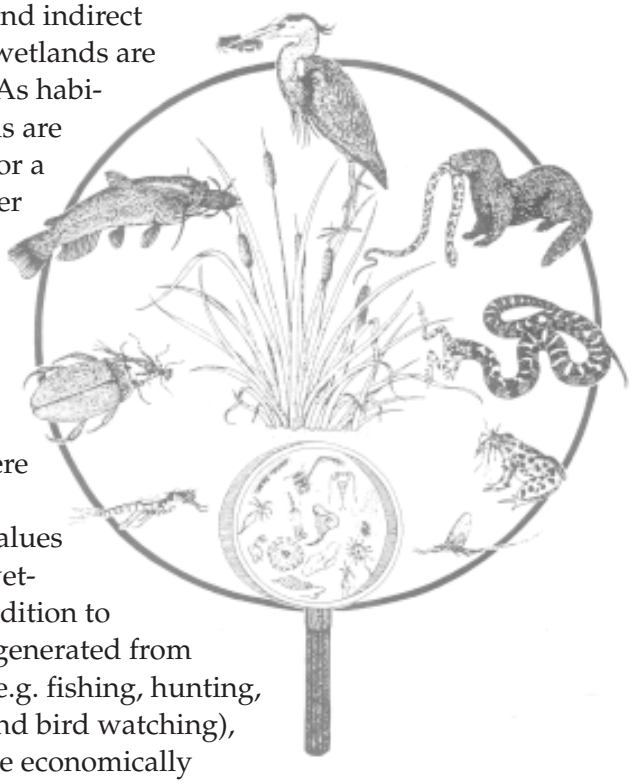
Managing Iowa Habitats:

Restoring Iowa Wetlands

Introduction

Greatly influenced by the retreat of the Wisconsinan glacier (10,000-12,000 years ago), the presettlement landscape of Iowa included a variety of natural communities. In addition to the seemingly boundless tallgrass prairies, there was water: rivers, streams, oxbows, lakes, ponds, marshes, bogs and sloughs. Nestled within and winding throughout the expansive grasslands were thousands of pools and streams. Collectively these water environments are referred to as wetlands.

Historically, Iowa's wetlands were viewed as a hindrance to land development. In less than 150 years, these rich resources were drained, filled, or otherwise altered, drastically changing the face of Iowa's land. Today, some 95 percent of Iowa's historic wetlands have been converted to other uses. Land development continues to threaten those that remain.



The direct and indirect benefits of wetlands are numerous. As habitat, wetlands are important for a large number of plants and animals. Beyond the direct benefit to wildlife, there are socio-economic values related to wetlands. In addition to the money generated from recreation (e.g. fishing, hunting, canoeing, and bird watching), wetlands are economically valuable in flood protection, water treatment (sediment trapping and nutrient removal), and erosion control.

Realizing the important roles wetlands play in Iowa's landscape, people are today restoring this diverse natural system

IOWA STATE UNIVERSITY
University Extension

Pm-1351h | April 1999

throughout the state. This publication is written to assist landowners in the identification, restoration, and management of shallow-water wetlands similar to those once scattered about Iowa's countryside.

What is a Wetland?

