *Wetlands in Washington State - Volume 2* [Granger et. al 2005].)

6.6.2 Buffer Averaging

Buffer averaging means having a wider buffer in some areas and a narrower buffer in others based on differences in adjacent land-uses and wetlands on the site and site-specific physical limitations. The total buffer area after averaging must be equal to the buffer area provided by uniform buffer widths. The widths of buffers may be averaged if this will improve the protection of wetland functions, or if it is the only way to allow for reasonable use of a parcel. **Averaging may not be used in conjunction with any of the other provisions for reductions in buffers listed above**.

- Averaging to **improve wetland protection** may be permitted when all of the following conditions are met:
  - The compensatory wetland will have significant differences in characteristics in different parts of the wetlands that affect its habitat functions, such as a compensatory wetland with a forested component adjacent to a degraded emergent component or a "dual-rated" wetland with a Category I area adjacent to a lower rated area (thus the buffer around the more degraded portion could be narrower through averaging whereas the higher rated area would have larger buffers)
  - The buffer is increased adjacent to the proposed higher-functioning habitat or more sensitive portion of the wetland, and decreased adjacent to the lower-functioning or less sensitive portion.
  - The total area of the buffer after averaging is at least equal to the area required without averaging.
  - The buffer at its narrowest point is never less than 75% of the required width.

- Averaging to allow reasonable use of a parcel may be permitted when all of the following are met:
  - There are no feasible alternatives to the site design that could be accomplished without buffer averaging.
  - The averaged buffer will not result in degradation of the compensatory wetland's functions and values as demonstrated by a report from a qualified wetland professional (see Appendix D, *Hiring a Qualified Wetland Professional*).
  - The total buffer area after averaging is equal to the area required without averaging.
  - The buffer at its narrowest point is never less than 75% of the required width.

6.6.3 Wetlands as Buffers

In cases where area for an upland buffer is limited or nonexistent, wetland area on the edge of the compensation wetland can be considered a buffer for the rest of the compensatory wetland. However, the acreage of wetland which is acting as a buffer would not count toward compensation requirements for wetland acreage. **It is not acceptable to fill wetlands to "create" an upland buffer for the wetland.**

In these situations, the outer portion of the wetland (often referred to as a "paper" buffer) is performing similar functions as an upland buffer (filtering out pollutants and screening noise, light, and intrusions), thus, protecting the inner portion of the wetland. In most cases, however, the "paper" buffer is not able to perform the additional buffer function of providing adjacent upland habitat needed for many wetland dependent species. Thus, the width of "paper" buffers generally will be based on the need for providing the water quality and screening functions.

6.6.4 Credit for Buffers

There are two situations where some compensation credit for buffers can be generated. These are described below.

Additional buffer acreage provided beyond the required minimum buffer can count as part of the compensation acreage, provided that certain conditions are met (see Section 6.5.7, *Uplands Used as Compensation*). For example, if a Category III compensatory wetland with a moderate habitat score is surrounded by moderate intensity land-uses, the agencies may determine that a minimum 110-foot buffer is needed to protect its functions (see Table 4). However, if the compensation proposal includes a 200-foot buffer for the wetland, the additional 90 feet may be used to meet requirements for compensation area if the buffer provides additional habitat and connections to other habitats, and supports appropriate native plant communities.

In some limited cases, mitigation credit may be given for enhancing buffers around a compensation site. The most likely scenario is one where the impact wetland has no buffer (or a minimal buffer) and the compensation site has no buffer (or a minimal or degraded buffer). In this situation, an applicant may receive some credit for enhancing/restoring the buffer around the compensation site. Applicants are encouraged to consult with the appropriate agency staff to determine if such a situation exists and warrants consideration of credit.

Federal Guidance on the use of vegetated buffers as compensatory mitigation

For more information and further guidance on vegetated buffers please refer to the Federal Guidance on the Use of Vegetated Buffers as Compensatory Mitigation Under Section 404 of the Clean Water Act, which is being developed as part of the National Mitigation Action Plan (http://www.mitigationactionplan.gov/index.html).

6.6.5 Buffers in Urban Areas

The agencies recognize that providing adequate buffers around compensation sites located in urban and urbanizing areas is a challenge. Higher land values increase the cost of providing buffers. In many urban settings it may be difficult to find a location for a compensation site that includes enough area to provide needed buffers.

However, in many instances, compensation wetlands located in urban areas will not be expected to provide significant wildlife habitat and, thus, will not need the wider buffers necessary to protect this function. In most urban locations, the compensation site will primarily provide water quality and quantity-related functions and will need buffers at the smaller end of the range.

In situations where moderate or high-quality wildlife habitat is provided by the compensation site, larger buffers may be necessary. However, the protection of a connecting corridor between the compensation site and other habitats or providing a large buffer on one side of the site may be sufficient to maintain the habitat functions. In most cases buffer averaging can be employed to address unique site constraints.

In other instances, the agencies may decide that it is critical to locate the compensation site in an urban area near the impact site where adequate buffers are precluded. This may mean that the expectations for the level of functions provided by the compensation site will be lowered and the credit given for the wetland compensation area may be lowered as well.

Chapter 7 - Other Mitigation Considerations

7.1 Compensatory Mitigation and Other Aquatic Resources

This document is not intended to address mitigation requirements and policies for resources other than freshwater wetlands although many of the basic principles in this guidance apply to other aquatic resources. Compensation may be required for impacts to other aquatic resources and specific mitigation requirement for impacts to them should be discussed with the appropriate permitting agencies.

Various information sources that address mitigation in other aquatic systems exist: The Washington State Department of Fish and Wildlife's (WDFW) *Integrated Streambank Protection Guidelines* (WDFW et al. 2003) provides guidance for addressing impacts to riverine systems. The Washington State Department of Natural Resources (WDNR) is developing a mitigation policy for state-owned aquatic lands. If a project will potentially impact a river, stream, or state-owned aquatic lands, applicants should work closely with the agencies, including WDFW and WDNR, for specific permitting and mitigation requirements.

Draft guidance on stream assessment methods appropriate for impact assessment and mitigation

In accordance with the National Mitigation Action Plan, the Federal Interagency Mitigation Workgroup (FIMW) commissioned the preparation of a technical resource document to assist with stream mitigation entitled: *Physical Stream Assessment: A Review of Selected Protocols for use in the Clean Water Act (CWA) Section 404 Program (Stream Mitigation Compendium)*. The Stream Mitigation Compendium is intended as a reference that can be consulted by regulatory agencies, resource managers, and restoration ecologists in order to select, adapt, or devise stream assessment methods appropriate for impact assessment and mitigation of fluvial resources in the CWA Section 404 Program.

The draft of this document can be found on-line at http://www.mitigationactionplan.gov/actionitem.html.

7.2 Invasive Species - An Evolving Policy

By now, most regulators and consultants are well aware of the challenges that *invasive species* can pose for successful *compensatory mitigation*. Some of the most common invasive species encountered in the Pacific Northwest include reed canary grass *(Phalaris arundinacea)*, and Himalayan and evergreen blackberries *(Rubus discolor (procerus) and R. laciniatus)*. The invasive purple loosestrife *(Lythrum salicaria)*, is being diligently watched for on mitigation sites to attempt to stave off potential infestations in the Pacific Northwest. However, the more common and prolific invasive species that are currently encountered pale in comparison to the potential foothold and problems that knotweeds pose for mitigation sites, particularly stream and riparian restoration projects.

7.2.1 Knotweed

Japanese, Himalayan, giant, and hybrid knotweeds *(Polygonum cuspidatum, P. polystachyum, P Sachalinense, and P. bohemicum)* spread quickly to form dense tall thickets that shade other species and preclude natural regeneration of the normally diverse native species assemblage. Knotweeds can have profound impacts on salmonid habitat, because they prevent tree establishment along stream banks, disrupt timing, decay rate and quality of detritus in aquatic food webs, and sequester nitrogen in fall, reducing the amount of nitrogen that would be provided by normal leaf-drop in streams. Knotweed therefore has significant impacts on riparian ecosystems and biological diversity.

Knotweed is a creeping perennial. It dies back to the ground with the first hard frost, and returns each year from the same roots. Knotweed has an extensive network of rhizomes spreading at least 23 feet from the parent plant and penetrating more than 7 feet into the soil, making it extremely difficult to control once it is established. Knotweed survives severe floods. In fact, floodwaters merely serve to disperse knotweed fragments throughout the floodplains and cobble bars of rivers. Small fragments can regenerate into whole new stands, and rhizome fragments can be buried up to a meter and still regenerate. Because it grows faster than native species, it quickly shades them out.

Many methods of control have been attempted including, hand cutting, mowing, digging, pulling, covering, herbicides, and a combination of the above. With proper timing these methods can effectively eliminate stands of knotweed; however, all treatment approaches must be tenacious and thorough to be successful.

Because knotweed is so rapidly infesting certain areas of Washington State, the agencies have adopted a "zero tolerance" policy to help control this noxious, invasive species. Knotweed is also beginning to appear on many state and county noxious weed lists. Therefore, if there are no existing non-native knotweed plants on a mitigation site, but knotweed is later found during a monitoring event, a *contingency plan* should be implemented to immediately eradicate it.

For mitigation sites that have established stands of knotweed on them, the agencies will require that efforts be made to reduce the population, with the ultimate goal of eradication over time. Reed canarygrass will allow co-existence of established trees and shrubs, so it is often possible to “live with” a certain percentage on-site. Allowing knotweed to exist is much more problematic. Given time, knotweed will totally overrun a site, and once vigorously established it is more difficult to eradicate. However, one encouraging factor is that, unlike reed canarygrass, clumps of knotweed are likely to be less numerous and much more visible. This makes it much easier to locate populations and ensure treatment of the entire infestation.

7.2.2 Reed Canarygrass

In the Pacific Northwest, reed canary grass *(Phalaris arundinacea)* is one of the most difficult species to eradicate. It is a perennial, typically found in wetlands, that spreads by both seeds and rhizomes and creates dense, tall monocultures that crowd out low-growing species. If reed canary grass is present it is difficult to establish native plants because of the competitive advantage of the reed canary grass.

There is promising on-going research which indicates certain treatments can be effective in controlling reed canarygrass. These include aggressive, repeated mowing at the right time of the year and applying herbicides over a two-year period; rolling up the reed canarygrass mats, including the rhizomes, using them for microtopography or as berms/*buffers* on the mitigation site, covering the rolled-up mats with soil and planting with native species; thick plantings of willows for dense shade establishment (lesser degree of success), and planting a quick growing and spreading native seed mix (must be arduously maintained to be successful). Even with these methods, if adjacent sites have reed canarygrass as a dominant species, then keeping aerial coverage to a 10% maximum has been difficult, at best, to achieve.

An important lesson has been learned from reed canarygrass control and standards. The agencies' previous policy regarding performance standards for reed canarygrass was generally a 10% maximum aerial coverage for all monitoring years. However, many mitigation sites “failed” because they could not achieve the 10% standard, mainly because of widespread coverage of reed canarygrass on adjacent properties or within upstream *corridors*. The intent of invasive species performance standards in mitigation plans is to prevent the establishment of monocultures of invasive species that out-compete native species and compromise and degrade wetland and ecosystem functions. It is not the agencies intent to require unrealistic or unattainable performance standards for compensatory mitigation success.

The agencies have therefore implemented a more flexible policy for reed canarygrass coverage on mitigation sites. The agencies acknowledge that reed canarygrass does provide some important wetland functions, such as water-quality filtering and food-chain support. However, if a native plant community is desired, the most effective and efficient way to manage and maintain a site is to prevent new infestations and eradicate small populations of reed canarygrass as soon as possible. Therefore, for creation or restoration sites that currently have little or no reed canarygrass coverage, limiting reed canary grass to 10% may still be appropriate. The agencies however have adopted a policy of case-by-case determination so that standards make sense, are realistic, and are achievable.

7.3 Compensatory Mitigation And The Endangered Species Act

Many of the activities that destroy or degrade wetlands and their functions also adversely impact species listed as threatened or endangered under the Endangered Species Act (ESA) (33 USC §§ 1531 et seq., see Appendix E for a description). As a result, the regulatory agencies often give special consideration to the specific needs of these federally protected species when determining what compensatory mitigation will be required. Even before considering compensatory mitigation, the regulatory agencies often apply more stringent standards for avoiding and minimizing impacts to the aquatic environment and ESA-listed species, especially when the activity would degrade or destroy habitat that is difficult or impossible to replace. Typically, requirements for compensatory mitigation for projects involving ESA-listed species simultaneously address impacts to both wetland functions and endangered species and their habitat.

Section 7 of the ESA requires federal agencies and departments to consult with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service (USFWS) prior to taking any action that could

potentially affect a species listed (or proposed for listing) as treatened or endangered. Consultation is also mandated if the action would destroy or adversely modify designated critical habitat for a listed species. This requirement applies to the Corps when it issues a Clean Water Act Section 404 or Section 10 permit. In a process somewhat analogous to *mitigation sequencing* (refer to section 3.5.1, *Mitigation Sequencing*), Section 7 consultations usually result in the identification of measures that would minimize the impacts of a proposed action on ESA-protected species and their critical habitat. As a result, the consultation process often gives the NOAA Fisheries and/or USFWS considerable influence over the nature and extent of compensatory mitigation required by the Corps in cases where federally listed species are involved.

Protecting habitat, as a component of compensatory mitigation, can benefit ESA-listed species. As such, larger consolidated mitigation projects, such as conservation and mitigation banks, may aid in the recovery of ESA-listed species. They may provide effective compensation for projects that impact ESA-listed species, their designated critical habitat, or both (see Section 4.2, *Programmatic Compensatory Mitigation*). Recognizing this, the USFWS, in 2003, issued a set of comprehensive federal guidelines intended to promote and guide the development of conservation banks (*Guidance for the Establishment, Use, and Operation of Conservation Banks,* see Appendix E for a description). Similar in many ways to wetland mitigation banks, conservation banks are lands (usually large tracts) with existing habitat that are acquired or protected[32] by third parties to be managed specifically for listed species and protected in perpetuity by *conservation easement*.[33] Like mitigation banks, conservation banks may develop and sell credits to offset adverse impacts to endangered species or their habitats that occur elsewhere. As of this writing, no conservation banks have been approved in Washington. The USFWS and NMFS are not currently engaged in banking in this region.

7.4 Stormwater and Wetland Mitigation

It can be difficult to separate wetland and stormwater issues when addressing compensatory mitigation in urban areas. In many cases existing wetlands receive all or part of their water from stormwater. However, stormwater facilities have not generally been considered acceptable compensation for the loss of wetland area. The agencies rarely allow the use of constructed stormwater facilities to be used for compensatory wetland mitigation for several reasons:

1. The stormwater facilities are generally designed to mitigate for impacts to water quality and quantity from additional impervious surfaces and changes to patterns of water flow (primarily conversions from infiltration of precipitation to surface runoff) that result from the proposed land-use change. They are generally not designed to also mitigate for the water quality and quantity functions lost when wetlands are lost.

32 Conservation banks can also be created by restoring or enhancing disturbed habitat, creating new habitat in some situations, and prescriptively managing a site for specified biological characteristics.

33 Use authorizations from WDNR (for state-owned aquatic lands) or other traditional conservation easements could be used to secure land for use as a conservation or mitigation bank.

2. Typical stormwater facilities such as detention basins and vaults do not provide the same types of functions as wetlands provide because they have water regimes which are very different in depth, timing and duration from natural wetlands.

3. Most stormwater facilities are so intensively managed that they cannot provide the range of functions needed to mitigate impacts to wetlands.

4. Stormwater facilities are not regulated as *waters of the state* whereas compensatory mitigation wetlands are afforded the same levels of protection as natural wetlands. This means that the long-term protection of wetland functions cannot be guaranteed if constructed stormwater facilities are used as compensation for lost wetlands.

Federal regulation of stormwater facilities

The Corps regulates some stormwater facilities as a result of the "Talent" decision (Ninth Circuit's decision on March 12, 2001, in *Headwaters, Inc. v. Talent Irrigation District*). Maintenance of stormwater facilities is an exempt activity. If however, the stormwater ponds are connected to a water of the U.S., impacts to the ponds are a regulated activity even if the ponds were dug from uplands. Stormwater ponds are often not maintained on a regular basis and therefore have some habitat functions which may need to be mitigated if lost.

However, there has been a growing interest on the part of project applicants to incorporate stormwater facilities as part of their wetland compensation package. The agencies have allowed some clean storm water[34] to be used as a water source for compensation sites. In this case, extensive modeling is needed to determine the appropriate size and topography for the compensation site. The use of clean stormwater can be beneficial to the water cycle in the basin if there is an attenuation of the flows leaving the wetland after storm events and/or some of the flows infiltrate into the soil profile.

The agencies are currently working on guidance and requirements for when stormwater facilities and wetland compensatory mitigation can be combined. When that guidance is developed, it will be added to this document. Check the following web site for updates: http://www.ecy.wa.gov/programs/sea/wet-updatedocs.htm.

Ecology has published a manual to provide local governments, land developers, development engineers, and businesses with technical standards and guidance on stormwater management based on the current state of the science and the best technical information available. The 2005 revision to the *Stormwater Management Manual for Western Washington i*ncludes practices to minimize stormwater impacts on receiving

34 Clean storm water is runoff that does not flow over areas where it could pick up contaminants such as parking lots or lawn areas. Roof runoff from buildings is generally considered clean provided that the roofing materials do not release pollutants. Galvanized or copper-treated, asphalt-shingle roofs are examples of non-suitable roofs, since rain on the roof can pick up zinc or copper contamination from the roof materials.

waters, including wetlands, in areas west of the crest of the Cascade Mountains and addresses the effects of changes in water quality and water quantity on those waters.

Ecology also published a stormwater management manual for eastern Washington in 2004. The manual is more limited in scope than the western Washington manual with respect to management guidelines for wetlands and stormwater.

How to obtain Ecology's stormwater management manuals

Details about changes to and requirements of the stormwater manual for western Washington are available on the internet at:
http://www.ecy.wa.gov/programs/wq/stormwater/manual.html

The manual for eastern Washington is available at:
http://www.ecy.wa.gov/programs/wq/stormwater/eastern_manual/index.html

7.5 Talent Decision: Ditches as Waters of the U.S.

In 2001, the United States Court of Appeals for the 9th Circuit decided on the case *Headwaters, Inc. v. Talent Irrigation Distric*t (commonly known as the Talent Decision, 243 F.3d 526). Prior to the Talent Decision, ditches dug in wetlands or hydric soils were always regulated as waters of the U.S. provided they connected to other waters of the U.S. In addition, ditches that were straightened or channelized natural drainages or streams were, and still are, regulated as waters of the U.S.

