

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD  
WETLAND CREATION

(Ac.)

CODE 658

**DEFINITION**

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

**PURPOSE**

To establish wetland hydrology, vegetation, and wildlife habitat functions on soils capable of supporting those functions.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies only to sites where hydric soils do not exist and the objective is to establish specific wetland functions.

This practice is applicable only if hydrologic conditions can be approximated by modifying drainage and/or artificial flooding of a duration and frequency to create and maintain wetland conditions during an average annual precipitation event. The wetland class or subclass will be specified.

This practice does not apply to:

- The treatment of point and non-point sources of water pollution (Constructed Wetland – Code 656).
- The rehabilitation of a degraded wetland or the reestablishment of a former wetland so that soils, hydrology, vegetative community, and habitat are a close approximation of the original natural condition and boundary that existed prior to the modification. (Wetland Restoration – Code 657).

- The rehabilitation of a degraded wetland, the reestablishment of a former wetland, or the modification of an existing wetland, where specific wetland functions are augmented beyond the original natural conditions; possibly at the expense of other functions. (Wetland Enhancement – Code 659).
- The management of fish and wildlife habitat created under this standard.

**CRITERIA**

**General Criteria Applicable to All Purposes**

The landowner shall obtain necessary local, State, and federal permits that apply before the practice is applied.

Establish vegetative buffers on surrounding uplands to reduce sediment and soluble and sediment-attached substances carried by runoff and/or wind. Refer to standards specifications for Filter Strip (393), Riparian Herbaceous Cover (390) and Riparian Forest Buffer (391) or Critical Area Treatment (342) for additional information.

Document the soil, hydrology and vegetative characteristics of the site and its contributing watershed prior to construction.

The purpose, goals, and objectives of the creation shall be clearly defined in the creation plan, including soils, hydrology, vegetation and fish and wildlife habitat criteria that are to be met and are appropriate for the site and the project objectives.

The soils, hydrology and vegetative conditions existing on the site, the adjacent landscape, and the contributing watershed shall be documented in the planning process.

The nutrient and pesticide tolerance of the plant and animal species likely to occur shall be considered where known nutrient and pesticide contamination exists. Sites suspected of containing hazardous material shall be tested to identify appropriate remedial measures. If remedial measures are not possible or practicable, the practice shall not be planned.

Water rights, if applicable, shall be assured prior to creation.

Upon completion, the site shall meet the appropriate wetland criteria and provide wetland functions as defined in the project's objectives.

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.

#### **Criteria for Soils**

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

Changes to soil hydrodynamic and biogeochemical properties such as permeability, porosity, pH, or soil organic carbon levels shall be made as needed to meet the planned objectives.

#### **Criteria for Hydrology**

The hydroperiod, hydrodynamics, and dominant water source shall meet the project objectives. The creation plan shall document the adequacy of available water sources based on groundwater investigation, stream gage data, water budgeting, or other appropriate means.

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.

Timing and level setting of water control structures required for the establishment and maintenance of vegetation, soil, and wildlife and fish habitat functions shall be determined.

Other structural practices, macrotopography and/or microtopography may be used to meet the planned objectives.

Macrotopographic features, including ditch plugs installed in lieu of re-filling surface drainage ditches, shall meet the requirements of other practice standards to which they may apply due to purpose, size, water storage capacity, hazard class, or other parameters. If no other practice standard applies, they shall meet the requirements for Dike (356) unless there is no potential for damage to the feature or other areas on or off site due to erosion, breaching, or overtopping.

Water control structures shall function to exclude fish or other unwanted organisms from created wetlands.

All wetlands designed to contain permanent or semi-permanent water shall be designed to provide varying water depths between 1 and 18 inches over at least 75% of the pool area.

The remainder of the pool area may be between 2 and 4 feet deep. Wetlands should be designed to retain some water for the majority of the year especially during peak fall and spring waterfowl migration periods.

The Additional Criteria for Providing Restoration of Wetlands and Creation of Shallow Water Areas in the Dike (356) and Structure for Water Control (587) NRCS practice standards 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.

The following criteria shall be used to create wetlands containing permanent and semi-permanent water:

- All side slopes should be as flat as possible but shall not be steeper than 4:1.
- Where feasible at least one-third of the side slopes should be 10:1 or flatter.
- Material excavated during the formation of shallow water areas shall be disposed of according to the Excavated Material section of the Criteria for Excavated Ponds in the NRCS Pond (378) standard or used to create habitat mounds using the following criteria:
  - Habitat mounds placed in areas with designed water levels should vary in elevation between 0.5 feet below the full pool elevation and 3 feet above the full pool elevation.
  - Mounds may be shaped in a linear fashion to form ridges or in a circular or elliptical fashion to form islands. Mounds should be distributed randomly throughout the wetland site to provide a natural appearance and optimize habitat and diversity of water depths .
  - Mound side slopes should be as flat as possible but shall not be steeper than 4:1.
  - Mounds shall be rough graded and left with rough side slopes.

