NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SHALLOW WATER MANAGEMENT FOR WILDLIFE

(Acre)
CODE 646

DEFINITION

Managing shallow water on agricultural lands and moist soil areas for wildlife habitat.

PURPOSE

- To provide open water areas on agricultural fields and moist soil areas to facilitate waterfowl resting and feeding.
- To provide habitat for reptiles and amphibians and other aquatic species which serve as important prey species for waterfowl, raptors, herons, and other wildlife.

CONDITIONS WHERE PRACTICE APPLIES

On agricultural and moist soil areas where water can be impounded or regulated by diking, ditching, or flooding.

This practice can be used to facilitate the conservation of declining wetland dependent and threatened and endangered species.

This practice does not apply to: Wetland Restoration (657) intended to rehabilitate a degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to original conditions; Wetland Enhancement (659) intended to rehabilitate a degraded wetland where specific functions and/or values are enhanced beyond original conditions; or Wetland Creation (658) for creating a wetland on a site location which historically was not a wetland or a site which was a wetland but will be replaced with a wetland type not naturally occurring on the site.

This practice should be used to offer opportunities to attract and provide life requirements to a variety of wetland dependent wildlife (e.g., waterfowl, wading birds, shore birds, reptiles, amphibians, etc.) on seasonally flooded/manipulated man-made shallow water impoundments. For migratory species, the target period for providing the opportunity to utilize the resource should coincide with the onset of immigration into the area and carry over until emigration.

CRITERIA

- Soils should have low permeability to inhibit subsurface drainage and allow for maintenance of proper water levels. Suitable material for dike constructions is essential. On lands not already used for rice production, construction of low levee is often required to provide suitable habitat. Woody vegetation must be removed from levee sites so not to interfere with construction activities or cause leakage. Standing water on the levee right of way should be drained so equipment can operate efficiently. Dikes shall be designed and constructed in accordance with NRCS Conservation Practice Standard 356, “Dike”. Moving soil from higher elevation to construct the dikes can level fields. Dikes should have 3:1 side slopes to promote safe maintenance operations. The crown of the dike should be of adequate width to provide access of applicable maintenance equipment.
- Shallow water impoundments require an adequate water supply for reflooding and a water control structure for removing the water when necessary. Relifting adjacent surface water should not be used if local aquifers may be negatively impacted. Rainfall often does not provide adequate control to provide optimum conditions.
- To reduce annual levee maintenance costs, muskrat (*Ondara zibethicus*), beaver (*Castor canadensis*), nutria (*Myocastor coypus*) and other rodent populations should be controlled.

Water control structures shall meet the requirements of NRCS Conservation Practice Standard 587, “Structure for Water Control”. Although several types of water control structures are available, flashboard risers made of steel, corrugated metal or PVC are commonly used to vary the water

levels on fields by installing or removing boards. Flashboard risers are generally preferred to other types because they are self-regulating once the proper elevation of the boards in the intake structure has been set. Also they may function as drainage pipes (provided the structure is sized correctly) when the boards are removed so there is no interference with agricultural operations. Structures constructed of steel pipe are more expensive initially than corrugated metal, however steel requires little maintenance and has a longer life expectancy. PVC structures also have long life and are less costly than steel, but can be damaged by farm equipment and/or fire. Tongue and groove flashboards made of PVC do not swell like wooden boards, allowing ease of operation.

- Landowners shall obtain local, state, and federal permits necessary.
- If pumping, water rights must be assured.
- The Standards and Specifications for Dike (356), Pumping Plant for Water Control (533), and Structure for Water Control (587) will be used as appropriate. Refer to Chapter 6, “Structures”, of Part 650 in the National Engineering Handbook for additional design information. Existing drainage systems will be utilized, removed, or modified as needed to achieve the intended purpose.

CONSIDERATIONS

To insure that foods are available to dabbling ducks, impoundment should be gradually flooded to a depth of 6 – 18 inches. Wading birds generally utilize 3 – 5 inches of water. Shore birds generally require mudflats or shallow water averaging 2 inches or less. Although most wetland dependent wildlife use shallow water areas to some extent regardless of size, large complexes (containing small grains, native vegetation, scrub/shrub wetlands, forested swamps, etc.) provide greater benefits. Continuous disturbances and/or intentional harassment can adversely affect bird use. Routine non-threatening activities have less negative impacts. Maintaining at least 25% of the managed area as a sanctuary could increase use. Sanctuary areas provide protection, resting, preening, and loafing areas, in addition to forage.

Habitat Manipulation

Although shallow water wetland systems are among the most productive ecosystems in terms of total biomass, few wetland dependant species, especially bird species acquire substantial energy or nutritional resources directly form plant material consumption other than seeds. Much of the energy from plants is transferred to primary consumers, including a diverse group invertebrate species. Manipulating water levels not only directly affect invertebrate populations, but also indirectly affect other fauna through modification of aquatic plant communities. Varying water levels influences germination, seed or tuber production and maturation and plant structure. Stocking and managing the area for crawfish can also provide alternative food source for wading birds, gulls, terns, cormorants, and pelicans. Refer to NRCS standards and specifications on Wetland Wildlife Habitat Management (644).