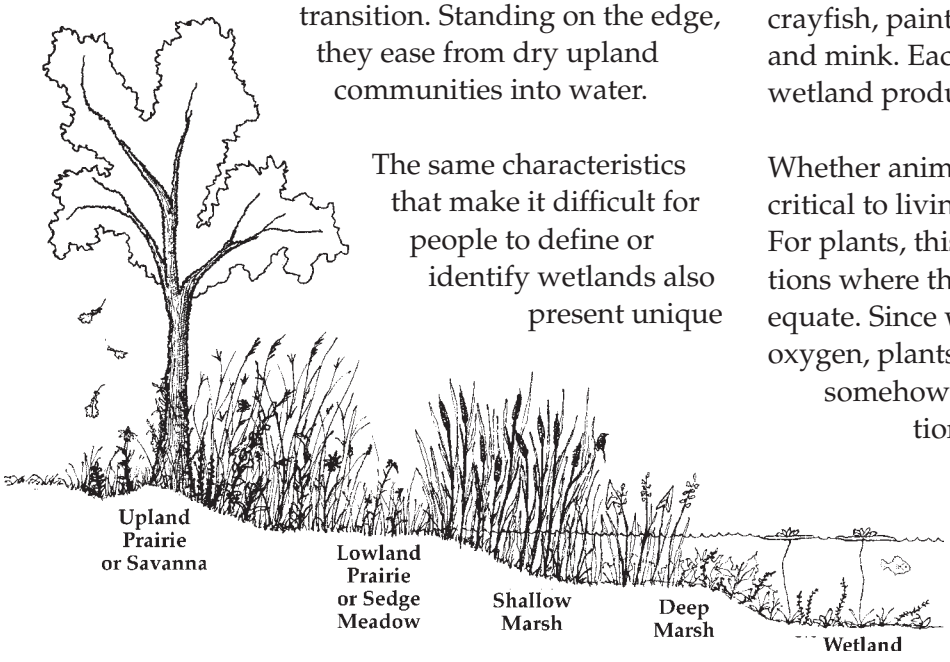
About 900 species of wildlife in the United States depend on wetland habitats at some stage in their life.

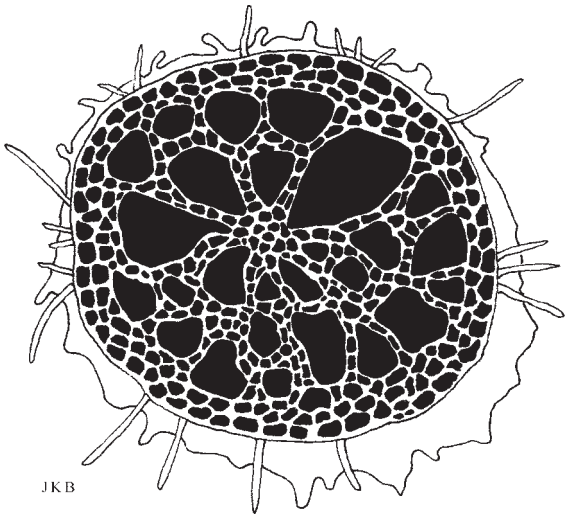
Although often thought of as wet, the presence of water alone does not constitute a wetland. Wetlands are defined by a combination of water, soil and plant features. Because of annual or seasonal changes in water level and/or plant cover, identifying wetlands and distinguishing their boundaries is sometimes difficult.

The current definition of wetland requires the presence of **water at or near the soil surface** during a portion of the year, **hydric soils** (soils developed under wet conditions), and **hydrophytic vegetation** (plants adapted to wet conditions).

Within this broad definition of wetlands, there are several classifications. Shallow lakes, as well as prairie marshes and potholes, are classified as *palustrine* wetlands. Typically they are no bigger than 20 acres and less than six feet deep. In general, these wetlands are areas of transition. Standing on the edge, they ease from dry upland communities into water.

The same characteristics that make it difficult for people to define or identify wetlands also present unique





Wetland plants have built in drinking straw-like bundles, called "aerenchyma", to move oxygen and other gases from air to the roots.

challenges to plants and animals using the habitat. In order to exploit this dynamic habitat, members of a wetland community must be adaptable.

A wetland community includes a variety interacting plants and animals adapted for life on the edge. Wetland plants and animals are adapted to seasonal and annual changes in water depth. A variety of animals depend on wetland habitats including zooplankton, dragonflies, crayfish, painted turtles, great blue herons, and mink. Each plays an important role in wetland productivity.

Whether animal or plant, adaptability is critical to living in a wetland environment. For plants, this means adapting to conditions where the supply of oxygen is inadequate. Since wetland soils often lack oxygen, plants that grow there must somehow compensate. One adaptation many wetland plants have is "aerenchyma". In addition to oxygen exchange, these straw-like bundles are similar in function to an

animal's kidney and remove harmful metabolic bi-products.

There are several types of plants typically found in wetlands including free-floating, submergent, and emergent. The majority of wetland plants are limited to water less than six feet deep. They contribute significantly to wetland productivity and provide a habitat niche for thousands of aquatic insects which, in turn, provide an important food source for other wetland animals.

