WETLAND RESTORATION (ACRE)

CODE 657

DEFINITION

A rehabilitation of a drained or degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to the natural condition to the extent practicable.

PURPOSE

To restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions that occurred on the disturbed wetland site prior to modification to the extent practicable.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies only to sites with hydric soil which were natural wetlands that have been previously degraded hydrologically and/or vegetatively.

This practice is applicable only if natural hydrologic conditions can be approximated by modifying drainage and/or artificial flooding of a duration and frequency similar to natural conditions.

Sites containing hazardous waste will not be restored under this standard. If the presence of hazardous waste materials in the sediment or fill is suspected, soil samples will be collected and analyzed for the presence of hazardous waste as defined by local, state, or federal authorities.

This practice does not apply to: a constructed wetland intended to treat point and non-point sources of water pollution; wetland enhancement intended **to modify or** rehabilitate **an existing or** degraded wetland where specific functions and/or values are enhanced beyond original conditions; or wetland creation for creating a wetland on a site location which historically was not a wetland; or was formerly a wetland, but will be replaced with a wetland type not naturally occurring on the site. **(See Field Office Technical Guide (FOTG), Section IV, Practice Standards 656–Constructed Wetland; 657–Wetland Restoration; 658–Wetland Creation.)**

CRITERIA

General Criteria

Upon completion of the restoration, the site will meet the current NRCS wetland criteria (soil, hydrology, and vegetation).

The landowner shall obtain necessary local, state, and federal permits that apply before restoration.

Water rights **shall be** assured prior to restoration, if required.

Vegetative buffers **shall be established** on surrounding uplands to reduce the movement of soluble and sediment-attached substances carried by runoff.

Excessive nutrients, pesticides or other pollutants shall be controlled prior to site restoration.

The soil, hydrology and vegetative characteristics existing on the site and the contributing watershed shall be documented before restoration of the site begins.

Criteria for Hydric Soil Conditions

Restoration sites will be located on hydric soils.

If the hydric soil is covered by fill, sediment, spoil, or other depositional material, the material covering the hydric soil shall be removed only

---

NOTE: This type of font **(AaBbCcDdEe 123..)** indicates NRCS National Standards.
This type of font **(AaBbCcDdEe 123..)** indicates Montana Supplement.

to the surface of the buried (or original) hydric soil. Material will be removed and placed on upland sites.

Reestablish an approximation of the original soil microtopography.

Criteria for Hydrology Restoration

A permanent water supply **shall** be available approximating **the original hydrology of the wetland.** The hydrology of the site is defined as the rate, path, **volume,** and timing of inflow and outflow; duration, frequency, **timing,** and depth of flooding, ponding or saturation.

The minimum restored hydrologic conditions will be according to a site-specific plan.

The maximum hydrology and the overall **hydrologic** variability of the restored site will approximate the conditions that existed before alteration, e.g., dynamic and static water levels, soil saturation.

Surface Drainage Removal

Where open channels were constructed to drain the wetland, the channels will be filled with earth or controlled with a grade stabilization structure to restore the wetland hydrologic conditions. A water control structure may be required to manage water levels for wetland operation and maintenance.

Provisions will be made to store, pass, or divert the flow from the 10-year frequency, 24-hour storm so that it does not cause erosion and flooding impacts.

Where the channel serves as an outlet for upstream lands, it is necessary to meet applicable state and local laws and regulations pertaining to flooding and surface and subsurface drainage.

The channel may be blocked with earth fill without a flow control device where flow duration and rate will not cause erosion and head cutting. The minimum length of the channel to be filled will be based on the hydraulic conductivity (permeability) of the soil on the site. This information can be determined from published soil survey data or from on site investigation. The minimum length to be filled is 50 feet for soils with a hydraulic conductivity of less than 0.6 inches per hour, 100 feet for 0.6 to 2.0 inches per hour, and 150 feet for greater than 2 inches per hour. The side slopes on channel blocks will be 3:1 or flatter. All fill will be compacted to achieve the density of adjacent materials. The fill for the channel block will be crowned a minimum of 10 percent–not to exceed 0.5 feet–above the top of the lowest existing channel bank to account for settlement and to prevent concentrated flow over the channel block.

Grade Stabilization Structure

When the 10-year frequency, 24-hour duration storm flow or base flow from snow melt or groundwater inflow results in long duration flows or high peak discharge, the channel will be filled and stabilized with a structure that meets the criteria for the FOTG, Section IV, Practice Standard 410–Grade Stabilization Structure.

Water Control Structure

When it is desirable to control or manipulate the water level for operation and maintenance of the wetland at an elevation different than that caused by blocking the channel, a water control device will be used that meets the criteria of the FOTG, Section IV, Practice Standard 587–Structure for Water Control.

Subsurface Drainage Removal

In areas where subsurface drains were used to remove surface water or soil saturation, the existing system will be modified to restore the wetland hydrologic conditions. Review of drainage records, interviews, and site investigations will be needed to determine the extent of the existing system. The effect of any modification to the existing subsurface drainage system on upstream landowners will be evaluated and the landowner will be notified of potential off-site impacts. This evaluation will include both surface and subsurface impacts.

Where the subsurface drain serves as an outlet for upstream properties, it will be necessary to meet applicable state and local laws and regulations pertaining to subsurface drainage and flooding. Upstream surface and subsurface drainage will not be impacted unless appropriate easements are obtained or mitigation measures are implemented.

