

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD AND SPECIFICATIONS**

**WETLAND ENHANCEMENT**

(acre)  
CODE 659

**DEFINITION**

The rehabilitation or re-establishment of a degraded wetland, and/or the modification of an existing wetland.

**PURPOSE**

To provide specific wetland conditions to favor specific wetland functions and targeted species by:

- hydrologic enhancement (depth duration and season of inundation, and/or duration and season of soil saturation).
- vegetative enhancement (including the removal of undesired species, and/or seeding or planting of desired species).
- topographic modifications using macro/micro topography techniques to emulate historic riverine swales and scours.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies on any degraded or non-degraded existing wetland where the objective is specifically to enhance selected wetland functions. Examples include: managing site hydrology for waterfowl or amphibian use, or managing plant community composition to favor native plants.

This practice does not apply to the following where the intention is to:

- treat point and non-point sources of water pollution (Constructed Wetland 656);
- rehabilitate a degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to original conditions (Wetland Restoration 657);

- create a wetland on a site that historically was not a wetland (Wetland Creation 658).

**CRITERIA**

**General Criteria Applicable to all Purposes**

The landowner shall obtain all necessary local, state and federal permits prior to the installation of this practice.

The purpose, goals and objectives of the enhancement shall be clearly outlined, including the soils, hydrology and vegetation criteria that are to be met and are appropriate for the site and the project purposes.

The impact of this practice on existing non-degraded wetland functions and/or values will be evaluated.

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

Where known nutrient and pesticide contamination exists, species selected will be tolerant of these conditions.

Sites containing hazardous material shall be cleaned prior to the establishment of this practice. Appropriate actions to clean sites suspected of containing hazardous wastes shall be based on soil tests.

Invasive species, federal/state listed noxious plant species, and nuisance species (e.g., those whose presence or overpopulation jeopardize the practice) shall be controlled on the site. The establishment and/or use of non-native plant species shall be discouraged.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service or download the standard from the [electronic Field Office Technical Guide](#) for Missouri.

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

Enhanced wetlands will only be located where the soils, hydrology and vegetation meet the NRCS criteria for a wetland.

Complete the Wetland Planning Checklist, Appendix A, - Chapter 13, NRCS – Engineering Field Handbook.

The potential for occurrence of threatened or endangered species shall be evaluated for each site proposed for enhancement. Sites containing threatened or endangered species will not be enhanced under this standard unless it can be demonstrated that the impact will benefit the species at risk. Use of the NRCS modified Natural Heritage Database is highly recommended.

The effect of any modification to the existing surface and/or subsurface drainage system on upstream and downstream landowners shall be evaluated. Upstream surface and subsurface drainage shall not be impacted unless appropriate permissions are obtained or mitigation measures are implemented. All applicable state and local laws and regulations pertaining to flooding, surface and subsurface drainage will be followed.

Excessive nutrient, pesticide, or other pollutant inflows shall be controlled prior to site work. Examples of excessive inflows include direct runoff from a feedlot or other obvious pollution source, an actively eroding gully emptying into the site, or a poorly treated watershed that is contributing sediment and its associated pollutants.

#### **Criteria for Hydrologic Enhancement**

The hydrology of the site (defined as the rate and timing of inflow and outflow, source, duration, frequency, and depth of flooding, ponding or saturation) shall meet the project objectives. An adequate source of water must be available to meet hydrology designs. Water budgets should be calculated to check the feasibility of the anticipated wetland enhancement and provided functions.

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.

To ensure the functions of the enhanced wetland remain intact during the life span or term of the practice, a water level management plan will be provided to establish/maintain wetland vegetation, wetland conditions and critical wetland wildlife habitat components.

Existing drainage systems will be utilized, removed or modified as needed to achieve the intended purpose.

If embankments, water control structures, surface or subsurface drainage manipulation, or grade stabilization structures are required use WETLAND RESTORATION (657), or STRUCTURE FOR WATER CONTROL (587).

#### **Criteria for Vegetative Enhancement**

Establish native hydrophytic vegetation typical for the wetland type(s) being established. Native vegetation will be established for the wetland type(s) being created. Soils and site condition will dictate what vegetation is appropriate.

