United States Department of Agriculture

NRCS Natural Resources Conservation Service

Wetland Restoration

Conservation Practice 657 - Job Sheet

Client:	Michael Galassi WRE NEST # 5404361701MKB

Emergent wetland in Klamath County, Oregon.

Definition

The return of a wetland and its functions to a close approximation of its original condition as it existed prior to disturbance on a former or degraded wetland site.

Purpose

To restore wetland function, value, habitat, diversity, and capacity to a close approximation of the pre-disturbance conditions by restoring:

- Conditions conducive to hydric soil maintenance.
- Wetland hydrology (dominant water source, hydroperiod, and hydrodynamics).
- Native hydrophytic vegetation (including the removal of undesired species, and/or seeding or planting of desired species).
- Original fish and wildlife habitats.

Where used

This practice applies only to natural wetland sites with hydric soils which have been subject to degradation of hydrology, vegetation, or soils.

Planning for Wetland Restoration

Wetland restoration is normally applied as part of a resource management system where a landowner's objectives are to return a wetland or wetland systems to a close approximation of the original pre-disturbance conditions. In general, the planner must 1) describe the likely original wetland conditions and contributing natural processes prior to anthropogenic disturbances, 2) characterize the extent of disturbance to the original system, and 3) determine the degree to which original conditions can be restored.

A critical step in wetland restoration planning is to identify reference wetlands of the same type as the wetland to be restored. Those reference wetlands with the least amount of anthropogenic disturbance are particularly useful as they typically exhibit high levels of function and can serve as a template for restoration. This critical step ensures the most appropriate wetland characteristics and functions are restored. In addition to reference wetlands, there are several resources that can help the planner determine the likely historical conditions of a given wetland including. These include, but not are not limited to: GLO survey notes and plat maps, soils descriptions, ecological site descriptions, old aerial photography, natural community descriptions, nearby remnant natural communities, and landowner accounts.

Most natural communities, including wetlands, exhibit a range in characteristics that are dependent upon several factors such as disturbance history and dynamic weather patterns. As such, there are usually a handful of intergrading plant communities that may be supported by a given soil type in a specific landscape position within a given ecoregion. These include both early and late successional phases. For example, in the absence of disturbance such as severe flooding or wildfire, a wet prairie community type may shift towards a shrub dominated community and ultimately a forested community. The phase that is targeted for restoration depends on site-specific capabilities and limitations, current landscape context, landowner objectives, and regional priorities. If target objectives of the project are not aligned with one of the natural phases of the

historical plant community, consider using Wetland Enhancement (659) practice standard.

The amount and duration (hydroperiod) of hydrology can vary greatly among wetland types. The hydrology of a wetland may be driven by floodwater from rivers and lakes, direct precipitation, runoff from contributing upland areas, groundwater discharge, or ocean tides. Some wetlands are inherently wetter than others. Permanently inundated depressional wetlands may retain surface water in most years while vernal pools may only have surface water for a period of weeks during the wet season then dry up for the remainder of the year. Other wetland types, such as groundwater driven fens, may rarely have surface water, but can remain saturated for extended periods during the year. It is important to identify the various hydrologic influences and their impact on the wetland hydroperiod.

When analyzing hydrology, existing water rights must also be taken into consideration. The availability of sufficient water rights and the conveyance of water rights to adjacent properties should be carefully reviewed prior to restoration.

Each wetland type has a unique set of functions and values. Wetland functions include biogeochemical, hydrologic, and habitat functions. Values are those functions deemed important by society. Functions of a particular wetland may be quantified and compared to highly functional wetlands of the same type by conducting a functional assessment. The scores of a functional assessment help determine which steps need to be taken to restore a wetland to its full functional potential. Functional assessments include general assessments, such as the Oregon Rapid Wetland Assessment Protocol (ORWAP) as well as more comprehensive Hydrogeomorphic (HGM) models, which are unique to specific wetland classes. Completion of a functional assessment is a national requirement of the wetland restoration practice standard. If no suitable Functional Assessment is available, an appropriate Wildlife Habitat Evaluation Guides (WHEGs) may be used to document existing and planned conditions.

In addition to wildlife habitat, wetlands provide many ecological functions and societal values, such as water storage and flood attenuation, nutrient cycling, and sediment retention. Wetlands are important habitat to many wildlife species, and different wetland types often support a unique suite of wildlife species. The timing, depth, duration, frequency, and flow of water through a wetland have significant influences on habitats and the wildlife species they support.

