



Oregon's Function-based Mitigation Accounting for Wetlands



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Overview

- Oregon mitigation objectives
 - Policy development history
- Assessing wetland functions and values
 - Oregon Rapid Wetland Assessment Protocol
 - Oregon Explorer Map-viewer
- Compensatory Wetland Mitigation
 - Eligibility
 - Accounting



Mitigation in Oregon



DSL's agency goals

Mitigation process

Principal objectives of mitigation

Mitigation in Oregon



DSL's agency goals

- **Protecting waters and wetlands** for their many contributions to Oregon, including
 - ✓ **streams** for swimming and fishing,
 - ✓ **wetlands** to clean water and reduce flooding, and
 - ✓ **rivers** where commerce thrives.
- **Support a thriving Oregon** - As dedicated stewards of lands, waterways, and wetlands, we are committed to supporting thriving communities and a legacy of healthy, resilient, and accessible natural resources for the people of Oregon

Mitigation process

Principal objectives of mitigation

Mitigation in Oregon



DSL's agency goals

Mitigation process (ORS 196.800)

- ***"Mitigation"*** means the reduction of adverse effects of a proposed project by considering, in the following order:
 - *Avoiding the effect altogether by not taking a certain action or parts of an action*
 - *Minimizing the effect by limiting the degree or magnitude of the action and its implementation*
 - *Rectifying the effect by repairing, rehabilitating, or restoring the affected environment*
 - *Reducing or eliminating the effect over time by preservation and maintenance operations during the life of the action by monitoring and taking the corrective measures and*
 - ***Compensating for the effect by creating, restoring, enhancing, or preserving substitute functions and values for the waters of this state***

Principal objectives of mitigation

Mitigation in Oregon



Agency goals

Mitigation process

Principal objectives of mitigation

- Replace **functions and values** lost at the impact site
- Provide local replacement for locally important **functions and values**
- Enhance, restore, create or preserve waters that are self sustaining
- Ensure ecologically suitable siting of compensatory mitigation
- Minimization of temporal loss

Function-based, Watershed Approach Program Development History

2009: Identified gaps & needs in Oregon

2009 – 2017:

- Oregon Rapid Wetland Assessment Protocol (ORWAP) refinement
- Stream Function Accounting Method (SFAM) development & testing
- Policy development
- Outreach
- Transition option for existing banks

2018 – 2022:

- Oregon DSL Rulemaking – decision to wait on stream accounting
- Wetland mitigation accounting rules
- SFAM training and revisions
- Implementation – forms, guidance & training

PROGRAM ELEMENTS

Site selection

Eligibility

Function assessment tools

Accounting

Stewardship

Performance standards

Monitoring requirements

Program effectiveness

Functions are the processes that create and support aquatic ecosystems

Science based

Objective

Based on the physical, chemical, and biological characteristics of the aquatic resource



Values (services) are the ecological and societal benefits that aquatic ecosystems provide

Subjective

Contextual

Driven by where a site is located within the watershed or basin



A person with long dark hair, wearing a red long-sleeved shirt and a dark beanie, is sitting in a field of tall, dry grass. They are leaning forward, writing in a notebook with a pen. The background shows a vast field of similar grass under a dark, overcast sky.

Quantification of Functions and Values

- Replacing lost functions – *What? Where? Why?*
- Wetland function and values assessment in Oregon
 - Functions a wetland provides
 - How functions are valued
 - User friendly quantification tools

To replace (or mitigate for) lost functions they must be quantified

Oregon Assessment Methods

2009 - Oregon Rapid Wetland Assessment Protocol (ORWAP)

