

Benefits and Challenges of Integrating Oregon Rapid Wetland Assessment Protocol (ORWAP) Results into Local Policy:

A case study of using ORWAP in the economic, social, environmental, and energy (ESEE) analyses of wetlands



Prepared by:



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1.0 The Oregon Rapid Wetland Assessment Protocol

The Oregon Rapid Wetland Assessment Protocol (ORWAP), first developed in 2009, by the Oregon Department of State Lands (DSL) and Paul Adamus, PhD. Of Adamus Resource Assessment, Inc. is a standardized protocol for rapidly assessing the functions and values of wetlands. The assessment protocol has the expressed intention of being used for multiple purposes by multiple agencies and types of organizations, including land use planning. To date ORWAP is usually used for the assessment of individual sites although it has also seen limited use for multiple sites in the local wetland inventory process. This report analyzes the use of ORWAP as a tool in the local wetland policy development phase using the cities of Cottage Grove and Creswell and to a limited extent Florence as a case study.

2.0 Existing wetland assessment methodologies

Oregon has seen a sequence of standardized wetland assessment methodologies over time, including the hydrogeomorphic (HGM) methodology and the Oregon Freshwater Wetland Assessment Methodology (OFWAM), both of which are still currently in use. Although Oregon Administrative Rule 141-086-0185 notes that other wetland assessment methodologies can be used for assessing wetland condition and functions in local wetland inventories, the Oregon Administrative Rules (OARs) specifically incorporate OFWAM.

Critical to an understanding of wetland assessment methodologies is the often confusing (and confused) distinction between wetland “functions” and wetland “values”. A wetland’s functions are the physical, chemical and biological processes that characterize the wetland ecosystems. In contrast, wetland values are the importance or worth of a wetland function to societal needs. This includes public attitudes and the wetland’s opportunity to provide a given function based on its location (for example the “value” of a wetland that will clean water run-off in the future but currently isn’t serving that function).

Statewide Planning Goal 5 (Natural Resources) establishes the requirement for jurisdictions to inventory and assess natural resources and identify those that are “significant”. Findings of the inventory and assessment play a critical role in current and long range planning efforts for these jurisdictions. OAR 141-086-0350 outlines the criteria for identifying “local significance” for Wetlands. The standard function assessment findings of the OFWAM methodology are referenced specifically within the OAR. Most communities throughout Oregon that have gone through a process of designating locally significant wetlands have done so using OFWAM results as the primary input, and most have also followed the significance designation criteria in OAR 141-086-0350 that are linked to OFWAM results. There is a growing desire by jurisdictions to use the more robust features of ORWAP in determining significance and in policy development.

3.0 Transitional challenges for land use purposes

DLCD approves local government wetland protection programs with technical input from DSL. Locally significant wetlands have primarily been identified using the OFWAM since

~1995. With the release of ORWAP in 2009, a handful of local governments such as Florence and Deschutes County, have opted to use this more current assessment method. Because standards have not been adopted for the use of ORWAP in significance determination, considerable effort still needs to be dedicated to making such a connection (both individually and eventually, broadly). Local jurisdictions currently develop their own criteria for significance determination.

The Florence Wetlands Project was one of the first attempts to use the ORWAP method for planning purposes. The Wetlands and Riparian Area Team of the Siuslaw Estuary Partnership worked together to come to a mutual understanding of how best to use the ORWAP tool and to agree to criterion for significance that make sense in a planning context. The Partnership had to determine and develop policy connections between ORWAP and Statewide Planning. One of the important outcomes of their process was a recognition that the significance of wetlands for planning purposes lies not solely in a wetlands current “functions” but also in its potential future functions. For example a site on the outskirts of town may not currently be serving an important water quality function, but as development encroaches and surrounds the area, it would be a vital component of water quality provision.

Until standards are created for significance determination, local jurisdictions will likely be discouraged from utilizing the ORWAP methodology for local wetland inventories. Each jurisdiction determining significance criteria allows some flexibility but is also time consuming and open to legal challenge. Directly evaluating the bridge between ORWAP and local significance criteria/determination is beyond the scope of this report and is recognized and intended to be addressed by DSL as soon as possible. Ultimately, future rulemaking will be needed to update both the local wetland inventory rules and locally significant wetland rules.

