POLLUTION CONTROL HEARINGS BOARD
FOR THE STATE OF WASHINGTON

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| AIRPORT COMMUNITIES COALITION,<br><br>Appellant,<br><br>v.<br><br>STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY; and THE PORT OF SEATTLE,<br><br>Respondents. | No. 01-133<br>No. 01-160<br><br>DECLARATION OF DYANNE SHELDON IN SUPPORT OF ACC'S MOTION FOR STAY<br><br>(Section 401 Certification No. 1996-4-02325 and CZMA concurrency statement, Issued August 10, 2001, Reissued September 21, 2001, under No. 1996-4-02325 (Amended-1)) |

Dyanne Sheldon declares as follows:

1. I am over the age of 18, am competent to testify, and have personal knowledge of the facts stated herein.

2. I am an environmental scientist, with over 20 years of specializing in wetland ecology and management related issues. I have a Bachelor's of Science in Botany, and a Master's of Education and Curriculum Development. I have worked as a wetland ecologist and land-use planner in the Pacific Northwest for over 20 years, and as a naturalist and educator for over 25 years. In 1981 I was one of three biologist hired by King County to assist in conducting King County's wetland inventory: the first such effort ever undertaken in the Pacific Northwest by a local jurisdiction. From that position I was hired as the Wetland Planner at



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King County, Washington, the first such 'local wetland planner' position in the country. I created the precedent setting wetland management program at King County: it established the first wetland rating system, the first requirements for buffers and setbacks on wetlands from development activities and the first requirements for compensatory mitigation ever demanded by a local or state government in this region. In my capacity as the only wetland planner for King County, I reviewed and conditioned or denied, every single development permit application that related to streams and/or wetlands submitted to the County between 1983 and 1988. In the intervening 17 years I have watched the consequences of some of the actions I allowed to be permitted at that time. As the first person to attempt to regulate wetlands for a local jurisdiction, through the process of placing conditions on individual permit applications, I did not have the benefit of any precedence, scientific 'research', or the results of long-term studies to inform my decision making process. The wetland rating system I helped develop in 1981 had never been used previously, no one in King County had ever required a buffer before, and certainly no one had ever required or attempted to create wetland mitigation in King County prior to the mid-1980's. The entire *science* of wetland management in the Pacific Northwest was barely in its conceptual stage: the Army Corps of



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Engineers 404 permitting requirements allowed up to 10 acres of wetland fill at that time. The wetland scientific and management community of the Pacific Northwest has watched and learned the lessons from those early attempts to 'protect' wetlands: the lessons learned and the mistakes made have informed and influenced wetland regulations and policies in this region for nearly the last two decades.

3. Based on my years of experience regulating wetlands and my knowledge of wetland ecology I have often been solicited by State and Federal agencies to actively participated in regulatory, policy and planning activities related to wetland and habitat issues throughout the region. In the mid-1980's I was asked frequently by the Washington State Department of Ecology Wetlands Section staff to participate formally and informally in processes to formulate State wetland management policy and regulatory framework and guidance. At the Department of Ecology's request I provided input on the original proposed State Wetland Management Program, the Wetland Rating System for Western Washington, the State Wetlands Integration Strategy, the State Model Wetland Ordinance (modeled directly on the King County Critical Area's Ordinance that I originally drafted in 1982 as King County's Wetland Management Guidelines). The State Model Wetland Ordinance contains requirements for buffers and building setbacks, rating systems, and



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replacement ratio's for compensatory mitigation: all issues for which Ecology actively contacted me and sought my input based on my professional experiences. As a consultant I've been hired by Ecology numerous times to provide technical expertise in wetland management related issues. In 1992 I was hired to conduct the field assessment element, to provide technical review and oversight, and to write key portions of the precedent setting study: Wetland Replacement Ratio's: Defining Equivalency (available at: http://www.ecy.wa.gov/pubs/92008.pdf). This was the first study prepared by Ecology that identified some of the key re-occurring design, implementation, maintenance and monitoring problems that resulted in compensatory mitigation failures in the region.

4. I have worked as an environmental consultant since 1988, and for more than 11 years as the Principal of Sheldon & Associates, Inc. At Sheldon & Associates I have continued to provide technical assistance and guidance to many local jurisdictions, functioning in an 'on-call' capacity as their technical critical areas staff. I have reviewed and conditioned many hundreds of permit applications and mitigation documents for numerous local city and county governments from simple applications to two of the largest single-owner development projects ever approved in King County: Redmond Ridge and Trilogy, both more than 1000 acres in



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size. These two Urban Planned Developments (UPD's) have many parallel issues to the STIA Third Runway project: they are large and complex, they are very controversial, and there have been years of permit submittals, negotiations, and conflicting expert testimony and acrimonious public hearings. The two UPD projects were in planning stages, permit application review and conditioning phases for over 10 years, and have now been in the construction phases for more than 3 years. The level of scrutiny and analysis of the applications, the complexity and perceived 'bomb-proof' nature of the permit conditions, and the subsequent reality of implementation, permit condition 'interpretation', and enforcement on these projects has strongly influenced my opinions on the methods, means, and implications of well-crafted and non-ambiguous conditions language. The harsh lessons learned from attempting to implement what were then precedent-setting permit conditions has been sobering, even with a relative willing applicant. That ongoing experience has informed my professional opinions on the need to grant ACC's request for a stay of the 401 Certification for STIA.

5. I have designed successful wetland compensation projects for open water, emergent, shrub and forested freshwater systems, as well as several estuarine restoration projects. I have done the technical design,



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coordinating with civil and hydraulic engineers, as well as our on-staff landscape designers. I have provided construction oversight and long-term monitoring of our own designs and of compensation projects designed by others. Observing the construction and installation of our own work, and that of others, I have learned many crucial elements that are often overlooked or not accounted for in compensation design. This knowledge, along with 20 years of watching the impacts caused to natural ecosystems despite the efforts of the best-intended permit conditions, is reflected in my professional opinions of the effectiveness of the 401 permit conditions crafted from Ecology for the STIA Third Runway project.

6. I was asked by the Airport Communities Coalition (ACC) to review the documentation provided by the Port of Seattle describing proposed development at Sea-Tac Airport (STIA) for possible impacts to wetlands. My review has included the Port's Wetlands Delineation and Wetland Functional Assessment documents, the Natural Resources Mitigation Plans (NRMP), the JARPA permit application and other documents and engineering plans related to activities affecting wetlands. My comments from previous reviews were sent to the U.S. Army Corps of Engineers on February 20th, 2001. I have also reviewed Ecology's recent CWA Section



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401 certification decision dated August 10, 2001, and amended September 21, 2001.

7. I have reviewed declarations and briefs relating to the ACC request for stay made by various Ecology staff persons, their consultants, consultants for the STIA Third Runway project, and others providing consultation to the ACC.

8. I understand that the ACC has filed an appeal with the Pollution Control Hearing Board challenging the Section 401 Certification (No. 1996-4-02325) and the CZMA concurrency statement, issued August 10, 2001, and amended September 21, 2001 to the Port of Seattle, and that ACC has requested a stay until the questions it has raised concerning compliance with the Clean Water Act have been resolved by the Pollution Control Hearings Board (PCHB). I am submitting this declaration in support of ACC's appeal and motion for stay because I am convinced that the Natural Resource Mitigation Plan (NRMP) and related measures proposed by the Port of Seattle fail to accurately describe all potential impacts to wetland resources associated with the STIA Third Runway and that the conditions imposed by Ecology through the 401 Certification are inadequate to assure adequate compensation for the identified losses in wetlands and wetland functions. Granting of a stay, while the merits of ACC's appeal are considered by the Board, will



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prevent the Port from permanently eliminating aquatic resources within the Miller, Walker and Des Moines Creek watersheds. Dismissal of the stay will result in irreparable harm to public resources: the documented permanent loss of wetland and stream resources, without adequate compensation that meets Ecology's own standards. It will also establish conditions that will likely have undocumented secondary adverse effects on wetlands and downstream resources.

9. One key issue of contention is the adequacy and efficacy of the proposed compensatory mitigation for the documented impacts to wetlands from the project. Speaking solely to the issue of quantifying compensation (not at this point, to the ecological adequacy of what has been proposed) I rely upon published guidance from Ecology[1,2]. The Port has identified 18.37 acres of permanent impacts, and Ecology has identified an additional 2.05 acres of 'long-term' impacts, resulting in 20.42 acres of wetland requiring compensation.

10. Using information provided in the NRMP, Table 3.1-1, the following acres of impacts to wetland vegetation types are anticipated:

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[1] Mc. Millan, Andy. How Ecology Regulates Wetlands. April 1998. Ecology publication: 97-112, available at: http://www.ecy.wa.gov/pubs/97112.pdf; copy attached.