General Guidelines for Wetland Creation and Restoration

In diversity and form, created or restored wetlands should imitate the ecological processes of those occurring naturally. The restoration process may be as simple as removing a drain tile or more complicated and costly. Planning is important. Contact local professionals to determine what (if any) permits are required and to discuss project objectives, site selection, wetland design, evaluation, and management.

Site Selection

Because of the tremendous variability within wetlands, identification of suitable restoration sites is challenging. The presence of water and certain plant species are good indicators. Soil type is also important. Soil descriptions and maps are in county soil surveys available through the local Natural Resource Conservation Service (NRCS). Their technicians can help interpret the maps and locate suitable sites.

The feasibility of establishing the desired water level, as well as the potential effect on adjacent lands, need careful consideration. Evaluation of the area's hydrological regime includes determining landscape position, water table depth, and groundwater flow patterns.

An assessment of existing vegetation will provide information about an area's potential seed bank. If possible, inventory adjacent land as well. This is important for revegetation as well as identifying troublesome exotic or invasive species such as Reed's canary grass.

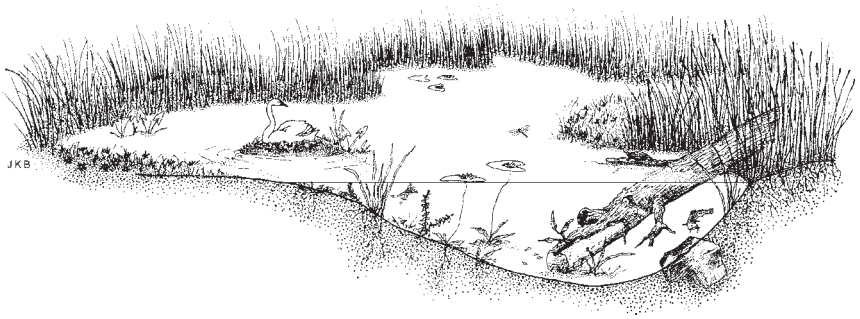
Finally, accessibility, property boundaries, and topography of the proposed site need to be studied. These items often determine the feasibility of a restoration.

Wetland Design

Wetland design is dependent on individual project goals. Water depth, slope, size, and shape are important characteristics to

Financial incentives, such as cost sharing programs, are available through federal and state agencies. Local groups like Pheasants Forever, Ducks Unlimited, and the Izaak Walton League may provide cost-share funding and other assistance.

A high quality restored wetland includes: emergent, submergent, or floating plants for food and cover; islands, coves, and peninsulas for wildlife and to enhance visual appeal; gentle slopes within the wetland basin; and uplands surrounding the wetland planted with native grasses and flowers for nesting cover.



Using local ecotypes (those appropriate for Iowa) may increase planting success.

determine prior to beginning restoration work.

Water depth and slope control several characteristics of a wetland including vegetation types, water level fluctuations, and water temperature. Plan on including a variety of depths. The NRCS recommends water depth of 3.5 feet in at least 1/2 of the wetland. By creating gentle slopes, water depth varies gradually and controls the absence or presence of many different types of plants and animals.

To approximate a natural wetland cycle or create favorable habitat conditions, it may be necessary to include a water control structure (e.g. a stoplog or low dam). Seasonal fluctuation of water levels duplicating natural wetland cycles improves habitat conditions for wildlife by altering water:cover ratios. Patches of vegetation (cover) dispersed throughout a wetland basin enhances wildlife diversity and usage.

Restoration size may be limited by financial and site constraints. However, wetlands as small as 0.25 acres are valuable to wildlife and people. Irregular shapes in wetland design tend to support higher biological diversity than regular shaped wetlands.

Evaluation

An important aspect of any restoration project is evaluation. Document the plants and animals inhabiting the area at the time of restoration. Continue this inventory annually for five years, then every two-three years thereafter. To evaluate the status of the restoration, comparisons with naturally occurring wetlands can be made. These evaluations can be used to direct future management plans by identifying potential problems.

