Shallow-water Wetlands

In general, wetlands are areas where the soils are saturated with water or there is standing water for long enough periods for the area to support wetland vegetation such as water lilies, cattails, sedges, bulrushes, reeds, willows, sweetgum, pin oak, willow oak, and bald cypress. Wetlands are often referred to as swamps, marshes, sloughs, wet meadows, river bottoms, or bogs and may be as large as the Florida Everglades or as small as a wet spot in a field. Wetlands are extremely complex ecosystems that provide essential habitat for a wide variety of wildlife. Wetlands also are beneficial in storing flood water and capturing pollutants carried by runoff, such as excessive chemical fertilizer, animal waste, and sediments.

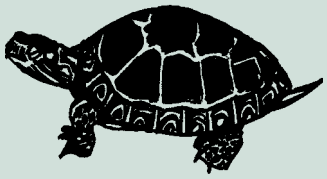
Naturally functioning wetland systems are very difficult if not impossible to recreate. Nonetheless, shallow-water wetland impoundments can be developed to provide good habitat for waterfowl, shore birds, and other wetland dependent wildlife.

Site Selection

Site selection is the first step to creating a successful shallow-water wetland. Suitable sites for shallow-water wetlands should have soils with sufficient clay for building levees (low dams or dikes) and holding water. They should be nearly level or very gently sloping. They should also have a large enough watershed to collect runoff or have an adjacent water source that can be diverted or pumped. Potential sites to investigate are wet areas below pond or lake dams, portions

Shallow water wetlands provide large amounts of natural vegetation which produce high quality forage for waterfowl and other wildlife.

Kentucky's wetlands are extremely complex ecosystems that provide essential habitat for a variety of wildlife.



Naturally occuring wetlands should not be considered for shallow water impoundments, but should be identified and protected.

of crop fields that are difficult to farm because of wetness, pastures with poor drainage, or flat lowland areas that have a natural bottleneck that can be easily plugged. Naturally occurring wetlands that have not been drastically disturbed should not be considered for shallow water wetland development, but should be identified and protected. Before any definite plans are made for a site you should consult with someone who has experience with wetlands and wetland development, such as a KDFWR biologist or NRCS personnel.

Permitting

The waters and wetlands of the United States fall under the regulatory jurisdiction of the United States Department of the Army Corps of Engineers (USACOE). Any filling or draining of the waters and wetlands of the United States requires a USACOE 404 permit. This pertains to all Jurisdictional Wetlands and to open fields labeled as Farmed Wetlands. Areas labeled as Prior Converted Wetlands do not need this permitting.

Depending on the site selected for creating a shallow-water wetland, it may be necessary to obtain appropriate permits from the U. S. Army Corps of Engineers and the Kentucky Division of Water. Wetland projects for wildlife may fall under general nationwide permits or a waiver may be granted from permitting agencies. However, all permitting issues should be addressed before any construction activities begin.

In addition to the USACOE 404 permit requirements, it may be necessary to obtain one or more permits from the Kentucky Division of Water. To construct a levee on a stream floodplain, a Floodplain Construction Permit is required by the Kentucky Division of Water. Also, if the proposed levee is to be built along, or adjacent to a stream, a separate Kentucky Division of Water 401 Permit (Water Quality Certification) may be required. It is important to realize that obtaining appropriate permits does take time, and they should be obtained before construction is started. However, for properly constructed wetlands that do not pose a threat to property or resources downstream, permitting is usually granted.

Contact Information

USACOE Regulatory Branch PO Box 59, Louisville, KY 40201 (502) 582-5452
USACOE Regulatory Branch PO Box 1070, Nashville, TN 37202 (615) 736-5181
USACOE Regulatory Branch 167 N. Main St. B202, Memphis, TN 38103 (901) 544-3471
USACOE Regulatory Branch 502 8th Street, Huntington, WV 25701 (304) 529-5487

for Kentucky Division of Water contact:

Floodplain Management Section, Division of Water
14 Reilly Road, Frankfort, KY 40601 (502) 564-3410

Levee Construction

To create a shallow-water wetland, low levees are used to impound an area that can be seasonally flooded and

drained to produce wetland habitat. Levees should be constructed to maximize surface area impounded to an average depth of about 10 inches. To effectively manage wetland impoundments, it is important that they are uniformly shallow. If the area selected for wetland development has too much of a slope, it may be necessary to create a series of smaller impoundments, to produce a step effect and obtain more desirable water depths on each impoundment.

Similar to building a pond dam, levees should be cored and compacted with backfill to ensure the levee has a tight seal and water does not leak underneath. A core (key-way) of at least 10 feet wide and deeper than any permeable layers underneath the soil surface such as a gravel bed is necessary to prevent leakage. Trackhoes work well for coring. Levees are generally constructed with pans and/or bulldozers depending on the size of the wetland impoundment, and how far levee material must be moved.

