

## ALONG THE SHORELINE

“The natural beauty of the region lying between Lakes Erie and Huron has been recorded by all the early travelers, with words of admiration.

Many of the islands were low, and some of the river margins scarcely above the water. But all was green and peaceful. Dark forests extended to the river edge, and many a tall monarch of the wood waved its gigantic arms over the brink, and was reflected in the glassy surface which not tide or flood ever disturbed. The marshes were luxuriant with wild rice that furnished a sumptuous repast to a great variety of birds and waterfowl, and even a welcoming supply to the Indians. Occasional villages and bark wigwams enlivened the shore, surrounded with gardens and cornfields, and the most elevated points were crowned with burial grounds. Most of the shores had high banks and were covered with timber.”

—Bela Hubbard, a historical address in 1879 marking the bicentennial of the discovery of Lake St. Clair by LaSalle in 1679.



ANDREW FOOT

(Left) Brighton Beach in West Windsor, Ontario is one of the last natural shorelines on the Detroit River. (Right) Twenty percent of the Canadian shoreline and 87 percent of the Michigan shoreline along the Detroit River have been modified with bulkheading and other shoreline hardening structures. As a consequence, in Michigan, only three percent of the original coastal wetlands remain in the Detroit River.



ANNE C. HAMMERSCHMIDT

(Above left) The great egret (*Ardea alba*) hunts in the shallows of the coastal marshes throughout the Lake Huron to Lake Erie Corridor, feeding on fish, frogs, small mammals and birds. The great egret nested on Stony Island in the Detroit River from the late-1940s to 1978, but abandoned that site due to high water and industrial activity. (Above) Dawn at the mouth of the Thames River at Lake St. Clair.



ERIN BEIGEN

Prior to European settlement, the shoreline of the Lake Huron to Lake Erie corridor looked very different than it does today. Extensive Great Lakes marshes skirted the shoreline, especially along Lakes St. Clair and Erie. Upland from these marshes there was generally hardwood swamp on poorly drained clay soils and beech-maple forest on better-drained sites. Tallgrass prairie and oak savanna grew in the lakeplain's sandy areas.

### Great Lakes Coastal Marsh

Great Lakes coastal marsh is a wetland ecosystem distinct to the Great Lakes. It is the most productive natural system in Earth's temperate zones, providing habitat for mammals, waterfowl, shorebirds, songbirds, reptiles, amphibians, fish, insects, crustaceans and many plant species.

“All the rivers and creeks enter from both sides, through low, swampy land covered with folle avoine, or wild oats. This aquatic grain, though thus named, is nevertheless essentially different from either oats or rice; no vegetable that I ever seen, has a more beautiful appearance than is exhibited by the immense marshes, covered with folle avoine; it is now in blossom, exhaling a peculiarly pleasing fragrance.”

—WILLIAM DARBY, 1819, DESCRIBING THE ONTARIO AND MICHIGAN SHORELINES ON THE DETROIT RIVER.

The aquatic plant, “folle avoine,” of which American geographer William Darby wrote is wild rice (*Zizania aquatica*) and once was common in the region's coastal marshes. Wild rice is very sensitive to changes in water flow. As a result of major shoreline alterations, it no longer thrives. In fact, today it is listed as a threatened plant species in Michigan.

Great Lakes marshes are dynamic systems. Since their topography is almost flat, they are highly influenced by fluctuating Great Lakes water levels. This is especially true in the St. Clair River Delta where a change of only a few inches greatly affects the size and position of wetlands. In high-water years, strong on-shore winds produce sufficient wave action to uproot plants and cause erosion. In low-water years, marsh habitat becomes more abundant. Changing water levels often cause dramatic shifts in vegetation in a short period of time, shaping the abundance and diversity of habitat available to wildlife. Mudflats appear in the shallows of coastal marshes when the water is low. Mudflats provide habitat for shorebirds that stop to rest and feed during migration. They use their long, pointed bills to probe exposed soil for insects and other invertebrates.



ARISTO MANTON  
CORPUS BAY



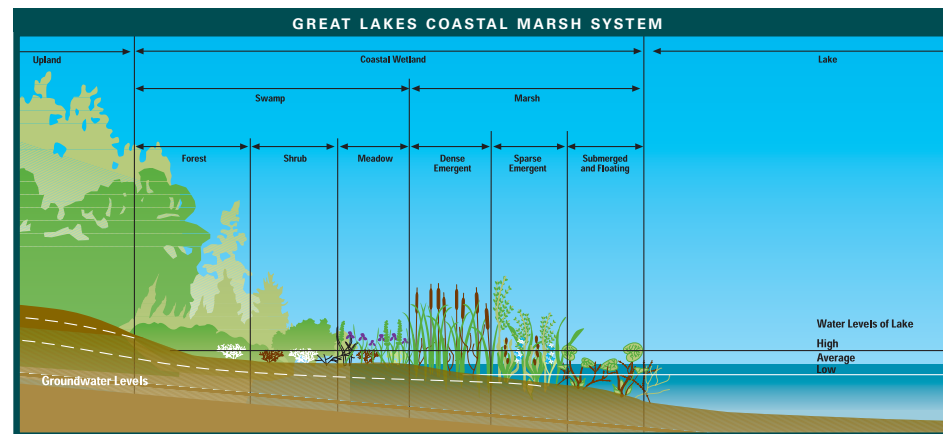
ALLEN CHARTER

The American lotus (*Nelumbo lutea*) is a floating plant of coastal marshes in the lower Detroit River and western Lake Erie. Its exotic-looking white blossoms inspire the Lotus Garden Club of Monroe, which works to help ensure there is good habitat for this threatened plant species in Michigan.



MARIE BOYLE

The large pink flowers of the swamp rose mallow (*Hibiscus moschutos*) grace the fringes of coastal marshes. Lake Erie Metropark in Michigan is a good place to view them during the summertime.



The Great Lakes coastal marsh system provides a wide range of habitats: mudflats, emergent and submergent wetlands, wet meadows, and tree and shrub swamps. Each zone is occupied by a different plant community, each of which supports a different animal community.

## REPTILES AND AMPHIBIANS AT RISK

Reptiles of the region are snakes and turtles. Amphibians are frogs, skinks, newts and salamanders. Both reptiles and amphibians rely on water and land habitats for survival. For turtles, the connection between the aquatic

wetlands where they feed, and the uplands where they nest, is critical. Unfortunately, roads and development have fragmented habitats and disrupted this connection. Wildlife is forced to cross roads, resulting in high

mortality rates. Overall, reptile and amphibian populations are declining due to habitat destruction, pollutants that cause birth defects, and nest predation by raccoons and other suburban wildlife.



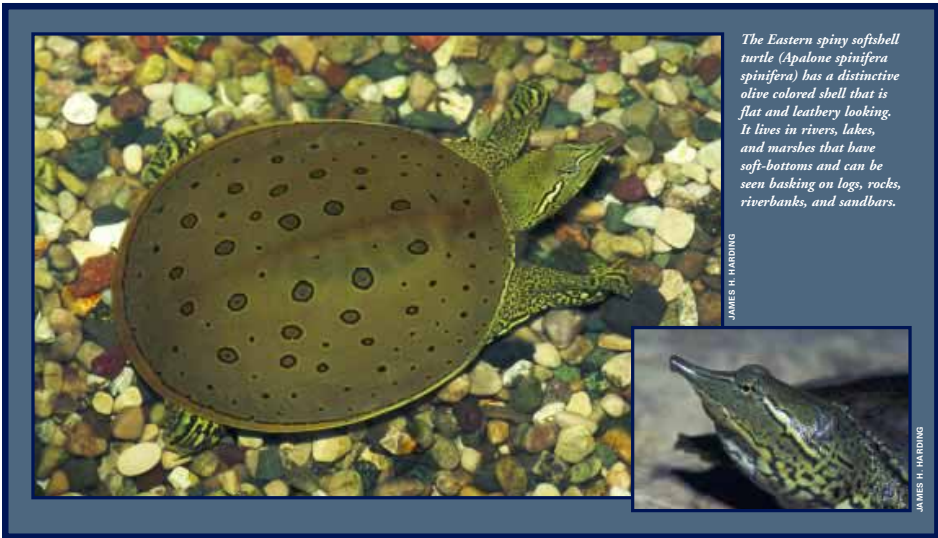
JOHN SCHAEFER

The eastern fox snake (*Elaphe vulpina gloydi*) lives in coastal marshes and associated wet meadows. This harmless snake may have a copper-colored head and will vibrate its tail when disturbed; thus it is often mistaken for a venomous snake and needlessly killed by fearful people. Historical and ongoing habitat destruction and persecution have greatly reduced Eastern fox snake numbers.



JOHN SCHAEFER

The spotted turtle (*Clemmys guttata*) has distinctive yellow dots on its head and shell that make it easy to identify. This animal inhabits clean, shallow waters with a soft bottom, such as sedge marshes, sphagnum seepages, and fens. They feed on insects, mollusks, crayfish, and other aquatic organisms. Historically, this small, secretive aquatic turtle was fairly common in its specialized habitats throughout southern Michigan and Ontario; however, illegal collection for the pet trade and habitat loss now make it rare.



The Eastern spiny softshell turtle (*Apalone spinifer spinifera*) has a distinctive olive colored shell that is flat and leathery looking. It lives in rivers, lakes, and marshes that have soft-bottoms and can be seen basking on logs, rocks, riverbanks, and sandbars.

