

# Lake Erie

Coastal Wetlands and Birding Tour

@ EcoSummit 2012

[www.ecosummit2012.org](http://www.ecosummit2012.org)





# Lake Erie Coastal Wet

## October 3, 2012 itinerary:

**7:30 am** - Board buses

**8:00 am** - Depart Columbus. En route, introduction to Lake Erie (pg 4 - 19)

**10:30 am** - Old Woman Creek National Estuarine Research Reserve ongoing research (pg 20 - 25)

**12:30 pm** - Public-Private Partnership Wetland Restoration (pg 26-31)

**2:00 pm** - Habitat Restoration in the Maumee Area of Concern (pg 32 - 33)

**En route** - Lake Erie CREP sites (pg 34 - 35)

**3:30 pm** - Magee Marsh Wildlife Area and Sportsman's Migratory Bird Center ongoing research (pg 36 - 41)

**4:45 pm** - Ottawa National Wildlife Refuge Visitor Center ongoing research (pg 42 - 45)

**5:00 pm** - Dine on local foods at the ONWR Visitor Center

Plan your return trip to Lake Erie and Acknowledgements, Maps (pg 46-51)

**6:30 pm** - Depart for Columbus

**9:00 pm** - Arrive Columbus

Begin your exploration of Ohio's Lake Erie coastal wetlands at Old Woman Creek National Estuarine Research Reserve. While there, learn about research, education and stewardship solutions to crucial issues facing Great Lakes' coastal communities.

Then visit and hear about the challenges, successes and methods used in public-nonprofit-private partnership wetland restoration.

Enjoy world class birding at Magee Marsh State Wildlife Area, visit the Sportsman's Migratory Bird Center and learn about ongoing research.

Witness restoration and management success stories at Ottawa National Wildlife Refuge and take the opportunity to hike the trails.

At each public site, enjoy educational displays that translate research in order to increase the understanding of Lake Erie's influence on the region, support ecological restoration and promote citizen-stewardship.

Before returning to Columbus, enjoy a dinner of local food including Lake Erie yellow perch.



# lands and Birding Tour

## Lake Erie Birding Trail

Lake Erie and its associated habitats support some of the most abundant and diverse bird populations in the United States. Migrant songbirds fill lakeside woodlands in spring and fall while passing through Ohio. Waterbirds pack marshes and the open lake waters, and marsh birds breed in coastal wetlands.

To help birders plan their outings, the ODNR Division of Wildlife and Ohio Sea Grant developed the Lake Erie Birding Trail connecting more than 80 of the top birding sites along Lake Erie in seven loops. The sites within each loop are similar in habitat type and landscape.

Old Woman Creek NERR is in the Huron & Lorain Loop. Sites within the Western Lake Erie Marshes Loop include Magee Marsh State Wildlife Area and the Ottawa National Wildlife Refuge. Every year, the second Saturday in May is International Migratory Bird Day. Around this time as many as 10,000 birders from all over the country and beyond come to the area to view the 350 bird species that have been seen in this loop, 11 of which have only been found in this region.

### Learn More:

[www.lakeerieohiobirding.info](http://www.lakeerieohiobirding.info)

ODNR Division of Wildlife

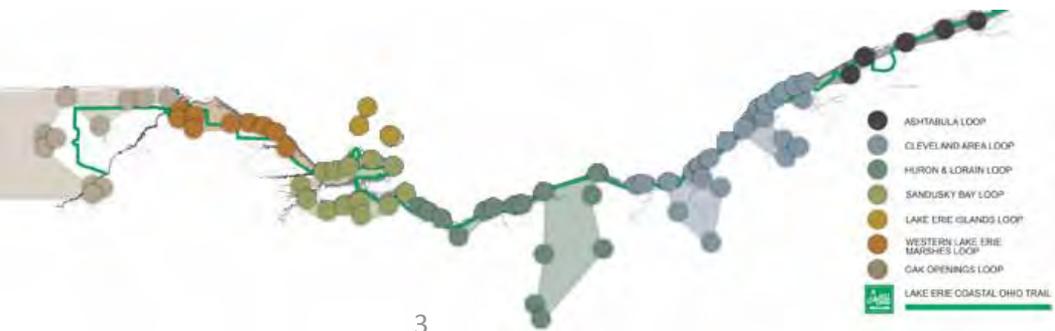
1 (800) WILDLIFE

[wildlife.social@dnr.state.oh.us](mailto:wildlife.social@dnr.state.oh.us)

or

Ohio Sea Grant College Program

(614) 292-8949





# Lake Erie 101

## by the numbers:

### Average Depth:

62 feet

### Maximum Depth:

210 feet

### Length (west to east):

241 miles

### Breadth (north to south):

57 miles

### Entire Coast Length:

871 miles

### Elevation:

573.4 feet IGLD 1985

### Water Retention Time:

2.6 years

### Volume:

127.7 trillion gallons

### Water Area:

9,910 sq. miles

### Watershed Drainage Area:

30,140 sq. miles

### Outlets:

the Niagara River and  
the Welland Canal

A prominent physical feature of North America is the five Great Lakes—Superior, Huron, Michigan, Erie and Ontario—which are part of the system containing 95 percent of North America’s fresh surface water and 20 percent of the world’s fresh surface water.

While smallest by volume at 127.7 trillion gallons (2.1 percent of all water in the Great Lakes), Lake Erie is the shallowest, warmest and most biologically productive of the Great Lakes. Lake Erie is an internationally shared resource forming part of the political boundary between the United States and Canada. The lake provides drinking water to 11 million people. One-third of the Great Lakes Watershed population lives in the Lake Erie Watershed.

In Ohio, Lake Erie and its watershed have highly diverse ecosystems supporting thousands of species of fish, wildlife and plants, including many rare and endangered species. Approximately 2.53 million Ohioans live in the state’s coastal counties; 3 million people tap Lake Erie as their source of daily drinking water; and more than \$10 billion is spent annually by visitors to the coastal region.

Ohio’s Lake Erie shore and watershed include the most southerly reaches of the Great Lakes ecosystem. The watershed has large and small businesses and industries, world-class institutions of higher-education, welcoming residential communities, prime farmland, scenic rivers, lush forests, natural wetlands, recreational beaches, sand dunes, thriving estuaries and countless other resources.



## Lake Erie Literacy Principles:

1. Lake Erie, one of the five Great Lakes, is a body of fresh water with many features.
2. Natural forces formed and continue to shape Lake Erie and its watershed.
3. Lake Erie influences local and regional weather and climate.
4. Water makes Earth habitable; fresh water sustains life on land.
5. Lake Erie supports a broad diversity of life and ecosystems.
6. Lake Erie and humans in its watersheds are inextricably interconnected.
7. Much remains to be learned about Lake Erie.
8. Lake Erie is socially, economically and environmentally significant to the region and nation.

[Learn More:](#)

[www.ohiodnr.com/LakeErieLiteracy](http://www.ohiodnr.com/LakeErieLiteracy)



Lake Erie from space May 21, 2012



# Lake Erie Formation

Natural forces and manmade influences formed and continue to shape Lake Erie and its surrounding topography. The region's history can be traced back 400 million years, to when shallow, tropical saltwater seas covered the area. Extensive deposits of halite (salt) lie a mile below the lake bed north of Cleveland (Cuyahoga County) and Fairport Harbor (Lake County). Today, these deposits play an important role in Ohio's economy with approximately 5 million tons of salt mined annually, most of which is used for road salt during the winter months.

The lake owes its shape and depth to a series of glacial advances that lasted from about 1 million to 12,600 years ago. Glaciers carved out all of the Great Lakes, but by the time the glaciers pushed south to the Ohio area, the glaciers were only a mile-thick and lacked significant erosive power leaving the Erie Basin the shallowest Great Lake. The average depths of Erie's three sub-basins are 24 feet (Western), 60 feet (Central) and 90 feet (Eastern).

