

Shallow Wetland Habitat Management



Photos by: Illinois Natural History Survey, Forbes Biological Station staff.

Shallow wetland habitats can be some of the most diverse, productive, and highly used habitats on a property. They may offer food and cover for a variety of wildlife species, but often target wetland dependent wildlife, specifically migratory waterfowl. Shallow wetlands typically require some management, but the goals and desired outcomes for the wetland and property may determine the intensity of that management.

Diversity within and among wetlands will often increase wildlife use, both in terms of the species that use the wetlands, and the number that use them. In general, shallow wetlands should be less than 18 inches deep, but should vary from that maximum depth to nearly dry or even mudflat. Depth should also vary annually, depending on the goals for the wetland, but should strive to have suitable water levels for wetland dependent wildlife at critical times of the year.

For instance, it is important to maintain water in most wetlands throughout spring. Most shallow wetlands should go through a dry period in most years in order to maximize productivity for wildlife. We refer to these wetlands as “seasonal” because they are usually not flooded for the entire year. It is important to note that several wetlands in close proximity form a wetland complex. Wetland complexes are typically more diverse, offer opportunities to manage individual wetlands in different ways, and to vary the amount and type of habitat available at different times of the year, potentially offering some habitat components all year.

Vegetation communities, or the plant species present, should largely be annual grasses and forbs. The best plant communities will appear weedy and messy with a mix of grasses and other plants of different types and sizes. Diversity of plant communities is desirable, but caution should be used to avoid development of dominant stands of perennial vegetation such as phragmites, bulrush or cattail, or woody species such as willow, cottonwood or buttonbush. Depth and vegetation can be included in design features of constructed or rehabilitated wetlands, or manipulated through management actions.

Wetland Design and Construction

Site selection may be the most important factor in shallow wetland development. Suitable sites should have hydric soils or at least heavy soils that will hold water. Sandy or gravelly soils usually will not hold water within managed wetlands or when levees are constructed from them. The area should be flat (less

than 6 inches of fall across area to be flooded) to afford the greatest area flooded per unit of levee height, although small topographic variations will add diversity to managed wetlands. A dependable source of water is also critical for wetland success. Ideally, this source would provide water that can be gravity drained or diverted into wetland units. However, it is often necessary to pump water from a permanent source or well. Finally, infrastructure to impound water is usually necessary. This often includes low levees (1-3 feet higher than maximum water depth), with a shallow slope of 3:1 or 4:1 with the shallower slopes being easier to maintain (i.e., mow) and more easily avoid damage from muskrats, beavers, wave action, or overtopping. Water control structures are necessary to manipulate water levels, ideally by gravity draining and flooding. However, it is occasionally necessary to pump water in and out of wetlands depending on site specific conditions.



Moist-soil plant communities developing during the summer growing season after wetlands have dried. These plants all grew naturally from the seed bank. The best moist-soil stands will be diverse with a mix of forbs and grasses (upper left and right). Depending on timing of drawdown and seed bank, a less diverse stand of grasses (lower left) or broad-leaves (lower right) may develop. All of these will be used extensively by wildlife throughout the year, with heavy use by waterfowl during fall, winter and spring when flooded shallowly.