When determining the restoration measures needed to restore wetland function, effects on adjacent lands must be taken into consideration. This is especially critical with hydrology. Oftentimes, existing drainage or water delivery infrastructure affects adjacent properties. Artificial drainage or conveyance infrastructure should be decommissioned to the extent practicable without adversely impacting adjacent lands. The degree to which remaining infrastructure impacts the wetland restoration must be critically evaluated. In cases where remaining infrastructure will significantly reduce the function of the restored wetland, restoration may not be practicable.

Identification of additional practices that support the wetland restoration is also important. Restored wetlands are most effective when used in combination with conservation practices that contribute to the restoration of adjacent upland areas.

Plans and Specifications

Site-specific requirements are listed on the specifications sheet, and associated engineering design. These specifications are used in conjunction with the Conservation Plan and Plan Map to document existing conditions and restoration actions needed to restore wetlands to the extent practicable. Refer to Conservation Practice Standard 657 – *Wetland Restoration* for additional guidance. If associated conservation practices are included in the plan, refer to individual practice specifications, as appropriate.

Operation and Maintenance

An Operation and Maintenance (O&M) Plan will be developed that describes specific actions required to ensure normal function of installed structural components over the practice lifespan. Maintenance, management and monitoring requirements needed to ensure long-term wetland function should be included in the Operation & Maintenance Plan.

Wetland Restoration

Conservation Practice 657 – Specification Sheet

General Information

Client:	Michael Galassi	Date:	3/19/2020
Location:	T6N R5W Sec. 14	County/SWCD	Columbia County
Contract #:	5404361701MKB	Tract/Field(s)	Tract 1937/Field WET
Planner:	C. Reidy	Acres:	21.8

General Project Description:

This project is enrolled in the Wetland Reserve Easement program (WRE). The 21.8-acre wetland was previously drained and used for production of hay and/or to support grazing animals. Hydrology was manipulated through the construction of a system of drainage ditches, which also had the effect of leveling the land. Original wetland vegetation has been replaced by reed canarygrass (*Phalaris arundinacea*). The wetland is classified as DEPRESSIONAL under the Hydrogeomorphic classification system. The project aims to restore original hydrology, vegetation, and topography to the extent practicable through plugging of drainage ditches, restoration of natural microtopography, control of reed canarygrass, and planting of native vegetation in the wetland and surrounding uplands in order to maximize habitat value to migratory birds and wetland-dependent wildlife species.

Landowner Objectives:

To restore wetlands and associated uplands to original conditions to the extent practicable.

Description of Original Wetland Type(s): Include HGM classes, Cowardin classifications, hydric soils, and description of dominant water sources and hydroperiod.

Hydric soils are mapped Natal silty clay loam and are typically saturated to the surface from December through April. The original wetland is classified as DEPRESSIONAL under the HGM classification system. Original sources of hydrology include direct precipitation, runoff from adjacent uplands, and groundwater discharge. While the exact hydroperiod cannot be determined, the wetland was likely inundated and/or saturated throughout the normal rainy season from December through April. Original vegetation is not known, but likely contained a few scattered trees in the overstory, a shrubby understory, and a diversity of wetland plants in the groundcover layer. Wetlands would have been classified as Palustrine Emergent – Seasonally flooded/saturated (PEME) or Palustrine Shrub-Scrub – Seasonally flooded/saturated (PSSE) under the Cowardin classification system.

Functional Assessment or WHEG used:	HGM Judgemental Method (1/13/2020) – Overall score: 0.6 existing/0.8 planned.

Description of Original Plant Community Types: Include Ecological Site Descriptions where available or other accepted classification system (e.g. International Vegetation Classification System Alliance/Association).

There are no Ecological Site Descriptions available for the project area. Per the ORNHIC Pre-settlement Vegetation data layer, original vegetation was presumed to be Douglas fir (*Pseudotsuga menziesii*) forest in the steep slopes in the southern portion of the project area and wetland, and oak savanna in the uplands adjacent to the Nehalem River. While the sloped uplands in the south portion of the project area do support Douglas fir and other coniferous and broad-leaved deciduous trees, it is highly improbable that the wetlands supported similar vegetation. Hydric soil areas most likely contained some scattered trees, such as western redcedar (*Thuja plicata*), vine maple (*Acer circinatum*), and pacific willow (*Salix lasiandra*), Oregon ash (*Fraxinus latifolia*), and red alder (*Alnus rubra*), plus a diversity of shrubs such as rose spirea (*Spirea douglasii*), salmonberry (*Rubus spectabilis*), Piper's (*Salix hookeriana*) and Sitka willow (*S. sitchensis*), red-osier dogwood (*Cornus sericea*), and Nootka (*Rosa nutkana*) and cluster roses (*R. pisocarpa*), among other shrub species. Herbaceous plants were likely abundant and consisted of a variety of rushes (*Juncus* spp.), sedges (*Carex* spp., *Eleocharis* spp., *Schoenoplectus* spp.), as well as an abundance of grasses and forbs. Uplands comprising along the terrace landform adjacent to the Nehalem River likely consisted of a mixture of broadleaved trees, conifers, and a variety of shrubs and herbaceous species similar to those found in the remaining forested areas immediately adjacent to the river. While no oaks have been observed onsite or nearby, it is possible they composed a portion of the original tree cover.