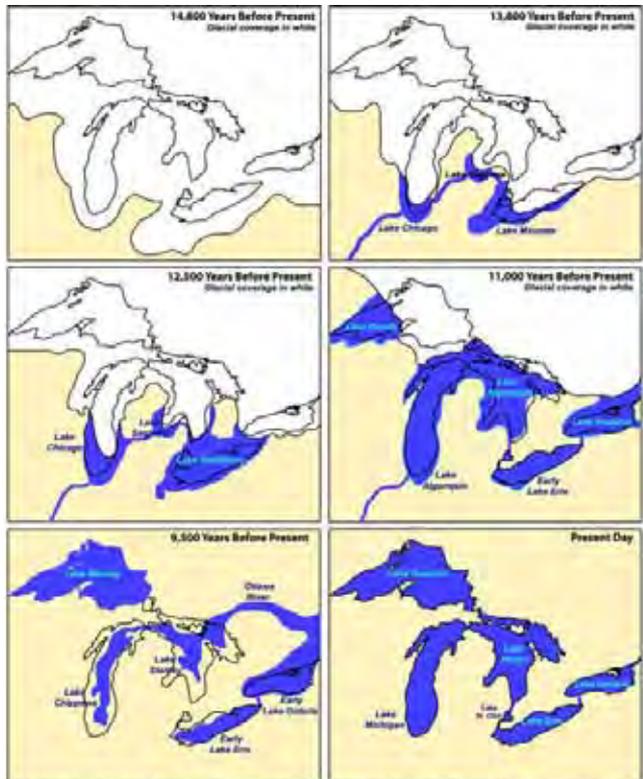
Throughout the period of glacial movement, the region experienced numerous lake-level stages, some of which were higher than today's water level. Evidence of the fluctuating levels is exhibited miles inland as sandy beach ridges which rise above nearly flat lake plains. Ancient beach ridges were used by Native Americans and early settlers as a means of transportation and became today's modern highways. The higher lake stages also had a profound influence on northern Ohio's landscape, agriculture and economy. The flat, clay deposits that were left by the glaciers and formed the Great Black Swamp were nearly impossible to drain. In the late 1800s, the blue clay that created the impermeable swamp was extracted and turned into tiles that rerouted water and turned this region of Ohio into the agricultural center it is today.

Lake Erie's past has also enabled Ohio's coastal region to be a modern-day source of a variety of minerals including gypsum, limestone and sandstone. One of the largest sandstone quarries in the world is located in Amherst (Lorain County).



*Photos: Glacial grooves, gouges and striations can be seen along exposed areas of bedrock in Ohio's coastal region such as the Glacial Grooves on Kelleys Island (left), at Middle Bass Island State Park (middle), and at North Shore Alvar State Nature Preserve on Kelleys Island (right).*

While wind, waves, water and human actions continue to shape Lake Erie's coast, imperceptible post-glacial rebound continues to influence the level of the land and water in the Great Lakes region. Post-glacial (also called isostatic) rebound/adjustment is the rise of land masses that were depressed by the weight of ice sheets during the last glacial period. Scientists have determined that some areas of the Great Lakes are still adjusting upward, while other areas are slowly sinking, such as areas in Ohio that are dropping at the rate of about 9 cm (3.54 inches) per century.



Map: ODNR Division of Geological Survey



# Coastal Wetlands:

Ohio became a state in 1803, but settlement and development of its northwestern landscape was severely delayed due to the Great Black Swamp. This wetland ecosystem was composed of 60-foot tall ash, elm, maple and oak forest cover, coastal marshes, poorly-drained soils, pristine fish spawning areas and lush habitats.

Dominating nearly 900,000 acres, the Great Black Swamp spanned an area that completely or partially covered 13 current Ohio counties and stretched into Indiana. The swamp ranged from Lake Erie and Sandusky Bay in the north, extending south through the Maumee and Sandusky rivers' watersheds to the Van Wert-Mercer county line then west to Fort Wayne, Ind.

In 1825, the first primitive "corduroy" planked road was completed through the swamp. This 31-mile corridor, linking Fremont to Perrysburg, frequently sank into the muddy ground and had wagon-sized potholes. In 1838, the road was paved and is the path of today's U.S. Route 20. In the 1850s, in an effort to facilitate agricultural progress and easier transportation, the Ohio General Assembly passed the first of many laws authorizing drainage of the Great Black Swamp. This began the massive undertaking of digging a complex system of drainage ditches, canals and feeders into Lake Erie tributaries.

The logging industry prospered as colossal trees were removed and sold until the majority of the Great Black Swamp timber was cleared and land drained. The exposed land offered farmers tremendously rich, fertile and productive soils – some of Ohio's best. Today, there are more than 16,000 miles of drainage ditches in the Maumee River Watershed alone; however, only approximately 15,000 acres of the Great Black Swamp remain. Private hunting clubs own and maintain about half of Ohio's remaining coastal wetlands, including Winous Point Shooting Club which is the oldest continuously operated duck hunting club in the United States (founded 1856). Of the remaining publicly-owned coastal wetlands, many were originally maintained as duck hunting clubs including Cedar Point, Ottawa National Wildlife Refuge and Magee Marsh State Wildlife Area.



# Then and Now

**Ohio has lost more than 90 percent of its historic wetland areas.**

Inland wetlands have been and continue to be drained for food production and urban development

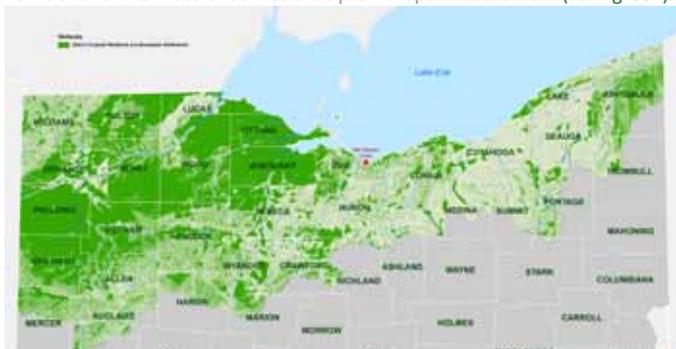
Coastal wetlands, particularly Ohio's estuaries (see page 13), have been altered to serve as ports and recreational marinas

Many coastal areas have been modified for shore protection. This may isolate adjacent coastal wetlands from the lake, disrupting some of their natural functions.

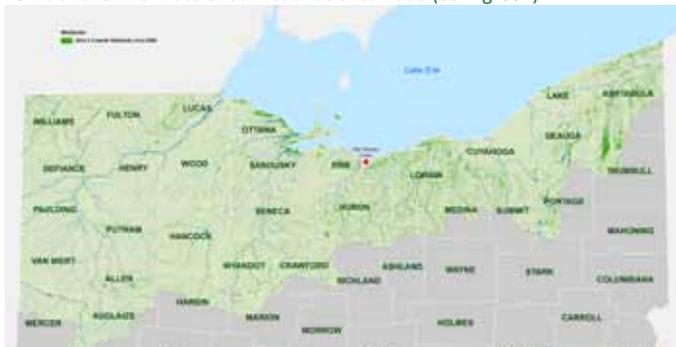
Stresses on coastal wetlands include:

- Polluted runoff
- Invasive species
- Habitat loss
- Climate change

Ohio's Lake Erie Watershed wetlands pre-European settlement (dark green)



Ohio's Lake Erie Watershed wetlands circa 2000 (dark green)



[Learn More:](#)

Old Woman Creek  
[www.oldwomancreek.org](http://www.oldwomancreek.org)

U.S. Fish and Wildlife Service  
[www.fws.gov](http://www.fws.gov)



# Value of Wetlands

Wetland ecosystem services in Ohio have been valued at more than \$300,000 per acre. Wetlands provide valuable services including:

## 1. Purifying water entering Lake Erie, the drinking water source for 11 million people.

- Wetlands can retain up to 80 percent of nitrates and 92 percent of phosphorus in surface water, and can break down contaminants such as pesticides and medications.

