SHALLOW WATER DEVELOPMENT AND MANAGEMENT

Illinois Conservation Practice Job Sheet 646 **August 2010**

WHAT IS SHALLOW WATER DEVELOPMENT AND MANAGEMENT FOR WILDLIFE?

Managing shallow water on agricultural fields and moist-soil areas can provide open water areas for waterfowl resting and feeding. Proper management can increase and maintain desirable foods for waterfowl and other species of wildlife.

Shallow water areas are typically flooded during the fall and winter and drained during the spring or summer to promote growth of desirable native food plants, or to plant crops that benefit wildlife. After seed-producing plants have matured, and during the fall waterfowl migration, the area is allowed to flood to a depth of 1 to 18 inches of water. The flooded plants provide excellent resting and feeding areas for "puddle ducks" that "tip" to feed like mallard, shoveler, pintail, and teal. The optimum feeding depth for these ducks is 4 to 10 inches of water.

Canada geese will also feed in shallow water areas located within their wintering range. Early spring migrating waterfowl utilize shallow water areas that remain flooded through the winter and early spring. These areas provide a protein rich food resource for the birds so they arrive on their northern breeding grounds in good condition. Later in the spring, shallow water areas that are mud flats to 4 inches deep are especially beneficial to shorebirds like plovers and sandpipers.

Ephemeral wetlands that dry up each summer are also used by many types of reptiles and amphibians like salamanders, frogs and turtles. Many of these species require shallow water for certain stages of their life cycle. Since ephemeral wetlands dry up each year, fish are not present and cannot prey on reptile and amphibian young.

VEGETATION MANAGEMENT

There are three basic ways to provide quality wildlife foods through vegetation management. They are 1) establish natural moist-soil plants, 2) plant a crop for wildlife and 3) proper management of crop residue.

Advantages of moist-soil management over planting crops are:

- Management costs are less.
- Attracts greater diversity of wildlife.
- Provides foods with greater nutrient value which are often in short supply.

Photo by Biologist Ellen Starr/ NRCS

- Row crops like corn are usually abundant close to wetlands where waste grain can be utilized.
- Possible on marginal row crop sites.
- Production is less influenced by weather.
- Vegetation can be mowed, unlike crops due to baiting laws, to create openings for hunting.

Advantages of planting crops are:

- Total energy production can be higher.
- Does not require precise water control.
- Easier to control undesirable plant species.

Each shallow water area may be managed using different methods in different years. In some cases, altering the type of management can facilitate maintenance and increase productivity and diversity of the site.

Moist-Soil Management. Wild millet, rice cutgrass, nutgrasses, smartweeds, beggarticks, etc., can be encouraged, through water level manipulations, to germinate from existing seed sources in the soil and produce an abundant source of high quality food for waterfowl.

Drawdown (dewatering) of the area is necessary for moist-soil plant production. Slow drawdowns (3-6 weeks) are most desirable for plant establishment and wildlife use. Slow drawdowns encourage desirable plants to germinate and will greatly reduce germination of cocklebur, an undesirable agricultural weed. Early drawdowns (April to mid May) and midseason drawdowns (mid May to mid June) result in the greatest quantity of seeds produced.

Consider the species of seed that are likely to exist in the soil when determining the food plants for which you intend to manage. The soil seedbank, the timing

of the drawdown, as well as the type of drawdown, will determine plant species composition. See Table 1 for response of common moist-soil plants to time of drawdown. In general, early slow drawdowns result in smartweeds and sedges, while midseason drawdowns produce millets and beggarticks. The timing and extent of the drawdown should be varied from year to year to maintain productivity and a diverse plant community.

Undesirable species that should be controlled include cocklebur, reed canarygrass, phragmites (common reed), maidencane, cattail, woody vegetation, and all noxious weeds including purple loosestrife. Most other plants that volunteer will be readily utilized by waterfowl.

If cocklebur volunteers, it can be controlled by a brief period of reflooding. Mowing and/or burning or disking during the growing season, then flooding until the following spring can usually control other undesirable species, including tree seedlings.

Annual species have the highest seed production, therefore, to maintain the site in early successional species (mostly annuals), and to control unwanted species, it is best to dewater and disk the site every 3 to 5 years.

After moist-soil plants have produced seed in late summer or fall, reflood the site slowly to coincide with the arrival of fall migrant waterfowl. Flooding the site slowly (3 to 6 weeks) allows new areas of food to become available each day at the preferred water depth as the water is rises.

Leave the shallow water area flooded during winter and early spring. Canada geese will feed in shallow water areas located within their wintering range. Early spring migrating waterfowl are very dependent on the protein rich invertebrates (small insects and crustaceans that live in the mud and water) that flooded moist-soil habitats produce in late winter and early spring. This food resource helps birds arrive on their northern breeding grounds in good condition. Therefore it is important to leave shallow water areas flooded during the winter and spring.

Planting Waterfowl Food Plants. Slowly draw down water in 3 to 6 weeks in late spring to avoid germination of cocklebur and plant species, such as browntop millet, buckwheat, Japanese millet, grain sorghum, or corn. Fertilize for good production. Use of herbicides is generally not required since annual weeds produce useable wildlife food. After the crop has matured in late summer or fall, reflood the site slowly to coincide with the arrival of fall migrant waterfowl. If corn is used, it must be flooded deep enough so that the surface of the water is high enough for ducks to reach the ears of corn. If millet is flooded too early (several weeks before waterfowl arrive), red-wing blackbirds are more likely to quickly eat the millet then if it is not flooded.