ORWAP presents a more-quantitative alternative to OFWAM. ORWAP, which assesses 140 functionally-relevant attributes of wetlands, clearly provides a more comprehensive and sensitive characterization of a site than does OFWAM, which only assesses about 43 attributes. ORWAP provides continuous numeric scores for 16 functions and 16 values, whereas OFWAM assigns sites to one of only three potential categories based on estimates of 4 functions and 5 values. The ORWAP method considers the ability of a wetland to support the following 16 functions:

- Water Storage and Delay
- Sediment Retention and Stabilization
- Phosphorus Retention
- Nitrate Removal and Retention
- Thermoregulation
- Carbon Sequestration
- Organic Matter Export
- Pollinator Habitat
- Aquatic Invertebrate Habitat
- Anadromous Fish Habitat
- Non-anadromous Fish Habitat
- Amphibian & Reptile Habitat
- Waterbird Feeding Habitat
- Waterbird Nesting Habitat
- Songbird, Raptor and Mammal Habitat
- Native Plant Diversity

In addition the following are also scored:

- Ecological Condition - *the integrity or health of the wetland as defined primarily by its vegetation composition*
- Provisioning Services - *the passive and sustainable providing of tangible natural items of potential commercial value*
- Public Use and Recognition - *the potential and actual capacity of a wetland to sustain low-intensity human uses such as hiking, nature photography, education, and research*
- Sensitivity - *the lack of intrinsic resistance and resilience of the wetland to human and natural stressors*
- Stressors - *the degree to which the wetland is or has recently been altered by, or exposed to risk from, human and natural factors*

Having been published more recently (2009), the indicators that ORWAP uses are more closely in step with current science, whereas OFWAM was intended to reflect extant knowledge of wetlands in the early 1990's. Finally, ORWAP's model logic is relatively sophisticated inasmuch as its scores more accurately reflect, at the scale of an individual wetland, the contingent relationships among key variables (questions) that determine wetland functions.

The focus of this report is how well ORWAP, in its current form, can be utilized to inform or be directly incorporated into local policy. In other words, if a community pursued ORWAP as its wetland assessment methodology, what would be the challenges and opportunities they might encounter in utilizing the results themselves.

Although ORWAP represents a significant technical advance over OFWAM (the method previously prescribed for use in Local Wetland Inventories in Oregon) and other methods for assessing wetland ecosystem services, like most rapid assessment tools, it does have several limitations (as noted by ORWAP's developers):

1. ORWAP is not a mechanistic model of ecosystem processes and thus cannot be expected to account for many interactions and feedbacks among important variables. ORWAP uses only the variables that can be observed easily, but factors that control many functions are unobservable except with sophisticated equipment and long-term expensive sampling.
2. Like all rapid assessment methods for wetlands, ORWAP has not been validated against actual measures of the functions it estimates.
3. ORWAP is intended to simply be an estimate of function effectiveness averaged over an entire wetland assessment unit. For most functions, ORWAP does not account for wetland size, but size should be taken into account in some manner when proposing candidate sites (wetland assessment units) for water quality resource status. Determining the boundaries of wetland assessment units (not the boundary between wetland and upland) has a subjective component. Despite guidance in the ORWAP manual, decisions of whether and where to divide two hydrologically connected wetlands into multiple units for purposes of applying ORWAP are sometimes subjective.

4.0 Evaluation through the use of ORWAP in Cottage Grove, Creswell, and Florence

As part of the Multi-City/County Water Resources Assessment Project (MCWRAP) wetland consultants and/or DSL staff performed ORWAP assessments for the cities of Cottage Grove and Creswell in Lane County. OFWAM assessments were also performed for both cities, creating a unique opportunity to evaluate the methodologies. One component of this evaluation, and the one specifically addressed in this report, is the use of ORWAP as a resource for informing the economic, social, environmental and energy (ESEE) analyses of wetlands to determine level of protection. The use of ORWAP in the City of Florence also provides insight into ORWAP's benefits and challenges.