2008 - Agate Desert Vernal Pool Functional Assessment Method

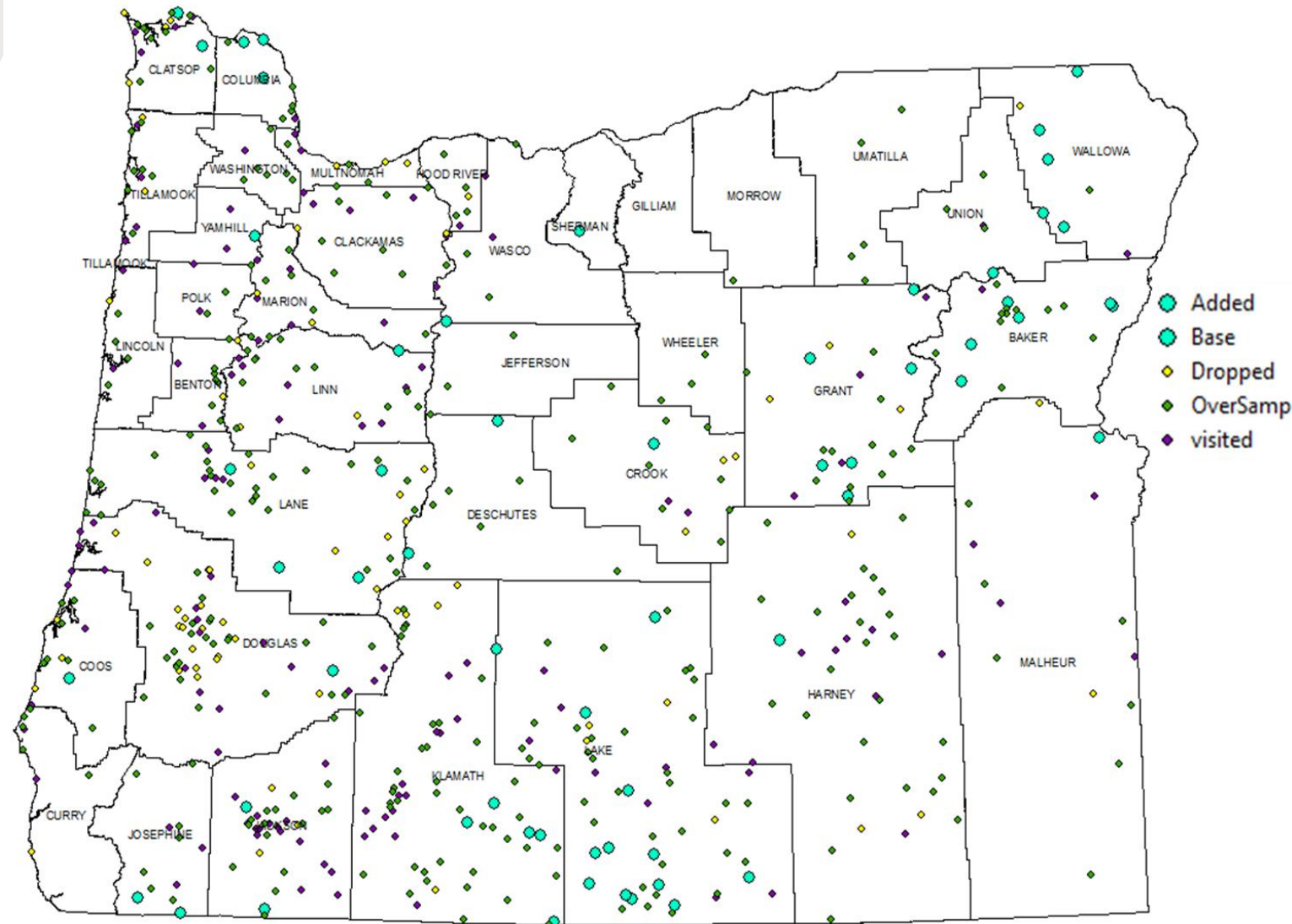
2001 - Hydrogeomorphic Assessment Methods (HGM)

Specific Functions or Values:	Function Score	Function Rating	Rating Break Proximity	Values Score	Values Rating	Rating Break Proximity
Water Storage & Delay (WS)	6.29	Moderate		8.33	Higher	
Sediment Retention & Stabilization (SR)	3.38	Lower	LM	3.75	Moderate	LM
Phosphorus Retention (PR)	3.96	Moderate		4.30	Moderate	
Nitrate Removal & Retention (NR)	2.80	Lower		3.53	Lower	LM
Anadromous Fish Habitat (FA)	6.00	Moderate		10.00	Higher	
Resident Fish Habitat (FR)	0.00	Lower		0.00	Lower	
Amphibian & Reptile Habitat (AM)	6.25	Moderate		2.25	Lower	
Waterbird Nesting Habitat (WBN)	8.02	Higher		2.28	Moderate	
Waterbird Feeding Habitat (WBF)	3.89	Moderate		2.92	Moderate	LM
Aquatic Invertebrate Habitat (INV)	1.00	Lower		1.42	Lower	
Songbird, Raptor, Mammal Habitat (SBM)	1.71	Lower		5.00	Moderate	
Water Cooling (WC)	2.22	Lower	LM	0.00	Lower	
Native Plant Diversity (PD)	4.97	Moderate		6.67	Moderate	MH
Pollinator Habitat (POL)	5.36	Moderate		4.64	Moderate	
Organic Nutrient Export (OE)	4.89	Moderate				
Carbon Sequestration (CS)	2.46	Lower				
Public Use & Recognition (PU)				2.76	Lower	
Other Attributes:	Score	Rating	Rating Break Proximity			
Wetland Sensitivity (SEN)	0.92	Lower				
Wetland Ecological Condition (EC)	0.00	Lower				
Wetland Stressors (STR)	6.79	Higher				
GROUPS	Selected Function	Function Rating	Rating Break Proximity	Values Rating	Rating Break Proximity	
Hydrologic Function (WS)	Water Storage & Delay (WS)	Moderate		Higher		
Water Quality Support (SR, PR, or NR)	Phosphorus Retention (PR)	Moderate		Moderate		
Fish Habitat (FA or FR)	Anadromous Fish Habitat (FA)	Moderate		Higher		
Aquatic Habitat (AM, WBF, or WBN)	Waterbird Nesting Habitat (WBN)	Higher		Moderate		
Ecosystem Support (WC, INV, PD, POL, SBM, or OE)	Native Plant Diversity (PD)	Moderate		Moderate	MH	