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8.17 acres forested wetland
2.98 acres shrub wetland
7.22 acres emergent wetland

Using the replacement ratio's from "How Ecology Regulates Wetlands", Category 2 and 3 wetlands require a variable ratio dependent upon the type of wetland vegetation community to be impacted and the type of compensation (creation or restoration) proposed. The total wetland compensation required (if all the compensation was done by using creation or restoration, not enhancement) using Ecology standards would be:

forested class: 3:1 ratio X 8.17 acres of impact = 24.51 acres
shrub class: 2:1 ratio X 2.98 acres of impact = 5.96 acres
emergent class: 2:1 ratio X 5.22 acres of impact = 10.44 acres
Type 4 wetlands: 1.25:1 X 2.01 acres of impact = 2.51 acres
TOTAL for 18. 37 acres of impact = **43.42 acres**

(Of the 18.37 acres of wetland impacts identified in Table 3.1-2 of the NRMP, 90% of them are Category 2 and Category 3 wetlands. A lower replacement ratio of 1.25:1 would be required for 2.01 acres of the Category 4 wetlands which were assumed to be emergent for these estimations). If one assumes that the additional 2.05 acres of additional wetland that Ecology has identified in the 401 Certification as required compensation are either shrub or emergent wetland, it would require an

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[2] Castelle, A., et. al. Wetland Mitigation Replacement Ratios: Defining Equivalency. 1992. Ecology



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additional 4.1 acres of compensation. That means that the total required acreage, per Ecology standards, would be:

**TOTAL Compensatory Mitigation: 47.52 acres**

For reasons that are not fully explained, Ecology in their 401 Certification has chosen a 1:1 replacement ratio for both wetland creation and restoration (the Port would get 1 acre of credit for every acre of wetland that they create or restore). From Ecology's own "How Ecology Regulates Wetlands" (pg. 15): "...historically a replacement ratio of 1:1 was common...In recent years the ratio has increased and seldom is a 1:1 ratio acceptable to any regulatory agency. This increase is due primarily to two factors: 1) the likelihood of success of the compensatory mitigation, and 2) the length of time it takes to successfully create or restore a wetland." Although the Ecology publication identifies that the ratios are guidelines, subject to some variability, it is unclear as to why the 401 Certification as issued by Ecology gives the Port one acre of wetland 'credit' for every single acre of wetland creation or restoration.

11. In addition, Ecology's "How Ecology Regulates Wetlands" (pg. 16), states, "For wetland *enhancement* (emphasis added) the (replacement) ratios

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publication 92-08. available at: http://www.ecy.wa.gov/pubs/92008.pdf.



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are doubled. Enhancement as compensation for wetland losses results in a net loss of wetland area and a net gain in wetland function from enhancement is usually less than from creation or restoration." That means that for every acre of forested wetlands that the Port proposes to fill and compensate by enhancing existing wetlands, they should be providing 6 acres of enhanced wetlands . For just the 8.17 acres of forested wetlands identified to be filled, that would require 49.02 acres of enhancement compensation. Yet the 401 Certification allows the Port to receive 1 acre of 'credit' for every 2 acres of wetland they enhance, regardless of whether they are impacting forest, shrub or emergent wetlands, with no clear scientific justification provided.

12. The Port is proposing 6.6 acres of in-basin restoration, and 29.98 acres of out-of-basin wetland creation. Using an average ratio of a 2.5:1 ratio for restoration/creation (averaging 3:1 and 2:1 for forest vs. shrub or emergent) those numbers would only compensate for 14.63 acres impacts. The 40.96 acres of total wetland enhancement would only compensate for just over 9 acres of impacts. The total compensation credit, as estimated, then would be roughly 23 acres, not 167 acres as stated in the 401 Certification, to compensate for the identified impacts of over 20 acres. Thus the 401 Certification would allow the Port to just meet the acreage standards for compensatory mitigation for the *known*



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impacts by using in-basin and out-of-basin compensation. There are no 'extra mitigation credits' provided in the NRMP, there is no compensation provided for the anticipated secondary impacts to wetlands.

13. The 401 Certification identifies a whopping total of 167 acres of compensatory mitigation for the project as "unprecedented". What also appears to be unprecedented is Ecology granting mitigation "credit" for simply *preserving* existing wetlands in the project area, and for enhancing *upland* buffer habitats. The premise of all wetland regulations (including Ecology's own Model Wetland Ordinance) is that wetlands are to be preserved and only altered when reasonable use of a property would be denied. I've never seen a written or implied public or scientific policy that one should get *compensation credit* for not filling wetlands: that implies that all wetlands are expected to be filled and an applicant should get compensation credit for simply *not* filling them.

14. The 401 Certification identifies *preservation* as one aspect of 'mitigation', and gives the applicant compensatory credit for it. However, the term 'mitigation', as defined in RCW 43.21C.110.84-05-020 for SEPA, is a sequence of actions: avoidance of impacts, minimizing impacts, rectifying impacts, reducing impacts, compensating for impacts, and monitoring impacts. It in no manner implies that 'mitigation credit'



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should be given for an applicant who preserves sensitive areas on their properties. The law directs that an applicant (or an agency reviewing an application) must proceed through the sequential steps of avoidance, minimization, and rectifying impacts BEFORE getting to the option of compensating for impacts. This jump to 'compensation' without going through the preceding sequential steps is one of the most common misinterpretations of 'mitigation'. Ecology mistakenly identifies astoundingly high mitigation ratios as having been provided, and implies substantial over-compensation on the part of the Port.

15. In a similar vein, providing compensation credit for wetland losses through improvements to *upland* forest habitats on a calculated acreage basis is not justified ecologically nor in Ecology's own guidance documents. That is not to argue that upland habitats are not critical for various life stages of some aquatic species, however, calculating over 50 acres of *wetland* mitigation acreage for improvement to *uplands* is not justified. If Ecology feels that it is ecologically sound to provide wetland credit for upland habitats, perhaps they should have required the Port to first identify the total acreage of upland habitat proposed to be eliminated by the project, and then compare relative functional loss to functional gain. That might begin to provide a more accurate ecological snapshot of the project impacts.



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16. The 401 Certification should be stayed because Ecology has been unable to make the Port clearly identify all permanent wetland impacts or for the Port to provide adequate compensation for those identified losses. Attachment B of the 401 Certificate contains five **pages** of corrections, additional data needs, clarifications of Port submitted plans, and revisions still required by Ecology of the applicant to the *approved* plans. When there remains so many requests for revisions, requests for additional data, and requests for explanation of plan sheets and drawings, Ecology should not have deemed the analysis as complete. As an example, on pg.3 of Appendix B of the 401 Certification, under the item labeled Appendix D Sheet C3, Ecology is asking the applicant to clarify how hydrologic support will be provided to two wetlands after construction. If Ecology cannot determine how those wetlands will have hydrologic support after construction, then Ecology cannot determine that the wetlands won't be adversely affected by the project, and they have not been able to accurately determine extent of likely impacts to wetlands and therefore to downstream water quality. There are multiple requests for clarifications in the 401 conditions from Ecology to the Port. The Port has failed to adequately address wetland issues, and Ecology acknowledges that in a *de facto* manner by requesting clarification and



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additional analysis specifically related to long-term wetland sustainability which influences water quality.

17. One of the gravest concerns I have regarding the issuance of the 401 Certification is the ability of the Department of Ecology to implement and enforce the conditions of the 401. Many conditions are ambiguous and unclear, leaving the way for broad interpretation and misrepresentation once the Port receives all their permits in hand. The Port has not been a willing participant in this permitting review and conditioning process, as is evidenced by the fact that there remain significant issues that the Port refuses to willingly modify through the *years* of Ecology's review. For example, the 401 Certification Condition # 4, states that the Port has misidentified 2.05 acres of wetland impacts as 'temporary' while Ecology has determined those losses as permanent. This issue was raised by several reviewers of previous Port documents, yet the Port retains the position that the impacts are temporal. Ecology has not held the Port fully accountable, but only lists several options of where the Port might consider developing additional in-basin compensation. In reviewing and conditioning permits designed to protect public resources, it is inappropriate for Ecology to accept flawed analysis and to suggest to the applicant how the Port might provide a more acceptable project. This kind of condition implies to me the state



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of this review and conditioning of this permit process: it appears that Ecology staff has become weary of fighting with the Port and their consultants, so conditions of the 401 are proffered as a means to resolution, rather than assuring adequate analysis and resolution of all potential adverse effects prior to issuance of the permit.

18. The scale of this project shifts into sharp focus when one realizes that this seemingly minor contested issue of 2.05 acres of wetland fill would require any other applicant to conduct a full Alternatives Analysis and apply for a Section 401 Water Quality Certification and an Individual Permit through Section 404 of the Corps. In the context of what the Port is proposing with their proposal, that 'small issue' seems only a minor detail. What would generate the need for a complete 401 Certification and Individual Permit and Alternative Analysis process has been regulated to a minor "housekeeping issue" through Ecology's 401 conditions.

19. In addition to the identified 20+ acres of wetland loss from the STIA project, there remains the issue of how much additional acreage of wetland will be adversely affected by the construction and permanent conditions resulting from the construction of the project and its on-site compensation. Although the 401 conditions and monitoring are supposed to assure that unforeseen adverse impacts are rectified and/or



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some contingency action is implemented, the reality is, for some consequences, there is no appropriate contingency action, and the damage will be irrevocable. As an example: I previously raised in written comments the issue of placing the relocated Miller Creek through Vacca farms peat bog by placing it on an impervious fabric 'substrate', thus hydrologically isolating the stream from the groundwater in the wetlands (a source of late-season stream flow). In their response comments, the Port's consultants identified the type of geotextile fabric they were proposing to use as a liner, stating the degree of permeability of the fabric. We subsequently did some research on the fabric samples provided by the applicant to the Army Corps of Engineers staff, and found first off that the product manufacturer that the Port identified as a source no longer made the material. Further research identified a new source for similar fabric. We described the proposed use of the fabric (to line a stream channel on top of a peat substrate, then back-filled with gravel, sands, and silts (sediment)) and asked the National Sales and Technical Manager of the John Manville Corporation (Mr. Dean Norman, July, 2001) how he thought the fabric would function to allow the free exchange of water in perpetuity in such a setting. Mr. Norman did not have any data, nor did his two technical field experts at John Manville or Fluid Systems (suppliers of the fabric),



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that the fabric, put to such use, would continue to remain pervious over-time. He did state, that, "logically, the fabric would act as a filter and over time might become less and less pervious". The point of this description is not to argue whether or not fabric, placed under a created stream channel will remain pervious or it won't, (neither the Port's consultants nor I, nor the fabric's manufacturer can testify that it will or that it won't: there is no data). The point is this: what will be Ecology staff's response if the stream channel/wetland interflow function fails? One of the functional gains the NRMP identifies is relocation and restoration of Miller Creek into a floodplain setting: yet key elements of that future condition are pure speculation (the fabric remaining permeable). Although a monitoring plan and contingency actions have been identified, how exactly will Ecology implement them? The Port will have its permits, the runway will be built and operational, and there will be no 'hammer' to encourage the Port to design and implement a 'fix' (that begs the question of how one would propose to 'fix' a broken stream channel bottom...). NRMP Table 5.2-12 does not identify a design criteria or performance standard linked to creating and maintaining that interflow. Although it is implied as a key element in increasing stream/floodplain functions over existing conditions, there is no performance standard, evaluation method or contingency plan if it fails.