In the Talent Decision the court held that irrigation canals that receive water from natural streams, and lakes and divert water to streams and creeks, are connected as "tributaries." The 9th Circuit further held that a "stream which contributes its flow to a larger stream or other body of water is a tributary…As tributaries, the canals are 'waters of the U.S'', and are subject to the Clean Water Act and its permit requirement." This decision supercedes any contrary conclusion from previous Corps of Engineers policy statements regarding ditches.

Corps districts are awaiting official guidance from their HQ office on making jurisdictional calls related to ditches. A Regulatory Guidance Letter (RGL) will also be developed to address exemptions for construction or maintenance of irrigations ditches and maintenance of drainage ditches. WSDOT has a website devoted to the Talent Decision: http://www.wsdot.wa.gov/environment/Talent/default.htm.

7.5.1 Compensatory Mitigation and Ditches

Most impacts to ditches will be self-mitigating since most roadside ditches that are impacted by construction projects are replaced in-kind. Mitigation may be required for impacts to ditches that have valuable habitat components (a small subset of ditches that are not routinely maintained). Applicants must assess the functions the ditch is providing (e.g., water quality, water conveyance, habitat) and which of those functions will be replaced with a new ditch or if the ditch is being tightlined, which functions may not be replaced. Compensatory mitigation requirements for ditch impacts will be determined on a case-by-case basis.

Glossary

Adaptive management. A systematic process for improving management policies and practices by learning from the outcomes of previous policies and practices. Related to compensatory mitigation, it involves the permittee and the agencies discussing the problems occurring on a compensation site and coming to agreement on possible solutions or alternative approaches necessary to bring the site into compliance.

Advance mitigation. Compensatory mitigation in which the mitigation project is implemented before, and in anticipation of, future known impacts to wetlands. Compare to *concurrent mitigation* and mitigation banking.

Aquatic resources. Refers to ecological systems where the regular or occasional presence of water is the dominant factor in determining the characteristics of the site. Aquatic resources include wetlands, rivers, streams, and lakes and other deepwater habitats.

Assessment. See *function assessment*.

Atypical wetland. A wetland whose "design" does not match the type of wetland that would be normally be found in the geomorphic setting of the proposed site (i.e., the water source and hydroperiod proposed for the mitigation site are not typical for the geomorphic setting). Designs that provide exaggerated morphology or require a berm or other engineered structures to hold back water would also be considered atypical.

Avoidance. The first step of *mitigation sequencing*.

Beneficial uses. The term used in the federal and state Clean Water Acts to represent societal values of aquatic resources such as water supply; surface and groundwater treatment; stormwater attenuation; fish and shellfish migration, rearing, spawning, and harvesting; wildlife habitat; recreation; support of biotic diversity; and aesthetics. See *wetland values*.

Best management practices (BMPs). Schedules of activities, prohibitions of practices, maintenance procedures, managerial practices, or structural features that prevent or reduce adverse impacts to waters of Washington State.

Bog. A unique type of wetland dominated by mosses at the surface and that form peat soils. Bogs form in areas where the climate allows the accumulation of peat. The water regime in bogs is dominated by precipitation rather than surface inflow. The plant community is specialized to survive in the nutrient-poor and highly acidic conditions typical of bog systems.

Buffers or buffer areas. Vegetated areas adjacent to wetlands, or other aquatic resources, that can reduce impacts from adjacent land uses through various physical, chemical, and/or biological processes.

Characterizations. A method that groups wetlands based on their distinguishing traits or qualities (Hruby 1999). For example, Ecology's wetland rating systems for eastern and western WA assign wetlands to Category I, II, III, or IV based on their distinguishing traits or qualities. See *wetland rating*.

Class. A grouping based on shared characteristics in a classification scheme. In the Cowardin classification (Cowardin et al. 1979) of wetlands a class is the third level in the 'taxonomy' of wetlands whereas in the *hydrogeomorphic classificatio*n (Brinson 1993) it is the highest taxonomic unit.

Compensation. Same as *compensatory mitigation*.

Compensatory mitigation. The stage of the mitigation sequence, where impacts to wetland functions are offset (i.e., compensated for) through creation (establishment), restoration (re-establishment, rehabilitation), or enhancement of other wetlands. Because regulatory requirements and policies tend to focus on compensatory mitigation, the term "mitigation" is often used to refer to compensation, which is just one part of the overall mitigation sequence. See *mitigation sequencing*.

Concurrent mitigation. Compensatory mitigation that is implemented at approximately the same time as the authorized activities that result in wetland impacts. See *compensatory mitigation*.

Connectivity. The degree to which structures found across the landscape facilitate movement of living organisms between patches or their habitat. The movement can occur either within the lifetime of an organism or over a period of generations. The purpose of facilitating movement is to maintain viable populations that allow species and communities of species to persist in time. Connectivity can be achieved via a continuous and linear habitat feature (as in a corridor) or discrete habitat patches comprised but not limited to individual forests, wetlands, shrub lands, and shorelines.

Conservation easement. A legal restriction placed on a piece of property to protect the resources (natural or man-made) associated with the parcel. It restricts the type and amount of activities that can take place on a parcel of land. Easements are recorded on the property deed and are held in trust by a conservation easement "holder" such as a land trust or government agency. The holder polices the terms of the easement for the duration of its existence, which is usually into perpetuity. Compare to *deed restriction*.

Contingency plan. A plan outlining actions that would be taken if monitoring revealed a problem that would prevent the site from attaining its performance standards. Contingency plans should both anticipate problems and identify specific actions that would be implemented to rectify each problem.

Corridor. Areas that contain relatively undisturbed habitat and/or vegetation that maintain connections for wildlife throughout the landscape. Corridors usually represent linear habitats with the range of environmental functions necessary to permit the movement of animals between larger and more fully functioning habitats. Corridors can include but are not limited to, annual or seasonal migration corridors that connect wintering and breeding habitat, or intra-seasonal corridors that connect foraging and nesting habitat or breeding and dispersal habitat. See *connectivity*.

Cowardin classification. The first commonly used classification system for wetlands. It was developed in 1979 by the U.S. Fish and Wildlife Service. The Cowardin system classifies wetlands based on water flow, substrate types, vegetation types, and dominant plant species. See *class*.

Creation. See *establishment*.

Critical areas. Defined by the State of Washington to "Include the following areas and ecosystems: (a) Wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas" (Growth Management Act RCW 36.70A.030). Basically, critical areas are those areas that should have some development limitations due to the benefits that those areas provide to society or to the dangers that those areas present to society if developed.

Cultural resources. Any archaeological, historical, or cultural (e.g., religious significance) areas of concern. This term is a catch-all term that is not defined in any federal statute or regulation.

Deed restriction. Clauses in a deed limiting the future uses of the property. Deed restrictions may impose a vast variety of limitations and conditions. For example, for a compensatory mitigation site, a deed restriction may limit the allowed activities on the site based on the goals and objectives of the site. If the site is primarily for wildlife habitat human access may be restricted. Compare to *conservation easement*.

Depressional wetland. A class of wetlands in the *hydrogeomorphic classification*. These are wetlands that occur in topographic depressions that exhibit closed contour interval(s) on three sides and elevations that are lower than the surrounding landscape.

Dredge/dredged. Any excavation of the substrate of a water body. Dredging can be conducted by mechanical or hydraulic means and is performed to maintain navigation channels, remove contaminated sediments, and other purposes.

Enhancement. The manipulation of the physical, chemical, or biological characteristics of a wetland site to heighten, intensify or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes such as water quality improvement, flood water retention or wildlife habitat. Activities typically consist of planting vegetation, controlling non-native or invasive species, modifying site elevations or the proportion of open water to influence hydroperiods, or some combination of these. Enhancement results in a change in some wetland functions and can lead to a decline in other wetland functions, but does not result in a gain in wetland acres. Compare to *establishment* and *restoration* (*re-establishment* and *rehabilitation*).

Environmental Processes. Environmental factors that occur at larger geographic scales, such as basins, sub-basins, and watersheds. Processes are dynamic and usually represent the movement of a basic environmental characteristic, such as water, sediment, nutrients and chemicals, energy, or animals and plants. The interaction of landscape processes with the physical environment creates specific

geographic locations where groundwater is recharged, flood waters are stored, stream water is oxygenated, pollutants are removed, and wetlands are created.

Establishment (creation). The manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deepwater site, where a wetland did not previously exist. Establishment results in a gain in wetland acreage [and function]. (Note: The U.S. Army Corps of Engineers' Regulatory Guidance Letter 02-02 uses the term "establishment" rather than the previously accepted term "creation." Federal agencies, as well as the Department of Ecology, have started using the term "establishment.") Compare to *enhancement* and *restoration*.

Estuarine wetland. Wetlands where salt tolerant plant species are dominant and the water regime is influenced by tidal action. The wetlands are usually partially enclosed by land with open, or partially obstructed access to open saline water. In areas where freshwater wetlands grade into estuarine areas, the boundary of the latter extends to an area where the salinity is less than 5 ppt (parts per thousand) during the period of average annual low flow.

Federal undertaking. For the purposes of this document, federal undertaking means issuing a Department of the Army permit by the Corps.

Flat. A class of wetlands in the *hydrogeomorphic classification*. These are wetlands that occur in topographically flat areas that are hydrologically isolated from surrounding ground or surface water. They are primarily maintained by precipitation.

Forested wetland. A wetland *class* in the *Cowardin classification* where woody plants taller than 20 feet form the dominant cover (> 30% aerial cover). Shrubs often form a second layer beneath the forest canopy, with a layer of herbaceous plants growing beneath the shrubs.

Functions. The physical, biological, chemical, and geologic interactions among different components of the environment. See *wetland functions*.

Function assessment. The process by which the capacity (i.e., potential) of a wetland to perform a function is measured or characterized. This approach analyzes the capacity to perform a function often using a numeric model. Assessments are methods that generate a number that represents an estimate of the performance of a wetland function. The number generated is relative to a predetermined standard (e.g., level of function provided by *reference wetlands*). Numbers do not reflect an actual level of function performance (Hruby 1999). Examples include the Washington State methods for assessing wetland functions (also known as WFAM) (Hruby et al. 1999 and 2000) and a Hydrogeomorphic wetland function assessment method (Brinson et al. 1995). See *functions*.

Historic property. Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register of Historic Places, including artifacts, records, and material remains related to such a property or resource. Historic properties are protected by the National Historic Preservation Act and other laws.

Hydrogeomorphic (HGM) classification. A system used to classify wetlands based on the position of the wetland in the landscape (geomorphic setting), the water source for the wetland, and the flow and fluctuation of the water once in the wetland. An HGM wetland *class* is the highest level in the hydrogeomorphic classification of wetlands. There are six basic hydrogeomorphic wetland classes including depressional, tidal fringe, slope, riverine, lake fringe, and flat. See class.

Hydroperiod (or water regime). The pattern of water level fluctuations in a wetland. Includes the depth, frequency, duration, and timing of inundation or flooding. Patterns can be daily, monthly, seasonal, annual or longer term.

In-kind mitigation. *Compensatory mitigation* that is the same physical and functional type as that of the impact area (e.g., same Cowardin class or hydrogeomorphic type) (RGL 02-02).

In-lieu fees (ILFs). An approach to compensatory mitigation that allows permit applicants to pay a fee to a third party such as a government agency or conservation organization. The fees are then used to restore, create, enhance, or preserve wetlands. Generally, in-lieu fee contributions are collected in advance of wetland losses. These funds are accumulated until they are sufficient to design and implement a wetland compensation project.

Interdunal wetlands. Wetlands that form in the "deflation plains" and "swales" that are geomorphic features in areas of coastal dunes. These dune forms are the result of the interaction between sand, wind, water, and plants. The dune system immediately behind the ocean beach (i.e., the primary dune system) is very dynamic and can change from storm to storm. These wetlands provide critical habitat in this ecosystem.

Invasive Species. Defined by the National Invasive Species Council (NISC) as "(1) a non-native (alien) to the ecosystem under consideration and (2) a species whose introduction is likely to cause economic or environmental harm, or harm to human health" (Executive Order 13112).

Lacustrine (lake) fringe wetlands. A wetland *class* under the *hydrogeomorphic classification*. These are wetlands that occur at the margins of topographic depressions in which surface water is greater than 8 hectares (20 acres) and greater than 2 meters deep in western Washington and 3 meters in eastern Washington.

Minimization. The second step of mitigation sequencing, in which actions are taken to reduce the extent of wetland impacts (e.g., a project is redesigned to lessen wetland alteration). It does not however eliminate the direct or indirect loss of area and/or functions. See *mitigation sequencing*.

Mitigation banking. As defined by the 1995 federal guidance on wetland mitigation banking and state law (Chapter 90.84 RCW), mitigation banking is "wetland restoration, creation, enhancement, and in exceptional circumstances, preservation undertaken expressly for the purpose of compensating for unavoidable wetland losses in advance of development actions, when such compensation cannot be achieved at the development site or would not be as environmentally beneficial."

Mitigation sequencing. A prescribed order of steps taken to reduce the impacts of activities on wetlands. Mitigation sequencing involves: 1. Avoiding the impact altogether by not taking a certain action or parts of an action; 2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts; 3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment; 4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; 5. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and 6. Monitoring the impact and taking appropriate corrective measures (WAC 197.11.768). See *compensatory mitigation*.

Navigable waters. Those waters that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past or may be susceptible to use to transport interstate or foreign commerce (33 CFR 329).

Off-site mitigation. Compensatory mitigation that is not located at or near the project that is affecting wetlands. Off-site mitigation is generally only allowed when on-site mitigation is not practicable and environmentally preferable.

On-site mitigation. *Compensatory mitigation* that occurs within project boundaries and/or areas adjacent or contiguous to impact area (RGL 02-02).

Out-of-kind mitigation. Compensatory mitigation in which the wetland and its associated functions used to compensate for the impacts are of a different kind than those impacted.

Performance standards. Observable or measurable attributes used to determine whether a compensatory mitigation project meets its objectives. Standards are written in a mitigation plan and are enforceable conditions.

Preservation. *See protection/maintenance.*

Programmatic mitigation area. A site (or series of sites) that has been identified by a local government or a state or federal agency as a preferred area for wetland compensation. Mitigation for multiple impacts is directed to these areas to produce larger more ecologically significant systems.

Protection/maintenance (preservation). Removing a threat to, or preventing the decline of, wetland conditions by an action in or near a wetland. This includes the purchase of land or easements, repairing water control structures or fences, or structural protection such as repairing a barrier island. This term also includes activities commonly associated with the term preservation (in a regulatory context). Under regulatory actions preservation does not result in a gain of wetland acres, but may result in a gain in functions over the long term, and is used only in exceptional circumstances.

Rating. A method that groups wetlands according to a qualitative scaling of function performance, such as high, medium, or low (Hruby 1999). The wetland evaluation technique (WET) (Adamus et al. 1987) is an example of a wetland rating method. The semi-quantitative assessment methodology (SAM) (Cooke 2000) is an example of a wetland rating method for the Puget lowlands of western Washington.

Re-establishment. The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former wetland. Activities could include removing fill material, plugging ditches or breaking drain tiles. Re-establishment results in a gain in wetland acres and functions. Compare to *rehabilitation*. See also *restoration*.

Reference wetland. In the context of compensatory mitigation, a wetland chosen to represent the functions and characteristics that are being created, restored, or enhanced at the "mitigation" site. A reference wetland can be used for monitoring the success of the mitigation project. Reference wetlands, in the context of methods for assessing wetland functions, mean the sites chosen to represent the full range of functioning in a region or hydrogeomorphic class. Data collected at these sites are used to calibrate the methods.

Rehabilitation. The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural or historic functions and processes of a degraded wetland. Activities could involve breaching a dike to reconnect wetlands to a floodplain, restoring tidal influence to a wetland, or breaking drain tiles and plugging drainage ditches. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres. Compare to *establishment (creation)*, *re-establishment* and *enhancement*. See also *restoration*.

Restoration. The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural or historic functions to a former or degraded wetland. For the purpose of tracking net gains in wetland acres, restoration is divided into *re-establishment* and *rehabilitation*. Re-establishment represents a net gain in acres while rehabilitation does not.

Riverine wetlands. A *class* of wetlands in the *hydrogeomorphic classification*. Wetlands that occur in floodplains and riparian corridors in association with stream or river channels where there is frequent overbank flooding.

Slope wetlands. A class of wetlands in the *hydrogeomorphic classification*. These are wetlands that occur on the slopes of hills or valleys. The principal water source is usually seepage from groundwater.

State Historic Preservation Officer (SHPO). Administers the national historic preservation program at the State level, review National Register of Historic Places nominations, maintain data on historic properties that have been identified but not yet nominated, and consult with Federal agencies during Section 106 review. SHPOs are designated by the governor of their respective State or territory. Federal agencies seek the views of the appropriate SHPO when identifying historic properties and assessing effects of an undertaking on historic properties. SHPO work for the Washington State Office of Archaeology and Historic Preservation.

Stormwater. Stormwater is the water coming from rain or snow that runs off surfaces such as rooftops, paved streets, highways, and parking lots. It can also come from hard grassy surfaces like lawns, play fields, and from graveled roads and parking lots.

Sub-basin. A smaller drainage basin that is part of a larger drainage basin or watershed. For example, the watershed of a large river may be composed of several sub-basins, one for each of the river's tributaries.

Temporal loss (of functions). Temporal loss is the loss of functions between the time an impact occurs and the time the functions are re-established. In the context of wetland mitigation, it is the loss of functions that occurs between the time functions are lost at an impact site and the time those functions are fully replaced at a mitigation site.

Tidal fringe wetlands. A class of wetlands in the *hydrogeomorphic classification*. Wetlands that occur on continental margins where marine waters are greater than 2 meters deep and more than 8 hectares (20 acres) in size.

Tribal Historic Preservation Officer (THPO). A representative of a tribe that assumes any or all of the functions of a State Historic Preservation Officer (see above) with respect to *tribal land*. The decision to participate or not participate in the program rests with the tribe. In Washington there are currently 5 tribes with a THPO: the Makah Tribe; the Skokomish Indian Tribe; the Confederated Tribes of the Colville; the Squaxin Island Tribe; and the Spokane Tribe.

Tribal lands. All lands within the boundaries of an Indian Reservation, whether they are tribally or independently owned.

Values. See *wetland values*.