Levees should be constructed with 3:1 or more gradual slopes (for a 3:1 slope the width of the levee extends 3 feet for each foot of elevation) and a minimum top

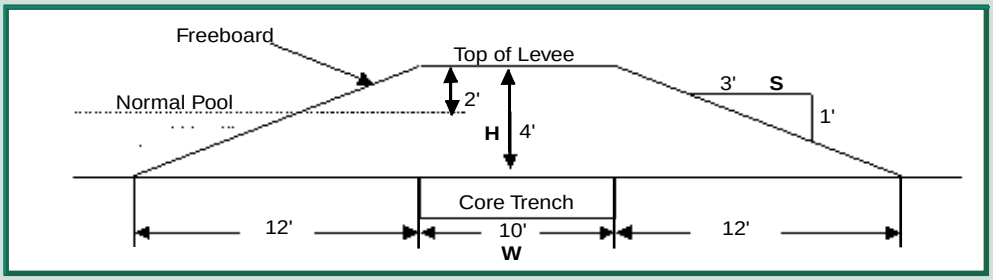


Figure 1. Cross section of a typical levee with a 3:1 slope.

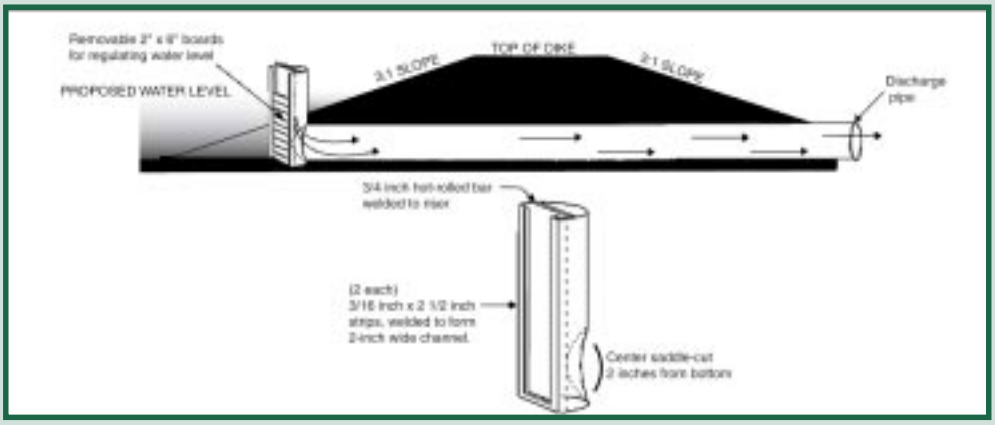


Figure 2. Half round flashboard riser inlet water control structure constructed from steel pipe. Reprinted from Waterfowl Habitat Management Handbook for the Lower Mississippi River Valley, Ducks Unlimited, Inc. 1993

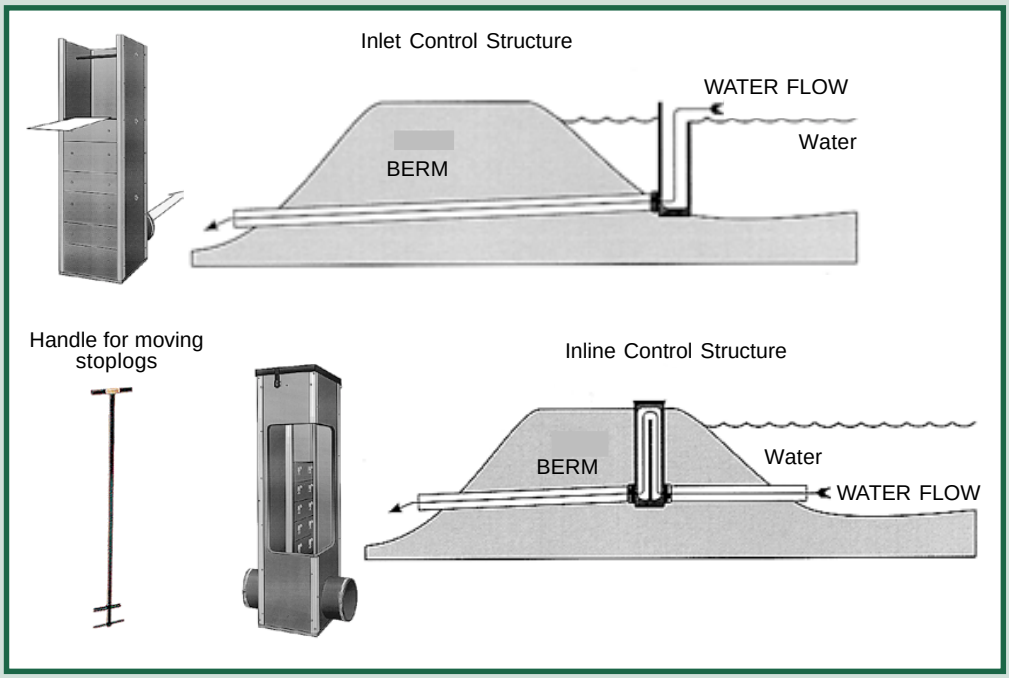


Figure 3. Prefabricated inlet and inline box type flashboard risers. Web site images courtesy of Agri Drain Corporation at www. ad-copr. com

