WASHINGTON STATE WETLAND RATING SYSTEM

for

WESTERN WASHINGTON

Revised

Ecology Publication # 04-06-025

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PREFACE

This document is a revision of the "Washington State Wetland Rating System for Western Washington," published by the Department of Ecology in October 1993. The original document was published with the understanding that modifications would be incorporated as we increase our understanding of wetland systems, and as the rating system is used by many different people.

The need to revise the earlier version became apparent as we have learned more about how wetlands function and what is needed to protect them, especially from the work done to develop methods for assessing wetland functions in the state. Furthermore, several textual inconsistencies and ambiguities were identified that made a consistent application of the ratings by different people difficult. Before undertaking the revisions, comments were sought from a wide range of users of the rating system.

Where possible the comments we have received to date have been incorporated in this revision.

ACKNOWLEDGEMENTS

This document would not have been possible without the participation and help of many people. Special thanks go to the technical committee of wetland experts and planners from local governments who helped develop the objectives for the rating system, reviewed the many drafts of the document, and helped field test the method. The list of participants of the review team for western Washington is found in Appendix A. We have also received valuable comments from many who took the time to review the draft sent out for public comment, and we wish to acknowledge their efforts. In addition, the staff at the Department of Ecology who deal with wetlands also provided much needed review and criticism, especially the regional staff (Perry Lund, Ann Boeholt, Brad Murphy, Erik Stockdale, Susan Meyer, Sarah Blake).

1. INTRODUCTION

The wetlands in Washington State differ widely in their functions and values. Some wetland types are common, while others are rare. Some are heavily disturbed while others are still relatively undisturbed. All, however, provide some functions and resources that are valued. These may be ecological, economic, recreational, or aesthetic. Managers, planners, and citizens need tools to understand the resource value of individual wetlands in order to protect them effectively.

Many tools have been developed to understand the functions and values of wetlands. The methods range from detailed scientific analyses that may require many years to complete, to the judgments of individual resource experts done during one visit to the wetland. Managers of our wetland resources, however, are faced with a dilemma. Scientific rigor is often time consuming and costly. Tools are needed to provide information on the functions and values of wetlands in a time- and cost-effective way. One way to accomplish this is to categorize wetlands by their important attributes or characteristics based on the collective judgment of regional experts. Such methods are relatively rapid but still provide some scientific rigor (Hruby 1999).

The Washington State Wetland Rating System categorizes wetlands based on specific attributes such as rarity, sensitivity to disturbance, and functions. In the first and second editions, the term "rating" was not used in a manner that is consistent with its definition in the dictionary, and this has caused some confusion. By definition*, a wetland rating system should group wetlands based on an estimate of value or level of functioning on a scale (e.g. high, medium, low). The Washington State Rating System, however, categorizes wetlands based on several criteria such as rarity, sensitivity, and function that are not on the same scale. The term "rating", however, is being kept in the title to maintain consistency with the previous edition. Some local jurisdictions have adopted the rating system in their critical areas ordinances, and a change in title may complicate the use of this revised edition by these jurisdictions.

* rating – A position assigned on a scale; a standing.(American Heritage® Dictionary on Yahoo.com accessed August 2, 2004)

This rating system was designed to differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, our ability to replace them, and the functions they provide. The rating system, however, does not replace a full assessment of wetland functions that may be necessary to plan and monitor a project of compensatory mitigation.

The "rating" categories are intended to be used as the basis for developing standards for protecting and managing the wetlands to reduce further loss of their value as a resource. Some decisions that can be made based on the rating include the width of buffers needed

to protect the wetland from adjacent development, the ratios needed to compensate for impacts to the wetland, and permitted uses in the wetland. The Department of Ecology has developed recommendations for such protective standards and these are available on the web at http://www.ecy.wa.gov/programs/sea/bas_wetlands/index.html).

The rating system is primarily intended for use with vegetated, freshwater, wetlands as identified using the State of Washington delineation method (WAC 173-22-080). It also categorizes estuarine wetlands but does not characterize their functions. The rating system, however, does not characterize streambeds, riparian areas, and other valuable aquatic resources.

The rating system is not considered perfect, nor the final answer in understanding wetlands. It is however, based on the best information available at this time and meets the needs of "best available science" under the Growth Management Act. The development of the revised rating system involved the participation of a Technical Review Team consisting of wetland scientists and local planners from western Washington. A draft was also sent out for broad review to local planners, wetland scientists and the general public. We anticipate that the method will be further modified over time as we keep increasing our understanding of the wetland resource.

The current version of the rating system was field tested and calibrated in over 122 wetlands throughout western Washington. Members of the Technical Review Team and wetland staff from the Department of Ecology visited each site during the spring of 2003 and rated the wetlands using both the old and the revised methods. A companion document, "Washington State Wetland Rating System – Eastern Washington," is also available.

2. DIFFERENCES BETWEEN THE SECOND EDITION AND THE REVISED EDITION

In fine-tuning this version of the rating system the Department of Ecology is aware that many local governments are using the earlier editions, or some modified version of them, for managing their wetland resources. The Department's intention in revising the rating system has been to maintain the concept of four wetland categories, while adding refinements that reflect the progress made in understanding how wetlands function and are valued. Five of the original seven criteria for categorization (sensitivity to disturbance, rarity, Natural Heritage wetlands, ability to replace them, and the functions they provide) have been kept.

The other two original criteria for categorization, the presence of federally or state listed Threatened or Endangered (T/E) Species and "wetlands of local significance," have been dropped. The requirements for managing and protecting T/E species in a wetland are very species specific. Recommendations on buffers and mitigation ratios that result from this categorization are too generic to adequately protect a single species. For example, an increase in mitigation ratios and buffers that is usually assigned to wetlands of a "higher" category does not necessarily protect a specific T/E species from impacts.

The department of Ecology does not have the expertise to specify standards for protecting each individual T/E species that might be found in a wetland. Local jurisdictions should consult with the appropriate state and federal agencies (U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, State Department of Fish and Wildlife) to develop standards for protecting T/E species using wetlands in their jurisdiction.