## 2. Storing flood waters.

- The Old Woman Creek Estuary's water volume expands by 20 percent after a major storm event and holds runoff for several hours allowing the wetland to decrease waterborne pollutants and sediments.

## 3. Providing homes to wildlife and plants.

- More than 40 species of Lake Erie fish use the Old Woman Creek Estuary at some point in their life cycle including for spawning and as nurseries for young fish.
- Many rare and threatened plant species depend on wetlands.
- More than 300 different species of birds use the Old Woman Creek Estuary to rest during migration.

## 4. Being enjoyed by people.

- Nature-based tourism such as wildlife viewing, kayaking, fishing and hunting is done in wetlands and supports local jobs.



Coastal wetlands protect communities and the lake by storing flood waters, absorbing wave energy to reduce coastal erosion, and removing sediment and other pollutants from streams and rivers that flow through the wetland. You can help protect and improve Lake Erie's water quality too by:

- Installing a rain barrel to collect water from rooftops to use in gardens.
- Directing downspouts to areas where runoff can soak into the soil.
- Planting a rain garden to capture and filter storm water from driveways, parking lots and rooftops.
- Leaving a natural area/filter strip between manicured yards/ agricultural fields and waterways.
- Landscaping with native plants to maintain soil health.
- Composting yard waste and re-using it in garden landscaping.
- Following the 4R's for fertilizer applications by using the right source, at the right rate at the right time, and in the right place.
- Supporting community planning and other efforts to protect and restore wetlands.
- Washing vehicles on the lawn. Soaps and detergents can contain nutrients which may benefit your lawn but the runoff from paved surfaces can negatively impact our water resources.
- Keeping paved surfaces clean by sweeping grass clippings and raking leaves off the street and away from storm drains.
- Cleaning up spilled fertilizer, oil and other chemicals and disposing of them properly.

**Learn More:**

U.S. Fish and Wildlife Service  
[www.fws.gov](http://www.fws.gov)

Old Woman Creek  
[www.oldwomancreek.org](http://www.oldwomancreek.org)

ODNR Division of Wildlife  
Magee Marsh State Wildlife Area



# Freshwater Estuaries

An estuary is a partially enclosed coastal body of water, having an open connection with the Great Lake or ocean, where fresh water from an inland river is mixed with water from the Great Lake or ocean. Estuaries represent one of the most sensitive and ecologically important habitats on earth. They provide sanctuary for many species of waterfowl, store nutrients for larval and juvenile marine life, serve as breeding grounds for many desirable species of fish and can provide excellent harbors.

A freshwater estuary, such as Old Woman Creek (OWC), occurs in and around the stream mouth where the flowing stream meets near-shore waters of one of the Great Lakes. At OWC, there is often a barrier beach at the intersection of lake and stream. The hydrologic effect of this intersection allows the development of a productive “drowned stream mouth” wetland system. Much like its marine counterparts, the OWC estuary is a biologically productive transition zone from land to sea which provides valuable services to people and the environment including serving as nurseries for numerous animal and plant species, spawning grounds for fish, and nesting and stopover habitat for birds.

Coastal estuary wetlands serve as Lake Erie’s last natural defense against pollutants. Estuaries also soak up flood waters, provide a buffer for nearshore coastal areas, and provide opportunities for recreation and nature appreciation. In freshwater estuaries, water levels are affected by storm surges and subsequent seiches. While the Great Lakes do exhibit tides, they are extremely small. The impacts of episodic storms and variability due to climate make freshwater estuaries one of the more dynamic wetland ecosystems on earth.

In addition to OWC, Ohio’s 312-mile coast has numerous other estuaries including those at Arcola Creek in Lake County and Crane Creek which connects Ottawa National Wildlife Refuge to Magee Marsh State Wildlife Area. To showcase the Crane Creek estuarine ecosystem, a new Crane Creek Estuary Trail connects the two wildlife refuges.



Photos: A barrier beach has formed at the mouth of Old Woman Creek completely separating the freshwater estuary and creek from the open waters of Lake Erie. The transient barrier beach comes and goes based on recent weather patterns, wave action and water levels in the creek, estuary and Lake Erie. The large photo above was taken standing on the path to the beach looking north toward Lake Erie. The smaller top photo was taken standing at the middle of the barrier looking south toward the creek. The middle photo was taken from the west end of the barrier looking east along the shore on 5/10/2012. The bottom photo, taken 03/13/2012 after a recent rain, shows the estuary waters (brown) pouring into the water of Lake Erie (blue).

Learn More:  
[estuaries.gov](http://estuaries.gov)

Old Woman Creek NERR  
[www.oldwomancreek.org](http://www.oldwomancreek.org)



# Lake Erie's Challenges

Lake Erie, its coast and watershed are directly affected by land use decisions, water use decisions, and natural forces.

Natural climate variability and our actions have created challenges throughout Lake Erie's post-European settlement history including:

- environmental degradation that accompanied industrialization and resulted in a river so polluted that the water surface caught on fire.
- periods of high water that resulted in erosion of coastal beaches and wetlands, and
- the reputation of being the lake where fish came to die.

Ecosystem recovery from more than a century of pollution began after the passage of numerous environmental regulations in the early 1970s. The laws required comprehensive phosphorus reductions and implementation of point-source pollution controls. Through the collaborations of government agencies, scientists, private industries, residents and non-profit groups, Lake Erie rebounded. In the 1990s, Lake Erie earned a new reputation as the walleye capital of the world, an economic asset and a poster-child for environmental restoration.

However, over the last decade, Lake Erie has faced a new set of challenges that include excessive loadings of sediment and nutrients, introductions of aquatic invasive species, climate change and land use issues. Ohio Sea Grant and Stone Laboratory Director Dr. Jeff Reutter has identified the seven major issues facing Lake Erie, which are listed at right.

The interactions between the issues are complex, and may result in environmental changes that cascade through the ecosystem. For example, according to Dr. Reutter, climate change is increasing the lake temperature

Story summarized from  
the Ohio Sea Grant College  
Program's *Twineline* Magazine  
2012 Spring/Summer Edition  
Vol. 34/No. 2



## The Top 7 Issues Facing Lake Erie

- 1. Sedimentation and Dredging** *[right photo - the high levels of sediment flowing down Old Woman Creek are visible in the blue water of Lake Erie.]*
- 2. Nutrient Loading and Phosphorus**
- 3. Harmful Algal Blooms** *[left center photo - 2011 HAB washes up along the shore]*
- 4. The Dead Zone**
- 5. Aquatic Invasive Species (AIS)** *[left photo - zebra and quagga mussels were discovered in Lake Erie in 1988 and 1989; right center photo - efforts are being made to keep potential AIS such as the Asian carp out of the Great Lakes]*
- 6. Climate Change**
- 7. Coastal Community and Economic Development**



and the frequency of severe storms. Severe storms can increase soil erosion and sedimentation. The sediment can include excessive nutrients which can cause blooms of toxin-producing algae (cyanobacteria). The blooms are made worse by the presence of aquatic invasive species. When the blooms die-off, they in-turn contribute to a larger dead zone in the lake's Central Basin. All of these activities have impacts on Ohio's economy, Reutter said.

To read the full story including analysis of each of the seven issues, download the Twineline Magazine from the Ohio State University's Ohio Sea Grant College Program webpage: [ohioseagrant.osu.edu/\\_documents/twineline/v34i2.pdf](http://ohioseagrant.osu.edu/_documents/twineline/v34i2.pdf)

### Learn More:

Ohio Sea Grant, The Ohio State University  
1314 Kinnear Rd.  
Columbus, OH 43212-1156  
614.292.8949  
[ohioseagrant.osu.edu](http://ohioseagrant.osu.edu)



# Types of Wetland Re

## Wetland Creation:

The establishment of a wetland in an area where a wetland never existed

## Wetland Restoration:

The re-establishment of wetland conditions similar to the original condition in an area where wetlands were altered by past human activities.