Example ORWAP Score Sheet – Riverine wetland with emergent vegetation

Oregon Rapid Wetland Assessment Method (ORWAP) version 3.2

- Science based
- Statewide applicability
- Tidal and non-tidal methods
- Incorporation of user feedback
- Streamlining of questions
- Sensitivity analysis
- Repeatability testing
- Normalization of scores (0-10 scale)



Wetland field sites for normalization study

Functions and Other Attributes	Function Scores		Value & Other Attribute Scores	
	Mean (n=6)	Confidence Interval (+/-)	Mean (n=6)	Confidence Interval (+/-)
Water Storage & Delay (WS)	2.56	0.38	4.27	0.53
Sediment Retention & Stabilization (SR)	5.03	0.67	5.76	0.87
Phosphorus Retention (PR)	6.36	0.71	3.93	0.56
Nitrate Removal & Retention (NR)	5.89	0.66	7.36	0.77
Anadromous Fish Habitat (FA)	6.03	0.74	7.25	0.82
Resident Fish Habitat (FR)	2.99	1.21	5.20	1.43
Amphibian & Reptile Habitat (AM)	4.48	0.57	5.23	0.48
Waterbird Nesting Habitat (WBN)	3.76	0.50	2.11	0.34
Waterbird Feeding Habitat (WBF)	3.44	0.65	5.57	0.55
Aquatic Invertebrate Habitat (INV)	3.89	0.69	3.85	0.27
Songbird, Raptor, & Mammal Habitat (SBM)	4.74	0.65	5.78	0.21
Water Cooling (WC)	3.77	0.83	3.78	0.54
Native Plant Diversity (PD)	5.99	0.96	5.37	1.13
Pollinator Habitat (POL)	5.33	0.78	3.64	0.65
Organic Nutrient Export (OE)	5.59	0.51		
Carbon Sequestration (CS)	5.65	0.44		
Public Use & Recognition (PU)			6.03	0.62
Wetland Sensitivity (SEN)			3.14	0.58
Wetland Ecological Condition (EC)			5.32	0.67
Wetland Stressors (STR)			4.73	0.82
Average:		0.68	Average:	0.66



ORWAP Repeatability Study

- 19 Volunteers: wetland scientists, DSL, ACOE, & EPA staff
- 6 wetlands (2 of which were tidal)
- Confidence intervals for all functions and values

ORWAP/SFAM MAP VIEWER

OREGON EXPLORER ORWAP and SFAM Map Viewer
Oregon Rapid Wetland Assessment Protocol & Stream Function Assessment Method

Search... Sign in

File Find Layer Create & Share Analysis Tool Labels ×

Home Pan Zoom In Zoom Out Initial View Full Extent Previous Extent Next Extent Identify Bookmarks Plot Coordinates Create ORWAP Report Add Acres Shapes Create SFAM Report USGS StreamStats 2 Mile Circle Tool Circles Tool Clear All Drawings Profile Tool

Navigation Find ORWAP Tools SFAM Tools Drawing Tools

Home

I want to...

Welcome to the Oregon Rapid Wetland Assessment Protocol (ORWAP) and Stream Function Assessment Method (SFAM) Map Viewer

Navigate to your site using the Zoom or Plot Coordinates tools on the Find tab, or by searching an address, place name, or latitude/longitude coordinates in the box below:

Search...