Protecting Threatened and Endangered Species in Wetlands

Threatened and endangered species need special protection, but this protection cannot be accomplished using the recommendations associated with the category rating of the wetland. If a T/E species is found living in or using a wetland, the appropriate state or federal agency will need to be consulted to determine what is needed to protect that species in the wetland. This information can be considered as an "overlay" on the category rating. A wetland containing T/E species will have to be protected to meet the requirements of the T/E species as well as those associated with its Category. If the T/E species using the wetland needs to be protected with larger buffers or by some other measures (e.g. no disturbance during the nesting season), then these measures will have to be applied.

For example, a category II riverine wetland that provides overwintering habitat for endangered Coho may need more than the standard buffers recommended for a Category II wetland to protect the fish.

Using "local significance" to determine a wetland category was also omitted from this revision because the criterion is rarely if ever used. Furthermore, the earlier editions of

the rating system required that a local jurisdiction establish independent criteria for categorizing wetlands. The teams reviewing the rating system judged that if local jurisdictions make the effort to identify wetlands of local significance they will also establish standards for protecting and managing these special wetlands. The standards for protecting these wetlands can then be tailored to the specific values or functions that are of local significance, and do not need to be tied to the standards recommended for the rating system.

Information, however, about the presence of T/E species and characteristics that are of local significance is still important in making decisions about a wetland. For this reason, the rating form contains questions about these characteristics of a wetland. Although the information is not used to establish a category, they are data necessary for anyone trying to make decisions about the wetland.

Changes have also been made in the categorization based on how well a wetland performs different functions. The earlier editions focused on habitat functions because more was known, at that time, about habitat than the hydrologic or "water quality" functions. Our understanding of the latter functions, however, has increased significantly in the last decade, and we are in a position to now include indicators of hydrologic and "water quality" functions in the questionnaire. The categorization based on functions is now equally based on habitat functions, the hydrologic functions (flood storage and reducing erosion), and the functions of that improve water quality (sediment retention, nutrient removal, and removal of toxic compounds). Much of the information on wetland functions used in this version of the rating system was derived from the data and knowledge developed during the "Washington State Wetland Functions Assessment Project" (Hruby et al. 1999).

In the first and second editions of the rating system, wetlands with a high level of functions, but no other important attributes, could only rate a Category II or a Category III. In this edition, wetlands that are performing all three types of functions well can be rated a Category I. Conversely, wetlands performing all functions poorly are rated as a Category IV.

The Category IV rating based on how well a wetland functions has replaced the former criteria of Category IV based on isolation, size, and cover of invasive species. We now know that some small isolated wetlands are important in certain landscapes and should not be automatically rated as a Category IV.

The distribution of wetlands in different categories in the revised rating system

Data were collected at 122 wetlands to calibrate the revised rating system. At the same time, the wetlands were rated using the old system. The points assigned each question were calibrated to the scores and judgments of functioning developed for the Wetland Function Assessment Project (Hruby et al. 1999, Hruby et al. 2000). The thresholds (scores) for assigning categories, however, were chosen so the distribution of wetlands in the four categories remained roughly the same in the old and the revised system (with one exception noted below).

Reviewers from local governments who participated in developing this draft did not want the relative proportion of wetlands in each category to change between the old and the revised versions. The following table compares the distribution of categories in the 122 reference wetlands using the old and the revised systems.

NOTE: The sum of category II and III wetlands were approximately the same using the old and the revised rating system (88 for the old rating system and 89 for the revised one). There is a difference, however, in the proportion of each category between the two versions. Sixty-eight out of the 88 wetlands scored more than 21 points using the field form in the old rating system. This meant that 77% of the wetlands rated on their habitat functions were Category II and only 23% were Category III. At the time the old rating system was developed, a decision was made to score wetlands that were connected to other aquatic resources higher than those that were not. Such wetlands almost always score a minimum of 11 points, or ½ of what is needed to become a Category II regardless of other factors. These wetlands only needed to score 11 more points out of the remaining 50 points possible to become Category II wetlands. Much of the preponderance of Category II ratings using the old method in the reference wetlands is a result of the importance assigned to these habitat characteristics. More recently, the teams of experts developing methods for assessing functions and the rating system in the state decided to reduce the importance of stream or lake connections in scoring the habitat functions based on their experience and professional judgment. The habitat functions of wetlands outside of stream corridors were considered to be as important as those in corridors, and a better balance between Category II and III wetlands was sought. For this reason the numeric threshold between Category II and Category III wetlands was set so the distribution would be more balanced. Of the 89 reference wetlands that are categorized as II's and III's using the revised method, 50 (56%) are Category II and 39 (44%) are Category III.

Number of Wetlands in Each Category (western Washington)

Category	Old Rating System	Revised Rating System
I	27	24
II	68	50
III	20	39
IV	7	9

3. RATIONALE FOR THE CATEGORIES

This rating system is designed to differentiate between wetlands based on their sensitivity to disturbance, rarity, the functions they provide, and whether we can replace them or not. The emphasis is on identifying those wetlands:

- where our ability to replace them is low,
- that are sensitive to adjacent disturbance,
- that are rare in the landscape,
- that perform many functions well,
- that are important in maintaining biodiversity.

The following description summarizes the rationale for including different wetland types in each category. As a general principle, it is important to note that wetlands of all categories have valuable functions in the landscape, and all are worthy of inclusion in programs for wetland protection.

3.1 CATEGORY I

Category I wetlands are those that 1) represent a unique or rare wetland type; or 2) are more sensitive to disturbance than most wetlands; or 3) are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or 4) provide a high level of functions. We cannot afford the risk of any degradation to these wetlands because their functions and values are too difficult to replace. Generally, these wetlands are not common and make up a small percentage of the wetlands in the region. Of the 122 wetlands used to field test the current rating system only 24 (20%) were rated as a Category I. In western Washington the following types of wetlands are Category I.

Estuarine Wetlands - Relatively undisturbed estuarine wetlands larger than 1 acre are Category I wetlands because they are relatively rare and provide unique natural resources that are considered to be valuable to society. These wetlands need a high level of protection to maintain their functions and the values society derives from them. Furthermore, the questions used to characterize how well a freshwater wetland functions cannot be used for estuarine wetlands. No rapid methods have been developed to date to characterize how well estuarine wetlands function.

