Chapter 8: Compensatory Mitigation Planning for Wetlands and Tidal Waters - *At a Glance*

When applying for a permit to impact waters of the state, the applicant is required to "mitigate" these impacts. Mitigation is a process to reduce the effects of the proposed project, and includes avoidance and minimization. This chapter assumes that all possible steps have been taken to avoid and minimize the impacts and the applicant now needs to replace or "compensate" for the ecological characteristics (functions) and societal benefits (values) that will be permanently lost.

The success of a mitigation project depends upon multiple factors including appropriate siting, a sound project design and monitoring plan, and the site's ability to be self-maintaining. Compensatory mitigation will normally require the assistance of trained professionals to assure that projects are successful and that plans and reports contain sufficient detail to satisfy Department of State Lands (DSL) requirements.

There are three general steps in compensatory mitigation planning:

- Step 1: Evaluate project impacts on acreage/linear feet, and functions and values
- Step 2: Select the mitigation opportunity(ies) that will best offset those impacts
- Step 3: Develop the mitigation plan as part of a permit application to DSL

This guidance is primarily directed toward compensatory wetland mitigation (CWM). CWM is mitigation for wetlands and tidal waters, herein referred to as "wetlands" unless called out differently. Compensatory non-wetland mitigation (CNWM) will follow the same steps outlined above; however specific mitigation requirements for non-wetland habitats are still being developed. Reviewing the Stream Mitigation Guidance will help guide and document your mitigation decisions. Applicants proposing impacts to waters of the state other than wetlands should work closely with a DSL resource coordinator to assure compliance.

"**Tidal Waters**," as defined by rule, includes the area between highest measured tide and extreme low tide, or to the elevation of any eelgrass beds, whichever is lower. Tidal waters requires CWM; Subtidal waters requires CNWM.

OREGON DEPARTMENT OF STATE LANDS

Acronyms

Chapter 8: Compensatory Mitigation Planning for Wetlands and Tidal Waters

Step 1: Evaluate Project Impacts

Wetlands at the project site will be qualified based the acreage and type (class) of wetlands present, and the functions and values they provide. This information is the basis for determining whether the proposed mitigation is appropriate.

Acreage and Class

Wetland class should include both the Cowardin classification system and class, and the Hydrogeomorphic Method (HGM) class/subclass present, using the Oregon HGM Statewide Classification (Oregon Department of State Lands, 2001; also see Appendix B). This information is normally contained in a wetland delineation report, the standards and procedures for which are outlined in DSL's Delineation Report Guidance. The acreage of each class of wetland should be outlined.

As used in this section, "**Function**" means the capacity of a wetland to perform the physical, chemical and biological processes that characterize wetland ecosystems. Examples are water storage and delay, nutrient removal, and support of wildlife. "**Value**" means 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. Examples are reduced flood damage, water quality improvements, and wildlife biodiversity.

Functions and Values

All applications with proposed impact to wetlands must include both a functions and values assessment for the impact site. At this time, the DSL-approved functional assessment methods by region are:

- **For tidal waters (excluding Columbia River estuary):** "HGM Assessment Method for Tidal Wetlands of the Oregon Coast" (reference-based method). Contact DSL for copies of this method and associated guidance. Required elements for the removal-fill application are:
  - Data form A1: Rapid indicators of risks to tidal wetland integrity and sustainability
  - Data form A2: Direct indicators of wetland integrity that require more-intensive field work
  - Data form B1: Rapid indicators of function that may be estimated
  - Data form B2: Rapid indicators of function requiring aerial photographs or measuring
  - Data form C: Rapid indicators of the values of functions

- **For the Willamette Valley ecoregion – riverine impounding, slope, or flats subclasses:** "HGM-based Assessment of Oregon Wetland and Riparian Sites – Willamette Valley Ecoregion - riverine impounding, slope, or flats subclasses"

(reference-based method). Contact DSL for copies of this method and associated guidance. Required elements for the removal-fill application are:
- o Assessment of Function Capacity: reference based method
- o Qualitative Assessment of Values of Function

- **For all other regions/HGM classes (including Columbia River estuary):** Oregon Rapid Wetland Assessment Protocol (ORWAP) is required. Detailed guidance on regulatory uses of ORWAP is available in the "Guidance for Using the Oregon Wetland Rapid Assessment Protocol (ORWAP) in the Removal-Fill Permit Program". Required elements for the removal-fill application are data sheets "Coverpg", "FinalScores", "OF", "Field F" and "Field S".

The Oregon Freshwater Assessment Method (OFWAM) is *not* an approved functional assessment method for the removal-fill regulatory program.

There are four exceptions to the guidance above:

- **Impact is 0.2 acres or less to non-tidal wetland, or impact is to tidal areas not covered by a DSL-approved functional assessment:** ORWAP is the preferred method for non-tidal wetlands less than 0.2 acres, however applicants may use best professional judgment (BPJ) to describe wetland functions and values at the impact site and CWM site. In tidal areas not covered by the HGM Assessment Method for Tidal Wetlands of the Oregon Coast (e.g. mudflats and eelgrass beds), BPJ should be used.

  BPJ assessments must assess at a minimum:
  - o Water quality functions and values
  - o Water quantity functions and values
  - o Fish and wildlife habitat functions and values
  - o Native plant communities and species diversity functions and values
  - o Recreation and education values.

  Scores for function and value (either quantitative or qualitative (high, medium, low)) must be supported by a discussion of the indicators and observations or measurements used for each function/value. Note that for non-tidal wetlands, the HGM judgmental method is a BPJ assessment method.

Removal-fill activities that will result in the **conversion of a wetland** from one Cowardin class to another (e.g., palustrine forested wetland to an emergent wetland) will require mitigation. The requirement is determined by assessing the functional losses that are predicted to occur by the conversion and mitigating for those losses. Typically, this will require a functional assessment of the affected area in its current condition and an assessment in its expected post-project condition to determine the type of losses.

- **Multiple wetland classes:** When a reference-based HGM is not available for all wetland subclasses on the impact site, ORWAP must be used for all wetlands on the impact site.

- **Comparison with CWM site:** When the removal-fill site and the proposed CWM site are both located within tidal wetlands, or within riverine impounding, slope or flats wetlands in the Willamette Valley ecoregion, then the appropriate reference-based HGM method must be used. If this is not the case, then ORWAP must be used in order to ensure an apples-to-apples comparison of assessment scores between the impact site and the CWM site. Note that a functions and values assessment will not be required for the CWM site if CWM is proposed through the purchase of bank credits, advances mitigation credits, or in-lieu fee program credits.

- **Linear projects:** Permanent impacts from linear projects that cross multiple watersheds should work with the DSL mitigation specialists to determine the appropriate assessment method. Staff will consider the range of wetland classes, the extent of impacts, and landscape variability across the project area. Impacts will be reviewed at the 4th field hydrologic unit and the following will generally apply:

  - All wetlands along the proposed corridor (permanent impacts only) will be screened for "special areas of concern". These areas will be subject to the normal function and values requirements. DSL includes the following highlighting any wetlands that involve:
    - Tidal wetland (brackish or freshwater)
    - Dune (Interdunal) Wetland
    - Bog or fen
    - Mature forested wetland
    - Playa
    - Serpentine riparian, spring, seep, and fen (ultramafic soil wetland)
    - Hot spring or cold spring
    - Vernal pool
    - Westside valley wet prairie (wet prairie)
    - Known use by any listed species
    - Documented high natural resource value (e.g., "significant" wetland identified in a communities Goal 5 inventory, or as may be identified in a local watershed management plan or water quality management plan)
    - "Conservation opportunity areas" as defined in ODFW's Oregon Conservation Strategy

  - For remaining wetlands, the predominant wetland condition should be assessed using ORWAP. The applicant and a DSL mitigation specialist should agree on the predominant wetland condition based on wetland delineations or other information.

DSL may also require **compensatory mitigation for unavoidable impacts to non-wetland and non-tidal waters**. At this time, there is no DSL-approved functional assessment method for this circumstance, therefore, a best professional judgment will be required documenting at least the following functions and values: hydrologic; geomorphic; biological; and chemical and nutrient. See the "Stream Mitigation Guidance". The mitigation plan must demonstrate functional replacement or otherwise provide comparable substitute water resources. DSL may require that the mitigation have defined performance standards, site monitoring and reporting, administrative protection and a financial security.

Step 2: Select the Appropriate CWM

Compensatory mitigation involves activities conducted by a permittee or third party to create, restore, enhance, or preserve the functions and values of the waters of this to state to compensate for the removal-fill related adverse impacts of project development to waters of this state or to resolve violations.

Forms of CWM

There are many forms of compensatory mitigation:

- **Using a mitigation bank**: Purchase of mitigation bank credits from a DSL and Corps' approved wetland mitigation bank or in-lieu fee program.

- **Using advance mitigation:** Use of excess credits from a previously developed, permittee-responsible CWM site. The Department must have pre-approved the credits for use by the applicant.

- **Permittee-responsible mitigation**: CWM constructed by the permittee, or their agent, as a condition of removal-fill permit to offset authorized impacts. Permittee remains responsible for mitigation site performance for the duration of the monitoring period. Permittee-responsible mitigation may be on-site or off-site.

- **Using the payment-in-lieu mitigation program:** Payment to DSL in- lieu of mitigation by any other means described above. Note that this is not a Corps approved program and will not satisfy federal mitigation obligations. Restrictions may apply.

The Principal Objectives

The goal of the principal objectives is to direct CWM to the appropriate place(s) and ecosystem processes that will result in successful and meaningful mitigation. Rather than applying a strict hierarchy of mitigation forms, the applicant is asked to consider the specific proposed effects of their removal-fill project and select the mitigation opportunity(ies) that will best offset those effects (i.e., maximize these principal objectives).

The applicant should consider the principal objectives in the early stages of their mitigation planning and focus the CWM plan on the option(s) that, on balance, best address the objectives. DSL does not intend for the objectives to be used as a hierarchy or in a pass-fail manner; in most cases there is no single mitigation option that will maximize all objectives concurrently. Some forms of mitigation are inherently better suited to meeting a particular objective. For example, banking options will usually best serve to minimize temporal loss whereas permittee responsible mitigation can often better provide for local replacement of locally important functions.