Management

How a wetland is managed is partially determined by project objectives. Management options may be as simple as benign-neglect - that is, doing nothing. Conversely, plans can be as detailed as planting buffer strips, mowing or fencing adjacent lands, and managing water levels with small dams or pumping devices.

Methods and Techniques

Restoration preparation is site- and project-specific but may include clearing and grubbing, excavation, grading, removal or placing fill, compacting substrate, removing drain tiles, or creating water control structures such as low-head dikes or stoplogs.

Since several methods of planting wetlands are most easily done in the absence of water, prior to flooding determine how plants are to be introduced to the restoration site. Natural revegetation of a restored wetland is one method of establishing the wetland plant community. Although wetland seed banks are viable for long periods of time (some seeds up to 20 years), much of Iowa's wetland drainage occurred over 50 years ago. Thus, it is not an option for most restoration projects.

Alternative methods include seeding the site using locally collected seed or "inoculating" the area with sediment from nearby surviving wetlands. Providing the sediment holds a viable seedbank, this method is quite practical. Always obtain permission from landowners to harvest wetland seed or sediment. Either method is effective and easiest to accomplish in the absence of water.

Planting nursery stock (seeds or plants) can supplement natural revegetation processes. Water depth guides plant selection and matching plant type to

wetland type is important. Before purchasing wetland plants or seeds, review the project objectives and study specific plant and wildlife requirements.

Managing Restored Wetlands for Wildlife

Wetlands meet the basic needs (food, water, shelter, space) of a variety of wildlife including invertebrates, amphibians, reptiles, fish, birds, and mammals. All play important roles in wetland ecology. Wetland habitats can be designed to meet the needs of and attract specific animals.

Knowledge of a given animal's biology and habitat preferences can guide a management plan to encourage their presence. Because seasonal needs vary in wildlife, the best management practices include providing the right food sources throughout the year.

One example of a management goal may be to attract blue-winged teal, a relatively common dabbling duck throughout the Midwest. Blue-winged teal are one of the latest arriving migrants each spring. They prefer, like many dabbling species, to nest in uplands close to water. Because of their small size, blue-winged teal do not require tall plant cover for nesting and they generally avoid nesting in brushy cover.

Their diet is dominated by snails, insects, and crustaceans in early spring, and gradually shifts to seeds as the season progresses. Egg-laying females and flying young birds continue to select high protein foods. The chances of attracting blue-winged teal to your wetland increase if its characteristics meet the biological needs of this animal.

Management strategies to attract blue-winged teal may include keeping the areas close to water free of shrubs and other woody plants and encouraging a variety of emergent, submergent, annual and perennial wetland plants. In addition to providing shelter, such diversity in plant life creates habitat niches for huge numbers of different insects, a key food item and source of protein for blue-winged teal and many other wildlife species. Good grassy nesting cover on the upland adjacent to the wetland is also critical nesting habitat for teal and other waterfowl.

Brush piles, berry-producing shrubs, and nesting structures or houses will attract wildlife

Another management goal may be to increase mink populations. Mink, a semi-aquatic member of the weasel family, is valuable as a fur-bearer. Active primarily at night, it feeds on variety of wetland critters including frogs, crayfish, muskrats, and birds. An unoccupied muskrat den or bank burrow is used to raise young mink.

Muskrat

Habitat requirements for mink include an abundant food supply, permanent water, and undeveloped shores. Management strategies may include enhancing and protecting water quality. Limiting the use of pesticides on adjacent lands improves insect populations which are an important food item for mink prey foods, like frogs. Protect wetland shorelines from agricultural degradation and encourage grassy cover. Brushpiles can be made to serve as denning sites, if naturally occurring dens are not available.

Landowners should keep in mind that wetlands are natural communities. Desirable as well as undesirable plant and animal species will come and go to some degree. Predator-prey interactions are normal and should be expected. The key to successfully managing wetland habitats is diversity. The healthiest restored wet-

lands meet the needs of a wide variety of wildlife

Problems and Solutions
On occasion, some plants and animals can become a nuisance. If it becomes a persistent problem, avoid relying on short-term solutions (e.g. chemicals or poisons). Although offering a quick result, they do not address or modify the biological processes at the root of the problem. It is well worth the time it takes to employ management techniques that focus on long-term solutions.

