

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**SHALLOW WATER DEVELOPMENT AND MANAGEMENT**

(Acres)

CODE 646

**DEFINITION**

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

**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. These include areas managed for periodic drawdown.

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

This practice does not apply to:

- Indiana (IN) Field Office Technical Guide (FOTG) [Wetland Restoration](#) Standard (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;
- IN FOTG [Wetland Enhancement](#) (659) Standard intended for modification of an existing wetland where specific attributes are targeted by management objectives, or the rehabilitation of a degraded wetland where the result is a wetland that is different than what previously existed on the site;

- IN FOTG [Wetland Creation](#) Standard (658) for creating a wetland on a site which historically was not a wetland;
- IN FOTG [Constructed Wetland](#) Standard (656) intended to treat point and non-point sources of water pollution;
- IN FOTG Standard (399) [Fish Pond Management](#); or
- IN FOTG [Watering Facility](#) Standard (614) intended to provide watering places for wildlife.

**CRITERIA**

**General Criteria Applicable To All Purposes**

Use of this standard will comply with all applicable federal, state, and local laws and regulations. The owner is responsible for obtaining all required approvals and permits, and for compliance with such laws, rules and regulations.

Water levels must be able to be maintained between 0 (i.e. saturated) to 18 inches in depth over more than 50% of the area during periods of planned inundation. An exception to this criterion is made for floodplain habitats connected to stream channels where water depths of up to six (6) feet provide habitat for native fish species that use these habitats during periods of inundation associated with high stream flows.

Soils will have moderately slow permeability (less than 0.6 inches per hour), or seasonally high water table within 1.5 feet, to inhibit subsurface drainage and allow for maintenance of designed water levels.

**Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service State Office, or download it from the Field Office Technical Guide for your State.**

Existing wetlands will not be negatively impacted by this practice.

The site must be free of hazardous materials.

Where structural components are necessary to meet the requirements of this standard, IN FOTG Standard (657) [Wetland Restoration](#) will be used on sites with hydric soils, and IN FOTG Standard (658) [Wetland Creation](#) will be used on sites with non-hydric soils.

Water supply for flooding the area during periods of planned inundation must be adequate.

An adequate method for dewatering is required when water levels must be artificially lowered to produce desired habitat condition.

Where active habitat management is planned (such as disking or water level management) a point of access will be planned and developed to facilitate management activity.

Invasive plant species and nuisance species will be controlled on the site.

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

#### **Additional Criteria to Provide Habitat for Waterfowl**

Areas planned to provide waterfowl feeding and resting habitat will be designed to facilitate gradual flooding of areas containing food plants to an average depth of six (6) to 10 inches.

Areas containing food plants will be flooded during seasonal periods of waterfowl use.

#### **Additional Criteria to Provide Habitat for Shorebirds**

Areas planned to provide shorebird habitat will have exposed mudflats and areas with one (1) to four (4) inches of water during seasonal periods of shorebird use.

Depending upon the species, flooding will occur from April 1 to mid-June for spring migrations, and from early July through the end of October for fall migrants. Impoundment draw down will occur during the migration period at a rate of approximately one (1) inch drop per week.

Flooding will occur approximately one month before the first heavy freeze and will be maintained throughout the winter to maintain conditions that promote invertebrate populations for shorebird foraging the following spring.

#### **Additional Criteria to Provide Habitat for Amphibians**

Flooding will occur approximately one month before the first heavy freeze and inundation will be planned to last through at least July 15.

Late fall or winter drawdowns should be avoided to protect hibernating amphibians.

Surrounding upland habitat will be of sufficient quality and quantity to support the complete life-cycle requirements of the target amphibian species.

Structures will be designed to prevent fish access to areas planned for amphibian breeding habitat.

#### **Additional Criteria to Provide for Off-stream Stream Fish Habitat**

Water control structures will be designed to prevent native fish from being trapped as water recedes.

### **CONSIDERATIONS**

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

Planned units should avoid the main stem of streams or drainage ways to facilitate proper management of water levels.

Consider movement of dissolved and suspended substances to downstream surface waters and groundwater.

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

Consider the impact of disease vectors such as mosquitoes. See Indiana Biology Technical [Wetland, Mosquitoes and West Nile Virus](#) for additional information.

Consider the following optimum site conditions and management considerations for shallow water impoundments:

Factors	Optimum Conditions
<b>Water Supply</b>	<ul style="list-style-type: none"> <li>Independent supply to each unit.</li> <li>Water supply enters at highest elevation.</li> </ul>
<b>Water Discharge</b>	<ul style="list-style-type: none"> <li>Independent discharge from each unit.</li> <li>Discharge at lowest elevation for complete drainage.</li> <li>Floor of control structure set at correct level for complete drainage.</li> </ul>
<b>Water Control</b>	<ul style="list-style-type: none"> <li>Stoplog structure allowing 2-inch changes in water levels.</li> <li>Adequate spillway capacity to handle storm events.</li> <li>Water control structure capable of draining at least one (1) inch per day from the unit.</li> <li>Design multiple units with individual drawdown capabilities to maximize management flexibility.</li> </ul>
<b>Unit Size</b>	<ul style="list-style-type: none"> <li>Five (5) to 100 acres.</li> </ul>
<b>Number of Units</b>	<ul style="list-style-type: none"> <li>Three (3) to five (5) units per site to maximize management flexibility.</li> </ul>

*Adapted from Fredrickson, 1991, Fish and Wildlife Leaflet 13.4.6.*

### **Vegetative Component**

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

Consider the effects of the timing of the flooding and drawdown (e.g. early, midseason, or late), as well as the type of drawdown (e.g. fast or slow), on target plant species and plant species composition.

