



The slide features a dark blue header with the text "Wetlands 101 Webinar Series" in white. Below the header, on a white background, is the text "Part 1: Introduction", "Rick Mraz, PWS", "Wetland Specialist", and "February 24, 2015". To the right of this text is a small portrait of Rick Mraz. At the bottom left are the logos for the Department of Ecology, State of Washington, and the Coastal Training Program, Washington. On the right side of the slide is a vertical photograph of a wetland area with tall grasses and water.

Wetlands 101 Webinar Series

Part 1: Introduction

Rick Mraz, PWS
Wetland Specialist
February 24, 2015

DEPARTMENT OF
ECOLOGY
State of Washington

COASTAL
TRAINING
PROGRAM
Washington

Hello everyone,

This four-part, Wetlands 101, webinar series is presented by the Washington Department of Ecology. It is intended for local government planners, particularly those at small jurisdictions with no technical wetland support staff. Our goals are to:

- Give planners the tools to be able to recognize a wetland, or to at least make them suspicious that a site could be a wetland
- Enable the planners to recognize a faulty delineation report
- Increase their comfort level in discussing wetlands with applicants and their consultants

We intend to do this through our presentation of four modules, which introduce wetlands in a ecological and regulatory context, and then explore the three parameters necessary for a positive finding of wetland presence. Following this introductory session, subsequent modules will examine a specific wetland parameter, using the federal wetland delineation manual and appropriate regional supplement to the manual to frame to discussion.

The topical material for this webinar will be Western Washington-focused. We hope to provide future webinars that will focus on Eastern Washington (east of the Cascade mountains), using the tools and regulatory manuals appropriate to those regions. We also hope to provide a webinar focused on wetland regulations in this state.

The first of the four modules will be an introductory presentation that will explore some of the most basic concepts about wetlands, both in ecological and regulatory contexts.

The second module will introduce and explore the concept of wetland hydrology, arguably the most important of the three parameters in determining wetland presence. After all, it's not a wetland without water.

The third module will examine hydric soils, how they are formed, and how to recognize field indicators of these unique soils.

The fourth and final module will discuss hydrophytic vegetation and includes a discussion of how to determine whether a community of plants is predominantly composed of these wetland-tolerant species.



This introductory discussion will provide an overview of wetlands from a qualitative perspective. It should answer questions like: what are wetlands, where would I find wetlands – including a brief look at some tools that are helpful in determining wetland presence, and why wetlands are important. We'll also briefly discuss one wetland assessment tool that helps quantify certain benefits of wetlands.

The first question: “what are wetlands”, is answered using the legal definition, which is present in a number of Washington state laws, including the Growth Management Act and Shoreline Management Act.

What are Wetlands?

The three-part recipe:

- Water (hydrology)
- Soils
- Vegetation



3

Wetlands are identified through three unique, but inter-related parameters. Water, which is a fundamental component, is often described as wetland “hydrology”. Please forgive this misnomer; “hydrology” actually means the study of water. In the context of wetlands, “hydrology” has a very specific meaning that will be discussed in the next module.

Wetland regulatory definition:

“Those areas that are inundated or saturated by surface or ground water at a frequency and duration ...”

(Wet enough – long enough)



4

These next two slides display the regulatory definition of wetlands with key terms underlined. The parentheses contain a distilled version of the concept.

Inundation is shown in this image.

...to support, and that under normal circumstance do support a prevalence of vegetation typically adapted for life in saturated soil conditions.”



(Specific soils, i.e. anaerobic)

(Specific plants, i.e. hydrophytes)

5

A prevalence of vegetation implies that there is a dominance of hydrophytes in the potential wetland area.

“Saturation” will be discussed in more detail in the hydrology and hydric soil modules.

State Definition of Wetlands

Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway.

Wetlands may include those artificial wetlands intentionally created from nonwetland areas to mitigate the conversion of wetlands.