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20. Another key element of the Port's proposed enhancement and replication of wetland functions in the project area is based on sophisticated models of infiltration of groundwater through the fill, to discharge into downslope wetlands. The infiltration models are as accurate as the assumptions on which they are built: if the assumptions are found to be in error, how would anyone begin to 'fix' the downslope wetlands?

21. To assure the protection of the State's water quality, Ecology, through the conditions of the 401 Certification has to assure the ability to enforce the permit conditions, measure the outcomes, and require contingency actions if they should become necessary. The manner in which many of the 401 conditions are written will preclude Ecology's ability to enforce them. I do not offer that observation lightly. I base that concern on my professional experience for the last 10 years of attempting to help craft and then enforce the most comprehensive and restrictive development conditions ever imposed by King County on two land-use applications (each project over 1,000 acres in size). Condition language that the applicant agreed to at the time of permitting, and which seemed so clear and unambiguous has been transformed over the years. Intention and specificity has given way to interpretation and literal construction: even with a *willing* applicant team at the time of permitting, the harsh reality of attempting to enforce sparsely crafted conditions is daunting.



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Ecology's conditions are too often vague and assume a cooperative collaborative environment in future conditions as the Port proceeds with its project. Protection of public resources is at stake, from degradation of water quality, changes in wetland hydroperiod, to discovering unexpected realities from predicted modeling conditions bad assumptions. Once the wetlands are filled and once the runway is operational, the technical ability of Ecology staff, no matter how qualified and how motivated, will not be sufficient to assure the protection of public resources and preservation of water quality standards in Miller, Des Moines, and Walker Creek once the Port has their permits in hand. Without granting this stay and assuring that adequate analysis has been completed, the Port will begin filling wetlands in an unalterable path towards completion of their project.

22. Granting of the stay is critical at this juncture, even if the Port states that they only intend to fill 2.8 acres of wetland initially. The rationale for the fill is logistics: to gain access to the surrounding non-wetland landscape to continue the on-going filling operations. To justify denying the stay because "only 2.8 acres of wetland would be immediately filled" ignores the consequences of the ongoing filling operation within the upstream contributing area to the existing wetlands on site. As long as the Port continues to fill uplands upslope of the wetlands, they continue



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to cause likely changes to the contributing basins and shallow ground-water interflow to those wetlands: filling the uplands *will* affect the wetlands downslope by changing the size and configuration of their contributing basins. In addition, pre-construction monitoring of wetland hydroperiods has been requested by Ecology and the Corps in wetlands identified to remain, post-project. The rationale for that hydrologic data is to use pre-project data to establish pre-existing conditions as a means to confirm "no adverse effects" in post-project conditions. If no "pre-project" data exists (i.e., the Port has only collected hydrologic data since the filling in the uplands has commenced), then it will be impossible for Ecology or the Corps to determine if the STIA project has had an effect. This may be a moot point: the 401 Certification conditions unbelievably do not require the Port to match or even compare pre and post project hydrologic conditions in the wetlands proposed to remain below the project area. The Performance standard is related to the relative wetness of the vegetation (the WIS rating per species) present in the wetlands, plus a re-delineation of the wetland edge to confirm it has not shrunken. This type of performance criteria fails to recognize that wetland soils, perhaps the most important defining parameter of wetland delineation, will not change as quickly as the vegetation and/or water: therefore wetland soils will persist to the historic pre-project extent even if



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the Port fails to get adequate water to the wetland. A stay of the 401 Certification is justified in my opinion to allow/encourage Ecology to re-visit their proposed performance standards to establish parameters that have sufficient substance to assure the long-term protection of aquatic resources, including water quality.

I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

DATED this 5 day of October, 2001, at Seattle, Washington.

Dyanne Sheldon



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# How Ecology Regulates Wetlands

**An introduction to:**

**Regulatory authority**
**Wetland definitions and delineation**
**Wetland characterization and function assessment**
**Wetland mitigation**
**Buffers**
**and more**

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# 1. Introduction

This document provides an overview of the role that the Department of Ecology plays in regulating wetlands and the factors that go into the agency's wetland permitting decisions. This document does not provide new qualifications or requirements for the regulation of wetlands. It provides a reference to wetland regulations but in no manner supercedes or adds to existing legal authority.

The field of wetland science and the wetland regulatory framework are constantly changing. In addition, wetlands are dynamic and highly variable ecosystems. Because of this variability, Ecology has developed general wetland regulation guidelines that allow the agency to incorporate current wetland science, tailor the level of regulation to the type of wetland being affected, and respond to site-specific situations.

The guidelines help provide predictability while allowing the flexibility that is needed to achieve ecologically and economically sound solutions on individual sites.

Ecology views regulations as only one tool to protect wetlands. Along with regulations, there are many non-regulatory opportunities to conserve wetland resources. Ecology's view of comprehensive wetlands protection includes voluntary stewardship actions, taken by landowners and local communities, to actively preserve, restore and enhance existing wetlands. Ecology's wetlands protection efforts focus on educating and informing wetland owners about all their options and opportunities - both regulatory and non-regulatory (see Chapter 10).

Given the constantly changing nature of wetland science and regulation be aware that this guidance document is subject to periodic revision. **Make sure you have the most recent version of this document before relying upon this information.**

In addition, be aware that other wetland regulatory agencies may have different policies, requirements or approaches. Ecology strives to achieve consistency among federal, state, and local agencies in wetlands regulation but we cannot speak for other agencies.

# 2. Wetland Regulatory Authority

The following descriptions of some key laws and regulations explain the basis for Ecology's involvement in wetland regulation. For a more detailed description of specific laws and regulations see Ecology's *Wetland Regulations Guidebook*, Ecology Pub. No. 88-5 (see Appendix B for ordering information).

## State laws and regulations

Two state laws, the State Water Pollution Control Act and the Shoreline Management Act, give Ecology authority to regulate wetlands. These are outlined below.

Ecology provides technical assistance to other agencies that regulate wetlands under separate statutes, such as the Hydraulic Code (Department of Fish and Wildlife) and the Forest Practices Act (Department of Natural Resources).

In addition, Ecology provides assistance to local governments under the Growth Management Act. This includes assistance in developing comprehensive plan policies and development regulations, and in implementing local wetland regulations.

Finally, Ecology uses the State Environmental Policy Act (SEPA) process as a mechanism to identify potential wetland-related concerns early in the permitting process. While substantive authority under SEPA can be used to require additional wetland protection, it is used primarily as a means of identifying impacts that are regulated under other statutes. For more information on these other statutes consult the *Wetland Regulations Guidebook.*

### State Water Pollution Control Act (Chapter 90.48 RCW)

This statute was originally passed in 1945 and has been modified several times since. The Act was created to protect the quality of all waters of the state for public health and enjoyment. It is written broadly and mandates the protection of all uses and benefits of water including water supply, commerce and navigation, recreation, fish and wildlife habitat and aesthetics.

The Act gives Ecology "jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland waters, salt waters,

water courses, and other surface and underground waters of the state of Washington."

Although wetlands are not specifically mentioned in the statute, all wetlands are either surface or underground water, or both. In addition, a Thurston County Superior Court decision in 1993 ruled that all wetlands "bigger than puddles" are waters of the state (No. 91-2-02895-5, *Building Industries Association of Washington, et al vs. City of Lacey, et al.).* Amendments to state water quality standards adopted in 1997 included wetlands in the definition of surface waters to clarify that they are waters of the state.

The Act's definitions of "pollution" (90.48.020) and "discharges" (90.48.080) are broad and include all of the impacts that typically degrade wetland functions, including placing fill and discharging stormwater runoff. The Act gives Ecology wide latitude in protecting waters of the state and designates Ecology as lead state agency for implementing provisions of the federal Clean Water Act including Section 401 (see "Federal Laws" section, below, for more detail on Section 401).

The implementing regulations for the statute include **Surface Water Quality Standards** (Chapter 173-201A WAC) - the primary regulations that cover wetlands and other waters of the state. Because wetlands are so variable there are no specific numerical standards for wetlands. A single standard for pH or dissolved oxygen for wetlands is not feasible because physical and chemical characteristics vary widely from wetland to wetland.

The **antidegradation policy** (Chapter 173-201A-070 WAC) provides the basis for protecting wetlands. The federal government requires that state water quality standards include an anti-degradation policy.

Washington's antidegradation policy states that "existing beneficial uses shall be maintained and protected and no further degradation which would interfere with or become injurious to existing beneficial uses shall be allowed." Strict adherence to this policy would mean that Ecology could not permit any alteration of a wetland which impairs the functions of the wetland as they relate to any of the defined beneficial uses such as water supply, recreation, fish and wildlife habitat, aesthetics, commerce, etc. However, the regulations allow for short-term impacts to waters of the state as long as the degradation does not "interfere(s) with or become

injurious to existing water uses or causes long-term harm to the environment [WAC 173-201A-110 (2)]."

Ecology is able to permit alterations of wetlands, including filling of a wetland, only if the net result of the action does not result in long-term harm to the environment. Generally, this allows the agency to permit projects with minimal or short-term impacts to wetlands. In addition, with adequate mitigation that effectively offsets the impacts, Ecology can permit projects that would otherwise not comply with the regulations. In these cases, we apply the guidelines in this document to help evaluate the project.