JAMES H. HARDING

JAMES H. HARDING

## Rare Birds Dependent on Coastal Marshes find Habitat in the Lake Huron to Lake Erie Corridor



JOHN SCHAEFER

Despite being the size of a chicken, the king rail (*Rallus elegans*) is one of the most secretive marsh birds and is not often seen. The king rail nests throughout most of the eastern U.S. and is a permanent resident of the south. The Lake Huron to Lake Erie Corridor lies within the northern edges of its range. King rails were abundant in the area around 1900, especially along the Detroit River and Lake Erie's western shore. It built nests on shrubs or vegetation clumps that grew in shallow areas there. But king rail populations have declined severely following wetland losses throughout their range. In addition, lead poisoning and pesticides may limit rail populations in otherwise suitable habitats.

King rails are endangered in both Michigan and Canada. Fewer than 10 pairs were estimated to exist in Michigan in the mid-1980s. Walpole Island still supports a population of these rare birds.



JOHN SCHAEFER

With its highly social nature and striking appearance, the black tern (*Chlidonias niger*) is characteristic of biologically rich marshlands. During the nesting season, it is found in inland marshes in much of northern North America. It spends the winter along ocean coasts in the tropics, from central Mexico through northern South America. Unlike other species of terns, which are highly colonial, black terns prefer some space

between their nests; they breed in loose colonies in shallow marshes that are an equal mix of open water and marsh vegetation.

This species was once an abundant breeder in the Lake Huron to Lake Erie Corridor. Early Detroit ornithologist Bradshaw Swales (1875-1928) described them as nesting in "immense numbers" along the Detroit River. But from 1966 to 1996, numbers of black terns declined by 61 percent in North America. Today, black terns are a species of special concern in Michigan and Ontario.

Loss and degradation of inland wetlands are the major causes of declining black tern populations. Invasions of purple loosestrife and other exotic plant species that alter the composition of marshland vegetation may also play a role. Environmental contaminants also may have negative impacts, as some marshes that appear to be appropriate habitat are not occupied by these birds.

The least bittern (*Ixobrychus exilis*) is the smallest member of the heron family. It breeds throughout much of the eastern U.S. and Ontario. Winters are spent in southern Florida and Texas, the West Indies and parts of Mexico and Central America. It nests in freshwater or brackish wetlands with tall, dense vegetation. Semi-open cattail and bulrush marshes are ideal habitat.



JOHN SCHAEFER

The least bittern was once a common summer resident in southern Michigan and Ontario, notably Grassy Island in the Detroit River, and on Grosse Ile, Michigan. Population trends are difficult to assess because this secretive species is not adequately surveyed, but most

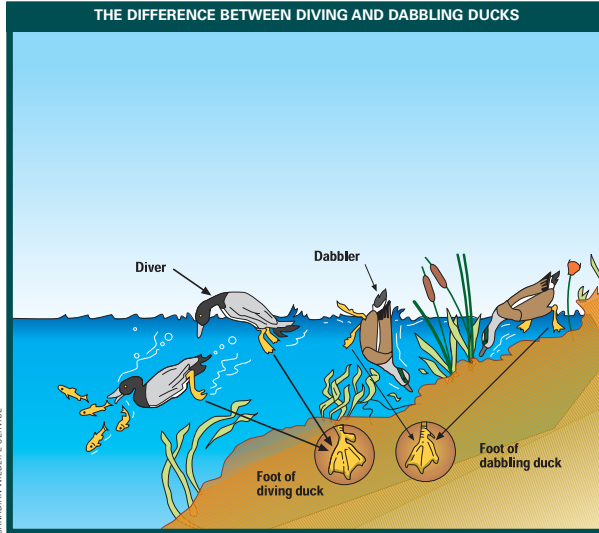
sources agree populations have declined to the point that the least bittern is now rare. The main cause is habitat loss, with additional pressures from pollution and predators such as raccoon. Least bitterns are considered threatened in Michigan and Canada, although they continue to inhabit Walpole Island's coastal marshes.

## Waterfowl

Coastal marshes are very important as feeding and resting areas for migrating waterfowl such as geese, swans and dabbling and diving ducks.

Dabbling ducks have broad, flat bills that they use to feed on plants and insects in water less than one foot (30.5 cm) deep. They prefer shallow areas of rivers, lakes and ponds. Dabbling ducks include the common mallard and American wigeon.

Diving ducks have stout bodies, short necks and tails, and large paddle feet. They dive to feed on fish, mussels, insects and aquatic plants. They prefer the deeper, open water areas of large



This illustration shows the differences between diving and dabbling ducks.

The mallard (*Anas platyrhynchos*) is the most abundant species of duck in the Lake Huron to Lake Erie Corridor. Here, mallards are shown congregating along the shoreline of the St. Clair River with the Blue Water Bridge in the distance.



lakes and rivers. Common diving ducks include the canvasback, scaups and redheads.

Geese have heavier bodies and longer necks. They have strong legs, well-suited to walking, and prefer to graze on grass and grain in farm fields far away from water.

The most recognizable of these is the Canada goose, whose population has increased to nuisance status, congregating

in large numbers around stormwater detention ponds, golf courses and public parks.

Swans are the largest and most graceful waterfowl. Their feathers are completely white and they have long necks which they use to feed on submerged vegetation. Although the tundra swan is native to the Corridor region, the introduced mute swan is now much more common.

Common Name	Scientific Name
Wood duck	<i>Aix sponsa</i>
Northern pintail	<i>Anas acuta</i>
American wigeon	<i>Anas americana</i>
Northern shoveler	<i>Anas clypeata</i>
Green-winged teal	<i>Anas crecca</i>
Blue-winged teal	<i>Anas discors</i>
Mallard duck	<i>Anas platyrhynchos</i>
Black duck	<i>Anas rubripes</i>
Gadwall	<i>Anas strepera</i>
Lesser scaup	<i>Aythya affinis</i>
Redhead	<i>Aythya americana</i>
Ring-necked duck	<i>Aythya collaris</i>
Greater scaup	<i>Aythya marila</i>
Canvasback	<i>Aythya valisineria</i>
Bufflehead	<i>Bucephala albeola</i>
Common goldeneye	<i>Bucephala clangula</i>
Long-tailed duck	<i>Clangula hyemalis</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Red-breasted merganser	<i>Mergus serrator</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Snow goose	<i>Chen caerulescens</i>
Canada goose	<i>Branta canadensis</i>
Tundra swan	<i>Cygnus columbianus</i>
Mute swan	<i>Cygnus olor</i>

The Lake Huron to Lake Erie Corridor's coastal marshes are frequented by at least 24 different species of waterfowl during migration. Some species, such as northern pintail and common goldeneye, are present only during migration. Others, such as the mallard duck and Canada goose, are present throughout the year.



The tundra swan (*Cygnus columbianus*), native to North America, migrates about 4,000 mi (6,000 km) a year between its breeding areas in the Arctic and its wintering habitats in western and eastern North America. The open waters and coastal marshes of the Corridor are important resting areas during migration. Once known as the "whistling swan" because of its distinctive melodious voice, the tundra swan is now rare compared with the mute swan.



Canada geese (*Branta canadensis*) are abundant in the Lake Huron to Lake Erie Corridor. Large numbers can be seen in open waters and congregating on mowed grounds. Unlike some other animals, they have thrived in manicured landscapes.



The wood duck (*Aix sponsa*) is considered to be one of our most beautiful native ducks. It was common to the region in the late 1800s, and then became rare. Today, this species has made a comeback due to hunting regulations and nest box programs.



The strong current and heated-water discharges often keep portions of the Corridor's waters from freezing during winter. Large numbers of waterfowl concentrate in the areas of open water. Mute swans (*Cygnus olor*), shown in front, have become common in the region since their introduction from Europe in 1919. Like many introduced animals they displace certain native species and over-graze vegetation. The knob on their beaks is the feature that distinguishes them from native tundra swans.

# DEVELOPMENT OF THE SHORELINE HAS RESULTED IN THE EXTENSIVE LOSS OF GREAT LAKES COASTAL MARSHES.



JOHN SCHAEER

The muskrat (*Ondatra zibethicus*) is a common wetland mammal. Muskrats feed on the rhizomes and tender bases of cattails, arrowhead and other aquatic vegetation along with the occasional crayfish and clam. They carry their dinner to feeding platforms constructed of vegetation where they eat the food they prefer and discard the rest, leaving traces of their activity.

## Furbearers of the Marsh

The first European settlers of the Lake Huron to Lake Erie Corridor were French trappers and explorers who were attracted by the abundant fur-bearing animals that lived in coastal marshes. The fur trade was the first commerce of the region, based on the great numbers of beaver, muskrat, mink and river otter. It is thought that the beaver played an important role in shaping the local landscape of Detroit.

This account given by Bela Hubbard published in 1887 provides insight to the region before the fur trade locally extirpated the beaver.

*"Illustrations of this beaver-made country are numerous enough in our immediate vicinity. In a semi-circle of twelve miles around Detroit, having the river for base, and embracing about 100,000 acres, fully one-fifth part consists of marshy tracts or prairies, which had their origin in the work of the beaver. A little further west, nearly one whole township, Wayne County is of this character.*

*The lands referable to this origin occupy not the lowest, but elevated and slightly rolling tracts. Numerous small streams have their sources in these prairies, or meander through them. These, flowing with little descent through the lower connecting levels, are ramified in every direction, and form a network or connected chain through the*



LARRY CORNELIS

Today, beavers (*Castor canadensis*) commonly live along the more remote treed watercourses of the region. This beaver dam is located within a hardwood swamp in Bickford Oak Woods in Lambton County, Ontario.