DSL does not intend that these principal objectives lead to conflicting mitigation directives or requirements between the state and federal mitigation programs. DSL believes the principal objectives are compatible with the 2008 federal mitigation rule (33 CFR) and expects consistency between the two regulatory programs as it relates to preferences for the most appropriate CWM method(s) for a given project.

CWM proposals for projects involving 0.2 acres or less wetland impacts may use mitigation banks, in-lieu fee, or payment in-lieu mitigation without addressing how the selected CWM method addresses or maximizes the principal objectives. For CWM proposals greater than 0.2 acres and using one of these forms of mitigation, additional guidance in addressing principal objectives is given in Step 3.

The principal objectives are:

- **Replace wetland functions and values lost at the removal fill site:** This is considered and documented by means of a functional assessment of the proposed impact site, and existing and predicted (post-CWM project) conditions at the CWM site.

- **Provide local replacement for locally important wetland functions and values, where appropriate:** This is considered and documented by showing how on- or near-site mitigation opportunities have been maximized when locally important wetland functions are anticipated to be lost at the impact site. “Locally important” may be defined or informed by: significance determinations by the community as part of locally adopted Goal 5 work; the values assessment conducted as part of the wetland functional assessment process; needs identified in an adopted watershed management plan; input from ODFW considering that agency’s habitat mitigation policy; and input received during the public review process.

- **Enhance, restore or create wetland areas that are self-sustaining and minimize long-term maintenance needs:** Proposed CWM should be shown to be self-sustaining, with a minimum of long-term intervention needs (e.g., artificial hydrology inputs, structure maintenance and repair, etc.).

- **Ensure the siting of CWM in ecologically suitable locations**: A foundation of successful CWM is the selection of a site with characteristics that will support the restoration, creation and enhancement of self-sustaining and ecologically relevant wetland functions and services. Site suitability considerations for selecting and evaluating a CWM site are provided below. These considerations should not be used as mandatory criteria nor viewed as an all-inclusive listing, rather, they are offered as a good starting point for CWM sites’ evaluation.

- **Minimize temporal loss:** To the extent that a CWM method can provide for mitigation site development in advance of a wetland loss at the impact site, temporal loss is reduced. For impacts to wetland types where substantial time is

CWM Siting Considerations

1. Consider the watershed position:
   - Position of the site in the watershed relative to the functions and services targeted for replacement
   - Position of the site in the watershed where target wetland type would be expected to occur naturally
   - Position of the site relative to other waters so as to ensure federal jurisdiction under Section 404 of the Clean Water Act.
2. Consider watershed processes within the site's watershed that have been historically degraded and could be improved by CWM development. Some sources of information can be found in Appendix A.
3. Consider the site's connectivity to other protected habitats. For example: designated parks, refuges, special management areas, or conservation easement protected areas.
4. Consider the site's ability to support the restoration, creation, or enhancement of wetland types that will replace wetland functions and services lost or impaired at the impact site.
5. Consider the proximity of CWM site to the impact site where relevant to replace locally important wetland functions.
6. Consider the suitability of the physical characteristics presented by the site including the reliability and availability (e.g., water right) of hydrological sources and suitable soil characteristics for the target HGM and Cowardin classes.
7. Consider whether the site supports local watershed needs or priorities (e.g., as documented in a local watershed management plan) and/or local, regional or statewide conservation strategies (e.g., location of the site relative to a mapped "Conservation Opportunity Area" as defined in ODFW's ""Oregon Conservation Strategy"").
8. Consider the extent to which site characteristics will minimize significant long-term maintenance needs beyond the monitoring period to maintain functionality. (For example, consider long-term management issues such as invasive species control when seed sources are nearby, or the need for water control structures that will require regular/long-term maintenance).
9. Consider the extent and functionality of upland buffers adequate to support and protect wetland functionality.
10. Consider the presence of conflicts and stressors:
    - Extent of human disturbance that would reduce the site's viability as a functionally sustainable wetland (e.g. presence of contaminants; pollutant or sediment runoff into the site; or recreational uses that would reduce the benefits to wildlife habitat).
    - Presence of any legal constraints or restrictions that would conflict with the site's development as CWM or the establishment of a legal protection instrument for the CWM
    - Presence of any adjacent or other nearby land uses or land use designations that could have an adverse effect on CWM functionality or sustainability
    - Presence of any adjacent or other nearby land uses or land use designations that could be adversely affected by CWM development.
11. Consider the site's ability to achieve multiple natural resource goals (e.g., address an established TMDL; accommodate state and/or federal threatened and endangered species recovery efforts).

anticipated to recreate the lost functions and values (e.g., forested wetlands), temporal loss should become a significant consideration.

Replacement by Functions and Values

Applications proposing to purchase credits from a bank, in-lieu fee mitigation program, or advance mitigation site, or using payment in-lieu, are not required to submit a functional assessment of the CWM site, but one may be used if it is available. DSL will make the assumption that form follows function and require in-kind replacement of the Cowardin and HGM classes impacted. Cowardin and HGM class(es) for banks and in-lieu fee projects are available on DSL's website.

Applications proposing permittee-responsible mitigation (on-site or off-site) must include a functions and values assessment for the CWM site. This analysis will compare function/value anticipated at the CWM site to wetland functions/values expected to be lost at the impact site. Typically, this will involve up to four steps:

1. Assessment of existing wetlands at the CWM site (if mitigation method includes enhancement of existing wetlands)
2. Assessment of wetlands at the CWM site in their anticipated post-treatment state
3. Consideration of likely function and value gains at the CWM site
4. Comparison of function and value gains at the CWM site to function and value losses at the impact site, so as to determine the CWM proposal's likelihood of achieving the functions and values replacement goal

Step 3 provides further guidance for presenting the results of the functions and values assessment.

Replacement by Class

Generally, DSL requires "in kind" replacement as a foundation to achieving the regulatory objective of functional replacement. In the regulatory context, "in-kind" is generally interpreted to mean of the same Cowardin system and class and HGM class and sub-class as classified in Appendix B. All else being equal, we assume that wetland functions generally follow from wetland form. In most cases, it should be expected that in-kind mitigation will be reasonably compatible with watershed-based considerations. In kind replacement will generally be required when purchasing credits from a bank, in-lieu fee mitigation program, or advance mitigation site.

The general requirement for ***in-kind*** replacement is intended to better ensure functional replacement, however, it is not intended to override or disallow an ***out-of-kind*** mitigation proposal that has used a watershed based approach to demonstrate:

- Replacement of wetland function and values that address problems identified in a watershed management plan or water quality management plan
- Replacement of important wetland types, functions and values disproportionately lost in the region (watershed)
- Replacement of rare or uncommon plant communities appropriate to the region as identified from sources such as the Oregon Biodiversity Information Center and the Oregon Conservation Strategy
- Replacement of wetland types that are technically impracticable to replace (e.g. slope wetlands)

Out-of-kind mitigation must make ecological sense within the landscape proposed. For example, while a proposal to create an out-of-kind depressional wetland may address a documented critical flood storage need in the watershed, creating that wetland at the bottom of the watershed would not make ecological sense. Similarly, while a proposal to create an out-of-kind wet prairie wetland would address a significant disproportionate loss, creating it by removing white oak woodlands would not be acceptable.

Out-of-kind replacement is most typically applied to formerly tidal waters that were historically diked to create a non-tidal wetland. Because tidal waters have been disproportionately lost in many regions and because estuarine waters are important in the life cycle of many listed species, CWM proposals entailing conversion to tidal waters will be permittable under the following conditions:

- The project site does not involve impact to high function/high value non-tidal wetlands or wetlands that are otherwise uncommon or disproportionately impacted in the region. In such cases, replacement in-kind or with-like-functions will be more appropriate.
- The wetland proposed for conversion to tidal waters does not already provide high function/high value.
- The wetland proposed for conversion to tidal waters does not currently support listed species or rare plant community(ies) that would be adversely affected by the conversion.

DSL may also consider comments from the public and government agencies to determine whether out of kind mitigation is permittable.

Off-site Mitigation

Generally, DSL interprets "off-site" to mean a location that is not within the tax lot(s) of the proposed removal-fill activity or within tax lots adjacent to the removal-fill activity tax lot(s). Where permittee-responsible off-site mitigation is determined to be the most appropriate form of CWM for the proposed impact considering the principal objectives, the following off-site selection guidance is offered:

Watershed HUC boundaries may be found by using the Oregon Explorer map viewer. On the left side, click the "+" sign next to "Water and Air" then likewise for "Watersheds". You can then click on the HUC level of interest to you for display. You may need to zoom in on your area of interest before the HUC boundary will display.

- The off-site mitigation area must be located, at a minimum, within the 4th field HUC (hydrologic unit code) in which the removal-fill site is located.
- DSL may direct applicants to more localized (e.g., 5th field HUC or smaller watershed) mitigation opportunities when warranted as a result of: application of the principal objectives for CWM; impact site functional assessment that identifies wetland service(s) of high function and value; input from public review process; or a watershed management plan or other locally adopted plan that identifies wetland services critical for retention within a smaller landscape.

Buffers

A buffer is the upland or wetland area immediately adjacent to or surrounding a wetland or other water that is set aside to protect against conflicting adjacent land use and to support ecological functions. This section deals only with buffers for compensatory

mitigation sites. Buffers may be proposed by the applicant or required by DSL in order to maximize the principal objectives.

The presence of conflicts and stressors near the mitigation wetland should be part of the siting considerations process. However, outstanding issues with surrounding land uses and replacement or sustainability of functions and values of the CWM wetland may be addressed through the use of buffers. Water resources will almost always benefit from a natural buffer at the upland or project boundary, and DSL encourages all CWM sites to have at least a narrow (10 to 20 feet) buffer dominated by native vegetation.

Buffers approved as part of a permit authorization become part of the CWM site and are subject to the same rules governing these areas, including performance standards, long term protection, and financial surety for the buffer areas and the removal-fill volume threshold of zero cubic yards.

To determine if a buffer is appropriate, the existing and potential future land uses surrounding the wetland should be assessed. Future land use may be based on zoning, known development plans, existing land uses in the area, and topography. Activities associated with these land uses, and the likelihood they could cause stress or harm to the CWM's ecological functions, should be considered. Particular attention should focus on stressors to highly valued services at the site as determined by a functional assessment (e.g. water storage, water quality, wildlife habitat support). Table 8-1 provides examples of conflicting land uses or ecological concerns, and the objectives and functions that buffers could serve in those situations.

