

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

WETLAND CREATION

(Acre)

CODE 658

DEFINITION

The creation of a wetland on a site that is historically non-wetland.

PURPOSE

To create wetland functions and values.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to sites where no natural wetland occurred historically and contains soils that are not hydric.

This practice does not apply to a Constructed Wetland (656) intended to treat point and non-point sources of water pollution; Wetland Enhancement (659) intended to rehabilitate a degraded wetland where specific functions and/or values are enhanced beyond original conditions; or Wetland Restoration (657) intended to rehabilitate a degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to approximate original conditions.

CRITERIA

General Criteria

The purpose, goals, and objectives of the creation shall be clearly defined, including the soils, hydrology, and vegetation criteria

that are to be met and are appropriate for the site and the project purposes.

The landowner shall obtain any necessary local, State, or Federal permits that apply before the practice is applied.

Planned excavation will require an investigation of the site for buried utilities.

Water rights and availability must be assured prior to creation, if required.

Created wetlands will only be located where the soils, hydrology, and vegetation can be modified to meet the current NRCS criteria for wetland.

Upon completion, the site shall meet the appropriate wetland criteria; i.e., the current criteria for a wetland as identified in the National Food Security Act Manual (latest amendment), and provide wetland functions and values as defined in the project's objectives.

The potential for occurrence of threatened or endangered species shall be evaluated for each site proposed for wetland creation.

Non-hydric soils shall have the capacity to hold water (fine textured low permeability soils), have an impermeable layer at a shallow depth, or exhibit a seasonal high water table just below the topsoil.

Vegetative buffers must be established on surrounding uplands to reduce sediment and soluble and sediment-attached substances carried by runoff, when needed.

Document the soil, hydrology, and vegetative characteristics of the site and its contributing watershed before alteration.

All disturbed areas associated with structural measures or excavation shall be re-vegetated as soon as possible after the construction period in accordance with the Critical Area Planting standard (342).

Sites containing hazardous material shall be cleaned, or they will not be developed under this standard. Soil testing shall be used to determine appropriate actions to clean sites suspected of containing hazardous wastes.

Invasive species, Federal/State listed noxious plant species, and nuisance species (e.g., those whose presence or overpopulation jeopardizes the effectiveness of the practice and listed in “Invasive Exotic Pest Plants in Tennessee – 2004”) shall be controlled on the site. The establishment and/or use of non-native plant species shall be discouraged and, where possible, controlled.

Criteria for Hydric Soil Conditions

Created wetlands shall be located in landscape positions and soil types capable of supporting the wetland functions and values.

Loosening of compacted soils, addition of organic matter, or other soil preparation activities shall be accomplished where necessary to establish desired vegetation.

An approximation of the soil micro-topography and/or macrotopography typical for the wetland type(s) being created shall be established.

Criteria for Wetland Hydrology

The site shall be designed to create hydrologic conditions (including the timing of inflow and outflow, duration, and frequency) that provide the desired wetland functions and values.

Wetland micro- and macro-topography shall be created to achieve hydrologic diversity and enhance the desired effect.

The work associated with the wetland shall not adversely affect adjacent properties or other water users unless agreed to by signed written letter, easement, or permit.

Engineering structures constructed for wetland creation shall approximate or mimic natural topography (e.g., ridge/swale complexes with levees exhibiting excessively broad bases) and micro- and macro-topography.

The standards and specifications for Dike (356) and Structure for Water Control (587) 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 Hydrophytic Vegetation

Establish hydrophytic vegetation typical for the wetland type(s) being established. Preference shall be given to native wetland plants with localized genetic material. Plant materials collected or grown from material collected within a 200-mile radius from the site are considered local.

Plant species selected for planting shall be based on the soil type, planned hydrologic condition, and the adaptability of the species to those created conditions. Refer to Tennessee Biology Technical Note TN-6 or other references listed in this standard for the selection of woody species.