6

The state has added language to its wetland definition. These additions include:

- a mention of synonyms for the term “wetland”,
- and clarification of what is and what is not considered a wetland for regulatory purposes.

*An important side note: these additions are not present in the federal definition of wetlands and are not recognized by federal regulatory agencies when exerting their jurisdiction.

What are Wetlands?

Wetlands are:

- Wet enough - long enough
- Soils become anaerobic (low oxygen)
- Only plants that can handle the wetness and lack of oxygen grow there.

7

Let's take a little closer look at these three parameters: water soil, vegetation. As previously noted, these individual parameters will be explored in much greater detail in the coming modules of this webinar.



Wetlands are regulated as critical areas, waters of the state and waters of the United States. In each context, the key requirement is water.

As we saw in the wetland definition, important wetland hydrology concepts are frequency and duration, but other factors, like timing can also be very important. For example, many parts of Western Washington receive enough rainfall during the winter to become inundated. However, this winter inundation alone does not make an area a wetland.



The ocean is not a wetland, nor are eelgrass beds, kelp forests or mud flats. While they may be regulated in other ways, they are not considered wetlands. One needs the other two parameters to be present as well.

Soil

Not just any soil; HYDRIC soil



It takes special conditions to form a hydric soil and these soils exhibit unique features. Persistent wetland hydrology during the right times of the year will create distinctive characteristics in the soil.

Some of these characteristics are mineral depletion (pale appearance) and redoximorphic features (rusty appearance). These will be discussed in greater detail in future webinars.



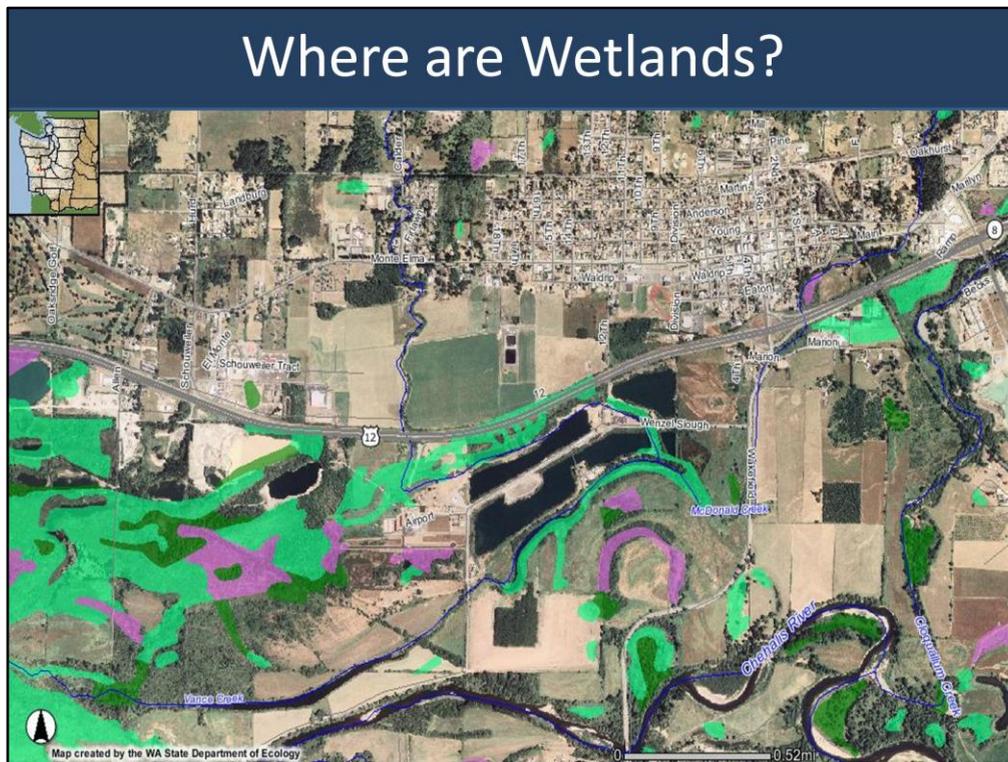
Plants need water to live, but too much water will kill most plants. Certain species have special adaptations to live in very wet conditions. Such plants are called hydrophytes: hydro=water, phyton (Gr.) =plant.