*whole surface. Dry ridges intervene, mostly sandy, and producing a scattered growth of white and yellow oaks. The broader marshes, which often extend several miles, are occasionally varied by a heavy growth of timber.*

*These marshes have a soil of black muck and fibrous peat, averaging two or three feet in depth, and often much more. This is overlaid by clay, with a thin stratum of sand or gravel intervening. Wild hay and cranberries on the open portions constitute a natural product of considerable value; other portions being covered by tamarack trees.*

*The beaver dams are still discernable. Their builders, so the Indians say,*



HOLLY JENSEN

*disappeared from this region about the beginning of the present century. Is there another instance where the operations of a single animal have so changed the face of a country, over extensive areas? For the region of which I treat is but a sample of many others, stretching through the border counties of eastern Michigan, and about the tributaries of the Saginaw... The beavers and Indian hunters and Canadian trappers have alike disappeared. Other furs, or substitutes for them, have superseded their value to the dealer, and the skins are but rarely met with in this whole region, which once yielded little other marketable product."*

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1937

ST. CLAIR COUNTY METROPOLITAN PLANNING COMMISSION

In 1850, early surveyors noted that Wallaceburg, Ontario was a potential center of regional commerce. However, it was also under the blighting influence of the "immense quantities of marsh and swamp within convenient reach."<sup>\*</sup>

This quote reflects the attitudes of many early European settlers who considered the vast Great Lakes marshes as an obstacle rather than a resource. The settlers went to great lengths to drain and fill wetlands.

Urban growth, industrialization, agriculture and waterfront development have dramatically reduced the acreage of Great Lakes marshes along the Lake Huron to Lake Erie Corridor. Where coastal wetlands once reigned, steel break walls now prevail. The Detroit River has lost 97 percent of its coastal marshes. Similar losses occur along the shorelines of Lake St. Clair and the St. Clair River.

<sup>\*</sup>1965. *Sydenham Valley Conservation Report*. Department of Energy and Resources Management, Conservation Authorities Branch. Toronto, Ontario.



1999

U.S. GEOLOGICAL SERVICE

Along Lake St. Clair's southern and western shores, very few wetlands have survived after years of residential, recreational and commercial development. Man-made canals are now a common feature of the shoreline. These photographs, one taken in 1937 and the other in 1999, illustrate dramatic changes.

*In the distance, great egrets perch on a sumac grove in Canada's St. Clair National Wildlife Area, located in the eastern basin of Lake St. Clair. The Canadian Wildlife Service manages this 289-ha site. Its marshes and shallow water habitat are interspersed with sandy beach ridges formed by wave action. The marshes provide excellent waterfowl habitat and are an important resting point for migrating waterfowl during spring and fall. More than 30 species of wetland-dependent birds breed in the National Wildlife Area, including the least bittern and Virginia rail. The importance of this marsh to bird life has been recognized through its designation as a "RAMSAR" site, meaning it has wetlands listed under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat.*

### Today's Coastal Marshes

Despite significant changes to the shoreline, coastal marshes persist in the Lake Huron to Lake Erie Corridor, particularly in the St. Clair River Delta and the islands of the lower Detroit River. The St. Clair River, with its relative straightness, uniform width and depth, and fast current, affords little opportunity for wetland growth.

The largest contiguous tract of coastal wetlands in the Great Lakes, encompassing more than 25,000-ac (10,000-ha), is found on Walpole Island. Ninety percent of today's coastal wetlands in the Detroit River are south of Grassy Island.

Dike systems now are used to manage many of the Corridor's largest coastal wetlands, including Pointe Mouillee State Game Area in Lake Erie as well as portions of Walpole Island and the St. Clair Flats State Game Area. Using dikes, water levels within the marshes can be regulated to maximize the growth of wetland vegetation that is beneficial to waterfowl.



ERNIE BERGEN



DEBORAH MATORANO

*A coastal marsh along western Lake Erie.*

*Pointe Mouillee State Game Area is located where the Huron River empties into Lake Erie. Pointe Mouillee means "wet point" in French. It has been known by this name since 1749 when French explorers first appreciated its vast delta and wetlands.*



TRISH BECKLORD



LEROY DERR

*St. John's Marsh in Algonac, Michigan, provides important stop-over habitat for migratory birds. In the foreground is giant reed grass, (*Phragmites australis*), an invasive wetland plant that now dominates many marshes in the Great Lakes system. It degrades the quality of marshland habitat by crowding out native wetland plants that are more beneficial to wildlife. Once established, it is very difficult to control and eradicate.*



BRUCE MANN

(LEFT) VISUAL IMAGE PRODUCTIONS, WINDSOR, ONTARIO. COURTESY OF THE GREATER DETROIT AMERICAN HERITAGE RIVER INITIATIVE

*Humbug Marsh is the last remaining natural coastal wetland on the U.S. side of the Detroit River. The one-mile (1.6-km) stretch of undeveloped shoreline is a nesting, resting and feeding island for many resident and migratory birds species. Shorebirds, raptors, migratory songbirds, waterfowl (even the common loon) make use of this unaltered, thus special, habitat. The diversity of birds, fish and insects found in the Humbug Marsh is the highest of any site studied in the Detroit River. It is an important spawning area for walleye that migrate from Lake Erie. Because of its unparalleled natural resource values, the recently acquired Humbug Marsh has become a centerpiece of the Detroit River International Wildlife Refuge.*

Protected coastal marshes with rich, abundant wildlife that are open for visitors' enjoyment include:

United States	Canada
1. St. Clair Flats State Game Area	9. Point Pelee National Park
2. St. John's Marsh	10. St. Clair National Wildlife Area
3. Pointe Mouillee State Game Area	11. Tremblay Beach Conservation Area
4. TNC Erie Marsh Preserve	12. Ruscom Shores Conservation Area
5. Sterling State Park	13. Holiday Beach Conservation Area
6. Metrobeach Metropark	14. Lighthouse Conservation Area
7. Lake Erie Metropark	15. Big 'O' Conservation Area
8. Belle Isle	



Migrating raptors from northern and eastern Canada are reluctant to cross large bodies of water. Therefore they funnel down the corridor, concentrating their numbers as they cross the comparatively narrow Detroit River near the western end of Lake Erie.



ALLEN CHARTIER

#### Lake Erie Metropark

Lake Erie Metropark is a 1,600-ac (640-ha) park near Gibraltar, Michigan, owned by the Huron-Clinton Metropolitan Authority. Situated at the mouth of the Detroit River at Lake Erie, the unique location contains an array of habitats, including Lake Erie shoreline, coastal marshes, islands and oak woodlands, which are home to a wide variety of wildlife.

Since the 1930s, warm-water effluent discharged from upstream industries

has kept much of the Detroit River and northwestern portions of Lake Erie ice-free in winter. Many waterfowl stay in the open waters, making the Metropark an ideal location for viewing waterfowl during the winter.

Bald eagles often fish along the Metropark's shoreline. Most notably, a pair recently made its first nesting attempt in Wayne County in 100 years.

The Metropark is best known for tens of thousands of raptors, or birds-of-prey, that can be seen passing overhead during their annual fall migration.



MARY BOHLING

(Above Left) A flock of broad-winged hawks passes over the Lake Erie Metropark.

(Above Right) A mute swan forages among spiky blue flowers of pickerel weed (*Pontederia cordata*) that bloom throughout the marshes of the Lake Erie Metropark.

Southeast Michigan Raptor Research is a non-profit organization that monitors and counts the hawks that fly through Lake Erie Metropark and Pointe Mouillee State Game Area each fall. The 10-year annual average for their counts is more than 225,000.

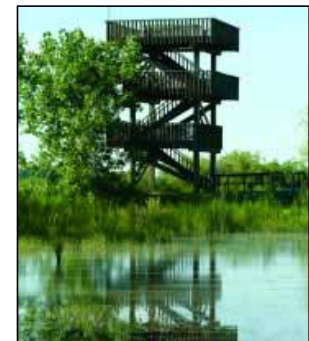
#### Holiday Beach Conservation Area

The Holiday Beach Conservation Area is a 525-ac (212-ha) park managed by the Essex Region Conservation Authority. It is located on the north shore of Lake Erie near the mouth of the Detroit River in Amherstburg, Ontario. This conservation area offers the natural beauty of the Lake Erie shoreline as well as trails that lead through meadows, woods, coastal marsh and a pine plantation.

Like the Lake Erie Metropark, the unique geography of Holiday Beach provides tremendous opportunities to view the annual

fall hawk migration. As many as 96,000 raptors have been seen migrating over the conservation area in a single day! The numerous eagles, hawks, falcons, and vultures flying overhead are best viewed from the three-story hawk tower shown at the right.

The Holiday Beach Migration Observatory is a non-profit volunteer organization that studies fall raptor migrations by counting and banding hawks at the conservation area. Observers strive to record exact numbers of all migrant bird species that fly over the site during daylight hours from late-August to early December.



ROBERT STEWART

The Hawk Tower at the Holiday Beach Conservation Area.

# THE LAKE HURON TO LAKE ERIE CORRIDOR

# IS A MAJOR PATHWAY FOR MIGRATION

**SONGBIRDS** are known for their perching behavior and musical song. Types of songbirds include thrushes, warblers, sparrows and finches. The species featured on these pages nest in the Lake Huron to Lake Erie Corridor. Many species through to the University of Michigan-Dearborn Campus Natural Area, where the Rouge River Bird Observatory studies the importance of urban natural areas to birds. This nearly 300-ac (120-ha) unique green space is a natural area donated by the Henry Ford estate to the University of Michigan and Wayne County to ensure its preservation as an urban-based wildlife habitat.