If a buffer is deemed appropriate, the next step is to design it, including width, extent, targeted vegetation and slope. DSL does not have standard buffer requirements because each CWM project is unique. Instead, the permit applicant (or consultant) should refer to technical documents that discuss design elements for specific buffer objectives and include the design and reasoning in the CWM section of the permit application. One good example is "Conservation buffers: design guidelines for buffers, corridors, and greenways" (Bentrup, G. 2008). Other documents are targeted to specific objectives:

- Wildlife corridors are the focus of a Metro white paper that includes an appendix with literature citations regarding buffer widths for various species and settings.
- Bioswales and vegetated buffers for stormwater discharge pollutant removal are discussed in a Department of Environmental Quality publication (Jurries, 2003).
- A Guide to Riparian Tree Planting in Southwest Oregon" offers help on planning and achieving various riparian functions (Bennett and Ahrens 2007).

Applicants may work with the DSL Aquatic Resource Coordinator for their county and Oregon Department of Fish and Wildlife staff to determine the best buffer design for the project. Local ordinances should be reviewed when designing the buffer. For example, some cities require dry vegetation to be mowed to reduce fire hazards, thus requiring a mowed buffer.

DSL will consider allowing mitigation credit for buffers when they are necessary for the protection or functionality of the water resource. Because allowing credits for upland

buffers represents a net loss of wetland area, the credit ratio will be at a lower ratio than for wetlands and will depend on the ecological necessity and effectiveness of the buffer. General guidance is to start at a 10:1 acreage ratio for most upland buffers; however buffers with high ecological value or necessity could have a slightly lower ratio. Buffer credits should represent a small portion (generally <5%) of the total credit at a mitigation site. The proportion may be higher for smaller mitigation sites in urban areas.

Table 8-1. Examples of Buffer Needs, Objectives and Targeted Functions

Current or Potential Conflicting Land Use	Buffer Objectives	Buffer Functions
Surface runoff into the wetland that delivers sediment, nutrients or other pollutants	Reduce runoff of sediment, nutrients and other potential pollutants	Slow water runoff and enhance infiltration Trap pollutants
Proximity to agricultural operations may expose the wetland to spray drift	Protect from wind Control air pollutants	Reduce wind energy Filter air pollutants
Urban sites prone to transient camps, or dumping of yard waste, pet waste and litter Sites adjacent to roads that may get hazmat spills or off-road vehicle trespass	Reduce pollutants Create a safe environment Promote nature-based recreation	Trap pollutants in surface runoff or subsurface flow Separate human activities Reduce hazards Protect natural areas Protect soil, plant resources
Human or domestic animal activity and noise near wetland may reduce native animal use	Control noise levels Enhance terrestrial habitat Enhance aquatic habitat	Screen undesirable noise Separate human activities Protect natural areas
Floodplain sites may get continual input of weed species and erosive action; other wetlands may get weed invasion from adjacent uplands	Protect from flood waters Enhance terrestrial and aquatic habitat	Reduce flood water levels and erosion Reduce bank erosion Protect soil, plant resources
Unmarked mitigation site boundaries may have trespass from overzealous landscapers, gardeners, grazers or other agricultural users	Enhance terrestrial and aquatic habitat Enhance visual quality Create a safe environment	Protect natural areas Reduce hazards Separate human activities Enhance visual interest

Table 8-1. (continued)

Support of Ecological Functions	Buffer Objectives	Buffer Functions
The site is located upstream of a temperature-limited stream	Enhance aquatic habitat	Shade stream or wetland to maintain temperature
A natural corridor would connect the water resource to a nearby habitat area	Enhance terrestrial and aquatic habitat	Restore connectivity Increase natural area Provide a corridor for movement
Sediment and phosphorus removal is highly valued at the site, but water is delivered quickly to the site from the contributing area	Reduce runoff of sediment, nutrients, and other potential pollutants	Slow water runoff and enhance infiltration Trap pollutants in surface runoff
Land directly upslope of the wetland/upland boundary is not in natural cover, and aquatic or terrestrial support is valuable at the site	Enhance terrestrial and aquatic habitat Increase biological control of pests	Restore connectivity Increase habitat area Enhance habitat for predators of pests

CWM Ratios

CWM must meet both minimum ratio replacement and function and value replacement. The ratios are:

- One acre of restored wetland for one acre of impact (1:1)
- One and one-half acres of created wetland for one acre of impact (1.5:1)
- Three acres of enhanced wetland for one acre of impact (3:1)
- Two acres of enhanced cropped wetland for one acre of impact (2:1)

Cropped wetland is converted wetland that is regularly plowed, seeded and harvested in order to produce a crop for market. Pasture, including lands determined by the Natural Resources and Conservation Service to be “farmed wetland pasture,” is not cropped wetland.

Ratios are still negotiable for CWM using preservation and for function-based accounting methods approved by DSL, and will be determined on a case-by-case basis based on information provided in the CWM plan. DSL may increase the minimum ratios when there is an unauthorized removal-fill activity or if timing of CWM implementation will be delayed. The minimum ratios may be doubled for project development affecting existing CWM sites.

Timing of CWM Implementation

As a condition of the removal-fill permit DSL will typically require that the CWM be performed prior to or concurrent with the proposed impact (i.e., wetland fill or removal). This means that, at a minimum, earthwork at the CWM site must be completed within the same construction season (typically spring-summer-fall) as the authorized impact.

Where necessary, a phased approach may be assumed, that is, if 50% of the authorized impact is to be done in one construction season, then 50% of the mitigation (considering the mitigation ratios) must have completed earthwork in that same season. “Earthwork” includes all manipulations of the land proposed in the CWM Plan such as excavation, grading, ditch plugging, dike breaching, sub-surface drain interruption.

DSL may approve non-concurrent CWM if the applicant can demonstrate, to the satisfaction of DSL, rationale for the delay or that there is a benefit to the aquatic resource by doing so. Non-concurrent CWM exacerbates the temporal loss of wetland functions and values between impact site and mitigation site and is therefore only approved with compelling rationale (e.g. site preparation) and for the shortest practicable time. The regulation allows for an increase in the mitigation obligation as a means to account for the added temporal loss (OAR 141-085-0690 (4e)). Generally, DSL will start with a minimum 25% increase in the ratio for each construction season of delay with the potential for greater increase if the impacted wetland supports particularly high function(s) or value(s). For example, using the 25%, a CWM site using creation would be given a minimum ratio of 1.5 x 1.25 = 1.875:1 for one construction season of delay; 2.25:1 for two construction seasons of delay; etc.

Special Requirements for Restoration as CWM

Wetland restoration is defined as the re-establishment of a former wetland. In many places former wetlands have been either filled or drained, and in a few cases, former wetlands have been converted to unvegetated, perennially open water. CWM plans using restoration must provide documentation demonstrating that the site was formerly a wetland or tidal water. To demonstrate that a wetland existed in the past, provide the following types of evidence, as applicable:

- A current delineation showing the area is not now wetland. Follow the delineation guidance to describe evidence of past impacts affecting remaining wetlands.
- An NRCS soil survey map showing hydric soils at the site. Soil survey mapping is typically at a much coarser scale than is required for delineation, so onsite soil data is typically needed to verify the presence and /or boundaries of relict hydric soils. The soil sampling should demonstrate the presence of relict hydric soil indicators according to the Delineation Manual and Supplements. Alternatively, a qualified soil classifier may present evidence that the soils match the profile of a soil map unit recognized as hydric.
- If hydric soils have been buried beneath fill material, sample pits at the perimeter of the fill, or a test pit excavated or augered through the fill may be needed. If soils have been deep ripped or otherwise highly altered, relict hydric soil indicators may be absent altogether, in which case the existence of former wetlands may not be provable.
- Historic photos showing a strong photo signature of wetlands prior to evident filling, draining, or impoundment. Provide the dates of each photo.
- Topographic maps showing that the site is in a landscape position conducive to the occurrence of wetlands. Comparison to existing nearby wetlands in the same landform, if any, can be helpful.

- Evidence that the water sources that previously contributed to wetland were diverted or drained via manipulations such as tiling, ditching, or diking. Provide the approximate date that the hydrology manipulation took place. Map the locations of all known tile lines and outfalls, and distinguish known from speculative tile locations.

Special Requirements for Enhancement as CWM

Enhancement of existing wetlands as CWM may only be accepted if ***all*** of the following conditions are met:

- Is conducted only on degraded wetlands
- Results in a net gain in functions and values
- Does not replace or diminish existing wetland functions and values with different ones unless the applicant justifies it is ecologically preferable
- Does not consist solely of the conversion of one HGM or Cowardin class to another
- Identifies the causes of wetland degradation and reverses, minimizes, or controls those causes as part of the CWM plan
- Does not consist solely of removal of non-native, invasive vegetation and replanting or seeding of native plant species
- Is not for the replacement of eelgrass habitat

When evaluating a potential CWM site containing wetlands, first determine whether the wetlands are degraded. By definition, “Degraded Wetland” refers to a wetland in poor condition with diminished functions and values resulting from hydrologic manipulation (such as diking, draining and filling) and other disturbance factors that demonstrably interferes with the normal functioning of wetland processes. Simply having a high cover of non-native or invasive vegetation does not qualify the site as degraded. There must have been hydrologic manipulation, and it must have been significant enough to have permanently affected the condition of the area being proposed for enhancement.

To qualify for enhancement, the cause of degradation must be identified and the mitigation strategy must reverse the cause of degradation. The following activities cause hydrologic degradation:

- Excavation of drainage ditches
- Drain tiling (lined or tiled subsurface drainage)
- Diking to exclude water
- Placement of fill
- Diversion of water source
- Drowning (addition of unnatural water source/depth/duration)
- Obstructions to tidal regime

For these types of activities, DSL may assess the *zone of influence* – the area hydrologically degraded by the activity. For example, a ditch along one edge of a wetland in high clay soils may have a narrow zone of influence.

Activities that do not result in significant hydrologic degradation are:

- Grazing
- Compaction
- Leveling
- Plow lines
- Logging
- Subsoiling (practice to temporarily fracture soils)
- Moling (unlined subsurface drainage)
- Roadside ditches

While **moling** can cause hydrologic degradation of the site, the effective life of these channels varies. The applicant should document when the moling occurred and document that they continue to affect drainage at the site.

