This beautiful wetlands poster is brought to you by the thousands of private citizens who have contributed to the Nongame Wildlife Fund on their state tax form or by direct donation to the Fund. It is designed to portray the beauty and values of wetland habitats, one of the most important elements of Michigan's rich natural heritage.

MICHIGAN WETLAND – A HISTORY

Twelve thousands years ago the last great ice age was coming to an end in Michigan. As the glaciers melted, they left behind a changed landscape. Water was everywhere. New river channels cut through the sands and gravels and drained into broad lowlands, flowing finally into lake basins carved by the glaciers. Massive chunks of ice became kettle lakes, while winds sculpted coastal dunes of shifting sands.

Slowly drainage patterns stabilized, and lake levels fell. Forests returned on the higher ground, while vast grassy marshes spread across the former lakebeds and coastal lowlands. Over time, the shallower kettle filled with plant debris, becoming bogs. Perhaps a third or more of the state was covered by wetland habitats. These new habitats filled with wildlife in great abundance, including mastodons, caribou, and bear-sized giant beavers. These species soon disappeared, to be replaced by more familiar creatures.

A succession of American-Indian cultures in Michigan made efficient use of wetlands. Open waters of lakes and rivers served as transportation corridors, while swamps and marshes produce wild game and food plants. These Native Americans understood the value of wet places. Then, about 200 years ago, an invasion of Europeans arrived, bringing with them the view that the wilderness was an enemy, to be subdued and conquered. Wetlands, in particular, were considered mysterious and forbidding places-wastelands to be drained or filled at the earliest opportunity. The prevailing attitude, reinforced by acts of Congress and State Government, led to the destruction of millions of acres of wetlands.

This "reclaim the wetlands" attitude continued to the middle of this century, when nearly three quarters of the original wetland area in our state (estimated at over 11 million acres) had been destroyed. Michigan's abundant freshwater resources, a gift of our glacial past, have too often been squandered and wasted. Only in recent years have we begun to realize the essential role that wetlands play in nature's, and the human-economy.

But despite new laws and the efforts of government and private conservation groups, the destruction of wetlands continues, through on a reduced scale.

This poster, produced by the Department of Natural Resources (DNR) Nongame Wildlife Fund, illustrates a small sample of abundant plant and animal life found in Michigan wetlands. We hope that it will encourage the study, appreciation, and conservation of wetlands and associated wildlife in our water wonderland.

WHAT IS A WETLAND?

Wetlands are characterized by the presence of water that saturates the soil or covers the land for most or all of the year. This leads to the development of plant and animal communities that are adapted to these conditions and which differ from those in purely aquatic (lakes, rivers) or dry land environments.

MAJOR WETLAND TYPES

Wetlands are a blending of lands and water in varying quantities, and many different types have been identified by biologists. This poster illustrates the three major types, the **marsh**, **swamp** and **bog**. These can be defined more specifically.

MARSHES have standing water from less than an inch to several feet deep. The amount of water can fluctuate seasonally or from year to year. Marshes might generally be called "flooded grasslands." They are dominated by soft-stemmed emergent plants such as cattails, grasses, sedges, rushes, arrowhead, pickerel weed, and smartweed. In deeper water are found lily pads and submerged plants such as elodea, milfoil, and powerweed. Marshes are critical for fish species that live and/or breed there. Marshes offer primary breeding and feeding habitat for water birds (ducks, geese, herons, cranes, rails) and song birds like the marsh wren and yellow warbler, as well as numerous frog species, reptiles (turtles, water snakes), and mammals such as muskrats, beaver, and otter. In Michigan, marshes are found at the edge of some rivers and lakes, in lowlands and depressions, and in swales between sand dunes.

SWAMPS can best be described as flooded woodlands or shrublands. Unlike marshes, they are dominated by woody plants. The soil is usually waterlogged throughout the growing season, through some swamp soils may become dry during the hot summer months. In Michigan, trees and shrubs found in swamps include red and silver maple, cedar, balsam, willow, alder, black ash, elm, and dogwood. Swamps occur most often

along streams or on floodplains, in flat uplands, or shallow lake basins. Numerous wildflower species are found in swamp habitats, including the cardinal flower and yellow ladyslipper. Characteristic of the many swamp-living animals are wood frogs, gray treefrogs, salamanders, barred owls, waterthrushes, prothonotary warblers, water shrews, and raccoons.

