



Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
SHALLOW WATER DEVELOPMENT AND MANAGEMENT

CODE 646

(ac)

DEFINITION

The inundation of lands to provide habitat for fish and/or wildlife.

PURPOSE

This practice is used to accomplish the following purpose—

- To provide habitat for wildlife such as shorebirds, waterfowl, wading birds, mammals, fish, reptiles, amphibians and other species that require shallow water for at least a part of their life cycle

CONDITIONS WHERE PRACTICE APPLIES

On lands where water can be impounded or regulated by diking, excavating, ditching, and/or flooding.

On floodplain areas that provide refuge habitats for native fish during high flow periods.

This practice does not apply to:

- Virginia Conservation Practice Standard *Wetland Restoration* (Code 657) intended to rehabilitate a degraded wetland where the soils, hydrology, vegetation community, and biological habitat are returned to a close approximation of the original conditions
- Virginia Conservation Practice Standard *Wetland Enhancement* (Code 659) intended for modification of an existing wetland where specific attributes are targeted by management objectives, possibly at the expense of other attributes, or the rehabilitation of a degraded wetland where the result is a wetland that is different than what previously existed on the site
- Virginia Conservation Practice Standard *Constructed Wetland* (Code 656) intended to treat point and non-point sources of water pollution
- Virginia Conservation Practice Standard *Wetland Creation* (Code 658) for creating a wetland on a site which historically was not a wetland

CRITERIA

General Criteria Applicable to All Purposes

Soils must have low permeability or seasonal high water table to inhibit subsurface drainage and allow for maintenance of proper water levels.

Site must be free of hazardous materials.

Verify water supply for flooding the area during periods of planned inundation. Potential water supplies include floodwaters, upland runoff, groundwater or a pumped source.

Maintain water levels between 1 to 18 inches in depth over the majority of the area during periods of planned inundation. A rare exception to this criterion is made for floodplain habitats connected to stream channels where water depths of up to 6 feet provide habitat for native fish species that use these habitats during periods of inundation associated with high stream flows.

Dikes used to impound 18" of water or less must be the Virginia Conservation Practice *Dike* (Code 356) and have 6" of freeboard. If the water impounded against the dike is greater than 18" in depth, the embankment must meet the Virginia Conservation Practice *Dike* (Code 356).

Virginia Conservation Practice Standard *Wetland Creation* (Code 658) shall be used to create the wetlands associated with this practice.

Plan and develop a point of access to facilitate management activity where active habitat management is planned (such as disking or water level management).

Early and ongoing control of invasive species, federal/state listed noxious plant species, and nuisance species (e.g., those whose presence or overpopulation jeopardize the practice) on the site (if applicable). This may include the manipulation of water levels to control unwanted vegetation. Discourage the establishment and/or use of non-native plant species where possible.

Utilize, remove or modify existing drainage systems as needed to achieve the intended purpose.

Criteria for Waterfowl Habitat

Provide gradual flooding of areas containing food plants to an average depth of 6 to 10 inches for waterfowl feeding and resting habitat.

Criteria for Shorebird Habitat

Provide exposed mudflats and areas with 1 to 4 inches of water during seasonal periods of shorebird use.

Criteria for Amphibian Habitat

Plan inundation to last throughout the local breeding period of at least one endemic amphibian species.

Establish surrounding upland habitat of sufficient quality and quantity to support the complete life-cycle requirements of at least one endemic amphibian species.

Design structures to prevent fish access to areas planned for amphibian breeding habitat.

Criteria for Off-stream Stream Fish Habitat

Design water control structures to prevent native fish from being trapped as water recedes.

CONSIDERATIONS

Optimum sites typically have slopes that are 2% or flatter where a majority of the area is made up of acceptable water depths established within reasonable economic constraints. Steeper sites will typically be more expensive to construct.

Consider flattening the side slopes of the dike in situations where overtopping could cause erosion or wave damage could occur.