4.1 Economic, social, environmental, energy (ESEE) Analysis

Once local wetland inventories are approved by DSL, and before inventories can be adopted by local governments, jurisdictions must develop local wetland protection programs for wetlands identified as locally significant. A local wetland protection program generally consists of a wetland protection overlay ordinance that details what uses are allowed and exempt within the wetland protection area. As directed by state land use planning goal 5, local governments can either adopt a "safe harbor approach" in which all development including vegetation removal is prevented within locally significant wetlands or a standard approach, which allows for more protection (i.e. buffer around the wetland) or less protection (i.e. roadway). The level of protection is guided by an analysis of the economic, social, environmental and energy (ESEE) factors associate with allowing, partially allowing, or prohibiting conflicting uses in or near significant wetlands (see Inventory, Assessment, and Protection of Wetland and Riparian Resources Using Oregon Statewide Planning Goal 5 and Goal 6: Options to Consider, LCOG 2010 for more detail

<http://www.lcog.org/southwillamettelwi/default.cfm>)

Cities must provide full local protection for significant resources unless the ESEE analysis provides evidence that full or even limited protection will have net negative impacts. Cities must perform an ESEE analysis to support additional protections (such as a buffer) as well. An ESEE analysis which concludes that lesser or greater protection should be pursued must be well-supported. These analyses are often conducted by staff who have no, or limited, technical training or experience with wetland science, and who are relying on the information provided them by experts.

4.2 Evaluation

This report focuses on an evaluation of ORWAP's relative usefulness in the development of ESEE analysis findings. The evaluation is based on the experience of Lane Council of Governments and staff from Creswell and Cottage Grove in referencing ORWAP assessment data in the ESEE analysis process to determine protection policy for wetlands. It also includes limited reference to the experiences of the Siuslaw Estuary Partnership's experiences using ORWAP for the City of Florence's policy process. The findings of this evaluation have general applicability and relevance for ways ORWAP

can or perhaps cannot be easily understood and applied in numerous policy applications.

Sites

The sites evaluated included many of Cottage Grove's significant wetlands (15) and a large sample of Creswell's significant wetlands (9) including a range of public, industrial, commercial, and residential sites. Florence staff also used ORWAP in significance determination and limited ESEE analysis.

Methodology

For each city and sets of wetlands, staff made every attempt to utilize and understand the ORWAP data in its evaluation of the sites, and in particular for the "environmental" component of the ESEE analysis. For the ESEE analyses, the ORWAP data was not the only source of data used for analyzing potential ESEE consequences. Other resources included the OFWAM assessments completed for each wetland, and/or other existing local plans, reports and knowledge.

5.0 Findings

Following is a summary description, of the benefits and challenges that staff realized in referencing ORWAP results in the ESEE analysis process. While ORWAP materials provide generally useful reference tools there are also significant barriers to ORWAP's use for the average city planner/administrator. Many of those challenges and barriers can be reduced with possible improvements or considerations for ORWAP revisions and expansions which are also included below as recommendations.

Benefits:

1. ORWAP Workbook provides helpful resources for the ESEE analysis such as data sources and habitat characteristics. These forms of general narrative suggestions and basic background provide a typical staff planner with technical references that can be cited in the ESEE analysis report.
2. ORWAP provides more specific information (compared to OFWAM) about each wetland site's characteristics, allowing the local jurisdiction to make more precise recommendations in the protection phase. Recommendations can target wetland functions and/or values since they are scored separately. Land use planning focuses highly on the speculative uses and values of land. ORWAP provides the ability to recognize that a wetland may currently have a low scoring function but a high value in the future.
3. Compared to OFWAM, ORWAP allows greater specificity and numerical scoring to more issues of particular interest to a local community. Rather than a general "water quality" function noted in OFWAM, ORWAP identifies several specific water quality related functions such as nitrate removal, phosphorous retention, thermoregulation, etc. For example, local jurisdictions such as Deschutes County, or the cities of Monroe and Harrisburg would find the scoring of nitrate removal of particular value because of known groundwater nitrate problems in

their areas. The cities of Creswell and Cottage Grove found the thermoregulation function score of particular value because of total maximum daily load (TMDLS) allocations for temperature in the Willamette Basin.