Estuaries, the areas where freshwater and salt water mix, are among the most highly productive and complex ecosystems where tremendous quantities of sediments, nutrients and organic matter are exchanged between terrestrial, freshwater and marine communities. This availability of resources benefits an enormous variety of plants and animals. Fish, shellfish and birds and plants are the most visible. However, there is also a huge variety of other life forms in an estuarine wetland: for example, many kinds of diatoms, algae and invertebrates are found there.

Estuarine systems have substantial economic value as well as environmental value. All

Washington State estuaries have been modified to some degree, bearing the brunt of development pressures through filling, drainage, port development and disposal of urban and industrial wastes. The over-harvest of certain selected economic species has also modified the natural functioning of estuarine systems. Many Puget Sound estuaries such as the Duwamish, Puyallup, Snohomish and Skagit have been extensively modified. Up to 99% of some estuarine wetland areas in the state have been lost.

Estuaries, of which estuarine wetlands are a part, are a "priority habitat" as defined by the state department of Fish and Wildlife. Estuaries have a high fish and wildlife density and species richness, important breeding habitat, important fish and wildlife seasonal ranges and movement corridors, limited availability, and high vulnerability to alteration of their habitat (Washington State Department of Fish and Wildlife (WDFW), http://www.wa.gov/wdfw/hab/phslist.htm, accessed October 15, 2003).

Natural Heritage Wetlands – Wetlands that are identified by scientists of the Washington Natural Heritage Program/DNR as high quality, relatively undisturbed wetlands, or wetlands that support State listed threatened or endangered plants are Category I wetlands.

High quality, relatively undisturbed examples of wetlands are uncommon in western Washington. By categorizing these wetlands as Category I, we are trying to provide a high level of protection to the undisturbed character of these remaining high quality wetlands. Examples of undisturbed wetlands help us to understand natural wetland processes. Furthermore, the presence of rare plants in a wetland indicates unique habitats that might otherwise not be identified through the rating system. Rare plant populations are also sensitive to disturbance, particularly activities that result in the spread of invasive species.

The Washington Natural Heritage Program of the Department of Natural Resources (DNR) has identified important natural plant communities and species that are very sensitive to disturbance or threatened by human activities, and maintains a database of these sites.

"These natural systems and species will survive in Washington only if we give them special attention and protection. By focusing on species at risk and maintaining the diversity of natural ecosystems and native species, we can help assure our state's continued environmental and economic health." (DNR http://www.wa.gov/dnr/htdocs/fr/nhp/wanhp.html , accessed October 1, 2002)

Bogs - Bogs are Category I wetlands because they are sensitive to disturbance and impossible to re-create through compensatory mitigation.

Bogs are low nutrient, acidic wetlands that have organic soils. The chemistry of bogs is such that changes to the water regime or water quality of the wetland can easily alter its ecosystem. The plants and animals that grow in bogs are specifically adapted to such conditions and do not tolerate changes well. Immediate changes in the composition of the plant community often occur after the water regime changes. Minor changes in the water regime or nutrient levels in these systems can have major adverse impacts on the plant and animal communities (e.g. Grigal and Brooks, 1997).

In addition to being sensitive to disturbance, bogs are not easy to re-create through compensatory mitigation. Researchers in northern Europe and Canada have found that restoring bogs is difficult, specifically in regard to plant communities (Bolscher 1995,

Grosvermier et al. 1995, Schouwenaars 1995, Schrautzer et al. 1996), water regime (Grootjans and van Diggelen 1995, Schouwenaars 1995) and/or water chemistry (Wind-Mulder and Vitt 2000). In fact, restoration may be impossible because of changes to the biotic and abiotic properties preclude the re-establishment of bogs (Shouwenaars 1995, Schrautzer et al. 1996). Furthermore, bogs form extremely slowly, with organic soils forming at a rate of about one inch per 40 years in western Washington (Rigg 1958).

Nutrient poor wetlands, such as bogs, have a higher species richness, many more rare species, and a greater range of plant communities than nutrient rich wetlands (review in Adamus and Brandt 1990). They are, therefore, more important than would be accounted for using a simple assessment of wetland functions (Moore et al. 1989).

Mature and Old-growth Forested Wetlands – Mature and old-growth forested wetlands over 1 acre in size are "rated" as Category I because these wetlands cannot be easily replaced through compensatory mitigation. A mature forest may require a century or more to develop, and the full range of functions performed by these wetlands may take even longer (see review in Sheldon et al. 2004, in press).

These forested wetlands are also important because they represent a second "priority habitat" as defined by the state department of Fish and Wildlife. "*Priority habitats* are those habitat types or elements with unique or significant value to a diverse assemblage of species." (Washington State Department of Fish and Wildlife (WDFW), http://www.wa.gov/wdfw/hab/phslist.htm, accessed October 15, 2002). NOTE: All wetlands are categorized as a priority habitat by the WDFW. Mature and forested wetlands, therefore, represent two priority habitats that coincide.

Wetlands in Coastal Lagoons – Coastal lagoons are shallow bodies of water, like a pond, partly or completely separated from the sea by a barrier beach. They may, or may not, be connected to the sea by an inlet, but they all receive periodic influxes of salt water. This can be either through storm surges overtopping the barrier beach, or by flow through the porous sediments of the beach.

Wetlands in coastal lagoons are placed into Category I because they probably cannot be reproduced through compensatory mitigation, and because they are relatively rare in the landscape. No information was found on any attempts to create or restore coastal lagoons in Washington that would suggest this type of compensatory mitigation is possible. Any impacts to lagoons will, therefore, probably result in a net loss of their functions and values.

In addition, coastal lagoons and their associated wetlands are proving to be very important habitat for salmonids. Unpublished reports of ongoing research in the Puget Sound (Hirschi et al. 2003, Beamer et al. 2003) suggests coastal lagoons are heavily used by juvenile salmonids.

Wetlands That Perform Many Functions Very Well - Wetlands scoring 70 points or more (out of 100) on the questions related to functions are Category I wetlands.

Not all wetlands function equally well, especially across the suite of functions performed. The field questionnaire was developed to provide a method by which wetlands can be categorized based on their relative performance of different functions. Wetlands scoring 70

points or more were judged to have the highest levels of function. Wetlands that provide high levels of all three types of functions (improving water quality, hydrologic functions, and habitat) are also relatively rare. Of the 122 wetlands used to calibrate the rating system in western Washington, only 18 (15%) scored 70 points or higher based on their functions.