Agricultural Fields

Small grain fields such as rice can provide important habitat for waterfowl and other wildlife. It is estimated that per acre; 150+ pounds of rice, 50+ pounds of soybeans, 180+ pounds of corn, and 130+ pounds of grain sorghum are lost during harvest. These fields can provide substantial food resources if they are not repeatedly disked or plowed after harvest, and shallowly flooded. Rice fields are among the most economical areas to manage for waterfowl, shore birds, and wading birds, because the existing levees and structures can be used, and the stubble can be lightly disked, rolled, or water buffaloed prior to flooding, The procedure of manipulating rice stubble prior to flooding aids in decomposition, which increases invertebrate populations. Not only does this enhance the area for wildlife, but also results in fields that are cleaner when the water is drained in the spring for seedbed preparation. Waterfowl feeding in rice fields also reduce the occurrence of red rice (Oryza sativa) and other weeds for the following production cycle. Small grains decompose at varying rates when flooded. Rice, sorghums, and corn persist for extended periods but soybeans deteriorate rapidly. At least 10% of the area should be flooded in August to mid September to a depth of 2 – 6 inches to provide habitat for early migrants. Waterfowl and other water birds benefit most when water levels are increased gradually rather than immediately

inundating the entire area. By increasing water level in 6-inch increments, new areas are flooded and additional food sources gradually become available.
This procedure conserves food for later in winter and provides a range of water depths, which benefits a wider array of wildlife. Fields should be completely flooded by December 15 and maintained until the following year just prior to seedbed preparation. When dewatering the area, it should be completed gradually (increments of six inches or less) to concentrate invertebrate food resources.

Moist Soil Areas

Moist soil areas are important because of the great diversity of foods. In addition, seasonally flooded moist soil areas tend to harbor greater densities of invertebrates than do habitats that are permanently flooded. Important factors when managing moist soil areas are the timing of the annual drawdown, and the frequency of soil disturbance to alter plant succession. Mid to late season drawdowns generally favor millets (*Echinochloa and Leptochloa sp.*). Total seed production however, is generally greater when impoundments are drained early to mid season. Early drawdowns occur within the first 45 days of the growing season, mid-season drawdowns occur within the second 45 days of the growing season, and late season drawdowns occur within the remainder of the growing season. While slow drawdowns typically produce diverse vegetative cover, fast (less than 2 weeks) drawdowns are more likely to result in a stand of similar vegetation. To maximize benefits, units should be drained at varying times and rates if able. For maximum seed production, native plant communities must be maintained in an early successional stage. The percentage of non-food producing plant species generally tends top increase in each consecutive year the area is not disturbed. Soil disturbances greatly affect the response of native plants to different management techniques. Impoundments should be disked at 2 – 3 years intervals to set back succession and control invasion by undesirable plants. Vegetative succession manipulations should not be more frequent than every tow years unless problems with undesirable plants begin. Manipulations every year have the potential to reduce beneficial food plant communities. Plants such as cocklebur (*Xanthium sp.*) and coffeeweed (*Sesbania sp.*) can quickly develop a closed canopy and outcompete desirable plants. If undesirable plants invade 50% or more of the managed area, control by either approved herbicides, disking, shredding, flooding, and/or prescribed burning is warranted.

Food Plantings

Fields can be planted with small grains such as Japanese millet, Chiwapa millet, browntop millet, corn, and rice. These plants typically produce high yields of seed and are eaten by many birds and most waterfowl. Soybeans are not recommended for use in shallow water because they deteriorate quickly once flooded. Consult applicable NRCS conservation practice standards for seeding rates, planting dates, and management practices.

Consider the effects of the timing of the flooding and drawdown, as well as the type of drawdown, on plant species composition (moist soil areas).

Consider the species flooding tolerances and the composition of seed in the soil at the site (moist soil areas).

Consider effects on wetlands or wildlife habitats that would be associated with the practice.

Consider effects of residual herbicides (moist soil areas).

Consider the targeted plant species' tolerances with respect to timing and type of drawdown.

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

Consider effects on downstream flows that would affect other water uses or users.

If the area will be hunted, consult with appropriate regulations relative to migratory bird management, hunting, and baiting issues.

PLANS AND SPECIFICAITONS

Plans and Specifications for installing structures for water control shall be in keeping with this standard and shall prescribe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

The impoundment should be dewatered and disked or burned at 2 to 3 year intervals to control the invasion by undesirable plants.

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life. These actions include normal repetitive activities in the application and use of the practice (operation), and repair and upkeep of the practice (maintenance).

Any use of fertilizers, mechanical treatments, prescribed burning, pesticides and other chemicals to assure the sallow water or moist soil area function shall not compromise the intended purpose.

Biological control of undesirable plant species and pest (e.g., using predator or parasitic species) shall be implemented where available and feasible.

Operation and maintenance shall include monitoring and management of the site as well as structure components.

REFERENCES

1988. Fredrickson, L.H., Reid, F.A. 133.3.1 Invertebrate Response to Wetland Management Waterfowl Management Handbook, Fish and Wildlife Leaflet 13. USDI USFWS

1982. Fredrickson, L.H., Taylor, T.S. Management of Seasonally Flooded Impoundments for Wildlife. Resource Publication 148. USDI ISFWS

1993. Ducks Unlimited, Inc. Waterfowl Habitat Management Handbook for the Lower Mississippi River Valley. Publication 1864. Ducks Unlimited, Inc. Mississippi Cooperative Extension Service, National Fish and Wildlife Foundation.