



Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
WETLAND CREATION
CODE 658
(Ac.)

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 does not apply to:

- Development of a wetland specifically for the treatment of point and non-point sources of water pollution. Refer to the Maryland conservation practice standard for Constructed Wetland (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. Refer to the Maryland conservation practice standard for Wetland Restoration (657).
- The augmentation of wetland functions beyond the original natural conditions on a degraded or naturally functioning wetland site, possibly at the expense of other functions. Refer to the Maryland conservation practice standard for Wetland Enhancement (659).
- The management of fish and wildlife habitat created under this standard. Refer to the Maryland conservation practice standard for Wetland Wildlife Habitat Management (644).

CRITERIA

General Criteria Applicable to All Purposes

In addition to the criteria included in this standard, follow the criteria and specifications provided in the *Maryland Wetland Design Guide* for design requirements. Follow the specifications in the *Maryland Wildlife Habitat Planning Guide* for habitat design and management requirements, as applicable. For additional requirements concerning plant species selection, planting dates, rates, methods, and care in handling and planting of seed or planting stock, refer to the applicable sections of the *Maryland Conservation Planting Guide*.

The purpose, goals, and objectives of wetland 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.

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.

Additional 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 bio-geochemical properties such as permeability, porosity, pH, or soil organic carbon levels shall be made as needed to meet the planned objectives.

Additional 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 a signed written agreement or easement.

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. On sites that have been in long-term agricultural production, use grading, shaping, and tillage as needed to create the diverse microtopography that occurs naturally in wetlands.

Structural measures such as embankments, ditch plugs, and water control structures, shall meet the requirements as specified in the *Maryland Wetland Design Guide*. If the feature exceeds the limits or is not specified in the *Maryland Wetland Design Guide*, the feature 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 (e.g., Dike (356)).

Water control structures installed in natural or channelized streams that may impede the movement of target aquatic species or species of concern shall meet the criteria in the Maryland conservation practice standard for Aquatic Organism Passage (396).

Additional Criteria for Vegetation

Hydrophytic vegetation planned to meet the selected wetland functions shall be compatible with the planned soil and hydrologic conditions. Preference shall be given to native wetland plants with localized genetic material.

Where natural colonization of acceptable species can realistically be expected to occur within 2 years, sites may be left to revegetate naturally. If not, the appropriate species will be established by seeding or planting.

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

Where planting and/or seeding is necessary, the minimum number of native species to be established shall be based upon the types of vegetative communities present and the vegetation type planned. To achieve habitat diversity and minimize the adverse effects of climate, disease, and other limiting factors, establish several species adapted to the site. 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.

After the site is created, the vegetation shall generally remain undisturbed so that the wetland will perform its natural functions, including (but not limited to) accumulation of organic matter, nutrient and contaminant sequestration, and retention of surface and subsurface water. Limited moist soil management may be implemented on sites created on cropland or pasture, following the specifications in the *Maryland Wildlife Habitat Planning Guide*.

Note: Specific programs may dictate criteria in addition to, or more restrictive than, those specified in this standard.

CONSIDERATIONS

General Considerations

Consider long-term maintenance requirements of the created wetland.

Take note of constraints such as economic feasibility, access, regulatory or program requirements, social effects, and visual aspects, such as compatibility with the natural landscape.

Refer to the *Maryland Wildlife Habitat Planning Guide* and the *Maryland Wetland Design Guide* for further discussion of planning considerations.

Soil

Consider the effects of the natural topography and soils of the site on the water regime and vegetation prior to design.

Consider making changes to physical soil properties, including increasing or decreasing saturated hydraulic conductivity by mechanical compaction or tillage, as appropriate.

Consider 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, and increasing or decreasing soil pH with lime, gypsum, or other compounds.

Hydrology

Consider the general hydrologic effects of wetland creation, including impacts on downstream stream

hydrographs, volumes of surface runoff, and groundwater resources due to changes of water use and movement created by the creation.

Consider designing the site to maintain permanent or semi-permanent shallow surface water in at least 20% of the wetland. This will benefit resident wildlife such as waterfowl, wading birds, frogs, toads, salamanders, and turtles that need a long-term water supply.