BOGS Occur where accumulations of decaying vegetation form mats that eventually cover and then fill in old ponds or kettle lakes. In some bogs, open water may be surrounded by floating vegetation, while other bogs are totally grown over and consist of spongy, waterlogged peaty soil covered by sphagnum moss. Bog soils are usually highly acidic and oxygen and nutrient deficient. Acid-tolerant plants found in or around bogs include woody plants such as labardor tea, poison sumac, tamarack, and black spruce. Many species of orchids prefer bog habitats, as do insect-eating sundews and pitcher plants. Bogs shelter many rare animal species, including the spotted turtle and southern bog lemming.

The bogs most people are familiar with are these acidic bogs. There is, however, a distinctly different type of bag called a **fen**. Its higher alkalinity and productivity is the result of water passing through calcareous deposits. Fens typically have high plant diversity due to higher nutrient levels; many plants are prairie plants such as prairie white fringed orchid, sweet grass, the bluestems, and blazing star. Unusual animals of fens include the eastern massasauga rattlesnake and rare butterflies such as Mitchell's satyr and Powesheik skipper.

Vernal Ponds are small bodies of standing water that form in the spring from meltwater and are often dry by mid-summer. While not usually considered in official definitions of wetlands, vernal ponds are very important in the life cycles of many wildlife species. In particular, many species of amphibians (frogs and salamanders) depend on these temporary ponds for breeding sites. This allows the vulnerable aquatic larvae (e.g. tadpoles) to mature in a place free of fish predators.

WHY ARE WETLANDS IMPORTANT?

Because they occur where the dry land meets the water, wetlands play a critical role in the management of our water-based resources.

Acre for acre, wetlands produce more wildlife and plants than any other Michigan habitat type. Wetland species also comprise a critically important segment of these species. For example, Michigan boasts about 2300 native plant species; 50 percent of these are wetland species and over 25 percent of the wetland species are threatened or endangered. More than 40 percent of the 575 vertebrate (with a backbone) wildlife species in Michigan live in or utilize wetlands. This includes 10 to 15 of the 66 mammals, 180 of the 370 birds, 22 of the 28 reptiles, and all of the 23 amphibians.

Here are a few other things that wetlands do:

- reduce flooding by absorbing runoff from rain and melting snow and slowly releasing excess water into rivers and lakes. (A one-acre swamp when flooded to a depth of one foot contains 330,000 gallons of water.)
- filters pollutants from surface runoff, trapping fertilizers, pesticides, sediments, and other contaminants and helping to break some of them down into less harmful substances, improving water clarity and quality.
- Help recharge groundwater supplies when connected to underground aquifers.
- Contribute to natural nutrient and water cycles, and produce vital atmospheric gases, including oxygen.
- Providing commercial or recreational value to our human economy, by producing plants, game birds (ducks, geese) and fur-breeding mammals. Many fish are directly connected to wetlands, requiring shallow water areas for breeding, feeding and escaping predators.
- When wetlands occur adjacent to the great lakes, inland lakes or streams, they serve as nutrient traps that then enrich the larger body of water they are part of.

WHAT ARE THE THREATS TO WETLANDS?

The extent of wetland habitat was once controlled by natural processes. Marshes along the Great Lakes and drowned river mouth lakes vary in size, depending on rainfall trends and Great Lakes water levels. The natural filling of old glacial lakes with plant remains and sediment will create bog habitat. Eventually through continued succession, open water may be eliminated, replaced with continuous sphagnum bog or wet meadow. Floodplain swamps may shrink or increase with the normal changes in a river's channel over time. Over the long term, such natural change is inevitable. Wetland areas in Michigan have been growing, shrinking and re-forming according to natural cycles since the last Ice Age and before, and these cycles continue today. The last century has seen a greatly increased rate of wetland loss due to filling and drainage by man. Prior to World War II, drainage to expand agricultural lands accounted for most of this loss. Recently, much wetland destruction has been caused by commercial, industrial, and

residential expansion. The estimated 11 million acres of Michigan wetlands existing in pre-settlement times has now been reduced to less than 3 million acres. Recent legislation has slowed the loss rate somewhat but threats to these habitats, particularly the smaller wetlands, continue in many areas.