Click button below to directly access the map layers or click on the "layers" icon in the bottom left hand corner of this window. A drop-down menu at the top of the Layers menu will allow you to choose between displaying all available data layers, or just those specific to either ORWAP or SFAM. The home button gets you back to this introduction.

[Go To Layers ->](#)

We hope you enjoy using the tool. Send questions or feedback to: virtualoregon.support@oregonstate.edu

Home Layers

Aerial Wi... [500]

0 30 60mi

© 2022 Microsoft Corporation, Earthstar Geographics SIO, © 2022 Tom

Latitude/Longitude ▲ Lat: 45.39585° N Long: 122.89165° W

Oregon Explorer Feedback

ORWAP/SFAM MAP VIEWER

OREGON EXPLORER ORWAP and SFAM Map Viewer
Oregon Rapid Wetland Assessment Protocol & Stream Function Assessment Method

File Find Layer Create & Share Analysis

Home Pan Zoom In Zoom Out Initial View Full Extent Previous Extent Next Extent Identify Bookmarks Plot Coordinates Create ORWAP Report Add Sh

Navigation Find ORWAP Tools

Layers

Filter Layers... Filter

- Wetlands
- Hydrology
- Water Quality and Quantity
- Floodplain
- Soils
- Land Classifications
- Habitat**
 - Essential Salmonid Habitat**
 - Essential Salmonid Habitat
 - Passage Barriers
 - Important Bird Areas
- Restoration

Home Layers Latitude / ... Edit Shape Aerial Wi... 0 0.1 0.2mi Crow Rd

OREGON EXPLORER ORWAP and SFAM Map Viewer
Oregon Rapid Wetland Assessment Protocol & Stream Function Assessment Method

File Find Layer Create & Share Analysis

Home Pan Polygon Edit Erase Clear Print Export Export Drawings Share

Navigation Draw Edit Drawings Share

Layers

Add Layers Upload Re-Order Toggle Legend

All Available Layers

Filter Layers... Filter

- Wetlands**
 - Local Wetland Inventory Subset
 - National Wetlands Inventory
 - More Oregon Wetlands
 - Oregon's Greatest Wetlands**
- Hydrology
- Water Quality and Quantity
- Floodplain
- Soils

Home Layers Latitude / ... Edit Shape Aerial Wi... 0 0.1 0.2mi Crow Rd

How are functions and values incorporated into wetland mitigation in Oregon?



Principal objectives of mitigation

Eligibility policy

Accounting policy

How are functions and values incorporated into wetland mitigation in Oregon?



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- Replace **functions and values** lost at the impact site
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How are functions and values incorporated into wetland mitigation in Oregon?