The primary mechanism for implementing the provisions of this statute is the state **water quality certification** issued pursuant to Section 401 of the federal Clean Water Act. Because most wetland impacts are regulated under Section 404 of the federal Clean Water Act, we have used this process to address the state's concerns with wetland impacts. However, for those activities that degrade wetlands and fall outside the purview of the 404 program, we may use other state water quality permitting processes such as wastewater discharge permits, short-term water quality modifications, and administrative orders.

### Shoreline Management Act (Chapter 90.58 RCW)

The Shoreline Management Act (SMA) was enacted in 1971 and regulates only a portion of the wetlands in the state. The SMA regulates only wetlands within 200 feet of shoreline water bodies and wetlands "associated" with these water bodies. (Approximately 30% of the state's freshwater wetlands and all of the tidal wetlands are under SMA jurisdiction.)

Ecology's role in regulating wetlands under the SMA is threefold:
1) determining which wetlands are within the jurisdiction of the law;
2) reviewing and approving local regulations which guide permit decisions; and
3) reviewing and either approving or appealing local government permit decisions (depending on the type of permit).

**Determining jurisdiction:** The Shoreline Act directs Ecology to determine which wetlands are regulated under the SMA. The regulations governing which wetlands are in SMA jurisdiction are

found in WAC 173-22. There are many factors to consider in making a wetland jurisdictional determination (see Appendix F).

**Reviewing local plans:** Ecology is also involved in the development and approval of local Shoreline Master Programs (SMPs) which contain the goals, policies and regulations used by cities and counties to guide their shoreline permit decisions. We encourage local governments to include the provisions of our various wetland guidelines in their Master Programs. Many local SMPs have not been updated in the past 10 years and thus, do not contain appropriate wetland protection language. However, with the passage of the Growth Management Act, most local governments are, or will be, revising their SMPs to be consistent with the GMA.

**Reviewing local permits:** The third role that Ecology plays in regulating wetlands under the SMA is in our review of local government permitting decisions. We must review and either approve, condition, or deny all Shoreline *Variance* permits and Shoreline *Conditional Use* permits. However, if we believe that a Shoreline *Substantial Development* permit issued by a local government does not adequately address wetland impacts we have the right to appeal that permit. In our review of these permits we consider the language in the local SMP, the policies of the SMA and our understanding of the project impacts to the wetland. Our wetland guidelines are useful in assessing the impacts and the adequacy of any proposed mitigation.

## Federal Laws

### Clean Water Act

Section 404 of the federal Clean Water Act regulates the placement of fill in waters of the United States including wetlands. The US Army Corps of Engineers administers the permitting program for this law. (For more detailed information on this law see the *Wetlands Regulations Guidebook*, Ecology Pub. #88-5.)

Section 401 of the federal Clean Water Act requires that proposed dredge and fill activities permitted under Section 404 be reviewed and certified by the designated state agency that the proposed project will meet state water quality standards. The federal permit is deemed to be invalid unless it has been certified by the state. This

certification is required on all Corps of Engineers General Permits as well as all Individual Permits.

The Department of Ecology is designated by statute as the state agency responsible for issuing this water quality certification. For Section 404 Individual Permits and some General Permits, applicants must contact Ecology and receive an approved water quality certification. For some General Permits a blanket certification has been issued. Our role in this process is outlined in the above section of the state clean water act and below in the section on permit processes.

### Coastal Zone Management Act

Ecology is also responsible for implementing provisions of the federal Coastal Zone Management Act. This statute requires that all federal licenses and permits be reviewed by the state for consistency with the state's coastal zone management plan. This is only applicable to projects within the 15 coastal counties of Washington. For those projects within SMA jurisdiction, compliance with Shoreline Management Act provisions is sufficient to meet CZMA consistency requirements. When a project is outside of SMA jurisdiction but still within the coastal zone, Ecology must issue a separate notice of consistency.

## State Wetlands Goals

The only formally adopted state goals on wetlands are contained in two Executive Orders signed by Governor Booth Gardner.

**Executive Order 89-10**, signed in December 1989, adopted the interim goal of "no overall net loss in acreage and function of Washington's remaining wetlands base" and the long term goal "to increase the quantity and quality of Washington's wetlands resource base." These goals originated in the work of the National Wetlands Policy Forum during the late 1980s.

It is important to understand that the goal of "no net loss" does not mean that no further wetlands will be lost; rather, that mitigation and non-regulatory restoration will offset wetland losses. It is expected that loss of wetland acreage and function will be minimized through regulation and that no net loss and a long-term

gain in wetland resources will only occur through a combination of regulation and non-regulatory restoration of wetlands in the state. Hence, the state's regulatory programs are designed to address all significant impacts to wetlands and, where losses are permitted, to require that equivalent wetland resources are provided through wetland creation, restoration, and enhancement.

**Executive Order 90-04**, signed in April 1990, directs state agencies to do a number of things to better protect wetlands. This Executive Order has been misinterpreted by some as providing new legal authority to state agencies to protect wetlands. In fact, the Order simply directs state agencies to use their existing authority to protect wetlands "to the extent legally permissible." The primary directive contained in 90-04 provides that state agencies apply the definition of mitigation found in SEPA in sequential order (see Chapter 5 on Mitigation). The remainder of 90-04 directed different agencies to conduct a variety of activities to improve their wetlands protection efforts.

# 3. Wetland Definitions and Delineation

Many people are confused about the difference between wetland definition and wetland delineation. The terms are often used interchangeably, thus contributing to the confusion. Simply put, a wetland *definition* tells what a wetland is, and a *delineation method* tells how to find a wetland on the ground.

Most **wetland definitions** include some reference to the presence of water, soil and vegetation. A **wetland delineation method** describes how a person determines if enough water, and the right types of soil and vegetation are present in a given site. There have been several different wetland definitions developed for different purposes throughout the country. There have also been several delineation manuals developed to implement the same wetland definition.

In understanding wetland regulation it is important to distinguish between "biological," "jurisdictional," and "regulated" wetlands.

**Biological Wetland**: A biological wetland is one that is determined to have the physical, biological and chemical characteristics to be called a wetland. There are several definitions that were developed over the years that attempted to describe a biological wetland. The most recent one, called *a reference definition* by the National Academy of Sciences, states: "A wetland is an ecosystem that depends on constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation at or near the surface and the presence of physical, chemical and biological features reflective of recurrent, sustained inundation or saturation. Common diagnostic features of wetlands are hydric soils and hydrophytic vegetation. These features will be present except where specific physiochemical, biotic, or anthropogenic factors have removed them or prevented their development."

**Jurisdictional Wetland**: A jurisdictional wetland is one that a particular law has determined should be regulated by the provisions of the law. It may be the same as a biological wetland or it may

represent a subset of biological wetlands. For example, the Shoreline Management Act has defined wetlands under its jurisdiction as being all wetlands associated with tidal waters and certain lakes and streams. Most freshwater wetlands in the state are not within shoreline jurisdiction. The SMA definition further restricts jurisdictional wetlands by specifically excluding artificial wetlands intentionally created from non-wetland sites such as canals, farm ponds and landscape amenities. Thus, even though some of these areas may meet the above biological definition, the SMA would not regulate them.

**Regulated Wetland**: While most jurisdictional wetlands are going to be regulated to some extent, there are always certain activities that are exempt from a given law. This results in some jurisdictional wetlands not being regulated. For example, a wetland may fall under SMA jurisdiction because it meets the specific criteria contained in the SMA wetland definition. However, if the wetland occurred in an area that had been historically farmed, a landowner could plow the wetland to plant a crop without having to get a shoreline permit because this activity is exempt. Thus, some people have been confused by the notion that an area may meet the jurisdictional definition of a wetland, are delineated as such, and still be exempt from any regulation because of the particular activity proposed.

### Recent changes to laws and regulations

Recent state legislative changes have helped the situation tremendously. At present, the wetland **definitions** contained in the Growth Management Act (GMA) and the Shoreline Management Act are virtually the same as the definition used by the federal agencies under Section 404 of the CWA. In addition, the state legislature passed a law in 1995 directing Ecology to adopt a **state wetland delineation manual** that is consistent with the federal delineation manual (1987 Corps of Engineers manual). Ecology has adopted a **Washington State Wetland Identification and Delineation Manual** under the SMA regulations (WAC 173-22). *(See Appendix B for ordering information.)*

This state manual is required for any delineation conducted under the SMA. Also, local governments must use it in implementing GMA regulations. Since this manual is consistent with the 1987 Corps Manual anyone needing approval from both federal and state/local agencies should simply designate that their delineation was conducted using both the state manual and the 1987 manual.

# 4. Wetland Characterization and Function Assessment

For many years most regulatory programs operated as if all wetlands should be treated the same. This "one regulation fits all wetlands" approach has historically resulted in inadequate protection of some wetlands and over-regulation of others. There is great variation in the types of wetlands found in the state of Washington and there is even greater variation in the functions they perform. Our approach is to base the level of protection on the importance of the wetland.

It is important to distinguish between wetland functions and wetland values. **Functions** are the things that wetlands do, such as trap sediments, recharge streamflows, provide habitat, etc. **Values** are how important we think these different functions are.

For example, a wetland may store a great amount of water during floods. This water storage capacity is a function the wetland performs. How much we may value this function depends on how important that flood storage is in the watershed. If there is no downstream development that would be threatened by flooding, then the function might be considered less important than it would be if structures were present. As another example, wetlands provide habitat for a wide variety of plant and animal species. If the species happens to be an endangered species, we will value that habitat more.