## Wetland Enhancement:

The maintenance and management of existing wetlands for a particular function or value, sometimes at the expense of other functions or values. Generally, wetland enhancement activities are used to restore severely degraded wetlands to higher quality sites. Enhancement includes management activities that affect wildlife habitat and vegetation.

All wetlands have three basic characteristics—hydric soils, plants adapted to grow in wet soils, and a supply of water at or near the ground surface for at least a portion of the growing season. Wetland restoration involves returning one or more of these characteristics to a degraded or drained wetland site.

Wetlands can be restored using a variety of techniques which are dependent on site conditions. Prior to restoration, background work must occur which includes analyzing soil conditions, the threat of invasive plants, the presence of utilities, locations of drainage mains, access to water, access to electricity, what federal/state/local permits may be needed, and restoration costs.

The simplest and cheapest wetland restoration is where site conditions enable landowners to break the tile drainage system and cause the area to flood. Unfortunately, much of Ohio cannot be restored using this method due to potential threats such as damage to neighboring properties or roads flooding and invasive plants taking over the restoration site. This technique is mainly used in northwest Ohio (Defiance and Williams counties) where sizable landholdings and large depression land formations occur.

In sites with several feet of fall in land elevation, an “L” or “U” shaped dike can be constructed with the goal of creating various



# storage Methods

water elevations on site that range from one to five feet deep. To do this, dirt can be moved by bulldozers or pans can be used to borrow fill from various areas within the restoration site to construct the dike walls. When flooded, the areas where dirt was borrowed from will be deeper than the restoration areas which are left untouched. Water level control structures can also be installed to assist with water management. This technique is used throughout most of Ohio fairly effectively, as long as invasive plants are not a threat.

In sites with little to no fall in land elevation, simple dike techniques cannot be applied because many times installing a dike will create flooding not only on the restoration site but also on neighboring properties. In these cases, it is best to construct a dike that surrounds the restoration site. For this method, engineers design a system to feed water into the restoration site using methods including gravity flow pipes and/or pumping stations. If pumping stations are used, electricity or fuel powered engines must also be incorporated into the dike's design, otherwise the site will be solely dependent on rainfall and evaporation for water level control. While expensive, the pumping technique is used in many wetlands in Ohio's coastal region.

There are three characteristics that every wetland possesses:

**Hydrology:** A supply of water that is at or near the ground surface at least a portion of the growing season.

**Hydric soils:** Soils that develop under saturated conditions. Hydric soils have the capacity to hold water on or near the ground surface for at least a portion of the year.

**Wetland vegetation:** Plants that are adapted to grow in wet soils.



# Great Lakes Restorat

The Great Lakes Restoration Initiative (GLRI) is the largest federal financial investment in the Great Lakes in two decades. A federal agency task force developed an action plan to implement the initiative – a comprehensive restoration strategy for the Great Lakes. According to a study by The Brookings Institution, if fully implemented, restoration would generate \$80 billion to \$100 billion in benefits in areas including tourism, fishing, recreation and higher property values. The five areas that the GLRI action plan covers for fiscal years 2010 through 2014 are:

- Cleaning up toxics and areas of concern;
- Combating invasive species;
- Promoting nearshore health by protecting watersheds from polluted run-off;
- Restoring wetlands and other habitats; and
- Tracking progress and working with strategic partners.

Since GLRI funding began in 2010, it has brought more than \$46 million to Ohio to help achieve targets in the GLRI strategy and Ohio's Lake Erie Protection and Restoration Plan. The funds have helped implement 76 local restoration projects in fiscal years 2010 and 2011. These site-specific projects are in addition to funding for broad-scale projects and activities that are being funded by GLRI dollars. GLRI project examples for Ohio include:

- Jobs Challenge Grant (33 ecological jobs created between Ottawa NWR, Ottawa Soil and Water Conservation District and Black Swamp Bird Observatory).
- Restoring Lake Hydrology to Middle Harbor (see page 28)
- Habitat Restoration in the Maumee Area of Concern (see page 33)
- Wetland Enhancement at Magee Marsh SWA (see page 38)
- Reconnection of Coastal Wetland Fish habitat (see page 44).

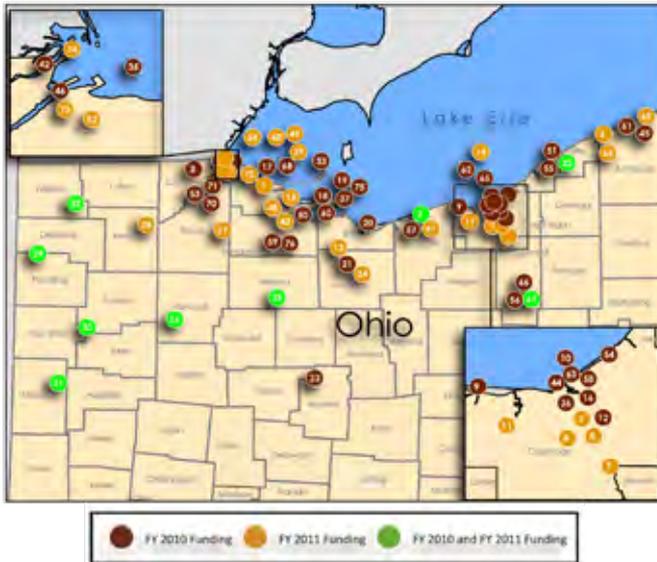


a source of wetland restoration funds

# Restoration Initiative (GLRI)

**NOTEWORTHY:** As of September 2012, Ducks Unlimited (DU) is administering nine GLRI awards (including two phase awards & two sub-awards) and a \$1 million North American Wetlands Conservation Act grant for wetlands protection, restoration and enhancement in Ohio's Lake Erie Watershed. DU's most recent award is to restore Lake Erie hydrology to the 1,460-acre Cedar Point Pool 1 wetland in the Ottawa National Wildlife Refuge.

Location Map:



Learn More:  
Great Lakes Restoration  
Initiative  
[www.glri.us](http://www.glri.us)

Ohio Lake Erie Commission  
Ohio's Lake Erie Protection  
and Restoration Plan  
[lakeerie.ohio.gov](http://lakeerie.ohio.gov)

Map from the Great Lakes Commission's GLRI Fact Sheet for Ohio which includes a listing of GLRI projects underway in the state. View at: [www.glc.org/restore/pdf/2012/GLRIStateFactsheet\\_Ohio\\_2012\\_final.pdf](http://www.glc.org/restore/pdf/2012/GLRIStateFactsheet_Ohio_2012_final.pdf)



# Old Woman Creek

## Location:

U.S. Route 6 (Cleveland Road E), west of State Route 61  
2514 Cleveland Road  
Huron, OH

## Latitude:

N 41° 23.00'

## Longitude:

W 082° 30.89'

## Waterbody:

Lake Erie  
Old Woman Creek

## Access

### Site Type:

Educational  
Natural  
Research

## Environments:

Riparian/River  
Estuarine  
Sandy Beach  
Wetland

Old Woman Creek (OWC) National Estuarine Research Reserve (NERR) is a living laboratory that seeks to address state and regional coastal management needs through research, education and stewardship. Old Woman Creek is one of 28 NERRs connected through the National Oceanic and Atmospheric Administration (NOAA). The NERRs are used to help find solutions to crucial issues facing United States' coastal communities. The findings of research work done at OWC can be applied to many Great Lakes estuaries and coastal watersheds.

Each one of the Great Lakes' 117 major tributaries has an estuary. OWC's estuary is located near the most southerly location on any of the Great Lakes' coasts. OWC is also one of Ohio's best examples of a natural estuary. OWC contains a variety of habitats including marshes and swamps, up-land forests, open water, tributary streams, barrier beach and near shore Lake Erie. The reserve supports a diverse assemblage of native freshwater plants and animals.

