What Happens When No One is Watching?

Ecological and Institutional Considerations for the Long-Term Management of Compensatory Wetland Mitigation in the Western Washington Coastal Zone

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Abstract

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Once compensatory wetland mitigation projects meet their permit criteria they are expected to last in perpetuity and are presumed to be self-sustaining. However, once projects are beyond their period of regulatory obligation there is rarely any follow up to determine how the projects ultimately end up. Recently, federal mitigation guidance has introduced a long-term management requirement, recognizing that to presume projects will continue to be successful without any long-term care may be flawed. Between 1999 and 2002 the WA State Department of Ecology conducted a Wetland Mitigation Evaluation Study to evaluate the effectiveness of compensatory wetland mitigation across the state. Projects evaluated were all less than ten years old and were still within their period of regulatory obligation. This thesis research revisited a subset of the mitigation projects used in Ecology's study to explore what has happened to them ecologically and institutionally in the ten years since the study, and to identify what can be learned from those projects to inform long-term management practices.

Office and field investigations were performed for nine mitigation projects. Current ecological function of the sites was assessed and a functional comparison of the sites from 2002 to now was completed as well as a review of the institutional conditions surrounding the sites and their management. Relevance of the current site conditions to the overall intention of the mitigation are discussed and recommendations given for considerations to include in the development of long-term management guidance. This research shows that mitigation areas evolve over time due to both internal process and external influences and that once permit criteria are met, the ecological trajectory of sites does not necessarily match that of the mitigation design. Institutional consistency was found to be lacking among the mitigation sites investigated and transfer of long-term stewardship responsibility to a third party group is recommended to help improve long-term outcomes.

Acknowledgments

This research would not have been possible without the Washington State Department of Ecology Shorelands and Environmental Assistance Program wetlands staff who provided me with their data, expertise, equipment and support. Thank you for your time and for your trust in me throughout this process.

Thanks also to my committee who gave me free reign to develop and pursue a project I was passionate about.

Thanks to my parents who raised me to believe I could achieve whatever I set out to do. I have always followed my dreams because of your lead.

And thanks to Colleen who has been there to keep me sane through every step of this process and who now knows more about wetlands than she could ever have imagined possible!

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"However beautiful the strategy, you should occasionally look at the results"- Winston Churchill

1.0 INTRODUCTION

Wetlands are one of the most productive and valuable natural resources. They provide extensive ecosystem services to society, including flood control, water filtration and wildlife habitat. These functions and services, from which society derives significant benefit, make wetlands not only intrinsically valuable, but also one of the most economically valuable ecosystems in the world (Costanza et al. 1997). They are also one of the most threatened.

The history of wetland degradation in the United States is long and contentious. The Swamp Land Acts of the mid 1800s exemplify society's sentiment that wetlands were disease-ridden waste lands that were nothing but nuisances to society and hindrances to settlement. The Acts encouraged "reclaiming" wetlands by draining and filling to convert them to other, more "productive" uses, primarily agricultural. This mindset, and the policies that enforced it, continued for decades and contributed to the loss of over half of the wetlands thought to originally have existed in the United States between the 1780s and 1980s (Dahl 1990).

Eventually, societal attitudes began to shift, and with the passage of the Federal Water Pollution Control Amendments in 1972, amended again as the Clean Water Act (CWA) in 1977, the structure and extent of wetland laws greatly changed (Gardner 2011). From the 1980s on, the rate of wetland loss has been declining (Dahl 1990, 2000). A key component of the new regime of wetland regulation is the goal of "no net loss" of wetlands. The idea of no net loss was first introduced in 1987 at the National Wetlands Policy Forum and was subsequently adopted under President George H.W. Bush's administration (Conservation Foundation 1988). It has since been incorporated into the regulatory structure of wetland protection policy and is intended to provide a compromise between development and conservation needs.

The cornerstone of the no net loss policy goal is the concept of mitigation. Wetland mitigation in WA State is completed in a series of steps, referred to as “mitigation sequencing”. The first steps of this process are 1) avoidance and 2) minimization of impacts. Following avoidance and minimization, “compensatory mitigation” is the stage in mitigation sequencing where unavoidable impacts to wetland functions are offset. There are several kinds of compensatory mitigation including restoring, enhancing, preserving or creating wetlands to replace the functions of those lost or degraded through permitted activities (Washington State Department of Ecology [Ecology] et al. 2006).

Compensatory wetland mitigation projects are intended to survive in perpetuity, providing permanent compensation for the wetland functions lost to development, ultimately yielding no net loss of wetland function. While compensatory mitigation practices have greatly evolved over the last thirty years as the best available science regarding wetlands has improved and as society’s regard for the importance of wetlands has evolved, there has been little work done to look back at what has happened to the older compensatory mitigation projects that have already been completed. This research sets out to investigate this question under the premise that to move forward with developing new policy and to better plan for the long-term sustainability of wetland mitigation, there must first be an understanding of past results and what social and ecological factors contributed to them.

1.1 A Framework for Understanding Change

The long history of human induced wetland degradation in the U.S. exemplifies the strong relationship that exists between ecological and social systems in regard to wetlands and the mitigation of wetland impacts. Wetlands are complex and diverse ecosystems and it is difficult to quantify wetland function, though many tools have been developed over the years to attempt to do so. It is especially difficult to evaluate the tradeoff of those functions or, more importantly the ecological endpoint the functions achieve, with other goods, such as the development that results when a wetland is impacted. As early as 1900, in the case of *Leovy v. United States*, the U.S. Supreme Court was tasked with considering the value of wetland encumbered land in its natural condition versus its value in a developed state. In *Leovy*, the court determined that that wetlands would be worth sixty times more in agricultural production and the land was allowed, moreover encouraged, to be drained (Gardner 2011). Today, a deeper understanding of ecosystem services and the benefits wetlands provide society have greatly strengthened the case for wetland protection and changed the way we view the costs and benefits of development. A recent study that attempted to monetarily quantify ecosystem services in Puget Sound found that fresh water wetlands alone could be worth between approximately three and 15 billion dollars to Washington State's economy each year (in 2010 dollars) (Batker et al. 2010). However, such studies are still rare, controversial and are not generally applied to the day to day land use decisions affecting the development of wetlands. Because there is no widely accepted market driven price assigned to wetland ecosystem services, they are generally considered free goods and as such tend to be undervalued and overexploited (Weimer and Vining 2011).

While wetland functions and services themselves may be considered public goods, the land that makes up the wetland which provides such services can, in principle, be bought and sold as private property. When a property owner has the right to develop a wetland on his land, the ecosystem services it provides in effect becomes excludable as the property owner can chose to develop the wetland and cause others to lose the benefits of its ecological functions. Adding to this issue is the fact that wetlands, unlike some other natural resources, are not as obviously identifiable- or understood, to the untrained eye. Wetlands can in fact be dry for the majority of the year. While a stream or the Puget Sound shoreline are obviously recognizable, and generally accepted to be important features, wetlands can often look like nothing more than a muddy hole in a grassy field, and the true extent of the benefits they provide, both individually and cumulatively, are not readily apparent. Negative externalities result when the development of a wetland by a private property owner affects non consenting users through the loss of the wetland ecosystem services, whether they realize it or not (Weimer and Vining 2011). This provides justification for the regulatory intervention from the government.

The ownership and economic issues surrounding wetland use are but one illustration of the nature of the complex social-ecological system wetlands comprise. Compensatory mitigation lies at the intersection of the ecological and human components of the system (Figure 1). Once the laws were created to protect wetlands, a commitment was made to preserve the functions and services they provide to society. But the political, economic and social pressures that once prescribed wetland degradation still exist. Compensatory mitigation has been tasked with balancing the two needs and attempts to replicate the ecological patterns and processes of wetlands, while being heavily influenced by the social processes and patterns which ultimately dictate the requirements. The mitigation process lies at the interface of the system's social and ecological components, and attempts to balance the interactions of the two systems.

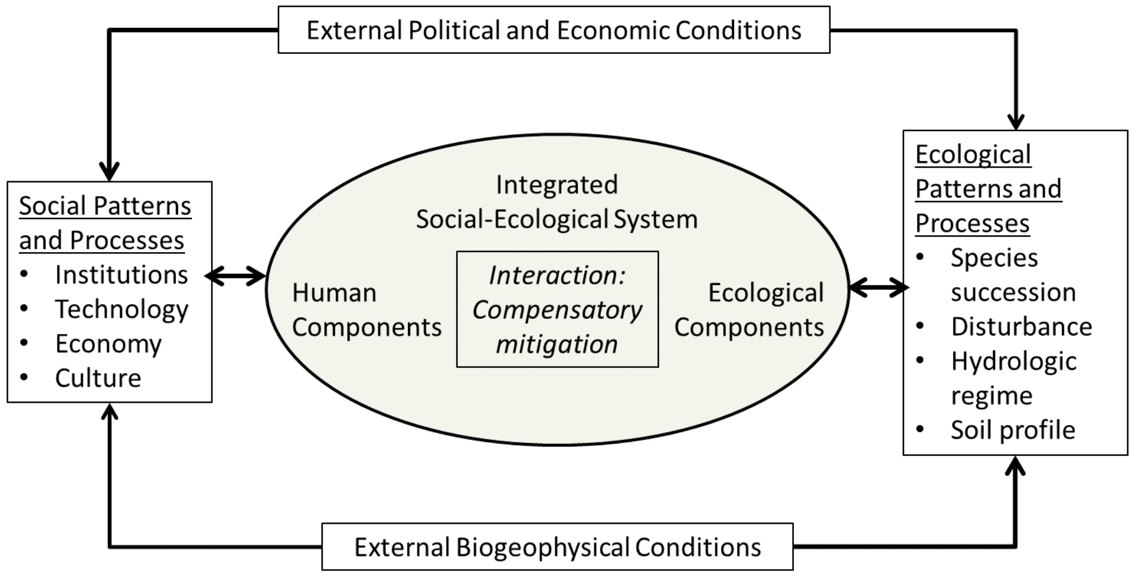

Figure 1. Conceptual Framework for Wetlands as a Social Ecological System
(Adapted and Modified from Redman et al. 2004)

It is prudent to have an understanding of how attitudes and policies regarding wetland use and protection, as well as wetland science, have changed over the years, in order to effectively move forward and plan for what may be to come in the future. However, the complexity of social-ecological systems makes managing them for any long-term, sustainable outcome particularly difficult (Walker et al. 2002). Forecasting the future of the system must consider both the ecological patterns and processes as well as the social reactions to, and manipulations of, those processes.

2.0 Background and Research Context

2.1 Current Structure of Compensatory Mitigation in WA State

Today the CWA still serves as the primary law governing wetland impacts in the United States. The wetland regulatory program is established under CWA Section 404 and is administered at the federal level primarily by the U.S. Army Corps of Engineers (Corps), in partnership with the U.S. Environmental Protection Agency (EPA).

Wetlands are also regulated at a state and local level. In Washington State, the Washington State Department of Ecology (Ecology) has authority to require and regulate compensatory wetland mitigation under the state Water Pollution Control Act, Hydraulic Code, Forest Practices Act, and Shoreline Management Act. Additionally, Section 401 of the Clean Water Act requires that activities permitted under Section 404 meet state water quality standards. Therefore, Ecology reviews all wetland permit applications received by the Corps for state Water Quality Certification. Ecology, together with EPA and the Corps, has developed interagency guidance for state specific mitigation policies. Additionally, under the state Growth Management Act (GMA) local governments are required to designate and protect critical areas, including wetlands. It is Ecology's role to provide the technical assistance to local governments to create and implement local wetland regulations in land use permitting decisions (Ecology, "Mitigation that Works", n.d.).

The size and type of a wetland dictate in part what type of impacts are allowed, what type of mitigation is required and which jurisdictions or agencies have the authority to make those decisions. Isolated wetlands, which have no legally defined nexus to a navigable water of the U.S., are not under the jurisdiction of the CWA and may not be regulated on the federal level. Likewise, certain lower category or very small wetlands may not be regulated by local governments under their critical areas ordinances. However, all wetlands in WA State are regulated by Ecology. Additionally, the Washington State Department of Fish and Wildlife (WDFW) and the Washington State Department of Natural Resources (WDNR) may also have jurisdiction over wetland development projects and may play a role in permitting compensatory mitigation activities (Ecology et al. 2006).

Permittee Responsible Mitigation

Wetland impacts permitted with a CWA 404 permit and/or state and local permits generally require applicants to follow mitigation sequencing and provide a mitigation plan outlining how they will compensate for their wetland impacts. Under federal and state regulations applicants are required to maintain and monitor their compensatory mitigation project for a period of five to ten years, or until performance standards outlined in the approved mitigation plan are met. Applicants are required to submit monitoring reports, usually annually, or as requested, to the permitting agencies, until they consider the project successfully completed. At this point the expectation is that the mitigation will be self-sustaining and will continue to exist, "successfully" in perpetuity. However, after the monitoring period ends there is no further regulatory obligation or agency oversight of compensatory mitigation projects.

Compensatory wetland mitigation policy allows for a variety of mitigation approaches, but traditionally the most common form has been permittee responsible "on site, in kind" mitigation primarily consisting of enhancing an existing wetland or creating a new wetland in the vicinity of the one degraded or destroyed. It is also possible to complete off-site mitigation where the compensation takes place on a property different from where the impact is, but within the same watershed. Both of these types of mitigation generally entail that the permittee is the responsible party in completing, maintaining and monitoring the mitigation until is it considered successfully complete.

Third-Party Mitigation

In contrast to permittee responsible mitigation, third party mitigation refers to mechanisms of mitigation where the permittee pays a third party to complete the mitigation obligation for them. This could include buying credits from a mitigation bank, a privately owned site that has been restored, created or enhanced with the intention of providing compensation for wetland impacts from other projects, unknown at the time of the bank creation. Bank owners have a formal agreement with regulators establishing liability, performance standards, management and monitoring requirements. Applicants with wetland impacts within the specified service area of the bank can buy mitigation “credits” from the bank owner, rather than completing their own mitigation project. The first guidance on mitigation banking came about in the early 90s, when less than 50 banks existed nationwide. Since then the popularity of banking has grown significantly, encouraged in part by agency support (see below). By 2010 nearly a thousand banks had been approved nationally. In WA, Ecology established a rule in 2009 to establish criteria for the creation of mitigation banks which could be certified by the state. Currently there are 13 approved banks in the state. However, many watershed service areas still have no banks available leaving permittee-responsible mitigation the most practicable solution for many applicants (Ecology 2013).

In lieu fees (ILF) are another mechanism in which permittees pay a third party, usually a natural resource nonprofit or government agency, in lieu of conducting their own project specific mitigation or buying credits from a bank. There are currently two approved ILF programs in Washington, both of which were approved in 2012 (Ecology, “In Lieu Fees” n.d(b)). The ILF represents the expected cost to the third party of replacing the lost wetland functions. The payment is held in trust until it can be combined with other ILFs to finance a larger mitigation project. Unlike mitigation banking, the mitigation project is not known at the time the impact is conducted.