*The rose-breasted grosbeak (Pheucticus ludovicianus) is aptly named, with a large, stout bill that it uses to glean insects from trees and open a wide variety of seeds. The male has a stunning appearance and sings a beautiful song similar to that of the robin. These birds consume large numbers of grasshoppers, caterpillars and beetles when they can find them, thereby helping to control local insect populations. They nest primarily in open deciduous woodlands in central and southern Canada east of the Rockies, the upper Midwest, New England and the Mid-Atlantic States. Rose-breasted grosbeaks winter in southern Mexico through to northern South America.*



JIM SIMEX, NATURE'S IMAGES

*The yellow warbler (Dendroica petechia) is one of the most common and widely distributed warblers in North America, nesting across much of the continent. It winters in Central and South America. They often are victims of the brown-headed cowbird (Molothrus ater), which lays its eggs in other birds' nests. The host parents are left to raise cowbird young, usually at the expense of the hosts' own eggs and chicks. Yellow warblers have developed a strategy to combat this parasitism by building a new nest floor over the cowbird eggs, and restarting the nesting process.*



JIM SIMEX, NATURE'S IMAGES

*The gray catbird (Dumetella carolinensis) frequents shrubby, abandoned fields that are in the early stages of succession. Widespread in North America, catbirds winter along the Atlantic and Gulf coasts and in the West Indies. Although closely related to the mockingbird, catbirds don't often mimic other species. They have a complicated, garbled song and a very cat-like call.*



JIM SIMEX, NATURE'S IMAGES

## MONARCH BUTTERFLIES



JOHN SCHAEFER

*Pictured are monarch butterflies (Danaus plexippus) on Harsens Island in the St. Clair River Delta. During the fall, they can be seen migrating along the shores of the St. Clair River, Lake St. Clair and Detroit River in large numbers while on their way southward to Mexico. Resting migrants may cover entire trees.*

JIM SIMEX, NATURE'S IMAGES

**SHOREBIRDS** have some of the longest migrations of all birds, with several species flying between South America and the arctic tundra each year. Their bodies reflect the lifestyle to which they are uniquely adapted: long legs for wading in shallow marshes and mudflats, a long bill to probe for invertebrate prey, and large wings and a streamlined body to allow for speedy long-distance flights. These birds are not residents of the Lake Huron to Lake Erie Corridor but stop here for critical resting and feeding as they migrate south. Pointe Mouillee State Game Area is one of the best places in the Midwestern United States to view migrating shorebirds.



*The semipalmated sandpiper (Calidris pusilla) winters in South America and nests in the arctic tundra near water. It sometimes makes a 2,000-mi (3,200-km) non-stop journey from nesting areas to its tropical wintering grounds.*



*The short-billed dowitcher (Limnodromus griseus) breeds in the wetlands of northern Canada and can winter as far south as Brazil.*

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ENVIRONMENT CANADA



THE MISSISSIPPI FLYWAY

ENVIRONMENT CANADA

Migration is often the most perilous part of a bird's annual cycle. It is estimated that half of all birds flying south for the winter will not live to migrate north in the spring. Causes of death include: bad weather; predation; collisions with windows, buildings, autos and communication towers; and the loss or deterioration of places to stop, rest and refuel (known as stopover sites). Populations of many migrant birds, particularly those that migrate to the tropics, have been in decline.

**RAPTORS** include 17 different types of eagles, falcons, hawks and vultures that either reside in or pass annually through the Lake Huron to Lake Erie Corridor. Lake Erie Metropark and the Holiday Beach Conservation Area are excellent places to view raptors during their spectacular fall migrations.



ALLEN CHARTER

*The sharp-shinned hawk (Accipiter striatus) is one of the most-traveled hawks. It breeds in northern forests of Canada and Alaska and flies south to Panama for the winter. During migration these hawks can be seen flying in large flocks. They can often be spotted lurking around backyard bird feeders in search of unwary songbirds.*



TERRY C. OIT



ALLEN CHARTER

*The broad-winged hawk (Buteo platypterus) is common in deciduous forests of Eastern North America during the summer. In the fall, these hawks leave in huge concentrations for Central and South America. In 1999, the Southeast Michigan Raptor Research Network counted more than a half million broad-winged hawks passing over Lake Erie Metropark during the fall migration.*



JOHN SCHAEFER

*The northern harrier (Circus cyaneus) is a species of special concern in Michigan. It once was common in southeast Michigan, but has been in decline. Harriers require open grasslands and associated wetlands. Their favored prey is the meadow vole, which is usually abundant in grassland habitat. The main reason for the northern harrier's decline is habitat loss. Other causes include human disturbance, predation and pesticides.*

*The snowy owl (Nyctea scandiaca) is a top predator of the arctic tundra in northern Canada and Alaska. Occasionally it will winter in the Corridor, where it occupies open fields, shorelines and other locations that resemble the treeless habitat of the tundra. This photograph was taken at DTE Energy's Fermi II Nuclear Power Plant near Monroe, Michigan.*

**WATERFOWL** More than a million waterfowl visit the Lake Huron to Lake Erie Corridor each year. The corridor lies on the major migration pathways of both dabbling and diving ducks. The region's coastal marshes are excellent places to view them during migration.



JOHN SCHAEFER

*Redhead ducks (Aythya americana) can be seen during their migration, when they congregate in large numbers in the Corridor's open waters. In fact, they often are part of mixed flocks of 20,000 or more diving ducks. Redheads winter mostly in the Gulf of Mexico.*



JOHN SCHAEFER

*The blue-winged teal (Anas discors) is a relatively small dabbling duck that migrates to Central and South America each year. It often is the last to arrive and earliest to leave the Corridor during migration. It can fly at high speeds and maneuver with great accuracy.*



JOHN SCHAEFER

*The American black duck (Anas rubripes) was considered a migrant in the region around 1915, but was suspected to be nesting there as well. Populations then increased and by the mid-20th Century, it was more abundant than the mallard in Michigan. However between the 1950s and the 1980s, the black duck's population declined dramatically due to loss of habitat, hunting and competition with mallards for nesting sites.*

# THE LANDSCAPES OF ONTARIO AND MICHIGAN HARBOR

## EXAMPLES OF TWO GLOBALLY IMPERILED NATURAL COMMUNITIES: TALLGRASS PRAIRIE AND OAK SAVANNA

*“The banks of the strait are vast meadows, and the prospect is terminated with some hills covered with vineyards, trees bearing good fruit, groves and forests, so well disposed that one would think that nature alone could not have made, without the help of art.”*

—Father Louis Hennepin, a Catholic priest and explorer, describing the shorelines of the Detroit and St. Clair Rivers in 1679.

### Historical References

In 1670, the early explorer Galinee noted “grand prairies” along the eastern shore of Lake St. Clair and Walpole Island. When European settlers arrived in the Corridor in the late-1700s, they described mosaics of prairie and “oak openings.” Early land surveys that established the boundary between Monroe and Wayne counties in Michigan made repeated references to “extensive open, wet prairie.” One of the first botanical descriptions of the prairies in southwestern Ontario characterized a sandy field in the Windsor region as a “garden of rarities.”

*“The land on its banks is about the richest I ever saw in any country. Six or seven feet deep of earth that would do for a garden, and extensive grass plains stretching for miles into the country, without a tree save here and there a small clump like an island in a plain – the grass, particularly that called blue joint, furnishes excellent pasture and hay.”*

This description by Robert Stevenson, a pioneer settler, of the land along the Thames River downstream of Chatham in 1843 reflects the attitudes of many

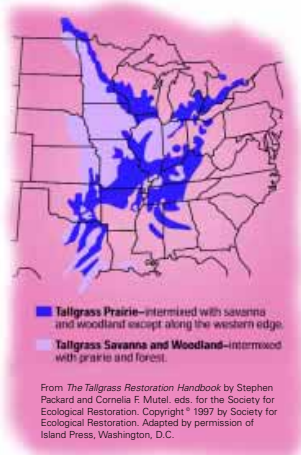
settlers who first saw the prairie and discovered its rich soils, which lay beneath the thick growth of grasses and wildflowers. The blue joint grass (*Calamagrostis canadensis*) of which Stevenson wrote was prized by early settlers as “marsh hay.”

Upland prairies were the first to succumb to farming cultivation in the early 1800s as farmers used plows pulled by teams of horses to turn the sod. It was said that the sound of ripping roots was akin to the sound of thunder. Drainage of wet prairies came later and required extensive drainage systems to yield highly productive and prized agricultural land. This mass conversion of land from wilderness to agriculture was the first of many dramatic land use changes in the Corridor.

Historical references of prairies originate from: Baskowsky, Wazyl and John L. Riley. 1992. *A Survey of the Prairies and Savannas of Southern Ontario. Proceedings from the 13th Annual North American Prairie Conference. Windsor, Ontario.*

### Tallgrass Prairie

The term “prairie” is the French word for meadow. Prairies are grasslands dominated by grasses, sedges and wildflowers. They are nearly treeless and are defined by an incredible diversity of herbaceous plants that provide



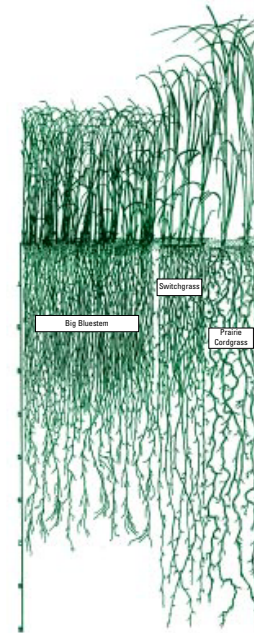
*Stretching from Texas to Canada, the prairie biome once covered vast expanses of land in the middle of the North American continent. Within this great stretch of grassland there are variations in plant communities, distinguished by three main types of prairie: short, mixed and tallgrass. Each supports distinct plant and animal communities. Short-grass prairies occur in the western, drier regions of the biome. As precipitation increases toward the east, mixed-grass prairie gives way to the high, lush vegetation of the tallgrass prairie. Southern Michigan and Ontario are home to tallgrass prairies.*

*Tallgrass prairies in southern Michigan and Ontario are on the northeastern edge of a “prairie peninsula,” first described by botanist Edgar Walter Transeau in 1935. The “prairie peninsula” is an extension of the tallgrass prairie of the eastern Great Plains. Prairie vegetation spread into Michigan and Ontario about 5,000 to 8,000 years ago during a relatively warm, dry period, known as a hypsithermal period, which followed the Wisconsin glacial retreat. As the climate gradually became cooler and wetter, forests re-invaded the prairie, resulting in the mosaic of prairie, savanna and woodlands that the first European explorers encountered.*

an excellent habitat and food source for many creatures. Prairies in North America support more biodiversity than any other type of terrestrial ecosystem.