The questionnaire on wetland functions is based on the six-year effort to develop detailed methods for assessing wetland functions both in eastern and western Washington. These methods currently represent the "best available science" in rapid assessments of wetland functions.

3.2 CATEGORY II

Category II wetlands are difficult, though not impossible, to replace, and provide high levels of some functions. These wetlands occur more commonly than Category I wetlands, but still need a relatively high level of protection. Category II wetlands in western Washington include:

Estuarine Wetlands - Any estuarine wetland smaller than an acre, or those that are disturbed and larger than 1 acre are category II wetlands. Although disturbed, these wetlands still provide unique natural resources that are considered to be valuable to society. Furthermore, the questions used to characterize how well a wetland functions cannot be used for estuarine wetlands.

Interdunal Wetlands - Interdunal wetlands greater than 1 acre are Category II because they provide critical habitat in this ecosystem (Wiedemann 1984). This resource is important but constitutes only a small part of the total dune system (Wiedemann 1984). No methods have been developed to characterize how well interdunal wetlands function, so these wetlands cannot be rated by a score.

Interdunal wetlands form in the "deflation plains" and "swales" that are geomorphic features in areas of coastal dunes. These dune forms are the result of the interaction between sand, wind, water and plants. The dune system immediately behind the ocean beach (the primary dune system) is very dynamic and can change from storm to storm (Wiedemann 1984). For the purpose of rating, any wetlands that are located to the west of the 1889 line (western boundary of upland ownership) are considered to be interdunal.

Wetlands That Perform Functions Well - Wetlands scoring between 51-69 points (out of 100) on the questions related to the functions present are Category II wetlands. Wetlands scoring 51-69 points were judged to perform most functions relatively well, or performed one group of functions very well and the other two moderately well.

3.3 CATEGORY III

Category III wetlands are 1) wetlands with a moderate level of functions (scores between 30 -50 points) and 2) interdunal wetlands between 0.1 and 1 acre in size. Wetlands scoring between 30 -50 points generally have been disturbed in some ways, and are often

less diverse or more isolated from other natural resources in the landscape than Category II wetlands.

3.4 CATEGORY IV

Category IV wetlands have the lowest levels of functions (scores less than 30 points) and are often heavily disturbed. These are wetlands that we should be able to replace, and in some cases be able to improve. However, experience has shown that replacement cannot be guaranteed in any specific case. These wetlands may provide some important functions, and also need to be protected.

4. OVERVIEW FOR USERS

4.1 WHEN TO USE THE WETLANDS RATING SYSTEM

The rating system is designed as a rapid screening tool to categorize wetlands for use by agencies and local governments in protecting and managing wetlands. It should be used only on vegetated wetlands as defined using the delineation procedures in WAC 173-22-80. The rating system does not try to establish the economic values present in a wetland; it only helps to identify its sensitivity, rarity, and functions.

Two versions of the rating system have been developed, one for western Washington and one for eastern. This broad division of the state into east and west may not reflect all regional differences in the importance of wetlands. Developing special measures to protect locally unique wetlands is recommended where local governments need to provide a level of protection that would not be otherwise provided by the rating system.

4.2 HOW THE WETLAND RATING SYSTEM WORKS

The first edition of the rating system had two forms that needed to be filled out, the "office" form and the "field" form. This revision only has one form, the "rating" form. The information that was incorporated in the "office" form is now included on the first page of the rating form.

The Wetlands Rating Form attached at the end of this document asks the user to collect information about the wetland in a step-by-step process. We recommend careful reading of the guidance before filling out the form. The wetland rating can be based on different criteria, so it is important to fill out the entire rating form. Since a wetland may rate a different category for each criterion, it is the "highest" that applies to the wetland. "Highest" here is defined as the most protective.

4.3 GENERAL GUIDANCE FOR THE WETLAND RATING FORM

Land-owner's Permission

It is important to obtain permission from the land owner(s) before going on their property.

Time Involved

The time necessary to rate wetlands will vary from as little as fifteen minutes to several hours. Larger sites with dense brush may involve strenuous effort. Several of the rating questions are best answered by using aerial photographs, topographic maps, other documents, or a combination of these resources with field observations. In some cases, however, it may be necessary to visit the wetland more than once. Some of the questions cannot be answered

if the ground is covered with snow or the surface water is frozen. If this is the case at the time a wetland is being rated, it may be necessary to revisit the site later.

Experience and Qualifications Needed

It is important that the person completing the rating have experience and/or education in the identification of natural wetland features, indicators of wetland function, vegetation classes, and some ability to distinguish between different plant species. We recommend that qualified wetland consultants or wetland experts be used to rate most sites, particularly the larger and more complex ones. This will help ensure that results are repeatable.

Identifying the Boundaries of Wetlands for Rating

First, determine the location and approximate boundaries of the wetland during the site visit. A surveyed delineation of the wetland, however, is not necessary to complete data collection, unless this information is required for another part of your project or the size becomes an issue in determining the category (e.g. >1 acre estuarine or > 1 acre mature or old-growth forest). It is often useful to have a map or aerial photograph on which the approximate boundaries of the wetland can be drawn. This boundary, however, will need to be verified in the field. A determination of the boundary that is not verified by a field survey may result in a different rating. This is especially true in forested wetlands where the boundaries are difficult to determine from aerial photographs.

The entire wetland within the delineated boundary is to be rated. Small areas within a wetland (such as the footprint of an impact) cannot be rated separately. The rating method is not sensitive enough, or complex enough, to allow division of a wetland into sub-units based on level of disturbance, property lines, or vegetation patterns. Furthermore, users of the rating system are not asked to subdivide a wetland into different (hydrogeomorphic [HGM] classes (see p. 24) as is done in the function assessment methods. A wetland with several wetland classes within its boundary is treated as one class for the purpose of rating. The second page of the rating form provides guidance on how to classify for wetlands having several HGM classes within its boundary.

Identifying Boundaries of Large Contiguous Wetlands in Valleys

Wetlands can often form large contiguous areas that extend over hundreds of acres. This is especially true in river valleys where there is some surface water connection between all areas of the floodplain. In these situations the initial task is to identify the wetland "unit" that will be rated. For the purposes of the rating system, a large contiguous area of wetland can be divided into smaller units using the criteria described below.