2.2 Learning from the Past

In the approximately thirty years that wetland mitigation has been practiced, the science supporting the concept and the management practices facilitating it have changed significantly. In 2001, with twenty years of mitigation projects to evaluate, the National Research Council (NRC) established the Committee on Mitigating Wetland Losses to evaluate how well and under what circumstances compensatory mitigation was working. A primary conclusion from this study was that no net loss is not occurring (National Research Council [NRC] 2001). The committee found that compliance with CWA 404 regulations was lacking and that performance expectations were often misunderstood. Recommendations coming out of the NRC report included focusing on a watershed approach to compensatory mitigation project planning and that third party mitigation mechanisms may offer some benefits over tradition permittee responsible projects (NRC 2001).

Around the time of the NRC report, WA State undertook the task of completing its own evaluation of local compensatory mitigation projects. In response to a 1998 study (Mockler et al. 1998) which reported that over three quarters of wetland mitigation sites evaluated in King County were unsuccessful according to the permit's required mitigation performance standards, Ecology conducted a Wetland Mitigation Evaluation Study to evaluate the effectiveness of compensatory wetland mitigation across the state. The study occurred in two phases between 1999 and 2002. Phase 1 evaluated the level of compliance with the project's permit conditions and Phase 2 determined the success of the project from an ecological perspective. In Phase 1 only 29% of projects were in full compliance with the three criteria evaluated: 1) was the project implemented at all, 2) was it implemented according to plan and 3) was it meeting performance standards (Johnson et al. 2000). In Phase 2 only 13% of the projects evaluated were deemed to be achieving all of the ecologically relevant measures required by their permits and providing adequate compensation for the wetland(s) lost (Johnson et al. 2002).

The results of this study led to the creation of Ecology's "Mitigation That Works" Campaign to address the flaws in traditional compensatory mitigation in an effort to improve success rates. The 2008 Mitigation Evaluation Study and Making Mitigation Work report coming out of the campaign both came up with a number of recommendations for mitigation in WA State, including, similar to the NRC report, watershed based planning and project siting, and improvement of the wetland banking system (Ecology 2008).

2.3 Planning for the Future

Three decades after acknowledging the problem of wetland loss and degradation, creating a compensatory mitigation program and following through with its implementation, compensatory mitigation policy is now in a place of significant evaluation and change (Figure 2). The mixed results of the studies from the early and mid-2000s and the changes they recommended have moved compensatory mitigation into a period of reform. Wetland scientists and regulators have begun to acknowledge concerns with the mitigation system and are reassessing the goals and expectations of the program and what the best way is to reach those goals, now that we have experience to learn from. We are now in a period of reevaluating how mitigation is done and moving into a new policy cycle, taking what we have learned from the past thirty years of mitigation and applying it to revised, improved mitigation policy and regulations.

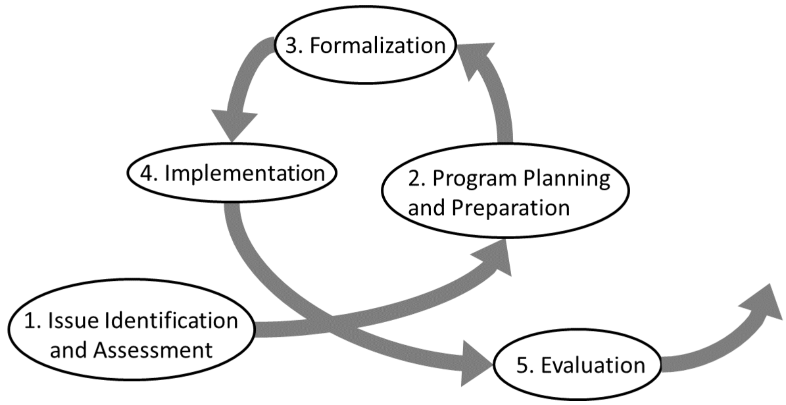

Figure 2. The Policy Cycle (adapted and modified from Olsen 2003)

2008 Federal Compensatory Mitigation Rule

One of the tools to come out of this new cycle of mitigation policy so far is the 2008 Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (33 CFR 332) published by the EPA and Corps (Code of Federal Regulations 2012). Prior to this rule, a conglomeration of various separate guidance documents were used to inform regulations for mitigation under the CWA Section 404 regulatory program. The new rule intends to improve and consolidate existing regulations and guidance based on better science and results oriented standards with the overall goal of reducing the risk and uncertainty associated with compensatory mitigation outcomes. Based on past lessons of what makes compensatory mitigation most successful, the new rule establishes a preferential hierarchy of mitigation types, with banking and in lieu fees as the first and second preference, respectively (EPA 2012).

While a preference is stated for in lieu fees and banking, the new rule intends to create a level playing field among the three compensatory mitigation mechanisms (mitigation banking, in-lieu fees and permittee responsible mitigation) so that all projects are held to the same standards. Therefore, the new rule requires that projects provided by each of the three mechanisms have mitigation plans which include the same fundamental components. One of these components is a long-term management plan. The focus on long-term management is new and is not a mitigation plan component that was commonly required nor included in the past, unless required by local jurisdictions' rules. The long-term management plan requires a description of how the compensatory mitigation project will be managed after performance standards have been achieved to ensure the long-term sustainability of the projects functions, including long-term financing mechanisms and the party responsible for long-term management (CFR §332.7(d)).

Despite significant improvements in societal understanding of the value and function of wetlands and the mechanisms through which to protect those functions, wetlands are still being lost each year and recent studies continue to show that the goal of no net loss may not yet be a reality (Dahl 2011, Moreno-Mateos et al. 2012). The majority of projects evaluated in the literature on compensatory mitigation have been found to be neither entirely successful nor entirely unsuccessful. However, for the most part these projects were evaluated at one snapshot in time, based on specific performance standards and criteria. As compensatory mitigation was relatively new during many of these studies, there is a lack of documentation on the long-term trajectory and ultimate success or failure of compensatory mitigation. Results of evaluations of the compensatory mitigation process continue to encourage increasing maintenance, monitoring, follow up and enforcement (Ecology 2008, Johnson et al. 2000, 2002, NRC 2001). However, as older mitigation projects continue to mature, agencies seldom, if ever have the opportunity to go back and see what has happened to them. So, while new projects may be better managed and receive improved oversight while they are within their monitoring period and still under a period of obligation, little is known about what will happen to these projects once they are outside of that monitoring window.

As regulatory agencies move into a new period of compensatory mitigation policy, they now recognize the need to look more holistically at compensatory mitigation, considering planning on a watershed level and for the long-term sustainability of the projects. However, the ultimate goal of compensatory mitigation is still to create self-sustaining projects that will survive in perpetuity. As early as 2001, experts noted that "the presumption that once mitigation sites meet their permit criteria they will be self-sustaining in the absence of any management or care is flawed" (NRC 2001). The 2008 federal mitigation rule takes steps toward acknowledging this flaw with the long-term management plan requirement. However, in reality we know very little about the long-term fate of compensatory mitigation projects as we know very little of what has ultimately happened to the projects of the past thirty years. Therefore, there is currently little to base this new long-term management guidance on. This research attempts to help fill this gap in knowledge through the exploration of the following two questions:

1) What happens to compensatory wetland mitigation projects, ecologically and institutionally, once they are beyond their required monitoring period?

2) What can be learned from those projects to help inform long-term management guidance?

3.0 CASE STUDIES

To investigate these questions this research used a subset of the compensatory mitigation projects which were used for Ecology's Wetland Mitigation Evaluation study between 1999 and 2002. All of these projects are permittee responsible compensatory mitigation for impacts to non-tidally influenced wetlands. Abundant compliance and ecological function data are available on these sites from the earlier study but no follow up has been done and no new data collected on them in the last ten years. Phase 1 of the original study evaluated the compliance of 45 randomly selected mitigation projects with the requirements of their permits. Projects were selected from a database that was generated to randomly sort permitted projects from the Corps' 404 database and Ecology's 401 database. Projects evaluated in Phase 1 were between less than one year and seven years post implementation, the majority being less than four years post implementation, and all were still within their required monitoring period.

In Phase II, the ecological success of 24 projects was evaluated. These 24 projects were a subset of the projects from Phase I which met additional criteria including that they were at least two years post implementation, as projects less than two years old were judged to be too immature to evaluate ecological success (Johnson et al. 2000, 2002). Ecological success proved to be a difficult concept to define and measure but ultimately was defined by two factors 1) how well the mitigation projects achieved their ecologically relevant measures and 2) how effective they were at compensating for their authorized wetland impacts (Johnson 2002).

It has now been ten years since Phase 2 and all of the sites are now beyond the required monitoring period and are not being followed up on by any agent of the regulatory system and have not been for several years. The 2002 Mitigation Study evaluated compliance and ecological success of relatively young mitigation sites during one snapshot in time. The resulting report recommended that a follow up study of the same sites in 5 to ten years would tell more about how mitigation sites evolve over time. The current study hopes to help fill this gap in information on what happens to these types of projects in the longer term. The intention is to evaluate the condition of the sites now and identify the social, ecological and institutional circumstances which may have contributed to the projects' outcomes. Furthermore, gathering new data on these sites will help to portray the trends of these projects over time, rather than just one snapshot in time, and help inform long-term management guidance.

3.1 Methods

Site Selection

For the purposes of this thesis research, Eastern Washington projects were eliminated as possible case studies. Of the 24 projects in Phase II, 18 were located in Western Washington. The limited resources and scope of this research further limited the case studies to four coastal zone counties: Whatcom, Skagit, Snohomish and King (Figure 3). Twelve of the 18 Western Washington projects from Phase II were located in these four counties. Nine projects were ultimately evaluated. An initial review of the case files was made for all 12 projects and an attempt was made to find the current responsible party who could provide permission to access the site (see below). The decision of which nine projects were ultimately evaluated was based primarily on the time constraints of the project. Therefore, the final projects chosen were those for which permission to access was received within the project timeframe.

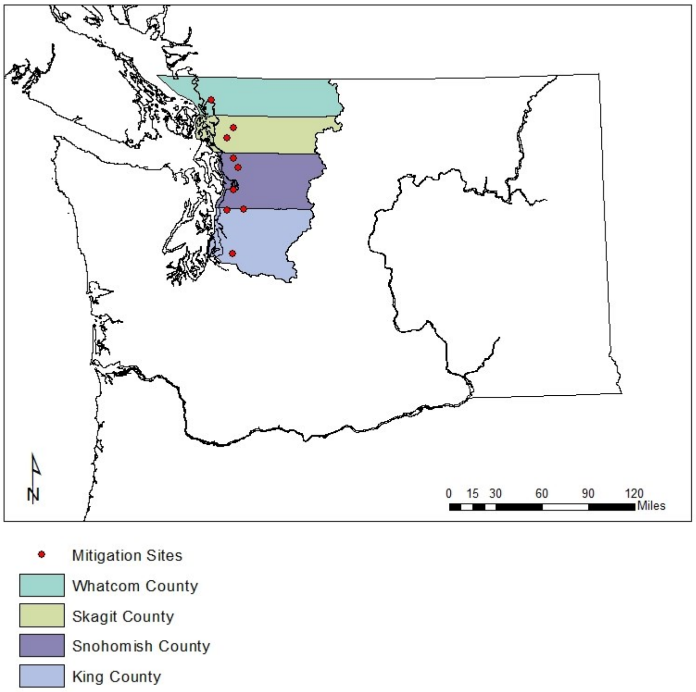

Figure 3. Mitigation Case Study Locations

File Review and Access Permission

Access to all files from the Phase I and Phase II projects was provided by Ecology. These files were reviewed for the last known project representative who was the point of contact during the Phase II study. In many cases the last known contact number was no longer was and/or the contact person was no longer available. In cases where the original contact was no longer an appropriate representative or was no longer available, the current landowner as listed with the assessor's office was contacted[1].

[1] Prior to contacting the project representatives, mitigation sites were reviewed using aerial imagery to try and determine, to the extent possible, if they still existed. If a flagrant violation was observed, such as the mitigation site was no longer there and had been redeveloped, Ecology staff wanted to be able to pursue enforcement actions. To facilitate this review, Ecology staff entered all 24 of the Phase I/II sites into their Facility Site Database. In this database the footprint of the mitigation area (based on GIS data from Phase I/II) is visible over aerial imagery. All 24 sites were found to still appear to be in existence.

Project contacts were informed that this research project was academic in nature, that neither they nor their property would be identifiable in the final report and that no regulatory actions would be taken regardless of outcome of the site evaluation. Therefore, in this report all projects are identified only by the randomly assigned number originally assigned to them during Ecology's Phase I/II study, and the county in which they are located.

Information was gathered from the project contacts in regard to their level of awareness of the mitigation project, contact with the regulatory agencies and what types of activities had occurred on or in association with the site since the 2002 study. Initial contact was made over the phone or by email to set up site visit appointments. Information gathered from project contacts during site visits and over the phone generally followed the outline of questions detailed in the questioner included in Appendix A. (An Application was made to The University of Washington Human Subjects Division and the Institutional Review Board granted an exempt status for this project.)

Additional background information reviewed from the project files and other available resources include:

- Mitigation plans
- Project maps
- Monitoring reports (if available)
- Correspondence
- Data and results of Phase I and II study evaluations
- Aerial photography
- Assessor's records

Site Visits

After permission to access the site was obtained and background documents reviewed, a site visit was conducted. Site visits were conducted during the fall through spring of 2012. Ecology staff members who were part of the original study were consulted and assisted throughout the project and were present for site visits when possible. In the majority of site visits the landowner or their representative was also present.

To help ensure that the correct mitigation area was located in the field, GPS points from the mitigation locations, collected during the Phase I/II site evaluations, were uploaded into a Trimble ProXR GPS by Ecology staff who were involved in the original study. The GPS outlined the boundaries of the mitigation wetlands identified during Phase I/II and helped orient current location relevant to the original mitigation area.

Site visits were performed in a manner similar to that of a final site visit which would be conducted at the end of a mitigation projects monitoring period before it is closed out by a regulatory agency. A general reconnaissance of the site was conducted to determine wetland extent and characteristics. A wetland determination was made in accordance with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (U.S. Army Corps of Engineers [Corps] 2010) and the Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). However, a complete delineation of wetland boundaries was out of the scope of this project and was not performed. Therefore assessing the established acreage of wetland mitigation is not a significant factor in this research. Rather aerial imagery, past delineation mapping and on the ground spot verification was used to make a general wetland determination. Field data were collected only within the mitigation areas, even where the mitigation site was a portion of a larger wetland.