If the site is degraded, determine whether the cause of degradation can be reversed, minimized, or controlled such that a net gain in functions and values can be accomplished. The net gain is the difference between the predicted function and values and those that currently exist at the site. Enhancement applies only to the area that is clearly affected by the reversal of the cause of degradation.

Special Requirements for Preservation as CWM

Preservation as CWM relies on preventing the decline of, and threat to, the exceptional ecological features of existing wetlands. Preservation represents a net loss of wetland acres and functions in the near term in exchange for long term protection and maintenance through implementation of appropriate legal and physical mechanisms. Preservation is the preferred CWM option when the wetland type is exceptionally difficult to replace. Examples are bogs, fens, vernal pools, and tidal spruce wetlands.

Applicants must demonstrate that the wetland proposed for preservation is under threat of destruction or adverse modification (including zoning that allows for a land use that could result in significant modification or adverse effect to existing wetland functions and values). The preservation site must also meet at least **one** of the following to demonstrate the exceptional ecological features of the wetland:

- The wetland supports a significant population of rare plant or animal species. Oregon's list of rare, threatened and endangered species is maintained by the Oregon Biodiversity Information Center.
- The site is a rare wetland or tidal waters type with a state rank of S1 or S2. Rankings are maintained by the Oregon Biodiversity Information Center and are based on rare plant associations. Types are listed on the Oregon Wetlands Explorer National Resources Digital Library.
- The site is a native, mature forested wetland. As guidance, this may be defined as a wetland in which the mean diameter of native trees (diameter at breast height, trees rooted within the wetland only) exceeds 18 inches, and/or the age of trees exceeds 80 years, or there are >5 trees/acre with diameter >32 inches. The diameter of >18 inches must be the mean measured from at least 10 trees.

- The preservation site, with existing and ongoing management, is in good condition and is highly functioning (as determined using a Department-approved assessment method). Preservation must also accomplish at least one of the following:
    - Serves a documented watershed need; or
    - Preserves wetland types disproportionately lost in the watershed.

Watershed needs may be found in documents such as local watershed assessments, watershed restoration priorities (e.g. Oregon Watershed Enhancement Board Restoration Priorities), and water quality management plans (e.g. Oregon Department of Environmental Quality). Sources of information regarding historically and disproportionately lost wetland types in Oregon may be found at the Oregon Wetlands Explorer and Oregon Habitat Joint Venture.

A suggested outline of materials required for a mitigation plan using preservation is found in Appendix D. A long-term management plan, funding mechanism, and long-term protection instrument must be in-place prior to permit issuance for preservation CWM.

Siting CWM in Tidal Waters

For proposed impact to tidal waters, CWM must be located within the same estuary unless the Director of DSL determines that it is environmentally preferable to exceed this limitation.

Special Considerations for Eelgrass Mitigation

Native eelgrass (Zostera marina) occurs naturally in many Oregon estuaries. The eelgrass plants are rooted in soft sediments, and they frequently form expansive beds or meadows within intertidal tideflats, or fragmented patches of discontinuous vegetation along the edges of deeper tidal channels. Eelgrass beds typically occur in shallow estuarine areas where water circulation is sufficient to ensure cool temperatures and an adequate supply of nutrients. Information from Dr. Steve Rumrill (South Slough National Estuarine Research Reserve) indicates that the primary environmental factors that control eelgrass growth are:

- Depth (depth range of +3 to -8.0 ft MLLW)
- Light availability (minimum PAR of 300 µM m^{-2} s^{-1} for 3 hrs day^{-1} during spring and summer)
- Substratum composition (medium to fine sands, sandy-mud, gravel with 0.5 to 15.0% organic content and low sediment sulfide toxicity)
- Temperature (optimal 7 to 12 ºC; tolerate 4 to 24 ºC)
- Salinity (optimal 20 to 34 ppt; tolerate 3 to 35 ppt)
- Inorganic nutrients (tolerate C:N: P ratio of 500:20:1)
- Waves and currents (minimum 3 cm^{-1} to maximum 180 cm s^{-1}; burst velocities up to 80 cm s^{-1})

It is important that candidate eelgrass mitigation sites be evaluated against these criteria to better ensure ultimate success.

CWM for eelgrass is primarily by means of restoration and creation by removing existing fill material (or native uplands) near existing eelgrass beds to establish elevations and a hydrologic regime suitable for supporting eelgrass beds. Generally, enhancement of existing eelgrass beds is not a desirable form of mitigation because the planting of unvegetated mudflat areas simply converts one high value estuarine habitat for another. Also, if eelgrass is not already growing in a particular area, it is very likely that there are physical conditions present that make that area not conducive to eelgrass growth.

Eelgrass is very sensitive to changes in the estuarine environment. In creating or restoring eelgrass beds, it must be expected a significant portion of the mitigation site will not sustain plants at a density sufficient to function as an eelgrass bed (at least 20 shoots per square meter). Literature on the subject suggests eelgrass mitigation efforts should plan on a successful re-establishment rate of no more than about 40% to 60%.

Eelgrass beds will normally have a high degree of density variability within a given estuarine environment. Within intact beds there can be substantial variation in density, referred to as “patchiness,” where bare or thin spots should be expected. Density will vary by location and elevation. Elevation will play a role but in one location deeper areas may be denser, in another shallower areas may be denser. The minimum density for an eelgrass area to be considered a “functioning bed” is 20 shoots per sq. meter, but may be as high as 300 shoots per square meter.

DSL will normally have an average density performance standard that is the greater of: 1) 100% of the density of eelgrass beds at the impact site; or, 2) 80% of the density at the nearest eelgrass reference site. Applicants should anticipate needing substantially more acreage than what the DSL minimum ratios would otherwise dictate to be sure acreage and density requirements are met by the end of the monitoring period.

Eelgrass beds generally have a narrow window of water velocity tolerance. Excessive velocities may continually remove sediment thus impacting eelgrass establishment. Velocities too low may result in excessive sedimentation and/or algae build-up that may smother eelgrass beds. Monitoring of grade stakes is likely required in the mitigation area to measure rates of sedimentation or erosion and to make visual observations of algae build-up. A good mitigation plan will include contingency measures in the event of excessive erosion or sedimentation.

The height or length of eelgrass leaves is a good indicator of growth rates and biomass production. A representative sample of plant height at the reference bed should be measured to determine target plant heights for the mitigation site. A performance standard could be set at a percentage of the reference metric. If the standard is not met after a few years, it could trigger an evaluation of site selection or other factors that may or may not be easily remedied.

Both the native eelgrass (Z. marina) and non-native eelgrass (Z. japonica) can be found in Oregon's estuaries. The non-native eelgrass tends to be present at a much shallower depth but otherwise may be functionally similar. Generally relative cover of non-native eelgrass species (Z. japonica) should be no more than 15%.

Eelgrass transplants sources will sometimes be the impact site doomed to direct impact or shading, in which case all plants may be salvaged for use at the mitigation site. For other sites it is recommended that only 10% of the density of the donor bed be "harvested" to minimize disturbance of the eelgrass community. Location of the transplant source area within the donor bed should be GPS-located and documented in the monitoring report. Donor beds should be monitored for three years to document recovery. If additional transplants are needed, only 10% of a new donor bed may be harvested, and this source location documented as well.

Land ownership is an important consideration before any site is selected for eelgrass mitigation. Ownership of Oregon's tidelands was granted to the state at statehood. Many, but not all, tideland areas remain in state ownership today and are managed by DSL. Early coordination with DSL's proprietary staff is important. Proprietary staff can determine if the land is state owned, and if state owned, identify what other encumbrances may already exist at the site, whether mitigation may be allowed at the site, and, if so, what easements are required to encumber the land with eelgrass mitigation. Permanent easements can involve significant compensation payment to DSL and require Land Board approval. That approval process can take substantially longer than the removal-fill permit process.

Limitations for Using Payment-in-Lieu Mitigation

For proposed impacts greater than 0.2 acres, payment-in-lieu mitigation is the CWM method of last resort when no other method (mitigation bank, in-lieu fee or advance mitigation credits, or permittee-responsible mitigation) is practicably available. DSL may use evidence presented by the applicant, public, or its own investigations to determine whether other practicable CWM methods exist.

For proposed impacts less than 0.2 acres *and* where mitigation bank or in-lieu fee credits are not available, an applicant may propose to use the payment-in-lieu method without demonstrating the impracticability of other mitigation methods. If bank or in-lieu fee credits are available, then these forms of mitigation take precedence to payment in-lieu.

The US Army Corps of Engineers will not accept payment-in-lieu as a method for CWM to satisfy federal wetland permit program requirements. Therefore applicants proposing such use should be prepared to provide another form of CWM to satisfy federal requirements.

Payment-In Lieu (PIL) is a state-approved CWM program whereby permittees may pay into the Removal-Fill Mitigation Fund and the State fulfills the mitigation obligation. Note that this is not a Corps approved program and will not satisfy federal mitigation obligations.

DSL has also established an **in-lieu fee** (ILF) program to provide an additional option in areas of the state with limited CWM alternatives. Under this program, DSL-funded restoration projects generate credits, which may be purchased as CWM if deemed appropriate by authorizing agencies. The Corps and DSL approve this program, however federal and state mitigation requirements still apply. There may be restrictions for use of DSL ILF credits if there are also appropriate private mitigation bank credits available.

CWM for Linear Projects in Multiple Watersheds

Linear projects such as pipelines, roads, power lines, etc. that have permanent wetland impacts in multiple watersheds present a challenge for CWM. It may not be practicable or ecologically desirable to create numerous, and potentially very small, CWM sites along such corridors extending for 10's or 100's of miles. Applicants with linear projects should work closely with the DSL mitigation specialists to determine the appropriate mitigation. DSL offers the following additional guidance when planning CWM for linear projects in multiple watersheds:

- Any proposed permanent impacts to "special wetlands" (as defined in Step 1) are subject to the standard CWM requirements.
- For all other proposed permanent impact to wetlands, CWM may be combined at the 4th field HUC level with the mitigation requirement interpreted to mean replacement of the predominant wetland condition being impacted in that watershed.

Step 3: Develop a Mitigation Plan

A CWM Plan is required for permittee-responsible CWM and should have a level of detail commensurate with the size and complexity of the proposed mitigation. A CWM plan is not required for proposed CWM using approved bank credits, advance mitigation credits, in-lieu fee program credits, or payment in-lieu, however the principal objectives must still be addressed in the permit application for impacts greater than 0.2 acres, and guidance is provided in Section 3 below.