Crop Residue. Utilize crop residue and waste grain after crops are harvested. Reflood the site slowly after harvest, to coincide with the arrival of fall migrants. Leave flooded until spring for early spring migrants.

Photo by Steven Zwicker/NRCS

OTHER MANAGEMENT CONSIDERATIONS

Mudflats. Shorebirds, like plovers and sandpipers, feed on mud flats and very shallow water (0 to 4 inches). They utilize these shallow areas from late spring to early summer, then again in late summer to early fall. Therefore, managed shallow water areas and mudflats can be a very important source of food for shorebirds during their spring and fall migrations.

Buffers. In many locations the shallow water area may benefit from a permanent vegetative buffer established around the area. Filter strips can limit sediment from entering the area. A border of grasses and legumes will buffer the area from surrounding land uses and provide additional wildlife habitat. Do not mow buffers unless necessary, and only mow after August 1, to provide escape and nesting cover for wildlife.

Permanent Pools. Consider leaving the lowest part of a shallow water area flooded even during a drawdown to benefit marsh and wading birds, such as the American bittern and great blue heron. If there are several shallow water units, consider leaving one without a drawdown each year on a rotational basis.

Islands. Larger shallow water areas can benefit from small (>15 sq. ft.) habitat islands. Islands can provide loafing and nesting sites for ducks and geese. The area for feeding on mud flats and in very shallow water is increased when flatter side slopes are utilized. Discourage mammalian predators from islands by surrounding islands with water at a depth of 2 to 3 feet.

Disturbances. Human activities in and around the management unit can have a significant impact on the behavior of wildlife. Activities with loud overwater movement cause the most disturbance, while quiet shoreline activities cause the least. Disturbances cause waterbirds to move to other feeding grounds, and may lower their productivity of nesting or brooding. Limit human disturbances while waterbirds are present. Consider screened buffer zones to separate disturbances (such as roads) from the site.

Amphibians and Reptiles. Shallow water areas that are fishless, usually because the water dries up every summer, are very important to amphibians. Amphibians rely on shallow water for 2.5 to 4 months of the year. Some species require 5 months for their young to complete their aquatic phase of life. Then they move to surrounding moist habitats in the buffer area of the shallow water area or into upland habitats like woodland areas located up to 500 feet or more away from the wetland.

There are also several aquatic or semi-aquatic species of turtles and snakes that use shallow water areas if the site is managed correctly. Management techniques that encourage amphibian and reptile use:

- Provide logs, rocks, and brush piles in and around the shallow water area and in adjacent uplands.
- Keep a vegetated buffer (minimum 50 feet) around the shallow water area.
- Provide upland habitat adjacent to the shallow water area (500 feet wide or wider, if possible).
- Avoid introduction of fish and eliminate fish if they become established.
- Plan any prescribed burning for times of the year when amphibians and reptiles are not active (late fall, winter, or very early spring).
- Avoid using pesticides in shallow water area and buffer. On adjacent land uses, use pesticides that are less likely to run off into the surface water.
- Avoid vehicle use, including off road vehicles, in buffer area.

Photo by Gary Kramer/USFWS

Table 1. Response of common moist-soil plants to drawdown date.*

Species				Drawdown date		
Family	Beneficial Species	Undesirable Species	Scientific name	Early[a]	Mid-season[b]	Late[c]
Grass	Rice cutgrass		*Leersia oryzoides*	+++	+	
	Sprangletop		*Leptochloa sp.*		+	+++
	Crabgrass		*Digitaria sp.*		+++	+++
	Panic grass		*Panicum sp.*		+++	++
	Wild millet		*Echinochloa crusgalli var. frumentacea*	+++	+	+
	Wild millet		*Echinochloa walteri*	+	+++	++
	Wild millet		*Echinochloa muricata*	+	+++	+
Sedge	Red-rooted sedge		*Cyperus erythrorhizos*		++	
	Chufa		*Cyperus esculentus*	+++	+	
	Spikerush		*Eleocharis spp*	+++	+	+
Buckwheat	Pennsylvania smartweed		*Polygonum pensylvanicum*	+++		
	Curltop ladysthumb		*Polygonum lapathifolium*	+++		
	Dock		*Rumex spp.*		+++	+
Pea		Sweetclover	*Melilotus sp.*	+++		
Composite		Cocklebur	*Xanthium strumarium*	++	+++	++
	Beggarticks		*Bidens spp.*	+	+++	+++
	Aster		*Aster spp.*	+++	++	+
Loosestrife		Purple loosestrife	*Lythrum salicaria*	++	++	+
	Toothcup		*Ammania coccinea*	+	++	++
Morning glory		Morning glory	*Ipomoea spp.*	**++**	**++**	
Goosefoot	Fat hen		*Atriplex spp*.	+++	++	

[a] Drawdown completed within the first 45 days of the growing season. Growing season typically begins near April 1 in Southern Illinois, April 7 in Central Illinois and April 14 in Northern Illinois.
[b] Drawdown after first 45 days of growing season and before 1 July.
[c] Drawdown after 1 July
+ = fair response; ++ = moderate response; +++ = excellent response.
***Taken from: U.S. Fish and Wildlife Service *Waterfowl Management Handbook Fish and Wildlife Leaflet* 13.4.6. • 1991**

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