Data collected included information on soils, hydrology, vegetation, wildlife, buffer condition, Cowardin classification (Cowardin et al. 1979), adjacent land uses and protection measures (signs, fencing, deed restrictions etc.) sufficient to complete the ratings and functional assessments discussed below. Photographs were also taken, when possible from the same points as during Phase I/II, if photo locations had been identified.

Evaluation

Three assessment methods were used to evaluate the mitigation areas: the revised Washington State Wetlands Rating System for Western Washington (Rating System) (Hruby, 2004), the Credit-Debit Method for Western WA (Hruby, 2012) and the Washington State Department of Transportation (WSDOT) Wetland Functions Characterization Tool for Linear Projects, also known as the Wetland Functions Best Professional Judgment (BPJ) (Null et al. 2000). The Rating System and Credit-Debit Method were used to identify and quantify the potential and opportunity for water quality, water quantity and wildlife habitat function operating within the wetlands. These determinations are based on the physical characteristics of the wetlands, their buffers and surrounding landscape. Application of the Rating System also results in a score based on the functions provided by the wetland, which classifies the wetland as Category I (highest functioning) through Category IV (lowest functioning). The Credit-Debit Method was used to provide additional information about the value to society of the functions provided. The WSDOT BPJ tool was used to supplement the other two assessments and aid in the qualitative comparison of the sites' current condition to the condition in Phase II (see limitations section below).

Some of the nine projects evaluated consisted of multiple mitigation areas. In cases where the separate mitigation areas were considered distinct units (as defined in the rating system) individual evaluations were done. This resulted in the evaluation of 12 wetland mitigation areas all together. The current ecological conditions of the mitigation areas were then compared descriptively to the conditions observed during Phase II, and to the originally permitted design and prescribed outcome of the site. In addition to the evaluation of ecological functions and values of the mitigation areas, the findings of the institutional practices and issues surrounding the sites were assessed.

Limitations

There are an abundance of data that could be gathered on these sites and numerous tools are available for evaluating wetland function according to current best available science. There are also many basic questions that can be answered by a general review of these sites even without using a specific functional assessment tool, starting with the question of if the mitigation is even still there. The challenge in this research is that when looking at the more specific wetland function questions, the extent that wetland science has evolved in the past ten years means the methods we can reasonably use now to evaluate specific wetland function will not result in data directly comparable to the data collected in the previous study which used different methods. The exact methods of the Phase II evaluation were not repeatable for the current study both because the breadth and depth of the Phase II study was more extensive than the current study, and because the best available science has changed resulting in changes to some of the assessment methods such as the rating system. Thus, while the current Rating System and Credit-Debit Method resulted in a determination of a wetland category and numeric functional scores based on the current best available science, these numeric scores are not directly comparable to the numeric scores from the Phase II evaluation. Given these constraints, for the purposes of comparison to the previously collected data on these sites, the analysis in this research is largely qualitative and descriptive in nature.

However, one method, the WSDOT tool, was used in both the current study and the Phase II study. Repeating this method aided in the ability to compare data and view trends from the 2002 study to now. Furthermore, when used together, many of the questions in the current Rating System and Credit-Debit Method repeat questions and concepts used in the various assessment methods used in Phase II. Therefore the methods used in this study focused primarily on the substance of the questions as a way to standardize the assessment of the main categories of wetland function: water quality, water quantity and habitat. The evaluation used these methods, along with the WSDOT BPJ tool to apply a consistent method in assessing the current ecological condition of the mitigation areas.

3.2 Results

The nine projects assessed ranged between 15 and 20 years post implementation with the majority being approximately 15 to 16 years old (Figure 4). Seven of the projects were originally completed by public entities and two were completed by private entities. The nine projects consisted of 14 separate mitigation areas. Two of these areas were wetland preservation only which were not assessed beyond confirming that the areas were still present. The remaining twelve mitigation areas included creation, enhancement and restoration work.

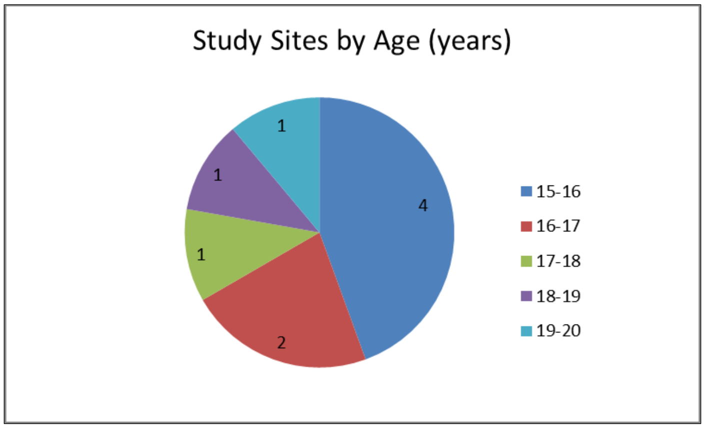

Figure 4. Study sites by time since implementation

All mitigation areas were found to still be in existence with no evident development impacts. This was initially determined through examination of aerial photography when the sites were entered into Ecology's Facility Site Database, and was confirmed though the on the ground the site visits. The majority of project contacts reported that to their knowledge no additional work, maintenance or otherwise, had been completed on the mitigation areas in the last ten years since the Phase II site visits.

3.2.1 Current Ecological Condition

The category of each wetland as well as the current potential and opportunity of the wetland to perform specific functions (water quality, water quantity and habitat) was determined using the Rating System, per recent guidance from Ecology (Ecology 2008b). The *potential* of the wetland to perform these functions is based on the attributes currently present within the wetland and its buffer. The level of potential depends on the extent to which certain physical characteristics exist which indicate that the environmental processes necessary to perform the function are present. The *opportunity* of the wetland to perform functions is based, rather, on the landscape characteristics surrounding the wetland. Opportunity refers to whether or not conditions in the contributing basin provide the wetland with the possibility to perform a function. A summary of these functional assessment results is shown in Table 1, below.

The wetland category (row 2) is based on the cumulative point total assigned in the rating system for all functions. However, qualitative ratings provide more accuracy when comparing wetlands and evaluating changes in functions (Ecology 2008b). Therefore, based upon the Ecology guidance, quantitative scores were converted to qualitative ratings of High, Medium or Low and are summarized in rows 3-8. The criteria for the qualitative scores are also more directly comparable to the data collected during Phase II (see Functional Comparison section below). The qualitative rating for water quality (row 4) and water quantity (row 6) function opportunities is listed as Yes or No, rather than High, Medium or Low, as it is based upon the presence or absence of contributing basin conditions. Qualitative ratings for specific habitat functions (rows 10-13) are based on best professional judgment.

Table 1. Summary of 2012 Functional Assessment

Site ID	**9a**	**9b**	**9c**	**14**	**243**	**278**	**400a**	**400b**	**233**	**151**	**33**	**294**
Wetland Category	III	IV	II	III	II	II	III	III	II	II	II	II
Overall Water Quality Potential	M	M	M	M	M	M	M	M	M	H	M	M
Overall Water Quality Opportunity (Y, N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Overall Water Quantity Potential	L	L	M	M	M	M	M	M	M	M	L	H
Overall Water Quantity Opportunity (Y,N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Overall Wildlife Habitat Potential	M	L	M	M	M	L	M	M	L	M	L	L
Overall Wildlife Habitat Opportunity	M	M	L	M	M	M	L	L	M	M	H	L
Specific Habitat Functions:												
Vegetation Structure	M	L	M	M/H	M	M	M	M/H	L	M	M	L
Habitat Features	L/M	L	L/M	L/M	L/M	L	L/M	L/M	L/M	H	L/M	L/M
Buffer Quality	M	L	L	M	M	M	L	L	M/L	M	M/H	L
Habitat Connectivity	M	L/M	L/M	M	L/M	L/M	L	L	M	M	H	L

(H=High, M=Medium, L=Low, Y=Yes, N=No)

The twelve mitigation wetlands evaluated are, overall, fairly high functioning and diverse wetlands. The most common category was a II, the second highest category available. Wetlands that receive a Category II rating are generally considered to provide high levels of some functions and to need a relatively high level of protection to preserve those functions (Hruby, 2004). Only one of the wetlands received a Category IV rating, the lowest rating available. Category IV wetlands generally provide low levels of function, are heavily disturbed and in need of improvement.

All wetlands evaluated currently have the potential to provide moderate to high levels of water quality function. This function is characteristic of wetlands which have the structure to detain and treat water for some duration of time and prevent particulates from flowing downstream. These wetlands also have persistent vegetation that provides a vertical structure to trap and filter pollutants. In addition to having the structural potential to provide water quality functions, all wetlands evaluated also have the opportunity to do so. Opportunity indicates that they are located in a landscape position where there are potential sources of pollutants that could enter the wetland which would otherwise flow downstream.

Most mitigation wetlands evaluated also had moderate to high potential to provide water quantity functions, however three had only low potential. Water quantity or hydrologic function refers to the wetland's capacity to slow and/or store water during wet periods and flood events. The mitigation wetlands with moderate to high potential to provide this function had evidence of ponding above the bottom of their outlet and evidence of overall contribution to storage in the watershed based on the size of the wetlands relative to the area of the upstream contributing basin. All wetlands evaluated, including those with low functional potential, had the opportunity to provide water quantity function indicating that they are located in a place in the watershed that allows them to provide flood storage and help protect downstream resources, both natural and man-made.

The level of habitat function was found to be more diverse across the wetlands. Seven of the wetlands had moderate potential to provide wildlife functions while five had only low potential. Those with low potential had only one or two vegetation classes present and lacked the structural and species diversity of more habitat-rich systems. None of the wetlands received a high rating for wildlife habitat potential. However, the majority of the wetlands had at least moderate opportunity to provide wildlife function based on their landscape position and connectivity to other relatively undisturbed habitat types.

Data obtained from the Credit-Debit Method and the WSDOT BPJ Tool were used as supplemental information in the determination of current functions described above. The questions and scoring of the functional potential used in the Rating System and summarized in Table 1 are the same as the questions and scoring of "site potential" used in the Credit-Debit Method. However, rather than using the opportunity score of the Rating System, the Credit-Method expands the information provided by the opportunity score into two categories referred to as "landscape potential" and "value". The three main functions rated in the Rating System and Credit-Debit Method, water quality, hydrology and wildlife habitat, are a subset of the total possible wetland functions which are selected because of their value to society. The value sub-rating in the Credit-Debit Method is therefore, intended to rate the values relative to other wetlands in the landscape. Wetlands whose function is more valuable to society because of factors in the surrounding landscape will receive a higher value rating. (For example, wetlands effective in filtering pollutants would receive a higher value rating if they are located in a watershed that does not meet water quality standards.) In considering the long-term contributions of these mitigation sites, the current understanding of their value to society is of great interest, thus these value scores are summarized in Table 2. The value of water quality and wildlife function tended to rate low for most wetlands evaluated while the value of hydrologic function rated high.

Table 2. Summary of 2012 Credit-Debit Method Value Ratings by Site

Site ID	9a	9b	9c	14	243	278	400a	400b	233	151	33	294
Value to Society of Water Quality Function	L	L	L	M	L	L	L	L	H	M	L	H
Value to Society of Hydrologic Function	H	H	H	M	M	H	H	H	H	M	M	M
Value to Society of Wildlife Habitat Function	L	L	L	L	L	M	L	L	M	L	L	L

H=High, M=Medium, L=Low

3.2.2 Functional Comparison

Ecology's Phase II study in 2002 determined four of the mitigation areas were "adequately compensating" for the permitted impacts, five were determined to be "somewhat compensating" for the permitted impacts and three were determined to be "not compensating" for the permitted impacts (Table 3). This study does not attempt to make a comparable, updated determination in regards to the level of compensation for permitted impacts, as not all criteria were evaluated (for example, wetland acreage established was not considered in this study). However, in general, comparing the main functional significance of the mitigation areas in Phase II to the main functions present now, the three mitigation projects which were found to be not compensating for their original impacts during Phase II (Sites 243, 278 and 233) and the three (Sites 9, 14, 33) determined to be somewhat compensating still appear to be deficient in the functions which they lacked resulting in the Phase II determinations.

Table 3 summarizes the originally permitted mitigation type and main design elements of each project, their ecological condition during the Phase II assessment, and today. Specific functional observations and changes are discussed in more detail below.

Table 3. Functional Comparison of Mitigation Sites in 2000-2002 and in 2012

Site ID[1]	Location (County)	Permitted Mitigation Type and Size	Original Design[2] Cowardin classes and main design functions, if data was available	Date Installed	Phase II Functional Assessment (Function: potential, opportunity, contribution) [3] , Cowardin classes present, and Determination of adequate compensation for impacts	2012 Conditions Qualitative Comparison Summary
9a	Whatcom	3.40 acres creation	PEM, PSS Together the three areas of Site 9 were intended to compensate for losses of 11 wetlands (21.1 acres) including PFO, PSS and PEM classes	1994	Water quality: NA, NA, NA Water quantity: ML, M, M Habitat: ML, M, M PEM, Somewhat compensating	PSS and PEM, provides increased water quality function today (new sources of pollutants adjacent), diversity and structure have increased
9b	Whatcom	12.70 acres creation	PEM	1994	Water quality: NA, NA, NA Water quantity: L, L, none Habitat: L, M, minimal PEM, Somewhat compensating	PEM, similar characteristics still observed today. Site is very low functioning and is not allowed to naturalize (always mowed) so functions not likely to ever increase. Water quantity function is main contribution
9c	Whatcom	5 acres enhancement	PSS	1994	Water quality: MH, MH, M Water quantity: MH, H, none Habitat: ML, M, minimal PSS, Somewhat compensating	Fairly high quality wetland-PFO and PSS classes, concerns of increased stormwater discharged to area degrading original function have resulted in plans for area being re-mitigated
14	Skagit	2.21 acres enhancement	Convert PEM wetland to PFO and PSS classes	1997	Water quality: M, M/H, minimal Water quantity: ML, M, none Habitat: M, M, M PEM and PSS, Somewhat compensating	PEM and PFO classes with multiple strata now present, increased potential for habitat and water quality functions
243	Skagit	4 acres enhancement	PFO and PSS/PFO mix to compensate for impacts to PEM wetlands	1996	Water quality: M, M/H, M Water quantity: M, H, M Habitat: ML, L, minimal PEM and PSS, Not compensating	PEM, PFO; Developed on three sides, limited wildlife opportunity but does have increased structure now and could provide habitat in an otherwise increasingly urban area