The guiding principle for separating a vegetated wetland into different units for the purpose of rating is changes in the water regime of the wetland. Boundaries between different units should be set at the point where the volume, flow, or velocity of the water changes abruptly, whether created by natural or human-made features. The following sections describe some common situations that might occur. The criteria for separating wetlands into different units for rating are based on the observations made during the field work undertaken to calibrate both the rating system and the methods for assessing wetland functions. They reflect the collective judgment of the teams of wetland experts

that developed and calibrated the methods.

Examples of Changes in Water Regime

- *Berms, dikes, cascades, rapids, falls, culverts, and other features that change flow, volume, or velocity of water over short distances.*
- *The presence of drainage ditches that significantly reduce water detention in one area of a wetland.*

Wetlands in a Series of Depressions in a Valley

Wetlands in depressions along stream or river corridors may contain constrictions where the wetland narrows between two or more depressions. The key consideration is the direction of flow through the constriction. If the water moves back and forth freely it is not a separate unit. If the flow is unidirectional, down-gradient, with an elevation change from one part to the other, then a separate unit should be created. The justification for separating wetlands increases as the flow between two areas becomes more unidirectional and has a higher velocity. Constrictions can be natural or man-made (e.g. culverts). (Figure 1)

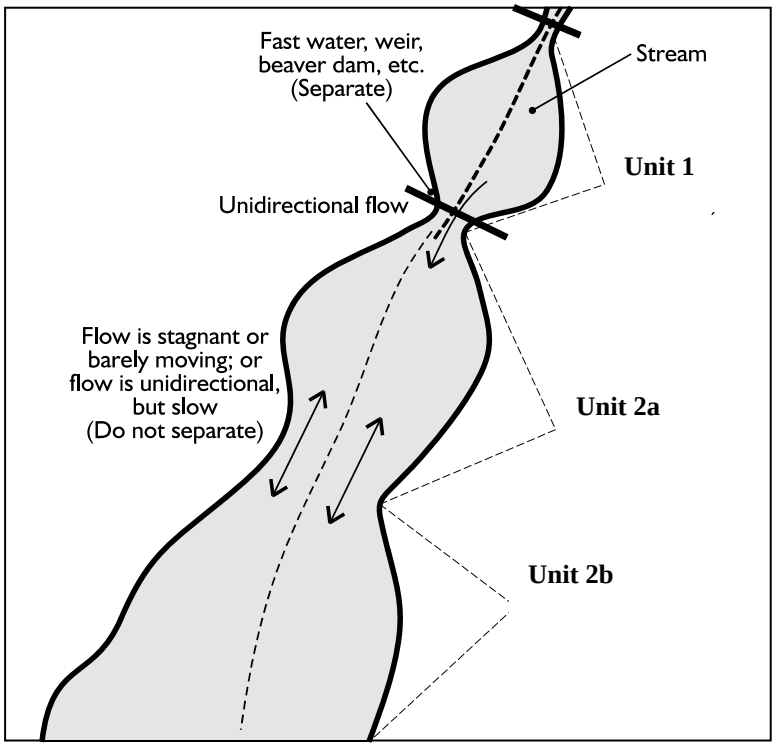
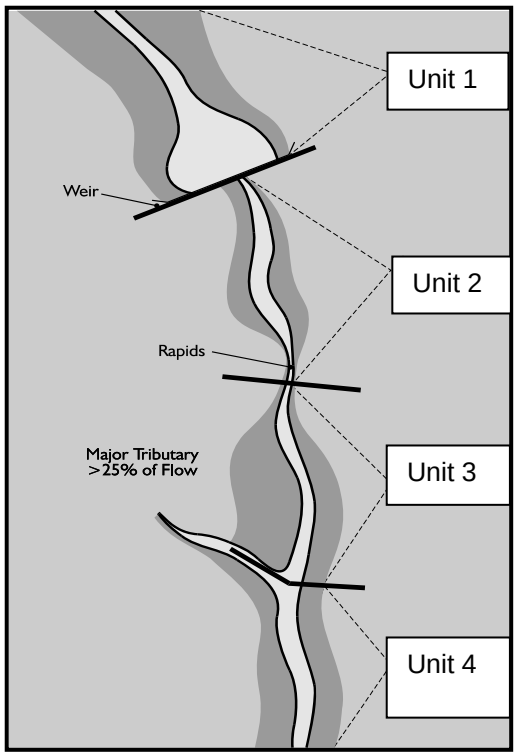


Figure 1. Determining wetland units along a stream corridor with constrictions. Units 2a and 2b should be rated as one unit.

Wetlands Associated with Streams or Rivers



In western Washington, linear wetlands contiguous with a stream or river may be broken into units using criteria based on hydrologic factors or vegetation. Figure 2 presents a diagram of how wetland units might be separated along a stream corridor based on change in the water regime. Three changes in water regime are illustrated: 1) a weir or dam, 2) a series of rapids, and 3) a tributary coming into the main stream that increases the flow significantly (generally > 25%). Figure 3 illustrates how a unit for rating can be separated when the wetland vegetation: 1) disappears and is replaced with unvegetated bars or banks for at least 50 ft along the stream, and 2) becomes narrow for at least 100 feet. A narrow band of vegetation is defined as one that is less than 30 feet in width.

Figure 2: Determining wetland units in a riverine system based on changes in water regime.

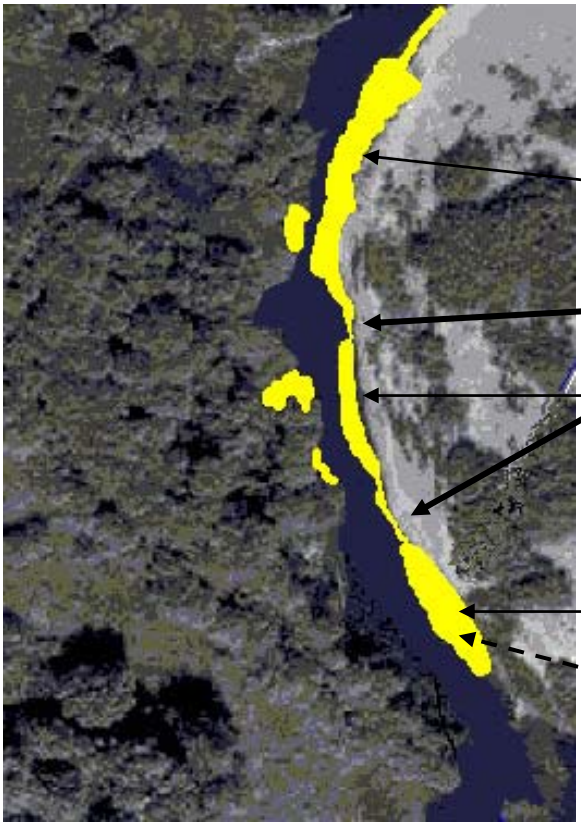


Figure3: Determining wetland units in a riverine setting based on breaks in vegetation. In this case the river is wider than 50ft., and the wetlands on either side are rated separately.