Vernal pool. Small depressions in the scabrock or in shallow soils of eastern Washington that fill with snowmelt or spring rains. They retain water until the late spring when reduced precipitation and increased evapotranspiration lead to a complete drying out. The wetlands hold water long enough throughout the year to allow some strictly aquatic organisms to flourish, but not long enough for the development of a typical wetland environment.

Waters of the state. Include lakes, rivers, ponds, streams, inland waters, underground waters, salt waters and all other surface waters and watercourses within the jurisdiction of the state of Washington (RCW Chapter 90.48.020).

Waters of the United States. Generally include navigable waters, tributaries of navigable waters, interstate waters, and all other waters such as intrastate lakes, rivers, streams, and wetlands. See 33 CFR 328.3 for a detailed definition.

Watershed. A geographic area of land bounded by topographic high points in which water drains to a common destination.

Wetland functions. The physical, biological, chemical, and geologic interactions among different components of the environment that occur within a wetland. Wetlands perform many valuable functions and these can be grouped into three categories: functions that improve water quality, functions that change the water regime in a watershed such as flood storage, and functions that provide habitat for plants and animals. See *functions*.

Wetland rating. Also called a wetland rating system, is a tool for dividing or grouping wetlands into groups that have similar needs for protection. One method used in Washington is the Washington State wetland rating systems (Hruby 2004a,b), which places wetlands in categories based on their rarity, sensitivity, our inability to replace them, and their functions. See *characterization*.

Wetland values. Wetland processes, characteristics, or attributes that are considered to benefit society. See *beneficial uses*.

Wetlands. As defined by the *Washington State Wetlands Delineation Manual* (Ecology 1997), "The Corps of Engineers (CE) (Federal Register 1982), the Environmental Protection Agency (EPA) (Federal Register 1985), Washington's Water Quality Standards, the Shoreline Management Act (SMA) and the Growth Management Act (GMA) all define wetlands as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. In addition, Washington's Water Quality Standards, the SMA and GMA definitions add: "Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas to mitigate the conversion of wetlands."

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On-line Resources

Publications

Internet addresses for other publications referenced in this document can be found in the References section. Links to specific laws, rules, policies, and guidance can be found in Appendix E.

Compensating for Wetland Losses Under The Clean Water Act
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http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/ACF101C.pdf.

Joint Aquatic Resource Permits Application (JARPA)
http://www.ecy.wa.gov/programs/sea/pac/jarpa.html.

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http://www.nrcs.usda.gov/programs/compliance/pdf_files/COE_NRCS_wetland.pdf.

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http://www.epa.gov/naaujydh/pages/models/ecoregions.htm

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Federal Register (FR) http://www.gpoaccess.gov/fr/.

National Wetlands Mitigation Action Plan (NWMAP)
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Revised Code of Washington (RCW) http://www.leg.wa.gov/rcw/index.cfm.

The Library of Congress, THOMAS, Legislative Information on the Internet. Find recent amendments to laws by searching this web site. http://thomas.loc.gov/.

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United States Code (USC) - Office of the Law Revision Counsel
http://uscode.house.gov/lawrevisioncounsel.shtml.

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U.S. Environmental Protection Agency Headquarters Wetlands Page
http://www.epa.gov/owow/wetlands/ .

U.S. Environmental Protection Agency Region 10 Wetlands Page
http://yosemite.epa.gov/R10/ECOCOMM.NSF/Wetlands/Wetlands.

U.S. Environmental Protection Agency Watershed Academy (online training courses on wetlands, invasive species, watersheds, etc)
http://www.epa.gov/OWOW/watershed/wacademy/acad2000/.

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http://www.epa.gov/OWW/wetlands/wetline.html.

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Washington Department of Natural Resources Forest Practices Division http://www.dnr.wa.gov/forestpractices/index.html.

Washington State Department of Ecology's "best available science for wetlands" project http://www.ecy.wa.gov/programs/sea/bas_wetlands/index.html.

Washington State Department of Ecology's on-line public notices http://www.ecy.wa.gov/programs/sea/fed-permit/index.html.

Washington State Department of Ecology's Mitigation Guidance Revisions (for updates to this document) http://www.ecy.wa.gov/programs/sea/wet-updatedocs.htm

Washington State Department of Ecology's Wetlands Home Page http://www.ecy.wa.gov/programs/sea/wetlan.html

Washington State Department of Ecology Wetlands Mitigation Banking Home Page http://www.ecy.wa.gov/programs/sea/wetmitig/index.html

Washington State Department of Transportation Environmental Services http://www.wsdot.wa.gov/environment/default.htm or for information on the Talent decision go directly to http://www.wsdot.wa.gov/environment/Talent/default.htm

Washington State Office of Regulatory Assistance (ORA) http://www.ecy.wa.gov/programs/sea/pac/ or go to http://apps.ecy.wa.gov/opas/index.asp for ORA's on-line Project Questionnaire, developed to help applicants determine which Washington State and Federal environmental permits will be needed for a project.

Appendix A - Reviewers of the Document

Individuals and organizations that provided written comments, suggestions, and materials during the public review period (Name and affiliation at time of comment)

Bill Null, Washington State Department of Transportation

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Washington State Department of Transportation (WSDOT), Environmental Services

Washington Wetlands Network (WETNET) of Audobon

Individuals and organizations that provided written input during pre-draft focus group meetings, the on-line comment form etc. (Name and affiliation at time of comment)

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Kristen Andersen, David Evans and Associates

Kristie Dunkin, Parametrix

Lyn Morgan-Hill, Whatcom County Planning & Development

Michael Muscari, Pentec Environmental

Washington State Department of Ecology Wetland Technical Advisory Group

Washington State Department of Transportation Wetland Mitigation Technical Group

Appendix B - National Research Council's Mitigation Guidelines

In 2001 the National Academy of Science's National Research Council published a report entitled, *Compensating for Wetland Losses Under The Clean Water Act*, which provided recommendations for improving mitigation. In response, the U.S. Army Corps of Engineers (Corps) provided implementation clarification so that a minimum level of standards for compensatory mitigation could be set for all Corps districts. The clarifying guidance is provided in this appendix. This information has been incorporated throughout this document and the agencies mitigation policies and guidance are consistent with it.

The full report (National Academy of Sciences 2001) can be found on-line at http://www.nap.edu/books/0309074320/html.

Incorporating the National Research Council's Mitigation Guidelines Into the Clean Water Act Section 404 Program

BACKGROUND

In its comprehensive report entitled "*Compensating for Wetland Losses Under the Clean Water Act*," the National Research Council (NRC) provided ten guidelines to aid in planning and implementing successful mitigation projects ("Operational Guidelines for Creating or Restoring Wetlands that are Ecologically Self-Sustaining"; NRC, 2001). Please note that these guidelines also pertain to restoration and enhancement of other aquatic resource systems, such as streams. Each of the ten guidelines can generally be described as A) basic requirement for mitigation success, or B) guide for mitigation site selection. The following sections include both the original text of the NRC guidelines, in italics, as well as a discussion of how applicants and field staff can incorporate these guidelines into the development and review of mitigation projects.

A. Basic Requirements for Success

When considering mitigation sites it is important to note that wetland mitigation is not a precise, exact science and predictable results are not always obtainable. Having an adaptive management attitude is a necessity. One should incorporate experimentation into the mitigation plan when possible. This may mean using experimental plots within a mitigation site with different controls, replication, different treatments, inputs, etc., to determine if specific mitigation efforts are effectively meeting the desired goals. This requires detailed planning, effective implementation of the mitigation project, close monitoring (both short and long term) of the implemented plans and finally adjusting to intermediate results with an adaptive attitude and additional modifications to obtain long range wetland and watershed goals. In addition, researchers have found that restoration is the most likely type of mitigation to result in successful and sustainable aquatic resource replacement. Moreover, numerous studies in a variety of landscapes and watershed types have shown that of all factors contributing to mitigation success, attaining and maintaining appropriate hydrological conditions is the most important. The following NRC guidelines should be considered basic requirements for mitigation success.

A.1. Whenever possible, choose wetland restoration over creation.

Select sites where wetlands previously existed or where nearby wetlands still exist. Restoration of wetlands has been observed to be more feasible and sustainable than creation of wetlands. In restored sites the proper substrate may be present, seed sources may be on-site or nearby, and the appropriate hydrological conditions may exist or may be more easily restored.

The U.S. Army Corps of Engineers (Corps) and Environmental Protection Agency (EPA) Mitigation Memorandum of Agreement states that, "because the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, restoration should be the first option considered" (Fed. Regist. 60(Nov. 28):58605). The Florida Department of Environmental Regulation (FDER 1991a) recommends an emphasis on restoration first, then enhancement, and, finally, creation as a last resort. Morgan and Roberts (1999) recommend encouraging the use of more restoration and less creation.

The applicant proposes the type of mitigation. However, the Corps and other agencies will evaluate proposals based on the ease of completion and the likelihood of success. Therefore, pure wetland creation will be evaluated using very stringent criteria before being approved for use as compensatory mitigation for project impacts. Some projects may include creation as part of an overall mitigation effort that involves restoration, enhancement, and/or preservation (e.g., as in a proposed mitigation bank). In these cases, evaluation will be based on the entire proposal and its location in the watershed.

A.2. Avoid over-engineered structures in the wetland's design

Design the system for minimal maintenance. Set initial conditions and let the system develop. Natural systems should be planned to accommodate biological systems. The system of plants, animals, microbes, substrate, and water flows should be developed for self-maintenance and self-design. Whenever possible, avoid manipulating wetland processes using approaches that require continual maintenance. Avoid hydraulic control structures and other engineered structures that are vulnerable to chronic failure and require maintenance and replacement. If necessary to design in structures, such as to prevent erosion until the wetland has developed soil stability, do so using natural features, such as large woody debris. Be aware that more specific habitat designs and planting will be required where rare and endangered species are among the specific restoration targets.

Whenever feasible, use natural recruitment sources for more resilient vegetation establishment. Some systems, especially estuarine wetlands, are rapidly colonized, and natural recruitment is often equivalent or superior to plantings (Dawe et al. 2000). Try to take advantage of native seed banks, and use soil and plant material salvage whenever possible. Consider planting mature plants as supplemental rather than required, with the decision depending on early results from natural recruitment and invasive species occurrence. Evaluate on-site and nearby seed banks to ascertain their viability and response to hydrological conditions. When plant introduction is necessary to promote soil stability and prevent invasive species, the vegetation selected must be appropriate to the site

rather than forced to fit external pressures for an ancillary purpose (e.g., preferred wildlife food source or habitat).

The use of over-engineered structures and maintenance intensive plans for mitigation is not recommended and will be evaluated using very stringent criteria. If these types of plans are ultimately approved, they must include a comprehensive remedial plan and financial assurances [note that all mitigation projects should have remedial plans and financial assurances], along with a non-wasting endowment to insure that proper maintenance occurs.

It should also be noted that aggressive soil and planting plans using introduced plants and soil from outside sources must be closely monitored to prevent invasive plant takeovers and monotypic plant communities. Such failures can be minimized by undertaking both short-term and long-term monitoring, and having contingency plans in place.

A. 3. Restore or develop naturally variable hydrological conditions.

Promote naturally variable hydrology, with emphasis on enabling fluctuations in water flow and level, and duration and frequency of change, representative of other comparable wetlands in the same landscape setting. Preferably, natural hydrology should be allowed to become reestablished rather than finessed through active engineering devices to mimic a natural hydroperiod. When restoration is not an option, favor the use of passive devices that have a higher likelihood to sustain the desired hydroperiod over long term. Try to avoid designing a system dependent on water-control structures or other artificial infrastructure that must be maintained in perpetuity in order for wetland hydrology to meet the specified design. In situations where direct (in-kind) replacement is desired, candidate mitigation sites should have the same basic hydrological attributes as the impacted site.

Hydrology should be inspected during flood seasons and heavy rains, and the annual and extreme-event flooding histories of the site should be reviewed as closely as possible. For larger mitigation projects, a detailed hydrological study of the site should be undertaken, including a determination of the potential interaction of groundwater with the proposed wetland. Without flooding or saturated soils, for at least part of the growing season, a wetland will not develop. Similarly, a site that is too wet will not support the desired biodiversity. The tidal cycle and stages are important to the hydrology of coastal wetlands.

Natural hydrology is the most important factor in the development of successful mitigation. Wetlands and other waters are very dynamic, and dependent on natural seasonal and yearly variations that are unlikely to be sustainable in a controlled hydrologic environment. Artificial structures and mechanisms should be used only temporarily. Complex engineering and solely artificial mechanisms to maintain water flow normally will not be acceptable in a mitigation proposal. In those sites where an artificial water source (irrigation) has been used to attempt to simulate natural hydrology there are several problems that lead to reduced likelihood of success. First, artificial irrigation does not provide the dynamic and variable nature of water flow normally found in wetlands or riparian systems. Second, the lack of seasonal flows limits the transport of organic matter into and out of the wetland or

riparian system. Without any inflow, the net result of artificial irrigation is transport of organic material out of the system. Third, depending on the timing, the use of flood or sprinkler systems on newly created or restoration sites often promotes the germination and growth of exotic plant species.

Note that this changes the Corps' past policy of accepting artificial irrigation as the sole source of hydrology for mitigation projects. If permitted at all, these projects will require substantial financial assurances and a higher mitigation ratio to offset their risk of failure. Applicants must weigh the potential investment costs of acquiring land suitable for restoration versus creation projects in upland environments that will likely involve higher long-term costs and greater risks of mitigation site failure.

The Corps may approve exceptions dealing with hydrologic manipulations, on a case-by-case basis in highly unusual circumstances. It should be noted, however, that even minor engineering or hydraulic manipulation requiring long-term maintenance will only be approved after the applicant posts a non-wasting endowment, performance bond, or other financial assurance.

A.4. Consider complications associated with creation or restoration in seriously degraded or disturbed sites

> *A seriously degraded wetland, surrounded by an extensively developed landscape, may achieve its maximal function only as an impaired system that requires active management to support natural processes and native species (NRC 1992). It should be recognized, however, that the functional performance of some degraded sites may be optimized by mitigation, and these considerations should be included if the goal of the mitigation is water- or sediment-quality improvement, promotion of rare or endangered species, or other objectives best served by locating a wetland in a disturbed landscape position. Disturbance that is intense, unnatural, or rare can promote extensive invasion by exotic species or at least delay the natural rates of redevelopment. Reintroducing natural hydrology with minimal excavation of soils often promotes alternative pathways of wetland development. It is often advantageous to preserve the integrity of native soils and to avoid deep grading of substrates that may destroy natural belowground processes and facilitate exotic species colonization (Zedler 1996).*

When considering restoration options it is necessary to determine the spatial and temporal scale of the damage: is the damage limited to the water body itself, or is it a predominant characteristic of the watershed or the surrounding landscape? On-site damage may be restorable, whereas regional-scale damage may be more difficult, or impossible, to reverse or obtain historic conditions. Alternate goals may be necessary in order to determine specific goals of the restoration project. Those desired wetland mitigation goals will depend on the resources needed, the level of degradation and realistic mitigation targets as reflected by the watershed and surrounding landscape. This issue points to the importance of evaluating mitigation plans from a broader watershed perspective.

A.5. Conduct early monitoring as part of adaptive management

Develop a thorough monitoring plan as part of an adaptive management program that provides early indication of potential problems and direction for correction actions. The monitoring of wetland structure, processes, and function from the onset of wetland restoration or creation can indicate potential problems. Process monitoring (e.g., water-level fluctuations, sediment accretion and erosion, plant flowering, and bird nesting) is particularly important because it will likely identify the source of a problem and how it can be remedied. Monitoring and control of nonindigenous species should be a part of any effective adaptive management program. Assessment of wetland performance must be integrated with adaptive management. Both require understanding the processes that drive the structure and characteristics of a developing wetland. Simply documenting the structure (vegetation, sediments, fauna, and nutrients) will not provide the knowledge and guidance required to make adaptive "corrections" when adverse conditions are discovered. Although wetland development may take years to decades, process-based monitoring might provide more sensitive early indicators of whether a mitigation site is proceeding along an appropriate trajectory.

There are many factors that may positively or negatively influence aquatic resources and the functions they provide, such as urbanization, farming or grazing. Wetlands and other aquatic resources are often subject to a wide range and frequency of events such as floods, fires and ice storms. As with all natural systems, some things are beyond control. Well-crafted mitigation plans, however, recognize the likelihood of these events and attempt to plan for them, primarily through monitoring and adaptive management. In addition, it is important to realize the mobile nature of wetlands and streams. They change over time and over the landscape in response to internal and external forces.

Monitoring and adaptive management should be used to evaluate and adjust maintenance (e.g., predator control, irrigation), and design remedial actions. Adaptive management should consider changes in ecological patterns and processes, including biodiversity of the mitigation project as it evolves or goes through successional stages. Trends in the surrounding area must also be taken into account (i.e., landscape/watershed context). Being proactive helps ensure the ultimate success of the mitigation, and improvement of the greater landscape. One proactive methodology is incorporation of experimentation into the mitigation plan when possible, such as using experimental plots within a mitigation site with different controls, replication, different treatments, inputs, etc., to determine if specific mitigation efforts are meeting the desired goals.

B. Mitigation Site Selection

The selection of an appropriate site to construct a mitigation project is one of the most important, yet often under-evaluated, aspects of mitigation planning. In many instances, the choice of the mitigation site has been completed by the applicant based solely on economic considerations with minimal concern for the underlying physical and ecological characteristics of the site. While economic factors are important in determining the practicability of site selection, current technology and the following NRC guidelines should also factor into the selection of a mitigation site.

B.1. Consider the hydrogeomorphic and ecological landscape and climate

Whenever possible, locate the mitigation site in a setting of comparable landscape position and hydrogeomorphic class. Do not generate atypical "hydrogeomorphic hybrids"; instead, duplicate the features of reference wetlands or enhance connectivity with natural upland landscape elements (Gwin et al. 1999).