OWC, an Ohio State Nature Preserve, is cooperatively managed through a partnership between NOAA and the Ohio Department of Natural Resources, Division of Wildlife. OWC's administrative offices are located in the Mike DeWine Center for Coastal Wetland Studies which overlooks the estuary's eastern shore. The center houses laboratories for ecological research and monitoring as well as educational exhibits and classrooms.

OWC is managed to maintain habitat diversity using a variety of techniques including control of invasive species and post-treatment restoration. OWC works with the Firelands Coastal Tributaries Watershed Program to enhance stewardship and restoration throughout the watershed.



# National Estuarine Research Reserve and State Nature Preserve

## Integrated Research & Education for Coastal Wetland Stewardship

**ACTIVITIES AT THE CREEK:** Browse the visitor center, enjoy the beach and hike the trails. Talk with staff and scientists involved in national ecological monitoring initiatives, coastal wetland restoration, graduate research fellowship programs, training and education for the public, decision-makers and students. NERR researchers will be on site to discuss their work investigating wetland ecology and services, development of remote sensing technologies for water pollution, and measuring the effectiveness of stormwater systems, watershed planning and restoration, and education/training initiatives.

### Location Map:



### Old Woman Creek Staff:

Manager:  
Frank Lopez  
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Research Coordinator:  
Dave Klarer, Ph.D. (emeritus)  
(419) 433-4601

Learn More:  
[www.oldwomancreek.org](http://www.oldwomancreek.org)



# Research @ the Reserve

## Breakdown of organic pollution in coastal wetlands

**Researcher:**  
Dr. Yu-Ping Chin

**Affiliated With:**  
Ohio State University  
School of Earth Science  
Division of Global and  
Environmental Change

**Current Study:**  
Breakdown of organic  
pollution in coastal  
wetlands

**Waterbody:**  
Lake Erie  
Old Woman Creek

**Contact:**  
(614) 292-6953  
yo@geology.ohio-state.edu



Dr. Yu-Ping Chin's research focuses on the role of dissolved organic matter in mediating reactions of environmental and biogeochemical significance in surface waters. These include photolytic and redox processes, absorption, and plant uptake. He has investigated how wetlands like Old Woman Creek breakdown pollutants such as herbicides and pharmaceuticals through natural processes including sunlight. His research has documented the rate at

which compounds are degraded in natural wetlands and identified ecological features that enhance this process. His work increases understanding of coastal wetland ecosystem services and provides valuable information to inform decision-making. Dr. Chin's research is supported by grants from NSF, U.S. EPA, NOAA, USDA and the USGS. He has served on panels for NSF, NOAA and the NRC. Dr. Chin is an associate editor for *Water Resources Research Aquatic Sciences*, and *Journal of Contaminant Hydrology*.

**photolytic** means the breakdown of matter or materials under the influence of light.

**redox** (reduction-oxidation) is a family of reactions that are connected with the transfer of electrons between species.



## Old Woman Creek Research: Science for Informed Management

### Microbial fuel cells as a tool to detect water pollution

Estuary managers and stakeholders need more reliable tools to better understand and minimize negative ecosystem impacts from urban development, industry and agriculture. Microbial fuel cells (MFCs) have the potential to fill this gap. Ms. Ying-Hua Feng's research is assessing the sensitivity and reliability of MFCs for detecting organic pollutants in lakes, rivers or wastewater. Her research has shown that MFCs can accurately detect Chemical Oxygen Demand, a measure of organic pollution, in less time than conventional methods. Her research is also demonstrating that MFCs are a promising technology for detection of pollution in estuaries and other coastal ecosystems.



**microbial fuel cells (MFCs)** also called bio-electrochemical systems (BESs), convert chemical energy, available in a bio-convertible substrate, into electricity. To achieve this, bacteria are used as a catalyst to convert substrate into electrons. Substrates include water based organic wastes, including sewage and manure.

**Researcher:**  
Ying-hua Feng

**Affiliated With:**  
Old Woman Creek  
NERR Graduate  
Research Fellow and  
Ph.D. Candidate, Uni-  
versity of Pittsburgh  
Department of Civil  
and Environmental  
Engineering

**Current Study:**  
Microbial fuel cells as  
a tool to detect water  
pollution

**Waterbody:**  
Lakes  
Rivers  
Wastewater

**Contact:**  
YIF6@pitt.edu



# Research @ the Reserve page 2

**Researcher:**

Dr. Robert Whyte

**Affiliated With:**

California University of Pennsylvania Dept of Biological and Environmental Sciences

**Current Study:**

Coastal Wetland Vegetation Dynamics

**Contact:**

(724) 938-5955  
whyte@calu.edu

**Researchers:**

Amy Brennan and Heather Elmer

**Affiliated With:**

Chagrin River Watershed Partners and Old Woman Creek NERR

**Current Study:**

Collaborative research to improve stormwater management

**Contact:**

(440) 975-3870  
abrennan@crwp.org  
or  
(419) 433-4601  
heather.elmer@dnr.state.oh.us

## Coastal Wetland Vegetation Dynamics

Dr. Whyte is a specialist in plant ecology and studies invasive plants, particularly in wetland systems. His research at Old Woman Creek has focused on mapping vegetation and investigating vegetation response to changing lake levels. The plant communities of Great Lakes coastal wetlands continually respond to fluctuating water levels. A consequence of declining lake water levels is growth and proliferation of invasive plant species. Understanding the response of wetland plant communities to fluctuating water levels will help coastal wetland managers evaluate climate change adaptation strategies.



## Collaborative research to improve stormwater management

Ms. Brennan and Ms. Elmer are co-leading a research project that will develop science-based tools to help minimize the impact of stormwater on Ohio's coastal communities and Lake Erie. This multi-year collaborative research project will quantify the runoff reduction performance of stormwater systems under current and projected future climate conditions and develop science-based design and policy tools that meet local needs and reduce barriers to effective stormwater management.



Brennan



Elmer



## Climate Change: Impacts on the Lake Erie Benthic Food Web

Mr. Brainard is examining how climate change may alter the benthos of Lake Erie and coastal wetlands causing a shift from native species to dominance by a non-native freshwater oligochaete, *Branchiura sowerbyi*. (common name: tubificid worm). It will also demonstrate how an increase in the non-native *Branchiura sowerbyi* may affect nutrient cycling and survival among native benthic invertebrates.



### Researcher:

Andrew Brainard

### Affiliated With:

Old Woman Creek  
NERR Graduate  
Research Fellow and  
Ph.D. Candidate, State  
University of New York  
– Syracuse College of  
Environmental Science  
and Forestry

### Current Study:

Climate Change -  
Impacts on the Lake  
Erie Benthic Food Web

### Contact:

(607) 245-9581  
abrainar@syr.edu

## Invasive plant impacts on macroinvertebrate communities

Dr. Holomuzki investigates community-wide effects of invasive species, particularly how flooding, fish predation, and geomorphology interact to regulate populations of the New Zealand mudsnail, a nuisance species in the Laurentian Great Lakes and western United States. Dr. Holomuzki also studies the effects of *Phragmites australis*, a ubiquitous invasive macrophyte, and glyphosate herbicides used to control *Phragmites*, on benthic food webs in Lake Erie coastal wetlands. A key goal is to provide baseline data on a practical economic strategy to limit expansion of this invasive species.