Consider the impacts of water level management, including:

- Increased predation due to concentrating aquatic organisms in small pool areas during draw downs.
- 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 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 the hydrologic regime have on soil bio-geochemical properties, including oxidation/reduction, maintenance of organic soils, and salinity increase or decrease on site and on adjacent areas.
- The potential for water control structures, dikes, and macrotopographic features to negatively impact aquatic organism passage.

Vegetation

Consider:

- The natural availability of plant species in the soil seed bank vs. the need for planting in the created wetland.
- The need for temporary water level management to promote seedling survival when vegetation is planted in the wetland.
- In existing woodland, the adverse impacts on forest conservation, including species adaptability to wetland hydrology, maturity of the woodland, amount of potential loss of existing woody species, and regulatory requirements and constraints (e.g., Maryland Forest Conservation Act).
- The need for additional conservation practices, such as Riparian Herbaceous Cover (390) and/or Riparian Forest Buffer (391), to establish a vegetative buffer around the wetland. Buffers can help to reduce movement of sediment and other pollutants into the wetland and can also provide wildlife habitat.
- 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.

Fish and Wildlife Habitat

Consider:

- The long-term land use objectives of the client. If the client is interested in providing wildlife habitat, consider the wildlife species or groups of species to be supported and the habitat needs that can be met on the managed area.
- The addition of coarse woody debris on sites planned to support woody plant communities for an initial carbon source.
- The potential to restore habitat capable of supporting fish and 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 site's colonization by native flora.
- The adverse impacts of nearby populations of nuisance wildlife, such as muskrats, beavers, or resident geese, on the establishment and maintenance of the site. Also consider the potential for attracting nuisance wildlife into an area.

For additional information concerning specific design and management criteria for selected wildlife species, refer to fact sheets and other publications in the References section of this standard and the Maryland NRCS Biology Technical Resources webpage.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared in accordance with the previously listed criteria. Plans and specifications shall contain sufficient detail to ensure successful implementation of this practice, and shall be recorded using approved engineering specifications 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.

Supporting Data and Documentation

The following is a list of the minimum data and documentation to be recorded in the case file:

- Location of the practice on the conservation plan map.
- Assistance notes. The notes shall include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom.

Planning Information, Field Data, and Survey Notes. The following is a list of the minimum data and documentation to be recorded in the case file:

- Description of the objectives of the project, including the desired functions that the wetland is expected to provide.
- Soil investigation logs and notes.
- Inventory of existing vegetation on the site. If applicable and available, note the agrichemicals that have been used on the site during the past 5 years.
- Topographic survey or lidar-based DEM for the site, as appropriate for site conditions and the proposed design.

- Identification on a map of structural features causing hydrology degradation, such as ditches, tile drains, or existing levees, and extent of existing blockage (if any).

Design Data. For guidance on the preparation of engineering plans see Chapter 5 of the Engineering Field Handbook, Part 650. The following is a list of the minimum required design data:

- Hydrologic and hydraulic design computations.
- Normal and design storm water surface elevations.
- Cross-section(s) of embankments.
- Profile of vegetated spillway, as appropriate.
- Detail of water control structure, as appropriate, including profile, elevations, and materials specifications with type and gauge/thickness of pipes.
- Planned blockage of drainage systems, including cross sections and lengths of drain plugs.
- Plan view(s) to scale with north arrow and stationing showing topographic contours, planting zones for vegetation, soil borings, and locations of other features, as appropriate.
- Seeding and/or planting requirements, including species selected for each planting zone, stocking/seeding rates, and the size and type of planting stock to be used (e.g., bare-root seedlings, containerized stock, etc.), shown on plans or referenced to Implementation Requirements sheets.
- Quantities estimate.
- Show job class on plans.
- Operation and maintenance plan.

Utilities Notification.