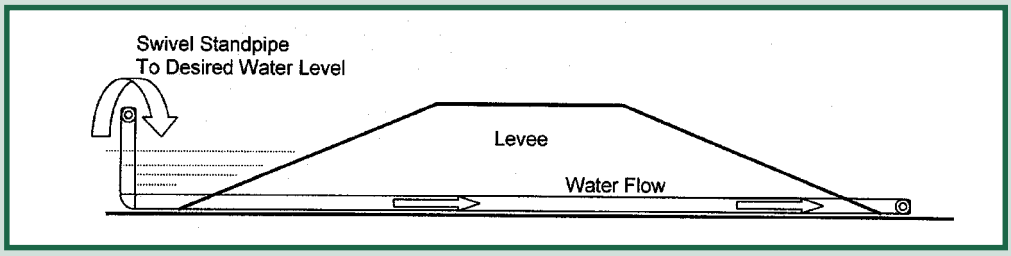
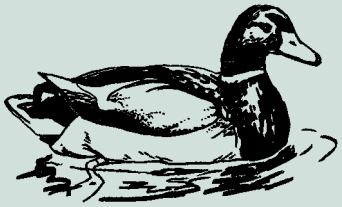


Figure 4. PVC pipe with 90-degree elbow and standpipe.

width of 10 feet (Fig. 1). Levees constructed to these standards will be suited for rotational mowing and annual inspections necessary for long-term maintenance. In most cases levees should be constructed with a 2-foot minimum freeboard (the height of levee above normal pool). An emergency spillway cut through undisturbed soil and not in the levee

Table 1. General specifications for pipe diameter and water control structure size, based on watershed size and rain fall
(Taken from Natural Resources Conservation Service Data).

Round pipe diameter (inches)	Field Size (acres)		Half- round riser diameter (inches)	Box riser size width x depth (inches)
	4 in. of rain in 24 hrs.	6 in. of rain in 24 hrs.		
12	12	8	18	9 x 18
15	21	14	24	12 x 24
18	34	23	30	15 x 30
21	49	33	36	18 x 36
24	68	46	42	21 x 42
30	119	80	54	27 x 54
36	190	127	66	33 x 66



Water levels of 10 inches or less are preferred by Kentucky's familiar"puddle ducks" such as the mallard, black duck, gadwall, green-winged teal, blue-winged teal, American wigeon, northern shoveler, and northern pintail.

itself should be included in levee designs to ensure excessive overflow does not breach the levee and cause an erosion problem. Your local KDFWR biologist or NRCS District Conservationist will be able to help you determine what earth-moving equipment is appropriate and provide engineering assistance.

Water Control

The ability to control water levels is essential for effective management of shallow-water wetlands. There are a number of water control options for shallow water impoundments. For most projects, the traditional "stoplog" or "flashboard riser" water control structures are the best choice (Fig. 2 and Fig. 3). These structures allow for water to be impounded and drained with minimum effort and monitoring, and may be "homemade" or purchased from a commercial vendor ready to install.

Water control structures should be placed at the lowest elevation of the impoundment to permit complete draining. The number and size of water control structures will be dependent on topography and the size of impoundments. It is especially important that the structures used are large enough to handle runoff from the impounded watershed (Table 1). For example, a 9 x 18 inch prefabricated box riser with a 12-inch diameter pipe should be able to drain about 4 inches of rain in 24 hours from a 12-acre field.

While Table 1 does provide some useful information, you should consult with your KDFWR biologist or NRCS district conservationist prior to final decisions on water con-

trol structure size and placement.

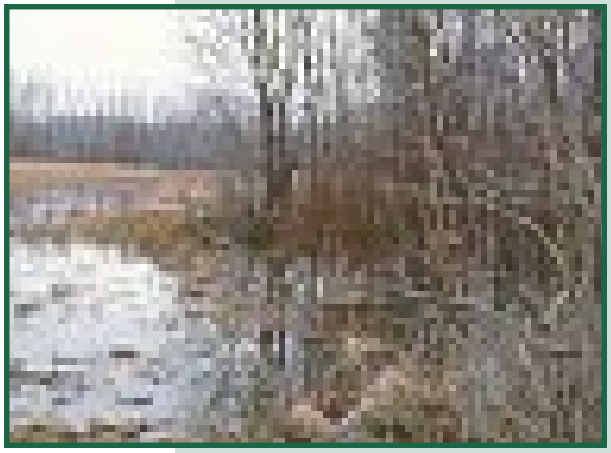
In some situations, PVC pipe with a 90 degree elbow and an upright overflow standpipe is a relatively simple and inexpensive way to effectively manage water levels (Fig. 4). The standpipe is simply tipped over to let out the appropriate amount of water, and can be turned to a fully horizontal position for complete drainage. On very shallow impoundments or depressions (6 to 12 inches) the wetland will often dry from natural evaporation, so control structures may not be necessary.