Regulatory agency personnel should provide a landscape setting characterization of both the wetland to be developed and, using comparable descriptors, the proposed mitigation site. Consider conducting a cumulative impact analysis at the landscape level based on templates for wetland development (Bedford 1999). Landscapes have natural patterns that maximize the value and function of individual habitats. For example, isolated wetlands function in ways that are quite different from wetlands adjacent to rivers. A forested wetland island, created in an otherwise grassy or agricultural landscape, will support species that are different from those in a forested wetland in a large forest tract. For wildlife and fisheries enhancement, determine if the wetland site is along ecological corridors such as migratory flyways or spawning runs. Constraints also include landscape factors. Shoreline and coastal wetlands adjacent to heavy wave action have historically high erosion rates or highly erodible soils, and often-heavy boat wakes. Placement of wetlands in these locations may require shoreline armoring and other protective engineered structures that are contrary to the mitigation goals and at cross-purposes to the desired functions

Even though catastrophic events cannot be prevented, a fundamental factor in mitigation plan design should be how well the site will respond to natural disturbances that are likely to occur. Floods, droughts, muskrats, geese, and storms are expected natural disturbances and should be accommodated in mitigation designs rather than feared. Natural ecosystems generally recover rapidly from natural disturbances to which they are adapted. The design should aim to restore a series of natural processes at the mitigation sites to ensure that resilience will have been achieved.

Watershed management requires thinking in terms of multiple spatial scales: the specific wetland or stream itself, the watershed that influences the wetland/stream, and the greater landscape. The landscape in which a wetland or water exists, defines its hydrogeologic setting. The hydrogeologic setting in turn controls surface and sub-surface flows of water, while a variety of hydrogeologic settings results in biological and functional diversity of aquatic resources.

There are three aspects of watershed management that the applicant must address in a mitigation plan: hydrogeomorphic considerations, the ecological landscape, and climate. It should be noted that the overall goal of compensatory mitigation is to replace the functions being lost (functional equivalency) due to a permitted Section 404 activity. By evaluating the hydrogeomorphic setting, ecological landscape and climate, one can determine which attributes can be manipulated (i.e. hydrology, topography, soil, vegetation or fauna) to restore, create or enhance viable aquatic functions.

Hydrogeomorphic considerations refers to the source of water and the geomorphic setting of the area. For example, a riverine wetland receives water from upstream sources in a linear manner, whereas vernal pools exist as relatively closed depressions underlain by an impermeable layer that allows rainfall runoff from a small watershed to fill the pool during specific times of year. Applicants should strive to replicate the hydrogeomorphic regime of the impacted water to increase the potential that the mitigation site mimics the functions lost. Only as a last resort, should applicants prepare plans for constructing wetlands using artificial water sources or placing wetlands into non-appropriate areas of the landscape. In such cases, there should be a contingency plan to prepare for unanticipated events or failures.

Ecological landscape describes the location and setting of the wetland/water in the surrounding landscape. For example, attempting to place mitigation in a dissimilar ecological complex than that of the impacted water is expected to result in a wetland/water unlikely to replicate the functions of the wetland/water that was lost. In all cases, the applicant should evaluate the historical ecological landscape of the mitigation site; for example, if there had been large areas of forested wetland in an agricultural area, then replacement of a forested wetland may be appropriate given other factors that should be considered. In most cases, applicants should plan for a mitigation area that fits best within the ecological landscape of the watershed or region of the mitigation site. Applicants should also consider constructing mitigation sites with more than one type of wetland/water regime, if appropriate, to provide for landscape diversity.

Climate also affects mitigation and is clearly beyond the control of the applicant. Therefore, the mitigation site should be sited in an area supported by the normal rainfall, subsurface and/or groundwater in the region. Climate considerations also can impact other hydrologic issues, sediment transport factors and other factors affecting attainment of desired functions. While climate cannot be manipulated, applicants need to account for it in mitigation plans, including local and regional variability and extremes.

B. 2. Adopt a dynamic landscape perspective

> *Consider both current and future watershed hydrology and wetland location. Take into account surrounding land use and future plans for the land. Select sites that are, and will continue to be, resistant to disturbance from the surrounding landscape, such as preserving large buffers and connectivity to other wetlands. Build on existing wetland and upland systems. If possible, locate the mitigation site to take advantage of refuges, buffers, green spaces, and other preserved elements of the landscape. Design a system that utilizes natural processes and energies, such as the potential energy of streams as natural subsidies to the system. Flooding rivers and tides transport great quantities of water, nutrients, and organic matter in relatively short time periods, subsidizing the wetlands open to these flows as well as the adjacent rivers, lakes, and estuaries.*

Applicants should consider both current and expected future hydrology (including effects of any proposed manipulations), sediment transport, locations of water resources, and overall watershed functional goals before choosing a mitigation site. This is extremely critical in watersheds that are rapidly urbanizing; changing infiltration rates can modify runoff profiles substantially, with associated changes in sediment transport, flooding frequency,

and water quality. More importantly, this factor encourages applicants to plan for long-term survival by placing mitigation in areas that will remain as open space and not be severely impacted by clearly predictable development. Consideration of the landscape perspective requires evaluation of buffers and connectivity (both hydrologic- and habitat-related). Buffers are particularly important to insure that changing conditions are ameliorated, especially in watersheds that have been, or are in the process of being, heavily developed. In addition, because wetlands are so dynamic, adequate buffers and open space upland areas are vital to allowing for wetlands to "breath" (expand and/or decrease in size and function) and migrate within the landscape, particularly in watersheds under natural and/or man-made pressures.

B.3. Pay attention to subsurface conditions, including soil and sediment geochemistry and physics, groundwater quantity and quality, and infaunal communities.

Inspect and characterize the soils in some detail to determine their permeability, texture, and stratigraphy. Highly permeable soils are not likely to support a wetland unless water inflow rates or water tables are high. Characterize the general chemical structure and variability of soils, surface water, groundwater, and tides. Even if the wetland is being created or restored primarily for wildlife enhancement, chemicals in the soil and water may be significant, either for wetland productivity or bioaccumulation of toxic materials. At a minimum, these should include chemical attributes that control critical geochemical or biological processes, such as pH, redox, nutrients (nitrogen and phosphorus species), organic content and suspended matter.

Knowledge of the physical and chemical properties of the soil and water at the mitigation site is also critical to choice of location. For example, to mitigate for a saline wetland, without knowing the properties of the soil and water sources at the mitigation site, it is unlikely that such a wetland is restorable or creatable. Certain plants are capable of tolerating some chemicals and actually thrive in those environments, while others plants have low tolerances and quickly diminish when subjected to water containing certain chemicals, promoting monotypic plant communities. Planning for outside influences that may negatively affect the mitigation project can make a big difference as to the success of the mitigation efforts and meeting watershed objectives.

B.4 Pay particular attention to appropriate planting elevation, depth, soil type, and seasonal timing

When the introduction of species is necessary, select appropriate genotypes. Genetic differences within species can affect wetland restoration outcomes, as found by Seliskar (1995), who planted cordgrass (Spartina alterniflora) from Georgia, Delaware, and Massachusetts into a tidal wetland restoration site in Delaware. Different genotypes displayed differences in stem density, stem height, belowground biomass, rooting depth, decomposition rate, and carbohydrate allocation. Beneath the plantings, there were differences in edaphic chlorophyll and invertebrates.

> *Many sites are deemed compliant once the vegetation community becomes established. If a site is still being irrigated or recently stopped being irrigated, the vegetation might not survive. In other cases, plants that are dependent on surface-water input might not have developed deep root systems. When the surface-water input is stopped, the plants decline and eventually die, leaving the mitigation site in poor condition after the Corps has certified the project as compliant.*

A successful mitigation plan needs to consider soil type and source, base elevation and water depth, plant adaptability and tolerances, and the timing of water input. When possible: a) use local plant stock already genetically adapted to the local environment; b) use stock known to be generally free from invasive or non-native species; c) use soil banks predetermined to have desirable seed sources; d) choose soil with desirable characteristics (e.g., high clay composition and low silt and sand composition for compaction purposes); e) determine final bottom elevations to insure that targeted water regimes are met and the planned plant community can tolerate the water depth, frequency of inundation and quality of water sources.

It is particularly helpful to examine reference wetlands and/or waters near the mitigation area, in order to identify typical characteristics of sustainable waters in a particular watershed or region. This allows one to determine the likelihood of certain attributes developing in a proposed mitigation site. It should be emphasized that wetland restoration is much more likely to achieve desired results than wetland creation, as evidence of a previously existing wetland or other aquatic resource is a strong indicator of what will return, given the proper circumstances Historical data for a particular site, if available, can also help establish management goals and monitoring objectives. Creating wetlands from uplands has proven to be difficult and often requires extensive maintenance.

B.5. Provide appropriately heterogeneous topography

> *The need to promote specific hydroperiods to support specific wetland plants and animals means that appropriate elevations and topographic variations must be present in restoration and creation sites. Slight differences in topography (e.g., micro- and meso-scale variations and presence and absence of drainage connections) can alter the timing, frequency, amplitude, and duration of inundation. In the case of some less-studied, restored wetland types, there is little scientific or technical information on natural microtopography (e.g., what causes strings and flarks in patterned fens or how hummocks in fens control local nutrient dynamics and species assemblages and subsurface hydrology are poorly known). In all cases, but especially those with minimal scientific and technical background, the proposed development wetland or appropriate example(s) of the target wetland type should provide a model template for incorporating microtopography.*
>
> *Plan for elevations that are appropriate to plant and animal communities that are reflected in adjacent or close-by natural systems. In tidal systems, be aware of local variations in tidal flooding regime (e.g., due to freshwater flow and local controls on circulation) that might affect flooding duration and frequency.*

While manipulations of natural water supply may not be possible or desirable, changes in topography are possible and should be incorporated in the design of a restored or created wetland/water when needed. Varying the depths of the substrate of the mitigation area ensures a heterogeneous topography, decreasing the likelihood of homogenous plant communities. Rather than plan on one water level or one elevation of the substrate, in hopes of establishing a specific plant community, it is best to vary the depth of the bottom stratum. This will increase the likelihood of success for a more diverse targeted plant community and desired functions.

Appendix C - Agency Contacts

U.S. Army Corps of Engineers (Corps) - Seattle District

The Seattle District administers the Corps' Regulatory Program throughout the state of Washington except that the activities of Ports located on the Washington side of the Lower Columbia River are regulated by the Portland District.

Within the Corps, staff responsibility is generally divided up by county, but the county responsibilities sometimes shift. Staff are also assigned to special topics (e.g., endangered species, transportation projects, etc.). For information contact the headquarters or regional offices (see below). Also, check the following website for the most current list of staff: http://www.nws.usace.army.mil/ (Regulatory, "Contact Our Staff").

Seattle District Headquarters and Regional Contacts

Mailing address	Agency staff	Counties
Seattle District Headquarters Seattle District Corps of Engineers Regulatory Branch, CENWS-OD-RG ATTN: "person's name/file number" Post Office Box 3755 Seattle, Washington 98124-3755 Telephone: (206)764-3495 Fax: (206)764-6602 **Physical Address** Federal Center South 4735 E. Marginal Way South Seattle, Washington	Please contact the Seattle District Headquarters for current county staff assignments. There are also staff assigned to special topics (e.g., endangered species, mitigation banking, etc.). Check the regulatory web page for a list of special topics and associated staff assignments: http://www.nws.usace.army.mil/ (Regulatory, "Contact Our Staff")	Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Lewis, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Whatcom
Eastern Washington Field Office U.S. Army Corps of Engineers Eastern Washington Field Office Post Office Box 273 Chattaroy, Washington 99003-0273	Tim Erkel tim.r.erkel@nws02.usace.army.mil (509)238-4570 Fax: (509)238-4561	Adams, Asotin, Benton, Columbia, Ferry, Franklin, Garfield, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman
Southwest Washington Field Office U.S. Army Corps of Engineers Southwest Washington Field Office 2108 Grand Boulevard Vancouver, WA 98661-4624 Fax: (360)750-9307	Ron Klump ron.klump@nws02.usace.army.mil (360)750-9046 Vacant (360)694-1171 Brad Murphy bradley.j.murphy@nws02.usace.army.mil (360)906-7274	Clark, Cowlitz, Klickitat, Pacific (enforcement only), Skamania, and Wahkiakum

Mailing address	Agency staff	Counties
Central Washington Field Office U.S. Army Corps of Engineers Central Washington Field Office Post Office Box 2829 Chelan, Washington 98816	Debbie Knaub deborah.j.knaub@nws02.usace.army.mil (509)682-7010 Fax: (509)682-7710	Chelan, Douglas, Grant, and Okanogan
Seattle District Corps of Engineers Regulatory Branch, CENWS-OD-RG ATTN: Jason Lehto Post Office Box 3755 Seattle, Washington 98124	Jason Lehto jason.a.lehto@nws02.usace.army.mil (206)764-3495 Fax: (206)764-6602	Kittitas and Yakima

U.S. Environmental Protection Agency (EPA) - Region 10

The EPA provides oversight of the Corps Regulatory Program and Clean Water Act Section 401 Water Quality Certifications for activities on *tribal lands* and in national parks. EPA Region 10 has a main office in Seattle, and small offices in Olympia WA; Portland, Eugene and La Grande OR; Boise, Prosser, and Pocatello ID; and Anchorage, Juneau, and Kenai AK. Within EPA, staff responsibility is generally divided up by county, but the county responsibilities sometimes shift. For information contact the Regional Office at:

U.S. EPA, Region 10
1200 Sixth Avenue
Seattle WA 98101
(206)553-1200 or 1-800-424-4EPA (toll free number)

The following table provides a list of staff that can answer questions regarding wetland mitigation proposals. For more general wetlands information you can contact the EPA Wetlands Helpline (see shaded box below).

EPA Region 10 Wetland Contacts

Agency staff	Contact information	Subject areas
Joan Cabreza	(206)553-7369 cabreza.joan@epa.gov	mitigation/restoration, mitigation banking, invasive species
Richard Clark	(206)553-6522 clark.richard@epa.gov	regulatory/permit processes, 401 certifications, enforcement
Krista Rave-Perkins	(206)553-6686 rave-perkins.krista@epa.gov	regulatory/permit processes, 401 certifications
Ralph Rogers	(206)553-4012 rogers.ralph@epa.gov	regional ecologist, mitigation/restoration, monitoring
Linda Storm	(206)553-6384 storm.linda@epa.gov	regulatory/permit processes, restoration, monitoring, cultural resources

EPA Wetlands Helpline

For more general wetlands information you can contact the EPA Wetlands Helpline. The helpline is a national resource and may be useful for obtaining national publications, federal registers, general wetland information, etc.

Who We Are

The EPA Wetlands Helpline is a contractor-operated information and referral service which handles requests for information on wetlands regulation, legislation and policy pursuant to Section 404 of the Clean Water Act, wetlands values and functions, and wetlands agricultural issues. The Helpline acts as a first point of contact for EPA's Wetlands Division, which is part of the Office of Wetlands, Oceans and Watersheds (OWOW). As of January 1, 2002, the Helpline has been co-located within the EPA's Water Resource Center allowing both Helpline and Resource Center customers access to the full spectrum of water-related public information available from EPA.

What We Do

The Helpline is staffed by librarians providing in-depth, EPA-approved information, documents, and referrals addressing Federal and State regulatory programs, wetlands science, and educational outreach. Librarians can respond to specialized research requests using the Helpline's extensive reference library, as well as other pertinent sources including the Internet. Librarians also maintain an extensive list of contacts at regulatory agencies and other organizations to provide the most appropriate and accurate referrals.

Our Documents

For more general wetlands information you can contact the EPA Wetlands Helpline, which is a contractor-operated information and referral service. The helpline is a national resource and may be useful for obtaining national publications, federal registers, general wetland information, etc. The Helpline acts as a first point of contact for EPA's Wetlands Division, which is part of the Office of Wetlands, Oceans and Watersheds (OWOW).

Contact Us

Hours: Monday through Friday, excluding Federal Holidays, 8:30am to 5:30pm Eastern Standard Time. Telephone: 1-800-832-7828

Fax: (202)566-1736.
Email: wetlands.helpline@epa.gov
Website: http://www.epa.gov/OWOW/wetlands/wetline.html
Helpline Publications List: http://www.epa.gov/owow/wetlands/wetpubs.html

Watershed Academy (web-based interactive courses)

The EPA Office of Water also maintains a series of web-based interactive courses called the Watershed Academy. The Academy provides dozens of on-line courses on everything from wetlands and watersheds to invasive species, and includes courses from other federal agencies as well. To see a catalogue of courses go to http://www.epa.gov/owow/watershed/waacademy/catolog.html.

Washington State Department of Ecology

Wetland staff at the Washington State Department of Ecology are located at the headquarters office in Lacey, Washington and in four regional offices: Central region (Yakima), Eastern region (Spokane), Northwest region (Bellevue), and Southwest region (Lacey). Regional staff responsibility is divided by county, but the county responsibilities sometimes shift. For information contact the headquarters or regional offices (see below). Also, check the following website for the most current list of staff: http://www.ecy.wa.gov/programs/sea/wetlandcontacts.htm.

Mailing address	Agency staff	County or Subject Area
Ecology Headquarters PO Box 47600 Olympia, WA 98504 Telephone: (360)407-6000 Fax: (360) 407-6902 **Physical Address** 300 Desmond Drive SE Lacey, WA 98503	Andy McMillan (360) 407-7272, anmc461@ecy.wa.gov	Wetland Science & Policy Manager
	Lauren Driscoll (360)407-7045, ldri461@ecy.wa.gov	Wetland mitigation policy and mitigation banking
	Christina Merten@NWRO (425)649-7007, chme461@ecy.wa.gov	Wetland mitigation banking
	Dana L. Mock (360)407-6947, dmoc461@ecy.wa.gov	Various wetland projects, including mitigation guidance updates
	Donna Bunten (360)407-7172, dbun461@ecy.wa.gov	Critical area ordinance review coordinator and other projects
	Jeanne Koenings (360)407-7258, jkoe461@ecy.wa.gov	Wetland stewardship
	Patricia Johnson 360)407-6140, pjoh461@ecy.wa.gov	Forested wetland projects (WETSAG) and other projects
	Susan Grigsby (360)407-7546, sgri461@ecy.wa.gov	Landscape planning and geographic information systems (GIS)
	Stephen Stanley @NWRO (425)649-4210, ssta461@ecy.wa.gov	Restoration and landscape planning
	Teri Granger (360)407-6857, tgra461@ecy.wa.gov	Various wetland grant projects, including best available science
	Tom Hruby (360)407-7274, thru461@ecy.wa.gov	Senior Ecologist

Central regional office 15 West Yakima Avenue, Suite 200 Yakima, WA 98902-3401 Fax: (509)575-2809 	Cathy Reed (509) 575-2616, craj461@ecy.wa.gov	Benton, Kittitas, Klickitat and Yakima counties
	Gary Graff (509) 454-4260, gagr461@ecy.wa.gov	Chelan, Douglas and Okanogan counties
Eastern regional office N. 4601 Monroe Spokane, WA 99205-1295 	Chris Merker (509) 329-3528, Fax: (509)329-3529 cmer461@ecy.wa.gov	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman counties
Northwest regional office Mail Stop NB-81 3190 – 160th Avenue SE Bellevue, WA 98008-5452 Fax: (206)649-7098 	Erik Stockdale (425)649-7061, esto461@ecy.wa.gov	Watershed planning and technical assistance
	Kim Harper (425)649-7004, khar461@ecy.wa.gov	Transportation projects, Multi-agency Permitting Team (MAPT)
	Laura Casey (425)649-7148, cala461@ecy.wa.gov	San Juan, Skagit, and Snohomish counties
	Richard Robohm (425) 649-4447, riro461@ecy.wa.gov	King and Kitsap counties
	Susan Meyer (425) 649-7168, sume461@ecy.wa.gov	Whatcom and Island counties
Southwest regional office P.O. Box 47775 Olympia, WA 98504-7775 Fax: (360)407-6305 	Gretchen Lux (360) 407-6221, glux461@ecy.wa.gov	Clallam, Jefferson, and Mason counties
	Mark Cline (360) 407-7273, mcli461@ecy.wa.gov	Wahkiakum, Skamania, Lewis, Clark, and Cowlitz counties
	Perry Lund (360) 407-7260, plun461@ecy.wa.gov	Unit Supervisor, Grays Harbor and Pacific counties
	Karen Rogers (360)407-6294, krog461@ecy.wa.gov	Pierce and Thurston counties

Office of Regulatory Assistance (ORA) - Help with Environmental Permitting

ORA staff provide information regarding environmental permits issued by the State departments of Ecology, Fish and Wildlife, Health, and Natural Resources, and the local air authorities. Regional staff are available to coordinate permit applications for large, complex projects, and to work with applicants, agencies and regulatory authorities to develop a plan for meeting environmental and land-use requirements.

