

## *Conservation Practice Job Sheet (646)*

### **WHAT IS SHALLOW WATER 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, shorebirds and other species of wildlife.

Shallow water areas are typically flooded during the winter and drained or dried during the spring or summer to promote the growth of desirable native food plants, or to plant crops that will benefit wildlife. After the 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 food plants provide excellent resting and feeding areas for "dabbling ducks" that "tip" to feed, like mallard, shoveler, pintail, and teal. The optimum feeding depth for these ducks is 4 to 10 inches.

In the spring, during a slow draw down, shallow water areas (from mud flats to 4 inches deep) are especially beneficial for shorebirds like plovers and sandpipers, on their northward migration.

### **VEGETATION MANAGEMENT**

There are three basic ways to provide quality wildlife foods through vegetation management. They are: 1) promotion of natural moist soil plants, 2) planting of crops for wildlife, and 3) management of crop residue.

**Advantages of moist soil management** are:

- Management costs are normally less
- A greater diversity of wildlife is attracted
- Foods with greater nutrient value are provided
- Management is possible on marginal row crops sites
- Production is less influenced by weather



Tim Cabes

**Advantages of planting crops** are:

- Total energy production can be higher
- Does not require as precise of 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.

**Natural moist-soil plants.** Rice cutgrass (*Leersia oryzoides*), nutsedges (*Cyperus spp.*), spikerushes (*Eleocharis spp.*), smartweeds (*Polygonum spp.*), beggarticks (*Bidens spp.*), barnyard grass (*Echinochloa crusgalli*), 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 (de-watering) of the area is necessary for moist soil plant production. Slow drawdowns (2-3 weeks) usually are more desirable for plant establishment and wildlife use. Early drawdowns (first 45 days of growing season) and midseason drawdowns (at least 90 days before the end of the growing season) result in the greatest quantity of seeds produced.

Consider the seed species that is likely to exist in the soil when determining the species of food plants for which you are going to manage. The species of seeds in the soil, the timing of the drawdown, as well as the type of drawdown, will determine plant species composition. See Table 1 for the response of common moist-soil plants to time of drawdown. In general, early slow drawdowns result in smartweed and sedge species, while midseason drawdowns produce millet and biden species.

**The timing and extent of the draw down should be varied from year to year to maintain productivity and a more diverse plant community.** See Figure 1 for suggested annual flooding strategies.

**Seed production.** 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 de-water and disk the site every 3 years.

After the moist soil plants have produced seed in late summer or fall, re-flood the site slowly to coincide with the arrival of fall migrant waterfowl. Flooding the site slowly (2-3 weeks) allows new areas of food to become available each day at the preferred water depth as the water is rising.

**Planting waterfowl food plants.** Draw down in late spring and plant species such as buckwheat, 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, re-flood the site slowly to coincide with the arrival of fall migrant waterfowl

**Crop residue.** Utilize crop residue and waste grain after crops are harvested. Re-flood the site slowly after harvest, to coincide with the arrival of fall migrants.

## SHOREBIRDS

Shorebirds can spend up to 9 months of the year on non-breeding areas. Therefore, managed shallow water areas can be a very important source of food during their migrations. The

spring migration ranges from about the 1<sup>st</sup> of April to mid-June, while the fall migration ranges from early July through the end of October, depending upon the species.



Paul Conover

Moist soil units suitable for spring shorebird management require autumn flooding approximately one month before the first heavy freeze, and maintenance of flooded conditions to enable chironomids and other invertebrates to re-populate, as well as to assure survival of larvae over winter. Shorebirds like plovers, sandpipers, greater and lesser yellowlegs, and Dunlins, feed on mud flats and very shallow water (0 to 4 inches) during the time of an early to midseason drawdown.

Shallow re-flooding of a disked, mowed, or harvested field can provide excellent shorebird foraging habitat during fall migration. Impoundment drawdown rate should be approximately 1 inch drop per week to maximize shallow water surface area.

Moist soil units may need reconditioning every several years to remove undesirable vegetation. Reconditioning units through shallow disking and re-flooding provides excellent opportunities especially for shorebird management. However, the type of disking is critical to shorebird response. The intent of disking is to convert plant biomass to a detrital base attractive to invertebrates. Deep disking that completely buries plant material is less desirable than shallow disking that only partially buries plant biomass.

## UNDESIRABLE PLANT SPECIES

A number of plant species can propagate extensively in Indiana to the point that serious management problems will result if they are not controlled. These invasive species tend to dominate the areas where they grow by creating monoculture populations, shading out native species and reducing native plant diversity. Consequently, waterfowl is negatively impacted by the reduced cover and diminished food values. Plants which need to be controlled include cocklebur, reed canarygrass, phragmites (common reed), cattail, woody vegetation, and all noxious weeds including purple loosestrife. Most other plants that volunteer will be readily utilized by waterfowl.

