

# WETLANDS

In geological terms, the landscape of the Chicago region has existed for just the blink of an eye. Young landscapes like ours, landscapes that have just emerged from under mountains of ice or lakes of water, are very poorly drained.

The elaborate systems of streams and rivers, branching like trees, that develop on older lands, have not yet appeared. Substantial parts of our landscape don't drain at all. Water either sinks into the ground or evaporates. Undrained depressions with no outlets—or with outlets that function only during periods of very high water—are scattered over the entire region.

This young landscape, combined with the many layers of varied deposits left by the glaciers and by post-glacial lakes, produces one of the most diverse collections of wetlands in North America. The pages that follow will describe major features of the most distinctive of these wetland types.

## HOW WET ARE THEY?

Some wetlands are submerged year around. Others are wet in spring and early summer and dry by August. In some wetlands, water can be hip-deep. In others, the soil is saturated but little or no water stands above the surface. These differences exert a powerful influence on the vegetation of a wetland. The vegetation, in

turn, exerts a major influence on what animals live there.

## WHAT IS THE CHEMISTRY?

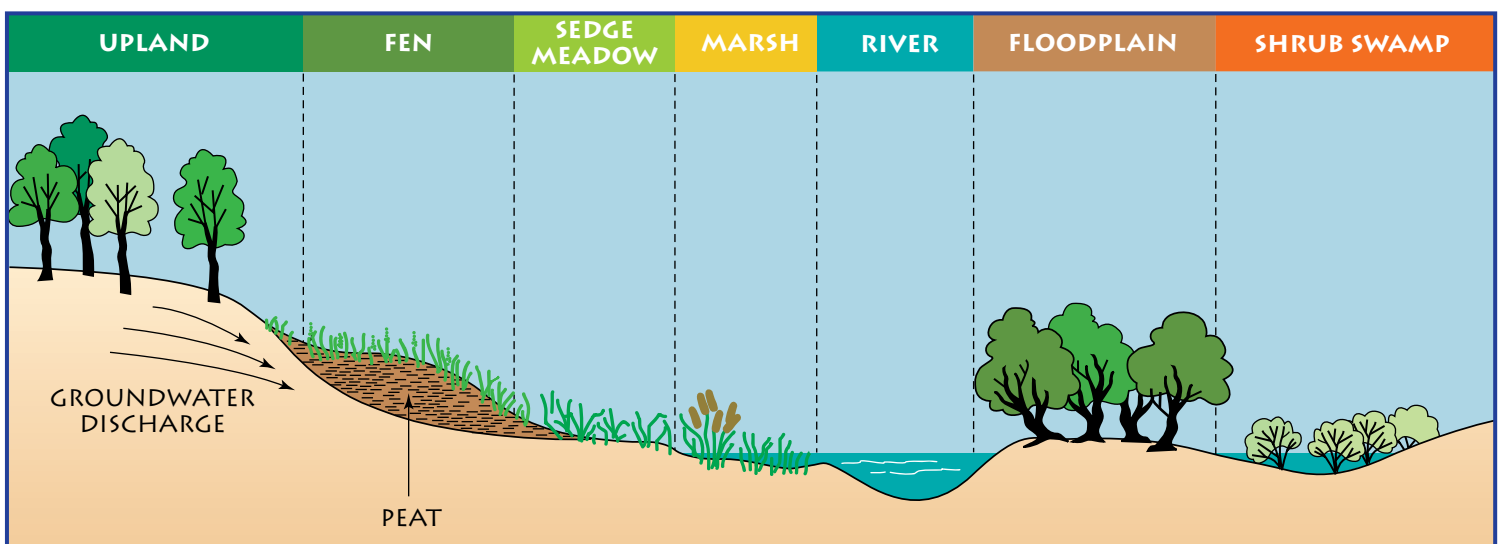
Soil chemistry plays a particularly important role in two of our wetland types: fens and bogs. Both of these communities depend on conditions created by the glaciers. Fens grow on slopes that are constantly fed by ground water flowing out of sand or gravel deposits. The ground water picks up calcium and magnesium carbonates from the sand and gravel. The highly alkaline water creates conditions that only a select group of calcium-loving plants can tolerate.

Bogs are at the opposite end of the pH scale. Their highly acidic conditions favor the growth of another select group of plants. While fens depend on a constant flow of water, bogs are usually in basins where drainage is either non-existent or extremely limited. Kettleholes in moraines are prime locations for bogs.

Sedge meadows share many species with wet prairies. A string of dry years would allow a sedge meadow to be invaded by prairie species, while a period of unusually wet conditions would allow sedge meadow species to invade the normally drier prairie.