The CWM plan should usually develop in a specific sequence:

Goals → Objectives → Performance Standards → Monitoring Plan

There should be an increasingly detailed progression from the goals that state *what* is aimed for, to more detailed objectives telling *how* goals will be accomplished, to performance standards that provide specifics on *how many*, *how much*, or *what types* of quantifiable items (e.g. 60% cover of native herbs each year of monitoring) will be provided.

A suggested outline for CWM Plans using permittee-responsible mitigation is outlined below. For CWM plans using preservation, see Appendix D.

CWM Plan Outline

Section 1: CWM Plan Overview
1.1 Ecological Goals and Objectives
1.2 Description of CWM Concept
1.3 Summary of CWM Acreages
1.4 Summary of Function & Value Gains and Losses

Section 2: CWM Site Information
2.1 Site Owner Information
2.2 Physical Location Information

Section 3: Description of How the CWM Addresses the Principal Objectives
3.1 Function and Value Replacement
3.1.1 Justification for Out-of-kind Mitigation (if applicable)
3.2 Local Replacement of Locally Important Functions and Values
3.3 Self-sustaining/Minimum Maintenance Needs
3.4 Siting Considerations
3.5 Minimize Temporal Loss

Section 4: CWM Existing Site Conditions
4.1 Wetland Delineation or Determination Results
4.2 Existing HGM and Cowardin Classes On-site
4.3 Description of Existing and Proposed Hydrology
4.4 Existing Plant Communities
4.5 Site Constraints or Limitations
4.6 Factors Leading to Degraded Condition (enhancement proposals only)

4.7 Means for Reversal of Degradation (enhancement proposals only)
4.8 Documentation of Former Wetland Condition (restoration proposals only)

Section 5: Functions and Values Assessment
5.1 Rationale for Method Used
5.2 Summary of Expected Gains and Losses
5.3 Considerations to Address Expected Losses

Section 6: CWM Construction Maps and Drawings
6.1 Grading Plan Objectives
6.2 Planting List and Rationale
6.3 Construction Schedule

Section 7: Monitoring Plan
7.1 Proposed Performance Standards
7.2 Monitoring Method(s)
7.3 Monitoring Schedule
7.4 Rationale for Plot and Photo-documentation Locations

Section 8: Long-Term Protection and Financial Security Instruments
8.1 Description of Proposed Protection Instrument
8.2 Description of Proposed Financial Security Instrument
8.3 Long-term Maintenance Plan

Other Requirements
Joint and Personal Guarantee (permittee-responsible mitigation only)

The following tables and figures list identifies the key tables and figures appropriate for most CWM plans. It is not intended to be an all-inclusive listing. Applicants should include any additional tables/figures necessary to clearly and concisely present the elements of their CWM proposal.

Tables:
Impact and Mitigation Acreages Summary Table
Functional Assessment Gains/Losses Summary
"Coverpg" and "FinalScores" Sheets for Impact & Mitigation Sites (if using ORWAP)
Plant List by HGM & Cowardin Class

Figures:
CWM Site Location Map
Wetland Delineation Map for CWM Site
Site plan(s)
Cross-section Plans
Water Control Structure Schematic(s)
Monitoring Plot/Transect Location Map

Appendices:
Functional Assessment Data Forms, Maps, Aerial Photos (mitigation site)
Legal Agreement between Applicant and Landowner (if applicable)
Other appendices as necessary

Section 1: CWM Plan Overview

Section 1 serves as an executive summary of the CWM plan and should include:

- The ecological goals and objectives
- The general CWM concept including how replacement is achieved
- The mitigation site acreage by method(s) of mitigation proposed, and by proposed HGM and Cowardin classification for each method
- A summary of the proposed losses and gains of wetland or tidal waters functions and values

Tables 8-2 and 8-3 serve as examples of how gains and losses can be summarized. For linear projects in multiple watersheds, there should be summary charts for each 4th field hydrologic unit showing attributes for each "special" wetland site individually, plus the predominant wetland condition for remaining wetlands, and the corresponding information for each mitigation site.

Table 8-2: Example Format for JPA Reporting of Functions and Values

Attribute		**Impact Site**	**CWM Site**			**Net Gain or Loss**
		Predicted Loss	Existing	Predicted	Δ	
Attribute 1	Function score					
	Value score					
Attribute 2	Function score					
	Value score					
Attribute 3	Function score					
	Value score					
Attribute …	Function score					
	Value score					

Table 8-3: Wetland Mitigation Summary Table for CWM Plan Using Standard Ratios

Impact Site				**CWM Site**					
Wetland ID	HGM	Cowardin	Acres	Mitigation Method	Acres	HGM	Cowardin	Mitigation Ratio	Credits Gained
A	DCNP	PEM	0.40						
B	Flat	PEM	0.50						
C				Create	0.52	DCNP	PEM	1.5:1	0.35
D				Restore	0.20	Flat	PEM	1:1	0.20
				Enhance	1.05	Flat	PEM	3:1	0.35
Total			0.90		1.77				0.90

In this example, the proposal is to mitigate for impacts to wetlands A and B at the impact site using wetlands C and D at the CWM site. The CWM site may be at the same location as the impact, or off-site.

Section 2: CWM Site Ownership and Location Information

Include the name address and phone number of the CWM landowner. If the applicant is not the landowner, provide copies of legal agreements that grant permission to conduct the CWM and the willingness of the landowner to provide long-term protection. Keep in mind that the applicant will retain responsibility for the CWM site until the monitoring period is complete. Location information should include a legal description (township, range, quarter and quarter-quarter section and tax lot(s), and the site location on a USGS or similar map relative to the impacted site, longitude and latitude, physical address, and road milepost.

Section 3: Description of How the CWM Addresses the Principal Objectives

Describe how the chosen method of CWM (mitigation bank, advance mitigation, payment-in-lieu, or permittee responsible) best addresses the Principal Objectives as a whole.

Principal Objectives:

- Replace functions and values lost at the impact site
- Provide local replacement for locally important functions/values where appropriate
- Enhance/restore/create wetlands that are self-sustaining and minimize long-term maintenance needs
- Ensure siting of CWM in ecologically suitable locations considering: local watershed needs and priorities; appropriate landscape position for the wetland types, functions and values sought; connectivity to other habitats and protected resources; and the absence of contaminants or conflicting adjacent land uses that would compromise wetland functions
- Minimize temporal loss

Projects involving 0.2 acres or less wetland impacts and proposing the purchase of credits from a bank, in-lieu fee project, or advance mitigation site, or payment in-lieu are not required to address the principal objectives. Any proposal for a project involving tidal waters impacts must address the Principal Objectives.

Section 4: CWM Existing Site Conditions

This section should provide an overview of what the site currently looks like and what resources are available that support the site being used for CWM. A delineation should be performed at the CWM site to document the acreage and HGM and Cowardin class(es) and subclass(es) of any existing wetlands. The delineation may also document the presence and extent of hydric soils if restoration is proposed. The approximate location of all water features (e.g. wetlands, streams, lakes) on or within

500 feet of the CWM site should also be documented. The availability of water to support the CWM project, and the potential threats to the long-term success of the project are important considerations.

When describing the plant community, describe the distribution of major plant communities present at the CWM site and in buffer areas, including the abundance and distribution of non-native and invasive species. If CWM includes enhancement of existing wetlands, describe why these areas qualify as degraded (see Step 2) and how the plan will reverse and sustain the reversal of the causes of degradation. Provide a general description of the existing and proposed water source, duration and frequency of inundation or saturation, and depth of surface water for wetlands on the CWM site. Include identification of any water rights necessary to sustain the CWM site. When a water right is required, the applicant must provide documentation prior to permit issuance that the water right has been secured.

There is a myth that **invasive weeds** can somehow be locked out of a site. In fact, invasives pose a serious threat to the sustainability of many wetland functions. Consideration of siting criteria, target plant communities, and long-term monitoring and maintenance is important to manage invasives.

Be sure to describe any known constraints or limitations of the site (e.g. buried lines, easements, liens) and how these were addressed in the CWM plan.

Section 5: Functions and Values Assessment

Rationale for Method Used

The appropriate functions and values assessment methodology for the region, HGM type, and area of impact should be used as outlined in Step 1:

Summary of Expected Gains and Losses

For the purposes of documentation in the joint permit application, Section 5 of the CWM Plan must include: a summary table of the assessment results (see Table 8-4 for example format), summary data form(s) for the pertinent assessment method, and explanations for any predicted function or value losses and how those losses may be ameliorated or otherwise mitigated for. Applicants should include all completed data forms, maps, and aerial photos used to conduct the assessment as an Appendix to the CWM plan. Photographs of the assessment area, while helpful, are not required.

Table 8-4: "Replacement" Example Using Enhancement

Attribute		Impact Site	CWM Site			Net Gain or Loss
		Predicted Loss	Existing	Predicted	Δ	
Water storage & delay	Function	-4	1	7	+6	+2
	Value	-5	4	4	- -	-1
Nitrogen removal	Function	-5	2	5	+3	-2

Attribute		Impact Site	CWM Site			Net Gain or Loss
		Predicted Loss	Existing	Predicted	Δ	
	Value	-7	8	8	- -	+1

Generally, a change in the value score for a given attribute should not be expected between the existing state and the predicted state of the CWM site since value is driven primarily by conditions offsite from the CWM (i.e., in the contributing area and downslope area). Therefore, the value score at the CWM site is simply compared to the value score at the impact site.

For the HGM method, “attributes” are the 12 to 13 functions identified in the applicable HGM Guide. For ORWAP, “attributes” will generally be reported as the 5 “grouped services”.

When using ORWAP, be sure to consult the “Guidance for Using the Oregon Wetland Rapid Assessment Protocol (ORWAP) in the Removal-Fill Permit Program” for assistance in interpreting and presenting the assessment results in the CWM Plan. Generally, this Guidance document can also be applied to HGM assessments as well, with the caveats noted in the Guide.