WETLAND REGULATIONS

Several laws exist that regulate wetland use and alteration:

- **Michigan's Goemaere-Anderson Wetland Protection Act** [Public Act (P.A.) 203, 1979], is a State law that provides for the preservation and proper management of wetlands. It is administered by the DNR's Land and Water Management Division (LWMD). LWMD receives and reviews applications for permits for alterations, typically construction projects, in wetlands which fall under the jurisdiction of the Act.
- **Section 10 of the Rivers and Harbors Act of 1899** is the section of a federal law which regulates construction in , over and under navigable waters. Regulatory jurisdiction extends landward to the Ordinary High Water Mark (OHWM) including wetlands below the OHWM.
- **Section 404 of the Clean Water Act of 1972** is the section of a Federal law which regulates the discharge of fi1l material into all "waters of the U.S.," including wetlands.

Both of these federal laws are administered by the U.S. Army Corps of Engineers. In Michigan, the Section 404 federal authority associated with interior (inland) waters and wetlands was assumed in 1984 by the Goemaere-Anderson Wetland Protection Act. Joint jurisdiction between MDNR and the U.S. Army Corps of Engineers still exists in commercially navigable waters and wetlands contiguous to those waters.

- **Michigan Enviromental Protection Act** (P.A. 127, 1970) requires public and private organizations, as well as individuals, to prevent or minimize environmental degradation that is caused or is likely to be caused by certain activites. Its requirements are in addition to those provided by any other environmental law.
- **Michigan's Shorelands Protection and Management Act** (P.A. 245, 1970) designates certain wetlands adjacent to Great Lakes and connecting waterways as critical environmental areas, and requires application to the DNR for permits for uses in these areas.
- Michigan's Great Lakes Submerged Lands Act (PA 247, 1955), as amended, regulates dredging, filling, and construction below the OHWM of the Great Lakes and Lake St. Clair.
- **Michigan's Inland Lakes and Streams Act** (PA 346, 1972), as amended, regulates dredging, filling, and construction, in, over, and below the OHWM of the state's waters which typically includes adjacent shorelands and contiguous wetlands.
- **Michigan's Floodplain Regulatory Authority** (PA 167, 1968), as amended, regulates any occupation within the 100-year floodplain and floodway of watercourses containing a drainage area of greater than 2 square miles. Wetlands are often found in floodplain areas due to the topography and inundation of water at certain times of the year.

Other laws both at the local level and state level affect wetland areas. Contact LWMD before initiating any project involving wetlands alteration, or if you have a question concerning a wetland development in your community. If you are interested in what wetland activities are occurring in your community, you can receive weekly notices of all permit applications LWMD receives for a $25.00 annual fee, payable to the State of Michigan. Send your written request and fee to: Michigan Department of Natural Resources, Land and Water Management Division, P.O. Box 300258, Lansing, Michigan 48909.

ADDITIONAL REFERENCES

Freshwater Marshes, Ecology, and Wildlife Management, Milton W. Weller, Univeristy of Minnesota Press, Minneapolis, 1987

Wetlands, The Audubon Society Nature Guides, William A. Niering, Alfred A. Knopf Publishing, New York, January 1987.

Michigan Wetlands-Yours To Protect. A Citizen's Guide to Local Involvement in Wetland Protection, Tip of the Mitt Watershed Council, Box 300, Conway, Michigan, 49722

Wetland Protection Guidebook, Michigan Department of Natural Resources, Land and Water Management Division, Box 30028, Lansing, Michigan, 48909, 1988.

DESCRIPTIONS OF PLANTS AND ANIMALS ON THE POSTER

INVERTEBRATES

Dragonflies (Order Odonata)

These familiar insects are among the most beneficial of wetland insects. Often called "mosquito hawks," they feed on mosquitoes, midges, black flies, and other small insects. Dragonflies use their great speed and agility, plus excellent eyesight, to capture their prey in the mid-air. All are harmless to humans. Females lay eggs in the water which hatch into wingless aquatic nymphs. The nymphs feed on insect larvae, worms, and other small creatures, and many remain underwater for several weeks, or several years, depending on the species. Dragonfly nymphs are, in turn, an important food for many game fish. The last nymphal stage crawls from the water, the outer skin splits and the winged adult emerges. This process of development is called incomplete metamorphosis.