**Reed canarygrass.** Reed canarygrass (*Phalaris arundinacea*) is sufficiently abundant and widespread that managers should anticipate most projects will be infested with this weed. Reed canarygrass is rarely fully eradicated and yearly, or even monthly, attention to the control of this weed may be necessary.



Reed canarygrass

Herbicide treatment with glyphosate (e.g. Roundup® and Rodeo®) is an effective control measure. Note that Roundup® is not registered for use in aquatic areas and is designed for use only where there is no standing water. Rodeo® is specifically designed for use in aquatic habitats.

Both Roundup® and Rodeo® are nonselective and should be applied only in areas where damage to other species is unlikely. They should be applied to actively growing plants at early heading or in the fall according to the manufacturer's recommendations.

Because reed canarygrass may tolerate deep inundation for up to two years before it succumbs, using flooding as a control method is most useful in systems that have water control systems capable of impounding sufficient water.

**Cocklebur.** If cocklebur volunteers, it can be controlled by a brief period of re-flooding. 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.

## OTHER MANAGEMENT CONSIDERATIONS

**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 (roads) from the site.

**Buffers.** In many locations the shallow water area may benefit from a permanent vegetative buffer around it. 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.

**Disease concerns.** Flooding sites that have been dry for a long time, in summer when temperatures are high, is generally not recommended except for shorebird management. Under these conditions the bacterium that causes avian botulism can flourish.

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternate means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14<sup>th</sup> and Independence Avenue SW, Washington, DC, 20250-9410, or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

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

| <u>Desired Species</u> |                                 | <u>Drawdown date</u> |                        |                   |
|------------------------|---------------------------------|----------------------|------------------------|-------------------|
| Common name            | Scientific name                 | Early <sup>a</sup>   | Midseason <sup>b</sup> | Late <sup>c</sup> |
| Rice cutgrass          | <i>Leersia oryzoides</i>        | +++ <sup>d</sup>     | +                      |                   |
| Crabgrass              | <i>Digitaria spp.</i>           |                      | +++                    | +++               |
| Panic grass            | <i>Panicum spp.</i>             |                      | +++                    | ++                |
| Wild millet            | <i>Echinochloa walteri</i>      | +                    | +++                    | ++                |
| Wild millet            | <i>Echinochloa muricata</i>     | +                    | +++                    | +                 |
| Red-rooted sedge       | <i>Cyperus erythrorhizos</i>    |                      | ++                     |                   |
| Spikerush              | <i>Eleocharis spp.</i>          | +++                  | +                      | +                 |
| Pennsylvania smartweed | <i>Polygonum pennsylvanicum</i> | +++                  |                        |                   |
| Curltop ladysthumb     | <i>Polygonum lapathifolium</i>  | +++                  |                        |                   |
| Dock                   | <i>Rumex spp.</i>               |                      | +++                    | +                 |
| Beggarticks            | <i>Bidens spp.</i>              | +                    | +++                    | +++               |
| Aster                  | <i>Aster spp.</i>               | +++                  | ++                     | +                 |
| Morning glory          | <i>Ipomoea spp.</i>             | ++                   | ++                     |                   |

| <u>Problem Species<sup>e</sup></u> |                            | <u>Drawdown date</u> |           |      |
|------------------------------------|----------------------------|----------------------|-----------|------|
| Common name                        | Scientific name            | Early                | Midseason | Late |
| Purple loosestrife                 | <i>Lythrum salicaria</i>   | ++                   | ++        | +    |
| Cocklebur                          | <i>Xanthium strumarium</i> | ++                   | +++       | ++   |

Adapted from: Fish and Wildlife Leaflet 13.4.6. , 1991.

<sup>a</sup> Drawdown completed within the first 45 days of the growing season.