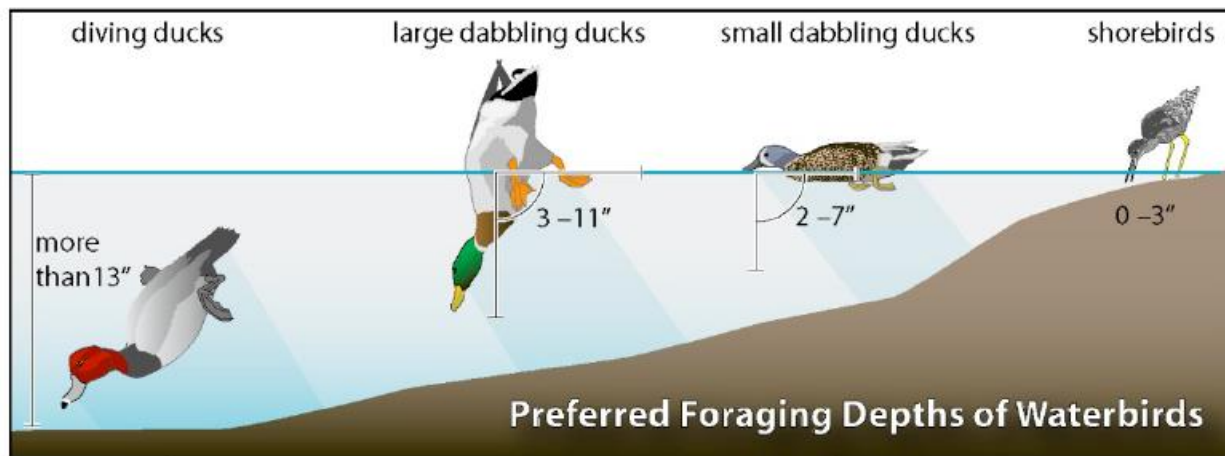
Wetland Management

Shallow wetlands will often be most beneficial when managed for “moist-soil plants”. These species grow on mudflats as water levels are drawn down through slow draining or passive evaporation. These are primarily annual grasses and forbs that produce an abundance of seeds and underground tubers that will provide food and cover for a variety wildlife. Moist-soil seeds are a very healthy food source for wildlife, with high levels of carbohydrates and essential nutrients and amino acids, and some seeds are even high in protein.

Moist-soil management involves the slow dewatering or drawing down of shallow wetlands in the late spring or summer to expose mudflats and encourage moist-soil plant growth. Once seeds have matured, wetlands can be re-flooded to provide habitat for wetland dependent wildlife. Moist-soil management typically relies on being able to impound water behind a low levee or berm, or by dewatering depressional wetlands. All managed wetlands should include a water control structure that can be opened and closed to allow water level manipulation.

Supplemental pumps or wells may be used to re-flood wetlands or to manipulate water levels throughout the year. This may add cost to an otherwise quite inexpensive management strategy; seeds usually exist in the underground seed bank, soils are usually fertile and do not require fertilizer, there are rarely costs associated with working the ground or with the application of chemicals. If water level manipulation can be done inexpensively, there may be almost no cost associated with this strategy once infrastructure is in place.

Moist-soil management strategies generally fall into two categories, active, and passive management. Passive management typically relies heavily on natural processes to vary water levels and develop plant communities. Active management relies on management actions to raise and lower water levels and assist in plant community development.



Frederickson, L.H., & Dugger, B.D. 1993. Management of Wetlands at high altitudes in the Southwest. U.S. Department of Agriculture, Forest Service, Southwest Region, Washington, D.C.

Both strategies should rely on natural vegetation, as opposed to planted food plots, but the plants that develop can be manipulated through timing of drawdown and soil disturbance to maximize beneficial plant production. Both actively and passively managed wetlands are useful and provide quality habitat, but actively managed wetlands typically support higher quality plant communities which attracts a greater diversity and abundance of wildlife.

Passively managed shallow wetlands will usually achieve their greatest depth in spring following snow melt or spring rains. As summer approaches, water levels often recede, occasionally drying completely. This is a positive development in most circumstances. The shallow water will be used by shorebirds and wading birds, and desirable vegetation will develop on the exposed mud. Passive management relies on natural precipitation to re-flood wetlands, so dry periods may vary from days to months in length, or may remain wet all year with above average precipitation.

Active management allows for experimentation with drawdown dates and other management actions to produce the highest quality habitat possible. In general, water should be drawn off as slowly as possible (approximately 1 inch or less per day), and relatively early in the growing season. Early to mid-season (June – mid-July in central IL), slow drawdowns produce the greatest diversity of wetland plants, usually resulting in the greatest abundance of plant seeds (yield).

In contrast, late (late July – August) and fast drawdowns often have the opposite result, with fewer species and far lower seed yield. Additionally, fast drawdowns often result in undesirable stands of cocklebur, whereas cocklebur can be largely avoided through slow dewatering. Late drawdowns do often reduce germination of undesirable woody species like willow, cottonwood and silver maple. Slow drawdowns are best achieved using stop-log structures which allow better control and fine-tuning of water levels compared to screw gates or flap gates. After drawdown, wetlands should remain dry for a minimum of 70 days from the first day mudflat is exposed to allow moist-soil plants to grow and seeds to mature. A duration of 120 days from the beginning of drawdown (mud exposure) to reflooding may maximize drawdown benefits.



