

**NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA CONSERVATION PRACTICE STANDARD**

WETLAND RESTORATION

(Ac.)

CODE 657

DEFINITION

The rehabilitation of a degraded wetland or the reestablishment of a wetland so that soils, hydrology, vegetative community, and habitat are a close approximation of the original natural condition that existed prior to modification to the extent practicable.

PURPOSE

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

- Restoring hydric soil.
- Restoring hydrology (depth duration and season of inundation, and/or duration and season of soil saturation).
- Restoring native vegetation (including the removal of undesired species, and/or seeding or planting of desired species).

CONDITIONS WHERE PRACTICE APPLIES

This practice applies only to natural wetland sites with hydric soils, or problem soils that are hydric, which have been subject to hydrologic or vegetative degradation, or to sites where hydric soils are covered by fill, sediment, or other deposits.

This practice is applicable only where the natural hydrologic conditions, including the hydroperiods, can be approximated by modifying drainage and/or by artificial flooding of a duration and frequency similar to the original, natural conditions.

This practice does not apply to:

- Treatment of point and non-point sources of water pollution (Virginia Conservation

Practice Standard *Constructed Wetland* (Code 656).

- Rehabilitation or re-establishment of a degraded wetland, and/or the modification of an existing wetland, which augments specific site conditions for specific species or purposes; (Virginia Conservation Practice Standard *Wetland Enhancement* – (Code 659).
- Creation of a wetland on a site location which historically was not a wetland (Virginia Conservation Practice Standard *Wetland Creation* (Code 658).

CRITERIA

General Criteria Applicable to All Purposes

Permits are not required where there is no impact to existing wetlands and streams. Nationwide Permit 27 (Section 404 of the Clean Water Act) authorizes certain activities impacting wetlands where there is limited incidental loss and creation results in a net gain of wetlands. Contact the Corps of Engineers and/or the Virginia Department of Environmental Quality (DEQ) if there are any wetland questions or stream impacts.

Clearly outline the purpose, goals and objectives of the restoration, including soils, hydrology and vegetation criteria appropriate for the site and the project purposes.

Document the soil, hydrology and vegetative characteristics existing on the site and the contributing watershed before restoration of the site begins.

Restore soil, hydrology, vegetation and habitat conditions of the wetland that previously existed on the site to the extent practical.

Compensate for offsite drainage and/or the presence of invasive species impact on the site (e.g., increased water depth, berms or microtopography).

Test the soils on suspected hazardous waste sites to identify appropriate remedial measures. Clean sites containing hazardous material prior to the installation of this practice.

Early and ongoing control of invasive species, federal/state listed noxious plant species, and nuisance species (e.g., those whose presence or overpopulation jeopardize the practice) on the site (if applicable). This may include the manipulation of water levels to control unwanted vegetation. Discourage the establishment and/or use of non-native plant species where possible.

Do not adversely affect adjacent properties or other water users unless agreed to by signed written letter or easement.

Obtain input from Virginia Department of Game and Inland Fisheries Biologist if wetland is adjacent to a cold water stream to ensure that there is no effect on water temperature.

Criteria for Hydric Soil Restoration

Only restore sites with hydric soils or problem soil areas that are hydric.

Remove fill, sediment, spoil, or other depositional material covering the hydric soil, to the extent technically feasible.

Criteria for Hydrology Restoration

Restore the site to the approximate hydrology and hydroperiod conditions before alteration, including the timing of inflow and outflow, duration, and frequency. This includes effects to hydrology restoration caused by roads, ditches, drains, terraces, etc., within the watershed.

A natural water supply should be used to reestablish the site's hydrology that approximates the needs of the wetland type. If this is not possible, an artificial water supply can be used; however, do not divert these sources from other wetland resources (e.g. wetland complexes or springs).

Reestablish topographic relief and/or microtopography to the extent technically

feasible. Use reference sites within the area to determine desired topographic relief.

Utilize, remove or modify existing drainage systems as needed to achieve the intended purpose.

Criteria for Vegetative Restoration

Where known nutrient and/or pesticide contamination exists, select species tolerant of these conditions.

Determine the adequacy of the substrate material. Identify the site preparation necessary for proper establishment of the selected plant species.

Revegetate with hydrophytic species typical for the wetland type(s) being established. Give preference to native wetland plants with localized genetic material (200-mile radius).

If natural colonization of pre-identified, selected species will realistically dominate within 5 years, then allow natural revegetation. Active forms of revegetation may be required if a site has not become dominated by the targeted species within 5 years.

Determine the appropriate number of vegetative species to establish using the following criteria:

- On sites that are predominantly herbaceous vegetation, establish a minimum of 4 species on projects restored to one ecological site (i.e., wet meadow, shallow marsh, or slough ecosystems, etc). For projects where there are two or more ecological sites, establish at least three native species on each site.
- On sites that are predominantly forest or woodland community types, vegetation establishment will include a minimum of 6 species.

CONSIDERATIONS

Establish vegetative buffers on surrounding uplands to reduce the movement of sediment, and soluble and sediment-attached substances carried by runoff. Refer to Virginia Conservation Practice Standards *Riparian Herbaceous Buffer* (Code 390), *Riparian Forest Buffer* (Code 391), and *Filter Strip* (Code 393) for establishment of the buffers.