Section 6: CWM Construction Maps and Drawings

This section should provide the proposed schedule for constructing the CWM site. Drawings and specifications should show:

- Scaled site plans that show the boundary of the project; existing and proposed wetland boundaries, including which areas will qualify for the minimum ratio types; the location and width of buffers; existing and proposed contours; cross section locations; and construction access location(s) and staging areas
- Scaled cross sections showing existing and proposed contours and proposed water depths
- Schematic of any proposed water control structures or other constructed features
- For CWM sites with tidal waters, plan views and cross-sections that show relevant tidal elevations relative to mean lower low water (MLLW) using the nearest local tidal datum. The elevation of MLLW should be referenced to the North American Vertical Datum 1988 (NAVD88).
- A plant list for each wetland habitat type (forested, shrub-dominated, herbaceous, and upland buffers) by species and wetland indicator status (wetland areas only)

Section 7: Monitoring Plan

Proposed Performance Standards

Performance standards are used to demonstrate that the site goals and objectives are being met, and provide the Department and permittee a way to track site progress. Because performance standards are tied to financial security release, there is incentive

for the permittee to assure that the agreed-upon actions outlined in the CWM plan are actually taken, and they also provide the permittee with some assured times where they can expect financial security release to occur, provided that the standards are being met.

Performance standards should meet the following goals:

- Address the proposed ecological goals and objectives specific to the CWM project
- Be objective and measurable in a practicable and repeatable manner, per the methods detailed in the monitoring plan
- Provide a timeline for achievement of each performance standard, which may be tied to financial security release or credit release schedules
- Performance standards should address achievement of:
  - Wetland acreage requirements
  - Hydrology that is within design parameters and similar to natural systems of the same HGM type
  - Wetland vegetation that is dominated by wetland plants
  - Vegetation diversity
  - Dominance by native species
  - Control of invasive species
  - Upland buffers adequate to protect the wetland from adjacent land uses

Routine Performance Standards

The Department has developed "routine" performance standards that may be used across a wide variety of wetland types (Table 8-5). The performance standards represent the best professional judgment of Department staff of the vegetative conditions that should be present at a site before it is released from further regulatory oversight. Each performance standard should be met annually for a minimum of five years, unless stated otherwise. Generally, the Department will use these performance standards for all CWM.

Table 8-5. Routine Performance Standards for Area and Vegetative Monitoring

Area of Wetland Achieved (all permits)
The CWM site will have a minimum of x acres of {HGM or Cowardin class} wetland by year 5, as determined by a delineation during spring of a year when precipitation has been near normal.
Herbaceous Wetlands
1. The cover of native species is at least 60%; 2. The cover of invasive species is no more than 10%; 3. Bare substrate represents no more than 20% cover; 4. By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5% average cover in the habitat class, **and** occur in at least 10% of the plots

sampled; and

5. Prevalence Index is <3.0.

Shrub-dominated and Forested Wetlands

1. The cover of native herbaceous species is at least 60%;

2. The cover of invasive herbaceous species is no more than 10%. After the site has matured to the stage when desirable canopy species reach 50% cover, the cover of invasive understory species may increase but may not exceed 30%;

3. The cover of invasive shrub or tree species is no more than 10%;

4. Bare substrate represents no more than 20% cover;

5. By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5% average cover in the habitat class, **and** occur in at least 10% of the plots sampled $^{\alpha}$;

6. Prevalence Index total for all strata is <3.0$^{\alpha}$; and

7. The density of woody vegetation is at least 1,600 native plants (shrubs) and/or stems (trees) per acre, or the cover of native woody vegetation on the site is at least 50%. Native species volunteering on the site may be included, dead plants do not count$^{\alpha}$.

$^{\alpha}$Woody vegetation standards should be met for two successive years without irrigation.

Upland buffers

1. The cover of native species is at least 60%;

2. The cover of invasive species is no more than 10%. After the site has matured to the stage when desirable canopy species reach 50% cover, the cover of invasive species may increase but may not exceed 30%.

An applicant may propose alternative performance standards, or DSL may require alternative standards, if the routine standards are not appropriate for the site. If alternate performance standards are proposed by the applicant, there should be supporting documentation and the standards proposed should reflect the goals and objectives of the CWM plan. Marshall et al. (2007) provides methodology to use reference sites to help plan and evaluate vegetation performance of mitigation sites. The Department reserves the right to approve alternate performance standards provided by the applicant, or use routine performance standards in permits.

In some cases, it is appropriate to include performance standards to show that specific targeted functions have been attained at the CWM site. Examples may be when the Department approves out-of-kind replacement, or when regional conservation initiatives

such as Total Maximum Daily Load's for water quality limited waters, or Endangered Species Act requirements apply at the impact or CWM site. Applicants may then propose, or DSL may require, performance standards for targeted functions based on reference conditions. Some suggestions are given in Appendix C.

Special Guidance for CWM Using Tidal Waters

Tidal waters include a diverse range of vegetated and nonvegetated subtidal to intertidal habitat types including eelgrass beds, algal beds, mudflats, low marsh, high marsh, and tidal swamps controlled predominantly by elevation relative to tidal regime. (For classification and descriptions of tidal waters see Estuarine System and Riverine Tidal subsystems in Cowardin's Classification of Wetlands and Deepwater Habitats of the United States). Due to the rarity of permitted impacts and diversity of Cowardin classes found within tidal waters, mitigation plans and specific performance standards will be determined by the Department on a case-by-case basis. Use of consultants with prior experience restoring tidal waters is recommended. In all cases, the following must be considered:

If a project involves the **excavation of tidal mudflats** to create a subtidal condition, then CWM may be required. The mitigation requirement will be waived if the removal site was previously permitted and mitigated for.

- Many historically tidal areas have been hydrologically altered due to diking, ditching, and installation of tidegates. Thus, restoration and enhancement mitigation involving the reestablishment of tidal regime are relatively easy and have the potential for a high probability of success.

- Observations of elevation, plant communities, salinity regime, hydroperiod over at least a full tidal cycle, and fluvial geomorphology of a nearby undisturbed reference sites will be needed to design a self-sustaining restored/enhanced condition.

- Given that the presence of a particular Cowardin class in tidal waters is contingent upon elevation with respect to tidal regime, the grading plan will be a fundamental component of any mitigation plan. On a case-by-case basis, performance standards will be developed for elevation and slope with respect to relevant tidal data and referenced to a geodetic datum.

- In marine-sourced low and high marshes, reestablishment of desired native species will likely happen naturally without planting because propagules will exist in the seed bank or will be brought in by the tides. However, for River-sourced tidal waters such as scrub-shrub and forested wetlands, planting and monitoring of species appropriate to the salinity and hydroperiod will be required. Eelgrass mitigation will also require planting. Performance standards for cover for desired native species will be developed on a case-by-case basis. Monitoring may also be required for donor sites to make sure of their recovery.

- Invasive species of concern in estuarine tidal swamps, high marsh, and low marsh are *Spartina alterniflora, Spartina patens, Lythrum salicaria, Iris*

pseudacorus, and Phalaris arundinacea (all are salt tolerant except *Phalaris*). In eelgrass beds and subtidal habitats, *Zostera japonica* (Japanese eelgrass) and *Carcinus maenas* (European green crab) are invasive species of concern (see pages 51-52 of the Estuary Assessment Manual for invasive species resources in estuaries). Performance standards for acceptable cover of each of these species should be developed on a case-by-case basis.

- All estuaries are designated essential salmonid habitat and support threatened and endangered species such as Coho. ODFW should be consulted for appropriate in-stream work windows, and consultation with the National Marine Fisheries Service may be necessary if any of the proposed activities fall outside of SLOPES.

Monitoring Methods

Describe the specific methods that will be used to monitor the CWM, as they relate to the proposed performance standards. For vegetation monitoring, the Department's Routine Monitoring Guidance may be referenced. If the Routine Monitoring Guidance will be altered, or another vegetation monitoring method used, the applicant should describe these methods in this section of the CWM Plan using the guidance below.

Section 8: Long-term Protection and Financial Security Instruments

Description of Proposed Protection Instrument

The wetlands, riparian areas, uplands, and buffers that comprise the entire CWM project must be provided long-term protection. The CWM Plan should describe the type of protection instrument that will be in place for the CWM site and provide a draft of the instrument as an appendix. For CWM sites not owned by a public entity, appropriate administrative protection instruments include conservation easements, deed restrictions, or other restrictive covenants that place limitations on use of the property, even if the property sells, and are in perpetuity. In addition, an access easement, conveyed to the Department, must be recorded on the deed, using a template provided by the Department.

Deed restrictions are covenants placed on a property by the property owner that prohibit certain actions or uses on the property. Conservation easements, on the other hand are "interests", such as development rights, that are actually conveyed to another party. Both are recorded on the deed to the property.

For the purpose of long term protection, the term of deed restrictions and conservation easements must be in perpetuity. Also, deed restrictions must contain a clause that requires Department approval prior to any amendments or extinguishment. Conservation easements must provide the Department with a third party right of enforcement.

Generally, conservation easements are more protective because they involve conveyance of a property interest or property right to a specific entity. However, that right entails a certain level of responsibility for monitoring compliance with the easement. Potential easement holders are selective and often require an endowment to provide for future monitoring and maintenance of the conservation easement provisions. (While eligible to hold conservation easements, the Department is not willing to be the holder of such property interests.) Consequently, generally only the large CWM projects are attractive candidates for this form of protection.

Conservation easements are non-possessory interests in the property and may only be held by qualified parties ("holder") outlined in ORS 271. These are currently:

- The state, any county, metropolitan service district, soil and water conservation district, city or park and recreation districts, and certain county service districts
- A charitable corporation, charitable association, charitable trust that are authorized to retain or protect values of real property and have as a purpose to retain or protect the natural, scenic, or open space values of property
- Recognized Indian tribes

Individuals, private businesses (corporations, partnerships, LLCs, etc.), or charitable organizations with purposes inconsistent with the conservation easement statute ORS 271 may not hold conservation easements.

Whichever form of long-term protection is used, documentation should include prohibited uses and activities. Generally, any activity that would alter hydrology of the site, remove vegetation other than that required for maintenance (e.g. weed treatments or tree thinning for habitat improvements), or remove or place material into the wetland is explicitly prohibited. Hunting and seed collecting are generally permissible.

The protection instrument must include a surveyed boundary of the protected area as an attachment or in the body of the instrument, and must be recorded on the property deed at the County Assessor's office. In most cases, the protected areas of a CWM site within a subdivision must be established in a separate tax lot(s) and not within lots that will be sold to individual owners. The boundary of the protected area must be identified in the approved plat. Permit conditions normally dictate that the instrument be recorded prior to any impacts and a copy of the recorded instrument submitted to the Department.