Many hydrophytes can also grow in uplands. We will discuss how to determine if there is a dominance of hydrophytes in a future webinar.

These three aspects, hydrology, soils and vegetation, are the parameters necessary to call an area a wetland.

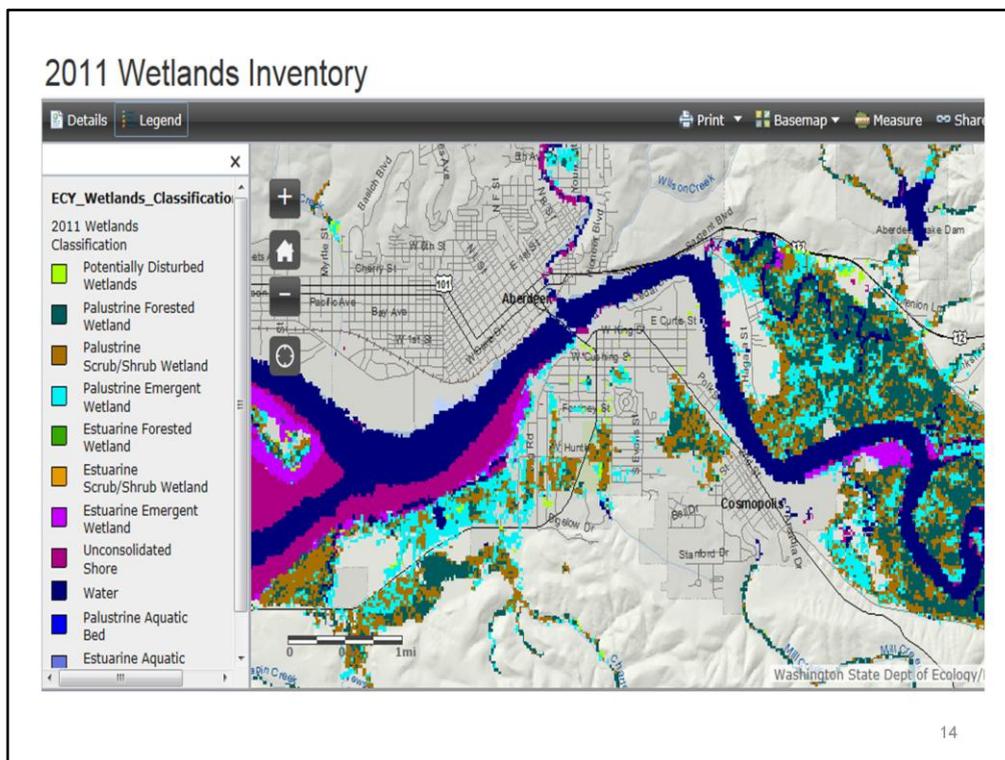
Questions?





Wetlands can be found all over Western Washington. This is a National Wetlands Inventory map of a small part of eastern Grays Harbor County. The different colored polygons are different types of wetlands, based on vegetation type.

National Wetlands Inventory mapping can be found at the USFWS website. This is an older projection of the NWI that is on Ecology's Coastal Atlas. While generally consistent with the most recent NWI mapping (of 2010), the older coverages are not entirely identical.



Here's another area in Grays Harbor, just west of the previous image, as depicted by The Wetland Change Analysis project.

This mapping is another source of information that can help give evidence of wetland presence. These wetland maps were produced by the Department of Ecology and will be used as a wetlands status and trends inventory to help determine if the goal of No Net Loss of wetlands is being achieved in Washington State.

The Wetland Change Analysis project provided a Wetland Inventory for Western Washington (modeled from the Coastal Change Analysis Program data).