For wildlife purposes, planting density and stocking rates are generally lower than for production purposes, and the selection of species will generally be different than those used for production purposes.

Plan borrow areas for dikes or embankments as permanent pools or deepwater habitats. Use excess materials to create islands in water features or upland areas in flatlands.

Where possible, excavate fill for dikes and embankments away from the dike. This prevents permanent water against the structure and reduces likelihood of rodents burrowing in the dike.

Consider adding 1 to 2 dead snags, tree stumps or logs per acre to provide structure and cover for wildlife and a carbon source for food chain support.

Consider the impact that water surface draw-downs will have on concentrating aquatic species such as turtles into diminished pool area resulting in increased mortality.

Consider installing complexes of vernal pools (5 acres is ideal) to provide habitat for amphibian species, that includes hardwood buffer areas.

Consider existing wetland functions and/or values that may be adversely impacted.

Consider the effect restoration will have on disease vectors such as mosquitoes.

Consider the effects of predatory species on other species (e.g. fish and bullfrogs on other amphibians).

Consider effect of volumes and rates of runoff, infiltration, evaporation and transpiration on the water budget.

Consider effects on downstream flows or aquifers that would affect other water uses or users.

Consider the effect of water control structures on the ability of fish or other aquatic species to move in and out of the wetland.

Consider establishing herbaceous vegetation by a variety of methods over the entire site, or a portion of the site, and at appropriate densities and depths.

Consider effects on wetlands and water-related resources, including fish and wildlife habitats, which would be associated with the practice.

Consider linking wetlands by corridors wherever appropriate to enhance the wetland's use and colonization by the native flora and fauna.

Consider effects on temperature of water resources to prevent undesired effects on aquatic and wildlife communities.

Soil disturbance associated with the installation of this practice may increase the potential for invasion by unwanted species.

For discharge wetlands, consider underground upslope water and/or groundwater source availability.

Consider microtopography and hydroperiod when determining which species to plant.

Consider controlling water levels to prevent oxidation of organic soils and inundated organic matter and materials.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for each site. Record all required information in Wetland Restoration Job Sheet and in an engineer field book, on a plan sheet or design computation sheet, or in another appropriate location. Plans and specifications shall be reviewed by staff with the appropriate planning, design, and implementation of wetland restoration.

DESIGN DATA

1. Completed Environmental Evaluation and subsequent requirements.
2. Wetland Restoration Job Sheet (The Operation and Maintenance Plan is part of the Job Sheet.)
3. Survey and plot data: profile, cross-sections, topography, as needed.
4. Design computations, including purpose of practice and references used.
5. Plan view of site with existing and planned features, including dimensions, distances, etc.
6. Standard Cover Sheet (VA-SO-100A).

7. Materials and quantities needed. Identify borrow material and/or spoil area, as needed.
8. Vegetation and/or ground cover requirements.
9. Identification of needed Erosion & Sediment Control measures.
10. Supplemental practices required.
11. Virginia Conservation Practice Specifications (700 Series).
12. Operation and Maintenance Plan.

CHECK DATA

1. As-built survey.
2. As-built plans including dimensions, types and quantities of materials installed, and variations from design. Include justification for variations.
3. Locations of appurtenant practices.
4. Adequacy of vegetation and/or ground cover.
5. Complete as-built section of Cover Sheet.

OPERATION AND MAINTENANCE

The following actions shall be carried out to ensure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance):

Document the O&M requirements in the appropriate sections of the Wetland Restoration Job Sheet.

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides and other chemicals shall assure that the intended purpose of the wetland restoration shall not be compromised.

Management actions shall maintain vegetation, and control undesirable vegetation. Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) shall be implemented where available and feasible.

Management of water depth and duration may be utilized to control unwanted vegetation.

Limited and controlled haying or grazing can be used as appropriate to manage vegetation. Minimize disturbance to ground nesting species, especially during the primary nesting season.

Inspect the embankments and structures on the site at least annually and after major storm events. Immediately repair any damage.

The depth of accumulated sediment should be measured and the accumulations removed when the planned project objectives are jeopardized.

Timing and level setting of water control structures is required for the establishment of desired hydrologic conditions, for management of vegetation and for optimum wildlife and fish use.

REFERENCES:

USDA, NRCS. Wetland Restoration, Enhancement, or Creation, Engineering Field Handbook Chapter 13, Part 650, pp. 3, 24, 77, 78, April 2008.

USDA, NRCS, Wetland Science Institute, Wetland Restoration, Enhancement and Management, January 2003. Available at: <ftp://ftp-fc.sc.egov.usda.gov/WLI/wre&m.pdf>

USDA-Natural Resources Conservation Service. Electronic Field Office Technical Guide (eFOTG), Section IV. Available at <http://www.nrcs.usda.gov/technical/eFOTG>.

USDA-Natural Resources Conservation Service. Virginia Biology Technical Note – Aquatic Systems #1. Available at <http://www.nrcs.usda.gov/technical/eFOTG>

USDA, NRCS. 2002. Field Indicators of Hydric Soils in the U.S., Version 5.0. G.W. Hurt, P.M. Whitely and R.F. Pringle (eds.). USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils, Fort Worth, TX.

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