## WHERE ARE OUR WETLANDS?

Most of the wetlands in the Midwest have been either drained or filled. In Illinois the loss



Typical wetland distribution in the Chicago region. Fens occupy hillsides where a constant flow of ground-water keeps them wet. Sedge meadows often grow where soils are saturated but there is little standing water. Marshes need standing water for at least part of the year. Shrub swamps are likely to be in permanently wet ponds. Bogs are usually in isolated depressions.



Early spring in Cowles' Bog at the Indiana Dunes National Lakeshore. The huge leaves of skunk cabbage (*Symplocarpus foetidus*) grow next to the unfolding fiddle-heads of ferns.

has been greater than 90 percent. In Indiana it is more than 85 percent. Losses in the Chicago Wilderness area have been less drastic than in other parts of these states, but nonetheless most of the wetlands that were here 200 years ago are gone.

Much of the lakeplain where Chicago now stands was wet prairie, sedge meadow, and marsh. Large scale drainage projects have lowered the water table several feet, turning wetland into dry land. The remnant marshes around Lake Calumet are the only surviving wetlands in the city.

For the past century, farmers in our region and throughout the Midwest have been laying drain tile in their fields to make wetlands farmable. Drain tile are placed in deep trenches which are then refilled. The separate pieces of tile are laid end to end, but the joints are not cemented. Water percolating down through the soil enters the tile at the joints and then flows away through the tile.

Elaborate tile systems have been created, with small lines of tile feeding into larger lines which ultimately connect with drainage ditches and rivers.

When conservation agencies buy former farm lands, they either allow these tile systems to decay naturally or deliberately break them up. With the tile gone, former corn fields may return to the hydrology that existed before they were plowed. Frogs and toads may sing again in places that, for a while, were dry land.

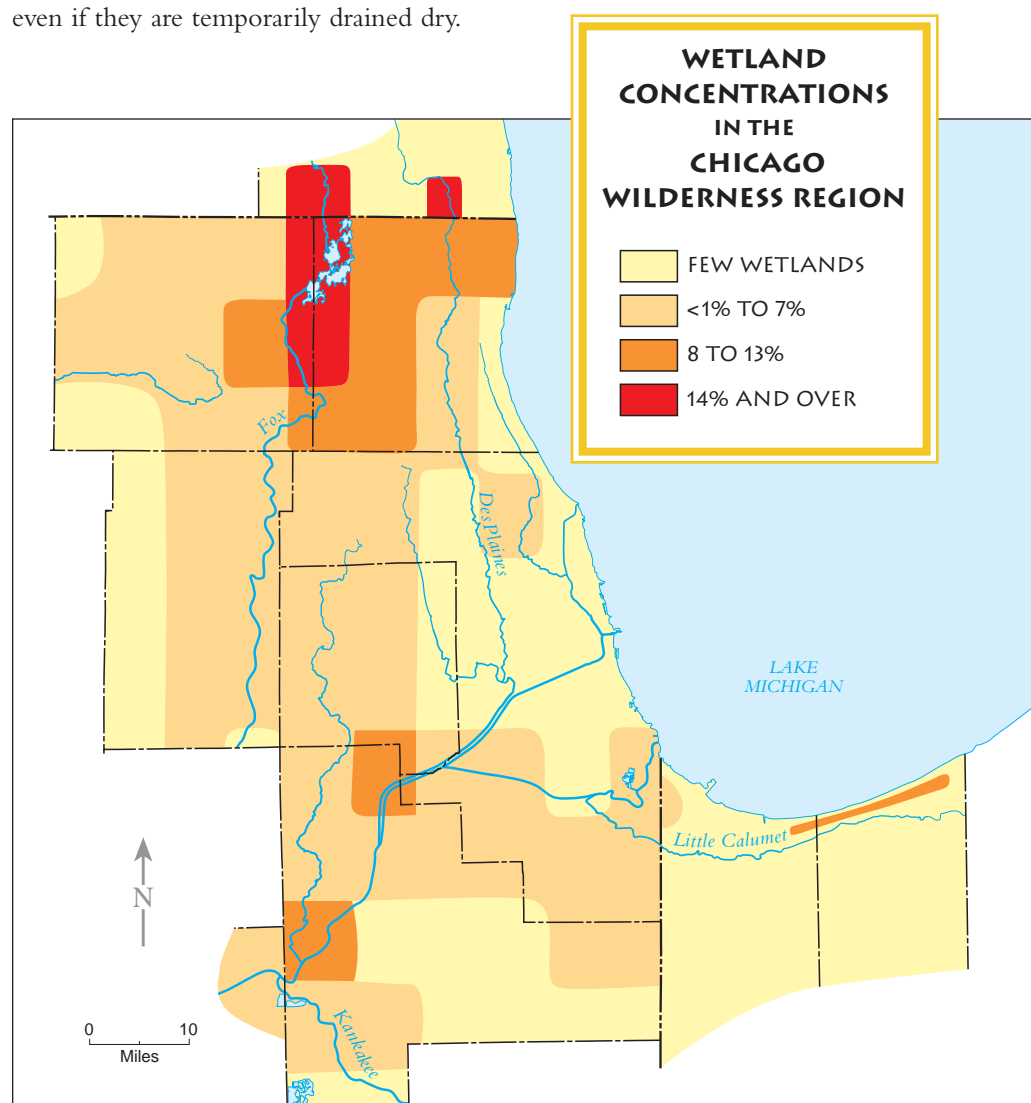
### LEGAL WETLANDS

The federal Clean Water Act forbids the filling of wetlands. The passage of this law led to the creation of an official legal definition of a wet-