It provides approximate locations for most wetlands larger than one acre

It includes a "Potentially Disturbed Wetlands" category for areas that have a high potential to be wetland, but have an observed land cover of "pasture/hay" or "cultivated"

It is more accurate than NWI for wetlands larger than one acre, especially in agricultural/pasture, forests, and stream corridors

It can be used for planning purposes and for initial permit review

But, like other wetland maps, it can NOT be used to determine regulatory boundaries.

Location, location, location

A wetland's location on the landscape is described as its:

HYDROGEOMORPHIC (HGM) setting

Some HGMs:

Depressional
Slope
Riverine
Lake-fringe



15

Wetlands can be found in a variety of landscape settings. Those locations have important influences on certain wetland characteristics, which we will discuss in more detail in just a few slides.

The term used to describe the landscape position is Hydrogeomorphic setting or class. This image is of a lake-fringe wetland.

Western Washington Wetlands



Wetlands can be classified other ways, too: source of water, vegetation types, or their functions and values. The following slides will show a variety of wetland types found in the Western Washington.

This slide shows a forested wetland, which can be difficult to identify in certain seasons. In late summer, the soils of this wetland may become dry and evidence of early season vegetation (skunk cabbage, in this instance) may have disappeared.

The timing of a wetland delineation is very important and will be discussed in future modules.

Depressional wetlands - beaver ponds



17

Beaver ponds are a type of depressional wetland.

Beaver are present in many watersheds in Western Washington and can obviously alter hydrology, soil and vegetation through their impoundment of water.

Seasonal fluctuations in the influence of ponding are common.



This is another type of wetland that can be difficult to spot in the landscape because they are often seasonally dry. They typically occur in shallow depressions or along river systems in the adjacent floodplain.

Some examples can be found in Thurston and Pierce County.



Oxbows are former river channels that are now isolated, either by river channel migration or human construction activity. Driving on Interstate 5 in Cowlitz County, you will see several old oxbows of the Columbia River that are now wetlands.



Some wetlands are classified by special characteristics that they exhibit. Bogs and Fens are wetlands that have acidic soils that are primarily composed of peats or other organic materials.

Due to the unusual water chemistry, bogs and fens exhibit an unique flora.

Bogs and fens are relatively rare in the landscape and many endangered or threatened plant species are associated with these wetland types.



These depressional wetlands are unique to the outer coast of Washington (and Oregon). They occur in sandy soils and are in hydrologic continuity with the Pacific Ocean; the freshwater sits on the saltwater.

Interdunal wetlands are typically linear and parallel to the coastline. They form in deflation plains behind the higher dunes. Those wetlands located closest to the ocean can be very ephemeral, disappearing beneath a blanket of sand during large storms.

Interdunal wetland show greater diversity in vegetation and hydrology as they occur further away from the wind and water forces of the ocean.



Estuarine wetlands are those subject to the ebb and flow of the tides. Salt-tolerant vegetation typically dominates. Some systems farther upriver on large tidally influenced systems may resemble agricultural fields and not experience significant salinities.

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.

Agricultural Wetlands and Pastures



Wetlands in agricultural settings may be highly modified and are among the most challenging to identify. Vegetation is often managed for specific crops, so native plants are usually absent.

However, these wetlands are not typically subject to regulations unless a change of use is proposed.

Questions?



Wetland Delineation

The steps used to identify the wetland-upland boundary based on the presence of recognized field indicators

25

The process of determining “where” a wetland is and what its boundaries are is called “delineation”. We’ll briefly touch on some aspects of delineation in the next few slides. Much more is covered in the coming modules.

Delineations are typically done trained professionals, although there is no legal requirement in Washington state for this. This may be a very good reason for reviewing a delineation.

A delineation is not officially valid until it is confirmed by Corps and Ecology as part of the permitting process. In general, a delineation is valid for 5 years.