### Researcher:

Dr. Joe Holomuzki

### Affiliated With:

Ohio State University  
Department of  
Evolution Ecology, and  
Organismal Biology

### Current Study:

Invasive plant impacts  
on macroinvertebrate  
communities

### Contact:

(419) 755-4340  
holomuzki.3@osu.edu



## Erie County

# Private Lands Restoration:

### Location:

South of Barrett Road extending west of McCartney Road approximately one mile and mostly north of State Route 2, Margareta Township

### Lat./Long.:

N 41° 27.57'  
W 082° 48.09'

### Waterbodies:

Sandusky Bay  
McCartney Ditch  
Sanford Ditch

### Environment:

Wetlands

### Restoration Grants:

ODNR Division of Wildlife Private Lands Program; Ohio EPA 319 Grant; Ducks Unlimited's Habitat for Healthy Water; USDA Farm Bill Programs: Conservation Program (CRP), Wildlife Habitat Incentive Program (WHIP), Wetland Reserve Program (WRP); Various temporary grants

Multiple techniques have been used to restore the Moxley-Brunkhorst private coastal wetlands sites including "U" shaped dikes and ring dikes with two pumping stations. Located just south of the central portion of Sandusky Bay, the Moxley-Brunkhorst wetlands total around 370 acres. The sites are part of more than 1,000 contiguous wetland acres owned by multiple landowners who have worked closely with federal, state and local agencies and grant/cost-share programs to restore these wetlands during the last thirty years.

Restoration of the Moxley-Brunkhorst wetlands includes invasive species (plants and animals) control. The sites have been part of the Purple Loosestrife Control Program where loosestrife eating beetles were successfully introduced on site to allow the bugs to eradicate the invasive plants. Landowners are now working with the Lake Erie Cooperative Weed Management Area-Phragmite Eradication Program which will use herbicide in an attempt to eradicate the plant *Phragmites australis*.

While programs fund wetland restoration, private landowners must fund their own maintenance costs. Ed Moxley estimates that he spends more than \$2,500 annually to keep the dikes groomed regularly and to cover the electrical costs of running the pumps that provide the wetlands water supply. No grants are available to assist with these types of basic maintenance costs or for major repairs such as replacing a pump or rebuilding a breeched dike- costs which can run into thousands of dollars. Assistance from local agencies to complete the proper federal, state and/or local permits for large maintenance projects is available.



# Moxley- Brunkhorst

The Moxley-Brunkhorst sites currently provide habitat for multiple threatened and endangered species, nesting bald eagles and trumpeter swans. Additionally, thousands of shorebirds and waterfowl regularly frequent the area year-round. A heron rookery exists here locally and wading birds visit the sites. Landowners have also installed nest boxes through a wood duck box program to encourage nest success. Other animals, such as the Blandings turtle and Lake Erie water snake, benefit from large coastal wetlands restoration.

**Learn More:**  
 Lake Erie Cooperative Weed Management Area- Phragmites Eradication Program [www.lakeeriecwma.com](http://www.lakeeriecwma.com)



**Private Lands Wetland Restoration Site Guides:**  
 Tim White, Erie County Wildlife Specialist and Director, Erie County Soil and Water Conservation District  
 (419) 626-5211 x107  
[twhite@eriecounty.oh.gov](mailto:twhite@eriecounty.oh.gov)

Jeff Burris, Private Lands Biologist – ODNR Division of Wildlife  
 (419) 429-8367  
[jeff.burris@dnr.state.oh.us](mailto:jeff.burris@dnr.state.oh.us)

Mark Witt, Private Lands Biologist – ODNR Division of Wildlife  
 (419) 429-8362  
[mark.witt@dnr.state.oh.us](mailto:mark.witt@dnr.state.oh.us)

Ed Moxley, property owner  
 2614 County Road 250  
 Vickery, Ohio 43464



# Ottawa County Restoring Lake Hydrolo

**Location:**  
State Route 269  
(Buck Road)  
1169 North Buck Rd  
Danbury Township, OH

**Latitude:**  
N 41° 32.71'

**Longitude:**  
W 82° 49.05'

**Waterbody:**  
Lake Erie  
Middle Harbor

**Access**  
**Site Type:**  
Recreational

**Environments:**  
Coastal Wetlands  
Rocky Shore  
Sandy Beach  
Manmade Shore

Lake Erie hydrology at a 350-acre site on the Catawba Peninsula has been restored with use of a \$643,000 Great Lakes Restoration Initiative (GLRI) grant awarded in 2010 by the National Oceanic and Atmospheric Administration (NOAA) to Ducks Unlimited. The grant was matched by \$31,200 from Ohio Department of Natural Resources (DNR) Division of Wildlife.

Prior to the grant project, the area within East Harbor State Park known as the Middle Harbor had no water exchange with Lake Erie, sparse aquatic vegetation, poor water quality, and limited benefits for fish, wildlife and the public. In 2011, Ducks Unlimited completed the topographic survey and engineering design for the project, and hired a contractor to begin construction of a water conveyance and control structure mounted in steel sheet piling and installed in an existing dike. Ducks Unlimited also provided bidding, contracting and construction management services for the project.

The structure was completed in June 2012 and provides the ODNR staff with a variety of water-level-management options to establish high-quality wetland conditions that can be sustained over the long term. Once wetland plant communities are re-established (over a 2 year period), the water control structure can remain open to allow for daily and seasonal fluctuations in lake levels and permit unrestricted fish passage, or employ carp-exclusion grates.



# gy to Middle Harbor

Restoration of the Middle Harbor coastal marsh is anticipated to provide substantial benefits to fish and wildlife. An intensive biological monitoring effort is being conducted to document the success of the project. The monitoring is part of a joint program funded by NOAA to concurrently evaluate a similar restoration at the 946-acre Erie Marsh Preserve, located 37 miles to the northwest in Michigan.

Location Map:



Learn more:

Roy Kroll, Manager of Conservation Programs – Ducks Unlimited, Inc. (734) 623-2000 rkroll@ducks.org

Ohio Department of Natural Resources  
Division of Parks and Recreation  
East Harbor State Park  
(419) 734-4424  
ohiodnr.com/parks  
ohiodnr.com/tabid/733/default.aspx  
ohiodnr.com/tabid/22599/default.aspx



## Ottawa County

# Private Lands Restoration:

### Location:

7092 West Toussaint  
Club Road, Oak Harbor

### Lat/Long:

N 41° 34.48'  
W 083° 03.48'

### Waterbodies:

Lake Erie  
Rusha Creek  
Toussaint River

### Environments:

Estuarine  
Wetlands  
Riparian  
Barrier Beach  
Man-made Shore

### Restoration Grants:

Great Lakes Restoration  
Initiative grant and  
partners including  
Toussaint Shooting  
Club, ODNR Division  
of Wildlife, Pheasants  
Forever, Ottawa Soil  
& Water Conservation  
District; Lake Erie CREP

When the Toussaint Shooting Club formed approximately 130 years ago, the coastal marshes supported huge flocks of birds and waterfowl. According to Louis W. Campbell's historic accounts, concentrations of ducks ranged from 40,000 to 60,000 in the late 1930s and early 1940s. Since then many of the surrounding wetlands and marshes have been drained and converted to agricultural uses. However, the site's ecological importance remains. This is signified by the ODNR Division of Wildlife's bi-weekly waterfowl surveys which repeatedly count 5,000 or more waterfowl using this marsh. Private and public partners have undertaken projects in 2010, 2011 and 2012-2013 to restore additional wetlands and enhance the 1,130 acre site.

Club land west of Rusha Creek is being restored from agricultural uses to wetlands through funds provided by Lake Erie CREP (see page 34). Dikes were installed around the perimeter of 25-acres and the middle portion was excavated to varying heights to create open water. Controlling invasive plants is a restoration challenge here as the plants can easily establish from nearby locations. Techniques used to suppress invasives include aerial and ground based herbicide treatments to *Phragmites*, purple loosestrife and reed canary grass. Sometimes annual food plots are used to further set back invasive species until native vegetation returns.

Adjacent to the east of Rusha Creek, 107 acres of the club's existing wetlands are being improved through a grant the Ottawa County Soil and Water Conservation District received from the Great Lakes Restoration Initiative's (GLRI) Joint Venture Habitat Protection and Restoration Program. This money is being matched with funds from the ODNR Division of Wildlife Private Lands Program.