Where natural colonization of selected species will realistically dominate within five years, natural regeneration can be left to occur. If a site has not become dominated by the targeted species within five years, active forms of revegetation may be required. For the planned afforestation of the site, natural regeneration of trees shall be allowed for light-seeded species when (1) the site is within 60 meters (197 feet) of mature hardwoods, or (2) the site is subject to periodic flooding with an upstream seed source for hydrochory.

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

If the targeted hydrophytic vegetation is predominantly herbaceous, several native species adapted to the site will be established in order to achieve diversity and minimize the adverse effects of climate, disease, and other limiting factors. Herbaceous vegetation may be established by a variety of methods including

mechanical or aerial seeding, topsoiling, organic mats, etc., over the entire site or a portion of the site and at appropriate densities and depths. Seeding rates shall be based on percentage of pure live seed to be tested within six months of planting.

Afforestation by planting will include a minimum of three species, where appropriate. Seedling preparation and planting will follow the criteria of conservation practice code 612, Tree and Shrub Establishment. Site preparation for the establishment of trees and shrubs shall follow the Forest Site Preparation standard (code 490).

Afforestation by planting will be at the minimum rate of 302 one-year-old tree seedlings per acre (12' x 12' spacing) and/or 680 shrub seedlings per acre (8' x 8' spacing), when wildlife habitat is a planned wetland function.

Livestock shall be excluded during a defined establishment period for the wetland plant community.

Criteria for Wetland Functions

When functional capacity must be documented (i.e., for a permitting action or project activity):

- A functional assessment (Hydrogeomorphic approach or similar method) shall be performed on the created wetland site. The Regional Guidebook for Applying the Hydrogeomorphic Approach to Assessing Wetland Functions of Low-Gradient Riverine Wetlands in West Tennessee will be the accepted functional assessment for evaluating riverine wetlands. The functional

assessment methodology found in the National Food Security Act Manual shall be the accepted methodology for the creation of non-riverine wetlands.

- Created wetland goals and objectives should include targeted natural wetland functions for the wetland type and the site location, as determined by the referenced wetland type being created.
- A post-project assessment will be performed after an adequate period (generally one to two growing seasons after plant establishment) to assess the success of the creation effort. The assessment shall include as a minimum: (1) an evaluation of the targeted hydrologic condition under normal climatic conditions and based on the engineering design, if applicable; (2) an adequate stand determination for planned plant communities; and (3) documentation of any damages resulting from off-site influences.
- An adequate stand for planned afforestation shall be determined based on the minimum of (1) 60 percent stem survival of planted seedlings/cuttings per acre; or (2) 150 stems per acre of natural colonization of acceptable wetland species. An adequate stand for planned establishment of native herbaceous vegetation shall be a minimum 80 percent ground cover of acceptable wetland species.

CONSIDERATIONS

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

**NRCS,TN
December 15, 2005**

Consider establishing dense stands of tall vegetation over a portion of the site for shading and to buffer wind. This effect can lower open water evaporation rates by as much as 20 percent, allowing for smaller drainage areas needed for recharge.

Consider the potential for a change in rates of plant growth and transpiration because of 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.

Considering positioning site(s) adjacent to existing wetlands to 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.

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

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

Embankments and excavated areas should be located and shaped in a manner that is compatible with the existing landscape and

do not adversely impact existing wetlands and floodplain functions.

When constructing levees in floodplains, consider increasing both the front and back slopes in proportion to the anticipated flood stage. In high flood stage areas, slopes from 10:1 to as high as 20:1 will increase stability and lower maintenance. Damage to levees may be reduced when the entire levee is submerged uniformly and has flatter side slopes.

On sites where woody vegetation will dominate, consider adding one or two dead snags, tree stumps, or logs per acre, where appropriate, to provide structure and cover for wildlife and a carbon source for food chain support.

Consider the effect that wetland creation will have on disease vectors such as mosquitoes.