The smaller, slimmer damselflies have a similar life history, but unlike dragonflies, they fold their wings over their backs when perched.

Baltimore Butterfly (Euphydryas phaeton)

This lovely, small (1 ½ - 2 ½ inch) butterfly has black, orange-bordered wings speckled with white and orange spots. Baltimores are found over much of the eastern United States, in varied habitats. In the Great Lakes they favor sphagnum bogs and wet meadows. Caterpillars feed in silk "nests" on turtlehead, false foxglove, plaintain, and ash. They over winter as half-grown larvae, continuing growth in spring, Adult butterflies emerge from the chrysalis after 10 days.

VERTEBRATES: AMPHIBIANS

Green Frog (Rana clamitans)

There are 13 frog and toad species in Michigan, forming an important group of wetland animals. One of the most common is the green frog, found in most habitats with permanent water. Adults, up to 4 inches long, are green or brown, sometimes with darker spotting. The underside is white. Males have yellow throats. Green frogs are often mistaken for bullfrogs but are smaller and, unlike the bullfrogs but are smaller and, unlike the bullfrog, have folds of skin down each side of the back. The males emit their calls (with a voice sounding like a plucked banjo string) From late May through July. Females lay up to 4000 eggs, and the tadpoles may take two years to become frogs. Green frogs eat insects, smaller frogs, and other small prey. (NOTE: A large full-color poster illustrating and describing Michigan's frog and toad species, produced by the Nongame Wildlife Fund, can be obtained by sending $1.00 to the Nongame Wildlife Fund address.)

Eastern Newt (Notophthalmus viridescens)

Newts are small salamanders that occur in both aquatic and terrestrial forms, They are generally uncommon in Michigan, but occur locally throughout the State in ponds, bogs, marshes, and swamps. The greenish adults breed in late winter and early spring; eggs are laid in April. The fill-breathing larvae may transform directly into the aquatic "adult" stage in late summer, or become reddish-colored "efts" that live on land for a year or two before returning to the water. Newts eat a variety of small insects, worms, crustaceans, and mollusks. Their toxic skin secretions cause many fish to avoid eating them.

REPTILES

Spotted Turtle (Clemmys guttata)

This small (3-to-5 inch-long) blackish, yellow-spotted turtle is Michigan's rarest turtle, and its numbers are rapidly declining. Spotted turtles live in bogs, shallow ponds, and marches, often where clumps of sedges and grasses emerge from the water. They mate and are most active in early spring and are rarely seen in summer. Females bury 3 to 9 eggs in a sunny location, which hatch in about two months. The hatchlings, which may not emerge until the following spring, are usually black with a single spot on each scrute of the carapace, but spotless specimens are not uncommon. Spotted turtles eat leaves, fruit, insects, worms, and other small animals. They should be left undisturbed and every effort should be made to preserve known habitat.

Kirtland's Snake (Clonophis kirtlandi)

Listed by the Department of Natural Resources as an Endangered species, this small (14-24 inch) brownish, black-spotted snake is easily recognized by its red belly with a row of black spots on each side. They flatten their bodies when threatened, but rarely bite and are completely harmless. They prefer wet meadow habitat and live underground much of the time in rodent or crayfish burrows and thus, are rarely seen. They feed on earthworms and slugs. Only two locations are known for this species, both in southwestern Michigan. Any sightings should be reported to the DNR Wildlife Division in Lansing.

FISHES

Bowfin (Amia calva)

The bowfin is a primitive fish that lives in muddy-bottomed lakes and marshes. Sometimes called "dog-fish," bowfins are often seen gulping air at the surface. They can grow to over 3 feet long. The males guard the eggs in a circular nest hidden among water plants, and also protect the young after hatch, as shown in this poster. These fish are predatory, feeding on other fish and crayfish. They are not highly regarded as a food or game fish.

Brook Stickleback (Culaea inconstans)

This is a small (2-inch) fish, greenish to mottled tan in color, with five separate dorsal spines. Sticklebacks prefer colder waters and are found in bog ponds are streams with mud-bottoms. Males construct a rounded nest using pieces of vegetation. Females then enter and deposit eggs, which are guarded by the male. Sticklebacks eat tiny aquatic insects and crustaceans. They help control mosquitoes by eating the insect's larvae.