# Toussaint Shooting Club

The project will refurbish 1.3 miles of dike running adjacent to the east bank of Rusha Creek for about 0.8 miles to the conflux with the Toussaint River then northeast along the river for 0.6 miles to the mouth of Lake Erie. Water control upgrades are also being performed in this area as the wetland is part of a complex that supports thousands of migrating waterfowl and shorebirds.

Club land also includes a 2-mile long natural barrier beach extending from the mouth of the Toussaint River southeast along the shore. This area is extremely sensitive to changes in Lake Erie water levels with erosion occurring during periods of higher water. For example, during a higher water period in the 1970s, sand along nearly half the beach eroded and some areas were breached by Lake Erie's waves. At that time, breached areas were armored with small rip-rap. During subsequent periods of lower water, accretion occurred returning some of the natural beach which now varies in width along the entire shore.



## Private Lands Wetland Restoration Site Guides:

Joe Uhinck, Wildlife Specialist -  
Ottawa County Soil and Water  
Conservation District  
(419) 898-1595  
joe.uhinck@ottawaswcd.com

Jeff Burris, Private Lands  
Biologist – ODNR Division of  
Wildlife, (419) 429-8367  
jeff.burris@dnr.state.oh.us

Mark Witt, Private Lands  
Biologist – ODNR Division of  
Wildlife, (419) 429-8362  
mark.witt@dnr.state.oh.us

Ollie Sinclair, Toussaint Shooting  
Club Manager



# Habitat Restoration

## Restoring coastal marshes & other habitats

**Location:**

Oak Harbor,  
Carroll Township  
Benton Township  
(Ottawa County)  
Jerusalem Township  
(Lucas County)

**Latitude:**

N 41° 36.13'

**Longitude:**

W 83° 12.08'

**Waterbody:**

Lake Erie  
Crane Creek  
Turtle Creek  
Toussaint River

**Access**

**Site Type:**

Outdoor  
Wildlife

**Environments:**

Coastal Wetlands  
Impounded Wetlands  
Coastal Estuary

The western Lake Erie landscape has experienced many human alterations during the last 200 years. Because the uplands and wetlands surrounding Lake Erie's Western Basin have been extensively altered, restoration is critically needed to ensure that the remaining rich flora and fauna can persist and be resilient to current challenges (see page 14) and future threats.

The Nature Conservancy in partnership with Ducks Unlimited and the U.S. Fish and Wildlife Service's 10,000 acre (blue on map) Ottawa National Wildlife Refuge Complex (ONWR) obtained funding through the GLRI to restore and enhance more than 500 acres of wetlands and associated habitats in the ONWR within the Toussaint River, and in the Turtle Creek and Crane Creek watersheds. The project's two main objectives are:

1) Restore 216 acres of row-crop agricultural and fallow land to wetlands, wet meadows and forested uplands for the benefit of delisting Maumee Area of Concern Beneficial Use Impairments including degradation of fish and wildlife populations, degradation of benthos, and loss of fish and wildlife habitat.

2) Enhance more than 296 acres through hydrologic improvements and reconnections to Lake Erie tributaries in order to expand fish access to 127 acres of coastal wetlands, reduce sediment and nutrients entering the Toussaint River and adjacent tributaries, and improve water quality by restoring wetlands ecosystem services. All aspects of the project should be completed by 2013.



# Area of Concern in the Maumee AOC



**Learn more:**

Jason Lewis,  
Refuge Manager @ ONWR  
(419) 898-0014  
Jason\_Lewis@fws.gov

James Cole, Ohio Bird  
Conservation Prgrm Mgr @ TNC  
(419) 867-4025 x 23  
jbc Cole@TNC.org

Roy Kroll, Mgr. of Conservation  
Programs @ Ducks Unlimited, Inc.  
(734) 623-2000  
rkroll@ducks.org

[www.tmacog.org/Environment/Wolf%20Creek%20Meetings/2011/05\\_11\\_11/Summary%20Projects\\_Maumee\\_AOC.pdf](http://www.tmacog.org/Environment/Wolf%20Creek%20Meetings/2011/05_11_11/Summary%20Projects_Maumee_AOC.pdf)



# Lake Erie CREP

## Conservation Reserve Enhancement Program

### Location:

Western Lake Erie

Watershed counties:

- Allen, Ashland,
- Auglaize, Crawford,
- Defiance, Erie, Fulton,
- Hancock, Hardin,
- Henry, Huron, Lorain,
- Lucas, Marion,
- Medina, Mercer,
- Ottawa, Paulding,
- Putnam, Richland,
- Sandusky, Seneca,
- Shelby, Van Wert,
- Williams, Wood
- and Wyandot

### Watersheds included:

- Maumee River
- Portage River
- Sandusky River
- Huron River
- Vermilion River
- Black River
- and direct Lake Erie drainage

Since 2000, the Lake Erie Conservation Reserve Enhancement Program (CREP) has been improving water quality by reducing sediment pollution and field runoff in 27 counties in Ohio's western Lake Erie Watershed. This is being achieved through a public-private partnership which pays landowners to **not** farm agricultural land near rivers, streams and other sensitive environs, and instead install filter strips, riparian buffers and field windbreaks, restore wetlands and wildlife habitat, and plant hardwood trees.

Ohio's Lake Erie CREP goals include reducing sediment loading to impaired streams and helping restore designated uses of surface waters; protecting 5,000 linear miles of streams by enrolling 10 percent (up to 67,000 acres) of the farmed riparian areas in the western Lake Erie watersheds. Riparian buffers help lower water temperatures, increase dissolved oxygen, and provide additional wildlife habitat. Vegetative buffers can also reduce both the frequency and severity of flood events.

The numbered "Xs" on the map at right indicate sites participating in this voluntary wetlands restoration program. Although individual sites may be small, collectively they are close in proximity and add up to large amounts of restored wetland acreage. Economically CREP helps landowners. Environmentally CREP helps restore water quality and wildlife ecosystem services to the Lake Erie watershed

Funding for the Lake Erie CREP comes from the U.S. Department of Agriculture and the ODNr Private Lands Program.



[Learn More:](#)  
 Ohio Department of Natural Resources  
 Division of Soil and Water Resources  
 (614) 265-6610  
[www.ohiodnr.com/tabid/8867/default.aspx](http://www.ohiodnr.com/tabid/8867/default.aspx)



# Magee Marsh Sta

## and Sportsman's Migratory Bird Center –

**Location:**  
State Route 2 at  
Benton-Carroll Road  
13229 West  
State Route 2  
Carroll Township  
(Ottawa County)  
Jerusalem Township  
(Lucas County)

**Latitude:**  
N 41° 36.72'

**Longitude:**  
W 083° 11.32'

**Waterbody:**  
Lake Erie

**Access**  
**Site Type:**  
Outdoor  
Wildlife

**Environments:**  
Riparian/River  
Sandy Beach

The 2,202-acre Magee Marsh State Wildlife Area is adjacent to the east of the Ottawa National Wildlife Refuge (ONWR). Together, along with Metzger Marsh to ONWR's west, the sites encompass some of Ohio's finest remaining publicly-owned coastal wetlands that were part of the Great Black Swamp. Magee is managed for waterfowl hunting with the wetland areas divided into a series of dikes and channels that separate the area into manageable units. The wetland complex is a haven for bald eagles, great blue herons, egrets, kestrels, tundra swans and other avian and terrestrial non-game and game species.

Magee attracts thousands of visitors annually for bird watching, ice fishing and hunting for waterfowl and deer. During the migratory seasons birds use the coastal marsh for resting and refueling before continuing on their northern or southern trip. During migration large numbers of birds can be viewed on one of many trails located on the wildlife area. Magee has been named one of the top ten bird watching spots in the country.