4. In instances where significant scrutiny (from the public, decision makers or agencies) seems likely, then ORWAP can assist in getting more specific support for ESEE conclusions. For example, a high native plant diversity score is more clearly related to specific environmental characteristics and potential within ORWAP than in OFWAM.
5. A Best Available Science Summary Report produced by Paul Adamus for San Juan County, Washington provides a discussion of wetland buffers and is helpful in understanding buffer nuances. If a jurisdiction chooses to have buffer widths that are dependent on site specific wetland characteristics, then ORWAP information can help determine which characteristics the buffer is protecting and the buffer width that would likely garner that protection.
6. Many small communities in Oregon and elsewhere are challenged in instituting natural resource protections. One reason often cited for this challenge is the complexity that local staff and officials face at the many and varied programs and agencies exercising jurisdiction over natural resource issues. These include:
 - Department of State Lands (DSL)
 - Department of Environmental Quality (DEQ)
 - Department of Fish and Wildlife (ODFW)
 - Water Resources Department (WRD)
 - Department of Land Conservation and Development (DLCD)
 - Oregon Health Authority (OHA)
 - US Fish and Wildlife Service (USFWS)
 - US Army Corps of Engineers (ACOE)
 - Environmental Protection Agency (EPA)
 - Federal Emergency Management (FEMA)
 - Local Watershed Councils (LWS)

These resources and agency objectives frequently relate closely to one another. Although ORWAP's primary utility is wetland program applications, an ORWAP assessment presents cross-program opportunities. Although OFWAM allowed for similar connections, the breadth and detail of an ORWAP assessment can provide additional and stronger cross-program relations. Examples include the "specific function" scores that are generated for every wetland as part of the ORWAP Scores Sheet. Functions such as thermoregulation, nitrate, phosphorus or sediment removal could relate to TMDL programs. The National Pollution Discharge Elimination System (NPDES) program is supported by functions such as water storage and delay and sediment retention. Drinking water protection (DWP) is supported by functions such as nitrate removal, sediment and phosphorous detention retention. Examples of how these specific functions directly relate to agency and program efforts are as follows:

Table 5.1 ORWAP Function Connections with Agency Programs

ORWAP Wetland Function	Agency (Program Connection)
Water Storage & Delay	WRD (Groundwater Recharge), FEMA (Flood Control/Mitigation), DEQ (NPDES)
Sediment Retention & Stabilization	DEQ, EPA, OHA (TMDLs, NPDES, DWP)
Phosphorus Retention	DEQ, EPA, OHA (TMDLs, NPDES, DWP)
Nitrate Removal & Retention	DEQ, EPA, OHA (TMDLs, NPDES, DWP),
Thermoregulation	DEQ, EPA (TMDLs), ODFW, USFW (Endangered Species, Habitat)
Carbon Sequestration	DSL, DEQ, EPA
Organic Matter Export	ODFW, USFW
Aquatic Invertebrate Habitat	ODFW, USFW, DEQ, EPA (Endangered Species, Habitat)
Anadromous Fish Habitat	DEQ, DLCD (TMDLs, Goal 5), ODFW, USFW (Endangered Species, Habitat)
Non-anadromous Fish Habitat	DEQ, DLCD (TMSLs, Goal 5), ODFW, USFW
Amphibian & Reptile Habitat	“”
Waterbird Feeding Habitat	“”
Waterbird Nesting Habitat	“”
Songbird, Raptor, & Mammal Habitat	“”
Pollinator Habitat	DLCD (Goal 5), ODFW, USFW
Native Plant Diversity	DLCD (Goal 5), ODFW, USFW (Endangered Species, Habitat)

Many programs, such as the TMDL program require that jurisdictions provide evidence of efforts to improve specific environmental conditions. ORWAP can provide that quantitative evidence. For example, by protecting wetlands that have a thermoregulation function the cities of Creswell and Cottage Grove can demonstrate that they are taking actions to meet the temperature TMDL allocation in the Willamette Basin.

In applying ORWAP scores across programs, local staff and officials can assess whether functions are “relatively high” by utilizing the summarized outcomes of ORWAP scoring for 221 wetlands (which provides the minimum, maximum, median and mean scores for the functions, values, conditions, stressors, and sensitivity outputs). The median score for a given output may be used as the threshold, i.e., scores above the median may be considered “relatively high” for that output. This summary tool is Appendix A of the report: ***Guidance for Using the Oregon Rapid Wetland Assessment Protocol (ORWAP) in the State and Federal Permit Programs***, created by DSL, EPA and Army Corps of Engineers. This guidance document is a valuable resource for making cross-program connections with ORWAP.