WHERE CAN EXAMPLES OF THESE WETLANDS BE SEEN?

Listed below are some places where the different types of wetlands can be found in Michigan. Remember that wetland habitats are fragile and easily damaged by human activity. It is best to visit them in small groups, and to avoid wading through areas of soft much soils and shallows where sensitive plants may occur. Many of the areas listed in the table below have boardwalks traversing the wetlands or observation towers to improve access, and to reduce human impact.

	FACILITY / ADDRESS	COUNTY / PHONE	HABITAT: Marsh	HABITAT: Swamp	HABITAT: Fan	HABITAT: Bog	FACILITIES: Visitor/Nature Center	FACILITIES: Picnic Area	FACILITIES: Nature Trail	FACILITIES: Auto Tour	FACILITIES: Towers/Boardwalks	ADDITIONAL INFORMATION: Naturalist	ADDITIONAL INFORMATION: Barrier Free	ADDITIONAL INFORMATION: Entry Fee	ADDITIONAL INFORMATION: Field Trips	ADDITIONAL INFORMATION: Write For More Info.	ADDITIONAL INFORMATION: Additional Restrictions ★
UPPER PENINSULA	Seney National Wildlife Refuge HCR 2, Box 1, Seney 49953	Schoolcraft County (906) 586-9851	•	•		•	•	•	•	•			•	•		•	•
	Porcupine Mountain St. Park 599 M-107, Ontonagon 49953	Ontonagon/Gogebic Counties (906) 885-5275	•	•			•	•					•			•	•
	Sturgeon River Sloughs DNR-Wildlife Division Box 440, Baraga 49908	Baraga County (906) 353-6651	•						•		•					•	
	Bruno's Run/Songbird/Scott's Marsh Trails, U.S. Forest Service Box 160, Munising 49862	Alger/Schoolcraft Counties (906) 387-2512	•		•	•	•	•	•			•			•	•	
NORTHERN LOWER PENINSULA	Rifle River Rec. Area 2550 E. Rose City Rd., Lupton 48635	Ogemaw County (517) 473-2258	•			•	•	•	•		•		•			•	•
	Manistee St. Game Area DNR-Wildlife Division 8015 Mackinaw Trail, Cadillac 49601 □	Manistee County (616)775-9727	•						•		•		•			•	•
	Mitchell State Park 6093 E. M-115, Cadillac 49601 □	Wexford County (616) 775-7911	•	•				•	•		•			•	•	•	•
	Tobico Marsh St. Game Area 3582 State Park Dr. Bay City 48706	Bay County (517) 684-3020	•				•	•	•		•	•	•	•	•	•	•
	Blue Horizon, Oscoda Comm. Schools 3550 River Rd., Oscoda 48750 □	Oscoda County (517) 739-1431	•	•					•		•				•	•	
SOUTHWEST LOWER PENINSULA	Baker Sanctuary Michigan Aububon Society 409 West "E" Ave., Kalamazoo 49007	Calhoun County (616) 344-8648	•						•		•				•	•	
	Haenie Sanctuary Michigan Aububon Society 409 West "E" Ave., Kalamazoo 49007	Jackson County (616)344-8648	•													•	
	Fernwood Nature Center 13988 Rangeline Rd., Niles 49120	Berrien County (616) 695-6442	•		•		•		•		•	•	•	•	•	•	
	Mud Lake Bog Natural Area Buchanan Township 15235 Main St., Buchanan 48107 □	Berrien County (616) 695-6442				•			•		•				•	•	
	Maple River St. Game Area Area Wildlife Biologist 8562 E. Stoli Rd. East Lansing 48812 □	Gratiot County (517) 373-9358	•						•		•					•	•
	Yankee Springs Rec. Area 2104 Gun Lake Rd., R#3 Middleville 49333	Barry County (616) 795-9081	•			•		•	•						•	•	•
SOUTHEAST LOWER PENINSULA	Shiawassee National Wildlife Refuge 6975 Mower Rd. Saginaw 48601	Saginaw County (517) 777-5930	•				•		•							•	•
	Shiawassee St. Game Area 225 E. Spruce, St. Charles 48655	Saginaw County (517) 865-6211	•						•							•	•
	Park Lynden Washtenaw County Parks Box 8645, Ann Arbor 48107	Washtenaw County (313) 971-6337				•		•	•			•			•	•	
	Independence Lake Park Washtenaw County Parks Box 8645, Ann Arbor 48107 □	Washtenaw County (313) 971-6337	•			•		•	•		•	•			•	•	
	Sterling St. Park 2800 State Park Rd. Monroe 48161	Monroe County (313) 289-2715	•					•	•					•		•	•
	Waterloo Rec. Area 16345 McClure Rd. R#1 Chelsea 48118	Washtenaw/Jackson Counties (313) 475-8307	•			•	•	•	•					•		•	•
	Haven Hill Nature Area Highland Rec. Area 5200 E. Highland Rd., Milford 48042	Oakland County (313) 887-5135	•					•	•					•		•	•
	Seven Pongs Nature Center 3854 Crawford St. Dryden 48428	Lapeer County (313) 796-3419	•	•		•	•		•		•	•	•	•	•	•	