Wetland Delineation in Western WA

- Federal
 - U.S. Army Corps of Engineers' 1987 Manual
 - Western Mountains, Valleys, & Coast (2010)
- Local
 - GMA requires that Critical Area Ordinances use the federal manual

26

The procedures for conducted a delineation are standardized and described in the Federal Manual and appropriate regional supplement.

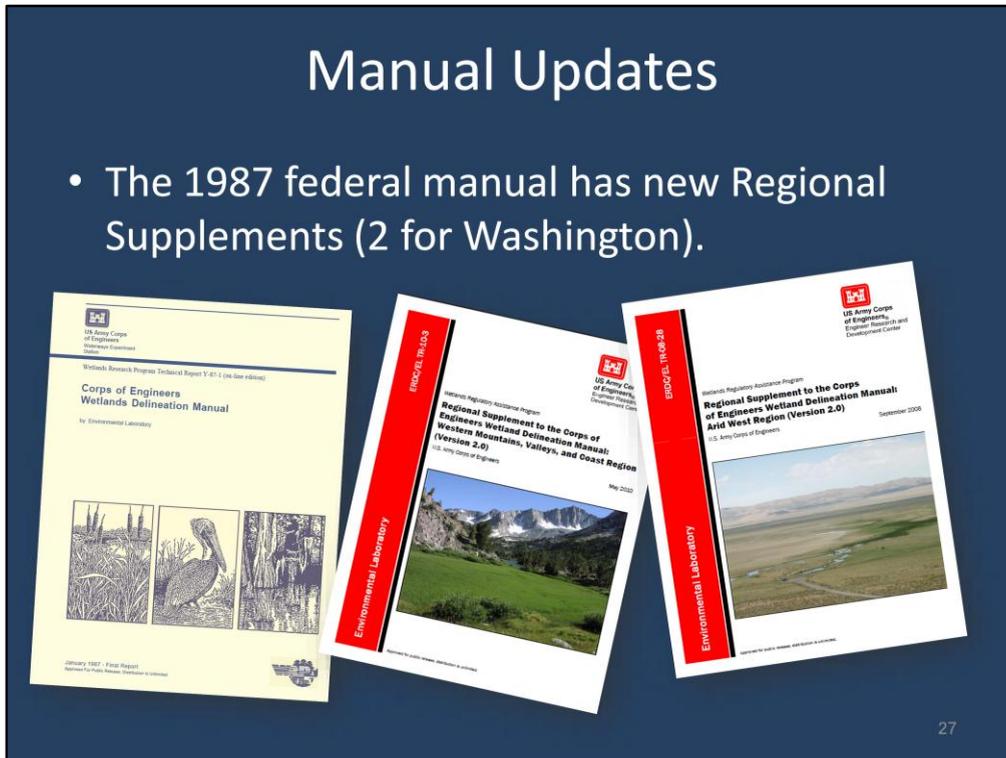
The Washington State Wetlands Identification and Delineation Manual (1997) is no longer in use; it has been superseded by federal manual and regional supplements.

The subsequent modules will discuss the 1987 manual and the Western Mountains, Valleys and Coast Region supplement.

Mention Arid West (2008) Regional Supplement

Manual Updates

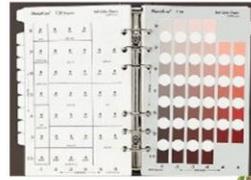
- The 1987 federal manual has new Regional Supplements (2 for Washington).



Regional differences in climate, geology, soils, hydrology, plant and animal communities, and other factors are important to the identification and functioning of wetlands. These differences cannot be considered adequately in a single national manual. The regional supplement approach intends to recognize those geographic differences.

Wetland Delineation Tools

- Munsell[®] soil color book
- Aerial photo/topo map
- Shovel
- Tape measure
- Field notebook
- Data sheets
- Plant list



28

There are many tools used in conducting a delineation. While this course is not intended to teach you how to conduct a delineation, it is important to note whether the proper tools and methods have been used when reviewing a wetland report.