In cases when a wetland contains a stream or river, you must also decide if the stream or river is a part of the wetland. Use the following guidelines to make your decision:

Wetland on one side only — If the wetland area is contiguous to, but only on one side of, a river or stream, **do not** include the river as a characteristic of the wetland unit for rating.

Wetland on both sides of a wide stream or river — If the river or stream has an unvegetated channel that is more than 50 ft (15 m) wide, and there is a contiguous wetland area on both sides, treat **each side as a separate unit** for rating. **Do not** include the river as a characteristic of the wetland unit for rating.

Wetland on both sides of a narrow river or stream — If the river or stream has an unvegetated channel less than 50 feet (15 m) wide, and there is are contiguous vegetated wetlands on both sides, treat **both sides together** as one unit, and **include** the river as a characteristic of the wetland.

Identifying Wetlands in a Patchwork on the Landscape (Mosaic)

If the wetland being categorized is in a mosaic of wetlands, the entire mosaic **should be considered one unit** when:

- Each patch of wetland is less than 1 acre (0.4 hectares), and
- Each patch is less than 100 ft (30 m) apart, on the average, and
- The areas delineated as vegetated wetland are more than 50% of the total area of the wetlands and the uplands together, or wetlands, open water, and river bars.

If these criteria are not met, each area should be considered as an individual unit (see Figure 4).

Identifying Boundaries of Estuarine Wetlands

Vegetation in estuarine wetlands is often found in patches that are interspersed among mud flats and tidal channels. The salt tolerant vegetation can also be found as long narrow bands along the shores of Puget Sound or in sloughs (see Figure 9). All these estuarine wetlands are to some degree interconnected because they are flushed by the same tidal waters, and thus to some degree also function together.

The criteria listed below for separating estuarine wetlands into separate units for rating are based more on practical issues, such as ease of use, rather than any scientific justification because no data exist to establish thresholds for separation. Patches of vegetation that are 10 ft apart will be more closely linked ecologically than those 50 ft apart, and even more so than patches 100 ft apart. There is no scientific information available to suggest that there are thresholds in distance at which the ecological interaction between two patches of vegetation changes significantly.

Estuarine wetlands should be rated as one unit when:

- Patches of salt tolerant vegetation are separated along a shore by less than 100 ft

of cobble or sand beaches

- Patches of salt tolerant vegetation are separated by less than 300 ft of mudflats that go dry on a Mean Low Tide.
- Patches of salt tolerant vegetation are separated by less than 100 ft of a tidal channel that has water at Mean Low Tide.

Estuarine wetlands in sloughs may be separated into different units for rating when the patches of salt tolerant vegetation in sloughs are separated by bridges, dikes, or bulkheads for more than 30 ft. Both sides of a slough, however, should be rated as one wetland.

NOTE: Kelp beds and eel grass beds are not considered as estuarine wetlands for the purpose of rating. They are important aquatic resources but cannot be characterized using this method.

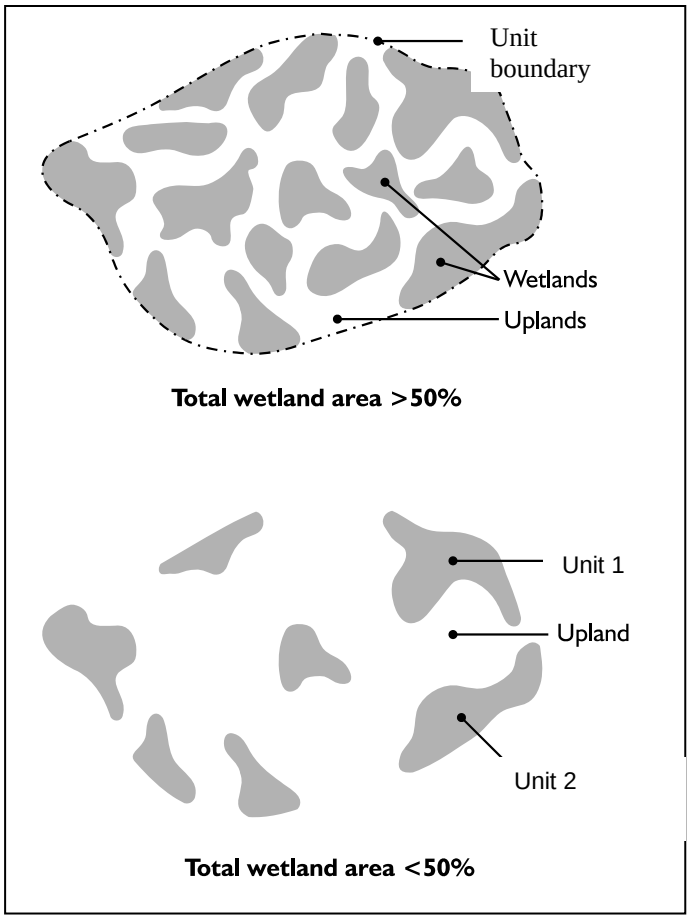


Figure 4: Determining unit boundaries when wetlands are in small patches.

Identifying Boundaries Along the Shores of Lakes or Reservoirs (Lake-fringe Wetlands)

Lakes or reservoirs will often have a fringe of wetland vegetation along their shores. Different areas of this vegetated fringe can be categorized separately if there are gaps

where the wetland vegetation disappears or where the band of vegetation is very narrow. Use the following criteria for separating different units along a lakeshore.

NOTE: If the open water is less than 20 acres, the entire area (open water and any other vegetated areas) is considered as one wetland unit, and it is a depressional or riverine wetland.