### Warm-Season Prairie Grasses

Tallgrass prairies are named after their dominant plants, the tall grasses, which can reach heights of 3m (nine ft) or more. Many of the native warm-season grasses, such as big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*), are excellent forage for grazing animals. When the grasses bloom in



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*Many prairie plants have deep or thick root systems and other adaptations that sustain them through dry summer months. Most of the biomass of prairie grasses is below the ground in their extensive root systems. As old roots die and new roots form, organic matter builds up, creating the rich soils for which prairies are known. Carbon dioxide is caught by this significant soil carbon buildup, which reduces the level of greenhouse gases in the atmosphere.*

late-summer, their bold, arching, flowering stalks dominate the prairie landscape. Warm-season grasses break dormancy in early summer and produce much of their growth during the heat of the summer. Cool-season grasses begin growth in early spring and go dormant during summertime. Canada wild rye (*Elymus canadensis*) and Pennsylvania sedge (*Carex pennsylvanica*) are native cool-season

grasses. Kentucky blue grass (*Poa pratensis*) is a cool-season grass introduced from Europe that has invaded prairies and is also the dominant plant of the millions of acres of lawn planted in the U.S. and Canada. Kentucky blue grass requires extensive and expensive watering and fertilization that contrasts sharply to the adaptability of the native warm-season grasses.



*A view of the restored Dow Prairie during wintertime at the University of Michigan's Nichols Arboretum in Ann Arbor, Michigan. Unlike non-native cool-season grasses, prairie grasses do not flatten under the weight of snow. Their stiff stems provide cover and protection for small animals during winter.*



*Big bluestem (Andropogon gerardii) is easy to identify when it blooms during the fall. Its distinctive flower head looks like a turkey's foot.*



# TYPES OF TALLGRASS PRAIRIE

Tallgrass prairies in the Lake Huron to Lake Erie Corridor occur mostly on sandy portions of the lakeplain, but they also have a patchy distribution on well-drained, sandy-gravelly kames, moraines and glacial outwash landforms. Inland, many wet prairies occur along the margins of river systems on outwash deposits, such as the Huron River. Different landforms support distinct prairie plant communities; their species composition varies greatly, depending on moisture, soils and topography.

Ecologists define tallgrass prairie types by their soil and moisture content, using terms wet, mesic (moderate), and xeric (dry.) These factors dictate the species of grasses and associated wildflowers that can grow in any given locale. Blue joint

grass, big bluestem, prairie cord grass (*Spartina pectinata*) and many different sedge species are dominant grasses in a wet prairie. Dry prairies support little bluestem (*Schizachyrium scoparium*), switch grass (*Panicum virgatum*) and Indian grass.

Yet, because changes in topography and soils are often subtle, different types of vegetation may grow next to each other. And some species, such as big bluestem, may be found in most prairies regardless of moisture content.

*(Above) Early historical accounts reveal that bouquets of the eastern prairie fringed orchid (Platanthera leucophaea) were gathered in abundance around the bathhouses of Belle Isle Park, Detroit. Today, this unique and stunning orchid of the prairie is an extremely rare plant globally. Only a few, undisturbed natural areas in the Lake Huron to Lake Erie Corridor still support it.*



SUSAN R. GREEN



JESSICA PIELKA OFFER

*Prairie remnants thrive along railroad tracks such as this one along the Clinton River Trail in Rochester, Michigan. Sparks from passing trains frequently cause fires in the surrounding landscape. Supported by the fires, many of the region's best remaining prairie communities can be found beside railroad lines.*



JOHN SCHAEFER

*The marsh blazing star (Liatris spicata) blooms profusely in a wet lakeplain prairie on Harsens Island in the St. Clair River Delta.*

Although tallgrass prairie has a scattered distribution throughout southeastern Michigan and southwestern Ontario, the prairies that occur on the lakeplain are special because of the unique plant and animal species which they support.

Some plant species that thrive in a lakeplain prairie community are restricted to the southern Great Lakes region. Their continued presence is important to maintaining biodiversity on a global scale.

## Fire and Soil Type

Prairies are fire-dependent communities. Fire prevents trees and shrubs from invading a prairie and converting it into a forest.

Warm-season grasses and prairie wildflowers are uniquely adapted to fire. Their growth tips, or meristems, are below the soil's surface and are not damaged from hot flames. In contrast, the growing tips of trees and shrubs and non-prairie weedy species are damaged by fire. The predominance of warm-season grasses in a prairie helps to carry fire. Once ignited, the grasses carry a surface fire that is hot enough to knock back competing shrubs, saplings and other non-prairie herbaceous plants.

In a normal prairie fire there is very little soil temperature change. Under these natural circumstances fire does not scorch the earth. Measurements taken by scientists indicate that for only a very brief time is there any significant change in temperature. Even then it is usually in the top centimeter of the soil. Slow-moving fires that have a lot of woody material to burn, such as in a degraded prairie invaded by trees and shrubs, can get hotter and cause localized sterilization of soil. Fires that occur more frequently, such as every two to four years, will not have the fuel of litter build-up to



TRISH BECKFORD

*Today, land managers use prescribed (controlled) burns to maintain and improve the health and diversity of tallgrass prairies and oak savannas.*

create the hotter conditions that might severely damage or kill mature oak trees. The most valuable result of a prairie fire is the blackened soil, which warms quickly under the heat of the sun. This warming favors the growth of prairie grasses that do not break dormancy until a certain soil temperature is reached. This helps them get a head start over weedy, cool-season competitors that could eventually shade them out.

A combination of built-up organic matter and seasonal drought makes prairies naturally prone to wildfires during the summer growing season. In pre-settlement times, these fires could have been caused by either lightning

strikes or by native people, who may have set fires to drive game and to maintain the plant and animal communities that sustained them with food, medicines and clothing.

Lakeplain prairies also have persisted because of the unique hydrology of the lakeplain. The soils in which the prairies grow are characterized by 3-9 ft (1-3 m) of highly permeable sand over clay, which results in very wet conditions during spring floods and a very dry environment during the summer. Such extreme variations in the availability of water are better suited to wildflowers and grasses than trees and shrubs.

## PRAIRIE OR MEADOW?

Not every meadow or field is a prairie. Although meadows are open, treeless areas with grasses, they usually form as a result of a disturbance, such as logging or land clearing, and are often early signs of forest regeneration. Fallow farm fields also have grasses and wildflowers. But most fallow fields tend to be dominated by Eurasian grasses and invasive plants, such as Queen Anne's lace (*Daucus carota*) or spotted knapweed (*Centaurea maculosa*), that thrive in disturbed areas. Meadows usually are dominated by asters and goldenrods, which do not carry fire as well as the warm-season grasses of a prairie ecosystem.



ROBERT STEWART

*Prairies and oak savannas remain in the Lake Huron to Lake Erie Corridor because they are able to withstand stressed environments where trees cannot. The combination of periodic wildfires, drought, spring floods and a warm climate have all contributed to their persistence in the region. Prairies thrive where these effects are most severe, while oak savanna grows where these stresses are less pronounced.*

# TALLGRASS PRAIRIE



Yellow star-grass  
*Hypoxis hirsuta*

JOHN TIEDE



Wood betony  
*Pedicularis canadensis*

JOHN TIEDE



Hoary puccoon  
*Lithospermum canescens*

ALLEN WOODRUFFE



Blue-eyed grass  
*Sisyrinchium albidum*

JOHN TIEDE

## SPRING

In early May, the first wildflowers of the prairie emerge from the ground.



Small white lady's-slippers  
*Cypripedium candidum*

ALLEN WOODRUFFE



Bird's foot violet  
*Viola pedata*

ALLEN WOODRUFFE



Golden Alexanders  
*Zizia aurea*

JOHN TIEDE

Some prairie remnants have as many as 200 distinct plant species growing in them. Given this diversity, the prairie is constantly changing, with different plants blooming from spring until fall.

These plants are a mere sampling of the beauty that can be found in a tallgrass prairie throughout the seasons.

Each wildflower displays its unique color and scent in hopes of attracting one of the many insects that inhabit a prairie ecosystem.

Very specialized relationships have developed between some insects and the prairie plants that host their larva. For example, rare insects such as Culver's root and blazing star borer moths feed among the many different prairie wildflowers, but require their namesake species

(Culver's root and marsh blazing star) to host their larvae.

Prairie grasses support wildlife in many ways. Several varieties of skipper butterflies—dusted, Indian, crossline and Leonard—feed on the leaf blades of little bluestem. Indian grass hosts the larvae of the wood satyr and common wood nymph butterflies.



DAVID L. CUTHRELL

The blazing star borer moth lives in harmony with the prairie ecosystem that supports its larval host plant, the marsh blazing star. This species at risk has been identified in the lakeplain prairies of Algonac State Park, Michigan.