Site ID[1]	Location (County)	Permitted Mitigation Type and Size	Original Design[2] Cowardin classes and main design functions, if data was available	Date Installed	Phase II Functional Assessment (Function: potential, opportunity, contribution) [3] , Cowardin classes present, and Determination of adequate compensation for impacts	2012 Conditions Qualitative Comparison Summary
278	Snohomish	0.28 acres restoration	Didn't specify, impacted wetlands were PSS, goal was to create greater diversity of wetland types	1996	Water quality: M, M/H, H Water quantity: M, L, M Habitat: M/L, M, M PEM and Open Water, Not compensating	PEM and PSS classes present, increased structural diversity and functions associated with PSS now
400a	Snohomish	2.03 acres creation, 0.32 acres enhancement installed across two areas	PFO, PSS and PEM classes designed to detain more water and provide more diverse wildlife habitat than the wet meadow that was impacted	1997	Water quality: M, M, H Water quantity: M, M, H Habitat: M, L, M PEM and PSS, Adequately compensating	PEM and PFO classes, PSS class is gone now, still providing moderate water quality and quantity function, wildlife opportunity limited but does have good structure and diversity in otherwise quite urban area
400b	Snohomish	2.03 acres creation, 0.32 acres enhancement installed across two areas	PFO, PSS and PEM classes designed to detain more water and provide more diverse wildlife habitat than the wet meadow that was impacted	1998	Water quality: M, H, H Water quantity: M, H, H Habitat: L, L, minimal PEM, Adequately compensating	PEM, PSS and PFO all present, Poor/no buffer but complex structure and some habitat features now present
233	Snohomish	.27 acres restoration, .65 acres enhancement	PFO riverine wetland designed primarily for wildlife habitat	1996	Water quality: M,H,M Water quantity: M, H, None Habitat: ML, M/H, minimal PSS, Not compensating	PFO, similar functions as before, main contribution is not wildlife habitat as intended- low structural diversity, provides shoreline stabilization
151	King	1.4 acres restoration, .2 acres enhancement	PFO, PSS and PEM components designed primarily for wildlife function, compensating for loss of 1.2 acres of PEM and PFO wetlands	1992	Water quality: MH, M, H Water quantity: M, M, M Habitat: M, M, H PEM and PSS, Adequately compensating	PSS and PFO, high water quality potential, diverse habitat types and features, fairly high functioning wetland

Site ID[1]	Location (County)	Permitted Mitigation Type and Size	Original Design[2] Cowardin classes and main design functions, if data was available	Date Installed	Phase II Functional Assessment (Function: potential, opportunity, contribution) [3] , Cowardin classes present, and Determination of adequate compensation for impacts	2012 Conditions Qualitative Comparison Summary
33	King	0.14 acres creation	Seasonally flooded PFO to compensate for 0.07 acres of lost PFO	1997	Water quality: M, M, H Water quantity: ML, M, M Habitat: ML, M, M PEM with upland forest canopy, Somewhat compensating	PEM and PSS classes now present, still not PFO as intended, similar functions as seen previously but with some more structural diversity
294	King	0.21 acres creation, 2.5 acres preservation	PEM with dense screening border of trees and shrubs; designed primarily to mitigate for lost flood storage, pollutant filtration and aquifer recharge capabilities	1994-95	Water quality: MH, H, H Water quantity: H, L, H Habitat: M, L, M PEM, PSS and PFO, Adequately compensating	PFO wetland now but very little understory present, Major functional contributions are still water quality and quantity, very limited wildlife access except some bird habitat-performing very close to design

1) Sites with multiple mitigation locations are divided into separate entries

2) Proposed Cowardin Classification: PFO= Palustrine forested, PSS= Palustrine scrub shrub, PEM=Palustrine emergent

3) Results of Ecology's Wetland Mitigation Evaluation Study, Phase II (2000-2002). Three results are given for each function, first is the potential of the site to perform the function, second the opportunity the site had at the time to perform those functions, and third the contribution of mitigation activities to effecting the potential of the site to perform the functions. L=low, M=moderate, H=high.

Vegetation structure and composition

Most of the ecological changes observed at the mitigation sites since the Phase II evaluations were found to pertain to the potential to provide wildlife function, stemming from vegetation structure, interspersion of habitat types, species composition and diversity. Five of the mitigation areas had an increase in the number of different Cowardin vegetation classes present. (Sites 9a, 9c, 278, 400b and 33) Only one mitigation area had a decrease in the number of vegetation classes present (Site 294). Another five of the areas had the same number of vegetation classes present but saw a shift from one class type to another (Sites 14, 243, 400a, 151 and 233). Two of the ten areas which had an emergent vegetation class present during the Phase II evaluation no longer had these classes present, as they had shifted to a scrub shrub class in one case, and a forested class in the other. However, both of these mitigation areas were designed to have an emergent class present to compensate for specific losses of emergent wetland function.

Of the seven mitigation areas that had forested wetland as part of the original design, none had forested classes present at the time of the Phase II evaluation, when they were between four and nine years old. Six of these mitigation areas now have forested classes present. Five of the seven mitigation areas which had scrub-shrub classes present during the Phase II evaluation no longer had these classes present. These five mitigation areas were all ones that have now gained a forested class. Only three of the mitigation areas which no longer had a scrub-shrub class present during the 2012 evaluation had a scrub-shrub class as part of its original design. All but one had a forested class as part of its original design.

While some invasive species, primarily Himalayan blackberry, were observed in the mitigation areas, at no site were they observed to be the dominant species.

Photo 1: 1999 conditions at a site in Snohomish County (photo courtesy of Ecology)

Photo 2: 2012 conditions at the same site as Photo 1, from approximately the same location, illustrating a change in species structure and composition

Corridors, connectivity and habitat features

For the majority of sites, buffer size and condition appeared similar to the conditions observed during Phase II. Those sites which had habitat corridors and connectivity to other habitat types during Phase II still appeared to have those connections. No new development impacts were observed in the immediate vicinity of any of the mitigation areas. Habitat features, commensurate with more mature and complex structure were observed at several sites including downed woody debris and snags.

Water quality and quantity

In general water quality and hydrologic function did not appear to change much from Phase II to now. Interestingly, however, while water quality potential and opportunity appear to remain largely the same for most mitigation areas evaluated, the current value rating for water quality was low for eight of the twelve wetlands. In contrast, the value rating for hydrologic function was determined to be high for seven of the wetlands and moderate for the rest. This seems to reflect an increase in the opportunity for these wetland areas to provide hydrologic function and an increased importance of that function to the current landscape.

As development has continued upstream and downstream of many of the sites, opportunity to provide water quality and quantity functions has increased in some cases as a result of new potential sources of pollutants entering the wetlands and threatened resources downstream. In the case of one of the mitigation areas evaluated (Site #9c), an application for new development on another part of the property triggered a concern that increased stormwater discharge from such a development would compromise the functions of the existing mitigation area by changing its hydrologic regime and species composition. This sort of cumulative effect review was not seen in any other project and was unique to the fact that in this project the studied mitigation areas was one portion of a large and complexly developed property with multiple permit applications.

3.2.3 Institutional Findings

In this research the term "institutional" is used to describe the non-ecological factors associated with the outcome of the mitigation projects. These factors include the human dimensions and social patterns and processes related to the management of the mitigation process and its compensatory projects (see Figure 1).

Table 4 summarizes the primary protection measures and institutional controls evaluated. Specific findings are discussed in more detail below.

Table 4. Summary of Institutional Findings

Site ID	Ownership Type	Ownership Change?	Knowledge of Project?	Real Estate Restriction?[2]	Signs?	Fencing?
9a	Public	No	Yes	Yes	No	No
9b	Public	No	Yes	Yes	No	No
9c	Public	No	No	Yes	No	No
14	Public	No	Yes	Yes	No	No
243	Private	Yes	Minimal[1]	Required but none found	Yes	Yes
278	Public	No	Minimal	No	No	No
400a	Private	Yes	Yes	Required but none found	No	No
400b	Private	Yes	Yes	Required but none found	No	No
233	Public	No	Yes	No	Yes	No
151	Public	No	Minimal	No	Yes	Yes
33	Public	No	No	No	No	No
294	Public	No	Minimal	Yes	Yes	Yes

1) Minimal knowledge indicates the contact knew of the mitigation's existence but nothing much more
2) Official assessor's records identifying and restricting activity in mitigation area such as deed restrictions, easements etc.

Ownership issues and knowledge of responsible parties

Determining who the current responsible party was and identifying what, if any, knowledge they had of the mitigation area they were responsible for proved a challenging aspect of this research. In every one of the projects assessed the original contact from the Phase II study was no longer considered the responsible party. In three of the cases the original contact was still involved in the permitted entities organization but in another capacity not directly involved with the mitigation area. The rest of the original contacts either could not be tracked down at all or indicated they were no longer involved in the property at all.

The majority of the mitigation projects evaluated in Ecology's Mitigation Evaluation Study, and subsequently the subset used in this research, were completed by public entities. These projects were easier to track because, for the majority, the overall ownership had not changed. However, even for these public entity projects in every case the individual responsible party contact had changed and the information the new contact had on the project, its history and even its current status was in many cases very limited.

The properties involved in the two projects which were originally completed by a private entity had both been sold at least once since the end of their monitoring period. One of these projects had dedicated the mitigation area to a public entity. This was one of the only projects evaluated which had received follow up maintenance or oversight (from the public entity) since the end of Phase II.

Two of the mitigation areas evaluated were not known to the property contacts. One contact thought they knew what area of the property was being referred to but during the site visit it was discovered they were thinking of a different area, which was in fact not a wetland mitigation project but a stormwater detention pond. When the actual mitigation area was identified the contact reported they had not known about it. A second mitigation area (one area of the overall permitted mitigation project that consisted of three separate mitigation areas) was not known by the responsible party contacted, though they did know about the other two areas which were part of that project. All other responsible parties contacted had at least knowledge of the mitigation areas existence, though four appeared to know little more than that (if any work had been done to it, if monitoring had been done etc.). Responsible parties for just half of the mitigation areas evaluated had actual technical knowledge of the mitigation area, the project permit, obligations, maintenance and monitoring requirements etc.

Protection measures

The most commonly prescribed long-term protection measures for compensatory mitigation projects today are signs and fencing. Of the projects evaluated three were fenced, however one was fenced with chain link fence which is generally considered to be a barrier to wildlife passage and is not the type of fence usually considered a protection measure for a mitigation area. The three fenced projects, along with one other project, had signage indicating a wetland or native growth protection area. The remaining projects had no visual indication that any sort of protected area was present.

The signs and fences which were observed were generally not in good repair and/or were not visible or readable. Photos 3-8 below depict the general condition of the observed protection measures.

Photo 3: Broken fence and garbage

Photo 4: Overgrown wetland protection area sign

Photo 5: Faded wetland protection area sign with Himalayan blackberry on fence

Photo 6: Graffiti on wetland protection area signage and wildlife barrier fencing

Photo 7: Native Growth Protection Area (NGPA) signage along a road

Photo 8: Broken mitigation area fence (wood) with adjacent property's fence (metal) damaged from fallen mitigation area tree

Some encroachment into the wetlands was observed at several of the sites which were adjacent to private properties, regardless of whether signage was present. Yard clippings and garbage were the most common intrusions found. Additionally, some mitigation areas appeared to be hazardous to adjacent development as is the case seen in Photo 6 above where mitigation trees caused damage to the adjacent property. Only one site had evidence of neighbors accessing it for recreation.

Real estate restrictions refer to institutional controls such as easements or deed restrictions which legally limit future activity in the mitigation area. The extent of the limitations depends on the particular wording of the agreement and could range from just identifying the area to restricting future development. Three of the projects evaluated had conservation easements on the mitigation property, two had easements required in the original mitigation plan but they were not found to have actually been recorded, and four did not have this requirement at all. In the small number of projects evaluated whether or not the mitigation area had an easement on it did not appear to correlate with any of the other results.

4.0 Discussion

The answer to the most basic question: *do wetland mitigation areas continue to exist once they are outside of their period of regulatory obligation?* was found to be yes for all sites investigated. This simple, yet important finding is perhaps surprising given that most of the sites had received little, if any, active management in the last ten years, and some were not even known to the responsible party. Furthermore, as to the condition of the sites, most were found to be fairly high functioning wetlands today, despite little or no management intervention. But does this degree of "success" correlate with the real intentions of the mitigation and what can be learned from these projects to help in planning for the long-term success of current and future projects?

Changing circumstances

The moderately high ratings of the wetlands evaluated were not necessarily reflective of the mitigation areas providing the functions they were intended to. Nor are the functional needs of the landscape today the same as they were when the mitigation was designed and installed. This is an inherent dilemma of the rating system-wetlands must be rated for the functions and values they have at the time the rating is done, usually preceding a development project, not for what the functions and values would be once development is completed thereby providing increased risk to, and need for, the functions of the wetland system. This situation is best seen in evaluation of water quality and quantity functions. The opportunity to provide water quality and quantity functions, including the value that function would provide to society, was often higher in the wetlands evaluated than their actual potential to provide the function. The increased opportunity score the wetlands received now could in some cases raise the overall wetland category, thereby making it rate as more valuable now, due to more development having gone in.

When mitigation is designed it is intended to compensate for the loss of functions of the existing wetland in its existing state. Likewise, required mitigation doesn't look out to project what the increased need will be for wetland functions due to projected future development around the site. This proved to be a problem for at least one site during the Phase II evaluations which concluded that the minimal increase in water quality function the mitigation provided did not compensate for the increased need for water quality treatment that resulted due to the development in the watershed (Johnson et al. 2002). The situation is similar in the case of the site discussed above (Site 9c), where re-mitigation of the mitigation areas will be required due to increased stormwater discharge resulting from a new development. Ordinarily, these issues would be unlikely to be caught. Only because the new development is being applied for by the same applicant, on the same property, did the question of its effect on the existing mitigation come up. If the applicant had been an adjacent property, or somewhere further upstream, this sort of cumulative effects review would have been quite unlikely, and not required. This begs the question of to what extent external changes influencing the trajectory of existing mitigation areas should and could be considered.

Often wetland mitigation is designed primarily to offset loss of wildlife habitat. This was the case in most of the mitigation areas evaluated, which tended to mention wildlife habitat in the original design plans more than hydrologic or water quality function. When it comes to habitat function, the opposite tends to be true of changing wildlife habitat opportunity over time. Habitat is limited in how much and in what ways it can improve over time. As sites develop, more diversity of structure or species composition and interspersion of habitat types may occur, but theoretically buffer quality and connectivity to other undisturbed habitat types would be expected to decrease as surrounding development increases. This would lower the wetland's opportunity to provide wildlife function. Interestingly, however this result was not seen in this study. While many of the mitigation areas had very low buffer quality and/or no real connectivity to other habitat types to begin with, those which did have habitat corridors present during Phase II were in general found to still have them today. This is a surprising result and it is not clear why this was found to be the case, if it is a result of good mitigation siting, site specific circumstances or chance. Based on the small sample size of sites it is also likely this is not indicative of a larger pattern, but further investigation may be warranted.