1. Only the vegetated areas along the lake shore are considered part of the wetland unit for the rating system. Open water within areas of vegetation is considered to be part of the wetland, but open water that separates patches of vegetation along a shore are not considered to be part of the wetland (Figure 5).
2. If only some parts of the circumference of a lake are vegetated, separate the vegetated parts into different units at the points where the wetland vegetation thins out to less than a foot in width for at least 33ft (10m). (Figure 6)

Figure 5: Lake-fringe wetland showing open water that is included within the wetland boundary.

Another common situation in western Washington is a lake-fringe wetland that is contiguous with a large wetland that extends far from the edge of the lake (Figure 7). These wetlands are usually classified as depressional or riverine. The entire unit of riverine and lake-fringe wetlands should be rated as one unit unless the connection between them is long and narrow (more than 100 ft long and less than 50f t wide).

Figure 6: Break in wetland vegetation along the shore of a lake that separates the wetlands into two units for rating.

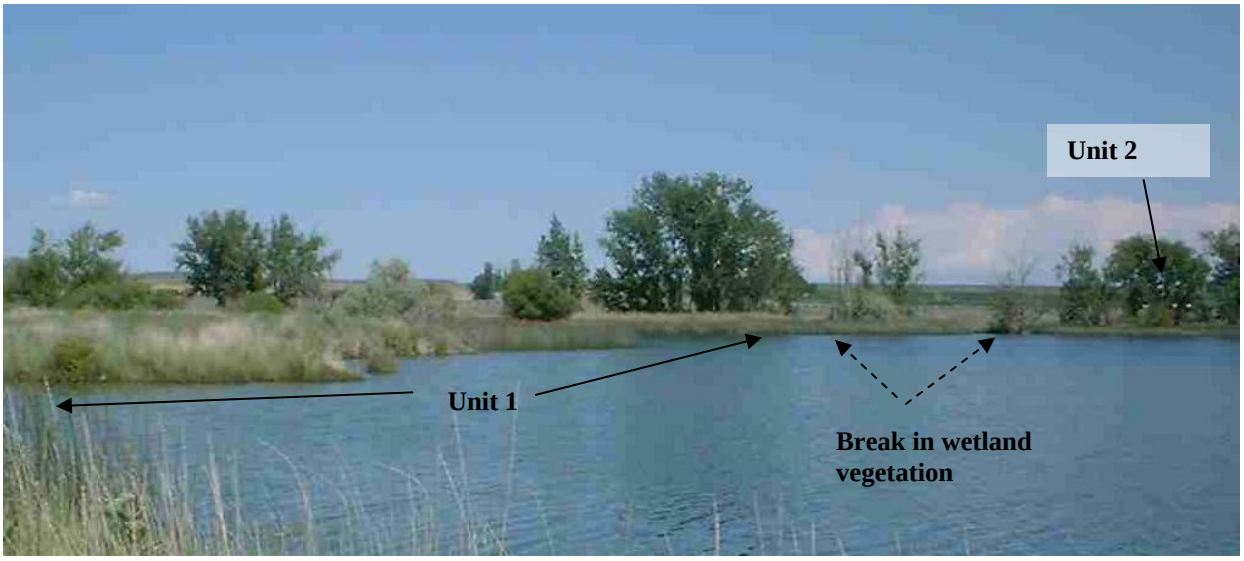
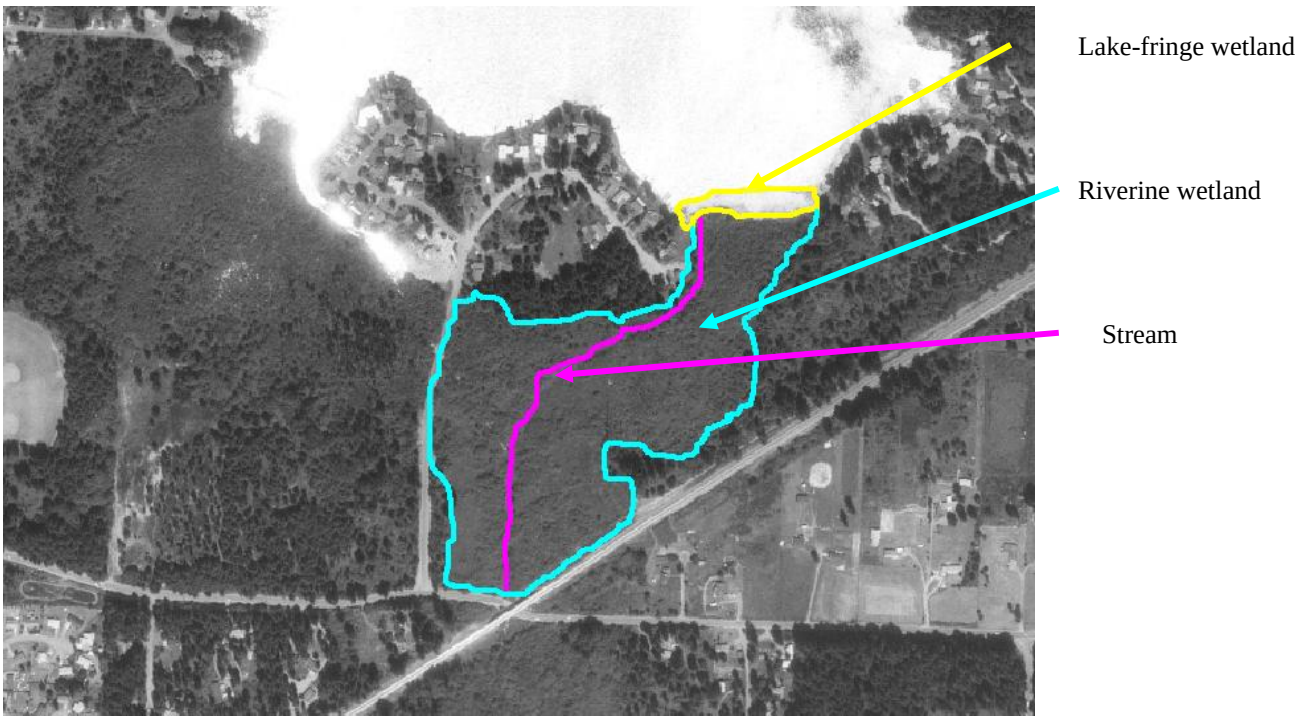


Figure 7: Aerial photograph of a lake-fringe wetland connecting to a riverine wetland without any topographic or hydrologic breaks between them. Both types of wetlands are rated as one using the questions for Riverine wetlands.