Consider tolerance of plants to flooding, as well as the composition of seed in the soil.

Consider how soil disturbance may increase the probability of invasion by unwanted plant species.

Consider how added water depth and duration may be used as a method to control unwanted vegetation.

Consider the use of biological control of undesirable plant species and pests (e.g., using predator or parasitic species) as the least damaging alternative for pest control.

If soil or climatic conditions preclude the establishment of vegetation on disturbed surfaces and protection is needed, consider the use of non-vegetative means, such as mulches or gravel. In some places, temporary vegetation may be used until permanent vegetation can be established.

### **Habitat**

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

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

Consider constructing multiple units that can be drawn down and flooded at different times to provide a diversity of habitats.

Consider the composition and extent of surrounding upland vegetation and how it may influence this practice's habitat functions.

Consider the need for buffer practices beneficial to wildlife around the perimeter of the site. Plan practices such as IN FOTG Standard (393) [Filter Strip](#) to limit sedimentation from entering or leaving the management unit, and/or IN FOTG Standard (386) [Field Border](#) and/or IN FOTG Standard (327) [Conservation Cover](#) to create a vegetative buffer between the management unit and adjacent land uses. This buffer should be at least 30 feet wide depending on its purpose.

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

Consider effects on wetlands or wildlife habitats that would be associated with the practice. For example, reptiles, amphibians and other aquatic species serve as important prey species for waterfowl, raptors, herons, and other wildlife.

Consider how the practice may function as a link in a habitat corridor that aids the site's use and colonization by wetland flora and fauna.

Consider how the practice may raise downstream water temperature, causing detrimental impacts to associated aquatic and terrestrial communities.

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

Consider planting shrubs such as buttonbush along the edges of impoundments to serve as food sources for songbirds.

Consider varying the drawdown from year to year to replicate natural flooding conditions.

When **turtles** are a species of concern, consider:

1. Designing the impoundments with gradual slopes that have a south facing aspect;
2. Sites that have adjacent upland soils with high sand content to encourage egg laying; and
3. Placing loafing logs, stumps and other woody debris in the pool area.

When **shorebirds** are the primary species of concern, consider:

1. Maximizing the areas of very shallow water flooding (0 to 4 inches);
2. Maximizing the area of mudflats during shorebird migration periods;
3. Maximizing food production by winter flooding to enable chironomids and other invertebrates to re-populate, and to assure survival of larvae over winter; and
4. Shallow re-flooding of disked, mowed, or harvested fields to provide foraging habitat during fall migration.

Consider requesting technical assistance from a professional biologist.

When **marshbirds, such as rails and bitterns**, are the primary species of concern, consider:

1. Providing water depths ranging from 0 to six (6) inches
2. Promoting emergent species such as sedges (*Carex* Spp.), cattails (*Typha* Spp.), bulrushes (*Schoenoplectus* spp.), rushes (*Juncus* spp.), and cordgrass (*Spartina* spp.)
3. Providing a management area interspersed with open water, mudflats, and a vegetation-to-water ratio of approximately 50:50
4. Dividing the management area, if possible, into several independently-controlled units to allow for biennial drawdowns which allow total drawdowns of some units, while maintaining standing water in others.
5. Conducting gradual drawdowns which will encourage the growth of diverse stands of emergent vegetation as well as seed-producing annuals such as smartweeds (*Polygonum* Spp.)
6. Fall flooding of robust emergent vegetation to attract migrating rails, and decrease the vigor of perennial species so that seed-producing annuals can become established in the spring to provide foraging habitat.
7. Areas with dense stands of emergent vegetation should be burned, disked, or mowed to set back succession and should be re-flooded to stimulate production of invertebrates.
8. Because rails commonly collide with utility wires or towers when flying under low light conditions and at night during migration, consider installing bird deflectors on utility lines where hazardous conditions cannot be avoided. Especially avoid situations where utilities are located between feeding and roosting or nesting areas.

## PLANS AND SPECIFICATIONS

Plans and specifications will be prepared for the practice site. Plans will include the following:

- Plan view
- Location of excavation or borrow

Plans and specifications for the establishment and management of plants to be established may be recorded in narrative form, on job sheets, or on other forms.

## OPERATION AND MAINTENANCE

Any plant species, whose presence or overpopulation may jeopardize this practice, will be controlled. Spraying or other control methods will be performed on a "spot" basis to protect forbs/legumes that benefit native pollinators and other wildlife.

An operation and maintenance plan will be provided to and reviewed with the landowner. The plan will include the following items and others as appropriate.

1. Promptly repair eroded areas.
2. Reestablish vegetative cover immediately where scour erosion has removed established seeding.
3. Periodically inspect the area for any new maintenance items and take immediate action to protect from further damage or deterioration.

## REFERENCES

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