Another consideration with the changes observed in the sites over time relates to the criteria for "success" and the length of time in which this determination must be made. For instance, of the seven mitigation areas that had forested wetland as part of the original design, none had forested classes present at the time of the Phase II evaluation, when they were between four and nine years old. Monitoring periods generally only range from five to ten years. An evaluation at the end of any of these projects' monitoring periods may have concluded that the project was not successful, yet today six of these mitigation areas now have forested classes present. Figure 5 illustrates circumstances where at the time of the five year monitoring, one project would be considered successful while the other would not, though in the longer term both would reach the same level of "success".

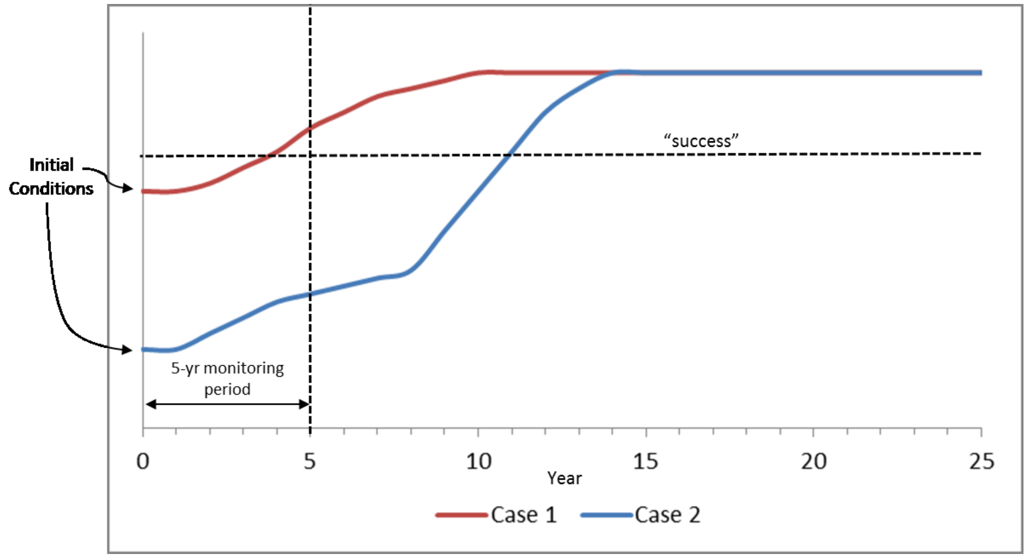

Figure 5. Hypothetical Comparison of the Trajectory of One Performance Standard for "Success" for Two Different Initial Conditions at the Same Hypothetical Mitigation Site
(Adapted from Mitsch and Wilson 1996 Fig. 2)

Conversely, some circumstances- either internal to the system or external pressures- could change once the mitigation has reached a stable state causing conditions to become degraded such that it would no longer be considered successful. For instance, two of the ten areas which had an emergent vegetation class present during the Phase II evaluation no longer had these classes present, as they had shifted to a scrub shrub class in one case, and a forested class in the other. However, both of these mitigation areas were designed to have an emergent class present to compensate for specific losses of emergent wetland function. These projects would have been deemed a success earlier on in their establishment when the emergent areas were present, but now those areas are gone and the site is no longer providing emergent wetland function. Even a ten year monitoring period is generally not a long enough time to responsibly be able to determine a project "successful" or not (Mitsch 1996).

Communication and coordination

The second main category of issues identified concerns the institutional communication and coordination of mitigation sites. The initial identification of the existence of these old mitigation areas was done by entering the sites in Ecology's Facility Site Database. This system is used to track and access information on facilities and sites of environmental interest to Ecology such as state and federal cleanup sites, hazardous waste facilities, and enforcement actions. Many of the database's features are publicly available. However, prior to the initiation of this investigation the wetland mitigation areas were not entered into this system and were not being tracked as other permitted projects in the system are. Routinely including wetland mitigation permits in this system could aid in long-term tracking and consolidation of information that may otherwise be lost.

With multiple agencies involved in permitting wetland mitigation, interagency coordination is also crucial to the institutional success of the project. Sharing compliance information between the Corps and Ecology, for instance could allow for greater transparency and for new projects to learn from the success and failures of past projects. Furthermore, rather than on a jurisdictional or agency level, tracking and monitoring mitigation projects on a watershed level could provide more meaningful ecological information and provide for greater continuity of protection.

Communication external of the regulatory system is also a key consideration, particularly when looking at the long-term sustainability of the site. Most sites evaluated did not have signage present though several were situated in locations where they had great potential to be an educational resource to the community. Those that did have signs were not particularly helpful to the public either because they were not visible or because they did not offer appropriate information. For example the NGPA signs in Photo 5, above. The general public may not know what "NGPA" means without any other information. Communication tools used to protect mitigation areas could also be used as a way to educate the public and increase awareness about wetland function and value.

Importance of individuals

Following closely with the concept of the significance of communication and coordination is the importance of individual players within the system. None of the contacts initially responsible for these projects were still the appropriate contact today. With the private entity projects on property that tends to be bought and sold with some regularity, as owners change information pertaining to the mitigation area is diluted as it passes from one owner to the next, if it is passed along at all. In the projects evaluated, even if ownership hadn't changed (for the public entity projects) it was difficult, if not impossible, to track down someone who knew the details of the mitigation. Individual employees and project managers involved seemed to take some of the institutional knowledge of the project with them when they left. The most consistent player in the mitigation process is the permitting agency. While within an agency individuals may also change, the agency as a whole has an obligation to be able to fulfill its mission through those changes. More continuity of protection may be afforded to these projects if there was more onus on the agency's to ensure long-term sustainability of mitigation sites, rather than placing that responsibility on the original applicant who will more likely than not no longer be involved in the project at some point down the line.

Sense of stewardship

Finally, something that was lacking for most of the projects evaluated was a sense of stewardship for the site. As indicated by the fact that in most cases it was difficult to track down someone who would claim responsibility for the mitigation area, the condition of the projects today appeared to have little to do with any ongoing stewardship tasks. An exception to this was seen at one site which had an outlet that needed regular maintenance or it would get blocked. A private neighbor who lived across the street from the mitigation (and actually did not know that it was a wetland mitigation project) had adopted this culvert and regularly maintained it, because no one else was and it was a necessary action to protect his property and neighborhood.

This example illustrates that in many circumstances, particularly where there are engineered structures involved in the mitigation, it is unrealistic to expect that the project will be self-sustaining in perpetuity without any ongoing, long-term stewardship tasks. These tasks should also be expected to cost money and funding must be available for them beyond the funds required through the monitoring period. The 2008 Federal Mitigation Rule acknowledges this and focuses on the need to identify funding sources for stewardship tasks. However, in addition to simply providing the funds for these actions, there has to be a responsibly party actively engaged in taking them on. This research has shown this piece to be one of the biggest hurdles in long-term management. In the case of the neighbor, he became a voluntary long-term steward of the site because of necessity. While this voluntary stewardship cannot be expected in lieu of an actual plan, it could be beneficial to investigate ways to foster a sense of community stewardship of mitigation sites and turn them into less of a burden and more of a value and educational resource to the community.

5.0 CONCLUSIONS AND RECOMMENDATIONS

"The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value."- Theodore Roosevelt, 1907

This research has attempted to use the story of a small number of mitigation sites to better understand a complex and changing social-ecological system. While the specific results of this small sample of projects are neither generalizable nor applicable to every mitigation project, the concepts and issues identified and discussed above comprise a few key considerations worthy of further attention as long-term management guidance is developed.

First, mitigation areas evolve over time due to both internal process and external influences. When attempting to replace the functions of one changing system with another changing system it is not realistic to prescribe an ultimate outcome. Just as some of the ecological functions of wetland ecosystems naturally change over time so to do the social systems with which they interact. Interdisciplinary, long-term studies of wetland mitigation as a social-ecological system should be conducted that examines both the ecological and institutional trajectories of mitigation sites.

Once permit criteria are met and mitigation areas are left to themselves and presumed to be self-sustaining, as is the ultimate goal, mitigation sites undergo some element of self-design and their ecological trajectory does not necessarily match that of the mitigation design. At very least management actions may be necessary to enable adaptations to external forces that may change the mitigation area and the ultimate functions it provides, if those functions are no longer serving the intent of the mitigation.

Regulatory requirements should also be built to give the system enough time to reach a stable state, though such partial self-design. A five or even ten year monitoring period does not allow for an accurate picture of the long-term state of the system. The long-term outcome of a site may be less dependent on the initial conditions then on how the site will evolve and adapt over time, both on its own and as a result of external forces. Extending the period of regulatory obligation would help ensure the legal and financial ability to manage sites until they are closer to their steady state. Monitoring every year may not be necessary but more agency follow up at, say five year increments, should be considered before a project is simply let out of the system.

Secondly, perhaps the clearest conclusion of this research is that the institutional circumstances surrounding mitigation sites change along with, and largely independent of, the ecological trajectory. For long-term management practices to be ensured a consistent responsible party will be necessary who can be relied on to identify needs, have the funds to enact the practices needed, and monitor their outcome. This is well beyond the scope of the typical applicants abilities or currently, their legal obligations once a project is considered to have completed its initial performance standard requirements.

For all of the reasons identified above, this thesis recommends that long-term stewardship responsibilities for compensatory mitigation areas be transferred to a third party group. The methods through which this could be done would likely vary depending on whether the mitigation was publicly or privately owned. However, different mechanisms are available to provide the legal protection and transfer of responsibility required and such as easements or deed restrictions. An independent group, based on a watershed level, that tracks and maintains all mitigation areas that are publicly held or under easement, would provide for the institutional consistency and ecological expertise necessary for successful long-term stewardship. Rather than putting the responsibility more on agencies which are already overburdened and underfinanced, this option still allows for a more coordinated and reliable long-term stewards of sites by transferring responsibility away from the permittee.

This concept has been recommended before and is similar to the transfer of responsibility used as the primary mechanism in third party mitigation such as mitigation banking[2], though in that case it is more in reference to the responsibility of the initial design, installation and short term monitoring and maintenance of the mitigation. Banks are also intended to be self-sustaining over time (WAC 173-700), which as we have seen may not be a realistic expectation. The concept of a third party long-term steward would be applicable to all types of mitigation- that which was initially done through a third party, and that which was initially permittee responsible, whether private or public. The transfer of responsibility would necessarily include financial assurance extending beyond the monitoring period. The amount and process of establishing such financial assurance would be an important area for further study.

This research has provided a first look at what happens to compensatory mitigation projects in WA State outside of their period of regulatory obligation. Many questions remain and further research is recommended to provide more understanding of these issues. For instance, it would provide additional insight to repeat this study with a new sample of mitigation projects where more were privately owned. The fact that most of the mitigation projects evaluated here were completed by public entities may, or may not, make a significant difference in the results.

[2] A note on mitigation banking: Mitigation banks are widely thought to have the potential to address many of the flaws with current mitigation practices, and could likely address many of the issues brought up in this research. I believe this research supports the concept of banking in particular in regard to a broader landscape approach to siting, larger areas with greater ability to limit external influences, and larger contiguous wildlife habitat areas. However, there are situations where permittee responsible mitigation is still appropriate or the only practicable alternative and those projects should not be held to lesser standards. This research does not discuss the details of mitigation banking but, some of the issues identified here could apply to portions of that system as well. These recommendations could be relevant for many types of mitigation.

The conditions and considerations identified in this research begin to fill the gap in our knowledge of how mitigation projects evolve and what ecological and institutional factors influence their outcome over time. The knowledge gained from past projects should be applied to improve the system moving forward as the mitigation process continues to evolve and long-term stewardship requirements are developed and implemented.

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APPENDIX A: Responsible Party Interview Questions and Written Questionnaire

Long Term Management of Compensatory Wetland Mitigation
Research Project Interview Questions and/or Written Questionnaire

To be completed by researcher:

Site: _County, #_

Thank you for completing this form regarding a wetland mitigation project which was part of the WA State Department of Ecology's Wetland Mitigation Evaluation Study in 2000 and 2002.
These sites are being re-evaluated now, ten years later, as part of a masters thesis project at the University of Washington. The intent of the project is to assess the current condition of the mitigation projects and identify factors which may have contributed to their long term outcome to help inform the development of long term management guidance.

Please do not record any identifiable information on this form (name, address etc). Your project will be identified only by the county it is in and a randomly assigned number. Thank you!

1. Please choose the option which best describes yourself:
a) the current landowner
b) a consultant (please indicate how long you have worked on the project and in what capacity)
c) other- please explain:

2. Before being contacted for this study were you aware of the wetland mitigation project on your property?

3. Has any maintenance work been done on the site since 2002 (weeding, plant replacement etc.)? Please briefly describe.

4. Aside from the Department of Ecology, did any other agency ever contact you in regard to this project requesting follow up documentation? Please briefly describe.

5. Did you receive any close out documentation from any agency when your mitigation monitoring period ended?

6. Have you had any problems associated with the mitigation site (flooding, down trees etc.)?

7. Are you aware of any conservation easements or other restrictive covenants pertaining to the mitigation site?

8. Any other comments you would like to share about the mitigation?

APPENDIX B: Credit-Debit Method for Western WA

SCORING FORM

Scoring functions to calculate mitigation credits and debits in Western Washington

Name of wetland (if known): ________________________________ Date of site visit: _____

Scored by___________________________
SEC: ___ TWNSHP: ____ RNGE: ___ Estimated size:_____ Aerial photo included? ________

These scores are for:
__________Wetland being altered
__________Mitigation site before mitigation takes place
__________Mitigation site after goals and objectives are met

SUMMARY OF SCORING

FUNCTION	Improving Water Quality	Hydrologic	Habitat
Rating of Site Potential			
Rating of Landscape Potential			
Rating of Value			
Score Based on Ratings (see table below)			

	Wetland HGM Class Used for Rating	
	Depressional	
	Riverine	
	Lake-fringe	
	Slope	
	Flats	
	Freshwater Tidal	
	Check if unit has multiple HGM classes present	☐

Scores
(*Order of ratings is not important*)
9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

NOTE: Form is not complete without the figures requested.
Put only the highest score for a question in each box of the form, even if more than one indicator applies to the unit. Do NOT add the scores within a question.

HGM Classification of Wetlands in Western Washington

For questions 1-7 the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e., except during floods)?

NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES – Freshwater Tidal Fringe **NO – Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and not scored. This method cannot be used for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3 **YES** – The wetland class is **Flats**

*If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface) at least 20 acres (8 ha) in size;

___At least 30% of the open water area is deeper than 6.6 ft (2 m)?

NO – go to 4 **YES** – The wetland class is **Lake-fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

____The wetland is on a slope (*slope can be very gradual*),

____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

____The water leaves the wetland **without being impounded**?

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

NO - go to 5 **YES** – The wetland class is **Slope**

5. Does the entire wetland unit **meet all** of the following criteria?

___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

___The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

NO - go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes Within the Wetland Unit Being Rated	HGM Class to Use in Rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake-fringe	Depressional
Riverine + Lake-fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

If you are still unable to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as Depressional for the rating.