The Office is located in the Ecology Building at 300 Desmond Dr. SE, Lacey, WA. Staff are available Monday through Friday from 9 a.m. to 4 p.m. Although you can drop in anytime during those hours, it is recommended that you make an appointment. You can call the Office at 360-407-7037 or 800-917-0043, or e-mail them at ecypac@ecy.wa.gov or go to the website at http://www.ecy.wa.gov/programs/sea/pac/.

Local Governments

Most local governments (cites and counties) maintain web sites with current contact information. The Municipal Research & Services Center of Washington maintains a current list of local government web sites (for cities and towns go to http://www.mrsc.org/byndmrsc/cities.aspx and for counties go to http://www.mrsc.org/byndmrsc/counties.aspx). This information is also accessible on the Access Washington web site, which provides Washington State Government information and services http://access.wa.gov/). You can call the Municipal Research & Services Center of Washington to get the phone number for your local government planner at (206) 625-1300.

The state Department of Community, Trade and Economic Development's (CTED) Local Government Division provides technical assistance to local governments, including growth management services. Go to http://www.cted.wa.gov/growth/ or call (360) 725-3000 for general information and to get connected with the appropriate planner who can answer specific questions.

Appendix D - Hiring a Qualified Wetland Professional

This appendix contains recommendations to help locate and select a professional who is qualified to assist with wetland issues. Wetland professionals are usually hired to identify and delineate wetlands, rate them, assess functions and values, and provide assistance with wetland regulations and permits. They often complete the necessary application forms and studies needed to meet regulations. They also provide advice about designing and implementing compensatory mitigation projects that are needed to replace wetlands if they will be lost or degraded.

Wetland professionals are generally hired by landowners or developers who want to do something on their property that may affect a wetland. In addition, many local governments hire professionals to provide review as a third party. Some professionals are self-employed; others work for larger environmental or engineering consulting firms.

What is a Qualified Wetland Professional?

There is no government sanctioned program for certifying someone as a "qualified wetland professional" or "qualified wetland specialist." Generally, the term means a person with professional experience and comprehensive training in wetland issues, including experience performing wetland delineations, assessing wetland functions and values, analyzing wetland impacts, and recommending and designing wetland mitigation projects.

The Society of Wetland Scientists administers a professional certification program for wetland scientists that has two levels of certification: Professional Wetland Scientist (PWS) and Wetland Professional In-Training (WPIT). A person certified as a PWS would be considered a qualified wetland scientist. This program is discussed further in the shaded box at the end of this appendix.

If the person is not a certified PWS, there is no simple means of determining if they are adequately qualified to undertake the tasks listed above. However, the following criteria are indicators of someone who may be qualified to perform the wide range of tasks typically required of a wetland professional:

- At a minimum, a **Bachelor of Science or Bachelor of Arts** or equivalent degree in hydrology, soil science, botany, ecology, resource management, or related field. A graduate degree in one of these fields is usually an indication of more advanced expertise.
- At least **two years of full-time work experience** as a wetland professional; including delineating wetlands using the state or federal manuals, preparing wetland reports, conducting function assessments, and developing and implementing mitigation plans. Generally, the more years of experience, the greater the expertise.
- **Completion of additional wetland-specific training programs**. This could include a more comprehensive program such as the University of Washington Wetland Science and Management Certificate Program or individual workshops on wetland delineation, function assessment, mitigation design, hydrophytic plant or hydric soil identification, etc.

Keep in mind that most people engaged in professional wetland work have greater expertise in some aspects of the field than others. A person may have in-depth training in plant ecology or soils or hydrology, but few people have all three. A person may have extensive experience in wetland delineation or function assessment and have little experience in designing and implementing mitigation projects. Thus, it is important to be clear what specific tasks need to be completed and make sure the person or firm being hired has the specific expertise needed. Generally, more complex projects require multiple individuals that provide collective expertise to address all aspects of the project.

How to Find a Qualified Wetland Professional

There are a number of ways to find the names of wetland professionals. Finding a qualified one, however, can be difficult since this group of professionals is not required to be certified, licensed, or bonded in the State of Washington. One approach is to look in the Yellow Pages under *Environmental and Ecological Services*. You can also contact the local government planning office and ask for a list of professionals that work in its jurisdiction. Some local governments maintain lists of wetland professionals they consider to be well qualified.

Wetland professionals may also be found by requesting the advice of associations or businesses that commonly encounter wetlands in their work, such as the Building Industry Association and Association of Washington Business. Finally, state and federal resource agencies can be asked for referrals. Be aware, however, that most agencies will not be able to provide recommendations because of questions of fairness.

Finally, the Society of Wetland Scientists maintains a searchable database of "professional wetland scientists." See the shaded box at the end of this appendix.

How to Select a Qualified Wetland Professional

A number of factors should be considered before hiring a wetlands professional. When interviewing professionals, their qualifications should be carefully considered (see above for the minimum recommended). Be sure to ask the following questions before making a selection:

- **Does the professional have training or experience in the use of the 1987 federal or 1997 Washington State wetland delineation manuals?** The selected professional should have the ability to apply the methods for identifying wetlands used by state and federal agencies. Make sure that the professional can identify wetlands and their boundaries consistent with regulating agencies.
- **Has the professional had additional training or expertise in related fields** such as hydrology, soil science, botany, or ecology?
- **Is the professional familiar with local, state, and federal wetland regulations?**
- **How long has the professional been doing wetlands work?** How much experience do they have delineating wetlands in the field, assessing wetlands functions and values, or working with wetland regulations? Has the person worked in the part of the state where you propose to develop? Ask the professional for examples of previous

work similar to the services being requested. Can the professional take you to a successful wetland mitigation project they designed and/or implemented?

- **Does the professional have experience working with regulatory agencies?** Ask the professional to describe their working relationship with the agencies that will be reviewing and/or permitting your project.
- **Does the professional have experience working on a team?** Given the complexity of some projects, it is expected that a wetland professional will team up with others who have experience in related fields such as water quality, wildlife, stormwater management, and hydrogeology. Ask the professional for a list of people with whom they have worked on a team in the past.
- **Who were some of the professional's past clients?** Request referrals and ask clients if they were satisfied with the professional's work. Ask whether there were any problems that occurred during or after the project, how the professional handled those problems, and what they charged for their work. Find out what type of track record the company has with local, state, and federal agencies. Be sure to ask for references that include clients who have had projects reviewed and approved by the regulatory agencies (Corps, Ecology, and local government).
- **Talk with colleagues and other businesses**, such as real estate, land development, homebuilding, etc. that are routinely involved in wetland concerns. Ask them about their experiences and knowledge regarding the professional being considered.
- **If you are considering a consulting firm, find out exactly who will be working on your project**. Will it be the principal professional with the years of experience, or someone with less experience who works for them?
- **Get an estimate of how much the professional will charge**. Compare rates but do not let cost be the sole criterion. Be sure to consider training, experience, and the other factors as well. A good professional who charges more may end up saving money by reducing permit processing delays.

Society of Wetland Scientists Professional Certification Program

The Society of Wetland Scientists keeps a list of those who have qualified for their professional certification program for wetland scientists. The certification program website http://www.wetlandcert.org allows you to search by name, city, and/or state. As explained in the Professional Wetland Scientist program overview:

> *Certification is not required by any agency and has no official or legal standing. However, certification signifies that the academic and work experience of a Professional Wetland Scientist (PWS) meets the standards expected by his or her peers of a practicing wetland professional and provides acknowledgment to his or her peers of adherence to standards of professional ethics with regard to the conduct and practice of wetland science.*
>
> *Wetland Professional in Training (WPIT) is considered a preliminary step for persons who meet the requirements for either (but not both) education and experience. Professional Wetland Scientist (PWS) certification is awarded for those meeting both educational and experience requirements.*
>
> *Minimum degree requirements for WPIT and PWS are the BA or BS degrees, with course distribution of 15 semester hours each in biological and physical sciences and 6 hours in quantitative areas. For certification as a PWS, an additional 15 semester hours in wetland-related courses are required. In addition to comprehensive training in wetland science, a PWS is expected to have professional experience of at least 5 years as a wetland scientist, demonstrating the application of current technical knowledge dealing with wetland resources and activities.*

Appendix E - Laws, Rules, Policies, and Guidance

This appendix provides a brief summary of each of the laws, rules, policies, and guidance most pertinent to wetlands and mitigation for impacts to wetlands. Table E-1 on the following page summarizes laws/permits commonly applicable to activities in or near wetlands. Those laws and additional laws, rules, policies, and guidance are then described in further detail. This appendix is not meant to be a comprehensive list. In order to determine if any laws, rules, policies, or guidance apply to a particular situation, contact the agencies (see Appendix C, *Agency Contacts*).

On-line access to laws and rules

The following web pages can be used to access many of the laws and rules described in this appendix. To find the Rivers and Harbors Act of 1899 (33 USC § 403), for example, you would go to either of the web pages listed below for the USC and search by Title (33 in this example) and Section (403 in this example).

United States Code (USC) – Legal Information Institute
http://www4.law.cornell.edu/uscode.

United States Code (USC) – Office of the Law Revision Counsel
http://uscode.house.gov/lawrevisioncounsel.shtml.

Code of Federal Regulations (CFR) http://www.gpoaccess.gov/cfr/index.html.

Federal Register (FR) http://www.gpoaccess.gov/fr/.

Revised Code of Washington (RCW) http://www.leg.wa.gov/rcw/index.cfm..

The Library of Congress, THOMAS, Legislative Information on the Internet. Find recent amendments to laws by searching this web site. http://thomas.loc.gov/.

Washington Administrative Codes (WAC's) http://www.leg.wa.gov/wac/.

Table E-1. Laws/permits commonly applicable to activities in or near wetlands

Law	Implementation	Jurisdiction	Application to Wetlands	Implementing Agency
Federal Laws/Permits				
Clean Water Act Section 404	Permit required for discharge of *dredged* or fill material into waters of the United States, including wetlands	*Waters of the United States*[36]	Includes all wetlands (with some exceptions)	*United States Army Corps of Engineers/ Environmental Protection Agency*
Clean Water Act Section 401	Certification that the proposed project will meet state water quality standards is a condition of federal permits approval	Federal permits affecting waters of the U.S., including wetlands	Includes all wetlands that may be affected by a federally permitted activity	*Washington Department of Ecology/ EPA on Tribal lands and National Parks*
Rivers and Harbors Act of 1899 Section 10	Permit required for structures and/or work in or affecting navigable waters of the United States	Navigable waters to the mean high water mark of tidal waters and the ordinary high water mark (OHWM) of non-tidal waters	Wetlands within the limits of navigable waters	*United States Army Corps of Engineers*
National Environmental Policy Act (NEPA)	Federal analysis and decision-making procedures that require full disclosure of potential impacts associated with proposed actions	All federal actions[37] not specifically exempted	All wetlands	*Varies (usually the federal agency issuing the permit)*
Federal Coastal Zone Management Act	A notice of consistency with the state coastal zone management plan is a condition of federal activities, federal license and permit approval, and federal support of local activities	Applies to Washington's 15 coastal counties[38]	Wetlands within the 15 coastal counties of Washington	*Washington Department of Ecology*

36 The Corps of Engineers, not applicants or their consultants, has authority to determine whether or not a wetland is a water of the U.S. and thus regulated under the federal Clean Water Act (CWA). If the Corps determines that a wetland is not subject to regulation under the CWA, applicants should be aware that these wetlands are still subject to regulation by Ecology under the State's Water Pollution Control Act as well as by local jurisdictions.

37 "Actions" includes permits, authorizations, and projects with federal funding.

38 Washington's 15 coastal counties are: Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum, and Whatcom.

State Laws/Permits				
Law	**Implementation**	**Jurisdiction**	**Application to Wetlands**	**Implementing Agency**
State Water Pollution Control Act	Permits, orders, certifications or compliance with water quality standards	Any pollution of waters of the state	All waters of the state including wetlands	*Washington Department of Ecology*
State Growth Management Act	Consistency with local comprehensive plans and development regulations. Various permits may be required.	All cities and counties in Washington State	Requires protection of all wetlands designated as critical areas	*Local government/ Washington Department of Community Trade & Economic Development*
State Shoreline Management Act	Permits required to ensure that proposed activity complies with local shoreline master plan and the Shoreline Management Act	Shorelines of the state including streams with flows greater than 20 cfs or lakes 20 acres or larger and landward area within 200 feet from OHWM or floodway; associated wetlands, river deltas and certain floodplains	Includes all land within 200 feet of the OHWM of a state shoreline. Jurisdiction may be extended to include the entirety of an associated wetland and/or floodplains	*Local government/ Washington Department of Ecology*
State Hydraulic Code	Permit (Hydraulic Project Approval) required for all work	Activities affecting waters of the state	All wetlands within OHWM of fresh or estuarine waters and those wetlands above OHWM[39] whose alteration could affect the bed or flow.	*Washington Department of Fish & Wildlife*
Forest Practices Act	Permit required for tree harvest	State-owned and private timberlands	Restricts harvest activities in and around wetlands	*Washington Department of Natural Resources*
Aquatic Lands Act	Authorization required for use of state-owned aquatic lands for a variety of activities	State-owned aquatic lands	Wetland impacts or compensation projects proposed on, or affecting, state-owned aquatic lands	*Washington Department of Natural Resources*
Local Laws/Permits				
Local Laws	Consistency with local comprehensive plans, zoning, ordinances, shoreline master programs. Various permits may be required	As defined by local plans, ordinances, and regulations	May identify specific wetlands and performance standards	Local government

39 Note: In marine waters, the OHWM is most often a higher elevation than Mean Higher High Water (MHHW) which is the average of the higher daily high tide. Clean Water Act jurisdiction is limited at MHHW but critical fish habitat for surf smelt spawning and some herring spawning occurs above MHHW to the OHWM.

Federal Laws and Rules

Rivers and Harbors Act of 1899 (33 USC § 403)

Section 10 of the Rivers and Harbors Act requires the Department of the Army authorization for structures and/or work in or affecting navigable waters of the United States. Section 10 regulates structures and work outside of navigable waters of the United States that would affect the course, location, or condition of a waterbody in such a manner as to impact its navigable capacity. Discharging dredged or fill material into navigable waters of the United States, including wetlands, may require authorization under both Section 10 and Section 404 of the CWA.

National Environmental Policy Act of 1969 (42 USC § 4321 et seq.)

The National Environmental Policy Act (NEPA) is the national charter for protecting and enhancing the quality of the nation's environment. NEPA directs the federal government to assess the likely impact of its proposed actions on the environment. Under NEPA, the Corps, before issuing and individual Section 404 permit must conduct an alternatives analysis and document that no reasonable alternative to the proposed action exists and that sufficient efforts have been made to minimize damage to wetlands and other aquatic resources[40].

The federal agencies are responsible for ensuring compliance with the following federal laws and rules which are described below:

- Fish and Wildlife Coordination Act.
- Coastal Zone Management Act.
- Endangered Species Act.
- Magnuson-Stevens Act and the National Historic Preservation Act.

The agencies will coordinate with applicants and/or their consultants to ensure that compliance with these laws and rules occurs.

Clean Water Act (33 USC § 1251 et seq.)

The Clean Water Act (CWA), formerly known as the Federal Water Pollution Control Act. The primary goal of the Clean Water Act (CWA) is to "restore the chemical, physical, and biological integrity of the Nation's waters." Two sections (404 and 401) of the CWA as they relate to wetlands and mitigation are described below.

40 Under the Corps' §404 Nationwide Permit (NWP) Program, this alternatives analysis has already been completed so applicants for nationwide permits are not required to conduct a project-specific alternatives analysis. They are, however, still required to avoid and minimize impacts. More information on the NWP Program can be found via the Corps' Regulatory Program web page ("Permit and Applicant Information").

Section 404. Under Section (§) 404 of the CWA, the Secretary of the Army, acting through the U.S. Army Corps of Engineers (Corps), regulates the discharge of *dredged or fill material into waters of the United States*, including wetlands, through a permit program. The Corps' Regulatory Program is the primary federal tool for protecting wetlands and other aquatic resources of the United States. Anyone proposing to discharge dredged or fill material into waters of the United States must first obtain authorization from the Corps.

The Corps has the responsibility and authority (33 CFR 320-331) to require permit applicants to implement all appropriate and practicable measures to minimize the adverse impacts of their activities on wetlands, ensure that those activities are not contrary to the public interest, and satisfy legal requirements such as the §404(b)(1) guidelines (see 404(b)(1) guidelines and the National Environmental Policy Act).

The Environmental Protection Agency (EPA) is also responsible for implementing and enforcing §404 (40 CFR Part 230). The EPA oversees the Corps Regulatory Program and is responsible for application of the 404(b)(1) guidelines for CWA permits.