The effects of the subsurface drainage system may be eliminated by the following: removing a portion of the drain at the downstream edge of the site; modifying the drain with a water control device; or installing non-perforated pipe through the wetland site.

The minimum length of drain to be removed is 50 feet for soils with a hydraulic conductivity of less than 0.6 inches per hour, 100 feet for 0.6 to 2.0 inches per hour, and 150 feet for greater than 2.0 inches per hour. All filter material or other flow enhancing material will also be removed for this length. The trench will be filled and compacted to achieve a density equal to adjacent material.

A water control device placed on the inlet of an existing drain will limit inflow that will prevent damage to the drain downstream of the site. If the drain serves other areas, inflow will be limited to the capacity originally apportioned to the drain.

The water control structure will be attached to a non-perforated conduit that extends at least the minimum length previously specified for length of drain to be removed. The connections of the water control structure and the non-perforated pipe will be watertight and the head created at the maximum pool level.

Storage Volume Replacement

Where sediment, landshaping, or other activities have filled the wetland site, the storage may be replaced by excavating the fill material from the site or by construction of an earth embankment.

Embankments

An earth embankment may be constructed to create a pool storage volume equal to that which existed prior to conversion of the site. Embankments with an effective height of less than six feet will meet the criteria for FOTG, Section IV, Practice Standard 356–Dike. Embankments with an effective height of greater than six feet will meet the criteria for Practice Standard 378–Pond.

Embankments meeting criteria for dikes will safely pass a 10-year frequency, 24-hour storm at the dike design high water level.

The standards and specifications for **FOTG, Section IV, Practice Standards,** 356–Dike and 587–Structure for Water Control will be used as appropriate. Refer to the Engineering Field Handbook, Chapter 13, "Wetland Restoration, Enhancement, and Creation," and Chapter 6, "Structures," for additional design information. Existing drainage systems will be utilized, removed, or modified as needed to achieve the intended purpose.

Criteria for Vegetation Restoration

The vegetation shall be restored as close to the original natural plant community as the restored site conditions will allow. Determination of the original plant community's species and percent composition shall be based upon reference wetlands of the type being restored or suitable technical references.

Plantings, seeding, or other types of vegetative establishment will be comprised of native species that occur on the wetland type being restored.

Preference shall be given to native wetland plants with localized genetic material.

In soils where **suitable** seed banks realistically exist, or where natural **succession or** colonization of selected native species (identified from reference wetlands) will dominate within 5 years, natural regeneration can be allowed. Specific guidelines that consider soil, seed source, and species will be developed by the states. Peripheral and wet-meadow wetland zones are least likely to have adequate seed banks and may require establishment of appropriate vegetation.

Forested wetland plantings and/or seeding will include a minimum of three tree or shrub species on each ecological site (i.e., low flat, bottom ridge eco-sites, etc.), where appropriate. Tree (and shrub) planting will follow the criteria of **the FOTG, Section IV, Practice Standard** 612–Tree Planting.

Seed planting rates and site preparation will meet the criteria **of the FOTG, Section IV, Practice Standard** 652–Woodland Direct Seeding. Seed viability will be determined prior to planting.

Adequate substrate material and site preparation necessary for proper establishment of the selected plant species shall be included in the design.

On sites which were predominantly herbaceous vegetation prior to modification and planting and/or seeding is necessary, the minimum number of native species to be established shall be based upon the number of ecological sites present. Sites restored to only one ecological site shall be established with at least two species adapted to the site. Sites with two or more ecological sites (i.e., wet meadow, shallow marsh, **deep marsh**, etc.) shall be established with at least one native species on each ecological site.

Herbaceous vegetation may be established by a variety of methods including: mechanical or aerial seeding, topsoiling, organic mat placement, wetland sod, vegetative sprigs, wetland hay, etc., over the entire site or a portion of the site and at densities and depths appropriate for the **species**.

Implementation of this practice will not adversely affect threatened, endangered or state species of special concern or their habitats.

CONSIDERATIONS

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

Evaluate the potential for a change in rates of plant growth and transpiration **resulting from** changes in the volume of available soil water.

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

Consider effects on wetlands or water-related resources **and** wildlife habitats that would be associated with the practice.

Consider, as a high priority, those sites adjacent to existing wetlands as they increase wetland system complexity and diversity, decrease habitat fragmentation, and ensure colonization of the site by wetland flora and fauna.

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

Consider the effects of varying water levels in response to potential climatic events such as wet or dry periods.

Consider changes in salt movement / concentrations in the soil resulting from hydrologic alterations.

The nutrient and pesticide tolerance of the plant species planned should be considered where known nutrient and pesticide contamination exists.

Consider effects of **water** temperature on aquatic and wildlife communities.

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

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specifications sheets, job sheets, and narrative statements in the conservation plan, or other documentation. Requirements for the operation and maintenance of the practice shall be incorporated into site specifications.

OPERATION AND MAINTENANCE

The following actions **should** be carried out to insure 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):

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides and other chemicals to assure the wetland restoration function **should** not compromise the intended purpose;

Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) **should** be implemented where available and feasible;

Timing and level setting of water control structures for the establishment of desired hydrologic conditions or for management of vegetation;

Inspection schedule for embankments and structures for damage assessment;

Depth of sediment accumulation to be allowed before removal is required;

Management needed to maintain vegetation, including control of unwanted vegetation;

Haying and livestock grazing plans will be developed so as to allow the establishment, development, and management of wetland and associated upland vegetation.

A functional assessment (Hydrogeomorphic approach or similar method) may be used before and after restoration to monitor progress at achieving goals.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.