land. The U.S. Army Corps of Engineers, which oversees this section of the Clean Water Act, defines wetlands as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.”

“Normal circumstances” means no drain tile, so areas that were wetlands are still wetlands, even if they are temporarily drained dry.

The major concentrations of wetlands in the Chicago Region are on the moraines, along the lower Des Plaines River, and in swales between old beach ridges on the lake plain in Indiana. The percentage figures in the map key refer to the amount of land in each area that is wetland.



## WETLANDS

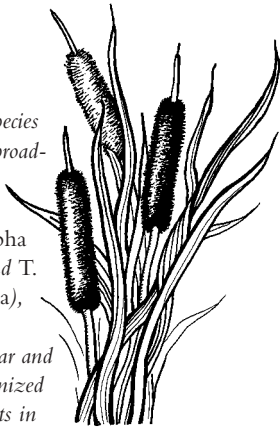
# Marshes and Shrub Swamps

The pink bloom of smartweeds (*Polygonum* sp.) rise from the waters of a marsh in DuPage County, Illinois.



## Cattails

Our two species of cattails, broad-leaved and narrow-leaved (*Typha latifolia* and *T. angustifolia*), are the two most familiar and easily recognized marsh plants in our region, but the historical evidence we have suggests that they were not very common in the pre-settlement landscape. Indeed, the narrow-leaved cattail may not be native to the region. Siltation and other such disturbances may account for the great increase in cattail populations. Land managers responsible for maintaining healthy, diverse marsh communities worry about the ability of cattails to form dense stands that exclude all other plants.



Marshes occur in a variety of circumstances in the Chicago Wilderness. Some are found in isolated kettleholes in the moraines. Others are located in the shallow water at the edges of lakes or along the banks of rivers. There are still a few marshes in low places in the Chicago Lake Plain and in the swales between the beach ridges that mark old shorelines of Lake Michigan in northwest Indiana.

Draining and filling have largely eliminated marshes from Illinois outside the Northeast Morainal and Lake Plain divisions and along major rivers. In Indiana, the once vast Kankakee Marshes have been nearly obliterated by drainage projects and the channelizing of the Kankakee River.

Water depth is a major controlling factor of marsh vegetation. In the deep, open waters of lakes and rivers, typical plants are tiny, floating algae that absorb their nutrients from the surrounding water.

In the deepest marsh waters, floating plants, some with submerged leaves, some with floating leaves, replace the algae. However, the more typical marsh plants are emergent species. They are rooted in the bottom and have erect stems that rise above the water. Cattails (*Typha* spp.) are the most familiar of these, but in healthy, diverse marsh communities, cattails are only a part of the plant life.

In late summer, the waters of marshes may turn bright green as duckweed (*Lemna* spp.), the world's smallest flowering plant, seems to cover every square inch of the surface.

Fire played a major role in the ecology of

marshes in the past. Of course, the presence of water would tend to prevent fires, but many marshlands are dry in late summer. The productivity of marsh communities provides abundant fuel, producing very hot blazes. The experience of land managers is that periodic fires help maintain the diversity of marsh plant communities.

Shrub swamps grow in shallow ponds. Buttonbush (*Cephalanthus occidentalis*) is the most common dominant in such communities. Other shrubs often present include red-osier dogwood (*Cornus stolonifera*) and various species of willows (*Salix* spp.).

In recent years, a European plant called purple loosestrife (*Lythrum salicaria*) has invaded marshes and other wet areas throughout eastern North America. This aggressive exotic species can completely take over a marsh, driving out native plants and eliminating birds by wiping out the rigid-stemmed plants they use for nest supports. The U.S. Fish & Wildlife Service is currently testing a loosestrife-eating beetle in marshes in the Chicago area to see if this insect can control the loosestrife.



These globular flowers give buttonbushes their common name. The flowers emerge in July and August.

## Sedge Meadows

Sedge meadows are most easily recognized in early spring. Look for low, flat ground flooded with a few inches of water and studded with lumpy tussocks or hummocks. The tussocks reveal the presence of *Carex stricta*, the most common sedge of the sedge meadow.