Big bluestem  
*Andropogon gerardii*

JOHN TIEDE



Indian grass  
*Sorghastrum nutans*

JOHN TIEDE



The common milkweed (*Asclepias syriaca*) has distinctive seed pods filled with downy hairs, which aid in seed dispersal by wind. These downy hairs, or floss, were used to stuff life preserver jackets in World War II. Today, milkweeds are a raw material for commercial purposes such as rubber, fiber and even fuel production.

RANDY HOLLAND



Prairie cord grass  
*Spartina pectinata*

CAROLINE BRIDGEMAN



Little bluestem  
*Schizachyrium scoparium*

ALLEN WOODRUFFE

## FALL

In autumn, warm-season prairie grasses have reached their full grandeur, topping out at heights of six feet (1.8 m) or more.



Switch grass  
*Panicum virgatum*

JOHN TIEDE



Michigan lily  
*Lilium michiganense*

MARY LARANCE



Mountain mint  
*Pycnanthemum virginianum*

MARY LARANCE



Marsh Blazing Star  
*Liatris spicata*

JOHN SCHWEPER



Sullivant's Milkweed  
*Asclepias sullivantii*

JOHN SCHWEPER



Fringed gentian  
*Gentiana crinita*

MARY LARANCE



Tall sunflower  
*Helianthus giganteus*

GERRY CLEAVES



Smooth Aster  
*Aster laevis*

ALLEN WOODRUFFE



Culver's root  
*Veronicastrum virginicum*

## SUMMER

Spring is merely the beginning for the color show in a prairie. By mid- to late-July, the wildflower show is in full swing, with a profusion of prairie flowers displaying a riotous combination of colors well into late summer and fall.



Butterfly Milkweed  
*Asclepias incarnata*

TRENT BICKNOLD



Black-eyed susan  
*Rudbeckia hirta*

GERRY CLEAVES



Ohio Spiderwort  
*Tradescantia ohioensis*

ALLEN WOODRUFFE



Yellow coneflower  
*Ratibida pinnata*

MICHAEL P. ROSENBERG



Bergamot  
*Monarda fistulosa*

JOHN TIEDE



Canada tick trefoil  
*Desmodium canadense*

MARY LARANCE



Joe-pye weed  
*Eupatorium maculatum*

CAROLINE BRIDGEMAN

# Birds Dependent on Grassland Habitat are in Decline

Grassland birds are declining at an alarming rate in North America. One largely-unnoticed reason is loss and fragmentation of the birds' grassland habitat – assorted prairie types, wet meadows, pastureland and fallow farm fields. Grassland birds also are threatened by high rates of predation, nest parasitism by cowbirds, and earlier and more frequent mowing and harvesting of fields, resulting in reproductive failure.

Historically, grassland ecosystems such as tallgrass prairies depended on periodic fires and animal grazing to maintain their character and diversity. The decrease or extirpation of grazing animals, fire suppression, the introduction of non-native or invasive plant species and changing agricultural practices have dramatically altered grasslands. Birds that rely on grasslands are becoming dependent on humans to create or manage suitable ecosystems. But determining how to manage grasslands for birds can be difficult because each species may have different requirements. Some prominent examples include the Henslow's sparrow, eastern meadowlark, bobolink, and loggerhead shrike.

Loggerhead shrikes (*Lanius ludovicianus*) are unique among songbirds because they prey upon vertebrates, including rodents and other birds. The shrikes lack the strong talons of predatory raptors, so they often impale their prey on thorns, barbed wire or sharp twigs, earning them the nickname "butcherbird." Loggerhead shrikes are birds of open country, such as grasslands that have short vegetation and a scattering of short trees and shrubs

Bobolinks (*Dolichonyx oryzivorus*) make one of the longest migrations of any songbird, up to 6,200 mi (9,920 km) from nesting areas in the northern U.S. and southern Canada to wintering grounds in South America. Historically, bobolinks nested in the prairies of the Midwestern U.S. and south-central Canada. They were considered abundant in the Lake Huron to Lake Erie Corridor in 1900. As agriculture spread eastward, so did bobolinks. They were most abundant when they could nest in the extensive hayfields required to support the widespread use of horses for transportation and farming.

Today, populations are declining due to habitat loss, changing agricultural practices and cowbird parasitism. Like meadowlarks, bobolinks prefer mixed grasslands and older fields, but can nest in smaller patches of habitat. Breeding

The Henslow's sparrow (*Ammodramus henslowii*) is a small, inconspicuous bird that requires large, often damp, grasslands usually greater than 250 ac (100 ha). It prefers tall, dense grasses with much standing decaying vegetation and a thick layer of litter. As grasslands mature and these distinctive elements diminish, Henslow's sparrows move to a new location. They make their nests on the ground, often in loose colonies of between

two and 50 pairs of birds. Around 1900, they were found sporadically in the Lake Huron to Lake Erie Corridor region, but were known to nest regularly on Grosse Ile. Today, they are threatened in Michigan and endangered in Canada.

from which they hunt. They live year-round in much of their broad North American range, but northern populations are migratory. Loggerhead shrikes once were fairly common nesters in the region. Now they are nearly extirpated and are considered endangered in Michigan and Ontario, mainly due to habitat loss. Other reasons have yet to be discovered but may include being hit by vehicles as they feed along roadsides, and reduction or



JIM SIMSEK, NATURE'S IMAGES

success has been lowered by the introduction of cool-season grasses, which are mowed earlier (during the nesting period) and more frequently than native, warm-season grasses. Since bobolinks exhibit strong fidelity to nesting areas, returning to a successful nesting place in subsequent years, this change in agricultural practices can be especially detrimental.



WALPOLE ISLAND HERITAGE CENTRE

contamination of insects, a substantial part of their diet, by pesticides.



U.S. FISH AND WILDLIFE SERVICE NATIONAL IMAGE LIBRARY HTTP://IMAGES.FWS.GOV/



IAN BOST

The bottle gentian (*Gentiana andrewsii*) grows in the wet soils of lakeplain prairies and wet meadows. Its intense blue flowers bloom in the late-summer at Sibley Prairie.

The Greater Sibley Road Prairie Complex in Brownstown Township, Michigan, is an ecological treasure of the largest and highest-quality lakeplain prairie remnants in Michigan. Prior to European settlement, native buffalo roamed the 16,000-ac

(6,400-ha) Sibley Prairie. Only 350-acres (140 ha) are left today. The complex is home to at least 170 rare grasses, sedges, rushes and wildflowers including 14 endangered, threatened and special concern plant species in Michigan. Birds such as the American kestrel and bluebird find habitat in its grassy meadows. Duke's skipper, a threatened species in Michigan, has been identified at the site. The prairie remnants are scattered among a mosaic of oak



DENNIS ALBERT

The colorful wildflowers of Sibley Prairie

savanna and oak woodlands. Its vast wetlands are significant groundwater recharge areas that flow into Brownstown Creek, the Bakely Drain and Marsh Creek, which connect to the Detroit River south of Gibraltar.

The Michigan Natural Features Inventory has identified the Sibley Prairie as representing "our greatest hope for preserving a functional lakeplain prairie ecosystem." The Nature Conservancy, Southeast Michigan Land Conservancy, and Michigan Nature Association are protecting very small parcels of this natural area. But more protection is needed to ensure the survival of this unique ecosystem and the many rare species that it supports.

# SIBLEY PRAIRIE

## BUFFALO

*"But 15 leagues from Detroit, at the entrance to Lake Erie, inclining to the south to southwest, are boundless prairies which stretch away for 100 leagues. It is there that these mighty oxen (bison), which are covered with wool, find food in abundance."*

– Antoine de la Mothe Cadillac, founder of Detroit, describing the landscape of southeastern Michigan in 1702



ILLUSTRATION BY HOLLY JENSEN

The buffalo (Bison bison) was generally known as a plains creature. But it also had lived in woodlands well into Alaska in the northwest and in most of the eastern United States, except for New England. Early settlers hunted this shaggy mammal in such places as forest glades in what is now Pennsylvania. Authorities agree that it was extirpated on the Atlantic side of the Alleghenies by 1730 and east of the Mississippi by about 1810. This husky creature was no match for hungry settlers with guns. The bison that frequented prairies in southeastern Michigan and described by Cadillac were killed off by about 1800.

# OJIBWAY PRAIRIE COMPLEX

The Ojibway Prairie Complex contains 550 ac (220 ha) of some of the highest-quality tallgrass prairie and oak savanna left in southern Ontario. It is composed of five natural areas within minutes of downtown Windsor, Ontario. Ojibway Park, Tallgrass Heritage Park, Black Oak Heritage Park and Spring Garden Prairie are owned in part by the City of Windsor Parks and Recreation Department. The Ojibway Prairie Provincial Nature Reserve is owned by the Ontario Ministry of Natural Resources. Remaining lands are owned by private landowners.

At the Ojibway Nature Centre at Ojibway Park, many walking trails invite visitors to experience and learn about rare tallgrass prairie and oak savanna ecosystems. In addition to the eastern massasauga, the eastern fox snake (*Elaphe vulpina gloydii*) and Butler's garter snake (*Thamnophis butleri*) are rare reptiles that find a home in the complex.



EVAN LARSON

(Above) Ojibway Park in Windsor, Ontario. (Right) The eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*) is found, over much of the year, in wetlands, such as sedge marshes, bogs, fens, and shrub swamps. They may move into adjacent grassland habitats in summer. Wet soils are important to this rattlesnake, as the high water tables found in wet prairies, meadows, and fens prevent the ground from freezing deeply. These snakes often hibernate in the tunnels created by crayfish or small mammals.