Hydrologic Restorability: Describe the extent and types of hydrologic manipulation, restoration techniques, and amount of original wetland area and hydroperiod to be restored. Show location of drainage features on map.

The wetland area has been drained through the construction of a network of surface drains (ditches). Through the construction of these ditches and subsequent farming activities, the natural topography of the wetland area has also been degraded. While the wetland still experiences significant ponding during the rainy season, the ditches have significantly reduced the natural hydroperiod.

Natural hydrology will be restored through selective ditch fills, installation of a ditch plug near where the main ditch leaves the project area, and restoration of natural microtopography. Hydrologic restoration will improve wetland functions and serve to support a more diverse plant community, thereby improving habitat for migratory birds, wetland-dependent, and other wildlife species. Refer to Engineering Drawings for details.

☐ **Water Rights:** Check if water rights are associated with the property to be restored. Describe how they will be used for restoration and how impacts to downstream users will be avoided.

Per the Oregon Water Resources Department Water Rights Mapping Tool, there are no water rights associated with the project area.

Permits: List permits required for implementation of restoration activities.

Project will require Section 404 permits (removal-fill) from Oregon Department of State Lands and the US Army Corps of Engineers. The project should qualify for Nationwide Permit (NWP) 27: Aquatic Habitat Restoration, Enhancement, and Establishment Activities. The Corps requires pre-project notification if utilizing NWP 27.

Due to the potential to affect Oregon Coast Coho (Federally Threatened), the Oregon-Washington Conservation (ORWAC) Programmatic Biological Opinion will be used to provide Section 7 Endangered Species Act coverage.

Existing Vegetation: Describe the predominant vegetation within each stratum (tree, shrub, groundcover) for existing plant communities. Show extent of existing plant communities on separate map.

Existing wetlands within the project area are presently dominated by invasive reed canarygrass. There are a few patches of native sedges (*Carex obnupta, C. exsiccata*) scattered throughout the reed canarygrass matrix that appear to be exhibiting some resilience to reed canarygrass invasion. Southern portions of the wetland area contain a spattering of pioneer shrub species including wild roses, wild crab (*Malus coronaria*), and rose spirea (*Spiraea douglasii*), among others.

Target Native Plant Communities: Identify the target vegetation within each stratum (tree, shrub, groundcover) for desired plant communities. In general, these should closely reflect the original plant community types. Describe site preparation, vegetative restoration techniques, and plant materials to be used. Show extent of target plant communities on separate map.

Target plant communities within wetland areas are those described under the original plant community section above. Restoration of natural hydrology through ditch plugs and fills combined with restoration of microtopographic features will create a diversity of conditions suited to a variety of native plant species typical of depressional wetlands in the area. Microtopographic lows will be designed to be wet enough to give native emergent plant species a competitive advantage over reed canarygrass. Conversely, microtopographic highs will be designed to be “dry” enough to support native woody shrubs. Once established, these shrubs should serve to provide competition to reed canarygrass as well as provide food and cover for a variety of wildlife species.

Before any planting occurs, extensive activities to reduce reed canarygrass cover and prepare the site for microtopographic restoration and eventual seed bed preparation will be undertaken as described in the next section. Once the site has been prepared, microtopographic highs will be seeded to an herbaceous seed mixture consisting of native wetland species, then planted to native trees and shrubs (refer to Herbaceous Weed Treatment (315), Conservation Cover (327), and Tree/Shrub Establishment (612) job sheets for additional details and follow-up maintenance). Herbaceous plants will be established via broadcast seeding and rolled or raked

into the soil prior to tree/shrub planting. Trees and shrubs will be either bare-root or containerized stock. Willows may be live stakes. Trees and shrubs will be planted at a sufficient density to quickly form a canopy to help preclude reed canarygrass re-infestation.

Invasive Species Present: List all invasive species known to occur within the project area and describe management strategies.