<table>
<tr><th colspan="2"><u>Depressional and Flats Wetlands</u>
WATER QUALITY FUNCTIONS - Indicators that the site functions to improve water quality.
Questions D 1.1 – D 1.4 are from the Wetland Rating System (Hruby 2004b).</th></tr>
<tr><td>D 1.0 Does the wetland unit have the <u>potential</u> to improve water quality?</td><td></td></tr>
<tr><td>D 1.1 Characteristics of surface water flows out of the wetland:
Provide photo or drawing
Unit is a depression with no surface water leaving it (no outlet) points =3
Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2
Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1
Unit is a “flat” depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1
(If ditch is not permanently flowing treat unit as “intermittently flowing”)</td><td>Figure ___</td></tr>
<tr><td>D 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)*
YES: points = 4 NO: points = 0</td><td></td></tr>
<tr><td>D 1.3 Characteristics of persistent plants (emergent, shrub, and/or forest Cowardin class
Provide map of Cowardin plant classes
Wetland has persistent, ungrazed, plants ≥ 95% of area points = 5
Wetland has persistent, ungrazed, plants ≥ 1/2 of area points = 3
Wetland has persistent, ungrazed plants ≥ 1/10 of area points = 1
Wetland has persistent, ungrazed plants <1/10 of area points = 0</td><td>Figure ___</td></tr>
<tr><td>D 1.4 Characteristics of seasonal ponding or inundation.
Provide map of hydroperiods
This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.
Area seasonally ponded is > ½ total area of wetland points = 4
Area seasonally ponded is > ¼ total area of wetland points = 2
Area seasonally ponded is < ¼ total area of wetland points = 0</td><td>Figure ___</td></tr>
<tr><td>Total for D 1 Add the points in the boxes above</td><td></td></tr>
<tr><td>**Rating of Site Potential: If score is 12 – 16 = H
6 - 11 = M
0 - 5 = L**</td><td></td></tr>
</table>

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number _______

D 2.0 Does the landscape have the potential to support the water quality function at the site?	
D 2.1 Does the Wetland unit receive stormwater discharges? Yes = 1 No = 0	
D 2.2 Is more than 10% of the area within 150 ft of wetland unit in agricultural, pasture, residential, commercial, or urban? Yes = 1 No = 0	
D 2.3 Are there septic systems within 250 ft of the wetland unit? Yes = 1 No = 0	
D 2.4 Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 – D 2.3? Source______________ Yes = 1 No = 0	
Total for D 2 Add the points in the boxes above	

Rating of Landscape Potential: If score is 3 or 4 = H
1 or 2 = M
0 = L

Record the rating on the first page

D 3.0 Is the water quality improvement provided by the site valuable to society?	
D 3.1 Does the unit discharge directly to a stream, river, or lake that is on the 303d list? Yes = 1 No = 0	
D 3.2 Is the unit in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	
D 3.3 Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the basin in which unit is found*) Yes = 2 No = 0	
Total for D 3 Add the points in the boxes above	

Rating of Value: If score is 2-4 = H
1 = M
0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Depressional and Flats Wetlands **HYDROLOGIC FUNCTIONS** - Indicators that the site functions to reduce flooding and stream degradation. Questions D 4.1 – D 4.3 are from Wetland Rating System (Hruby 2004b).	
D 4. 0 Does the wetland unit have the potential to reduce flooding and erosion?	
D 4.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing OR highly constricted permanently flowing outlet points = 2 Unit is a “flat” depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 Unit has an unconstricted, or slightly constricted, surface outlet and is permanently flowing) points = 0 (If ditch is not permanently flowing treat unit as “intermittently flowing”)	
D 4.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a “headwater” wetland” points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	
D 4.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire unit is in the FLATS class points = 5	
Total for D 4 Add the points in the boxes above	
Rating of Site Potential: If score is 12 – 16 = H **6 - 11 = M** **0 - 5 = L**	

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

D 5.0 Does the landscape have the potential to support hydrologic functions at the site?	
D 5.1 Does the unit receive any stormwater discharges? Yes = 1 No = 0	
D5.2 Is >10% of the land use within 150 ft of the wetland unit agriculture, pasture, residential, urban, or commercial? Yes = 1 No = 0	
D 5.3 Is more than 25% of the contributing basin of the wetland unit covered with intensive human land uses (residential at >1 residence/1 acre, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	
Total for D 5 Add the points in the boxes above	

Rating of Landscape Potential: If score is **3 = H**
1,2 = M
0 = L

Record the rating on the first page

D 6.0 Are the hydrologic functions provided by the site valuable to society?	
D 6.1 The unit is in a landscape that has flooding problems. Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met. ☐ The site has been identified as important for flood storage or flood conveyance in a regional flood control plan. points = 2 ☐ The wetland captures surface water that would otherwise flow downgradient into areas where flooding has damaged human or natural resources (e.g., salmon redds), AND ○ Damage occurs in sub-basin that is immediately down-gradient of unit. points = 2 ○ Damage occurs in a sub-basin further down-gradient. points = 1 ☐ Flooding from groundwater is an issue in the sub-basin. points = 1 ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* ________________________________ points = 0 ☐ There are no problems with flooding downstream of the unit. points = 0	

Rating of Value: **If score is** **2 = H**
1 = M
0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Riverine and Freshwater Tidal Fringe Wetlands **WATER QUALITY FUNCTIONS** - Indicators that site functions to improve water quality Questions R 1.1 – R 1.2 are from the Wetland Rating System (Hruby 2004b).	
R 1. Does the wetland unit have the potential to improve water quality?	
R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: *If depressions > ½ of area of unit draw polygons on aerial photo or map* Depressions cover >3/4 area of wetland points = 8 Depressions cover > 1/2 area of wetland points = 4 Depressions present but cover < 1/2 area of wetland points = 2 No depressions present points = 0	Figure __
R 1.2 Characteristics of the plants in the unit (areas with >90% cover at person height): *Include photo or map showing polygons of different plants types* Trees or shrubs > 2/3 area of the unit points = 8 Trees or shrubs > 1/3 area of the unit points = 6 Herbaceous plants (> 6" high) > 2/3 area of unit points = 6 Herbaceous plants (> 6" high) > 1/3 area of unit points = 3 Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit points = 0	Figure __
Total for R 1 Add the points in the boxes above	

Rating of Site Potential: If score is 12 – 16 = H
6 - 11 = M
0 - 5 = L

Record the rating on the first page

R 2.0 Does the landscape have the potential to support the water quality function at the site?	
R 2.1 Is the unit within an incorporated city or within its UGA? Yes = 2 No = 0	
R. 2.2 Does the contributing basin include a UGA or incorporated area? Yes = 1 No = 0	
R 2.3 Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years? Yes = 1 No = 0	
R 2.4 Is more than 10% of the area within 150 ft of the wetland unit in agricultural, pasture, golf courses, residential, commercial, or urban? Yes = 1 No = 0	
Total for R 2 Add the points in the boxes above	

Rating of Landscape Potential: If score is 3 - 5 = H
1 or 2 = M
0 = L

Record the rating on the first page

Wetland name or number _______

R 3.0 Is the water quality improvement provided by the site valuable to society?	
R 3.1 Is the unit along a stream or river that is on the 303(d) list or on a tributary that drains to one? Yes = 1 No = 0	
R 3.2 Does the river or stream have TMDL limits for nutrients, toxics, or pathogens? Yes = 1 No = 0	
R 3.3 Has the site been identified in a watershed or local plan as important for maintaining water quality? (*answer YES if there is a TMDL for the drainage in which unit is found*) Yes = 2 No = 0	
Total for R 3 Add the points in the boxes above	

Rating of Value: If score is 2 - 4 = H
1 = M
0 = L

Record the rating on the first page

<u>**Riverine and Freshwater Tidal Fringe Wetlands**</u> **HYDROLOGIC FUNCTIONS** - Indicators that site functions to reduce flooding and stream erosion Questions R 4.1 and R 4.2 are from Wetland Rating System (Hruby 2004b).	
R 4.0 Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	
R 4.1 Characteristics of the overbank storage the unit provides: *Provide aerial photo showing average widths* Estimate the average width of the wetland unit perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit)/(average width of stream between banks). If the ratio is more than 20 points = 9 If the ratio is between 10 – 20 points = 6 If the ratio is between 5 - <10 points = 4 If the ratio is between 1 - <5 points = 2 If the ratio is < 1 points = 1	Figure __
R 4.2 Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description* (polygons need to have >90% cover at person height NOT Cowardin classes): *Provide photo or map showing polygons of different plants types* Forest or shrub for >1/3 area OR herbaceous plants > 2/3 area points = 7 Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area points = 4 Plants do not meet above criteria points = 0	Figure __
Total for R 4 Add the points in the boxes above	

Rating of Site Potential: If score is 12 – 16 = H
6 - 11 = M
0 - 5 = L

R 5.0 Does the landscape have the potential to support the hydrologic functions at the site?	
R5.1 Is the stream/river adjacent to the unit downcut? Yes = 0 No = 1	
R 5.2 Does the contributing basin include a UGA or incorporated area? Yes = 1 No = 0	
R 5.3 Is the upgradient stream or river controlled by dams? Yes = 0 No = 1	
Total for R 5 Add the points in the boxes above	

Rating of Landscape Potential: If score is 3 = H
1 or 2 = M
0 = L

Record the rating on the first page

R 6.0 Are the hydrologic functions provided by the site valuable to society?	
R 6.1 Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.* The sub-basin immediately down-gradient of site has surface flooding problems that results in $$ loss or loss of natural resources. points = 2 Surface flooding problems are in a sub-basin further down-gradient. points = 1 No flooding problems anywhere downstream. points = 0	
R 6.2 Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	
Total for R 6 Add the points in the boxes above	

Rating of Value: If score is 2 – 4 = H
1 = M
0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number ______

Lake-fringe Wetlands **WATER QUALITY FUNCTIONS** - Indicators that the site functions to improve water quality. Questions L 1.1 – L 1.2 are from the Wetland Rating System (Hruby 2004b).	
L 1.0 Does the wetland unit have the potential to improve water quality?	
L 1.1 Average width of plants along the lakeshore *(use polygons of Cowardin classes)*: *Provide map of Cowardin classes with widths marked* Plants are more than 33 ft (10m) wide points = 6 Plants are more than 16 ft (5m) wide and <33ft points = 3 Plants are more than 6 ft (2m) wide and <16 ft points = 1 Plants are less than 6 ft wide points = 0	Figure __
L 1.2 Characteristics of the plants in the wetland: choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of cover is total cover in the unit, but it can be in patches. *Herbaceous does not include aquatic bed.* *Provide map with polygons of different plants types* Cover of herbaceous plants are >90% of the vegetated area points = 6 Cover of herbaceous plants are >2/3 of the vegetated area points = 4 Cover of herbaceous plants are >1/3 of the vegetated area points = 3 Other plants that are not aquatic bed > 2/3 unit points = 3 Other plants that are not aquatic bed in > 1/3 vegetated area points = 1 Aquatic bed plants and open water cover > 2/3 of the unit points = 0	Figure __
Total for L 1 Add the points in the boxes above	
Rating of Site Potential: If score is 8 - 12 = H **4 – 7 = M** **0 - 3 = L** *Record the rating on the first page*	

L 2. Does the landscape have the potential to support the water quality function at the site?	
L 2.1 Is the lake used by power boats? Yes = 1 No = 0	
L 2.2 Is more than 10% of the area within 150 ft of wetland unit (on the shore side) agricultural, pasture, residential, commercial, or urban? Yes = 1 No = 0	
L 2.3 Does the lake have problems with algal blooms or excessive plants such as milfoil? Yes = 1 No = 0	
Total for L 2 Add the points in the boxes above	
Rating of Landscape Potential: If score is 2 or 3 = H **1 = M** **0 = L** *Record the rating on the first page*	

L 3.0 Is the water quality improvement provided by the site valuable to society?	
L 3.1 Is the unit on a lake that is on the 303(d) list? Yes = 1 No = 0	
L 3.2 Is the lake in a sub-basin where water quality is an issue? (at least one aquatic resource in the basin is on the 303(d) list) Yes = 1 No = 0	
L 3.3 Has the site been identified in a watershed or local plan as important for maintaining water quality? Yes = 2 No = 0	
Total for D 3 Add the points in the boxes above	
Rating of Value: If score is 2 - 4 = H **1 = M** **0 = L** *Record the rating on the first page*	

Lake-fringe Wetlands **HYDROLOGIC FUNCTIONS** - Indicators that the wetland unit functions to reduce shoreline erosion Question L 4.1 is from Wetland Rating System (Hruby 2004b).	
L 4.0 Does the wetland unit have the potential to reduce shoreline erosion?	
L 4.1 Distance along shore and average width of Cowardin classes along the lakeshore (**do not** include aquatic bed): *(choose the highest scoring description that matches conditions in the wetland)* *Include aerial photo or map with Cowardin plant classes* > ¾ of distance is shrubs or forest at least 33 ft (10m) wide points = 6 > ¾ of distance is shrubs or forest at least 6 ft (2 m) wide points = 4 > ¼ distance is shrubs or forest at least 33 ft (10m) wide points = 4 Plants are at least 6 ft (2m) wide (any type except aquatic bed) points = 2 Plants are less than 6 ft (2m) wide (any type except aquatic bed) points = 0	Figure__
Rating of Site Potential: If score is 6 = M **0 - 5 = L** *Record the rating on the first page*	

L 5.0 Does the landscape have the potential to support hydrologic functions at the site?	
L 5.1 Is the lake used by power boats with more than 10 hp? Yes = 1 No = 0	
L 5.2 Is the fetch on the lake side of the unit at least 1 mile in distance? Yes = 1 No = 0	
Total for L 5 Add the points in the boxes above	

Rating of Landscape Potential: If score is **2 = H**
1 = M
0 = L

Record the rating on the first page

L 6.0 Are the hydrologic functions provided by the site valuable to society?	
L 6.1 If more than one resource is present, choose the one with the highest score. There are human structures or old growth/mature forests within 25 ft of OHWM of the shore in the unit. points = 2 There are nature trails or other paths and recreational activities within 25 ft of OHWM. points = 1 Other resources that could be impacted by erosion. points = 1 There are no resources that can be impacted by erosion along the shores of the unit. points = 0	

Rating of Value: If score is **2 = H**
1 = M
0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number _______