★ Additional Restrictions: Some areas closed seasonally, access only with naturalist, or permit, et cetera.
□ Tower or Boardwalk funded by Nongame Wildlife Fund

MICHIGAN'S NONGAME WILDLIFE FUND:
A decade of commitment to helping wildlife.

Look for the LOON

... on your state tax form.

Become a working member in this Wildlife Partnership. Your contributions have helped to:

- reintroduce the peregrine falcon in Michigan, with the first successful fledging of chicks in over 40 years.
- bring back trumpeter swans to Michigan's wetlands.
- provide school children with educational posters and teaching activites on Kirtland's warvlers, gray wolves, raptors and bluebirds.
- provide information to landowners on protected Great Lakes plants.
- create watchable wildlife opportunities.
- offer tips on creating butterfly gardens, wildlife nest boxes and wildflower gardens.

For more information or to make a donation to this important wildlife program, contact: Michigan Department of Natural Resources, Nongame Wildlife Fund, P.O. Box 30180, Lansing, MI 48909-7680.

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MIchigan Department of Natural Resources

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BIRDS

Common Loon (Gavia immer)

Loons are goose-sized, long bodied water birds with stout, sharp beaks. In summer they are dark above with a white-collar and white spots on the back. Known for their mournful wailing calls, these birds are symbolic of our wild northern lakes and marshes. Loons require undisturbed habitat, and are very sensitive to human activity while nesting or rearing young. They nest near the water's edge on small islands, muskrat lodges, or forested shores, and lay only two eggs. The blackish downy young are closely tended, often riding on their parent's back. Loons dive for fish, crayfish, and other small animals. Recent declines in loon numbers are alarming, and the species is listed as Threatened by the Michigan Department of Natural Resources. Surveys by the Nongame Wildlife Fund indicate a statewide population of fewer that 300 breeding pairs. Protection and restoration of the Loon is a major program of the Nongame Wildlife Fund.

Bald Eagle (Haliaeetus leucocephalus)

Our national bird, the bald eagle is unmistakable with its dark wings and body, and white head and tail. Immature birds are mostly dark, with whitish feathers under the wings and tail. Their diet is largely fish, They nest along coasts and near inland lakes and marshes usually in a large white pine or dead snag. The bulky stick nests may be re-used and added to for many years by the same pair. Eagle numbers were greatly reduced by habitat loss, illegal shooting, and especially pesticide poisoning, Strict controls on certain pesticides have helped eagles recover. There were 161 pairs counted by the Nongame Wildlife Fund in 1988, up from 84 pairs recorded in 1980. But problems still exist. Eagles nesting along the Great Lakes coasts have higher contaminant levels in their blood than inland nesting pairs. The bald eagle is considered Threatened by the Michigan DNR.

Osprey (Pandion haliaetus)

The "fish hawk" is brown above and white below, and flies with a distinct bend in its wing at the "wrist." Their feet are equipped with spiny scales and long talons that give them a firm grip on slippery fish, their only prey. Ospreys usually select tall trees in marshes along streams, lakes or man-made floodings. They will adapt to artificial nesting platforms. This "help" from humans, along with the restriction of certain harmful pesticides, has helped ospreys recover from the drastic population reduction seen in the 1950's and 60's. The Nongame Wildlife Fund located 166 pairs in 1988, up from the 81 counted in 1975. Heavy use of pesticides on its winter range in Central and South America still threaten the osprey.