Management

Flooding and Drawdowns

Most management techniques used on man-made shallow-water wetlands are focused on waterfowl. While naturally occurring wetland processes may be difficult to understand and duplicate, simple water level manipulations on shallow water impoundments can produce desirable habitat for wildlife.

Seasonal fluctuations in water levels are the key ingredient for creating desirable shallow water wetland habitat.



The timing of seasonal flooding and draining of wetland impoundments will determine what type of habitat is created and when that habitat will be made available to waterfowl. The general idea is to slowly flood an impoundment during fall, allow it to stand in shallow water through winter, then drain the impoundment during spring and summer. This type of flooding system creates optimum germination and growing conditions for heavy seed-producing wetland vegetation and associated invertebrates, then it makes those food resources available to waterfowl and shorebirds from fall to late spring.

There are no concrete dates that work best for draining and flooding managed wetlands. In general, 10 inches of water should be held on wetland impoundments until late spring (May through mid-June). Then, stoplogs should be incrementally removed from water control structures to produce a slow draining of the wetland impoundment that does not dry out the soil too rapidly. Slow drawdowns (2-3 weeks) usually produce better plant establishment, seed production, and overall wildlife use than rapid drawdowns. Stoplogs should incrementally be replaced in water control structures to produce a slow flooding around the first of September for wood ducks and teal or around early to mid October for most other waterfowl species. Flooding shallow water wetlands is highly dependent on adequate rainfall. However, pumping from a suitable water source may be feasible in some situations.

Excellent seed production in shallow water wetlands can be obtained through appropriate management of naturally occuring annual vegetation.

Natural Vegetation

A diverse community of plants naturally grow on moist to wet soils. Most of these plants produce seeds that are a valuable food source for waterfowl. Moist soils also create excellent growing conditions for invertebrates associated with wetland vegetation, such as insects, small snails, and clams, all of which are essential foods for waterfowl.

Maximum seed production and waterfowl benefits are generally achieved by maintaining heavy seed producing

SUMMARY OF OPTIONS:

Site Selection
Necessary Permits
Construction of the Levee
Controlling Water Levels
Management Techniques

***Related *Habitat How-To* References:**

Streamside Management
Prescribed Burning
Strip Disking
Annual Grains

Planning For My Property

annual vegetation. Without periodic disturbance, woody vegetation and other perennial plants that will not produce as much seed will gradually dominate shallow water wetlands. Shallow water wetlands managed for migrating waterfowl should be disked or burned every 2 to 3 years to maintain desirable vegetation. Disking * or burning* should be conducted early enough in the growing season to allow enough time for moist soil vegetation to respond. In some instances invasive annual plants such as cocklebur may quickly establish and out-compete desirable species. When necessary, undesirable species may be controlled by re-flooding, mowing or using herbicides.

Small Grain Plantings

Research shows that the food value and resistance to decay of wild plants and associated invertebrates exceeds that available in planted wetlands. However, desirable natural moist soil vegetation such as wild millets, foxtails, beggarticks, smartweed, and sedges may be supplemented by planting annual small grains. Planting annual small grains in wetland impoundments can be beneficial for waterfowl during late winter when temperatures are more severe and food resources are low. Suitable plantings include millets, sorghums, and corn*.

Harvested Fields

Flooding active farmland can create excellent, although short lived, habitat for migrating waterfowl and shorebirds, plus it can improve soil fertility. Slow flooding should begin as soon after harvest as possible. Holding as little as 6 to 10 inches of water through December and completing a slow drawdown by early March will provide favorable water depths for both waterfowl and shorebirds. Harvested fields can be flooded by using permanent levees as described above or simple terraces such as those used in rice fields. Terrace building machines and terrace plows can be effective for building semi-permanent and temporary levees.

Forested Impoundments

Some shallow water wetlands may have a significant portion of the impoundment covered with desirable mast-producing bottomland hardwoods. **Caution: With the exception of species such as bald cypress, water tupelo, and willows, flooding during the growing season will kill trees**! When attempting to manage water levels on forested habitat, flooding should begin well after leaves fall (November 1st) and draining should be complete well before buds begin to swell (February 15th). Flooding dates and water depths should also vary from year to year within these general guidelines to maintain forest productivity.