Sedges belong to the same order of plants as grasses, but they form a separate family within that order. Papyrus, the plant the ancient Egyptians turned into paper, is a sedge, as are bulrushes.

Some 800 species of sedges belong to the genus *Carex*. Almost 150 species of this genus are native to the Chicago region, and several others have been introduced. Most of these are found in various kinds of wet habitats. Some are quite common; others are quite rare. Illinois lists 32 members of the genus as endangered or threatened. This is a reflection of the massive destruction of wetlands that has occurred in the state. Half of these listed species are thought to survive somewhere in the Chicago region. This is a reflection of the survival of greater biodiversity in this region than in the rest of the corn belt.

### ORGANIC SOILS

The tussocks of *Carex stricta* are composed of peat formed of the partly decomposed roots and rhizomes (underground stems) of the plant. The soil between the tussocks is also peat. Peat soils are classed as organic soils, meaning they are made almost entirely of the partially decayed remains of once-living plants. Mineral soils, on the other hand, are formed of sand, gravel, silt, clay, and other inorganic materials. Organic soils are common in wetlands where low oxygen levels in the saturated soils prevent the decay of dead plants. If organic soils are composed of peat that has decayed to the point where the individual plant parts that



The hummocks created by the sedge called *Carex stricta* show plainly in early spring. The standing water will be gone before mid-summer and the hummocks will be hidden by new growth.

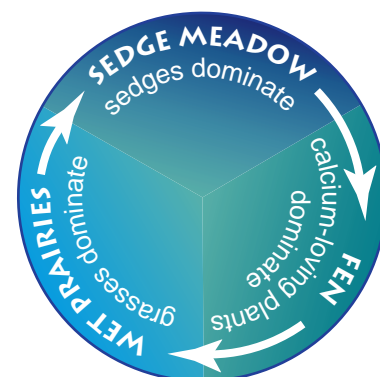
make it up are not identifiable, the soil is called muck.

Several other species of *Carex* are likely to be present in sedge meadows along with a number of species that also occur in other communities—particularly in wet prairies. Canada bluejoint grass (*Calamagrostis canadensis*) is perhaps the most common of these. In late summer, the tall stems of joe pye weed (*Eupatorium maculatum*) are topped by large clusters of purple flowers. Joe pye weed also grows in savannas.

Where the water in a sedge meadow is high in calcium, plants typical of fens can often be found.

Sedge meadows typically flourish where soils remain saturated most of the time, although periods when standing water is present are rare. Fire—which prevents invasion by woody plants—is important to the survival of this community.

Peat will burn if it dries out, so in years when drought strikes, fire could consume the muck soil of the meadow and drastically change conditions. Depending on circumstances such as water levels, marsh vegetation could replace the sedge meadow. If conditions are drier, wet prairie plants could invade.

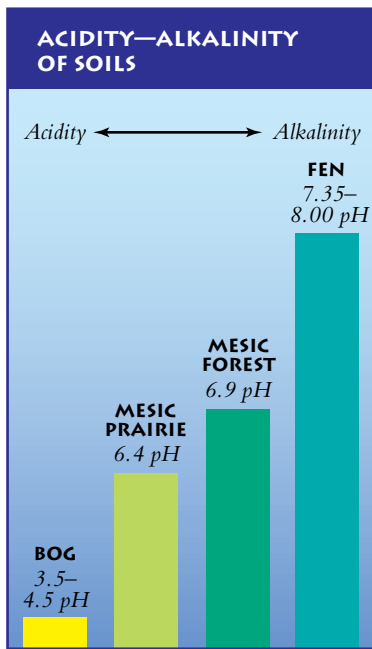


### Some Shared Species of Wet Ground

These three wet communities share many species. The differences among them are more likely to be based on the relative importance of various groups of species rather than on the presence or absence of any particular species.

## WETLANDS

## Fens



The pH scale measures the acidity and alkalinity of organic materials. On this scale, each whole number represents a ten-fold change. A fen with a pH of 7.4 is ten times as alkaline as a mesic prairie with a pH of 6.4. Soil pH is an important factor determining the distribution of plants.

Fens come in many varieties, but what they all have in common is a continuous source of calcium- and magnesium-rich ground water. In our region, the source of this ground water is in layers of sand or gravel deposited by melt water flowing from a glacier. These sand and gravel aquifers typically sit atop a relatively impermeable layer of glacial drift that prevents water from sinking farther below the surface.

Since it can't go down, the water flows sideways until it emerges on a slope. Along the way, the water has picked up the minerals that give fens their unique chemistry. The flow

river was a torrent carrying a flood of melt-water from the wasting glacier. Others are similarly situated in glacial deposits where erosion has exposed gravel aquifers on hill-sides.