Slope Wetlands **WATER QUALITY FUNCTIONS** - Indicators that the site functions to improve water quality Questions S 1.1 – S 1.3 are from Wetland Rating System (Hruby 2004b).	
S 1. Does the wetland unit have the potential to improve water quality?	
S 1.1 Characteristics of average slope of unit: *(a 1% slope has a 1 ft vertical drop in elevation for every 100 ft horizontal distance*) Slope is1% or less — points = 3 Slope is 1% - 2% — points = 2 Slope is 2% - 5% — points = 1 Slope is greater than 5% — points = 0	
S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	
S 1.3 Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense plants means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* *Provide photo or map showing polygons of different plants types* Dense, uncut, herbaceous plants > 90% of the wetland area — points = 6 Dense, uncut, herbaceous plants > ½ of area — points = 3 Dense, woody, plants > ½ of area — points = 2 Dense, uncut, herbaceous plants > ¼ of area — points = 1 Does not meet any of the criteria above for plants — points = 0	Figure__
Total for S 1 — Add the points in the boxes above	
Rating of Site Potential: If score is 12 = H **6 - 11 = M** **0 - 5 = L** *Record the rating on the first page*	

S 2. 0 Does the landscape have the potential to support the water quality function at the site?	
S 2.1 IS >10% of the buffer area within 150 ft upslope of wetland unit in agricultural, pasture, residential, commercial, or urban? Yes = 1 No = 0	
Rating of Landscape Potential: If score is 1 = M **0 = L** *Record the rating on the first page*	

S 3.0 Is the water quality improvement provided by the site valuable to society?	
S 3.1 Does the unit discharge directly to a stream, river, or lake that is on the 303(d) list? Yes = 1 No = 0	
S 3.2 Is the unit in a sub-basin where water quality is an issue? (at least one aquatic resource in the basin is on the 303(d) list) Yes = 1 No = 0	
S 3.3 Has the site been identified in a watershed or local plan as important for maintaining water quality? Yes = 2 No = 0	
Total for D 3 Add the points in the boxes above	

Rating of Value: If score is 2 - 4 = H
1 = M
0 = L

Record the rating on the first page

Slope Wetlands **HYDROLOGIC FUNCTIONS** - Indicators that the site functions to reduce flooding and stream erosion Questions S 4.1 – S 4.2 are from Wetland Rating System (Hruby 2004b).	
S 4.0 Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	
S 4.1 Characteristics of plants that reduce the velocity of surface flows during storms. Choose the points appropriate for the description that best fit conditions in the wetland. *(Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** plants covers > 90% of the area of the wetland. YES = 1 All other conditions = 0	

Rating of Site Potential: If score is 1 = M
0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

S 5.0 Does the landscape have the potential to support the hydrologic functions at the site?	
S 5.1 Is more than 25% of the buffer area within 150 ft upslope of wetland unit in agricultural, pasture, residential, commercial, or urban ? Yes = 1 No = 0	

Rating of Landscape Potential: If score is 1 = M
0 = L

Record the rating on the first page

S 6.0 Are the hydrologic functions provided by the site valuable to society?	
S 6.1 Distance to the nearest areas downstream that have flooding problems? Immediate sub-basin down-gradient of site has surface flooding problems that results in $$ loss or loss of natural resources points = 2 Surface flooding problems are in a sub-basin further down-gradient points = 1 No flooding problems anywhere downstream points = 0	
S 6.2 Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	
Total for R 6 Add the points in the boxes above	

Rating of Value: If score is 2 - 4 = H
1 = M
0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number _______

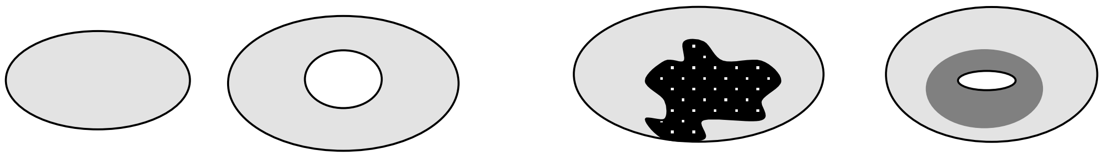
These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat. Questions H 1.1 – H 1.5 are from Wetland Rating System (Hruby 2004b).	
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Structure of plant community – *indicators are Cowardin classes and layers in forest* Check the Cowardin plant classes in unit – *Polygons for each class must total ¼ acre, or more than 10% of the unit if it is smaller than 2.5 acres.* *Provide map of Cowardin plant classes* ___Aquatic bed ___Emergent plants ___Scrub/shrub (areas where shrubs have > 30% cover) ___Forested (areas where trees have > 30% cover) If the unit has a forested class check if: ___The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon Add the number of structures checked. If you have: 4 structures or more points = 4 3 structures points = 2 2 structures points = 1 1 structure points = 0	Figure__
H 1.2. Hydroperiods Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count (*see text for descriptions of hydroperiods*). *Provide map of polygons with different hydroperiods* ___Permanently flooded or inundated — 4 or more types present points = 3 ___Seasonally flooded or inundated — 3 types present points = 2 ___Occasionally flooded or inundated — 2 types present points = 1 ___Saturated only — 1 type present points = 0 ___Permanently flowing stream or river in, or adjacent to, the wetland ___Seasonally flowing stream in, or adjacent to, the wetland **___Lake-fringe wetland = 2 points** **___Freshwater tidal wetland = 2 points**	Figure__
H 1.3. Richness of Plant Species Count the number of plant species in the wetland unit that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold and you do not have to name the species.* Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle If you counted: > 19 species points = 2 *List species below if you want to:* 5 - 19 species points = 1 < 5 species points = 0	

H 1.4. Interspersion of habitats

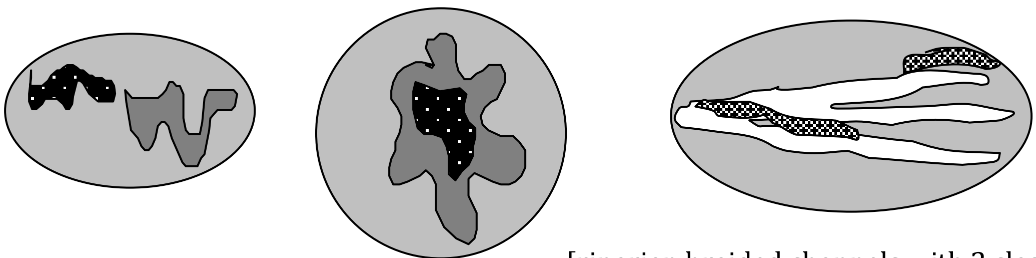
Figure__

Decide from the diagrams below whether interspersion between Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.

Provide map of Cowardin plant classes (same as H1.1)



None = 0 points   Low = 1 point   Moderate = 2 points



[riparian braided channels with 2 classes]

High = 3 points

NOTE: If you have four or more classes or three plants classes and open water the rating is always "high."

H 1.5. Special Habitat Features:

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

____Large, downed, woody debris within the unit (>4 inches diameter and 6 ft long).

____Standing snags (diameter at the bottom > 4 inches) within the unit

____Undercut banks are present for at least 6.6 ft (2m) **and/or** overhanging plants extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)*

____At least ¼ acre of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)*

____Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)

H 1. TOTAL Score - potential for providing habitat

Add the scores from H 1.1, H 1.2, H 1.3, H 1.4, and H 1.5

Rating of Site Potential: If score is **15 - 18 = H**

7 – 14 = M

0 – 6 = L

Record the rating on the first page

H 2.0 Does the landscape have the potential to support habitat at the site?	
H 2.1 Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat **+** [(% moderate and low intensity land uses)/2] **=** _____ *Provide map of land use within 1 km of unit edge* If total accessible habitat is: > 1/3 (33.3%) of 1 km circle *(~100 hectares or 250 acres)* points = 3 20 - 33% of 1 km circle points = 2 10 - 19% of 1 km circle points = 1 <10% of 1 km circle points = 0	Figure__
H 2.2 Undisturbed habitat in 1 km circle around unit. If: Undisturbed habitat > 50% of circle points = 3 Undisturbed habitat 10 - 50% and in 1-3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of circle points = 0	
H 2.3 Land use intensity in 1 km circle. If: > 50% of circle is high intensity land use points = (- 2) Does not meet criterion above points = 0	
Total for H 2 Add the points in the boxes above	

Rating of Landscape Potential: If score is 4- 6 = H
1-3 = M
< 1 = L

Record the rating on the first page

H 3.0 Is the Habitat provided by the site valuable to society?	
H3.1Does the site provides habitat for species valued in laws, regulations or policies? *(choose only the highest score)* Site meets ANY of the following criteria: points = 2 — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is a “priority area” for an individual WDFW species — It is a Natural Heritage Site as determined by the Department of Natural Resources — It scores 4 on question H2.3 of the wetland rating system — It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site scores 1-3 on question H2.3 of the wetland rating system points = 1 Site does not meet any of the criteria above points = 0	

Rating of Value: If score is 2 = H
1 = M
0 = L

Record the rating on the first page

APPENDIX C: Wetland Rating System for Western WA

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): ________________________________Date of site visit: ______

Rated by____________________________ Trained by Ecology? Yes__No___ Date of training______

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes__ No___

Map of wetland unit: Figure ____ Estimated size ______

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	
Score for Hydrologic Functions	
Score for Habitat Functions	
TOTAL score for Functions	

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply___

Final Category **(choose the "highest" category from above)** ☐

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		**Wetland HGM Class used for Rating**	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	**YES**	**NO**
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions*? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

If your wetland can be classified as a Freshwater Tidal Fringe use the forms for ***Riverine*** *wetlands. If it is Saltwater Tidal Fringe it is rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3 **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO – go to 4 **YES –** The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
____The wetland is on a slope (*slope can be very gradual*),
____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
____The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES –** The wetland class is **Slope**

5. Does the entire wetland unit **meet all** of the following criteria?

____ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

____ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

NO - go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES –** The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

D	Depressional and Flats Wetlands **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	***(see p.38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	Figure ___
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure ___
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0 Map of Hydroperiods	Figure ___
D	**Total for D 1** *Add the points in the boxes above*	
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* Grazing in the wetland or within 150 ft Untreated stormwater discharges to wetland Tilled fields or orchards within 150 ft of wetland A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging Residential, urban areas, golf courses are within 150 ft of wetland Wetland is fed by groundwater high in phosphorus or nitrogen Other______________________________ **YES** multiplier is **2** **NO** multiplier is **1**	***(see p. 44)*** multiplier _____
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	

D	Depressional and Flats Wetlands HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	Points (only 1 score per box)
	D 3. Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0	
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire unit is in the FLATS class points = 5	
D	**Total for D 3** *Add the points in the boxes above*	
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* Wetland is in a headwater of a river or stream that has flooding problems Wetland drains to a river or stream that has flooding problems Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems Other ________________________________ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 49)* multiplier ______
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	

R	**Riverine and Freshwater Tidal Fringe Wetlands** WATER QUALITY FUNCTIONS - Indicators that wetland functions to improve water quality	**Points** (only 1 score per box)
R	**R 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	***(see p.52)***
R	R 1.1 Area of surface depressions within the riverine wetland that can trap sediments during a flooding event: Depressions cover >3/4 area of wetland — points = 8 Depressions cover > 1/2 area of wetland — points = 4 If depressions > ½ of area of unit draw polygons on aerial photo or map Depressions present but cover < 1/2 area of wetland — points = 2 No depressions present — points = 0	**Figure ___**
R	R 1.2 Characteristics of the vegetation in the unit (areas with >90% cover at person height): Trees or shrubs > 2/3 the area of the unit — points = 8 Trees or shrubs > 1/3 area of the unit — points = 6 Ungrazed, herbaceous plants > 2/3 area of unit — points = 6 Ungrazed herbaceous plants > 1/3 area of unit — points = 3 Trees, shrubs, and ungrazed herbaceous < 1/3 area of unit — points = 0 Aerial photo or map showing polygons of different vegetation types	**Figure ___**
R	*Add the points in the boxes above*	
R	**R 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* Grazing in the wetland or within 150ft Untreated stormwater discharges to wetland Tilled fields or orchards within 150 feet of wetland A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging Residential, urban areas, golf courses are within 150 ft of wetland The river or stream linked to the wetland has a contributing basin where human activities have raised levels of sediment, toxic compounds or nutrients in the river water above standards for water quality Other______________________________ **YES** multiplier is **2** **NO** multiplier is **1**	***(see p.53)*** multiplier _____
R	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from R 1 by R 2 ***Add score to table on p. 1***	

Comments

R	**Riverine and Freshwater Tidal Fringe Wetlands** HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	R 3. Does the wetland unit have the potential to reduce flooding and erosion?	***(see p.54)***
R	R 3.1 Characteristics of the overbank storage the unit provides: *Estimate the average width of the wetland unit perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit)/(average width of stream between banks).* If the ratio is more than 20 points = 9 If the ratio is between 10 – 20 points = 6 If the ratio is 5 - <10 points = 4 If the ratio is 1 - <5 points = 2 If the ratio is < 1 points = 1 Aerial photo or map showing average widths	**Figure ___**
R	R 3.2 Characteristics of vegetation that slow down water velocities during floods: *Treat large woody debris as "forest or shrub". Choose the points appropriate for the best description.* (polygons need to have >90% cover at person height NOT Cowardin classes): Forest or shrub for >1/3 area OR herbaceous plants > 2/3 area points = 7 Forest or shrub for > 1/10 area OR herbaceous plants > 1/3 area points = 4 Vegetation does not meet above criteria points = 0 Aerial photo or map showing polygons of different vegetation types	**Figure ___**
R	*Add the points in the boxes above*	
R	**R 4. Does the wetland unit have the opportunity to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. *Note which of the following conditions apply.* There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding. There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding Other______________________________ *(Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike)* **YES** multiplier is **2** **NO** multiplier is **1**	***(see p.57)*** multiplier ______
R	**TOTAL - Hydrologic Functions** Multiply the score from R 3 by R 4 ***Add score to table on p. 1***	

Comments

<table>
<tr><td>L</td><td>Lake-fringe Wetlands
WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality</td><td>Points
(only 1 score per box)</td></tr>
<tr><td>L</td><td>L 1. Does the wetland unit have the <u>potential</u> to improve water quality?</td><td>(see p.59)</td></tr>
<tr><td>L</td><td>L 1.1 Average width of vegetation along the lakeshore (use polygons of Cowardin classes):
Vegetation is more than 33ft (10m) wide points = 6
Vegetation is more than 16 (5m) wide and <33ft points = 3
Vegetation is more than 6ft (2m) wide and <16 ft points = 1
Vegetation is less than 6 ft wide points = 0
Map of Cowardin classes with widths marked</td><td>Figure ___</td></tr>
<tr><td>L</td><td>L 1.2 Characteristics of the vegetation in the wetland: choose the appropriate description that results in the highest points, and do not include any open water in your estimate of coverage. The herbaceous plants can be either the dominant form or as an understory in a shrub or forest community. These are not Cowardin classes. Area of Cover is total cover in the unit, but it can be in patches. NOTE: Herbaceous does not include aquatic bed.
Cover of herbaceous plants is >90% of the vegetated area points = 6
Cover of herbaceous plants is >2/3 of the vegetated area points = 4
Cover of herbaceous plants is >1/3 of the vegetated area points = 3
Other vegetation that is not aquatic bed or herbaceous covers > 2/3 unit points = 3
Other vegetation that is not aquatic bed in > 1/3 vegetated area points = 1
Aquatic bed vegetation and open water cover > 2/3 of the unit points = 0
Map with polygons of different vegetation types</td><td>Figure ___</td></tr>
<tr><td>L</td><td>Add the points in the boxes above</td><td></td></tr>
<tr><td>L</td><td>L 2. Does the wetland have the <u>opportunity</u> to improve water quality?
Answer YES if you know or believe there are pollutants in the lake water, or polluted surface water flowing through the unit to the lake. Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.
Wetland is along the shores of a lake or reservoir that does not meet water quality standards
Grazing in the wetland or within 150ft
Polluted water discharges to wetland along upland edge
Tilled fields or orchards within 150 feet of wetland
Residential or urban areas are within 150 ft of wetland
Parks with grassy areas that are maintained, ballfields, golf courses (all within 150 ft. of lake shore)
Power boats with gasoline or diesel engines use the lake
Other____________________________________
YES multiplier is 2 NO multiplier is 1</td><td>(see p.61)

multiplier

_____</td></tr>
<tr><td>L</td><td><u>TOTAL</u> - Water Quality Functions Multiply the score from L1 by L2
Add score to table on p. 1</td><td></td></tr>
</table>