Foraging ducks. Note the mix of grasses and broad-leaved forbs (darker brown color) and shallow water (ducks can feed without tipping up). Feeding dabbling ducks prefer water less than 18 inches, but 6-8 inches or less is ideal.

Another important management tool is soil disturbance. After several years without disturbance, moist-soil plant growth may become less vigorous, woody species may start to encroach, and undesirable perennial species which do not produce as much seed will become more common. Diking, either lightly or heavily, sets back succession, reduces less productive perennial species, reduces woody species and exposes seed in the underground seed bank which can invigorate a wetland.

Some managers recommend heavy disking in moist-soil wetlands every 3-4 years to ensure maximum seed production. Other management to prevent encroachment of woody species or other undesirable species may include mowing, prescribed fire or herbicide application. Deeply flooding a wetland through a growing season may also provide disturbance, drown out some susceptible species, and result in a different plant community or more marsh-like conditions.



Shorebirds will use exposed mudflat extensively during their migration periods (April–June and July–October).

Shallow Wetland Plant Species

Many beneficial plant species common to shallow wetlands are typically considered weeds by agricultural producers and homeowners alike. These are typically annual grasses and forbs that produce an abundance of seed which provides food for wildlife, while the plants themselves provide cover and allow a diverse aquatic invertebrate community to develop.

Some typical beneficial annual grasses and sedges include: millets, (both common barnyard grass and Walter's millet; *Echinochloa spp.*), rice cutgrass (*Leersia oryzoides*), panic grasses (*Panicum spp.*), sprangletop (*Leptochloa spp.*), lovegrasses (*Eragrostis spp.*), foxtail (*Setaria spp.*), nutsedges (including chufa; *Cyperus spp.*), and spikerushes (*Eleocharis spp.*).

Some beneficial broad-leaved forbs include: smartweeds (*Polygonum spp.*), pigweeds (*Amaranthus spp.*), stick-tights or beggarticks (*Bidens spp.*) and arrowhead (*Sagittaria spp.*).

Some undesirable species that may warrant management action include: common reed (*Phragmites australis*), purple loosetrife (*Lythrum salicaria*), river bulrush (*Scirpus fluviatilis*), reed canary grass (*Phalaris arundinacea*), perennial water smartweed (*Polygonum amphibium*), cocklebur (*Xanthium spp.*) and cattail (*Typha spp.*).

Woody species may also create problems when left unchecked. Typical woody species that may become problematic include: willows (*Salix spp.*), cottonwood (*Populus deltoids*), swamp privet (*Forestiera acuminata*) and silver maple (*Acer saccharinum*). Button bush (*Cephalanthus occidentalis*) can become problematic but can also be desirable if it does not over run a site.

Management Resources:

The following links provide in-depth discussion and detail of the subjects touched on here, including; wetland planning and construction, timing of drawdown, beneficial plant species, controlling undesirable plant species, maximizing wildlife value, as well as others.

- Fredrickson, L. H. and T. S. Taylor. 1982. Management of seasonally flooded impoundments for wildlife. U.S. Fish and Wildlife Service Resource Publication 148.
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- Strader, R.W., P.H. Stinson. 2005. Moist-soil management guidelines for the U.S. Fish and Wildlife Service southeast region. U.S. Fish and Wildlife Service Migratory Bird Field Office, Jackson, MS.
<http://www.fws.gov/columbiawildlife/MoistSoilReport.pdf>
- Nelms, K. D. 2007. Wetland management for waterfowl handbook. Natural Resource Conservation Service.
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_016986.pdf
- Fredrickson, L.H. 1991. Strategies for water level manipulations in moist-soil systems. Waterfowl Management Handbook. Fish and Wildlife Leaflet 13.4.6
http://www.nwrc.usgs.gov/wdb/pub/wmh/13_4_6.pdf