In some places, the flowing ground water carries such a heavy load of minerals that some of them precipitate out and form a porous rock called tufa. Sometimes, marl, a loose, crumbly material formed of calcium and other minerals, collects. Fen soils are formed of peat.

Places with high mineral concentrations and heavy flows may be separated out as spring runs or marl flats. Calcareous seeps are areas



White lady slippers (*Cypripedium candidum*) are among the beautiful orchids that show an affinity for the alkaline, peaty soils of fens.

from the aquifer may be sufficient to keep the water liquid through the winter.

Terrain, the amount of flow, and the amounts of minerals in the water all affect the precise nature of the fen community. In small amounts, calcium is an important plant nutrient. At high concentrations, it creates caustic conditions that place strong limitations on plant life. Only species adapted to these unusual conditions can live in fens.

Many of our fens are along the Fox River on the slopes of morainal hills, kames, and gravel terraces left from the time when the

with high flow but with more organic matter and nutrients in their soils than occur in spring runs. Graminoid fens occur where flow is reduced and still more nutrients and organic matter are in the soil. Graminoid fens share many plants with the prairies. Such dominant prairie grasses as big and little bluestem (*Andropogon spp.*) and Indian grass (*Sorghastrum nutans*) can be found growing along with calcium-loving species like grass-of-parnassus (*Parnassia glauca*) and Ohio goldenrod (*Solidago ohioensis*). Sedges are also common.

Graminoid fens depend on periodic fire. If fire cannot reach them, shrubs and trees invade.

# Bogs



Open water, sedge mats, and bog forest appear in this picture of Volo Bog in Lake (IL) and McHenry Counties. The sundew (left) uses sticky filaments to capture insects.



The grass pink (*Calopogon tuberosus*) decorates summer bogs with its flowers. This species can also be found at the other end of the pH scale in fens.

**B**ogs are remnants of a time when the Chicago Wilderness region was covered with vegetation like that of present-day Upper Michigan. In early post-glacial time, a spruce-fir forest dominated this region. As oak-woods and prairies replaced this boreal forest on the uplands, bogs hung on in small glacial depressions where drainage was limited or totally absent.

Bogs are striking examples of the ability of plants to change their environment. They can, over time, fill a pond or small lake with peat that forms a substrate firm enough to support trees.

Bog waters are cold, extremely acid, and very low in oxygen. Mineral nutrients are locked up in the peat and therefore unavailable to plants. These conditions place severe limits on plant life. A group of species has adapted to these conditions. These bog plants dominate this extreme environment and are unlikely to be found anywhere else.

Bog development is likely to begin with the formation of a floating mat of plants. Sedges are a major element in this mat as are mosses, particularly Sphagnum moss.

As this mat thickens, it becomes firm enough to allow shrubs to root in it. Bog birch (*Betula pumila*) may begin to grow, along with leatherleaf (*Chamaedaphne calyculata*) and other species of heaths, among them, cranberries (*Vaccinium macrocarpon*). In time, trees may

invade, particularly tamarack (*Larix laricina*), a deciduous conifer whose needles turn a rich gold before dropping in the fall.

In our region, the final stage in this process is considered to be a tall-shrub bog dominated by winterberry (*Ilex verticillata*) and poison sumac (*Rhus vernix*). The exotic shrub glossy buckthorn (*Rhamnus frangula*) has invaded this community in recent years.

The stages in bog development can often be seen as a series of concentric circles in existing bogs. The outermost circle is a narrow moat of open water next to the shore of the lake or pond. Inside that is a sedge mat, then a low shrub bog, a forested bog, and a tall-shrub bog. A small pond of open water may remain at the center of this sequence.

In the nutrient-poor environment of the bog, some plants have developed the ability to capture insects to provide themselves with nitrogen and other essential elements. The sundews (*Drosera spp.*) snare their prey on sticky filaments. The pitcher plants (*Sarracenia spp.*) trap insects in cups baited with sugar water.