Section 401. Under §401 of the CWA, activities involving a discharge of dredged or fill material to navigable waters authorized by a federal permit or license, such as a §404 permit, must receive certification from the state that the activity complies with the water quality standards of that state and any established effluent limitations (such as those under a water clean up plan[41]). The §401 certification signifies that the state has reasonable assurance that the project as proposed and conditioned will comply with applicable water quality standards and other appropriate requirements of state law.

Ecology is the state agency responsible for §401 water quality certifications (401 certification) in Washington (see State Water Pollution Control Act). A 401 certification must be obtained from Ecology before the federal permit can be issued. The EPA is responsible for issuing 401 certifications on most[42] *Tribal lands* (land within the boundaries of an Indian Reservation) and within all national parks where the state has not been given jurisdiction for water quality certification. In Washington, national parks where the state does not have 401 jurisdiction include Olympic, Mount Rainier and North Cascades National Parks.

41 Water clean up plans or TMDLs (Total Maximum Daily Load plans) are developed for waters which are impaired (i.e. not meeting water quality standards) due to various pollutants. These water clean up plans may set limits on the amount of specific pollutants that can be discharged into a water body. The limits are referred to as "effluent limitations".

42 Some tribes have been given exclusive jurisdiction for activities occurring on their lands (they have their own water quality standards that have been approved by EPA and therefore they can write their own 401 certifications). Check with the EPA for a current list of approved tribes.

Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 USC § 661 et seq.)

The Fish and Wildlife Coordination Act, authorizes the Secretary of the Interior, through the U.S. Fish and Wildlife Service (USFWS), to assist and cooperate with federal, state, and public or private agencies and organizations in the conservation and rehabilitation of wildlife whenever the waters of a stream or other waterbody would be impounded, diverted, deepened, or otherwise controlled or modified. The act requires proponents to also consult with the state wildlife resources agency and, when appropriate, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS). This coordination helps to conserve our wildlife resources by preventing or reducing the loss of those resources and, whenever possible, improving those resources.

Coastal Zone Management Act (16 USC §1451 et seq.)

The Coastal Zone Management Act (CZMA) requires states to review all federal projects, permits, and licenses that may affect any land or water use or natural resources of the coastal zone for consistency with the state's coastal management program. In Washington, CZM review applies to Washington's 15 coastal counties[43], and Ecology is the state agency responsible for this review. Activities and development affecting coastal resources which involve federal activities, federal licenses or permits, and federal assistance programs (funding) require a written CZM decision by Ecology. A CZM notice of consistency determination must be submitted stating whether the project is consistent with Washington's Coastal Zone Management Program (WCZMP).

For projects located within the 15 coastal counties, the project must comply with the enforceable policies within the following six laws: 1) Shoreline Management Act (SMA), 2) State Environmental Policy Act (SEPA), 3) Clean Water Act (CWA), 4) Clean Air Act, 5) Energy Facility Site Evaluation Council (EFSEC), and 6) Ocean Resource Management Act (ORMA). Ecology must issue a CZM consistency determination for projects if they have complied with the enforceable policies. For more information on coastal zone management in Washington go to http://www.ecy.wa.gov/programs/sea/czm/index.html.

Endangered Species Act (16 USC 1531 et seq.)

The Endangered Species Act (ESA) establishes a federal program to conserve the ecosystems upon which endangered and threatened species depend. It also establishes a policy that federal agencies and departments seek to conserve endangered and threatened species. Section 7 of the ESA requires federal departments and agencies to consult with NMFS and/or the USFWS to ensure that the actions they authorize, fund, or carry out do not jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of designated critical habitat for those species. Federal agencies are responsible for ensuring compliance with the requirements of Section 7 of the ESA. Section 9 of the ESA, prohibits all individuals, governments, and other entities from "taking" listed species of fish and wildlife except as exempted under Section 10 of the ESA (see Section 7.3, *Compensatory Mitigation and the Endangered Species Act)*.

43 Washington's 15 coastal counties include, Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum, and Whatcom.

Magnuson-Stevens Act (16 USC § 1801 et seq.)

The Magnuson-Stevens Act (MSA) is the federal law that governs marine fisheries management in the United States. Among its provisions, the MSA mandates the identification of essential fish habitat (EFH) for federally managed species as well as the development of measures to conserve and enhance the habitat necessary for fish to carry out their life cycles. The MSA requires federal agencies to consult with NMFS before they authorize, fund or conduct an activity that may adversely affect EFH. When consulted, NMFS provides guidance, in the form of conservation recommendations, to help federal agencies minimize the impact of their actions on EFH.

National Historic Preservation Act of 1966 (16 USC 470 et seq.)

Section 106 (16 USC § 470f) of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies, including the Corps to make a determination on how a project may affect recorded or undiscovered *cultural resources* and/or *historic properties* within the permit area. Section 106 of the NHPA states, in part, a Federal agency "having direct or indirect jurisdiction" over a proposed *federal undertaking* shall, prior to approval of the undertaking, take into account the effect of the undertaking on any historic property "in or eligible for inclusion in the National Register of Historic Places." A cultural resource/historic property survey, conducted by a professional archaeologist, may be required for the specific project impact area and compensation areas. The federal agencies involved in the project make the determination on whether a survey needs to be done[44]. Based on the results of the survey, the applicable federal agency will take the lead on conducting the appropriate Section 106 consultation with the *State Historic Preservation Officers or Tribal Historic Preservation Officers*. Applicants should be aware that Section 106 coordination and/or consultation may add substantial time to the application and mitigation review process.

Federal Policies and Guidance

Executive Order 11990, Protection of Wetlands (May 24, 1977)

Executive Order(EO) 11990 requires federal agencies to "avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative." In carrying out these directives, federal agencies must avoid undertaking or providing assistance for new construction located in wetlands unless there is no practicable alternative to such construction and the proposed action includes all practicable measures to minimize harm to wetlands, taking into account factors relevant to the proposal's effect on the survival and quality of wetlands. These factors include: 1) public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards; and sediment and erosion; 2) maintenance of natural systems, including conservation and long term productivity of existing flora and fauna,

44 One criterion for determining if a survey needs to be done is whether the project location is listed on the National Register of Historic Places or the project has raised concerns with the local Native American Tribes with knowledge of the area.

species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and 3) other uses of wetlands in the public interest, including recreational, scientific, and cultural uses. EO 11990 can be found at http://www.ecy.wa.gov/programs/sea/czm/index.html.

Executive Order 11988, Protection of Floodplains (May 24, 1977)

Since wetlands can often be found in floodplains and losses of those wetlands can adversely affect the functions of the floodplain, some projects may need to be evaluated in the context of floodplain management.

Executive Order 11988 requires federal agencies to "avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains" and "avoid direct or indirect support of floodplain development wherever there is a practicable alternative." In carrying out these directives, the Corps must consider "alternatives to avoid adverse effects and incompatible development in the floodplains" during its permit application evaluation process. Those activities that the Corps finds could not practicably avoid impacting floodplains must be designed or modified as necessary to minimize their potential harm to the floodplain. EO 11988 can be found at http://www.epa.gov/owow/wetlands/regs/eo11988.html.

Guidelines for Specification of Disposal Sites for Dredged or Fill Material (also known as the 404 (b)(1) guidelines)[45] (45 FR 85336-85357, December 24th, 1980)

Prior to issuing a permit under §404 of the CWA, the Corps must determine that the proposed discharge of dredged or fill material into *waters of the United States* would not be contrary to the public interest and would comply with the *Guidelines for Specification of Disposal Sites for Dredged or Fill Material* (40 CFR Part 230), more popularly known as the 404(b)(1) guidelines. Mitigation sequencing (see Section 3.5.1) is an important consideration in both the 404(b)(1) guidelines and the public interest review process.

The 404(b)(1) guidelines, which provide criteria to be used by the Corps to evaluate a proposed discharge, generally prohibit the Corps from authorizing a discharge of dredged or fill material into waters of the United States if: 1) there is a practicable alternative to the proposed discharge that would have less environmental impact, 2) the discharge would violate any applicable state water quality standard or CWA toxic effluent standard or would jeopardize the continued existence of species listed as threatened or endangered under the ESA, 3) the discharge would cause or contribute to significant degradation of the waters of the United States, or 4) appropriate and practicable steps have not been taken to minimize adverse impacts of the discharge on the aquatic ecosystem.

45 The following two Memorandums to the Field, issued by the EPA and the Corps, provide guidance on the flexibility that the Corps should be utilizing when making determinations of compliance with the Section 404(b)(1) Guidelines, particularly with regard to the alternatives analysis: *Appropriate level of Analysis Required for Evaluating Compliance With the Section 404(b)(1) Guidelines Alternatives Requirements*, RGL 93-02, August 23, 1993 (); and, *Individual Permit Flexibility for Small Landowners*, RGL 95-01, March 6, 1995 (). RGLs can be found via the Seattle District Corps home page (Regulatory, Regulatory Permit Program, Regulations and Guidance).

Memorandum of Agreement Between the Environmental Protection Agency and Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines (February 6, 1990)

The Department of the Army and the EPA signed a memorandum of agreement (MOA) that provides guidance for determining the type and level of mitigation necessary to comply with the 404(b)(1) guidelines in the case of standard individual permit applications. The MOA describes mitigation as a sequential process of avoiding adverse impacts, taking appropriate and practicable steps to minimize adverse impacts, and providing appropriate and practicable compensation for adverse impacts that remain after all appropriate and practicable minimization has been required. The MOA also instituted a preference for on-site, in-kind mitigation and recognized that "no net loss" of wetland functions and values may not be achieved with every permit action. The MOA noted, without providing further guidance, that mitigation banking may be an acceptable form of compensatory mitigation under certain conditions. The MOA can be found at http://www.epa.gov/owow/wetlands/regs/mitigate.html..

Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (60 FR 58605-58614, November 28, 1995)

This multi-agency guidance establishes federal policy on establishing, using, and operating mitigation banks to provide compensatory mitigation for adverse impacts to wetlands and other aquatic resources. This guidance is intended to assist federal agencies, bank sponsors, and others in meeting the requirements of Section 404 of the CWA and other federal statutes and regulations. The banking guidance establishes a process to evaluate mitigation bank proposals, criteria for using a mitigation bank, and requirements for long-term management, monitoring, and remediation of mitigation banks. In addition, this guidance discusses a number of important planning and policy issues, such as the role of preservation, the relationship between mitigation banks and in-lieu fee mitigation arrangements, the approval process, and considerations for bank site development and operation. The guidance can be found at http://www.epa.gov/owow/wetlands/guidance/mitbankn.html.

Memorandum of Agreement Between the Federal Aviation Administration, the U.S. Air Force, the U.S. Army, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture to Address Aircraft-Wildlife Strikes (and attached Advisory Circular on Hazardous Wildlife Attractants on or Near Airports (150/5200-33, May 1, 1997)

The listed agencies signed a memorandum of agreement (MOA) with the goal to more effectively address existing and future environmental conditions that contribute to aircraft-wildlife strikes. The signatory agencies agreed that one of the major activities of concern was the development of conservation/mitigation habitats or other land uses that could attract hazardous wildlife to airports or nearby areas. In addition, the Advisory Circular provides guidance on locating certain land uses that have the potential to attract hazardous wildlife. Wetlands are considered a land use that is incompatible with safe airport operations and the FAA recommends that wetland mitigation sites be located at least 10,000 feet (for airports serving turbine-powered aircraft) from aircraft movement areas. The Corps RGL 02-02 agrees and states that "Compensatory mitigation projects that

have the potential to attract waterfowl and other bird species that might pose a threat to aircraft will be sited consistent with the Federal Aviation Administration Advisory Circular on Hazardous Wildlife Attractants on or near Airports." The MOA can be found at http://wildlife-mitigation.tc.faa.gov/public_html/moa.pdf.

Guidelines for Implementation of Compensatory Mitigation Requirements for Conversion of Wetlands to Cranberry Bogs (1998)

The Corps, Ecology, EPA, and USFWS published this special public notice, which is still in effect. The Corps and Ecology regulate the expansion of existing, and creation of new, cranberry operations in wetlands under §404 and §401, respectively, of the CWA. In 1992, the Corps created a special Nationwide Permit (NWP 34) for expansion of existing cranberry bogs of up to 10 acres; new operations must be processed under the Corps Individual Permit Process. The 1998 guidance was developed as a result of questions arising from agencies concerning the need for additional mitigation requirements in terms of avoidance, minimization, and compensation for unavoidable impacts to wetlands due to cranberry projects. Guidance concerning compensatory mitigation ratios, used to implement mitigation requirements, was identified as a need for cranberry expansion and new operations in Washington State. This guidance provides a table of compensation ratios for impacts/conversion of wetland to cranberry bog as well as the statement «Mitigation ratios would be doubled if an after-the fact Corps permit is issued for unauthorized work in waters of the U.S., including wetlands.» The ratios are, on average, lower than for other types of wetland impacts because it is acknowledged that cranberry bogs, in most circumstances, are wetlands themselves which may provide some important wetland functions. As with other types of projects, ratios are determined on a case-by-case basis using best professional judgment.

In addition to restoration (preferred), creation (very low priority), and enhancement (low priority), the cranberry guidance views the preservation of threatened, high-quality wetlands as a high priority for compensation for the conversion of bogs to cranberry production. The agencies allowed a more flexible approach to preservation because 1) cranberry bogs are still wetlands, although their habitat and water quality functions are lower; 2) mitigation opportunities in Pacific and Grays Harbor County are very limited; and 3) mature forested and scrub shrub wetlands are very much at risk in the cranberry producing counties. This policy is consistent with the February 6th, 1990 MOA. The guidelines can be found at http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/ACF101C.pdf.

Executive Order 13112, Invasive Species (February 3, 1999)

Executive Order 13112 requires each federal agency whose actions may affect the status of invasive species to take a number of proactive steps. These include: identifying such actions; using relevant programs and authorities to prevent invasive species introductions; detecting and responding rapidly to control populations of such species in a cost-effective and environmentally sound manner; monitoring invasive species populations accurately and reliably; providing for restoration of native species and habitat conditions in invaded ecosystems; conducting research on invasive species; developing technologies to prevent introduction and provide for environmentally sound control of invasive species; and promoting public education on invasive species. In addition, the Order instructs agencies

not to authorize, fund, or carry out actions that it believes are likely to cause the introduction or spread of invasive species. In carrying out this Order, the Corps and other federal agencies must ensure that compensatory mitigation activities do not establish new populations of invasive species or facilitate the spread of existing populations. EO 13112 can be found at http://www.invasivespeciesinfo.gov/laws/execorder.shtml

Federal Guidance on the Use of In-Lieu-Fee Arrangements for Compensatory Mitigation Under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 (65 FR 66914-66917, November 7, 2000)

This multi-agency (Corps, EPA, USFWS, and NMFS) guidance establishes federal policy on the use of in-lieu fee (ILF) arrangements for compensatory mitigation for adverse impacts to wetlands and other aquatic resources. The goal of the guidance is to clarify the manner in which in-lieu fee mitigation may be used to serve as an effective and useful approach for satisfying compensatory mitigation requirements and in helping to meet federal government's goal of no overall net loss of wetlands. This guidance continues a discussion started in the 1995 federal mitigation banking guidance (see above) by outlining the circumstances under which ILF mitigation can be used and remain consistent with existing federal regulations and policy. This guidance also establishes federal policy on planning, establishing, and using ILF arrangements. This policy is very similar to that applied to mitigation banking. The guidance can be found at http://www.epa.gov/owow/wetlands/pdf/inlieufee.pdf.

US Army Corps of Engineers/EPA Memorandum to the Field: Guidance on Compensatory Mitigation Projects for Aquatic Resource Impacts Under the Corps Regulatory Program Pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 (Regulatory Guidance Letter 02-02, December 24, 2002)

Regulatory Guidance Letter (RGL) 02-02 was developed to improve the success of compensatory mitigation and help meet the national goal of "no net loss" of wetlands. The RGL also responded to the 2001 National Research Council/National Academy of Sciences report on mitigation in the Corps Regulatory Program. RGL 02-02 provides guidance intended to improve the planning, construction, monitoring, and enforcement of mitigation projects. The RGL will help the Corps' meet its goal of no overall net loss of wetlands by improving the quality of wetland mitigation required as conditions of Corps permits. The RGL focuses on using a landscape-scale approach, requiring wetland mitigation that addresses the ecological needs of watersheds, and ensuring the protection of wetlands and other aquatic areas established as compensatory mitigation. RGL 02-02 can be found at http://www.usace.army.mil/inet/functions/cw/hot_topics/RGL_02-2.pdf.

National Wetlands Mitigation Action Plan (December 24, 2002)

In conjunction with the release of Regulatory Guidance Letter 02-02, the Corps and other federal agencies jointly issued the National Wetlands Mitigation Action Plan (NWMAP) on December 24, 2002. The NWMAP is a comprehensive set of actions that federal agencies are undertaking to improve the ecological success of compensatory mitigation under the Clean Water Act and related programs, and to help ensure the effective restoration and protection of our nation's wetlands.

The NWMAP was developed in response to studies by the National Academy of Sciences and General Accounting Office that concluded that the national goal of no net loss of wetlands was not being met for wetland functions through compensatory mitigation. Action items in the NWMAP include clarifying current mitigation policy on such issues as the use of in-kind vs. out-of-kind mitigation, the use of on-site vs. off-site mitigation, and the use of preservation and vegetated buffers as mitigation; integrating compensatory mitigation into a landscape context; improving data collection and availability; building a national database to more effectively track the success of mitigation projects; and developing performance standards that better measure the success of mitigation at replacing lost aquatic functions. Go to the following website for more information: http://www.mitigationactionplan.gov.

Guidance for the Establishment, Use, and Operation of Conservation Banks (May 2, 2003)

In a memorandum the U.S. Department of the Interior's Fish and Wildlife Service issued guidance on establishing, using, and operating conservation banks. This federal guidance, which closely parallels the 1995 federal mitigation banking guidance, discusses the relationship between mitigation and conservation banking and establishes criteria for developing and using a conservation bank, including provisions for long-term management, monitoring, and a detailed conservation bank agreement. In essence, conservation banking transfers the mitigation banking concept to endangered and threatened species conservation.

In contrast to mitigation banks, which typically offset adverse impacts to wetlands and other aquatic resources, conservation banks, also known as habitat banks, offset adverse impacts to natural resources that are typically associated with species listed under the Endangered Species Act. The natural resources associated with conservation banks are not necessarily aquatic in nature. Like mitigation banks, conservation banks represent a market-based approach to implementing high-quality, larger-scale, mitigation projects that are permanently protected. The memorandum can be found at http://www.fws.gov/endangered/policies/conservation-banking.pdf.