Functions can be assessed, and to some extent, measured. More often it is only feasible to estimate a relative level of performance. Actual measurement of functions (cubic feet of floodwater storage, # of waterfowl species, etc.) is usually too expensive to assess. Values, on the other hand, are generally "assessed" through the regulatory process. The policies and regulations of the different laws usually establish how much different functions are valued.

Our current understanding is that wetlands perform different types of functions and perform these functions to varying degrees. There are several different methods that are used to characterize the types of functions performed by wetlands and some of these methods generalize the extent to which these functions are performed.

However, we currently do not have a quantitative method for determining wetland function that is scientifically valid and applicable in a regulatory setting. What is needed is a rapid method of quantifying wetland functional performance that is scientifically supported.

The various functional assessment methods currently available all have drawbacks and cannot be heavily relied upon to base regulatory decisions. Some of these methods can provide useful information to assist in making a regulatory decision but we are still left with applying "best professional judgment" (BPJ) in determining performance of wetland functions.

Recent development of two new methods, the **hydrogeomorphic** approach and the **Indicator Value Assessment** method show great promise. With funds from an EPA grant, Ecology will be coordinating development of a quantitative function assessment method for certain types of wetlands in Washington State over the next few years. It is our hope that this tool will be useful in making regulatory decisions. *(For a brochure describing the **Wetland Function Assessment Project**, order Ecology Publication 96-103. To order, see Appendix B.)*

Until better methods are developed, Ecology relies upon the best professional judgment of its staff combined with the best available science in assessing wetland function for regulatory decisions. We have found that established methods such as the **Wetland Evaluation Technique** (WET) and **the Habitat Evaluation Procedure** (HEP) can provide useful information when applied correctly but cannot be relied upon to accurately measure wetland functions. However, Ecology may use this information in evaluating projects and making regulatory decisions.

Other methods, such as **Reppert** and the **Wetland Characterization Method** are not accepted by Ecology. The Wetland Characterization Method was developed by Ecology for use with inventory-level planning efforts and is not appropriate for assessing functions for regulatory decisions on a specific site. The original Reppert method contains flaws that make it ineffective - however, more recent, regionalized Reppert-based methods may provide useful information in estimating performance of wetland functions.

In addition to using one of the above methods, applicants are encouraged to provide **site-specific information** on wetland characteristics to assist in making an individual assessment of wetland functions. Important characteristics include:

- location in the watershed,
- inlet/outlet character,
- basin storage capacity,
- vegetation type,
- species abundance and distribution,
- interspersion, and
- structural diversity.

We also encourage the use of **the Washington State Wetland Rating System** (either Eastern or Western Washington version) to assist with a decision about the management of a particular site. *The rating system does not assess wetland functions.* It places wetlands into four different categories based on a combination of functions and values. The four basic criteria that determine a wetland's placement in a category are:

- rarity,
- irreplaceability,
- sensitivity to disturbance, and
- habitat functions.

The rating system was designed to be used with local development regulations to ascertain appropriate protective measures. Thus, while the rating system is not sufficient to evaluate the adequacy of a particular mitigation plan, it is helpful in determining the appropriate buffers for a site and in establishing mitigation parameters such as sequencing and replacement ratios (see Chapter 5 on Mitigation).

# 5. Wetland Mitigation

Wetland mitigation is a concept that is frequently misunderstood. The term mitigate means literally "to make less severe or painful; to moderate" (Webster's). In the wetland regulatory context it essentially means *to reduce the total adverse impacts of a project to an acceptable level.* This can be accomplished through a variety of methods. Wetland mitigation is usually defined in terms of a series of steps that should be taken in sequential order. They are:

1) **Avoiding** adverse impacts (either by finding another site or changing the location on-site);
2) **Minimizing** adverse impacts by limiting the degree or location of a project on-site;
3) Rectifying adverse impacts by **restoring** the affected environment;
4) **Reducing** the adverse impacts by preservation and maintenance operations over the life of the project;
5) **Compensating** for adverse impacts by replacing or providing substitute resources or environments; and
6) **Monitoring** the impacts and taking appropriate corrective measures.

Following this process is referred to as **sequencing**. Most people equate wetland mitigation with step 5, and this has led to the use of the term "compensatory mitigation" to distinguish this type of mitigation from the broader definition.

In most cases, Ecology requires that an applicant demonstrate that they have followed this sequence in developing their project before permit approval is granted. However, Ecology has taken the position that lower quality wetlands *(Category 4 wetlands in our rating system)* usually do not warrant the first step of avoiding the impact altogether. This is based on our assumption that these types of wetlands can be successfully replaced. With other wetlands, particularly higher quality wetlands, we are usually stringent in requiring that project proponents demonstrate that they have followed the sequence.

We work with project proponents to design their project so that they can accomplish their objectives while avoiding and minimizing

impacts to wetland resources. The earlier we are involved in the process the more successful we usually are in finding a win-win solution.

### Compensatory mitigation

When adverse wetland impacts are truly "unavoidable," an applicant is required to develop a **compensatory mitigation plan**. This can include creation of a new wetland, restoration of a former wetland, enhancement of a degraded wetland or some combination of the three. In some instances, preservation of high quality wetlands and/or adjacent high quality uplands may be acceptable as part of an overall mitigation "package."

Historically, creation of new wetlands in upland sites has been problematic, primarily due to the difficulty in establishing an adequate water regime to sustain wetland conditions. Thus, Ecology emphasizes restoration of former wetlands or enhancement of significantly degraded wetlands as the preferred methods of compensation. With these methods, establishing an adequate water regime is usually more certain.

The primary questions we ask in determining the adequacy of a compensatory mitigation method, location or plan are:

1) What are the type and extent of functions being impacted by the project?
2) How will the proposed mitigation replace these functions?
3) Will the proposed mitigation be successful and sustainable?

Thus, the appropriate type of compensatory mitigation will depend on the individual circumstances of the project. It will also depend on the opportunities for mitigation in the area of the project since we usually require that the replacement wetland be located in the same drainage basin. It is difficult to replace hydrologic and fish habitat functions in a different drainage basin and impossible to replace them in a different watershed. However, the old notion that compensatory mitigation must be "on-site" is now seldom required since adequate opportunities are rarely available on a given project site.

Also, in the past we typically required "in-kind" compensatory mitigation, usually meaning that the replacement wetland must be the same type of wetland as the one being impacted (e.g., a cattail

marsh for a cattail marsh). This is still often a requirement since it is difficult to replace lost functions with a different type of wetland. However, Ecology makes an individual assessment in each case and has occasionally decided to accept, or even encourage, out-of-kind replacement. This is usually due to one or more of several factors. Sometimes the wetland being impacted is of low value such as a depression dominated by exotic invasive plants such as reed-canarygrass.

In some cases there may not be adequate opportunities to recreate or restore the same type of wetland in the area and there may be an excellent opportunity to create a different, usually higher-value wetland in the area. In other cases we have judged that a different type of resource restoration makes more ecological sense in a particular situation. For example, we have allowed the restoration of stream and riparian corridors in exchange for a minimal loss of wetlands in areas where stream resources have been significantly degraded, particularly in eastern Washington.

Another mitigation concept is the use of **replacement ratios**. A replacement ratio is the amount of wetland area created, restored or enhanced in relation to the amount of wetland area impacted. For example, historically a replacement ratio of 1:1 was common. This means for every acre of wetland impacted an acre of wetland would be created. In recent years the ratio has increased and seldom is a 1:1 ratio acceptable to any regulatory agency. This increase is due primarily to two factors: 1) the likelihood of success of the compensatory mitigation and 2) the length of time it takes to successfully create or restore a wetland.

Since compensatory wetland mitigation has historically been less than 100% successful (different studies have determined that roughly half of the attempts to create wetlands have failed) and it takes anywhere from several years to several decades to create a fully-functioning wetland, replacement ratios greater than 1:1 are used as a means of equalizing the tradeoff. While the goal is always to replace the lost functions at a 1:1 ratio, it is almost always necessary to increase the replacement acreage in order to accomplish this.

At present Ecology recommends replacement ratios based on the rating of the wetland and/or the type of wetland.

The recommended ratios are as follows:

| Wetland category | Creation and Restoration | Enhancement* |
|---|---|---|
| **Category 1 (all types)** | 6:1 | 12:1 |
| **Category 2 or 3** | | |
| • **Forested** | 3:1 | 6:1 |
| • **Scrub/shrub** | 2:1 | 4:1 |
| • **Emergent** | 2:1 | 4:1 |
| **Category 4** | 1.25:1 | 2.5:1 |

** For wetland enhancement the ratios are doubled. Enhancement as compensation for wetland losses results in a net loss of wetland area and the net gain in wetland function from enhancement is usually less than from creation or restoration.*

These ratios are general guidelines that are adjusted up or down based on the likelihood of success of the proposed mitigation and the expected length of time it will take to reach maturity. Good hydrologic information on the proposed mitigation site is necessary to establish a likelihood of success. In addition, the track record of the type of proposed compensatory mitigation is an important factor.

If the person responsible for designing and constructing the compensatory mitigation can demonstrate that they or anyone else have successfully conducted a similar project, the likelihood of success is increased and replacement ratios may be lowered. Likewise, a lack of documentation that the type of mitigation proposed has been successful elsewhere may lead to even higher ratios.

For more information on replacement ratios and their scientific rationale, see *Wetland Mitigation Replacement Ratios: Defining Equivalency,* Ecology Pub. No. 92-08.

### Early consultation with agencies

There are many details that must be considered in the development of an acceptable mitigation plan. Ecology likes to work with the applicant in developing a conceptual plan prior to extensive work being done on a detailed plan. This can prevent unnecessary expenditures of time and money for all parties. State and federal

agencies have developed extensive guidance on how to develop conceptual and detailed mitigation plans (see *Guidelines for Developing Freshwater Wetlands Mitigation Plans and Proposals*, Ecology Pub. #94-29).