For publically owned CWM sites, long-term protection may be provided through an adopted management plan or integrated natural resources management plan. Management plans should provide for appropriate protection of the CWM site, including outlining prohibited uses as outlined above. DSL should be provided the opportunity to review the protection clauses of the management plan prior to adoption, and prior to modification.

Description of the Proposed Financial Security Instrument

Financial security is required for all permittee-responsible CWM projects, except those that are conducted by government agencies. This requirement may be waived at the discretion of DSL for impacts less than 0.2 acres. The purpose of a financial security instrument is to guarantee the performance of the mitigation and provide to the Department financial resources to conduct the mitigation in the event of default of the mitigation obligation. Describe the type of financial instrument(s) that is proposed for the CWM site and provide a draft of the instrument as an appendix using the appropriate form from the Department. The Department will determine the amount of surety required. A final signed financial security instrument will be required prior to permit issuance.

The general terms and conditions of financial security instruments are:

- Financial security instruments must be issued by an institution licensed to do business in Oregon. A list of financial institutions licensed to do business in Oregon can be found at the Oregon Division of Finance and Corporate Securities website. The Oregon Department of Consumer and Business Services Insurance Division has a database of Insurance companies authorized to issue bonds in Oregon.
- Instruments will be in the amount determined by the Department as provided in OAR 141-085-0700 (6) and must be made payable to the "Oregon Department of State Lands".
- The original financial security instrument should be provided to the Department prior to authorization, or prior to credit release for mitigation banks, unless otherwise approved by the Department of State Lands. The instrument must be on the appropriate DSL template.
- The financial security instrument must be conditioned upon meeting the conditions of the removal-fill permit.
- Liability period. The permit holder's liability under the financial security instrument must be for the duration of responsibility for the CWM, as set out in the approved removal-fill permit. The term begins at the time of authorization, or prior to credit release for mitigation banks, and must be renewed without lapse until the CWM has been released from further monitoring.
- Release schedule: In most cases, the permit will specify an incremental financial security release schedule based on meeting performance standards at specific intervals. Upon request, if the CWM site is meeting the required performance standards, DSL will provide a financial security release letter to the permittee (and copy the financial institution.) The permittee will need to supply a replacement instrument in the reduced amount within 45 days of the financial security release letter.

The types of financial security instruments and appropriate templates are:

- **Surety bonds**: Must be provided specifically for the purpose of guaranteeing CWM site performance and executed by the permit holder and a corporate surety

licensed to do business in Oregon. Surety bonds are generally issued for one year and the permittee is responsible for keeping the bond active as long as the CWM obligation exists. The surety bond template provided by the Department must be used.

- **Certificates of deposit**: Must be issued by a bank licensed to do business in Oregon, assigned to the Department, and upon the books of the bank issuing such certificates.

- **Letters of credit:** Are subject to the following conditions:
  - The letter may only be issued by a bank authorized to do business in the state of Oregon.
  - The letter must be irrevocable prior to release by the Department.
  - The letter must be payable to the "Department of State Lands" in part or in full upon of a notice of forfeiture issued by DSL in accordance with OAR 141-085-0700.

- **Other financial security instruments:** As may be approved by the Department.

DSL will make all reasonable attempts to work with the permittee to bring an out-of-compliance CWM site into compliance. Situations that may lead to forfeiture of the financial security instrument include failure to conduct CWM, failure to provide appropriate long-term protection of the CWM site, or failure of a CWM site to meet the performance standards. In these situations, the Department may, at its sole discretion, declare forfeiture on part or all of the financial surety. A declaration of partial forfeiture may occur where only a portion of a CWM site has failed to meet performance standards. A declaration of full forfeiture may occur where the CWM site has failed to conduct the CWM, where most or all of the CWM site has substantially failed to meet performance standards, or where the permittee has failed to meet other substantive permit conditions related to the CWM site. A declaration of forfeiture does not automatically release a permittee from its CWM obligations. DSL will issue written notice to the permittee informing them of the declaration, the reasons for such, and what, if any, CWM obligations still remain in effect after the declaration. At its discretion, DSL may use security funds to correct deficiencies at the CWM site, if feasible, or deposit funds into the State's Removal-Fill Mitigation Fund.

Long-term Maintenance Plan

Most CWM sites will require some form of maintenance past the monitoring period to ensure its sustainability. This may include tasks such as maintenance of water control structures, weed management, litter pick-up, fence maintenance, and vandalism repair. A maintenance plan should outline the anticipated party responsible for long-term maintenance and how these activities will be funded. The party responsible may be an interested conservation organization (typically for larger sites), donation of the property to a city or county, a private landowner, or a Home Owners Association arranged by a developer at the time of local permitting and platting.

Other Requirements

For permittee-responsible mitigation proposed on behalf of a closely held corporation, limited partnership, Limited Liability Company (LLC) or trust, there must be a joint and personal guarantee (*using Department provided form*) from all shareholders/members that secures compliance with mitigation obligations and outlines requirements to make all reasonable efforts to maintain the business entity in active status until all mitigation obligations have been satisfied.

References

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Adamus, P.R. 2001. Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Sites: Statewide Classification and Profiles. Oregon Division of State Lands, Salem, OR.

Bennett, M. and G. Ahrens 2007. A Guide to Riparian Tree Planting in Southwest Oregon. EM 8893-E, Oregon State University Extension Service. 32p.

Bentrup, G. 2008. Conservation buffers: design guidelines for buffers, corridors, and greenways. Gen. Tech. Rep. SRS-109. Asheville, NC: Department of Agriculture, Forest Service, Southern Research Station. 110 p.

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Jurries, D. 2003. Biofilters for Storm Water Discharge Pollution Removal. Oregon Department of Environmental Quality, DEQ Northwest Region Document. 56 p.

Oregon Department of State Lands 2001. Guidebook for Hydrogeomorphic (HGM)-based Assessment of Oregon Wetland and Riparian Sites: Statewide Classification and Profiles. Salem, OR.

Marshall, J. 2007. Guidance for Vegetation Planning and Monitoring in Western Oregon Wetlands and Riparian Areas: Using Reference Sites to Help Plant and Evaluate Vegetation Performance of Mitigation Sites.

Pendegrass, Kathy. 2005. Species Compositions for Willamette Valley Wet Prairie Types. US Fish and Wildlife Service.

Appendix A: Information Sources to Guide CWM Site Selection

Additional information sources are:

- Oregon Department of Fish and Wildlife biologists
- Local watershed councils have conducted watershed assessments for many areas of the state. Contact the local watershed council for additional information or updates to the assessment.
- Soil and Water Conservation Districts
- Natural Resource Conservation Service
- Oregon Watershed Enhancement Board Restoration Priorities
- Tidal Waters:
    - Green Point Consulting has published restoration prioritizations for the Nehalem, Yaquina, Alsea, Siuslaw, Umpqua, Smith, Sixes and Elk River.
    - The Lower Columbia River Estuary Partnership has developed restoration priorities for the Columbia River estuary.
    - The Tillamook Estuary Partnership is a helpful resource for identifying potential mitigation sites in Tillamook Bay.
    - A GIS-based resource titled “Oregon Coastal Watershed GIS Tidal Wetland Assessment” is available for download from the Oregon Coastal Atlas. This map classifies tidal wetlands in Oregon’s estuaries (excluding the Columbia River) into three HGM subclasses for Tidal wetlands, maps areas of fill, and identifies potential Restoration Consideration Areas.
    - A historical vegetation GIS layer that could be used to identify areas that were historically tidal marsh and tidal swamp is available from the Oregon Biodiversity Information Center.

Appendix B: Cowardin and Hydrogeomorphic Wetland and Tidal Waters Classification

Cowardin Systems and Classes (Cowardin et al. 1979).

System	Subsystem	Class	Abbreviation
Estuarine (E)	Subtidal (1) Intertidal (2)	Rock Bottom (RB)	E1RB
		Unconsolidated Bottom (UB)	E1UB
		Aquatic Bed (AB)	E1AB, E2AB
		Reef (RF)	E1RF, E2RF
		Streambed (SB)	E2SB
		Rocky Shore (RS)	E2RS
		Unconsolidated Shore (US)	E2US
		Emergent (EM)	E2EM
		Scrub Shrub (SS)	E2SS
		Forested (FO)	E2FO
		Open Water/Unknown (OW)	E1OW
Riverine (R)	Tidal (1) Lower Perennial (2) Upper Perennial (3) Intermittent (4) Unknown Perennial (5)	Rock Bottom (RB)	R1RB, R2RB, R3RB, R4RB, R5RB
		Unconsolidated Bottom (UB)	R1UB, R2UB, R3UB, R4UB, R5UB
		Streambed* (SB)	R1SB, R4SB
		Aquatic Bed (AB)	R1AB, R2AB, R3AB, R4AB, R5AB
		Rocky Shore (RS)	R1RS, R2RS, R3RS, R4RS, R5RS
		Unconsolidated Shore (US)	R1US, R2US, R3US, R4US, R5US
		Emergent (EM)	R1EM, R2EM
		Open Water/Unknown Bottom (OW)	R1OW, R2OW, R3OW, R4OW, R5OW

Lacustrine	Limnetic (1) Littoral (2)	Rock Bottom (RB)	L1RB, L2RB
		Unconsolidated Bottom (UB)	L1UB, L2UB
		Aquatic Bed (AB)	L1AB, L2AB
		Rocky Shore (RS)	L2RS
		Unconsolidated Shore (US)	L2US
		Emergent (EM)	L2EM
		Open Water/Unknown Bottom (OW)	L1OW, L2OW
Palustrine	No Subclasses	Rock Bottom (RB)	PRB
		Unconsolidated Bottom (UB)	PUB
		Aquatic Bed (AB)	PAB
		Unconsolidated Shore (US)	PUS
		Moss-Lichen (ML)	PML
		Emergent (EM)	PEM
		Scrub-shrub (SS)	PSS
		Forested (FO)	PFO

HGM Classes and Subclasses (Oregon Department of State Lands 2001)

Class	Subclass	Abbreviation
Estuarine Fringe	Marine Sourced High	EMH
	Marine Sourced Low	EML
	River-Sourced	ERS
Riverine	Flow-Through	RFT
	Impounding	RI
Depressional	Closed Permanently Flooded	DCP
	Closed Nonpermanently Flooded	DCNP
	Outflow	DO
	Alkaline	DA
	Bog	DB
Slope	Headwater	SH
	Valley	SV
Flats	No Subclasses	Flat
Lacustrine Fringe	Headwater	LFH
	Valley	LFV

Appendix C: Optional Performance Standards Based on Targeted Functions

Applicants may propose, or DSL may require, performance standards for targeted functions. Examples of when this may be required are when the Department approves out-of-kind functional replacement or converts one HGM or Cowardin class of wetland to another, or when regional conservation initiatives such as TMDL's or Endangered Species Act requirements apply at the impact or CWM site.