BRUCE KINGSBURY

The Eastern Massasauga is the only venomous snake native to the region. Despite its reputation, this rattlesnake is normally docile unless provoked. Its distribution is restricted to the southern Great Lakes region of Lower Michigan and Ontario along with northern Indiana and Illinois. Michigan now has the highest remaining populations of the Eastern Massasauga. Because of habitat loss and persecution by humans, this snake is a rare and a protected species throughout its range.

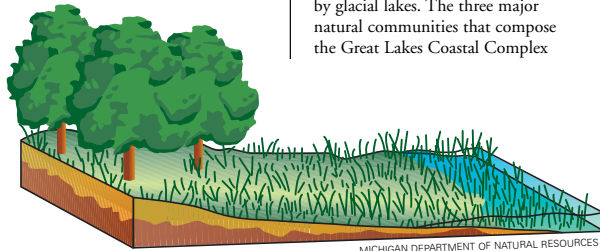
## The Great Lakes Coastal Complex

In the St. Clair River Delta at Algonac State Park and Walpole Island, along with locations in Saginaw Bay and Lake Erie, there is a very special association of natural communities called the

Great Lakes Coastal Complex. The vegetation ranges from submersed plants rooted in water about 6 ft (2 m) deep to tall, wide-spreading white oaks (*Quercus alba*) that grow on the sandy beach ridges formed thousands of years ago by glacial lakes. The three major natural communities that compose the Great Lakes Coastal Complex

are defined by water fluctuations and lakeplain geology: oak savanna, lakeplain prairie, and Great Lakes marsh. All are rare and globally imperiled.

The Great Lakes marsh extends into the nearshore waters, but also includes saturated sand. The prairie borders the inland portion of the marsh on sandy deposits. Oak savanna is scattered throughout the prairie on narrow, sandy beach ridges. Historically, all three of these communities were tied together by fluctuating water levels, which could alter their sizes and boundaries both seasonally and annually.



Oak Savanna Lakeplain Prairie Great Lakes Marsh MICHIGAN DEPARTMENT OF NATURAL RESOURCES

# OAK SAVANNA

*“A sandy ridge producing nothing but a few scattering of trees of white oak.”*

—SURVEY MAP FOR A RIDGE WEST OF LEAMINGTON, ONTARIO

Oak savannas are characterized by widely spaced trees with shrubs, grasses, sedges, ferns and wildflowers occupying the understory, which means they are on the ground under the canopy of tree branches. The oak savanna ecosystem is a transition community between a prairie and a true woodland ecosystem.

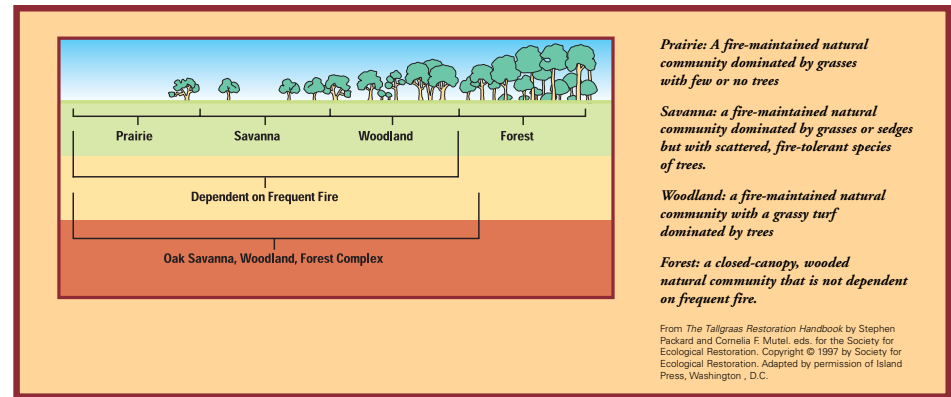
The grassy understory of an oak savanna is filled with many plants species associated both with tallgrass prairie and forest communities. The groundcover is a mosaic of plant species, each with a varying sun and shade tolerance. The open canopy of the savanna, which allows sunlight to reach the groundcover layer, can support prairie plant species in sunnier areas, such as butterfly weed (*Asclepias tuberosa*) and flowering spurge (*Euphorbia corollata*). In shadier areas, fire-tolerant forest shrubs like blueberries (*Vaccinium spp.*) and huckleberry (*Gaylussacia baccata*) grow.



An oak savanna on Walpole Island

Because there are so few quality remnants left, it is hard to fully understand the ecology of oak savannas. However it is thought that the true plant species of

savannas are able to thrive in a blend of shade and sun; examples include wild lupine (*Lupinus perennis*) and purple milkweed (*Asclepias purpurascens*).



## Types of Oak Savanna

Oak savannas occupy a variety of soils, ranging from wet to dry. In the glacial lakeplains of Michigan and Ontario, oak savannas occur on sand ridges, level sandplains and wet swales between ridges. Further inland, oak savanna and oak barrens grow on well-drained outwash plains, moraines and kames. In all cases, oaks are the dominant trees while grasses and sedges make up most of the groundcover.

Two types of oak savanna are prominent in the lakeplain: dry to mesic, and mesic to wet. Dry oak savannas exist on the dry sandy beach ridges of the lakeplain, where black oak (*Quercus velutina*), white oak and pignut hickory (*Carya glabra*) dominate the tree canopy, and shrubs such as New Jersey tea (*Ceanothus americanus*), American hazelnut (*Corylus americana*), wild plum (*Prunus americana*) and blueberry vegetate the understory. Very dry savannas also may have evergreen trees such as white pine (*Pinus strobus*), red pine (*Pinus resinosa*) or eastern redcedar

(*Juniperus virginiana*). The ground cover of this dry savanna type is diverse. Little bluestem and Pennsylvania sedge are dominant grass species. Wildflowers adapted to drought conditions such as tickseed (*Coreopsis lanceolata*), wild lupine (*Lupinus perennis*),



FRANCY HOLLAND

The eastern prickly pear cactus (*Opuntia humifusa*), found in the dry black oak savannas of Ontario's Point Pelee National Park, is the only native cactus in this region.

rough blazing star (*Liatris aspera*) and wild bergamot (*Monarda fistulosa*) populate sunnier areas.

Wetter savannas occupy flat, poorly-drained soils of the lakeplain. The flora of this wetter savanna type is able to withstand springtime flooding. Bur oak (*Quercus macrocarpa*), pin oak (*Quercus palustris*) and swamp white oak (*Quercus bicolor*) dominate the tree canopy. Shrubs such as winterberry (*Ilex verticillata*), dogwoods (*Cornus spp.*) and chokeberry (*Aronia melanocarpa*) frequent the understory. Many of the grasses and wildflowers in the ground layer are the same as in the adjacent wet prairies. Big bluestem, blue joint grass and sedges are dominant grasses. Forbs that prefer wetter conditions such as common mountain mint (*Pycnanthemum virginianum*), Riddell's goldenrod (*Solidago riddellii*), and ironweed (*Vernonia fasciculata*) are indicators of this savanna type.

Like tallgrass prairie, oak savanna is a fire-dependent community. Frequent wildfires have historically played a major role in maintaining oak savanna's open structure and grassy understory.

Grazing animals such as the buffalo, as well as drought on the sandy ridges and the lakeplain's unique hydrology, also have contributed to maintenance of oak savanna in the Corridor. Ecologists have discovered that the seasonally high water table of the lakeplain has helped maintain wet savanna communities.

Oak trees, which define savanna in this region, have a thick, fire-resistant bark. Oaks are not killed by low-intensity fire, although often the lower branches are burned off. Trees and shrubs that are more common in woodlands with dense canopies, such as black cherry (*Prunus serotina*), are

## The Karner Blue Butterfly

The Karner blue butterfly (*Lyciaes melissa samuelis*) lives in oak savanna and pine barren ecosystems where its larval host plant, wild lupine, thrives. Wild lupine is known to be the only plant on which the Karner blue's caterpillar feeds. Without this plant, the butterfly can't reproduce. The adult butterfly feeds on a wide variety of wildflowers, such as wild bergamot and butterfly weed.

The loss of oak savannas has brought this little butterfly close to extinction. It is now extirpated from southeastern Michigan and all of Ontario. It is listed as federally endangered in the U.S. and is the subject of recovery efforts that span its native range of New York, New Hampshire, Ontario, Michigan, Ohio, Indiana, Wisconsin and Minnesota.

In Lambton County, Ontario, efforts are being made to restore the butterfly's habitat at Pinery Provincial Park and adjacent nature preserves managed by Lambton Wildlife Inc. in Lambton County, Ontario. It is hoped that the work of a multi-disciplinary recovery team, with cooperation from the U.S. Fish and Wildlife Service, will enable Karner blue butterflies to flourish once again in Ontario.



(Above) The wild lupine (*Lupinus perennis*) thrives at Petersburg State Game Area in western Monroe County, Michigan, where "prescribed burns," or deliberately set and controlled fires, are conducted to help manage this natural area's oak savannas and tallgrass prairies.



(Right) The Karner blue butterfly.

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## OAK SAVANNAS ARE MAINTAINED BY FIRE



DENNIS ALBERT



DENNIS ALBERT

The following spring

Prescribed burns are being used to restore wet oak savannas at Algonac State Park, Michigan. At left is a highly degraded oak savanna, which has been invaded by thick brush, during a controlled burn. At right is the same oak savanna the following spring after a prescribed burn, which opened the tree canopy, cleared away saplings and shrubby growth, and permitted the sun to reach the forest floor. Often, more than one prescribed burn is needed to fully restore the health of a degraded oak savanna.



ALLEN WOODLIFE

killed or severely stunted by fire. By removing fire-sensitive woody species and the lower branches of oaks, fire creates the characteristic open canopy of the savanna. Fire also fostered the growth of warm-season prairie grasses such as little bluestem, and other plants that are adapted to periodic fires.