State Laws and Rules

State Water Pollution Control Act (Chapter 90.48 RCW)

The State Water Pollution Control Act directs Ecology to protect state water quality by controlling and preventing the pollution or degradation of streams, lakes, rivers, ponds, inland waters, salt waters, water courses, and other surface and underground *waters of the state of Washington*. The law directs Ecology to establish water quality standards that will uphold the state's water quality. A certification issued under § 401 of the Clean Water Act reflects the state's determination that a project approved by the Corps complies with state water quality standards and other appropriate requirements of state law (see Clean Water Act).

The state utilizes its authority under the Water Pollution Control Act to review and authorize projects that will result in the alteration or loss of isolated wetlands and other waters of the state that are not within Corps jurisdiction (see Section 3.3, *What Type and*

Size of Wetlands Are Present?). Also, refer to Ecology's focus sheet on isolated wetlands found in Appendix F.

Ecology's regulation of wetlands, including isolated wetlands, ensures that projects are in compliance with the State Water Quality Standards (Chapter 173.201A WAC). The State Water Quality Standards consist of three main elements:

1. Characteristic uses of surface waters;
2. Numerical criteria for conventional water quality parameters that are not to be exceeded (Chapter 173-201A-130 WAC); and
3. An antidegradation policy (Chapter 173.201A.260[3]h WAC).

As discussed in the Ecology publication, *Water Quality Guidelines for Wetlands: Using the Surface Water Quality Standards for Activities Involving Wetlands* (Ecology publication # 96-06, http://www.ecy.wa.gov/pubs/9606.pdf), the antidegradation section of the water quality standards is the primary means used to protect water quality in wetlands. Specific numeric criteria for wetland water quality are difficult to establish, hence they are not generally used.

Antidegradation Policy (Chapter 173.201A.300 WAC)

The implementing rules for the state Water Pollution Control Act (Chapter 90.48 RCW) contain an antidegradation policy (Chapter 173-201A-300 WAC) that applies to human activities which may impact state water quality. The purpose of the antidegradation policy is to restore and maintain the quality of the surface waters of Washington and ensure that all human activities which may degrade the water quality "at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment." The policy calls for three levels of protection for surface waters:

- Tier I is used to ensure existing and designated uses are maintained and protected and applies to all waters and all sources of pollution. "No degradation may be allowed that would interfere with, or become injurious to, existing or designated uses, except as provided for in this chapter" (Chapter 173-201A-310 WAC).
- Tier II is used to ensure that waters of a higher quality than the criteria assigned in this chapter are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.
- Tier III is used to prevent the degradation of waters formally listed in this chapter as "outstanding resource waters," and applies to all sources of pollution.

The antidegradation policy establishes the bottom line for water quality protection in the state: "Existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed." Beneficial uses are more or less equivalent to wetland "functions and values" and therefore include: water supply; surface and groundwater treatment; stormwater attenuation; fish and shellfish migration, rearing, spawning, and harvesting; wildlife habitat; recreation; support of biotic diversity; and aesthetics.

Applying the water quality standards to wetlands means that all existing beneficial uses (or functions and values) of wetlands cannot be lost, and if wetland impacts are unavoidable, the loss of beneficial uses must be adequately replaced (compensated).

Shoreline Management Act (Chapter 90.58 RCW)

The Shoreline Management Act (SMA) of 1971 was enacted to protect the State's shorelines and the reasonable uses of those shorelines. The Shoreline Management Act states that the intent of the act is to "provide for the management of the shorelines of the state by planning for and fostering all reasonable and appropriate uses" of those shorelines (Chapter 90.58.020 RCW). Uses identified in the SMA include state interests, preserving the natural character of the shoreline, protecting the resources and ecology of the shoreline and public access. State shorelines include shorelines of lakes over 20 acres in size and rivers and streams with flows greater than 20.0 cubic feet per second (cfs). State wetland jurisdiction under the SMA is limited to uplands and wetlands within 200 feet of the shoreline and wetlands that are associated with regulated water bodies. Associated wetlands can be located beyond the 200-foot zone if they influence or are influenced by the SMA-regulated water body. The SMA also requires local governments to adopt shoreline master programs to protect the state's shorelines (see Shoreline Master Program).

Growth Management Act (Chapter 36.70A RCW)

The Growth Management Act (GMA) adopted in 1990 and amended in 1991 requires local governments to designate and protect *critical areas*, which include wetlands. Local governments must use best available science (BAS) when reviewing and revising policies and regulations for critical areas (Chapter 36.70A.172 RCW). Ecology provides technical assistance to local governments under GMA. Requirements for wetland protection standards, buffers, and wetland mitigation vary from jurisdiction to jurisdiction, so you need to contact your local planning and development services department to get information on local requirements for projects involving wetlands. The Department of Community, Trade and Economic Development (CTED), a state agency, is another resource for information on local rules affecting wetlands (see Appendix C, *Agency Contacts*).

Hydraulic Code (Chapter 77.55.100 RCW)

This law, passed in 1949, is intended to protect fish from harm in all marine and fresh waters of the state. This law is implemented through a permit called the Hydraulic Project Approval (HPA) and administered by the Washington Department of Fish and Wildlife. The permit is required for any project that will "use, divert, obstruct or change the natural flow or bed of any of the salt or fresh waters of the state." While not directly intended to protect wetlands, the HPA is required for any work that affects the bed or flow of state waters including all work within the mean higher high water line in salt water or within the ordinary high water line in fresh water, which often includes wetlands. For more information on the HPA go to http://wdfw.wa.gov/hab/hpapage.htm..

Forest Practices Act (Chapter 76.09 RCW)

This law and its implementing regulations (Chapter 222 WAC) apply the wetland provisions of the federal Clean Water Act and Washington State Water Pollution Control Act (Chapter 90.48.425 RCW) to state and private forest lands. Section 8 of the Forest Practices Manual

(Chapter 222 WAC) contains an abbreviated wetland delineation manual. Prohibitions or restrictions for timber harvest along streams and within wetlands and their buffers are detailed in the Forest Practices Manual. For more information on forest practices go to http://www.dnr.wa.gov/forestpractices/index.html.

Aquatic Lands Act (commonly referred to as such) (Chapter 79.90-79.96 RCW)

These statutes define the Washington Department of Natural Resources (WDNR) responsibility to manage state-owned aquatic lands and include authorizing the use of these lands for a variety of activities, which can include wetland mitigation projects. Projects proposed on state aquatic land may require separate authorization from WDNR. Chapters 79.90 – 79.96 RCW were not passed under the term "Aquatic Lands Act." However, the sections all relate to the management of state-owned aquatic lands and have become commonly referred to as such.

State Environmental Policy Act (Chapter 43.21C RCW)

The Washington State Environmental Policy Act (SEPA) provides a way to identify environmental impacts that might result from state and local government decisions, such as issuing permits for private projects, constructing public facilities, or adopting regulations, policies, or plans. Information provided for the SEPA review process helps state and local government decision-makers, applicants, and the public understand how a proposal would affect the environment. This information can be used to revise a proposal to reduce likely environmental impacts, to condition the proposal so that impacts are mitigated, or to deny a proposal when adverse environmental impacts cannot be mitigated.

Wetlands Mitigation Banking Act (Chapter 90.84 RCW)

This law articulates the state's policy to support wetland mitigation banks as an important tool for compensating for wetland losses. The law directs Ecology to develop rules for a statewide certification process to ensure that approved wetland banks are environmentally sound and the process is predictable for applicants. Ecology has completed a draft bank certification rule, which currently provides guidance on developing wetland banks in Washington (see DRAFT State Wetland Banking Rule). For more information on the status of the rule go to the Ecology Wetland Mitigation Banking Home Page at http://www.ecy.wa.gov/programs/sea/wetmitig/index.html.

Wetland Delineation Manual (Chapter 36.70A.175 RCW, Chapter 90.58.380 RCW, Chapter 173.22.080 WAC)

The state legislature passed a law in 1995 directing Ecology to "adopt a manual for the delineation of wetlands under this chapter that implements and is consistent with the 1987 manual in use on January 1, 1995, by the Corps of Engineers and the Environmental Protection Agency" (Chapter 90.58.380 RCW). Ecology has adopted a Washington State Wetland Identification and Delineation Manual (Chapter 173.22.080 WAC), which includes clarifying guidance from the Corps and EPA. This state manual is required to be used by all state agencies in the application of any state laws and regulations. Cities and counties must also use the state manual in the implementation of any regulations under the Growth Management Act (Chapter 36.70A.175 RCW). See GMA above. See also Section 3.2, *Do*

You Have a Wetland Present? The wetland delineation manual can be found at http://www.ecy.wa.gov/biblio/9694.html (Ecology 1997).

Aquatic Resources Mitigation Act (Chapter 90.74 RCW)

The Aquatic Resources Mitigation Act articulates the state's policy related to the mitigation of wetlands and aquatic habitat for infrastructure development. The law states "The practice of considering traditional on-site, in-kind mitigation may provide fewer environmental benefits when compared to innovative mitigation proposals that provide benefits in advance of a project's planned impacts and that restore functions or habitat other than those impacted at a project site; and regulatory decisions on development proposals that attempt to incorporate innovative mitigation measures take an unreasonable long period of time and are subject to a great deal of uncertainty and additional expenses." Therefore, the law directs state regulatory agencies to authorize innovative mitigation measures for infrastructure projects (i.e., Ecology and the Washington Department of Fish and Wildlife should consider mitigation proposals that are "timed, designed, and located in a manner to provide equal or better biological functions and values compared to traditional on-site, in-kind mitigation proposals"). The state's Alternative Mitigation Policy is consistent with the above-mentioned directives of this law.

State Policies and Guidance

Governor's Executive Order 89-10, Protection of Wetlands (December 1989)

This executive order, signed by Governor Booth Gardner, established an interim goal "to achieve no overall net loss in acreage and function of Washington's remaining wetlands base," and a long-term goal of increasing acreage and function of the state's wetland resources. Further, the order directed Ecology to develop guidance that would "lessen the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands" (see Section 6.1.1, *No Net Loss*).
http://www.governor.wa.gov/actions/orders/eoarchive/e089-10.htm

Governor's Executive Order 90-04, Protection of Wetlands (April 1990)

This executive order, signed by Governor Booth Gardner, directed all state agencies to use their existing authorities to protect wetlands. In particular, the order directed state agencies to use their SEPA authorities "to the extent legally permissible, to require mitigation of wetland impacts for all agency actions affecting wetlands." Executive Order 90-04 also defines mitigation and directs state agencies to implement the process of mitigation in sequential order (see Section 3.5.1, *Mitigation Sequencing*).
http://www.governor.wa.gov/actions/orders/eoarchive/e090-04.htm

Alternative Mitigation Policy Guidance for Aquatic Permitting Resources (February 2000)

Washington State's Alternative Mitigation Policy Guidance describes how the Departments of Ecology and Fish and Wildlife implement their policies regarding mitigation for aquatic resources. The policy guidance was developed through a cooperative effort between the Washington departments of Community Trade and Economic Development, Ecology, Transportation, and Fish and Wildlife, and interested Tribes as directed under the Salmon

Recovery Act, Chapter 75.46 RCW. The Alternative Mitigation Policy provides guidance on the factors and preferences used by each agency in determining when alternative mitigation options are preferable to on-site and in-kind compensation. The Alternative Mitigation Policy Guidance is consistent with the requirements under the state's Aquatic Resources Mitigation Act (Ch. 90.74 RCW). This guidance can be found at http://www.ecy.wa.gov/biblio/0306007.html.

DRAFT State Wetland Banking Rule (January 2001)

Ecology published its draft rule for a certification program for wetland mitigation banks pursuant to the Wetlands Mitigation Banking Act (Ch. 90.84 RCW). Although the rule was withdrawn prior to its adoption, Ecology uses it as its primary guidance for the review of wetland bank proposals. The draft rule outlines the review and approval process for mitigation banks, and provides technical guidance on designing and constructing a wetland mitigation bank. The draft state rule is consistent with the 1995 federal guidance for wetland mitigation banks.

In July 2004, the department started implementation of a pilot rule project to test the implementation of the draft bank certification rule. Check the Ecology Wetland Banking Home Page for the most recent information on the status of the bank certification rule. http://www.ecy.wa.gov/programs/sea/wetmitig/index.html.

Local Laws and Rules

Local governments also play an important role in protecting and managing wetlands. They are responsible for administering certain state laws as well as their own wetland protection programs and requirements. As always contact your local government for specific information on local requirements and standards prior to conducting any work in wetlands, streams, or other water bodies.

Critical Area Ordinance

Under the Growth Management Act, local governments (cities, towns, and counties) are required to identify *critical areas*, including wetlands and adopt ordinances protecting those areas. A Critical Area Ordinance (CAO), which is adopted by a local government, specifies the permit requirements and standards for wetland protection that will be employed in that particular jurisdiction.

Shoreline Master Program

The Shoreline Management Act (SMA, Chapter 90.58 RCW) directs local governments to develop shoreline master programs in order to protect the state's shorelines. Shoreline jurisdiction extends a minimum of 200 feet from the ordinary high water mark (OHWM) of a state shoreline. Under the SMA, wetlands that are associated with a shoreline area are regulated, even when they extend beyond 200 feet from the OHWM. Most shoreline master programs require the protection of a buffer in addition to protecting the wetland itself. Projects proposed in the shoreline zone must be consistent with the approved master plan or the applicant must apply for a variance. Consult with the local shoreline administrator for specific situations.

Appendix F - Isolated Wetlands - Changes in the Regulatory Process

This appendix includes a Focus Sheet developed by Ecology to help clarify the regulatory process for isolated wetlands. This document was published in 2001 (Ecology Publication #01-06-020). Some of the information provided in the Focus Sheet has since become out-of-date. The text has been modified to provide up-to-date information (edits are shown in *italics* and ~~strikethrough~~).

Focus

Isolated Wetlands Changes in the Regulatory Process

Supreme Court Decision

A U.S. 2001 Supreme Court decision ~~last January~~ regarding how wetlands are regulated has generated a lot of questions by landowners and developers.

The court ruled that the federal Clean Water Act does not apply to those "isolated" wetlands where the only interstate commerce connection is use by migratory birds. This ruling overturned 15 years of regulation of isolated wetlands by the U.S. Army Corps of Engineers. While the court did not define the term "isolated," the Corps ~~has previously considered~~ *generally considers* isolated wetlands to be those that are not adjacent to or ~~connected via surface water~~ *do not have a sufficient hydrologic connection* to a navigable water body, such as a river, lake or marine waters.

Changes in Regulatory Process

Based on the Supreme Court's ruling, federal agencies no longer have regulatory oversight of these important environmental resources. More specifically, landowners no longer need a permit from the U.S. Army Corps of Engineers to fill in most isolated wetlands - although a Corps permit is still required for isolated wetlands with other interstate commerce use (recreation, industrial, etc.) as well as wetlands that are connected to a navigable water body. *Corps policy regarding the definition and regulation of isolated wetlands is currently in flux, and future court or administrative decisions may further change how isolated wetlands are regulated by the federal government*.[46]

However, the Supreme Court ruling did not change Washington state laws on wetlands. The state Clean Water Act (90.48 RCW) makes no distinction between types of wetlands. Rather, all "waters of the state" are covered by the law, and isolated wetlands are considered waters of the state.

It's not always easy to tell if a wetland is isolated. Landowners who want to develop an isolated wetland should contact the Corps of Engineers and request a formal jurisdictional determination to avoid any future legal problems and fines.

Why Regulate Isolated Wetlands?

Isolated wetlands in Washington perform many of the same important environmental functions as other wetlands, including recharging streams and aquifers, storing flood waters, filtering pollutants from water, and providing habitat for a host of plants and

46 Check the following web pages for updates http://www.ecy.wa.gov/programs/sea/pac/iso-wetlands.html or via the Corps regulatory web page at http://www.nws.usace.army.mil/ (Regulatory, WAters & Wetlands Information).

animals. Many wildlife species, including amphibians and waterfowl, are particularly dependent on isolated wetlands for breeding and foraging.

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- Any project that calls for filling or altering a wetland determined by the Corps to be isolated will still be subject to regulation by the state. The state's process for reviewing projects that involve isolated wetlands will be different from the 401 Water Quality Certification process that is triggered by the Corps' 404 permit. Rather, Ecology will use administrative orders to regulate projects that will have impacts to isolated wetlands. The standards of review will remain the same as under 401 water-quality certifications - that is, the state water-quality standards for surface waters (WAC 173-201A). Anyone who wants more information about the review standards should obtain the following two publications: Water Quality Guidelines for Wetlands, Publication # 96-06, ~~and How Ecology Regulates Wetlands, Publication #97-112~~. This can be obtained by contacting Jean Witt at 360-407-7472.

  To seek an administrative order for a project that involves isolated wetlands, landowners should contact the ~~Permit Assistance Center~~ *Office of Regulatory Assistance* at the Department of Ecology, where our staff will guide you through the regulatory process. The phone number is 800-917-0043 or 360-407-7037, and the e-mail address is ecypac@ecy.wa.gov.

GMA Regulations

Additionally, applicants should be aware that isolated wetlands in Washington also are regulated under the state's Growth Management Act. Thus, projects with impacts to isolated wetlands typically will require approval from the applicable city or county.

Appendix G - Analyzing the Functions of Wetlands: An Overview of Methods

Wetland "assessment" methods are used to identify, characterize, or measure wetland functions, and in some cases, social values (Bartoldus 1999). An assessment of the functions performed by a wetland is often required when impacts to that wetland will result from a change in land use. The level of analysis depends upon the type, severity, and extent of the proposed impacts such that the detail necessary will be commensurate with the impacts.

A number of methods have been developed to assess wetland functions in Washington and across the U.S. A list of the methods for analyzing functions that were either specifically developed to analyze wetlands in Washington or are commonly used in the state can be found below. A brief description of each method, its advantages, limitations, and recommended uses are provided. For a list of tools developed to assist with analyses of wetlands at a landscape scale, refer to Appendix 5-b, *Wetlands in Washington State: Volume 2* (Granger et al. 2005).

Overview of Methods that Analyze Functions

The **types of methods** that analyze wetland functions include those that provide:

- Semi-quantitative results (for example, WFAM).
- Qualitative results (for example, Rating System, WSDOT Linear Method, SAM).

In general, more rapid methods produce more qualitative results.