For ephemeral pools, the material excavated that is not used for an embankment shall be either:

- Spread uniformly to a height that does not exceed 3 feet, with the top graded to a continuous slope away from the pond; or
- Shaped to a form that blends visually with the landscape and sloped away from the pond.

#### **Criteria for Vegetation**

Hydrophytic vegetation planned to meet the selected wetland functions shall be compatible with the planned soil and hydrologic conditions. No variety of tall fescue or reed canarygrass shall be utilized in conjunction

with this standard if wildlife is a targeted function of the wetland.

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

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

All sites shall be planted to native vegetation. Species selected shall be based upon the planned/target functions of the wetland. To achieve habitat diversity and minimize the adverse effects of climate, disease, and other limiting factors. A minimum of five (5) species (woody or herbaceous) adapted to the site will be established on created wetlands. These species shall have wetland status indicators of FAC, FACW or OBL.

Seeding rates shall be based upon the percentage of pure live seed and labeled with a current seed tag from a registered seed laboratory identifying the germination rate, purity analysis, and other seed statistics.

If the targeted hydrophytic vegetation is predominantly herbaceous, a minimum of five (5) species adapted to the site will be established. These species shall have wetland status indicators of FAC, FACW or OBL. Contact KDFWR wetland biologist or the State Biologist for herbaceous species suitable for establishment in wetlands planned for herbaceous communities (palustrine emergent wetlands).

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. Planting rates shall be compatible with the functions of the restored wetland and specified in the plan.

Created forested wetlands or wetlands with forested components will be planted with a minimum of five (5) species and include at least three hard mast species. These three

hard mast species shall have wetland status indicators of FAC, FACW or OBL.

Seedling preparation and planting will follow the criteria outlined in conservation practice 612, Tree/Shrub Establishment and 490 Tree/Shrub Site Preparation.

At a minimum livestock shall be excluded from the wetland area and/or planting until established.

#### **Criteria for Wetland Functions**

Created wetland goals and objectives should include targeted natural wetland functions for the wetland type and the site location. Goals and objectives shall be documented prior to construction.

Project goals and objectives shall minimize adverse impacts to existing adjacent wetlands.

Where wildlife habitat is identified as a primary function, refer to the conservation practice standard Wetland Wildlife Habitat Management (644).

#### **Additional Criteria for Ephemeral Pools and Shallow Water Areas**

Ephemeral pools and shallow water areas may be established in suitable locations in forested or non-forested areas in agricultural landscapes. They should be designed to provide temporary or seasonal water for amphibians, reptiles and other wildlife that require water for a portion of their lifecycle.

Ephemeral pools may be developed as an excavated pit, small embankment or a combination of the two methods.

The preferred drainage area for ephemeral pools is 0 to 3 acres but shall not exceed 5 acres.

The minimum pool size is 400 square feet and maximum pool size is 0.3 acres.

Maximum water depth shall be between 1.5 and 2.5 feet.

Pool side slopes should be 6:1 or flatter. Flatter side slopes may improve amphibian

habitats.

A 30' buffer of wildlife friendly vegetation shall be allowed to naturally regenerate or established around ephemeral pools.

#### **Embankment:**

- The minimum dam top width is 6 feet and side slopes are 3:1.
- A 10' wide grassed spillway is required at one end of the pool and one foot below the top of the embankment.
- Core trenches are not required but should be used when soil material is not optimum.

#### **Spoil Placement and Treatment**

Material excavated from the pool that is not used for an embankment shall be either:

1. Spread uniformly to a height that does not exceed 3 feet, with the top graded to a continuous slope away from the pond; or
2. Shaped to a form that blends visually with the landscape and sloped away from the pond.

### **CONSIDERATIONS**

#### **Hydrology Considerations**

Consider the general hydrologic effects of the restoration, including:

- Impacts on downstream stream hydrographs, volumes of surface runoff, and groundwater resources due to changes of water use and movement created by the restoration.

Consider the impacts of water level management, including:

- Increased predation due to concentrating aquatic organisms, including herptivores, in small pool areas during drawdowns.
- Increased predation of amphibians due to high water levels that can sustain predators.