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

Preference is given to top-dressing at least 50% of the site with soil containing a seed bank of desired native species to a minimum depth of 4 inches. If natural colonization of native species will realistically dominate within 5 years, then natural regeneration can be left to occur without top-dressing. Specific guidelines that consider soil, seed source, and species will be developed from recommendations by MDC or NRCS biologist.

If the site was predominantly herbaceous vegetation prior to modification and planting is necessary, then a minimum of two species adapted to the site will be planted. Use soils and site information to determine plants to use. 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 densities and depths appropriate. Planting rates

and species will be based on recommendations from MDC or NRCS biologist.

Forested wetland plantings will include a minimum of six species adapted to the site. Where appropriate, two of the species will be hard mast producing species. Tree planting will meet the criteria in TREE/SHRUB ESTABLISHMENT (612).

### **Criteria for Wetland Functions**

Wetland goals and objectives should include targeted wetland functions for the enhanced wetland. When possible, wetland functions not targeted for enhancement should also be maximized.

See WETLAND WILDLIFE HABITAT MANAGEMENT (644) or SHALLOW WATER MANAGEMENT (646).

### **CONSIDERATIONS**

Dike (356), Wetland Restoration (657) and Structure for Water Control (587) may be used to enhance the performance of this practice.

Consider manipulation of water levels to control unwanted vegetation.

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

Consider effect enhancement will have on disease vectors such as mosquitoes.

The inclusion of microtopography can achieve changes in depth and duration of flooding without changing extent of surface area. Macro/micro topography activities and excavations should be located at least 30 to 50 feet from the inside toes of levees to alleviate burrowing animal activities.

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 effects on fish and wildlife habitats that would be associated with the practice.

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

Establishing vegetative buffers on surrounding uplands can reduce sediment and soluble and sediment-attached contaminant delivery by runoff and/or wind.

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.

On sites where woody vegetation will dominate, consider adding 1 to 2 dead snags, tree trunks or logs per acre to provide structure and cover for wildlife and a carbon source for food chain support.

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

When determining which species to plant, consider microtopography and the different hydrology levels.

Consider the effects that location, installation and management may have on subsurface cultural resources.

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

Consider applying this practice 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 nutrients, pesticides, and other pollutants contained in surface and ground water, as well as accumulated sediments, that may have an adverse effect on wetland vegetation. The nutrient and pesticide tolerance of the species planned along with the wetland objectives should be considered where known nutrient and pesticide contamination exists.

Consider use of these areas by reptiles and amphibians. Stacked logs and/or rock piles may

be located near the water's edge to provide critical habitat for local reptile and amphibian species.

## **PLANS AND SPECIFICATIONS**

Plans and specifications for this practice shall be prepared for each site. Plans and specifications shall be recorded using approved specification sheets, job sheets, technical notes, narrative documentation in the conservation plan, or other acceptable documentation.

Plans and specifications for installing structures for water control shall be in keeping with this standard and shall prescribe the requirements for applying the practice to achieve its intended purpose. The plan shall specify the location, grades, dimensions, materials, hydraulic and structural requirements for the individual structure, and the timing or sequence of installation activities. Provisions must be made for necessary maintenance.

NRCS staff is encouraged to work closely with the NRCS Biologist, MDC Wetland Biologist, or other wetland specialist/engineer in developing site specific plans and specifications.

## **OPERATION AND MAINTENANCE**

An operation and maintenance plan will be prepared for each wetland enhancement site.

A plan for the operation, maintenance, and management of the area shall be developed and recorded using approved job sheets, technical notes, or other forms of acceptable documentation. The plan shall include monitoring and management of the overall site, as well as structural and vegetative measures. The area should be reviewed annually to see if adjustments are needed in any water/vegetation plan.

Repair and upkeep of the practice (maintenance) shall be carried out as needed, such as repair or replacement of vegetative or structural components.

The following activities will be addressed in the plan: (1) timing and level setting of water control structures required for establishment of desired hydrologic conditions or for management of vegetation; (2) inspection schedule of embankments and structures for damage assessment; (3) depth of sediment accumulation allowed before removal is required; (4) management needed to maintain vegetation, including control of unwanted vegetation; and (5) acceptable uses and timing (e.g. grazing and haying).

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