Reed canarygrass is the predominant invasive species within the project area. It forms a virtual monoculture across much of the existing wetland. Reed canarygrass cannot be completely controlled at this site, however, establishment of woody species on micro highs and native wetland emergent species in micro lows will help break up this monoculture and improve the overall vegetative composition and structure of the wetland area. Reed canarygrass control will be achieved by the following means:

1. Biomass reduction – Standing vegetation will be mowed and removed from the site in the late summer.
2. Late Summer/Fall herbicide application – the footprints of the microtopographic highs and microtopographic lows will be delineated and sprayed with an herbicide approved for use in wetlands as per the ORWAC Programmatic Biological Opinion.
3. Disking – After the late summer/fall herbicide application has been applied and herbicide has had time to act, the footprints of the micro highs and lows will be disked twice to break up the dense reed canarygrass rhizome mat. Microtopographic restoration can now take place.
4. Spring herbicide application – Once site conditions allow, the treated areas will again be sprayed with an herbicide approved for use in wetlands to kill any recently germinated reed canarygrass seedlings and re-sprouts that survived the initial herbicide treatment.
5. Late Summer/Fall herbicide treatment 2 - the treated areas will again be sprayed with an herbicide approved for use in wetlands to kill any recently germinated reed canarygrass seedlings and re-sprouts that survived the previous treatments.
6. Harrow – After the Fall herbicide treatment 2 has had time to act, harrow the footprints of the micro highs and lows to smooth the surface and further prepare for seeding and tree/shrub establishment.
7. Spring herbicide application 2 – Once site conditions allow, the treated areas will again be sprayed with an herbicide approved for use in wetlands to kill any recently germinated reed canarygrass seedlings and re-sprouts that survived the previous treatments.
8. Fall herbicide treatment 3 - the treated areas will again be sprayed with an herbicide approved for use in wetlands to kill any recently germinated reed canarygrass seedlings and re-sprouts that survived the previous treatments.
9. After seeding native herbaceous species and trees/shrubs, spot treat any undesirable weeds as needed until native plantings are well established.

Refer to Herbaceous Weed Treatment (315) job sheets for additional information on invasive species control.

Associated Practices:

☐ Brush Management (314)	☒ Conservation Cover (327)	☐ Critical Area Seeding (342)
☐ Dike (356)	☐ Early Successional Habitat Mgt. (647)	☐ Fence (382)
☒ Herbaceous Weed Control (315)	☐ Restoration & Mgt. of Declining Habitats (643)	☐ Structure for Water Control (587)
☒ Tree/Shrub Establishment (612)	☐ Stream Habitat Improvement & Mgt. (395)	☐ Structures for Wildlife (649)
☒ Upland Wildlife Habitat Mgt. (645)	☐ Wetland Enhancement (659)	☒ Wetland Wildlife Habitat Mgt. (644)
☒ Obstruction Removal (500)	☒ Access Control (472)	☐

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CLIENT'S ACKNOWLEDGEMENT STATEMENT:

The Client acknowledges that:

a. They have received a copy of the specification and understand the contents and requirements.
b. It shall be the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinances and laws pertaining to the application of this practice.

Accepted by:/s/_____ Date:_____

Practice Code No.	Practice	Lead Discipline	Controlling Factor	Units	Job Class					
					I	II	III	IV	V	VI
657	Wetland Restoration	ESD-AqBio	1) Risk Factors[1]	No	1 ☐	2 ☐	3 ☒	All ☐	All ☐	None
Check appropriate Job Class for each Controlling Factor		ESD-AqBio	2) Wetland size	Acres	10 ☐	40 ☒	160 ☐	640 ☐	All ☐	None
		ESD-AqBio	3) Site complexity and hazard potential	HGM Class[2]	D, MSF ☒	LF ☐	S, OSF ☐	R, EF ☐	All ☐	None
		CED-HE	4) Microtopography	Acres	10 ☐	40 ☒	160 ☐	400 ☐	All ☐	None
		CED-HE	5) Macrotopography	Acres	0.25 ☐	1 ☒	3 ☐	5 ☐	All ☐	None

[1] Risk Factors: 1) Poor water quality or lack of sufficient water, 2) Lack of native species onsite or nearby, 3) Invasive and non-native species present onsite or on adjacent lands.
[2] D=Depressional, MSF=Mineral Soil Flats, LF=Lacustrine Fringe, S=Slope, OSF=Organic Soil Flats, R=Riverine, EF=Estuarine Fringe

Biologist Approval

Design Approved by:/s/ CHRISTOPHER REIDY Digitally signed by CHRISTOPHER REIDY Date: 2020.03.19 14:38:07 -07'00' Date: 3/19/2020

Job Title: State Wetlands Planner Design JAA: 1/V, 2/V, 3/V

Engineer Approval

Design Approved by:/s/_____ Date:_____

Job Title:_____ Design JAA:_____

CERTIFICATION:

I have completed a review of the information provided by the client or have conducted a site visit and certify this practice has been applied according NRCS standards and specifications.

Certified by:/s/_____ Date:_____

Job Title:_____ Construction JAA:_____