Water volume, rates of runoff, infiltration, evaporation and transpiration will affect performance of the practice.

Nearly level sites will allow for larger units while keeping planned water depths within the optimum range over most of the unit.

Where impoundments are developed, shorelines with irregular shapes and varying side slopes from 9:1 to 20:1 along water surface margins may increase habitat diversity.

Consider how the timing of flooding and drawdown, as well as the type of drawdown, will affect moist soil plant species composition.

Consider tolerance of plants to flooding and salinity.

Nutrient and pesticide residues may affect plant species composition and the site's capability to grow desirable plants.

Consider effects on nearby wetlands, or water-related fish and wildlife habitats.

Consider the effects of predatory species on other species (e.g. fish and bullfrogs on other amphibians).

Consider effects management will have on disease vectors such as mosquitoes.

Consider installing complexes of vernal pools (5 acres is ideal) to provide habitat for amphibian species, that include hardwood buffer areas.

The composition and extent of surrounding upland vegetation may influence this practice's habitat functions.

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

Added water depth and duration may be used as a method to control unwanted vegetation.

Biological control of undesirable plant species and pests (e.g., using predator or parasitic species) may be the least damaging alternative for pest control.

Human and livestock activities in and surrounding the practice may disturb wildlife, thereby decreasing habitat suitability and function. Vegetative screens, fences, or gates are means of reducing unwanted disturbance.

Consider the impact that water surface draw-downs will have on concentrating aquatic species, such as turtles, into diminished pool area resulting in increased mortality.

PLANS AND SPECIFICATIONS

Virginia NRCS staff is encouraged to work closely with the NRCS Biologist and biologists from the U.S. Fish and Wildlife Service, Virginia Department of Game and Inland Fisheries or Ducks Unlimited in developing site specific plans and specifications.

Record all required information in Shallow Water Development and Management Job Sheet and in an engineer field book, on a plan sheet or design computation sheet, or in another appropriate location.

DESIGN DATA

1. Completed Environmental Evaluation and subsequent requirements.
2. Shallow Water Development Management Job Sheet
3. Survey and plot data: profile, cross-sections, topography, as needed.
4. Design computations, including purpose of practice and references used.
5. Plan view of site with existing and planned features, including dimensions, distances, verification of water supply during planned inundation period, etc.

CHECK DATA

1. As-built survey.
2. As-built plans including dimensions, types and quantities of materials installed, and variations from design. Include justification for variations.
3. Locations of appurtenant practices.
4. Adequacy of vegetation and/or ground cover.

Use the practice job sheet (IR) to plan and certify this practice.

OPERATION AND MAINTENANCE

Document the O&M requirements in the appropriate sections of the Shallow Water Development and Management Job Sheet.

Waterfowl and shorebird feeding and resting areas that can be hydrologically controlled or have natural dry periods should be burned, disked or surface disturbed every 3-5 years to set back succession and control the growth of undesirable plants. Such burning, disking, or surface disturbance shall be scheduled to encourage desirable habitat plants.

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides and other chemicals shall not compromise the capability of the practice to provide habitat for the target species.

Include the following actions in the O&M Plan:

- Timing and setting of water control structures for establishment of planned water levels and management of vegetation.
- Management requirements to maintain vegetation, including control of unwanted plants.
- Periodic cleanout of sediment may be needed, especially for excavated areas.

REFERENCES

Helmets, Doug. 1992. Shorebird Management Manual. Western Hemisphere Shorebird Reserve Network, Manomet, MA, 58 pp.

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

NRCS, Engineering Field Handbook, Chapter 6, "Structures" and 13, "Wetland Restoration, Enhancement, or Creation".

NRCS e-FOTG, Section IV, <http://efotg.sc.egov.usda.gov/treemenuFS.asp>

NRCS Virginia Biology Technical Note – Aquatic Systems #1.

Smith, Loren M. and Roger L. Pederson. 1989. Habitat management for migrating and wintering waterfowl in North America. Texas Tech University Press, 574 pp