- Forms ENG-5 and ENG-6 can be used to assist in tracking utility notifications.
- Document on CPA-6 initial discussion about the landowner's responsibility to notify Miss Utility.
- Document on CPA-6 any information from the landowner about the existence and location of known utilities.
- Document on CPA-6 assurances from the landowner that Miss Utility has been notified, including staking by the utilities.

Construction Check Data/As-Built. Record on survey notepaper, SCS-ENG-28, other appropriate engineering paper, or on approved design. Survey data shall be plotted on plans in red. The following is a list of minimum data needed for as-builts:

- Documentation of site visits on CPA-6. Include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom.
- Check notes recorded during or after completion of construction, and plans showing as-built conditions of all structures.
- Note plant species as-installed, including species used, quantities, date(s) planted, and arrangement of plants within each planting zone. Vegetation not installed specifically for erosion control or critical area stabilization, and designed based on a different practice standard (e.g., 612, 327) may be

installed and certified at a later date if the design is documented on an Implementation Requirements sheet or separate planting plan.

- Final quantities and documentation for quantity changes and materials certification.
- Sign and date checknotes and plans by a person with appropriate approval authority. Include statement that practice meets or exceeds plans and NRCS practice standards.

OPERATION AND MAINTENANCE

An Operation and Management (O&M) plan shall be prepared and is the responsibility of the client to implement. The O&M Plan shall provide specific instructions for proper operation and maintenance of each component of this practice, and shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice. This plan shall be reviewed with and provided to the client.

A completed Wetland Wildlife Habitat Management (644) IR sheet may serve as the management plan, as well as supporting documentation, and shall be reviewed with and provided to the client.

At a minimum, the following components shall be addressed in the O&M plan, as applicable:

- Inspect all embankments and structures at least once per year and after every major storm. Promptly remove trash and obstructions, fix leaks, and make other repairs as needed.
- Inspect the site periodically (at least annually) to determine whether the desired vegetation is present in suitable quantity, quality, and distribution to meet the objectives of the project.
- On embankments to be maintained in herbaceous cover, spot mow or burn infrequently (not more than once every 2 to 3 years) if needed to reduce encroachment of trees and shrubs. To protect ground-nesting wildlife, do not mow or burn between April 15 and August 15.
- Control noxious weeds and other invasive plants by spot treatment, using mechanical methods or approved herbicides. Control of noxious weeds is required by state law. Noxious weed control can be conducted during the primary nesting season (April 15 to August 15), but may require prior approval if the site is enrolled in a financial assistance program. Contact your local weed control specialist concerning recommendations for spot-treating the weed problem.
- Deter colonization of undesirable plants (e.g., cocklebur, phragmites) by conducting regular site inspections and spot treating using mechanical methods or approved herbicides.
- Nuisance animals, such as beavers and muskrats, may be removed in accordance with state game regulations. Geese can be discouraged by minimizing areas of open water and promoting the growth of tall vegetation in the wetland and adjacent buffers.
- Avoid noisy activities, such as mowing or use of recreational vehicles, in or near the wetland when waterfowl are present. To the extent possible, do not allow livestock and other domestic animals to have uncontrolled access to the site.
- Limit use of motorized vehicles to designated trails and access roads to protect vegetation and minimize disturbance to wildlife. Avoid use of motorized vehicles on ponded or inundated areas at any time during the year to prevent damage to soil, vegetation, and aquatic wildlife (e.g., frogs, salamanders).
- Avoid the use of pesticides on the site to prevent harm to wildlife that use the wetland area.
- Describe the acceptable uses (e.g., flash grazing, cropping, timber production, hunting, nature preserve, etc.) and time of year or frequency of use restrictions, if any. *Pay particular attention to program requirements as they relate to acceptable vs. restricted uses and other management restrictions.*

REFERENCES

Martin, Alexander C., Herbert S. Zim, and Arnold L. Nelson. 1951. *American Wildlife and Plants: A Guide to Wildlife Food Habits*. Dover Publications, New York. 500 pages.

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U.S. Fish and Wildlife Service, Chesapeake Bay Field Office, with the Natural Science Center and Adkins Arboretum. 1995. *Native Plants for Wildlife Habitat*. Annapolis, MD.