### Monitoring plans

Given the poor track record of compensatory mitigation it is critical to have an adequate monitoring plan for a mitigation site. The standard length of time for monitoring a mitigation site has increased over the years as projects have demonstrated how slowly wetlands evolve. At present, five years is the minimum requirement and in many cases, especially where forested wetlands are being created or restored, a much longer time is required. Increasingly, invasion of a created or restored wetland by aggressive, non-native plant species is a major concern. It is essential that the mitigation plan takes into account the potential for invasion and includes monitoring and maintenance provisions to ensure success.

### Mitigation banking

Mitigation banking is a concept that is receiving increasing attention and support. The general idea is to create or restore a large wetland area and use the "credit" to compensate for wetland impacts that occur elsewhere. If conducted appropriately this approach can be beneficial to applicants and the environment.

Project proponents benefit by not having to take on a risky, open-ended mitigation project and the environment benefits by having a functioning replacement wetland in place before the impact occurs. At present, federal and state agencies are working to develop consistent guidelines on mitigation banking to facilitate the development and use of private banks. The Department of Transportation has a signed agreement with federal and state regulatory agencies on how to establish and operate a bank for its own use but has yet to initiate development of a banking site. The 1998 Legislature directed Ecology to develop rules for mitigation banking.

There are still some obstacles remaining that continue to make banking problematic. There is need for a method of quantifying wetland functions to establish wetland credits and debits to be used in banking "transactions." There is also a need to establish how banking will mesh with the existing regulatory processes.

# 6. Buffers

Wetland buffers have been a subject of considerable debate and discussion in recent years. While increased attention is being directed at the scientific basis for establishing buffers around wetlands, it remains a highly charged issue. While some people still challenge the need for any buffers, most of the debate centers on "how much is enough?"

## The case for buffers

Wetland buffers are important to protect the functions provided by wetlands. They do this in two basic ways:

1) Buffers reduce the adverse impacts of adjacent land uses by
   - stabilizing soil and preventing erosion;
   - filtering suspended solids, nutrients, and toxic substances;
   - moderating impacts of stormwater runoff; and
   - reducing noise, light, intrusion and other disturbances.

2) Buffers provide important habitat for wildlife which utilize the wetland and the buffer area for essential feeding, nesting, breeding, rearing and resting. For example, some waterfowl feed in the wetlands and nest in adjacent uplands while many amphibians spend the majority of their lives in forested areas and breed in wetlands. Without protecting adjacent upland areas, wetlands would not be able to support these wetland dependent species.

Ecology funded several private consulting firms to work together to document the scientific basis for buffers. Their report is titled *Wetland Buffers: Use and Effectiveness* and is available from Ecology as Publication #92-10.

## How much is enough?

This is the question most often asked and debated about buffers. Unfortunately, there is no single definitive answer for all wetlands. Appropriate buffer widths should be determined case by case and are dependent on the four major variables described below: (1) wetland function and sensitivity to disturbance; (2) buffer

characteristics; (3) land use impacts; and (4) desired buffer functions.

(1) **Wetland function** and sensitivity to disturbance are attributes that will influence the necessary level of protection for a wetland. Wetlands systems that are extremely sensitive or have important functions will require larger buffers to protect them from disturbances (e.g., high quality estuarine wetlands and bogs need larger buffer widths to ensure a lower risk of disturbance.)

(2) **Buffer characteristics** such as vegetative composition, plant density, soils and slope are all important factors in determining effective buffer widths.

(3) **Land use impacts** play a significant role in determining buffer widths. Construction impacts include erosion and sedimentation, debris disposal, vegetation removal and noise. Post-construction impacts are variable depending on the land use, but residential land use, in particular, can have significant impacts.

(4) **Desired buffer function(s)** are pertinent in determining appropriate buffer widths. Temperature moderation, for example, will require smaller buffer widths than some wildlife habitat or water quality functions. Buffer widths for wildlife may be generalized, but specific habitat needs of wildlife species depends on individual habitat requirements.

Despite the need for site-specific analysis to determine appropriate buffer widths there are instances where generalized widths or ranges are useful. Most local ordinances provide specific buffer widths or ranges as a starting point to provide some consistency and predictability. Most of these ordinances also contain provisions for adjusting buffer widths up or down based on site-specific factors.

Ecology has proposed buffer ranges to be used in conjunction with our 4-tiered rating system. They are:

**Category 1** 200 - 300 feet
**Category 2** 100 - 200 feet
**Category 3** 50 - 100 feet
**Category 4** 25 - 50 feet

In addition to these suggested buffer widths we utilize the following guidelines:

- Buffer effectiveness increases with buffer width.
- Buffers of less than 50 feet in width are generally ineffective in protecting wetlands.
- Buffer widths effective in preventing significant water quality impacts to wetlands are generally 100 feet or greater.
- Buffers from 50 to 150 feet are necessary to protect a wetland from direct human disturbance in the form of human encroachment (e.g., trampling, debris).
- In western Washington, wetlands with important wildlife functions should have 200 to 300 foot buffers based on land use. In eastern Washington, wetlands with important wildlife functions should have 100 to 200 foot buffers based on land use.

# 7. Stormwater Issues

One of the more complex wetland-related issues that we deal with is stormwater management. It has become virtually impossible to separate wetland and stormwater issues when dealing with projects in urban areas. In many cases wetlands receive all or part of their water from stormwater. There are two primary components of this issue that are important to understand. They are framed below as questions we are often asked. (For more information on wetlands and stormwater see *Stormwater and Wetlands*, Ecology Pub. 97-91)

1. **Can wetlands be used for stormwater treatment?** In many cases it would be detrimental to a wetland to discharge stormwater into it. In all cases it is necessary to "clean" the stormwater prior to discharge into a wetland. Stormwater should meet state water quality standards for Class A waters before being discharged into a wetland. Typically, we require the pretreatment of stormwater using the methods outlined in Ecology's Stormwater Manual. For discharge of stormwater into wetlands, we must evaluate the potential impacts to the wetland including changes in the wetlands water regime and the introduction of pollutants. In some cases, stormwater must be directed into a wetland in order to maintain the water regime of the wetland.

2. **Can stormwater treatment facilities count as wetland mitigation?** Generally, the answer is no. Most stormwater treatment ponds or swales are too degraded and too intensively managed to provide the range of wetland functions desirable in a mitigation project. However, stormwater treatment facilities may help offset the loss of certain water quality improvement functions associated with a wetland that is being impacted. To the extent that they do that, stormwater facilities may be included as part of an overall wetland mitigation "package."

# 8. Wetland Permitting Processes

Ecology issues many different permits or approvals that may involve wetland concerns. These could include such permits as water rights, wells, hazardous waste cleanup, etc. However, the two primary approvals that typically involve wetlands are shoreline permits and water quality certifications (described in Chapter 2). In each case, there is a distinctly different process involved. In most cases, however, there will be a wetlands specialist who is primarily responsible for determining whether the wetland-related issues are adequately addressed.

Whenever a wetland issue is involved, the applicant is advised to contact the wetland specialist for their area and work with them to address the agency's wetland-related concerns. These staff work in one of the agency's four regional offices (see Appendix A). For more information on the permitting requirements and procedures consult the *Wetland Regulations Guidebook* (Ecology Pub. #88-5.)

# 9. Technical Assistance

In addition to their regulatory activities, wetlands specialists with Ecology provide a range of technical assistance to local governments, other state and federal agencies, and the public. Because of their specific wetlands expertise, local government staff often call on these staff to assist in reviewing development proposals requiring local approval. In these instances, Ecology staff are not acting under any direct regulatory authority but are providing assistance as directed in the State Environmental Policy Act and the Growth Management Act.

There are times when Ecology's wetland specialists are involved in a project where they are providing technical assistance to a local government or other state agency as well as performing their regulatory duties under state statute. This dual role requires that Ecology staff communicate clearly what constitutes requirements and what is simply a recommendation. However, whether acting in

a regulatory or advisory capacity, Ecology wetland staff will generally base their decisions or recommendations on this guidance.

Ecology is frequently asked to assist local landowners, especially in conducting wetland delineations. In general, we do not have an adequate number of staff to conduct delineations for landowners. We have, and as time allows, will continue to assist landowners in determining if they have a wetland on their property and what laws, if any, might apply. In some instances, we have assisted in determining approximate wetland boundaries, especially if no direct wetland impacts are anticipated and no detailed delineation will be required.

In addition to providing assistance on projects, wetlands specialists are frequently involved in providing training on wetland issues to local government or state agency staff. As time allows, Ecology is also involved in conducting training or educational presentations for public organizations.

For more information on wetlands, contact one of the individuals listed in Appendix A. If you are calling about a site-specific issue contact the appropriate regional staff.

# 10. Wetlands Stewardship

Voluntarily protecting wetlands benefits landowners and their neighbors. Wetlands provide functions which benefit communities and the environment - rearing habitat for salmon, the holding of flood waters, and water quality filtration, to name a few. When wetlands are lost, communities have to pay for engineered replacements of these services.

Voluntary approaches to wetlands protection include permanently preserving lands, restoring and enhancing functions, and conserving wetland features by applying best management practices.

Stewardship does not have to mean an economic loss to the landowner. A growing number of land stewards are realizing that they can benefit economically by protecting and enhancing wetlands. Some of the financial benefits include direct income from wetland amenities, estate tax reductions, and in some cases income and property tax reductions. An outstanding program that is available to Washington landowners is the local 'current use' property valuation tax which offers long-term property tax reductions for maintaining wetlands in an undeveloped state.

Ecology provides information and assistance on stewardship approaches, programs, and opportunities. Refer to Appendix A for stewardship and restoration contacts. Refer to the Ecology publications *At Home with Wetlands* (Pub. # 90-31) and *Exploring Wetlands Stewardship* (Pub. # 96-120) for more general information about stewardship.