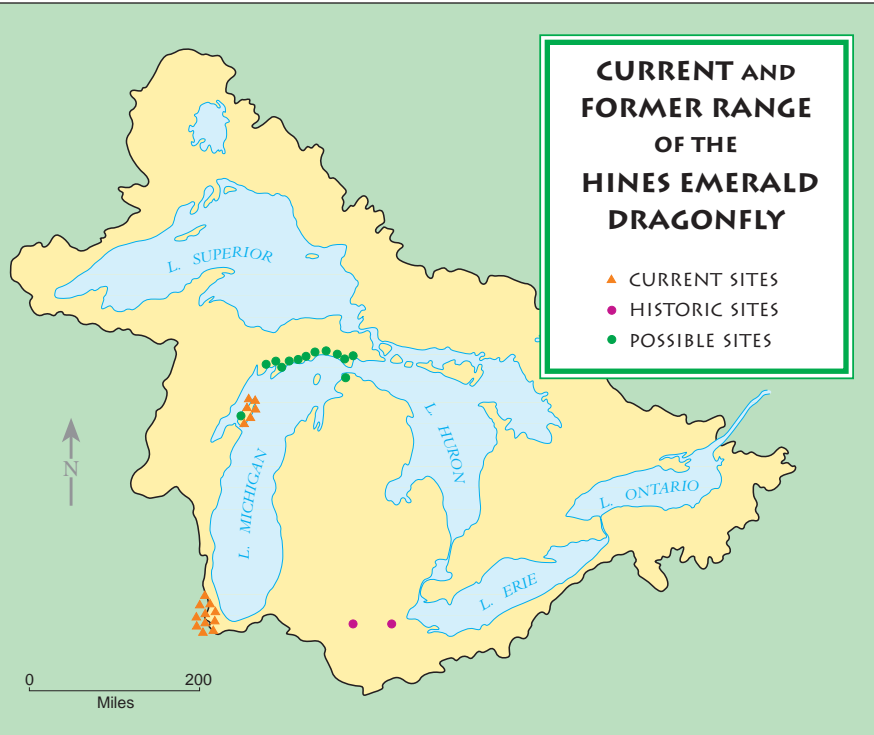
Bogs are known for the beauty of their flowers. The heath shrubs produce bell-like blooms and miniature versions of azaleas. A number of orchids—like the stemless lady slipper (*Cypripedium acaule*)—are bog specialists. Others, like the grass pink (*Calopogon tuberosus*) are often found there.

## WETLANDS

# Insects



The green damer (*Anax junius*) hawks for mosquitoes above the wetlands of Chicago Wilderness.



Dragonflies are among the most familiar sights at summer marshes. These ancient insects—their ancestry goes back to the coal forests—are predators that win the affection of humans by eating mosquitoes. Their larvae live in water where they prey on small aquatic creatures.

At a few special places in Chicago Wilderness, wet places along the lower Des Plaines River where a torrent of meltwater scraped away the glacial debris and exposed the 400 million year old bedrock, a bright green dragonfly called the Hines emerald (*Somatochlora hinena*) hunts insects over marshes, sedge meadows, and forest edges. The Hines emerald is known from a few sites in Cook and Will Counties; it is known from a few sites in Wisconsin's Door County where this same dolomite bedrock is exposed. Historical records exist from northern Ohio on the same bedrock.

The Chicago Region is at the center of efforts to protect this rare and endangered insect.

## Birds

Wetlands are rich in bird life. Dabbling ducks like the blue-winged teal (*Anas discors*) sit on the surface scooping up duckweed, sedge seeds, and snails. Pied-billed grebes (*Podilymbus podiceps*) use their control of their own buoyancy to sink like submerging submarines until only their heads remain above the surface, then dive in search of small fish, crayfish, and tadpoles.

Soras slip among the reeds searching out snails, insects, and smartweed seeds. The marsh wren (*Cistothorus palustris*) sings its rattling song from the cattails and yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) sing a song that sounds like somebody dropping a handful of nails in a coffee grinder.

Great blue herons stand motionless in shallow water waiting for a fish to get careless and reveal its position while black terns (*Chlidonias niger*) swoop through the air picking off flying insects.

Lists of endangered and threatened birds are depressingly heavy on wetland species. Three of the birds mentioned above are on the endangered list in Illinois. The Chicago region is a refuge for these



birds simply because so many wetlands still survive here.

Perhaps our most vulnerable birds are the big colonial nesters. The loss of a single nesting location can leave dozens—in some cases hundreds—of potential nesting pairs without a home. Five species of these colonial nesters live in the Chicago Wilderness, although the cattle egret lives at only one site, Will County's Lake Renwick. Cattle egrets

A common moorhen (*Gallinula chloropus*) helps her chicks learn to recognize food. A threatened species in Illinois, the moorhen nests in several locations in our region. These birds were photographed at Chicago's Lake Calumet.

are African birds that managed to get to North America on their own. They nest in wetlands, but they usually feed in pastures.

The double-crested cormorant is actually more of a river and lake bird than a wetland bird. This diving bird may go down 25 feet or more after fish. It would find little to interest it in seasonal ponds.