Methods are more appropriate when developed or adapted for:

- The specific geographic area (for example, the Pacific Northwest).
- The appropriate domain or region (for example, the Columbia Basin of eastern Washington).
- The appropriate wetland type (for example, depressional vs. riverine wetlands).

The following is a **list of methods that were developed for Washington wetlands or are commonly used in the state**.

- Washington wetland function assessment methods (WFAM).
- Wetland rating systems for eastern and western Washington (Hruby 2004a and 2004b).
- Wetland Functions Characterization Tool for Linear Projects (Null 2000).
- Semi-Quantitative Assessment Methodology (SAM) (Cooke 2000).
- Wetland Evaluation Technique (WET) (Adamus et al. 1987).

- Wetland Values: Concepts and Methods for Wetlands Evaluation (Reppert).
- Proper Functioning Condition for Lentic Areas (PFC) (Pritchard 1999).
- Best Professional Judgment (BPJ).

A description of the hydrogeomorphic approach (HGM) is also provided at the end of this appendix.

Which Method Should I Use to Analyze Functions?

Most projects involving impacts to wetlands will, at some level, be required to describe the functions provided by that wetland. As a minimum, the agencies usually require that an analysis of functions be performed using a rating system. An applicant will generally be requested to apply the wetlands rating system for western or eastern Washington (see description below) to determine the category of the wetland and how well it performs three basic functions (improving water quality, reducing flooding and erosion, and the potential to provide habitat for many species). The rating system also helps determine if particular features or situations of concern exist at the site, such as the presence of a mature forest. However, a more thorough assessment of functions may be needed when wetland impacts will be significant. In such cases the agencies may request that an applicant complete an assessment using the wetland function assessment methods for Washington State, if the wetland is in one of the classes for which a method has been developed (see description of WFAM below).

Best professional judgment (BPJ) is recommended for use on relatively small (generally < 1/4 acre) wetland impacts where more intensive analysis is not warranted. When used, it is necessary to provide written documentation of the rationale used to decide the level of function provided by the wetland. For projects with minimal impacts the applicant may not be required to assess functions[47].

The agencies will also usually request some assessment of level of function performed by compensation wetlands. This is particularly true in the case of enhancement. When an applicant proposes to enhance wetlands, a baseline function assessment is required. In order to determine how much of an increase in functions has been attained, the level of functions provided by the wetlands being enhanced must be assessed prior to any enhancement activities taking place. An assessment of functions may be required as part of the project's performance standards to determine whether a compensation project has provided the required increase in the performance of functions.

47 Impacts which do not require pre-notification to the Corps are not likely to require assessments of wetland function. Applicants are advised to contact the Corps if you have any questions.

Brief Description of Methods and their Recommended Uses

Washington State Wetland Function Assessment Methods (WFAM)

Hruby, T, S. Stanley, T. Granger, T. Duebendorfer, R. Friesz, B. Lang, B. Leonard, K. March, and A. Wald. 2000. Methods for Assessing Wetland Functions, Volume II: Depressional Wetlands in the Columbia Basin of Eastern Washington. Parts I and II. Washington State Department of Ecology Publication #00-06-47 and#00-06-48. Olympia, WA.

Hruby, T., T. Granger, K. Brunner, S. Cooke, K. Dublanica, R. Gersib, L. Reinelt, K. Richter, D. Sheldon, E. Teachout, A. Wald, and F. Weinmann. 1999. Methods for Assessing Wetland Functions, Volume I: Riverine and Depressional Wetlands in the Lowlands of Western Washington. Parts I and II. Washington State Department of Ecology Publication #99-115 and #99-116. Olympia, WA.

The methods can be found at http://www.ecy.wa.gov/programs/sea/wfap

*Methods for Assessing Wetland Function*s, commonly called the Washington State Wetland Function Assessment Methods (WFAM), are a collection of *assessment* methods developed by interdisciplinary teams of experts and published by Ecology. Unlike rating systems which categorize wetlands using information about basic functions, the assessments provide a score for the degree to which several functions (up to 15) are performed by a wetland. The methods are based on the hydrogeomorphic (HGM) classification for wetlands.

Advantages

- Relatively rapid for the scientific rigor of the assessments that are needed.
- Provides a numeric expression of the level of performance of wetlands in regard to their potential to perform and their opportunity to perform numerous functions.
- Developed for specific areas in Washington and for specific wetland types.
- Peer reviewed and field tested in the area for which they were developed.
- Results are reproducible to +10%, especially with training.

Limitations

- Large, structurally complex sites may require a few days to complete an assessment.
- Site visits at different times of the year may be necessary to accurately determine the water regime (e.g., the length and extent of inundation).
- Specific training in the application of WFAM is required before one uses it for regulatory purposes.
- WFAM are lacking for specific wetland types. Methods do not exist for riverine wetlands in eastern Washington, any montane areas, or any slope, tidal, or interdunal wetlands.

- Numeric results may be misused to assume scores are continuous functions rather than discrete integers.
- It is not possible to make a direct quantitative comparison between the levels of wetland functions at sites with different HGM subclasses.

Recommended Uses

- Projects involving significant wetland impacts in terms of size (e.g., >2 acres) or estimated level of performance of the wetland.
- Determine if functions lost to impacts have been adequately replaced in compensatory mitigation. (Note: It is not recommended to detect small changes in functions.)

Washington State Wetlands Rating Systems

Hruby, T. 2004. Washington State Wetland Rating System for Eastern Washington – Revised. Washington State Department of Ecology Publication #04-06-015. Olympia, WA. http://www.ecy.wa.gov/biblio/0406015.html

Hruby, T. 2004. Washington State Wetland Rating System for Western Washington – Revised. Washington State Department of Ecology Publication #04-06-025. Olympia, WA. http://www.ecy.wa.gov/biblio/0406025.html

The wetland rating systems for eastern and western Washington are technically characterizations that group wetlands based on sensitivity, rarity, functions, and other criteria including the performance of basic functions.

Advantages

- Designed to categorize wetlands into one of four groups which allow agencies/local governments to determine how the wetlands should be protected and managed.
- Rapid and relatively easy to perform; the vast majority of sites can be rated within 1 to 2 hours in the field.

Limitations

- Not a quantitative assessment of functions, but a characterization.
- May oversimplify the performance of functions by lumping groups of functions in the scoring. This means that the information provided may not be adequate to protect individual functions.

Recommended Uses

- Determine into which category a wetland is grouped, often for regulatory purposes to determine buffer widths and ratios for compensatory mitigation.
- May provide sufficient characterization of potential functions for impacts to small (e.g., <1 acre), degraded wetlands when determining needs for compensation.

Wetland Functions Characterization Tool for Linear Projects

Null, W., G. Skinner, and W. Leonard. 2000. Wetland Functions Characterization Tool for Linear Projects. Washington State Department of Transportation Environmental Affairs Office, Olympia, WA. http://www.wsdot.wa.gov/environment/biology/docs/bpjtool.pdf.

This method is also a characterization. Washington State Department of Transportation adapted this method for Washington to meet their specific needs for assessing wetland impacts along linear projects. It uses a list of criteria for each function to guide decision-making. It relies on professional judgment regarding the likelihood that the function is being performed.

Advantages

- Provides documentation of the criteria and rationale used when applying best professional judgment to analyze functions.
- Can be very rapid when used by trained wetland professionals.
- Can also be used to characterize a portion of a larger wetland when a wetland exists on multiple properties and access to all parts of the wetland is restricted.
- Based on WFAM, which corresponds to "best available science."

Limitations

- Cannot determine the level at which a function may be performed to plan compensatory mitigation.
- This method should not be used to measure change over time or as the result of alterations (e.g., impacts or mitigation).
- Method is subjective and results may vary significantly based on the experience and expertise of the user.

Recommended Uses

- Rapid screening of many wetlands to determine best areas for development or roads.

Semi-Quantitative Assessment Methodology (SAM)

Cooke Scientific Services Inc. 2000. Wetland and Buffer Functions Semi-quantitative Assessment Methodology (SAM). Final Working Draft User's Manual. Cooke Scientific Services Inc. Seattle, WA. This method has not been published but is available on the web at http://www.cookescientific.com/sam.htm

Although SAM is in wide use, better tools have been developed more recently. The WFAM method is much more accurate in its ability to characterize the functions and their

performance in wetlands and should be used in its place, especially for larger (> 1 acre) wetlands.

SAM provides a rapid method for *rating* various wetland attributes, including functions, with high, medium, and low rating.

Advantages

- Easy to use and requires no specific training (some knowledge of wetland ecology would obviously be beneficial).
- Reproducible between users.
- Developed for western Washington.

Limitations

- Provides very general information.
- "Low" ratings miss many site-specific details that are important for protection and management.
- Allocates high ratings to large, rural, undisturbed wetlands, while smaller wetlands in urban areas rate lower.
- Should not be used for wetlands east of the crest of the Cascade Mountains.

Wetland Evaluation Technique (WET)

Adamus, P.R., E.J. Clairain, Jr., R.D. Smith, and R.E. Young. 1987. Wetland evaluation technique (WET), Volume II: Methodology. Department of the Army, Waterways Experiment Station, Vicksburg, MS. NTIS No. ADA 189968.

WET is a rating method that was developed in the late 1980s by the U.S. Army Corps of Engineers in cooperation with Paul Adamus. WET was designed to be applicable to all wetland types throughout the contiguous U.S. For this reason it is not specific to wetland conditions in Washington and therefore provides only general information about functions. WET is no longer recommended for use in Washington's wetlands. Better tools have been developed more recently.

Wetland Values: Concepts and Methods for Wetlands Evaluation (often called the Reppert method after the author)

Reppert, R.T., W. Sigleo, E. Stakhiv, L. Messman and C. Beyers. 1979. Wetland Values: Concepts and Methods for Wetland Evaluation. U.S. Army Corps of Engineers, Institute for Water Resources. Fort Belvoir, Virginia.

Published in 1979, this was one of the first methods developed to help determine how wetlands function. It is a *rating* that groups wetlands into high, medium, or low based on "functional values." This method is no longer recommended for use in Washington's wetlands. Better tools have been developed more recently.

Proper Functioning Condition for Lentic Areas (PFC)

Prichard, D., C. Bridges, R. Krapf, S. Leonard, and W. Hagenbuck. 1999. Riparian Area Management: Process for Assessing Proper Functioning Condition for Lentic Riparian-Wetland Areas. TR 1737-11. Bureau of Land Management, BLM/SC/ST-94/008+1737, Service Center, CO. 37 pp.

PFC is a qualitative method to *characterize* streams, riparian areas, and riparian wetlands. It was developed by the Bureau of Land Management to assess how well the physical processes in these areas are functioning.

Advantages

- Provides good information for designing restoration of riparian wetlands.

Limitations

- Correct application of this method requires an interdisciplinary team of experts.
- Does not separate wetlands from the rest of the riparian resources.
- Primarily for riparian wetlands.
- Not an assessment that can be used independently to rate, characterize, or assess wetlands and their functions.

Recommended Uses

- Could be useful in combination with other assessment methods.
- For wetlands that are "functional - at risk" or "non-functional" the methods can help to identify what is lacking (vegetation, soil, water) and may provide guidance on the likelihood of improving the condition and what actions could be taken to improve the condition.

Best Professional Judgment (BPJ)

Application of BPJ is the most common method used to determine the functions that a wetland provides. Application of this method requires that a wetland professional decide how well a wetland performs functions based on his/her own experience or knowledge.

Most methods are based to some degree on the best professional judgment of the individuals or the teams of individuals who developed them.

Advantages

- Can be very rapid.
- If the expert has local knowledge, the information on functions may be very specific to the region and wetland type.

Limitations

- Not reproducible. Reliability of results varies greatly with expertise.
- Can't track the criteria used to base the judgment unless they are carefully recorded.
- Easier to be biased in regard to functions for which the expert has more knowledge.

Recommended Uses

BPJ may be used in analyzing functions for small impacts where more intensive analysis is not warranted. BPJ should also be used in concert with other methods to help define and clarify the functional performance of wetlands, based on specific site conditions of the wetland and adjacent watersheds.

Hydrogeomorphic Approach (HGM)

Smith, D. R., Ammann, A., Bartoldus, C., and Brinson, M. M. 1995. An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices. Technical Report WRP-DE-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A307 121.

The HGM approach is not a method to assess, characterize, or rate wetlands. This approach has been developed by the U.S. Army Corps of Engineers to provide guidance on how to develop regional methods for analyzing functions. It was put forth by the Corps for use in Section 404 permitting. WFAM is based on many concepts in this approach. Other documents associated with this approach are available at: http://www.wes.army.mil/el/wetlands/hgmhp.html.

Appendix H - Examples of Compensation Actions and Their Relative Effectiveness

The amount of compensatory mitigation (mitigation ratio) that will be required is partially contingent upon the type of compensation being provided (see Section 6.5.2, Typical Ratios for *Compensatory Mitigation*). As discussed in Section 5.1.1, the distinction between rehabilitation and enhancement is not clear-cut and can be hard to understand. Actions that rehabilitate or enhance wetlands span a continuum of activities that cannot be defined by specific criteria and may overlap. Proposals that fall within the gray area between rehabilitation and enhancement will result in a mitigation ratio that lies between the ratios for rehabilitation and the ratios for enhancement. The ratios will be based on the ecological effectiveness of the proposed activities. Generally, more effective actions require lower ratios to adequately offset authorized impacts.

Applicants proposing to rehabilitate or enhance an existing wetland will therefore need to identify the specific actions to be performed and how they will improve wetland functions, environmental processes, or both. It is therefore more important for applicants to focus on the ecological effectiveness of the proposed mitigation activities (e.g., will processes be restored, or how much of a gain in functions will result) and put less emphasis on what the compensation action may be called.

Table H-1 below describes some of the actions that may be proposed for compensation. The table identifies how effective those actions may be in terms of gain in functions. The table was developed based on the best professional judgment of agency wetland staff that review and approve compensatory mitigation proposals.

Table H-2 provides some examples of actions that could be implemented on a proposed compensation site to address alterations or disturbances that have occurred in the past. Some of the actions are considered more effective while others are considered less effective. As with Table H-1, more effective actions would generally provide greater gains in the performance of functions and are more likely to be sustainable in the long term. In most cases, the more effective actions should be used.

Table H-1. Examples of compensation actions and their relative effectiveness

More Effective Actions (Greater performance of functions & sustainable)	Less Effective Actions (Lesser gain in function & may not be sustainable)
Restore water processes by reinstating subsurface/return flow for depressional & slope wetlands; tidal waters for estuarine wetlands; overbank flooding or flow-through from riverine source for riverine wetland.	Partially restore or incorrectly restore water flow and/or focus on enhancing the structure of the wetland area which may not be supported by the existing water regime (e.g., underplanting in existing scrub-shrub area).
Restore to hydrogeomorphic (HGM) class appropriate for landscape setting.	Create an atypical wetland or incorrect wetland class for landscape setting.
Remove stressors, such as water diversions, intensive agriculture, logging, clearing and grading, urban uses, and discharges from non-point sources.	No change to the stressors.
Design wetland mitigation in accordance with upslope or upstream processes present. In other words, don't design a wetland for amphibian habitat in a flashy urban hydrologic regime.	Design wetland mitigation based solely on the type of habitat or physical structure desired/proposed without consideration of the existing landform, HGM setting, or hydrologic processes.

Table H-2. Examples of alterations and the relative effectiveness of compensation actions to correct those alterations.

Site Alterations Due to Past Activities	Actions to Address Alterations or Disturbances on Areas Proposed as Compensation Sites	
Hydrologic alterations	More Effective	Less Effective
Diking	Remove dikes *(generally considered rehabilitation)*	Partial or no removal of dikes (may result in fish stranding)
Tiling	Break all tiles *(generally considered rehabilitation)*	Partial or no removal of tiles
Ditching	Plug all ditches *(generally considered rehabilitation)*	Partial or no removal of ditches
Channelization	Re-grade stream channel to proper curve amplitude and frequency and ensure that stream will flood over the bank (at approx 1.5 yr frequency) into adjoining floodplain (i.e. stream or river is not incised)	Stream or river remains incised and/or no overbank flooding occurs with redesign of channel
Stormwater Inputs	Treat and introduce as subsurface flow (i.e. infiltration through buffer)	Stormwater is treated but introduced as unregulated point source.
Weirs/Tide Gates	Remove	Lower outlet height without achieving natural hydroperiod of wetland (for tidal wetland fish stranding and flushing problems result; for riverine wetlands overbank flooding is limited)

Utilities - Pipelines, Sewers, Waterlines	Remove abandoned utilities or relocate active lines	Try to restore natural water regime by installing collars on subsurface utilities to prevent draining of water along utility line; or install subsurface permeable corridors to allow passage of water perpendicular to utility line (eliminates ponding on one side and less water out on the other) (reduced impact). No remediation
Soil alterations	**More Effective**	**Less Effective**
Tilling/Plowing	Stop tilling/plowing	Continue tilling and plowing (greatest impact)
Compaction of the Soil	Scarification and addition of organic material (mulch)	No measures except planting and grading (greatest impact)
Contamination of the Soil	Remove existing soils and replace with hydric soils	Contamination is not removed either through remediation or replacement of soils
Alteration of Soil/Surficial Geology	Maintain or restore natural soil and surficial geologic structure (e.g. impermeable layers, organic soils, recharge layers)	Puncture impermeable layers, excavate organic soils, put in impermeable layer (pond liner) in recharge area)
Vegetation alterations	**More Effective**	**Less Effective**
Removal of All Vegetation/Clear ing	Revegetate and install necessary erosion control measures (hydroseed, natural materials mulching, natural matting - no plastics) and control invasives preferably without herbicides.	Revegetate without control of invasive species. Under planting alone, insufficient maintenance of planted site
Grazing	Remove grazing/mowing and control invasives. May need to replant areas to "jump-start" succession process (evaluate site by site.)	Continue grazing, use controls and create buffer strips and fencing to limit erosion/sedimentation and access to flowing and open water (reduced impacts); or continue grazing with no restrictions (greatest impacts)
Mowing	Stop mowing, control invasive plants - same measures as above	Continue mowing but impose Best Mamagement Practices and other restrictions including buffer strips on stream/river edges and open water areas (reduced impacts); Continue mowing with no controls (greatest impacts).
Logging	Revegetate with scrub shrub & appropriate pioneer forest species (e.g. willow and cottonwood planted first followed with subsequent plantings of cedars and other conifers)	Revegetate with inappropriate species or inappropriate timing (plant later successional species immediately) (reduced impacts). No planting (greatest impacts but evaluate each site for best approach)