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

Consider the effects of soil disturbance and probability of invasion by unwanted species.

Consider micro-topography, hydrology, and hydro period when determining which species of vegetation to plant.

Where visual quality would be impacted by structures (e.g., outlet structures, dikes, etc.), consider using low profile structures, natural screening, and/or colors that minimize the impact.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other documentation. Requirements for the operation and maintenance of the practice shall be incorporated into site specifications. Plans and specifications should be reviewed by staff with appropriate training in design and implementation of wetland creation.

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):

- Any use of fertilizers, mechanical treatments, prescribed burning, pesticides, and other chemicals shall not compromise the intended purpose. Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) shall be implemented where available and feasible.
- Timing and level setting of water control structures required for the establishment of desired hydrologic conditions, for management of vegetation, and for optimum wildlife and fish use.
- 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 will be managed to protect and enhance established and emerging vegetation.

COMPLIMENTARY PRACTICES

Dike (356)
Structure for Water Control (587)
Fence (382)
Use Exclusion (472)
Critical Area Planting (342)
Tree/Shrub Establishment (612)
Forest Site Preparation (490)

GLOSSARY OF TERMS

Afforestation - The establishment of trees and shrubs by means of planting seed, seedlings, or cuttings.

Hydrochory - Seed dispersal by water.

Hydrogeomorphic Approach - Wetland classification system based on hydrology and landscape position.

Macrotopography - Significant variation in land relief resulting in alternating deeper water intermixed with some upland characteristics. Macrotopography is typically created with earth-moving equipment and results in greater than 6 inches up to 30 inches depth within created depressions.

Microtopography - Slight variation in land relief resulting in shallow depressions of less than 6 inches. Microtopography is

typically created with on-farm tillage equipment.

REFERENCES

Allen, James A. 1997. Reforestation of Bottomland Hardwoods and the Issue of Woody Species Diversity. Restoration Ecology, Vol. 5, No. 2. pp. 125-134.

Allen, James A. and Harvey E. Kennedy, Jr. 1989. Bottomland Hardwood Reforestation in the Lower Mississippi Valley. 28 pp.

Broadfoot, Walter M. 1976. Hardwood Suitability for and Properties of Important Midsouth Soils. USDA Southern Forest Experiment Station, New Orleans, Louisiana. 84 pp.

Galatowitsch, Susan, et al. 1994. *Restoring Prairie Wetlands: an ecological approach*. Iowa State University Press, Ames IA. 246 pp.

Hammer, Donald A. 1992. Creating Freshwater Wetlands. Lewis Publishers, Inc. Chelsea, Michigan. 298 pp.

Kingsbury, Bruce and Joanne Gibson, 2002. *Habitat Management Guidelines for Amphibians and Reptiles of the Midwest*. Partners in Amphibian & Reptile Conservation, Ft. Wayne, IN. 57 pp.

Maschhoff, Justin T. and James H. Dooley, 2001. *Functional Requirements and Design Parameters for Restocking Coarse Woody Features in Restored Wetlands*. ASAE Meeting Presentation, Paper No.: 012059.

Mississippi State University Extension Service. Publication 2004. Bottomland Hardwood Management Species/Site Relationships. 6 pp.

Teskey, Robert O. and Thomas M. Hinckley. 1977. Impact of Water Level Changes on Woody Riparian and Wetland Communities. Vol. II. The Southern Forest Region. Biological Services Program. USDI Fish and Wildlife Service FWS/OBS-77/59. 46 pp.

USDA, Soil Conservation Service. 1984. "Structures." Chapter 6, Engineering Field

Handbook. 99 pp.

<http://www.nrcs.usda.gov/technical/ENG/efh.html>.

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

USDA, NRCS. 2003. ECS 190-15 *Wetland Restoration, Enhancement, Management & Monitoring*. 425 pp. <http://msa.ars.usda.gov/ms/oxford/nsl/projects/restoration/RestorationManual.html>.