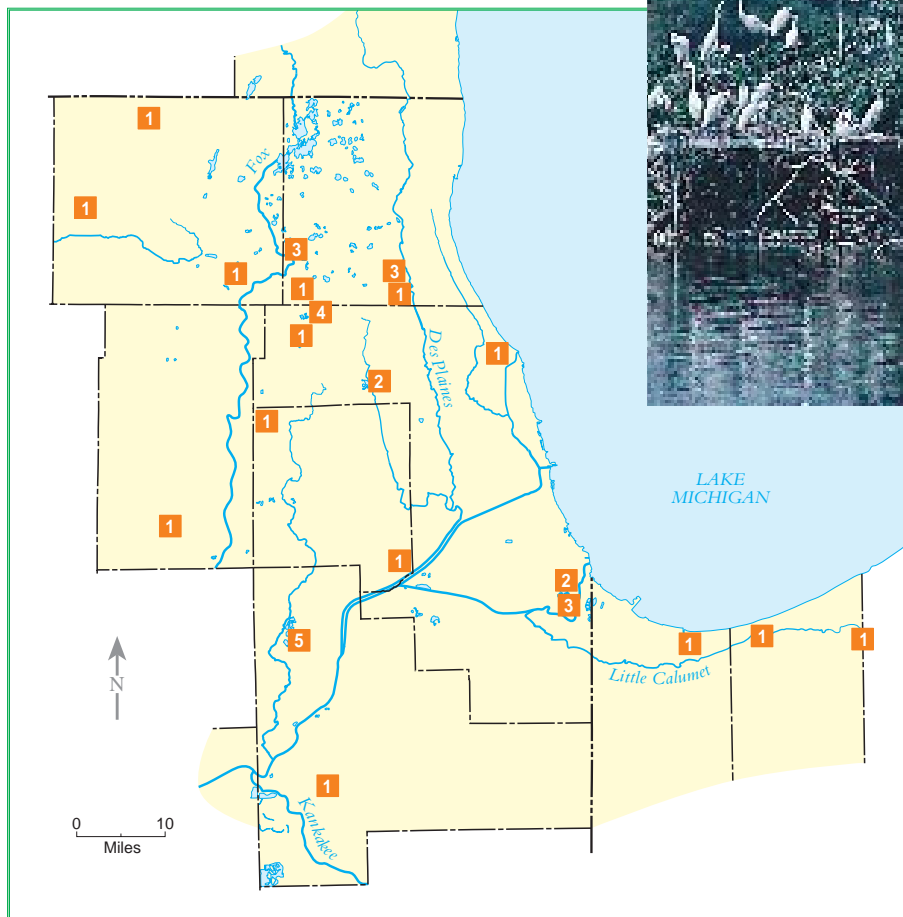
The colonial herons--the great blue, the great egret, and the black-crowned night heron- fish the shallow waters. Their usual hunting strategy is to stand very still and wait for something to move. They usually grab things in their bills, although the great blue may use its bill as a spear for capturing larger fish.

Great blue herons and great egrets are off and flying by dawn, looking for ponds and marshes that are likely hunting areas. Black crowned night herons, as their name suggests, do more of their work after dark. They leave their nesting grounds at dusk. The night herons usually nest in trees, but at the Big Marsh near Lake Calumet, they have adapted to nesting on the ground amid rushes.

Large numbers of big birds need large areas for hunting. These birds may travel 10 to 15 miles in search of food. It takes lots of small wetlands to support the animals living in one rookery in one big wetland.

The most familiar wetland bird is the red-winged blackbird (*Agelaius phoeniceus*), a wetland species that has invaded uplands in recent years. Red-wings seem to do well even where cattails have completely covered all the water in a wetland. Yellow-headed blackbirds appear to need some open water.

*Lake Remwick is an old gravel quarry in Will County that is our largest rookery. All five of our colonial nesting waterbirds nest on the islands in this lake.*



Colonial nesters of the Chicago region include double-crested cormorants (*Phalacrocorax auritus*), great blue herons (*Ardea herodias*), great egrets (*Casmerodius albus*), black-crowned night herons (*Nycticorax nycticorax*), and cattle egrets (*Bubulcus ibis*). Cattle egrets nest only at Lake Remwick in Will county. Numbers on rookery sites show number of colonial species nesting at the location.

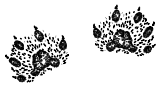


Soras (*Porzana carolina*) slip between the stems of emergent vegetation in search of insects, snails, and seeds. Smart-weed seeds are a favorite food.



## WETLANDS

# Mammals



Mink tracks



The river otter was once common in our region, but has been extirpated. As water quality improves in our rivers, the reintroduction of this species is a possibility.

The skins of beavers were the first products of the Midwest to enter the world market. Native Americans controlled this end of the trade in the early days, but late in the 1600s, the French arrived. Later, British and American traders took over the business. The hides of other animals were traded too, but beavers (*Castor canadensis*) made up the bulk of the commerce. Their skins were turned into hats in Europe.

The trapping of beavers was a huge business, so big that it eventually killed all the beavers. Historical accounts say that by about 1850, beavers were completely gone not only from the Chicago Region but from the rest of Illinois and Indiana as well.