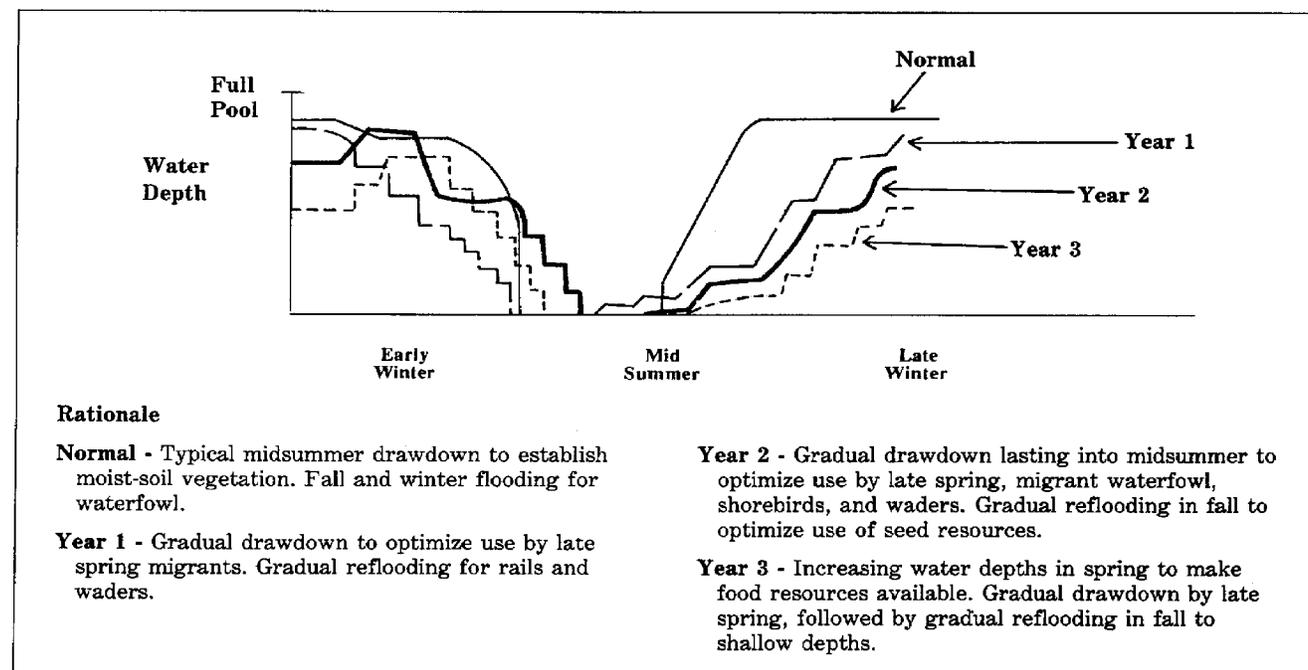
<sup>b</sup> Drawdown after first 45 days of growing season and before July 1.

<sup>c</sup> Drawdown after July 1.

<sup>d</sup> + = fair response; ++ = moderate response; +++ = excellent response.

<sup>e</sup> Control through extending flooding duration, chemical treatment, or mechanical means.

**Figure 1** Suggested Flooding Regimes for Seasonally Flooded Wetlands of the Midwest.



## SHALLOW WATER MANAGEMENT FOR WILDLIFE DESIGN WORKSHEET

|             |              |                           |             |
|-------------|--------------|---------------------------|-------------|
| Farm: _____ | Field: _____ | Shallow Water Unit: _____ | Date: _____ |
|-------------|--------------|---------------------------|-------------|

### Structural Components Required

**Source of water:** (Check if required. See engineering design for location)

- |  |   |
|--|---|
| <input type="checkbox"/> Diversion.<br><input type="checkbox"/> Pond/reservoir<br><input type="checkbox"/> Well with pump.<br><input type="checkbox"/> Pump. | <input type="checkbox"/> Water control structure on tile line, ditch, or dike.<br><input type="checkbox"/> Other source to be developed<br><input type="checkbox"/> Surface water (Seasonal flood events and/or surface runoff is usually sufficient) |
|--|---|

**Dikes required:** (See engineering design for location)

Average height \_\_\_\_\_ Total length \_\_\_\_\_ . Total cubic yards \_\_\_\_\_ .

### Seeding Required:

- \_\_\_\_\_ Acres of seeding on dikes.  
 \_\_\_\_\_ Acres of seeding for buffer strips.

### Management Recommendations (Schedule one of the following 3 methods each year)

#### I. Moist Soil Management

- Slow drawdown starting on or about:  
 1<sup>st</sup> year \_\_\_\_\_; 2<sup>nd</sup> year \_\_\_\_\_; 3<sup>rd</sup> year \_\_\_\_\_.
- Leave drained over summer for moist soil plants to grow.
- Allow shallow water area to gradually refill as waterfowl migrate through the area, start refilling on:  
 1<sup>st</sup> year \_\_\_\_\_; 2<sup>nd</sup> year \_\_\_\_\_; 3<sup>rd</sup> year \_\_\_\_\_.
- Maintain shallow water over winter. Vary water depth from year to year.
- Every three years disk at the start of the growing season. If undesirable plants become established, disk 2 or 3 times by mid summer then immediately flood (if possible) until the following spring.

#### II. Crops Planted For Waterfowl

| Year  | Planting Date     | Crop               | Rate        | Fertilizer    |
|-------|-------------------|--------------------|-------------|---------------|
| _____ | May-June          | Corn/grain sorghum | 6-8 lbs/ac. | 80-100 lbs. N |
| _____ | June – early July | Milletts           | 20 lbs/ac.  | 30 lbs. N     |

- Gradually flood unit, maintaining the active feeding area 4 - 10 inches deep, as waterfowl migrate through the area in the fall.
- Leave flooded through the winter.

#### III. Crop Residue Managed For Waterfowl

In the following years conventional crops will be grown and harvested with the crop residue left for wildlife. After harvest flood the majority of the area 4 to 10 inches deep, to coincide with the arrival of waterfowl in the fall.

Year(s) \_\_\_\_\_ Crop(s) \_\_\_\_\_