# Appendix A - Ecology Wetlands Contacts

| | | | | |
|---|---|---|---|---|
| HEADQUARTERS<br>PO Box 47600<br>Olympia, WA<br>98504-7600<br>FAX (360) 407-7162 | **Policy & Regulation** | Andy McMillan<br>(360) 407-7272 | **Function Assessment** | Teri Granger<br>(360) 407-6547 |
| | **Senior Ecologist** | Tom Hruby<br>(360) 407-7274 | **Restoration** | Richard Gersib<br>(360) 407-7259 |
| | **Stewardship** | Jane Rubey<br>(360) 407-7258 | | |

| | | |
|---|---|---|
| EASTERN REGION<br>N. 4601 Monroe<br>Spokane, WA<br>99205-1295<br>Fax: (509) 456-6175 | **Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman** | Dennis Beich (509) 625-5192 |

| | | |
|---|---|---|
| CENTRAL REGION<br>15 West Yakima Avenue,<br>Suite 200<br>Yakima, WA 98902-3401<br>FAX: (509) 575-2809 | **Benton, Kittitas, Klickitat, Yakima,** | Cathy Reed (509) 575-2616 |
| | **Chelan, Douglas, Okanogan** | Mark Schuppe (509) 575-2384 |

| | | |
|---|---|---|
| SOUTHWEST REGION<br>PO Box 47775<br>Olympia, WA 98504-7775<br>FAX: (360) 407-6305 | **Pacific, Wahkiakum, Skamania, Clark** | Bill Leonard (360) 407-7273 |
| | **Clallam, Jefferson, Pierce, Kitsap** | Ann Boeholt (360) 407-6221 |
| | **Grays Harbor, Cowlitz, Thurston, Lewis, Mason** | Perry Lund (360) 407-7260 |

| | | |
|---|---|---|
| NORTHWEST REGION<br>Mail Stop NB-81<br>3190 - 160th Avenue SE<br>Bellevue, WA 98008-5452<br>FAX: (425) 649-7098 | **Snohomish, King, San Juan** | Erik Stockdale (425) 649-7061 |
| | **Skagit, King, Island** | Susan Meyer (425) 649-7000 |
| | **Whatcom** | Barry Wenger (360) 738-4633 |

*Current as of 4/98*

# Appendix B - Publications

Ecology has a variety of wetland publications that cover a range of topics. Some are listed below and are available through Ecology's Publications Office at 360/407-7472. Most of these documents are available on Ecology's World Wide Web home page at www.wa.gov/ecology/ under the "Shorelands and Wetlands" section.

- **Wetland Regulations Guidebook** (88-5) A guide to federal, state and local wetlands regulations. 40 pages.
- **Exploring Wetlands Stewardship - A Reference Guide for Assisting Washington Landowners** (96-120) Technical assistance on options for preservation, conservation, and recovery of wetlands and riparian areas. 260 pages.
- **At Home With Wetlands: A Landowners Guide** (90-31) How to protect or enhance wetlands on your property. 42 pages.
- **Washington State Hydric Soils Guidebook** (#90-20) 33 pages.
- **Guidelines for Developing Freshwater Wetlands Mitigation Plans and Proposals** (94-29). A guide for permit applicants, consultants, and landscape architects. 40 pages.
- **Wetland Mitigation Replacement Ratios: Defining Equivalency** (92-08) 110 pages.
- **Wetland Buffers: Use and Effectiveness** (92-10) 180 pages.
- **Washington State Wetland Rating System - Western WA** (93-74) 61 pages.
- **Washington State Wetland Rating System - Eastern WA** (91-58) 58 pages.
- **Wetland Function Assessment Project** brochure (96-103).
- **Stormwater and Wetlands** - A brief introduction to the issue. 4 pages.
- **Washington State Wetlands Identification and Delineation Manual** (96-94)

# Appendix C - Preparing wetland reports

## Background

Wetland reports are advised, and sometimes required, for development projects where wetlands may be affected. Thorough wetlands reports reduce project delays by providing local governments and regulatory agencies with the information needed to make informed and timely decisions. A typical report includes a wetland assessment, an impact assessment, and a mitigation proposal. This is only a recommended format. More or less detail may be necessary depending on the complexity of the project.

## Wetland assessment

The wetland assessment provides detailed information about wetlands on the site. The information required for a complete wetland assessment falls into three categories: wetland community description, delineation report, and an assessment of the functions and values provided by the wetland.

## Wetland community description

Each wetland community on the site should be described by including:

- composition of dominant plant species
- a map showing the distribution of dominant plants
- U.S. Fish and Wildlife (Cowardin) classification
- connection and proximity to nearby water bodies
- known or suspected wildlife use
- evidence of recent or historic disturbances
- habitat features; (color photographs are useful in portraying these features)
- a brief description of adjacent upland plant communities
- its rating, based on Ecology's Washington State Wetlands Rating System

## Delineation report

Delineation reports should explain both how and when the delineation was conducted. All delineations conducted for state or local government approval should be done using the Washington State Wetland Identification and Delineation Manual (1997). This

manual is consistent with the 1987 Corps Manual, so the same report can be submitted to the Corps. A good delineation report includes:

- complete set of the field data forms that were filled out during the wetland determination and delineation
- site map showing wetland boundaries and the locations of all data points
- topographic map of the area
- site designation on a National Wetlands Inventory map
- site designation on local wetland inventories (when available)
- site designation on a Soils Survey Report soils map
- any previous site documentation and/or analysis (e.g. environmental checklist, Environmental Impact Statement, or geotechnical report)
- Washington Natural Heritage Program data on rare plants, or high quality wetlands
- WA Department of Wildlife Nongame and Priority Habitat information
- Federal Emergency Management Agency (FEMA) Flood Insurance Rates maps

For large and/or complex projects, a large scale (1":400' to 1":100') air photo with overlays displaying site property and wetland boundaries is helpful.

## Values and functions assessment

Wetland functions and values assessments should be conducted by individuals with training or expertise in plant ecology, wildlife biology, and hydrology. Functions and values that should be evaluated include, but are not limited to: water quality improvement, fisheries and wildlife habitat, flood and stream flow attenuation, and recreation and aesthetics.

The report should explain what methods were used to assess the wetland functions, and the strengths and limitations of the methods applied. Another acceptable method for assessing wetland functions and values is for qualified staff to use "best professional judgement". If best professional judgement is used, it is particularly important to explain what factors or criteria were used to reach any conclusions on functions and values. When detailed habitat information is needed sites may be evaluated using the Habitat Evaluation Procedure (HEP).

## Impact assessment and brief project description

The wetland report should provide detailed information on how wetland functions and values will be adversely affected by the proposed project. The report should discuss the effects of both direct impacts (e.g. filling, dredging, clearing, and alterations to wetland hydrology) as well as indirect impacts (increased intrusion, increased noise, light, and glare, etc.) on each wetland. In addition, specific water quality impacts (e.g. sedimentation, nutrients, hydrocarbons, and toxics) should be discussed. The report should estimate the area (in square feet) of each wetland plant community that will be directly affected by the project. A site plan should be included which clearly identifies all areas of direct and indirect impact.

## Mitigation proposal

The mitigation section of the report should include a discussion on how the project has been designed to avoid and minimize adverse impacts to wetlands. This section should also discuss how wetland buffers and stormwater treatment facilities will be provided. Each of the anticipated impacts noted under the previous section should be addressed here, relative to the effectiveness of the mitigation at replacing lost functions.

If any wetland creation, restoration, or enhancement is proposed as compensation, a plan should be provided. The plan should follow the outline presented in the Guidelines for Developing Freshwater Mitigation Plans and Proposals prepared by the Department of Ecology (see Appendix B for ordering information).

## For more information

For more information on wetland reports, contact Ecology's regional wetlands staff at any of the agency's regional offices (see Appendix A.

# Appendix D - Hiring a wetlands consultant

## Who needs wetlands consultants?

Wetlands consultants are usually hired to identify and delineate wetlands, assess the values of a particular wetland, and provide guidance with wetland regulations and permits. They are generally hired by landowners who want to do something on their property that may affect a wetland. Some consultants are self-employed; others work for larger environmental consulting firms.

## How to find a wetlands consultant

There are a number of ways to find the names of wetlands consultants. One approach is to look in the Yellow Pages of your phone directory (or the directories of the closest cities) under "Environmental and Ecological Services". You can also contact your local government planning office and ask if they know of any local wetlands consultants. Finally, you can contact state and federal resource agencies and ask for referrals. Be aware, however, that many agencies might not be able to provide recommendations because of questions of fairness.

## Selecting a wetlands consultant

There are a number of factors you should consider before hiring a wetlands consultant. Be sure to ask the following questions before making your selection.

**Training** - Does the consultant have training or experience in the use of the 1987 federal or 1997 state wetlands delineation manuals? Has the consultant had additional training or expertise in related fields such as botany, soils, hydrology or wildlife?

**Experience** - How long has the consultant been doing wetlands work? How much experience do they have delineating wetlands in the field, assessing wetlands values, or working with wetland regulations? Has the consultant worked in the part of the state where you propose to develop?

**References** - Who were some of the consultant's past clients? Were they satisfied customers? Call them and find out who they worked

with from the consulting firm and how they liked working with them. Ask whether there were any problems that occurred during or after the project, how the consultant handled those problems, and what they charged for their work. You may also want to ask local governments about their experiences working with a particular consultant.

**Staff** - Who will be working on your project? Will it be the principal consultant with the years of experience or someone with less experience who works for them? Know who you're hiring!

**Cost** - How much will the consultant cost? Compare rates, but don't let cost be your sole criteria. Be sure to consider training, experience, and the other factors as well. A good consultant who charges you more may end up saving you money by reducing permit-processing delays.