Northern Harrier (Circus cyaneus)

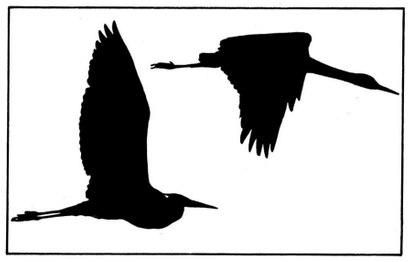
This is the long-tailed hawk with a white rump patch. It is often seen soaring in a "wobbly" fashion low over marshes, wet meadows, and open fields with wings held out in a shallow "V." This hawk is the only Michigan hawk that nests on the ground, typically in tall grasses or under shrubs near wetlands. They feed largely on small rodents, particularly meadow voles. Harrier numbers are much reduced for reasons believed related to the destruction of its marsh habitat by humans. They are listed as a species of Special Concern by the Michigan DNR. Northern harriers, once known by the fitting name of "marsh hawk,' are found Statewide, but now nest most commonly in the eastern Upper Peninsula.

Black Tern (Childonias niger)

Terns are gull-like but slimmer, with pointed wings and beaks. In breeding plumage the black tern has a black head and underparts and gray wings. In Michigan they prefer open or swampy marsh habitat. Nests may be on floating masses of vegetation, or wood debris, or on muskrat houses or small patches of solid ground. They will use man-made artificial nesting platforms. (Write to the DNR Nongame Wildlife Fund for nesting platform plans.) The downy young usually stay on the nest for two weeks, but will leave quickly if disturbed, thus human intrusion near nests with very young nestlings can be a serious problem. Black terns feed on insects and small fish, usually picking food from the surface rather than diving like other terns. Their numbers have fallen seriously in recent years.

Great Blue Heron (Ardea herodias)

This is the familiar, large grayish-blue heron seen wading in shallow water in marshes, ponds and along lakeshores and steam edges. They are sometimes confused with the sandhill crane; the heron is smaller and flies with its neck folded back, while cranes fly with their neck extended. Great blue herons are commonly seen in small suburban wetlands (cranes are generally less tolerant of close presence). Herons feed on fish, frogs,



and other small animals, captured by a quick jab of the beak. They nest in colonies, usually building their stick platform nests in trees in lowland hardwood swamps. In recent years many rookeries have been displaced by shoreline development or timber cutting. Every attempt must be made to preserve known nesting sites if these beautiful birds are to remain common in Michigan's wetlands.

Sandhill Crane (Grus Canadensis)

Sandhills are a tall, long-legged, long-necked gray bird with red featherless foreheads. They feed on frogs, fish, and insects, but also take much plant food such as seeds, fruits, and aquatic vegetation. They are often seen feeding in corn and upland grain fields. In Michigan, sandhills nest in solitary nests on the ground near or over shallow water in marshes and bogs. They nest by heaping plant debris into a low mound. Two eggs are laid; the young follow the parents soon after hatching, fly in about 70 days, and stay with the parents for nearly a year. Sandhill cranes are intolerant of human disturbance. Their numbers were much reduced by habitat loss and shooting in the early part of this century but have grown in recent decades. A two-year survey funded by the Nongame Wildlife Fund confirmed 805 breeding pair statewide. Most breeding pairs in the

Lower Peninsula were found in a six-county area near Jackson and Ann Arbor. Highest concentrations in the Upper Peninsula occurred in the eastern counties.

Trumpeter Swan (Cygnus buccinator)

The largest waterfowl species in North America, the trumpeter is similar in appearance to other white swans, but their foreheads slope evenly to an all-black bill. The more common and smaller tundra (whistling) swan usually has a yellow spot in front of its eye. The trumpeter swan was once widespread over much of the continent, but was largely wiped out by market hunters before the turn of the century, holding out only in remote parts of the Rocky Mountains and Alaska. An attempt is now being made to reintroduce them to Michigan and other Midwestern states, as part of a continent-wide recovery effort.