7. ORWAP, at least for the purposes of generating ESEE analyses, could, with fairly minor modifications provide a workable, and in many respects, more useful alternative to OFWAM. ORWAP also appears to provide a viable means for

significance determination (though more work and rulemaking will be necessary in this area).

8. The Siuslaw Estuary Partnership staff noted that ORWAP's detailed quantitative results provided helpful content and justification for their analysis. They noted that the overwhelming majority of their wetlands have very high functions and values and of a particularly unique nature, therefore they were not seeking as much detail as other communities may need to. They noted that ORWAP seems to be a very context sensitive tool, but was particularly helpful in providing supportive findings related to fish habitat, water storage and water quality.

Challenges:

1. The format in which ORWAP results are currently delivered complicates the wetland specific evaluation of numerous wetlands. ORWAP results are contained within a large spreadsheet which includes over 40 individual worksheets. Some of these worksheets are for internal referencing, some contain unique responses, some contain aggregated responses and some contain high level summaries. The City of Creswell had over fifty wetlands identified and assessed. Many of the ORWAP worksheets present data results for each wetland, this means fifty columns, (fifty wetlands) for many of the worksheets. These worksheets, in many cases, have hundreds of rows. These worksheets are critical and useful, but that much information is overwhelming. As one staff person explained, "I feel like I went down the well of darkness at first trying to get my head wrapped around ORWAP".

The highest level summary worksheet, "Scores" is the fourth tab in the overall ORWAP spreadsheet. This sheet is arguably the most useful for the purposes of ESEE analysis and connections to local policy. Currently, one must manually copy and paste the form answers for each individual wetland (Office Form, Form F and Form S) in to the first column of each respective form in order to populate the "Scores" summary with the desired wetlands data. This process can be tedious, and more importantly, can introduce human error which can be hard to remedy or go unnoticed.

2. ORWAP can be overwhelming to understand to the typical city planner or similar staff. The larger and numerous spreadsheets with their often lengthy and cryptic formulas can cause non-technical staff to be intimidated by the resource. An indication of this is how Cottage Grove's planner who had access to both OFWAM and ORWAP assessments noted the following:
"I originally turned to ORWAP to provide additional data to the OFWAM results but gave up after realizing the amount of time it would take to decipher the new data. Perhaps for someone familiar with the process this would have been much quicker however I was starting out as a lay person to this field."

In this instance, the planner all but ignored the ORWAP data because A)“sufficient” information was available in the OFWAM assessments, and B) the ORWAP data appeared too complex to merit the investment of more intimately familiarizing themselves with it. In a more typical setting, staff will not have such an alternative, but will have to try to establish an understanding.

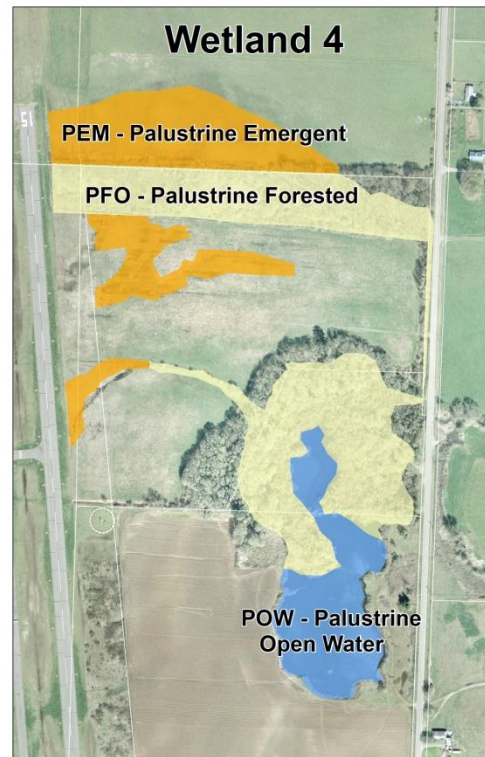
The Cottage Grove Planner further noted that:

“ORWAP did appear to get into greater detail about specific wetland qualities which would have been nice to include in the ESEE report and be able to share with others.”