Wildfire suppression by humans has greatly altered the distribution and extent of oak savannas throughout North America. Compared with pre-settlement distribution, oak savannas

(Left) The smooth yellow false foxglove (*Aureolaria flava*) lives in oak savannas and woodlands with sandy soils. It is parasitic to the roots of white oak and is often found in close association with them.

are nearly extinct. Without periodic fire, woody species invade a savanna. Their shade eventually smothers the prairie vegetation and blocks the open sunlight that oak seedlings need to thrive. Without fire, oak savanna gradually transforms into oak woodlands. This trend is especially apparent in the lakeplain of Michigan, where many of the historical oak savannas have become closed-canopy oak forests.

Usually considered destructive, fire actually has preserved a rich natural heritage. Without fire's regenerative effects, oak savannas and tallgrass prairies, along with the myriad of rare species living in them, could be lost forever.



*The American badger (Taxidea taxus) is a classic mammal of tallgrass prairie and oak savanna. It is becoming increasingly rare in Southern Ontario and Michigan, areas which define the easternmost extent of its distribution across North America. The badger prefers sandy soils where it uses its short, powerful legs for digging. In fact, the badger can dig a hole faster than a man with a shovel. This nomadic animal likes to travel during darkness and can move more than 10 km (6 mi) in one night.*

### Animals of Oak Savanna

Oak savanna provides habitat for many wildlife species. Songbirds, such as the eastern bluebird, indigo bunting and brown thrasher thrive in the open grasslands occasionally punctuated by oak trees. Oak savanna also supports many small mammal species, such as cottontail rabbit and fox squirrel, which are hunted by raptors, like the sharp-shinned hawk. Larger mammals, such as red fox, white-tailed deer, coyote and badger, find ideal habitat in oak savanna as well.

*(Above Right) Oak savanna provides ideal habitat for the eastern bluebird (Sialia sialis), a native species that lives in cavities left in dead trees by woodpeckers or other natural causes.*

*The loss of dead trees and competition from exotic birds – house sparrow (Passer domesticus) and European starling (Sturnus vulgaris) – have contributed to the decline of this colorful bird. Efforts to place artificial nest boxes are contributing to the eastern bluebird's recovery.*

*(Below) The American kestrel (Falco sparverius) is the smallest and most familiar hawk in North America. It prefers open country with wooded edges where it can find perching sites and an abundance of large insects such as its favored prey, the grasshopper, as well as small animals such as mice and frogs. It also nests in the cavities of trees.*



FERN WILSON



ALLEN CHARTIER

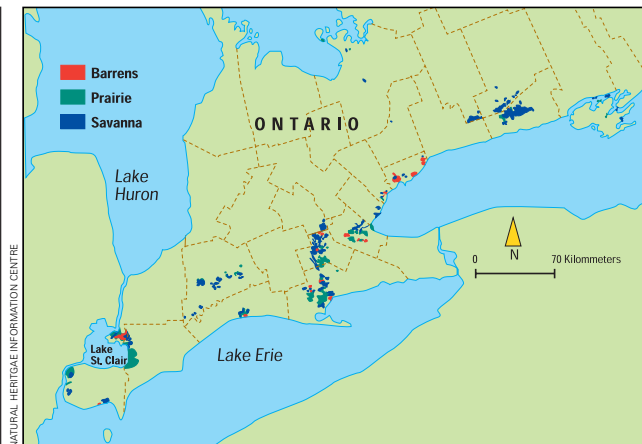
*Less than one percent of the original tallgrass prairie and oak savanna vegetation remains in Southern Michigan and Ontario. Because these ecosystems support so many rare plant and animal species, the protection and management of the isolated remnants is critical to preserving our native biodiversity.*

### The Loss of Tallgrass Prairie and Oak Savanna Habitat in the Region

It isn't known exactly how much original prairie and savanna habitat existed prior to European settlement in Ontario, but it is estimated that 100,000 ac (40,000 ha) once covered the landscape of the southern part of the province. A mere 2,100 ha of prairie and oak savanna remain today. Most of this vegetation is located at Walpole Island First Nation (450 ha), the Windsor Ojibway Prairie Complex (320 ha) and Pinery Provincial Park (1,250 ha).

In Michigan, pre-settlement vegetation is estimated at 122,425 ac (48,970 ha) of lakeplain prairies in St. Clair, Macomb, Oakland, Washtenaw, Wayne and Monroe counties. Unfortunately, less than 800 ac (320 ha) remain today.

These natural areas represent the best of the remaining prairie and oak savanna ecosystems left in the Lake Huron to Lake Erie Corridor. Unfortunately, the remnants perform few, if any, of their original landscape and habitat functions to support mammals, birds, reptiles and amphibians. Butterfly populations have declined to the point that some species, such as Karner blue and frosted elfin, are endangered species in the U.S. and have been extirpated from Ontario. In addition, many plants that once were common in tallgrass prairie and oak savanna ecosystems are at risk of being lost to the region, and in some cases, Earth.



NATURAL HERITAGE INFORMATION CENTRE

*This map illustrates the Pre-European settlement distribution of tallgrass prairie and oak savanna in Ontario. Today, existing prairie communities are remnants of this original distribution.*

### Places to visit and experience tallgrass prairies and oak savannas in the Lake Huron to Lake Erie Corridor are:

United States	Canada
Petersburg State Game Area	Ojibway Prairie Provincial Nature Reserve
Algonac State Park	Ojibway Park
St. Clair Flats State Game Area	Point Pelee National Park
Lower Huron Metropark	Stone Road Alvar on Pelee Island
Indian Springs Metropark	Pinery Provincial Park
Highland State Recreation Area	Howard Watson Nature Trail
Island Lake Recreation Area	Canatara Park Prairie Reconstruction
Nichols Arboretum Dow Prairie Reconstruction	Dennis Rupert Prairie Preserve
Matthaei Botanical Gardens Prairie Reconstruction	
Gallup Park (City of Ann Arbor)	
Furstenburg Park (City of Ann Arbor)	
Barton Park (City of Ann Arbor)	
Bandemer Park (City of Ann Arbor)	
Brighton Recreation Area	
Sterling State Park	

**The Great Lakes Marshes, tallgrass prairies and oak savannas of the Lake Huron to Lake Erie Corridor have diminished greatly since the development of the region by European settlers. Parks and nature preserves make up most of the high-quality natural areas remaining today. An extraordinary diversity of plants and animals still call these remarkable ecosystems home in today's environment. Protecting them is critical for their survival.**

# WALPOLE ISLAND FIRST NATION TERRITORY

## “BKEJWANONG” LAND WHERE THE WATERS DIVIDE

*“Walpole Island First Nation lands is a mosaic of wetlands, prairie, and oak savanna habitats without equal in the Great Lakes Basin”*

- STATE OF THE LAKES ECOSYSTEM CONFERENCE, 1998



An aerial view of Walpole Island in the St. Clair River Delta



*“Waabshkoki” is the Ojibwa name for marsh and all the life and rich biodiversity contained within it. Walpole Island has 42,500 ac (17,000 ha) of coastal marsh. It is one of the largest contiguous portions of coastal marsh left in the Great Lakes Basin. Patches of wild rice are purposefully not harvested to sustain the many waterfowl that visit each year.*

Walpole Island is truly an ecological treasure in the Lake Huron to Lake Erie Corridor. The natural communities found on Walpole Island offer clues to how the region’s landscape might have looked prior to European settlement.

Among the many beautiful scenes on Walpole Island is a grove of widely spaced oak trees, with dappled light filtering through the canopy and the ground thickly covered with a multitude of wildflowers and grasses. In the distance, oak trees fade seamlessly into prairie meadows of purple, yellow, pink and white blossoms, as well as grasses that reach beyond shoulder height, seemingly to the sky. The air abounds with the buzz of insects, birds calling to one another, and dewy scents.

On the fringes of Walpole Island, coastal marshes filled with cattails, sedges and rushes spread out in every direction. Turquoise water, like that found in the tropics, extends from the marshes into Lake St. Clair. The marsh area is so expansive that one could easily become lost in its many openings, islands and dikes.

The plant and animal life is amazingly diverse. In fact, Walpole Island has some of the highest concentrations of rare species of any place in Canada. The people of Walpole Island First Nation have successfully managed and lived off



*Walpole Island is the only place in Canada where the white prairie gentian (Gentiana alba) is found. This plant is characteristic of high-quality oak savanna ecosystems.*



*The eastern portion of St. Clair River Delta constitutes the lands of Walpole Island First Nation. There, 24,000 ha of delta islands are a part of the traditional homeland of the Ojibwe, Odawa, and Pottawatomi people who together comprise a political compact known as the Three Fires Confederacy. The Ojibwe language “Anishinaabemowin” is their native language.*

*“Mushkode” is the Ojibwa name for prairie and savanna. Walpole Island contains the best remnants in the Corridor of the globally imperiled tallgrass prairie and oak savanna communities. Those at Walpole are home to more than 140 rare plant species.*

their lands for thousands of years. The existence of high-quality tallgrass prairie and oak savanna is most likely due to their use of fire, as well as protection from large-scale agricultural development. The people’s traditional values and practices are probably the largest factors responsible for sustaining the different habitats and associated plants and animals in their territory. The ecosystems that are threatened on a global scale remain a vital part of the Walpole Island community’s past, present and future.

*Visitors can learn more about Walpole Island’s natural heritage at the Walpole Island Heritage Centre.*



*“Mitigwaaki” is the Ojibwa name for deciduous forests, or “bush.” Walpole Island contains one of the largest continuous tracts of forested area in southern Ontario.*