MAMMALS

Water Shrew (Sorex palustris)

There are only a few mammals in Michigan hat live exclusively in wetland habitats. One is the tiny (6-inch) water shrew, a black 'mouse like" animal with a long tail and large hind feet. These hind feet have a fringe of hairs which assist the shrew in swimming, and even trap air bubbles, allowing them to run over the water's surface. In northern Michigan, the water shrew inhabits swamps, bogs, and wooded streamsides. Little is known about their life history. They are active hunters, ceaselessly seeking insects, spiders, worms, and small aquatic animals as food. They spend much time in the water diving to the bottom, then bobbing to the surface due to air trapped in their fur.

Man (Homo sapiens)

Can you find the man in the poster?

PLANTS

Arrowhead (Sagittaria latifolia)

One of our most common aquatic plants, arrowhead, occurs in a wide variety of wetland habitats, including rivers, streams, lakes, and ponds. This particular species, one of six known in Michigan, is our most widespread arrowhead. It is often referred to as "duck-potato" or "wapato." Leaves can vary considerably in appearance. Flowers are borne in whorls on leafless stems, each bearing three small, whit petals. The round tubers provide an important waterfowl food source and give this species one of its common names.

Cardinal-Flower (Lovelia cardinalis)

This brilliant flower, named for its scarlet red spikes, blooms in late summer. This colorful species typically occurs along river and stream banks and can also be found in swamps and along lakeshores. Sometimes it may form large colonies in wet soils in roadside ditches.

Dragon's-Mouth, Wild Pink (Arethusa bulbosa)

The delicate, rose-purple dragon's-mouth is one of Michigan's most beautiful orchids. Although primarily a plant of open sphagnum bogs, preferring wet, acid pear near open water, this species can also be found in alkaline fens. The upright upper petals, some of which dangle over the prominent, yellow-streaked lower lip, are suggestive of the pricked-up ears of an animal. Grass pink and rose pogonia are two other orchid species commonly found growing with dragon's-mouth.

Cotton-Grass (Eriophorum virginicum)

Cotton-grass, actually a member of the sedge family, typically grows in bogs, but also inhabits conifer swamps and marshes. When mature, the flower parts form dense, cottony tufts dotting the late summer and fall bog landscape with their showy heads.

Liverwort (Conocephalum conicum)

Liverworts are non-flowering plants related to the mosses. Though frequently overlooked, perhaps because of their small size, liverworts represent a diverse and ecologically important group of plants. Conocephalum conicum can be identified by its flattened, spotted plant body and a faint sweet scent produced when rubbed between the fingers.

Water-Milfoil (Myriophyllum species)

Water-milfoils are submerged aquatic plants. All but one of Michigan's seven species are characterized by very dissected leaves that have the appearance of 2-sided combs. The Eurasian water-milfoil (Myriophyllum spicatum) is an introduced species that has become a serious pest in the lakes of several counties in the Lower Peninsula.

Pitcher-Plant (Sarracenia purpurea)

This unusual plant, usually found in bogs, is carnivorous, feeding on insects that are trapped in its bulbous pitcher-like leaves. Although this carnivorous plant is a common inhabitant of acidic bogs, it also is found in fens. The highly modified leaves are covered with downward-pointing hairs on the inside which keep insects from escaping. Insects that enter the leaf eventually drown, providing the pitcher-plants with important nutrients. The tiny sundews also shown in this poster are also carnivorous and trap insects on the surface of their sticky leaves.

Black Spruce (Picea mariana)

This is a common tree species in bogs in the U.P. and northern Lower Peninsula. In southern Michigan it is less common and at the very southern edge of its range. From a distance this species can be recognized by its narrowly conic form often with a club shaped tuft of growth at the top. Trees in northern Michigan and Canada are commonly infested with dwarf mistletoe (Arceuthobium pusillum), shown on the right center of the poster. Mistletoe is a parasitic flowering plant that causes the formation of "witch's brooms."

Smartweed, Knotweed (Polygonum species)

Smartweeds are valuable wetland plants. Their seeds provide an abundant source of food for aquatic wildlife. More than 20 species occur in Michigan, including several that are non-native. Nodding smartweed (Polygonum lapathifolium) is one of the more common species, and quite variable, producing flowering individuals of only a few inches in height and sometimes colonizing marsh flats in extensive patches consisting of six foot tall plants.