Moist-soil Management for Waterfowl

Science Meets Outreach.

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Photos By Illinois Natural History Survey Staff

Understanding the importance of moist-soil plants to waterfowl was one of the life goals of Frank C. Bellrose (above and right). Biologists continue his work today.

Millions of waterfowl visit Illinois each fall and spring, seeking the foods they need to fuel their stopover and migration.

In the late 1930s, Illinois native Frank C. Bellrose recognized the importance of wetland plant seeds to migrating ducks and geese in the Illinois River valley and coined the term "moist-soil" to refer to this type of vegetation. Bellrose went on to contribute significantly to many aspects of waterfowl ecology and management during his distinguished career with the Illinois Natural History Survey, but his work on moist-soil plants and wetlands stimulated important research on the foraging ecology of waterfowl.

During the decades since Bellrose's initial research, waterfowl scientists and managers have determined that moist-soil plant seeds may be particularly valuable foods to waterfowl because they are relatively high in energy and contain essential nutrients and amino acids not found in row crops, such as corn. Further study has determined that although moist-soil plants may occur naturally, their growth can be encouraged by manipulating water levels, seed banks or other vegetation in wetlands. Moist-soil management has become a

Soil-core samples were taken from moist-soil areas around the state to analyze seed abundance.

popular technique to provide food for migrating waterfowl in Illinois and beyond. Because the Midwestern U.S. is a critical mid-migration region where waterfowl gain resources that may influence survival and breeding success, it is important to understand production and management of these foods in the wetlands of Illinois.

More than 70 sites are managed by the Department of Natural Resources to provide habitat for migrating or wintering waterfowl, and many practice moist-soil management to meet wetland habitat objectives. However, manipulating water levels and seed banks requires active management, and site staff may not have the resources necessary to evaluate their success. Additionally, regional conservation plans rely on Illinois wetlands to provide food for millions of waterfowl during migration, but the combined contribution of DNR lands to overall foraging carrying capacity is not known. With these needs in mind, staff of the Illinois Natural History Survey's Forbes Biological Station and Frank C. Bellrose Waterfowl Research Center began an investigation of moist-soil plant seed abundance for waterfowl on DNR lands in fall 2005.

Ten DNR waterfowl management areas—from southern Illinois (e.g., Mermet Lake State Fish and Wildlife Area) to central Illinois (e.g., Anderson Lake SFWA) to northeastern Illinois (e.g., Des Plaines SFWA)—were selected each year for a study on seed abundance. The number of wetland units managed for moist-soil vegetation varied among sites, so two units (if available) were randomly selected at each location and 15 soil-core samples (4-inch diameter) were extracted from each wetland. Seeds were painstakingly separated from the soil in each core sample—one sample may take hours to sort and some seeds are smaller than a

(Photo by Chris Young, Springfield Journal Register.)

Moist-soil plant seeds vary in size, from smaller than a grain of sand to visible with the naked eye.

Issues regarding management of moist-soil habitats include:

- **Identifying and controlling invasive and non-desirable plant species:** Many species, such as cocklebur, may be controlled by flooding, mowing, disking soils or applying herbicides. Large, woody plants, such as willow or cottonwood, may require mechanical removal.
- **Managing water:** Considerations include maintaining and repairing levees, determining when to dewater in spring and reflood vegetation in fall (flood too early and ducks may eat the food too quickly, but flood too late and ducks won't be in the area during the early hunting season), and controlling the cost of pumping with increasing fuel prices.
- **Integration of crops:** To provide a mosaic of natural and agricultural foods and habitat for other wildlife species, managers may consider encouraging moist-soil plant growth between rows of crops.
- **Natural variation:** Despite their best efforts, conditions such as floods or drought mean that some years won't be ideal for moist-soil plants and managers will need to adapt priorities and techniques accordingly.

Research findings and field observations were put to good use during two-day workshops conducted on the practices and principles of moist-soil management. Presentations were made on the annual cycle of waterfowl, concepts and practices of moist-soil management, abundance of waterfowl foods in moist-soil units, food habits of waterfowl, wetland management for shorebirds, and plant and waterbird identification. Wetlands were visited at Anderson Lake SFWA, Spring Lake SFWA and Carlyle Lake SFWA where discussions took place about management plans and strategies and specific problems faced.

Biologists and land managers are applying the moist-soil management research results to wetlands throughout Illinois.

grain of sand—then dried and weighed. Seed-mass data were analyzed using specialized statistical software to derive estimates of moist-soil plant seed abundance that were representative of all DNR lands with moist-soil habitat.

Preliminary results indicated that moist-soil wetlands at DNR sites produced 919 pounds per acre in 2005 and 483 pounds per acre in 2006. Using energetic models, estimates suggested that, on average, one acre of moist-soil wetland provided enough food to support 119 and 63 mallard-sized ducks for 30 days in 2005 and 2006, respectively. The difference in seed yield between years wasn't surprising given that moist-soil plant seed production may vary significantly depending on growing conditions. Specifically, a major drought occurred in 2005 that completely dewatered many wetlands in the Illinois River valley and enhanced seed production. The overall average yield (701 pounds per acre) suggested that seed production on DNR lands during 2005–2006 was as good as or better than other published estimates from North America. DNR moist-soil wetlands were sampled again during late-summer and early fall 2007 and samples will be processed during winter 2008.

These types of studies provide site managers with information to evaluate the success of their management practices and understand how their sites compare with other areas of the state. And although researchers are occasionally guilty of spending too much time in the lab, when managers and researchers work together to solve land management problems, both parties improve the sciences of conservation and management, thereby benefiting wetland-dependant wildlife and the citizens of Illinois.

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Row crops vs natural vegetation

Corn and other crops provide food for ducks and geese, but are generally poor habitats for other wildlife. In contrast, the diversity and structure of vegetation in moist-soil wetlands make them attractive to many species, such as song and wading birds, amphibians and small mammals. Further, crop foods are high in energy but lack important nutrients found in moist-soil plant seeds; in fact, research indicates that ducks fed only corn (or soybeans) will actually lose weight over a period of weeks. Farmers typically consider moist-soil plants as weeds that compete with row crops and reduce yields. However, food plots for waterfowl rarely are intended for harvest (except by the birds themselves) and because soils stay moist, competition may be less than in production crop fields. Managing for row crops and natural vegetation together may provide habitat for many wildlife species and a diversity of foods—high energy grains and nutritious moist-soil plant seeds—for waterfowl.

Allowing moist-soil plants to grow within crop fields produces abundant food for wildlife.