Principal objectives of mitigation

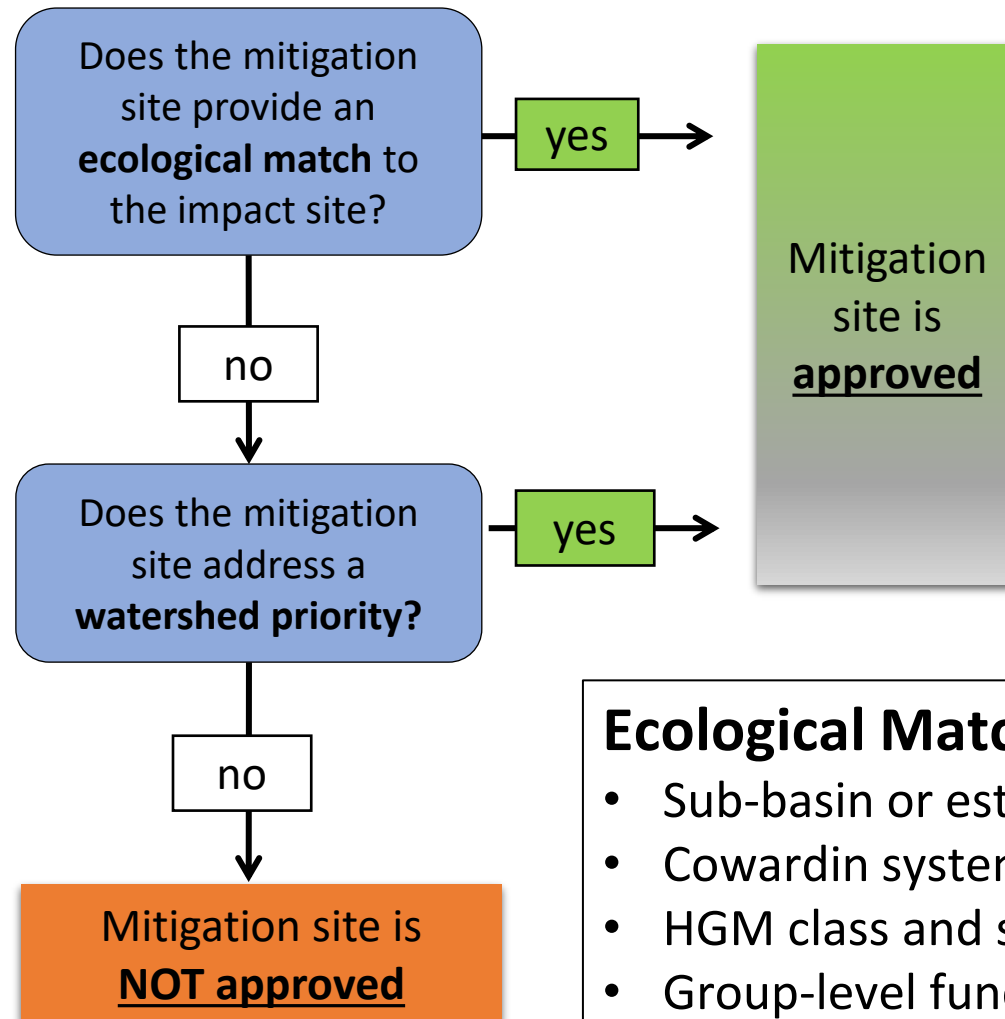
Eligibility policy

- ***Eligibility*** is the process for determining whether a proposed compensatory mitigation option provides an **ecological match** to offset permitted impacts

Accounting policy

How are Functions and Values Incorporated into Wetland Mitigation Accounting in Oregon?

Step 1: DETERMINE ELIGIBILITY



Ecological Match:

- Sub-basin or estuary
- Cowardin system and class
- HGM class and subclass(es)
- Group-level functions and values

NOTE: Aquatic Resources of Special Concern are subject to slightly different eligibility criteria

How are functions and values incorporated into wetland mitigation in Oregon?



Principal objectives of mitigation

Eligibility policy

Accounting policy

- **Accounting** consists of methods to calculate the **amount** of CWM required to offset wetland impacts.
- Accounting begins with a minimum acreage compensation (Base CWM Ratios)
- Base CWM ratios may be adjusted depending on certain factors.

How are Functions and Values Incorporated into Wetland Mitigation Accounting in Oregon?

Step 1: DETERMINE ELIGIBILITY

Does the mitigation site provide an **ecological match** to the impact site?

yes

no

Does the mitigation site address a **watershed priority**?

yes

no

Mitigation site is **NOT approved**

Mitigation site is **approved**

Step 2: MITIGATION ACCOUNTING

Determine mitigation requirements using the **accounting worksheet**:

- Minimum acreage
- Increase factors
- Decrease factors
- Buffers

Ecological Match:

- Sub-basin or estuary
- Cowardin system and class
- HGM class and subclass(es)
- Group-level functions and values

How are Functions and Values Incorporated into Wetland Mitigation Accounting in Oregon?

Minimum Acreage

- Compensatory wetland mitigation base ratios
 - Restoration/creation 1:1
 - Credit purchase 1:1
 - Enhancement 3:1
 - Preservation – case-by-case, 10:1

Adjustments to the base ratios

- Increase factors
 - Specific functions and value replacement
 - Temporal loss of functions (soils & veg based)
- Decrease factors
 - High level of function replacement
 - Site protection and stewardship

In summary

- Our society values the functions wetlands provide
- Lost functions must be quantified to be equivalently replaced
- Values inform mitigation decisions
- Wetland functions and values are incorporated into wetland mitigation accounting in Oregon:
 - Principle objectives
 - Eligibility policy
 - Accounting policy
- Function-based CWM is likely to result in more successful compensatory mitigation that maximizes mitigation outcome per effort

With thanks to:

- Additional team members for development of ORWAP, SFAM, Map Viewer, and the mitigation framework
- People who engaged with this project including regulated, mitigation banking, and restoration communities, federal, state, tribal, and local agencies, non-governmental organizations and the public
- Our agencies' leadership for their support of this project and our project development team
- Funding provided through EPA cooperative agreements (Wetland Program Development Grants) and contracts over many years

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More information

- DSL: <http://www.oregon.gov/dsl/WW/Pages/Aquatic-Resources-Mitigation-Framework.aspx>
- Oregon Explorer: <http://oregonexplorer.info/topics/aquatic-mitigation?ptopic=38>



Also in picture:
Shauna Everett,
USFWS (back row,
middle)