They are now found in suitable habitat throughout the Chicago region. The return of the beaver was accomplished with a certain amount of stocking, but mainly, the beavers made it back on their own. They were helped by the extensive network of drainage ditches dug to keep the water out of croplands across Illinois.

Beavers not only live in wetlands, they make wetlands. Their dams turn sections of

streams into ponds. The dams deepen the water providing room for underwater entrances to beaver lodges. Along larger rivers where banks are suitable the beavers live in burrows with underwater entrances.

Muskrats (*Ondatra zibethicus*) are the most visible of marsh mammals. They are frequently seen swimming, especially near dawn and dusk. Their houses are low domes—much smaller than beaver lodges—roofed with mud and marsh plants. Birds as diverse as Canada geese (*Branta canadensis*) and black terns nest on top of muskrat houses.

Muskrats are prolific animals. When populations are at peak levels, their appetites can significantly reduce cattail stands.

Mink (*Mustela vison*) eat muskrats and virtually anything else they can overpower. They sometimes take over muskrat houses after eating the inhabitants. They are active mainly at night, but sometimes continue hunting into the morning when early visitors might catch sight of one.

River otters (*Lutra canadensis*) were once part of the Chicago Wilderness. They have been extirpated from much of their former range in the Midwest. Today, they are occasionally seen along the Mississippi and in extreme southern Illinois.

Occasional sightings, including some from McHenry, Kane, and DuPage County in recent years, were probably wandering individuals looking for a home. With better water quality and some limits on development along rivers, they might find one.

The huge lodge and the gnawed tree trunk are both signs of the presence of beavers. Beavers fell trees for food and for construction material for lodges and dams.

## Herps

A female Blanding's turtle (*Emydoidea blandingii*) was captured at Spring Bluff Preserve, a Lake County (IL) forest preserve on Lake Michigan immediately south of the Wisconsin Border. She was equipped with a radio tracking device and released. She began traveling north, crossing the state line into the Chiwaukee Prairie, a preserve managed by The Nature Conservancy of Wisconsin. There she took up residence at a pond. She had traveled a total of 765 meters, about half a mile.



In her wandering, she crossed land held by a county preserve system and a private conservation organization. In Illinois, she was a member of a species on a "watch list." The watch list is reserved for animals and plants whose future is a matter of concern but who are not considered in sufficient peril to make the endangered or threatened list. However, when she crossed the state line, this turtle became a member of a threatened species, since that is the status of Blanding's turtle in Wisconsin.

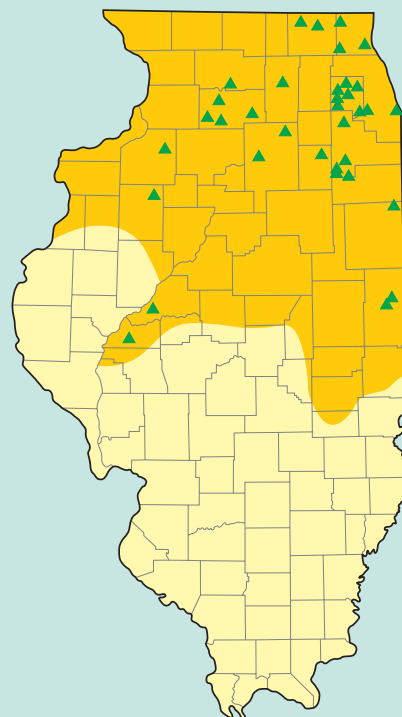
The travels of this turtle point up the importance of cooperation among conservation agencies and states. They also emphasize the importance of preserving wetlands—even small wetlands. Many animals visit wetlands too small to support permanent populations. Some wetlands can support small populations that may die out from time to time. These populations must be replenished by migrants from other areas, and that recolonization cannot happen if great distances or other obstacles prevent it.

Adult Blanding's turtles prefer shallow ponds with at least some open water. They do not live where dense stands of cattails dominate the wetland. Young animals of this species have been observed in several different kinds of wetlands. They have been known to live in burrows dug into the hummocks created by *Carex stricta* in sedge meadows.

Many wetland herps are confined to areas with permanent water. Snapping turtles (*Chelydra serpentina*) belong to this group as do bullfrogs (*Rana catesbeiana*).

Kirtland's snake (*Clonophis kirtlandii*) is a species that can be defined as an animal of wet prairies, wet savannas, or wetlands. Like the massasauga, it uses crayfish burrows, and it spends much time in them. Earthworms are a major food source and they may be captured underground.

### RANGE OF BLANDING'S TURTLE IN ILLINOIS



*Blanding's turtle* (*Emydoidea blandingii*) (above left) is a once-common wetland species that has been eliminated in most of its historic range by habitat loss. The map shows the historic range in color. The triangles indicate locations of recent sightings of the species. Baby snapping turtles (above) will look for permanent bodies of water to provide them with a home.