

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**WETLAND ENHANCEMENT**

(Ac.)

**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 enhance vegetative and hydrologic characteristics of natural wetland for targeted fish wildlife species.

**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.

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, vegetation, 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 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 that jeopardize the practice shall be controlled on the site. The establishment and/or use of non-native plant species shall be discouraged.

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 soils, hydrology, and vegetation meet the NRCS criteria for a wetland.

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

### **Criteria for Hydrology 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 planned hydrology designs.

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.

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

If embankments or water control structures are required, use the Oklahoma NRCS standard Structure for Water Control (587) for guidance.

### **Criteria for Vegetative Enhancement**

Establish native hydrophytic vegetation adapted for the wetland type(s) being enhanced. Soils and site conditions will determine the appropriate vegetation to be established.

Where natural regeneration of native species will dominate within 5 years, supplemental plantings of seeds, roots, or seedlings is not required.

Adequate site preparation necessary for proper establishment of the selected plant species shall be provided for in the design and plan.

If the targeted hydrophytic vegetation is predominantly herbaceous, a minimum of three species adapted to the site shall be established. 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.

Forested wetland plantings will include a minimum of three species adapted to the site.

Where appropriate, at least two of the species will be hard mast producing species. All tree plantings will meet the criteria for the Oklahoma NRCS Tree/Shrub Establishment (612) standard.

Consult with the NRCS biologist, resource specialist or WRP specialist for recommendations on species, quantities and planting rates for all vegetative plantings on wetland sites.

### **Criteria for Landscape and Topographic Enhancement**

Topographic features (both micro- / macro-topography) should be installed as an enhancement feature on wetlands where the existing landscape does not provide similar variations in water depth and duration.

Micro-topography is characterized by features with less than 6 inches of relative elevation change. Macro-topography consists of features with greater than 6 inches of relative elevation changes.

Macro-topographic feature designs should be installed in accordance with specifications identified in standard drawings contained in "Oklahoma Engineering Forms and Standard Drawings" which are available on the Oklahoma NRCS website or as described in Oklahoma NRCS Conservation Practice Job Sheet 657 02 "Using Micro and Macro Topography in Wetland Restoration", or as designed on a site by site basis by the WRP project engineer.

On sites where hydrology enhancement will be primarily accomplished by impounding shallow water using the Oklahoma NRCS standards for Structure for Water Control (587) or Dike (356) at least one macro-topographic feature should be installed on each 20 acres of shallow water where the existing topography of the land does not provide similar variations in water depths, and conditions. On sites where hydrology enhancement will primarily be accomplished by excavations to pond surface water or expose water tables, macro-topographic features should comprise between 30 and 50 percent of the targeted area.

Constructed islands installed in accordance with the approved standard drawings should have side slopes no steeper than 6:1. Cut slopes for associated borrow areas (swales) should not be steeper than 3:1.

Excavated swales installed in accordance with approved standard drawings will be laid out in a serpentine manner. Swales will average 2 feet in depth and 8 feet in bottom width. Cut slopes shall not be steeper than 3:1 and borrow from the excavated swale will be disposed of as specified on the standard drawing.

Islands, swales, and other features installed using designs described in Oklahoma Conservation Practice Job Sheet 657 02 "Using Micro and Macro Topography in Wetland Restoration" will have slopes, shapes, and sizes as determined by the WRP project engineer.

The shape, location, and orientation of constructed macro-topographic features should be based on existing site conditions.

Construction of "Deep Water Habitat Islands" is recommended where beaver are likely to be present. The deeper water provided by this feature may provide more attractive habitat for beaver and thereby reduce the damages caused by burrowing into dikes and obstructing water control structures. These features should be based on the approved standard drawing for the "Kidney Shaped" island with the following dimensions: length will be 200 feet, width will be 98 feet, height will be 2 feet and the side slopes will be 6:1. The minimum depth of the borrow area will be 4 feet.

Micro-topographic features should be installed by disking, plowing, ripping, or scraping to create ridges, furrows, and other uneven surface conditions.

## 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.

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.

Consider establishing vegetative buffers on surrounding uplands to 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 the effects that water level draw downs will have on the mortality of aquatic species such as turtles.

Consider timing of water control to mimic the natural hydrological regime of the area, further enhancing the habitat for aquatic species.

Consider design modifications that will limit potential negative impacts of wetland plants and animals on the project.

## PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specifications sheets, job sheets, technical notes, 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 individuals with appropriate training in design and implementation of wetland enhancement. NRCS staff is encouraged to work closely with the NRCS biologist, WRP specialist, resource conservationist, engineer, or ODWC wetland biologist.

## OPERATION AND MAINTENANCE

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

A plan for 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 goals for the overall site as well as structural and vegetative measures. The area should be reviewed annually to see if adjustments are needed in the management of water or vegetation.

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:

- Operation of water control structures to insure that timing and regulation of water conditions achieve the intended hydrology conditions and vegetative responses.
- Inspection schedule of embankments and structures for damage assessment.
- Vegetation management techniques such as mowing, burning, grazing, etc.

- Acceptable uses of the wetland such as mowing, haying, grazing, cropping, etc. and timing of uses to avoid impacts to ground nesting species.
- Control of undesirable plant species and pests (e.g., using predator or parasitic species) should be implemented where available and feasible.

## REFERENCES

USDA Natural Resources Conservation Service. 1992. *Engineering Field Handbook, Chapter 13, Wetland Restoration, Enhancement, or Creation*. Washington D.C. 74 pp

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