The subsequent modules will use the Western Mountains, Valleys and Coast Region field data sheet as teaching tool. They will also help you review field methods and information presented in a delineation report to ensure that proper techniques were used.

Data sheets are vital.

Wetland Delineation Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: _____ City/County: _____ Sampling Date: _____

Applicant/Owner: _____ State: _____ Sampling Point: _____

Investigator(s): _____ Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____ No _____	Is the Sampled Area within a Wetland? Yes _____ No _____
Hydric Soil Present?	Yes _____ No _____	
Wetland Hydrology Present?	Yes _____ No _____	
Remarks:		

Here is a screen shot of the first part of the wetland delineation data sheet. This upper portion should be completed in its entirety!

The project site should be given or named. The sampling date is critical, for reasons that will be discussed in upcoming modules.

The sampling point is a unique identifier that should correspond to a map, provided in a delineation report. It lets the reviewer know where this test pit was located. There should be a data sheet for every spot that was sampled during the delineation.

Landforms, local relief and slope all help the reviewer consider whether the area might be more likely to contain wetlands.

The questions about whether the site is significantly disturbed or naturally problematic are very important. The delineation manual provides detailed guidance on how to approach a delineation in disturbed areas and the regional supplement lists several types of problems areas common to our region.

Normal circumstances is what it sounds like: the term refers to situations in which the vegetation has not been substantially altered by human activities.

Valuable resources are available online :

- National Wetlands Inventory (<http://www.fws.gov/wetlands/>)
- Soil Survey
- Aerial photos
- National Wetlands Plant list



30

Whether conducting a delineation or reviewing one, certain tools and perspectives are necessary. National Wetlands Inventory maps can provide evidence of wetland presence.

Aerial photos can provide evidence of seasonal ponding.

Soil maps can identify mapped hydric soils.

Knowing those plants that commonly occur in wetlands is a valuable skill.

The upcoming modules will help address using this information to your advantage.



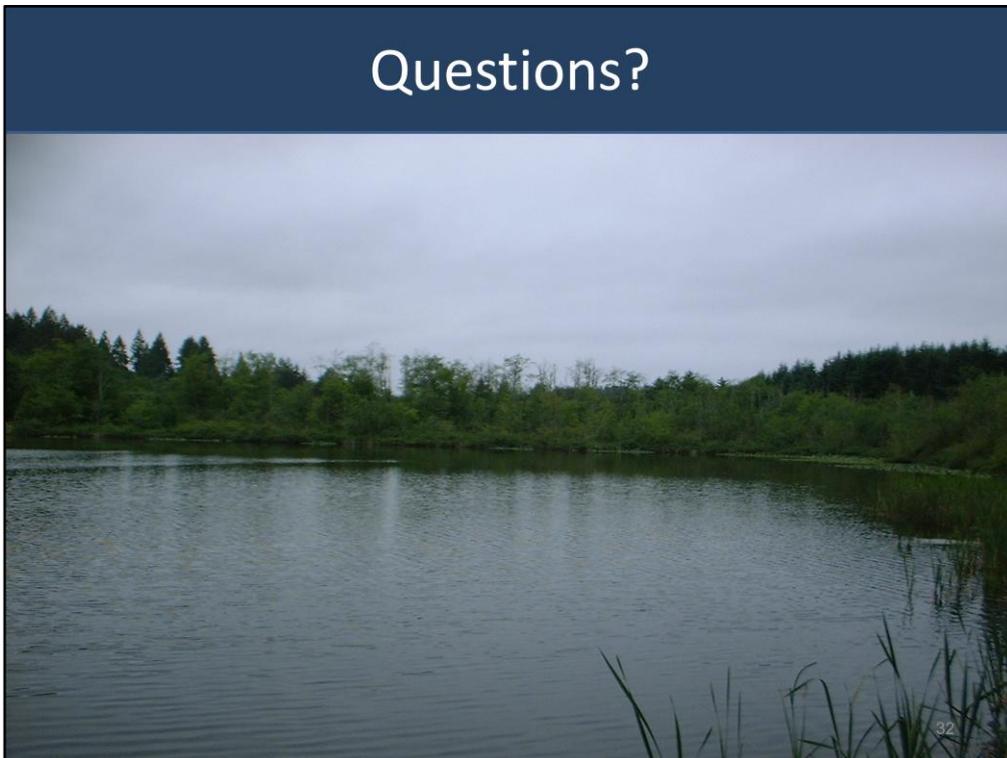
When reviewing a delineation consider the larger contexts of climate, season and other weather events.