Table C-1 outlines parameters that are important to wetland functions (Oregon Department of State Lands 2001) and that meet the purposes of performance standards. These standards should be developed based on reference site conditions, and/or be developed with help from experts such as DSL mitigation and wetland staff, or external experts such as ODFW biologists. Wording of the standards is important, because lack of clarity will cause disputes over their meaning, and therefore debate as to when they are achieved. Performance standards must meet the general goals outlined above and must be enforceable. To be enforceable, a standard must be specific, observable, and measurable.

Hydroperiod
CWM sites should have natural hydroperiods and little acreage with static high water levels. Piezometers or shallow wells may be placed in specific locations as necessary to demonstrate the hydroperiod at a site. In areas with permanent water proposed, use of water level gauges may be appropriate.

1.1 Duration: Permanent and Seasonal Water Zones
The areas of the CWM site that contains surface water even during times of biennial low water are permanent zones. These areas can be important for attracting amphibians. Alternatively, seasonal zones where sediments become periodically unsaturated are important for water storage and delay, suspended sediment retention, and phosphorus adsorption.

1.2 Water level fluctuations
Water level fluctuations can indicate level of function for water storage and delay and nitrogen removal (anoxic/oxic conditions). Severe fluctuations can reduce reproductive success of many fish species that lay their eggs in shallow areas, amphibians that lay eggs in water on vegetation, and waterfowl that make their nests along the water's edge. Both the absence of fluctuation and the occurrence of excessive fluctuation can limit plant species richness. Fluctuations may be represented as the difference between biennial high and low spatially predominating water levels by categories, or vertical increase in surface water level (ft) in most of the seasonal zone.

Sample Performance Criteria: "The vertical increase in the surface water level in the seasonal zone during an average year (2-year peak flow recurrence interval) will be at least 2 feet," or

"The difference between biennial high and low predominating water levels will be no more than 2 classes as defined in Oregon Department of State Lands (2001)."

Vegetation

2.1 Vegetation in the Seasonal Zone

Increased cover of vegetation increases roughness and the capacity to slow water long enough for some infiltration, evapotranspiration, and sediment deposition to occur.

Sample Performance Criteria: "The percent of the seasonal zone that is bare during most of the dry season is no more than 20% greater than reference conditions by year 5."

Vernal pools/shorebird scrapes and mud flats are important for many species of waterbirds for feeding and/or resting. These areas meet all of the following criteria (Oregon Department of State Lands 2001):

a. Herbs are generally shorter than 4 inches and comprise <80% ground cover during winter or early spring, and
b. topography is generally flat, and
c. inundated to a depth of less than 6 inches for 2 or more continuous weeks, and
d. are never shaded by trees, shrubs, or buildings, and
e. are not entirely a constructed ditch

Sample Performance Criteria: "The annual extent of vernal pools, shorebird scrapes and mudflats is at least 100 square feet."

Fish benefit from a relatively open canopy that allows solar inputs to support invertebrate communities, although this must be balanced with water temperature requirements. "Canopy" relates to shading of the water surface by vegetation and is not restricted to forested systems.

Sample Performance Criteria: "The percent of the seasonal zone that contains a closed canopy will be between 20-80% by year 5."

2.2 Shading in Permanent Zone

Shading by woody or aquatic plants can provide thermoregulation functions that are in turn important for fish habitat and water quality.

Sample Performance Criteria: "The percent of the permanent zone shaded by woody or aquatic plants is 80% that at the reference site by year 5." The rate of canopy closure in forested sites may also be used.

Physical and Chemical Characteristics

3.1 Shore Slope

Gradually sloping shorelines provide more area for fish spawning, amphibian habitat, and waterbird habitat.

Sample Performance Criteria: "The CWM site shall have side slopes of 15:1 or shallower for the first 15 meters measured perpendicular from the upland edge for 50% or more of the perimeter, as reflected in the post construction report."

3.2 Open Water Interspersion
Sites in which unvegetated open water areas are well-interspersed with stands of emergent vegetation can increase function of the site for primary production, and for amphibians and waterbirds if the site is larger than ~1 acre and wider than 100 feet.

Sample Performance Criteria: "During a year of normal precipitation, at least 30% of the site contains non-contiguous, unvegetated pools during the growing season."

3.3 Water Quality
Support of wildlife and growth of characteristic vegetation requires good water quality. This may include temperature, turbidity, dissolved oxygen, pH, and low levels of toxics.

Sample Performance Criteria: "The CWM site shall not exceed water quality standards applicable for the CWM project area."

Soil and Sediment Characteristics
Organic content and nutrient concentrations in the soil may be important to ensure vegetation targets, especially for wetland creation sites or in areas where organics and nutrients in the soil are known to be limiting.

4.1 Organic Content
Organic matter supports prolific microbial communities that are key to most nutrient cycling. Accumulated soil organic matter also indicates depositional conditions that imply sediment and nutrient retention (Oregon Department of State Lands 2001). Soil organic matter is also important for plant growth at the site, although large amounts of organic content can indicate that carbon is not being cycled effectively and primary production is lower. Site managers may elect to augment the soil with organic matter during construction of the site.

Sample Performance Criteria: "The median values of soil/sediment organic content at the CWM site shall be equal to the minimum value at the reference site prior to planting," or "The median values of soil/sediment organic content shall be equal to the minimum value at the reference site by year 5."

4.2 Soil Nutrients
Nutrient content in the soil increases plant production and ultimately soil organic content. Site managers may elect to augment the soil with fertilizer during construction of the site, during planting, or as part of vegetation maintenance.

Sample Performance Criteria: "The soil shall be augmented with fertilizer as recommended by a soil nutrient analysis prior to planting."

Table C-1: Possible Monitoring Parameters for Targeted Non-tidal Functions (DSL 2001).

Parameters to Monitor	Functional Characteristics										
	Water Storage and Delay	Sediment Stabilization	Phosphorus Retention	Nitrogen Removal	Thermoregulation	Primary Production	Anadromous Fish	Resident Fish	Amphibian Habitat	Waterbird Habitat	Characteristic Native Vegetation
Geographical											
Actual acreage by habitat class	x	X	x	x	x	x	x	x	x	x	x
• Permanent water									x		
• Seasonal water	x	X	x								
• Seasonal area - vegetated		X									
• Seasonal area w/woody veg.	x	X									
Biological											
Species, % cover, and native/non-native status in seasonal and permanent zones of:											
• Herbs		X	x	x	x	x	x	x	x	x	x
• Woody		X	x	x	x	x	x	x	x	x	x
• Bare (dry season)/mud flat										x	
Open water interspersion						x			x	x	
Rate of canopy closure					x		x	x			
Percent of permanent zone shaded					x		x	x			
Physical											
Shore slope								x	x	x	
Water depth (max. and classes) and distribution during low water					x		x	x	x	x	

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Acronyms

Parameters to Monitor	Functional Characteristics										
	Water Storage and Delay	Sediment Stabilization	Phosphorus Retention	Nitrogen Removal	Thermoregulation	Primary Production	Anadromous Fish	Resident Fish	Amphibian Habitat	Waterbird Habitat	Characteristic Native Vegetation
Water depth (max. and classes) and distribution during high water	x	X	x	x						x	
Water level fluctuation (annual high & low predominating)	x			x				x	x	x	x
Duration (Connection to other waterbody, or duration of water presence)	x						x	x	x		
Chemical											
Water Quality							x	x	x		x
Soil/Sediment											
Organic content		X	x	x		x					
Nutrient levels						x					

Appendix D: Suggested Outline for CWM Plans Using Preservation

Section 1: Preservation Plan Overview
1.1 Description of CWM Concept
1.2 Summary of CWM Acreage
1.3 Summary of Function & Value Gains and Losses

Section 2: CWM Site Information
2.1 Site Owner Information
2.2 Physical Location Information

Section 3: Preservation Site Conditions
3.1 Wetland Delineation or Determination Results
3.2 Proposed Mitigation Ratio and Rationale
3.3 Existing HGM and Cowardin Classes On-site
3.4 Description of Existing Hydrology
3.5 Existing Plant Communities
3.6 Functions and Values Assessment
3.7 Threat of Development
3.8 Additional Rationale for Preservation (must address at least one)
    Significant Population of Rare Plants or Animals
    Rare Wetland or Tidal Waters Type
    Native, Mature Forested Wetland
    Serves a Documented Watershed Need or Preserves Wetland Type
    Disproportionately Lost
3.9 Surrounding Land Uses and Likely Effects
    Measures to Minimize Likely Effects

Section 4: Monitoring Plan
4.1 Proposed Performance Standards
4.2 Monitoring Methods
4.3 Monitoring Schedule
4.4 Rationale for Plot and Photo-Documentation Locations

Section 5: Long-term Protection, Management and Funding
5.1 Description of Proposed Protection Instrument
5.2 Long-term Management Plan
    Description of Long-Term Maintenance Actions
    Entity Responsible for Maintenance
    Funding Mechanism for Monitoring and Long-Term Management

The following tables and figures list identifies the key tables and figures appropriate for most CWM plans. It is not intended to be an all-inclusive listing. Applicants should include any additional tables/figures necessary to clearly and concisely present the elements of their CWM proposal.

Tables:

Impact and Mitigation Summary Table
Functional Assessment Summary
"Coverpg" and "FinalScores" Sheets for Impact & Mitigation Sites (if using ORWAP)
Monitoring Schedule

Figures:

Preservation site location map
Wetland delineation map for preservation site
Monitoring site locations

Appendices:

Functional Assessment Data Forms, Maps, Aerial Photos (impact and mitigation site)
Draft Long-term Protection Instrument
Draft Funding Instrument for Monitoring and Long-term Maintenance
Others appendices as necessary