It is important to note that the OARs (660-023-0040), clarify that ...*“The ESEE analysis need not be lengthy or complex, but should enable reviewers to gain a clear understanding of the conflicts and the consequences to be expected.”* For the majority of ESEE cases the depth of the ORWAP reports is more information than is necessary to meet the above stated standard. Were the standards to increase at the state or local level, or in cases where high scrutiny is applied, ORWAP’s outputs certainly provide a better resource for details.

3. The transition to ORWAP will place a higher burden on the cities which first choose to pursue it. In every instance that ORWAP has been used as a pilot (Including in Florence and in the MCWRAP communities) outside grant funding has enabled the communities to pursue ORWAP. Because of the lack of existing connections with current statute and rules, the process has complexity built into it. This will discourage its use. Staff at the Siuslaw Estuary Partnership noted the following:
“...the use of pilots is a good way to gain a better understanding of how to apply the criteria and what criteria makes sense. In Florence, we were able to use criteria that made sense for Florence and it worked. I think the more time you spend finding out what matters most in your communities, the more the pieces will come into place.”
Communities utilizing ORWAP (and particularly those “early adapters”) will likely need financial and technical support in order to make policy connections.
4. There is a lack of distinction in assessment for different cowardin classes within one wetland. It is difficult from the results to assume (or know) whether policy distinctions can be made based on the nuances of cowardin classes. The quality of wildlife habitat, for example, may differ between these cowardin classes. It is difficult to make sub-wetland level distinction with protection policies.

An example is Wetland 4 in Creswell, which consists of three separate Cowardin classes, palustrine emergent (PEM), palustrine forested (PFO), and palustrine open water (POW). The wetland is a significant wetland as per OAR, and is a wetland of “Special Interest for Protection.” The wetland is also expansive and partially located in an area that the City views as having commercial and industrial significance (due to its proximity to the City’s airport). In conducting the ESEE analysis, to support added protection, it was unclear to what extent that extra protection was truly merited given the multiple parts and multiple Cowardin classes represented. Because the wetland has one assessment, non-technical staff will have difficulty recognizing nuances that may represent bad policy or missed opportunities.



6.0 Recommended Improvements:

1. An ORWAP summary sheet for each wetland would make ORWAP data a more user friendly and effective ESEE analysis resource. One suggestion for accomplishing this is to include numerous summary templates on the “Score” worksheet (one per print page, perhaps up to fifty?). Each repeated template could simply point to next row(s) of data (wetland). Although the potential complexity of such a task is recognized, something that automated the summaries would be an enormously useful improvement. These individual wetland forms are the most likely to be used frequently during ESEE analyses.

Additionally, due to the importance of the ORWAP score sheet, it would be most ideal if it was the first worksheet in the spreadsheet. The “Scores” sheet serving as the entry point to ORWAP would help in mitigating the immediate overwhelming sensation that the current worksheet order produces (clicking through 4 fairly intimidating worksheets before getting to the less complex “Score” sheet).

2. Local planners could benefit by having a science based buffer matrix or site specific recommendations made during the ORWAP assessment. This is understandably difficult as science does not always support what is commonly viewed as politically feasible with regard to buffers. The recommendations or matrix could include ranges that reflect “fair, better, best” alternatives

(understanding that, from the perspective of many leaders and residents, the mere existence of any buffer is at least a “fair” protection approach).

3. Paul Adamus’s report for Washington including discussion of wetland buffers could be included as an official ORWAP resource for development and justification of buffers by local planners. It could also be included in an ORWAP specific guide for land use planning application (see Recommendation 4).
4. Ultimately it would be helpful to have a guide for ORWAP that is specific for land use planning (Goal compliance). This would be very similar to the existing resource: ***Guidance for Using the Oregon Rapid Wetland Assessment Protocol (ORWAP) in the State and Federal Permit Programs***. The guide could include sections addressing significance criteria, developing protection measures and performing ESEE analyses. It could also include a section on the cross-program connections of ORWAP.
5. Provide clarification for large wetland complexes that either reiterates the comprehensiveness of the wetland-wide conclusions, or includes some nuance for distinction in policy approaches for areas of greater or lesser significance.