Is it the dry season or the rainy season? Has it been raining more or less than normal?

Consider land modifications that have happened. Has the site been altered by ditching, draining, fill or other land disturbance? Are circumstances “normal”?

These aspects should all be considered when conducting or reviewing a delineation.

Questions?



Why do we care?

Wetland provide functions
and values

Wetlands can...

33

Wetlands are protected by federal, state and local laws. These protections exist because science has shown us that wetlands provide significant benefits to humans, directly and indirectly.

A century ago the president of the American Health Association promoted the idea of a national campaign to eliminate wetlands. Today, scientists recognize the environmental benefits that wetlands provide, and they are now alerting us to the importance of preserving rather than eliminating our wetland resources.

Wetland functions are the physical, biological, chemical, and geologic interactions among different components of the environment that occur within a wetland.

Wetland values are the benefits that we (humans) receive when wetlands perform certain functions.



This is often described as the hydrologic function that wetlands provide.

Because of their low topographic position relative to uplands (e.g., isolated depressions, floodplains), wetlands store and slowly release surface water, rain, snowmelt, groundwater and flood waters. Trees and other wetland vegetation also impede the movement of flood waters and distribute them more slowly over floodplains. This combined water storage and slowing action lowers flood heights and reduces erosion downstream and on adjacent lands.

Wetlands within and downstream of urban areas are particularly valuable in this regard, counteracting the greatly increased rate and volume of surface-water runoff from pavement and buildings.



Wetlands greatly influence the quality of water in a watershed by removing many different types of contaminants. They help improve water quality, including that of drinking water, by intercepting surface runoff and removing or retaining inorganic nutrients, processing organic

wastes, removing pathogens and reducing suspended sediments before they reach open water.



Wetlands provide habitat to a wide range of animals. Some live in wetlands for their entire lives; others require wetland habitat for at least part of their life cycles.

Although wetlands represent only 2.1% of the area of the state (Dahl 1990), over two-thirds of all terrestrial vertebrate species in Washington can be considered "wetland users" (Adamus et al. 1991).

The more functions that a wetland has, the greater its VALUE is to us and the natural world.

Wetland Functions

Depend on geology, soils, vegetation & location,
location, location

- Position in the watershed
- Connection to other surface waters
- Connection to other habitats

Wetlands don't function in isolation from the
surrounding landscape.

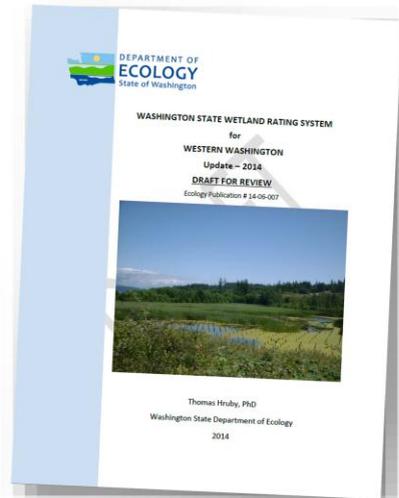
37

One way to assess the functions and values a wetland provides is the Washington State Wetland Rating System. This method is in wide application in Washington state. Local regulations often coordinate functional ratings with protection strategies like buffers and mitigation requirements.

Wetland Rating

Divides wetlands into 4 categories based on:

- Rarity
- Sensitivity to disturbance
- Restoration feasibility
- Functions!