Problems	Potential Solutions
Plants such as purple loosestrife, Reed's canary grass, and cattails are aggressive. Left alone, they can choke out other wetland vegetation.	Maintaining high water levels (flooding) is an effective means of long term control. Consult a professional for chemical control methods.
High concentrations of nutrients entering a wetland through runoff (nitrogen and phosphorues) adversely affect water quality and a variety of aquatic animals.	Long-term prevention of nutrients entering the wetland is accomplished by planting a 50- to 100-foot wide buffer around the wetland.
Sometimes muskrats and beavers can cause structural or vegetation damage.	Control for both muskrat and beaver involves trapping the animals during the legal season.
In high densities, Canada geese are extremely messy. They are attracted to wetlands with manicured or mowed edges.	The easiest way to discourage a goose siege is to keep the wetland edge "messy." This interferes with their ability to see predators and they avoid the area.

The Future of Iowa Wetlands

Iowa's wetland communities can never be returned to their presettlement condition. However, landowners have the opportunity to ensure that wetlands remain an important part of Iowa's natural communities. This publication includes a small portion of the information available for the creation and restoration of wetlands. Detailed information is available from a variety of other sources.

Sources for Additional Information and Technical Support

Iowa Department of Natural Resources, Wallace Building, Des Moines, IA 50319 515/281-5145

County Conservation Boards – Listed under the "Government-County" section of your local phone book

Natural Resource Conservation Service—County offices listed under "Government—Federal, USDA" section of your local phone book.

Soil Conservation District—Listed under the "Government--County" section of your local phone book.

The Nature Conservancy, 108 3rd St., Suite 300, Des Moines, IA 50309, 515/244-5044

Pheasants Forever, 1205 Ilion Ave., Chariton, IA 50049, 515/774-2238

Iowa State University Extension Service—County offices listed under the "Government-County" section of your local phone book.

Other Iowa State University Extension Publications Useful in Wetland Restoration

IAN-204	Iowa Wetlands
IAN-406	Natural Cycles in Iowa
IAN-407	Iowa Biodiversity
IAN-501	Changing Land Use and Values
Pm-1302e	Managing Iowa Wildlife: Raccoons
Pm-1351e	Nest Structures for Ducks and Geese
Pm-1351f	Managing Iowa Habitats: Fen Wetlands
Pm-1520	Agricultural Pesticide Impacts on Prairie Wetlands
NCR-338	Shelves, Houses and Feeders for Birds and Mammals
Pm-1626a	Riparian Buffer Systems

Selected Free Floating, Emergent, and Submergent Plant Species

Free Floating Species

Common Name	Scientific Name
water fern	*Azolla mexicana*
lesser duckweed	*Lemna minor*
star duckweed	*Lemna trisulca*
greater duckweed	*Spirodela polyrhiza*
watermeal	*Wolffia columbiana*

Emergent Species

Common Name	Scientific Name
giant bur reed	*Sparganium eurycarpum*
common cattail	*Typha latifolia*
water plantain	*Alisma plantago-aquatica*
arrowhead	*Sagittaria latifolia*
spikerush	*Eleocharis palustris*
American sloughgrass	*Beckmannia syzigachne*
soft stem bulrush	*Scirpus validus*
river bulrush	*Scirpus fluviatilis*
water smartweed	*Polygonum amphibium*

Submergent Species

Common Name	Scientific Name
sago pondweed	*Potamogeton pectinatus*
flat-stemmed pondweed	*Potamogeton zosteriformes*
pondweed	*Potamogeton nodosus*
coontail	*Ceratophyllum demersum*
water shield	*Brasenia schreberi*
yellow water lily	*Nuphar advena*
white water lily	*Nymphaea tuberosa*
common bladderwort	*Utricularia vulgaris*

Funding
This publication has been funded in part by a grant from the Resource Enhancement And Protection—Conservation Education Board (REAP-CEP), grant #18N to the Iowa County Soil and Water Conservation District.

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Stanley R. Johnson, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.