- Decreased ability of aquatic organisms to move within the wetland and from the wetland area to adjacent habitats, including fish and herptivores, as water levels are decreased.
- Increases in water temperature on-site, and in off-site receiving waters.
- Changes in the quantity and direction of movement of subsurface flows due to increases or decreases in water depth.
- The effect changes in hydrologic regime have on soil bio-geochemical properties; including oxidation/reduction, maintenance of organic soils, and salinity increase or decrease on adjacent areas.
- The potential for water control structures, dikes, and macrotopographic to negatively impact aquatic organism passage.
- Multiple water depths in single sites to achieve the maximum diversity in plant and animal communities. Varying water depths only a few inches may provide multiple habitats.

### **Vegetation Considerations**

Consider:

- The relative effects of planting density on wildlife habitat versus production rates in woody plantings.
- The potential for vegetative buffers to increase function by trapping sediment, cycling nutrients, and removing pesticides.
- The selection of vegetation for the protection of structural measures that is appropriate for wetland function.
- The potential for invasive or noxious plant species to establish on bare soils after construction and before the planned plant community is established.
- The nutrient and pesticide tolerance of the species planned should be considered

where known nutrient and pesticide contamination exists.

### **Soil Considerations**

Consider changes of physical soil properties, including:

- Increasing or decreasing saturated hydraulic conductivity by mechanical compaction or tillage, as appropriate.
- Incorporating soil amendments.
- The effect of construction equipment on soil density, infiltration, and structure.

Consider changes in soil bio-geochemical properties, including:

- Increasing soil organic carbon by incorporating compost.
  - Increasing or decreasing soil pH with lime, gypsum, or other compounds.

### **Wildlife Habitat Considerations**

Consider:

- The addition of coarse woody debris on sites to be restored to woody plant communities for an initial carbon source.
- The potential to restore habitat capable of supporting wildlife with the ability to control disease vectors such as mosquitoes.
- The potential to establish fish and wildlife corridors linking the site to adjacent landscapes, streams and waterbodies and to increase the sites colonization by native flora.
- The need to provide barriers to passage for unwanted or predatory wildlife species.

### **PLANS AND SPECIFICATIONS**

Plans and specifications for this practice shall be prepared for each site. Plans and specifications shall be recorded using approved specifications sheets, job sheets, or other documentation. The plans and

specifications for structural features will include, at a minimum, a plan view, quantities, and sufficient profiles and cross-sections to define the location, line, and grade for stakeout and checkout. Plans and specifications shall be reviewed and approved by staff with appropriate job approval authority.

At a minimum the following will be identified as appropriate:

- Plan map with appropriate on-site resources identified (i.e. soils, planned structures existing and/or planned vegetative communities, reference sites, etc.) Also, any off-site concern identified as impacting construction such as utilities, etc.
- Number and type of wetlands to be created (Cowardin or other suitable description/classification)
- Target wetland functions planned
- Any component practices required
- Any apparent existing water table depths or indicators of seasonal high water tables and planned depths as appropriate
- Soil type(s) and amounts within the project area with permeability shown at an appropriate scale;
- For herbaceous vegetation, indicate the stock type, planting methods, date, spacing, rates and planting depths
- The existence, location (and/or elevation if necessary) of neighboring property boundaries and utilities;
- Documentation of any required permits
- Any structural specification that is developed for individual components of the wetland system design using specifications or guides from those standards,

## OPERATION AND MAINTENANCE

A separate Operation and Maintenance Plan will be prepared for sites that have structural features. The plan will include specific actions for the normal and repetitive operation of installed structural items, especially water control structures, if included in the project. The plan will also include the maintenance actions necessary to assure that constructed items are maintained as constructed for the life of the project. It will include the inspection schedule, a list of items to inspect, a checklist of potential damages to look for, recommended repairs, and procedures for documentation.

Management and monitoring activities needed to ensure the continued success of the wetland functions may be included in the above plan, or in a separate Management and Monitoring Plan. In addition to the monitoring schedule, this plan may include the following:

- The timing and methods for the use of fertilizers, pesticides, prescribed burning, or mechanical treatments
- Circumstances when the use of biological control of undesirable plant species and pests (e.g. using predator or parasitic species) is appropriate, and the approved methods.
- Actions which specifically address any expected problems from invasive or noxious species
- The circumstances which require the removal of accumulated sediment.
- Conditions which indicate the need to use haying or grazing as a management tool, including timing and methods.
- Any acceptable uses including the timing and intensities (e.g. grazing, haying, timber removal). For wildlife habitat purposes, haying and grazing, if justified as a necessary wildlife/wetland management tool, may be used for management of vegetation. Disturbance to ground nesting

species shall be minimized (during nesting season (May 15<sup>th</sup> – August 1<sup>st</sup>). If utilizing grazing as a management tool, the timing and intensity shall be specified. Refer to conservation practice standard Prescribed Grazing (528) for more information.

## REFERENCES

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