38

The Department of Ecology published its first version of the Washington State Wetlands Rating System in 1991. Subsequent updates to reflect current science were published in 1993 and 2004.

As was noted in an earlier webinar, we currently are updating the rating system again and the new version will be required for state and federal permitting in January 2015. There is a version for E. WA and W. WA. The rating system assess wetland functions for water quality, hydrology (storage) and habitat.

We'll now spend a few minutes discussing the Washington State wetland rating system. For more in-depth training on the use of the ratings system or for classes on how to review wetland ratings, please consult the Coastal Training Program (at: <http://www.coastaltraining-wa.com/>). It was their website that you used to register for this class.

HGM approach

Hydrogeomorphic (HGM) setting*

*Precursor to assessing wetland functions

39

We mentioned HGM setting in an earlier slide. This approach is integral to use of the Washington State wetlands rating system.

Scientists have come to understand that wetlands can perform functions in different ways. The way wetlands function depends to a large degree on hydrologic and geomorphic conditions (Brinson 1993). Because of these differences among wetlands, a way to group, or classify, them has been developed. This classification system, called the Hydrogeomorphic (HGM) Classification, groups wetlands into categories based on the geomorphic and hydrologic characteristics that control many functions.

The following slides show some of the common HGM setting in Western Washington.



Depressional wetlands are probably the most common HGM setting in Western Washington. They occur in depressions where elevations within the wetland are lower than in the surrounding landscape. The shapes of depressional wetlands vary, but in all cases, the movement of surface water and shallow subsurface water is toward the lowest point in the depression. The depression may have an outlet, but the lowest point in the wetland is somewhere within the boundary, not at the outlet.



In the Washington State wetland ratings system, if the area of open water next to a vegetated wetland is larger than 20 acres (8 hectares), and more than 6.6 feet deep (2m) over 30% of the open water areas, the wetland is considered to be —lake-fringe.



Slope wetlands, another HGM setting, occur on hill or valley slopes where groundwater —daylightsll and begins running along the surface, or immediately below the soil surface. Water in these wetlands flows only in one direction (down the slope) and the gradient is steep enough that the water is not impounded. The —downhillll side of the wetland is always the point of lowest elevation in the wetland.



Riverine wetlands occur in valleys associated with stream or river channels. They lie in the active floodplain of a river, and have important hydrologic links to the water dynamics of the river or stream. The distinguishing characteristic of riverine wetlands in Washington is that they are frequently flooded by overbank flow from the stream or river. The floodwater is a major environmental factor that structures the ecosystem in these wetlands.



Wetlands are ranked by Category (1-4) in the ratings system, with Category 1 being the highest value wetlands. They 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.



Category I are deemed the highest value wetlands. 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.



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 Interdunal wetlands greater than 1 acre.



Category III wetlands are wetlands with low to moderate levels of functions. They may have high functions in one area, but low in others. This forested slope wetland provides moderate levels of habitat functions, but relatively low levels of water quality and hydrologic function.



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.



There are wetlands and then there are wetlands. Is this area valuable? Think about its functions and values.

Summary

- Wetlands – what, where, why do we care?
 - What = regulatory definition/3-part recipe
 - Where = delineation
 - Why do we care = functions & values
- Next presentation:
 - Wetland hydrology



50

So, we've come to the end of the first module: Introduction to wetlands. Thanks for your participation thus far.

Hopefully, we've given you a basic understanding of what wetlands are, how we determine where they are, and why they are important.

Our next module is Wetland Hydrology, perhaps the most important parameter. Our presenter is Patrick McGraner, wetland specialist with Ecology's Northwest Regional Office.

Questions?



Rick Mraz, PWS
WA Dept of Ecology
(360) 407-6221
Richard.Mraz@ecy.wa.gov

OR

Contact a regional
wetlands specialist

<http://www.ecy.wa.gov/programs/wetlands/contacts.htm>