Another scenario that may occur in a lake-fringe wetland is one where open water is found between the wetland plants along the shore and patches in deeper water. One can

usually assume that the water depth in this area of open water is shallower than the depth in the area of the plants further offshore. In this situation the open water is considered a part of one wetland that encompasses both the rooted submerged plants offshore and the shore-side plants. The absence of plants in the area of open water may only be temporary, or the submerged plants are present but not visible because they do not grow to the surface. The vegetation may also be absent due to wave action, physical removal, or herbicide applications.

Wetlands Bisected by Human-Made Features

When a wetland is divided by a human-made feature, such as a road embankment, the wetland should not be divided into different units if there is a level surface-water connection between the two parts of the wetland. Water should be able to flow equally well between the two areas. For example, if there is a wetland on either side or a road with a culvert connecting the two, and both sides of the culvert are partially or completely underwater for most of the year, the wetland should be rated as one. Make the down gradient wetland a separate unit, however, if the bottom of the culvert is above the high water marks in the receiving wetland, or the high-water marks on either side differ by more than 6 inches in elevation.

Cases When a Wetland Should Not be Divided

Differences in land uses within a wetland should not be used to define units, unless they coincide with the circumstances described above. For example, if half a wetland has been recently cleared for farming and the other half left intact, the entire area functions as, and should be categorized as, one unit. Figure 8 shows a wetland that is a pasture along one side and relatively undisturbed on the other side. In this case the entire wetland should be rated as one unit.

Figure 8: A wetland with two different levels of disturbance and separated by a fence. The entire wetland should be rated; not just the mowed part.

Freshwater Wetlands Where Only Part of the Wetland is a Forest or a Bog

Freshwater wetlands may be rated as Category I because they contain a smaller area of bogs or mature or old-growth forest. If the entire wetland (including the bog and forested areas) scores between 30 and 69 points for its functions, it may be possible to assign a dual rating to the wetland (Category I/II, Category I/III).

Table 1: Situations where dual ratings may be possible.

Rating Based on Special Characteristics	Score for Functions >= 70	Score for Functions 51-69	Score for Functions 30-50
Cat. I bog	Not possible – Cat. I	I/II	I/III
Cat. I forest	Not possible – Cat. I	I/II	I/III

To develop a dual rating you will need to establish a boundary within the wetland that clearly establishes the area that is the Category I bog or forest. If you are unable to clearly map the boundaries between the forest or bog and the rest of the wetland it may be impossible to assign a dual rating.

Dual ratings are acceptable only when a wetland contains a small area of bog or forest, or in certain estuarine cases (see below). **Wetlands that are a Category I Natural Heritage sites Category I coastal lagoons, or Category II interdunal wetlands cannot be split.**

The criteria to be used in establishing the boundary between the Category I part of a wetland and those that are either Category II or III are as follows:

1. For wetland areas that are Category I as a result of the presence of a forest, the boundary between categories should be set at the edge of the forest.
2. For wetland areas that are Category I because they are bogs, the boundary between categories should be set where the characteristic bog vegetation changes (i.e. most of the plants that are specifically adapted to bogs are replaced with more common wetland species) and/or where the organic soils become shallow (less than 16 inches).

Category I Estuarine Wetlands With a Fringe of *Spartina* spp.

A dual rating is also possible when an estuarine wetland that meets the criteria for a Category I estuarine wetland has a fringe along the seaward edge of the invasive *Spartina* spp. The area that has more than 10% cover of *Spartina*, but no other invasive species, meets the criteria for a Category II estuarine wetland. The entire vegetated system can be categorized as an estuarine I/II. The boundary between the two categories is the zone where the cover of *Spartina* spp. becomes 10%. The area of *Spartina* would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I.

Very Small Wetlands

Users of the rating system often question the effectiveness of the method at rating wetlands that are ¼ acre or less. One tree or shrub may be all that is needed in a small wetland to score points on the data sheet for certain questions. The data collected during the calibration of the method, however, indicate that wetlands smaller than a quarter acre can be rated accurately. The smallest wetlands rated during the calibration were about 1/10 acre in size (see Figure 9 for an example of a small wetland that is about 1/10 acre in size), and all were judged by the field teams to be adequately characterized using the method.

Figure 9: A slope wetland near Padilla Bay that is approximately 1/10 acre in size. It rated as a Category IV wetland.

At present, the accuracy of the ratings has not been tested for wetlands smaller than 1/10 acre, but it may be applicable to even smaller wetlands because the rating of most functions is not dependent on the size or number of characteristics in the wetland. The scoring for the “water quality” functions is independent of size because the functions are rated on the "potential" per unit area. For example the ability of a square yard of organic soil in a wetland to remove nitrogen is not dependent of the size of the wetland. A square yard of soil in a wetland of 1/10 acre can be just as effective as a square yard in a large wetland if it undergoes seasonal ponding.

The same is true for the hydrologic functions. A small wetland that stores 3 ft of water during a flooding event is more effective, on a per acre basis, than a large wetland that stores only 1ft. The larger wetland may store a larger volume overall, but it is the volume per unit area that needs to be characterized. Impacts to wetlands are usually calculated by area. For example, an impact to 1/10 acre of a wetland that stores 3 ft of water needs to be mitigated by replacing a similar amount of storage (i.e. 3 ft over 1/10 acre). It makes no difference if the size of the wetland impacted is ¼ acre, 10 acres, or 100 acres.

Very small wetlands may not provide good habitat for some of the larger wildlife species such as otter or beaver, but they are known to provide critical habitat for many smaller species. For example, amphibians were found using and breeding in wetlands as small as 270 ft^2 in the Palouse region of northern Idaho (Monello and Wright 1999).

Thus, very small wetlands may be less important for large wildlife but more important for smaller wildlife. Since the methods were judged to be accurate for wetlands as small as a 1/10 of an acre, the review team and the department of Ecology staff decided not to develop additional questions for very small wetlands less than 1/10 acre in size.