Comments

L	**Lake-fringe Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce shoreline erosion	**Points** (only 1 score per box)
L	**L 3. Does the wetland unit have the potential to reduce shoreline erosion?**	*(see p.62)*
L	L 3 Distance along shore and average width of Cowardin classes along the lakeshore (**do not** include aquatic bed): *(choose the highest scoring description that matches conditions in the wetland)* > ¾ of distance is shrubs or forest at least 33 ft (10m) wide — points = 6 > ¾ of distance is shrubs or forest at least 6 ft. (2 m) wide — points = 4 > ¼ distance is shrubs or forest at least 33 ft (10m) wide — points = 4 Vegetation is at least 6 ft (2m) wide (any type except aquatic bed) — points = 2 Vegetation is less than 6 ft (2m) wide (any type except aquatic bed) — points = 0 Aerial photo or map with Cowardin vegetation classes	Figure ___
L	*Record the points from the box above*	
L	**L 4. Does the wetland unit have the opportunity to reduce erosion?** Are there features along the shore that will be impacted if the shoreline erodes? *Note which of the following conditions apply.* There are human structures and activities along the upland edge of the wetland (buildings, fields) that can be damaged by erosion. There are undisturbed natural resources along the upland edge of the wetland (e.g. mature forests other wetlands) than can be damaged by shoreline erosion Other______________________________________ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p.63)* multiplier _____
L	**TOTAL - Hydrologic Functions** Multiply the score from L 3 by L 4 ***Add score to table on p. 1***	

Comments

S	Slope Wetlands WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	***(see p.64)***
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance*) points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0	
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___
S	**Total for S 1** *Add the points in the boxes above*	
S	**S 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity*. Grazing in the wetland or within 150ft Untreated stormwater discharges to wetland Tilled fields, logging, or orchards within 150 feet of wetland Residential, urban areas, or golf courses are within 150 ft upslope of wetland Other_______________________ **YES** multiplier is **2** **NO** multiplier is **1**	***(see p.67)*** multiplier _____
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	

Comments

S	Slope Wetlands HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	Points (only 1 score per box)
	S 3. Does the wetland unit have the potential to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	
S	*Add the points in the boxes above*	
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* Wetland has surface runoff that drains to a river or stream that has flooding problems Other______________________________ *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 70)* multiplier _____
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	

Comments

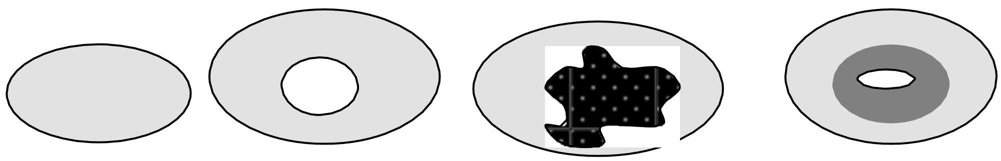
These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed ____Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ____The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* 4 structures or more points = 4 Map of Cowardin vegetation classes 3 structures points = 2 2 structures points = 1 1 structure points = 0	Figure ___
H 1.2. <u>Hydroperiods</u> ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* ____Permanently flooded or inundated 4 or more types present points = 3 ____Seasonally flooded or inundated 3 types present points = 2 ____Occasionally flooded or inundated 2 types present point = 1 ____Saturated only 1 type present points = 0 ____ Permanently flowing stream or river in, or adjacent to, the wetland ____ Seasonally flowing stream in, or adjacent to, the wetland ____ ***Lake-fringe wetland* = 2 points** ____***Freshwater tidal wetland* = 2 points** Map of hydroperiods	Figure ___
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species points = 2 *List species below if you want to:* 5 - 19 species points = 1 < 5 species points = 0	

Total for page ______

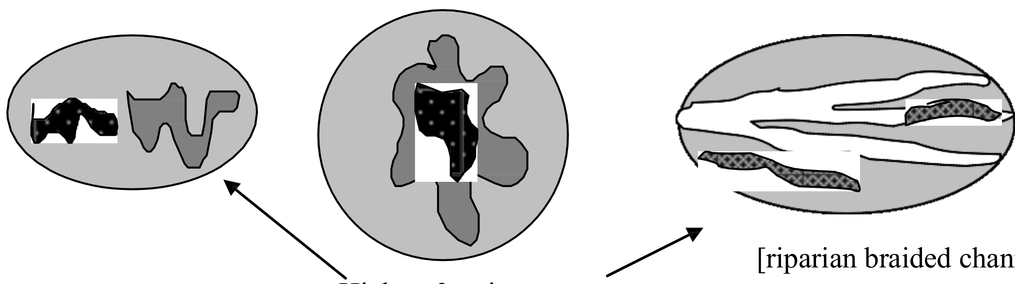
H 1.4. Interspersion of habitats *(see p. 76)*

Figure ___

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



None = 0 points   Low = 1 point   Moderate = 2 points



[riparian braided channels]

High = 3 points

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

H 1.5. Special Habitat Features: *(see p. 77)*

Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.

____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long).

____Standing snags (diameter at the bottom > 4 inches) in the wetland

____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m)

____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

____At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)*

____ Invasive plants cover less than 25% of the wetland area in each stratum of plants

NOTE: The 20% stated in early printings of the manual on page 78 is an error.

H 1. TOTAL Score - potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

Comments

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers ***(see p. 80)*** *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer**.** (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** Heavy grazing in buffer. **Points = 1** Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	**Figure ___**
H 2.2 Corridors and Connections ***(see p. 81)*** H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors*, *heavily used gravel roads*, *paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	

Total for page______

H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW</u> ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*** Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ____**Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*). ____**Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock. ____**Old-growth/Mature forests:** (<u>Old-growth west of Cascade crest</u>) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**<u>Mature forests</u>) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*). ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*). ____**Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ____ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).* ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has **3 or more** priority habitats **= 4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat **= 1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	

H 2.4 <u>Wetland Landscape</u> *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	
TOTAL for H 1 from page 14	
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? The dominant water regime is tidal, Vegetated, and With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO ___	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO go to SC 1.2	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

SC 2.0 Natural Heritage Wetlands ***(see p. 87)*** Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ____ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO ____not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs ***(see p. 87)*** Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No___Is not a bog for purpose of rating	**Cat. I**

SC 4.0 Forested Wetlands ***(see p. 90)*** Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO ___not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons ***(see p. 91)*** Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* YES = Go to SC 5.1 NO___ not a wetland in a coastal lagoon SC 5.1 Does the wetland meets all of the following three conditions? The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. The wetland is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

SC 6.0 Interdunal Wetlands ***(see p. 93)*** Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO __not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: Long Beach Peninsula- lands west of SR 103 Grayland-Westport- lands west of SR 105 Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	

APPENDIX D: Washington State Department of Transportation (WSDOT) Wetland Functions Characterization Tool for Linear Projects

Wetland Functions Field Data Form – WSDOT's BPJ Characterization *

Project: ____ Date: ________________

Wetland Name: _______________________________ Biologist: _____________________

A. Flood Flow Alteration
(Storage and Desynchronization)

1. Wetland occurs in the upper portion of its watershed.
2. Wetland is in a relatively flat area and is capable of retaining higher volumes of water during storm events, than under normal rainfall conditions.
3. Wetland is a closed (depressional) system.
4. If flowthrough, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris.
5. Wetland has dense woody vegetation.
6. Wetland receives floodwater from an adjacent water course.
7. Floodwaters come as sheet flow rather than channel flow.

Likely or not likely to provide.
(State your rationale.)

B. Sediment Removal

1. Sources of excess sediment (from tillage or construction) are present upgradient of the wetland.
2. Slow-moving water and/or a deepwater habitat are present in the wetland.
3. Dense herbaceous vegetation is present.
4. Interspersion of vegetation and water is high in wetland.
5. Ponding of water occurs in the wetland.
6. Sediment deposits are present in wetland.

Likely or not likely to provide.
(State your rationale.)

C. Nutrient and Toxicant Removal

1. Sources of excess nutrients (fertilizers) and toxicants (pesticides and heavy metals) are present upgradient of the wetland. 2. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. 3. Wetland provides long duration for water detention. 4. Wetland has at least 30% areal cover of live dense herbaceous vegetation. 5. Fine-grained mineral or organic soils are present in the wetland.	Likely or not likely to provide. (State your rationale.)
D. Erosion Control and Shoreline Stabilization *If associated with water course or shoreline.* 1. Wetland has dense, energy absorbing vegetation bordering the water course and no evidence of erosion. 2. A herbaceous layer is part of this dense vegetation. 3. Trees and shrubs able to withstand erosive flood events are also part of this dense vegetation.	Likely or not likely to provide. (State your rationale.)
E. Production of Organic Matter and its Export 1. Wetland has at least 30% areal cover of dense herbaceous vegetation. 2. Woody plants in wetland are mostly deciduous. 3. High degree of plant community structure, vegetation density, and species richness present. 4. Interspersion of vegetation and water is high in wetland. 5. Wetland is inundated or has indicators that flooding is a seasonal event during the growing season. 6. Wetland has outlet from which organic matter is flushed.	Likely or not likely to provide. (State your rationale.)

F. General Habitat Suitability

1. Wetland is not fragmented by development.
2. Upland surrounding wetland is undeveloped.
3. Wetland has connectivity with other habitat types.
4. Diversity of plant species is high.
5. Wetland has more than one Cowardin Class, i.e., (PFO, PSS, PEM, PAB, POW, etc.)
6. Has high degree of Cowardin Class interspersion.
7. Evidence of wildlife use, e.g., tracks, scat, gnawed stumps, etc., is present

Likely or not likely to provide.
(State your rationale.)

G. Habitat for Aquatic Invertebrates

1. Wetland must have permanent or evidence of seasonal inundation for this function to be provided.
2. Various water depths present in wetland
3. Aquatic bed vegetation present.
4. Emergent vegetation present within ponded area.
5. Cover (i.e., woody debris, rocks, and leaf litter) present within in the standing water area.
6. A stream or another wetland within 2 km (1.2 mi) of wetland.

Likely or not likely to provide.
(State your rationale.)

H. Habitat for Amphibians

1. Wetland contains areas of seasonal and/or permanent standing water in most years. (Must be present for this function to be provided)
2. Thin-stemmed emergent and/or floating aquatic vegetation present within areas of seasonal and/or perennial standing water.
3. Wetland buffer < 40% developed, i.e., by pavement and/or buildings.

Likely or not likely to provide.
(State your rationale.)

4. Woody debris present within wetland.

5. Lands within 1 km (0.6 mi) of wetland are greater than or equal to 40% undeveloped (e.g., green belts, forest, grassland, agricultural).

6. Other wetlands and/or an intermittent or perennial stream within 1 km (0.6 mi) of wetland.

Likely or not likely to provide.
(State your rationale.)

I. Habitat for Wetland-Associated Mammals

1. Permanent water present within the wetland. (Must be present for this function to be provided.)

2. Presence of emergent vegetation in areas of permanent water.

3. Areas containing dense shrubs and/or trees are present within wetland or its buffer.

4. Interspersion between different strata of vegetation.

5. Interspersion between permanent open water (without vegetation) and permanent water with vegetation.

6. Presence of banks suitable for denning.

7. Evidence of wildlife use, e.g., dens, tracks, scat, gnawed stumps, etc., is present.

Likely or not likely to provide.
(State your rationale.)

J. Habitat for Wetland-Associated Birds

1. Wetland has 30 to 50% shallow open water and/or aquatic bed classes present within the wetland.

2. Emergent vegetation class present within the wetland.

3. Forested and scrub-shrub classes present within the wetland or its buffer.

4. Snags present in wetland or its buffer.

5. Sand bars and/or mud flats present within the wetland.

Likely or not likely to provide.
(State your rationale.)

6. Wetland contains invertebrates, amphibians, and/or fish.

7, Buffer contains relatively undisturbed grassland shrub and/or forest habitats.

8. Lands within 1 km (0.6 mi) of the wetland are greater than or equal to 40% undeveloped (e.g., green belts, forest, grassland, agricultural).

Likely or not likely to provide.
(State your rationale.)

K. General Fish Habitat

(*Must be associated with a fish-bearing water.*)

1. Wetland has a perennial or intermittent surface-water connection to a fish-bearing water body

2. Wetland has sufficient size and depth of open water so as not to freeze completely during winter.

3. Observation of fish.

4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter.

5. Spawning areas are present (aquatic vegetation and/or gravel beds).

Likely or not likely to provide.
(State your rationale.)

L. Native Plant Richness

1. Dominant and codominant plants are native.

2. Wetland contains two or more Cowardin Classes.

3. Wetland has three or more strata of vegetation.

4. Wetland has mature trees.

Likely or not likely to provide.
(State your rationale.)

M. Educational or Scientific Value

1. Site has documented scientific or educational use.

2. Wetland is in public ownership.

3. Parking at site is suitable for a school bus.

Likely or not likely to provide.
(State your rationale.)

N. Uniqueness and Heritage

Criteria	Likely or not likely to provide. (State your rationale.)
1. Wetland contains documented occurrence of a state– or federally listed threatened or endangered species.	
2. Wetland contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the U.S. Fish and Wildlife Service, the WDNR's Natural Heritage Program, or WDFW's Priority Habitats and Species Program.	
3. Wetland is part of a National Natural Landmark designated by the National Park Service or a Natural Heritage Site designated by WDNR.	
4. Wetland has biological, geological, or other features that are determined rare by the local jurisdiction.	
5. Wetland has been determined significant by the local jurisdiction because it provides functions scarce for the area.	
6. Wetland is part of …);; an estuary,);; a bog,);; a mature forest	