# Appendix E - Suggested Definitions for Wetlands Studies

## Background

In the course of reviewing wetlands ordinances at the request of local governments, Ecology staff have noted a variety of ways that different types of wetland studies have been defined. While there are no official or "correct" definitions for these studies, the following are definitions used in Ecology offices.

## Definitions

**Special Studies** — These studies are referenced in many critical areas ordinances. They can include a variety of environmental reports such as seismic hazard geotechnical reports, habitat management plans, drainage and erosion control plans, or specific wetland studies such as wetland reports or wetland mitigation plans.

**Wetland Boundary Survey** — This is the same procedure as a wetland delineation.

**Wetland Delineation** — A process of marking a line on the ground (and ultimately on a map), delineating the boundary between the wetland and upland for regulatory purposes. This delineation is aimed at determining a precise location for the wetland/upland boundary based on field indicators (such as vegetation, soils, and hydrology), and is best accomplished by an experienced wetland specialist. For federal, state and most local jurisdictional purposes, delineations are carried out using 1987 Army Corps Manual or the 1997 Washington State Wetland Identification and Delineation Manual.

**Wetland Determination** — A formal determination of whether a wetland or its buffer exists on a site. A determination may include a formal wetland delineation.

**Wetland Evaluation** — The process of determining the values of a wetland based on an assessment of the potential and /or actual functions performed by the wetland. Some evaluations include characterizing and analyzing potential impacts to the wetland.

Functions often assessed include groundwater recharge and discharge; sediment stabilization; nutrient removal and/or transformation; food web support; flood-flow alteration; retention of toxics; habitat for wildlife (often done using the U.S. Fish and Wildlife Service "Habitat Evaluation Procedure"); and transition habitat between aquatic and terrestrial systems.

**Wetland Functional Assessment** — Often synonymous with a wetland evaluation. A method of evaluating wetland functions, such as water quality, hydrology, wildlife habitat, and food chain support. The most commonly used assessment method is Wetland Evaluation Technique (WET).

**Wetland Inventory** — An effort to collect data about wetlands. Inventories are designed to provide information about the location, extent, and often, the characteristics of wetlands within a geographic area. In some cases, inventories include data about wetland functions and values or adjacent upland areas.

**Wetland Mitigation Plan** — A two-phase plan describing how impacts to wetlands will be addressed. The first phase is a preliminary plan, which includes an outline of the impacts that have necessitated the mitigation, and the steps taken in implementing mitigation including avoidance, minimization, rectification and compensation. The second phase is the final mitigation plan. Here, changes are made to the preliminary plan based on comments from agencies, and a final detailed plan is presented. Both plans include background information, an ecological assessment of the affected wetland and the proposed mitigation site, goals and objectives for the mitigation site, detailed site plans, the schedule and method for implementation, and a contingency plan.

**Wetland Rating Evaluation** — An evaluation of a wetland's importance according to specific characteristics or functional attributes. Ordinance standards for buffers, mitigation acreage and replacement ratios, and permitted uses can vary according to the rating a wetland receives. Some jurisdictions refer to this process as "wetland ranking."

**Wetland Reconnaissance** — This process is similar to a wetland determination. It is a preliminary site visit to determine whether a wetland or its buffer exists on site.

**Wetland Report** — A report required for development projects where wetlands may be affected. A report should generally provide the following types of information: a wetland delineation, a community description, a functional assessment, an impact assessment, and a mitigation proposal. Definitions of wetland reports in some ordinances have also included a wetland determination, a wetland rating evaluation, and a wetland evaluation.

## For more information

If you have suggestions or comments about this list, please contact Tom Hruby at (360) 407-7274. You may also send ideas to:

Tom Hruby
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

# Appendix F - Associated Wetlands Designation Criteria (or, How to Identify Wetlands subject to SMA jurisdiction)

This appendix, excerpted from Ecology's *Shoreline Management Guidebook*, is intended to assist local governments determine wetland areas subject to shoreline jurisdiction.

In administering the SMA, it is important to be able to identify wetlands that are "associated" with Shoreline waters (marine waters, lakes $\geq$ 20 acres and streams > 20cfs). Associated wetlands are those described in RCW 90.58.030(2)(f) and defined in RCW 90.58.030(2)(h). The definition of wetlands in the original Act was confusing because it included all lands within 200 feet of the Ordinary High Water Mark (OHWM) of the shoreline water body. This definition has been changed so that wetlands are now defined consistent with other state and federal definitions and includes those areas previously defined in the Act as "marshes, swamps and bogs." (The area within 200 feet of the OHWM is now called "shoreland areas.")

Much confusion in shoreline administration results from difficulty or uncertainty in identifying the wetlands that are "associated" with the streams, lakes and tidal waters of the state. These guidelines are intended to assist in the designation of wetlands that fall under the jurisdiction of the SMA.

## I. General Guidelines

A. A wetland is associated if it falls within 200 feet as measured on a horizontal plane from the OHWM or the floodway, whichever is more inclusive, of a water body under shoreline jurisdiction. See WAC 173-22-030(1).

B. The entire wetland is associated if any part of it is within the area described in A., above.

C. The entire wetland is associated if any part of it lies within the 100-year floodplain of a shoreline.

D. The entire wetland is associated when it is in proximity to and either influences or is influenced by the water body. See WAC 173-220-40(3)(c).

NOTE: When a road, dike, or other built barrier is between the wetland and shoreline, the wetland is still associated if it meets the general designation guidelines and the tests of influence and proximity. Don't assume that SMA jurisdiction ends just because a wetland is separated from the shoreline by a road or other structure.

"In proximity" means that the wetland is close enough to the shoreline to affect or be affected by that shoreline. Proximity is not limited to horizontal distance but can also include consideration of vertical distance. Proximate shorelines can include such situations as:

> A hundred-acre wetland in the floodplain that is two miles away from a water body but that intercepts flood runoff and dampens the flood surge that eventually enters that water body; or,
>
> a wetland in an overflow channel adjacent to a stream that acts as a flood storage area.

Factors to use in deciding if "influence" exists include:

1. **Hydraulic continuity**

Hydraulic continuity includes surface and ground water, can be perennial or intermittent and can be a ditch, culvert, or pipe. Intermittent streams flow at some time during a normal year. Indicators of hydraulic continuity include direct surface or subsurface water connection, continuous undrained hydric surface or subsurface water connection, continuous undrained hydric soil (particularly organic soils), or continuous hydrophytic vegetation.

These indicators are evidenced by:

a. Periodic inundation occurring in a normal year.

i. Inundation (standing water) or fully saturated soils observed during a normal or drier year.
ii. Hydrologic gauging data from period record that indicates periodic overbank flows.
iii. Drift lines, sediment or other materials deposited on vegetation by water.

b. Tidally influenced geohydraulic features such as:

i. Dunal systems.
ii. Spits and jetties.
iii. Beaches.

c. Tidal inundation as indicated by:

i. Presence of salt-tolerant vegetation.
ii. Interstitial soil salinity of greater than 0.5 parts per thousands.
iii. Tidally formed dendritic channels, particularly with tidal waters in them (fresh or salt).
iv. Drift lines or piles.

d. Connection by a tide gate or a culvert (determines whether the tide gate is functioning).

2. **Groundwater recharge and discharge**.

a. Spring systems discharging into shoreline.

b. Continuous organic soils with shoreline.

c. Augmentation of low flows in shoreline.

d. Wetlands recharging into sole source aquifer.

3. **Stormwater and floodwater detention**, such as:

a. Wetland located close to mouth of system.

b. Wetland is significant percentage of detention capacity of watershed.

4. **Water quality improvement**, filtration and assimilation of sediment, nutrients, and pollutants.

a. Wetland discharges directly into shoreline.

b. Ambient water quality of the shoreline susceptible to degradation, and wetland buffers potential adverse impacts.

c. Specific pollutant source in watershed (point or non-point source) which the wetland is effectively buffering.

d. Is there an unstable sediment source that the wetland is effectively buffering?

5. **Erosion control and buffering**, such as stability of banks (presence of headcutting or bank erosion), sediment accretion, evidence including:

a. System in hydrologic equilibrium (watershed currently functioning at capacity, without bank cutting or deposition occurring from altered watershed characteristics).

b. Urbanization in watershed, altering flowing patterns.

c. Agricultural or forestry development in watershed (particularly with related road systems) altering flow patterns.

6. **Food chain support**, important to a particular species or habitat within the affected shoreline area, which may include:

a. Plant species diversity.

b. Invertebrate diversity.

c. Faunal diversity.

d. Fish spawning, overwintering, and rearing habitat (anadromous, wild strain).

e. Structural diversity-terrestrial: presence of stratified horizontal and vertical canopy layers, including snags and downed wood.

f. Structural diversity-aquatic: large organic debris, pool: rifle: run ratio, bank overhang.

7. **Wildlife habitat** important to a particular species or group that use the affected shoreline area.

a. Habitat available for individual species.

b. Breeding/spawning habitat.

c. Overwintering habitat.

**8. Wildlife corridors.**

a. Connectivity and conductivity of shoreline watershed.

b. Fractionalization of habitat in watershed.

c. Availability of habitat and water in adjacent landscape.

d. Disturbance (noise, presence of people, development in watershed).

## II. Special Situations

A. When a wetland is adjacent to or potentially impacted by both a shoreline and a non-shoreline, the rules for determining association with the shorelines apply *(see I. General Guidelines, above).* If the hydraulic gradient of the wetland is clearly away form the shoreline, then other indications of association must be strongly present.

B. When a non-SMA water body enters the floodplain of an SMA shoreline, the associated wetland extends above the floodplain to the outer limit of continuous hydric soils, hydrophytic vegetation, and/or surface or subsurface hydrology.