Magee's main entrance leads to the Sportsman's Migratory Bird Center, Waterfowl Hunter check station, walking trails and wild beach. The Bird Center features exhibits on the history of the marsh, wildlife mounts, decoys and a collection of duck stamps and prints. Restrooms and educational publications are available, and the Crane Creek Wildlife Research Station is also housed at the center. This research station monitors wetland wildlife (*see page 40*).

The center is surrounded by a display pond, walking trail and 42-foot tall observation deck that offers views of the marshes and Lake Erie. Additional trails include the



# te Wildlife Area

## Ohio Wetland Wildlife Research

Magee Marsh Bird Trail, Wildlife Beach Trail, the Magee/Ottawa Partnership Trail, and the new Freshwater Estuary Trail, the last two of which connect to the ONWR.

When conditions are favorable, the beach front provides access to Lake Erie for ice fishing. Walleye and yellow perch can be caught just off shore. A large lot provides an ample parking area for fishermen and their gear. Controlled hunting is by permit only. Please contact the Division of Wildlife for details.

Magee Marsh's Turtle Creek Access drive is located about 1.5 miles east of the main entrance and hosts a small boat launch and fishing access.

### Location Map:



### Learn more:

(wildlife management contact)  
 Patrick Baranowski, Wildlife Area  
 Manager – ODNR Division of Wildlife  
 (419) 898-0960 x30  
[patrick.baranowski@dnr.state.oh.us](mailto:patrick.baranowski@dnr.state.oh.us)

(programs and Bird Center contact)  
 Mary Warren, Wildlife  
 Communications Specialist – ODNR  
 Division of Wildlife  
 (419) 898-0960 x31  
[mary.warren@dnr.state.oh.us](mailto:mary.warren@dnr.state.oh.us)

(research contact)  
 Dave Sherman, Certified Wildlife  
 Biologist® – ODNR Division of Wildlife  
 (419) 898-0960 x24  
[dave.sherman@dnr.state.oh.us](mailto:dave.sherman@dnr.state.oh.us)



## Magee Marsh SWA

# Wetland Enhancement

### Joint Ventures:

The Upper Mississippi River/ Great Lakes Joint Venture (UMGL JV) strives for sustainable populations of all birds through regionally coordinated conservation actions based on the best scientific information and techniques available. Bird population goals, decision tools and an implementation plan are used to guide resources for conservation delivery, research and evaluation.

Since the completion of the 2007 plan, UMGL JV partners have protected, restored and enhanced more than 820,889 acres of habitat. While implementing the plan, partners have been evaluating projects' effectiveness toward achieving the plan's goals. The results from these scientific studies will feed into future planning tools.

### Learn more:

[www.uppermissisgreatlakesjv.org](http://www.uppermissisgreatlakesjv.org)

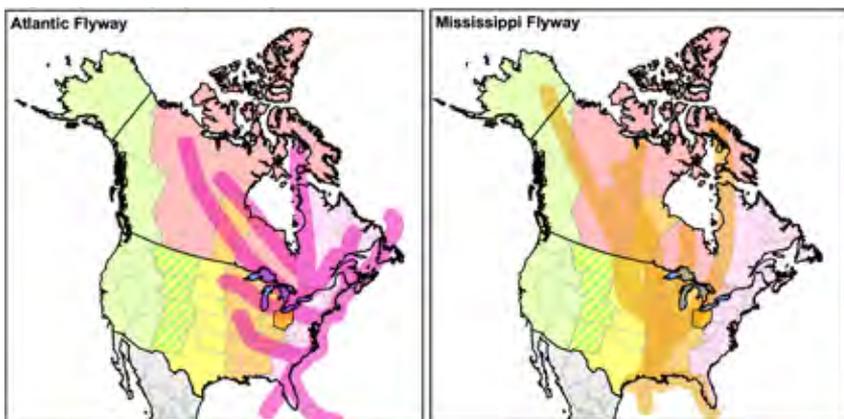
Coastal wetlands at Magee Marsh State Wildlife Area have been enhanced through a 2011 Great Lakes Restoration Initiative (GLRI) grant to Ducks Unlimited that was matched with \$60,000 from the ODNR Division of Wildlife. The \$150,013 GLRI grant was part of the funds allocated to the U.S. Fish and Wildlife Service Upper Mississippi River & Great Lakes Region Joint Venture program.

Project funding was used to improve 392 acres of wetlands by replacing three failing water control structures and repairing more than 2,500 feet of eroded dike that is critical to the long-term viability of the water supply channel used to manage the coastal wetlands at Magee Marsh.

Ducks Unlimited provided the topographic survey, engineering design, bidding, contracting and construction management services for the project. Water control structures were installed in three wetlands near Turtle Creek (see map page 37). This restored the capacity to manage for desired aquatic plants and Lake Erie hydrology. A dragline was used to repair the east dike of the main water supply channel and armor stone was added to prevent erosion. The work was completed in June 2012 and is improving habitat conditions, providing substantial benefits for waterfowl and other wildlife and ensuring opportunities for public recreation at Magee Marsh.



## Mississippi Flyway Council



Ohio is part of the Mississippi Flyway Council, a group of 14 states and three Canadian provinces (Alabama, Arkansas, Indiana, Illinois, Iowa, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Ohio, Tennessee and Wisconsin, and the provinces of Saskatchewan, Manitoba and Ontario) that provide input to the U.S. Fish and Wildlife Service regarding waterfowl hunting regulations. The Mississippi Flyway Council was organized in 1952 to coordinate the management of migratory game birds in the Mississippi Flyway and to promote those activities of its members that serve the long-term benefit to the resources and the flyway as a whole.

The council includes a technical section which is composed of biologists who make recommendations to the council based on biology and science. Then the council's state and provincial administrators review and approve/reject the tech section's recommendations and pass the approved recommendations on to the USFWS for consideration.

[Learn more:](http://mississippi.flyways.us) [mississippi.flyways.us](http://mississippi.flyways.us)



## Crane Creek Research Station

# Sandhill Cranes and

Greater sandhill cranes (*Grus canadensis tabida*) are among the oldest living species of birds, dating back 2.5 million years. Today, they are an endangered species in Ohio.

These cranes are primarily a wetland-dependent species. On their wintering grounds, they will use agricultural fields; however, they roost in shallow, standing water or moist bottomlands. During breeding they require a rather large tract of wet meadow, shallow marsh or bog for nesting.

In Ohio, the cranes breed in the shallow marshes and wet meadows primarily centered in the Killbuck/Funk Bottoms region (Ashland and Wayne counties), Geauga, Ashtabula, Lorain, Trumbull and Williams counties, and at Killdeer Plains Wildlife Area (Wyandot County). Peak breeding activity is April to May with two young typically hatching.

The juveniles fly 90 days after hatching. After fledging, the young remain with their parents throughout the year. The parents will abandon their young cranes just prior to the next nesting season.

To study the birds' breeding grounds and migratory routes, the ODNR Division of Wildlife has radio-marked 10 sandhill cranes with satellite transmitters. Most Ohio sandhill cranes migrate to southern Georgia and Florida and are usually at their wintering grounds by mid-December.

Sandhill cranes range from 34 to 38 inches in height with a six to seven-foot wingspan. Weight varies from 7.7 to 14.4 pounds according to the sex, with males being larger.

[Learn more:](http://www.ohiodnr.com/tabid/18911/default.aspx) [www.ohiodnr.com/tabid/18911/default.aspx](http://www.ohiodnr.com/tabid/18911/default.aspx) and [www.ohiodnr.com/tabid/6748/default.aspx](http://www.ohiodnr.com/tabid/6748/default.aspx)



# Wood Ducks

Wood ducks (*Aix sponsa*) play an important role for Ohio's waterfowl hunters and nature enthusiasts. The wood duck is the most numerous breeding duck in Ohio and second only to the mallard in terms of harvest in the buckeye state. It is found in all flyways, but is most numerous in the Atlantic and Mississippi. They are early migrants; most of them have left the northern states by mid-November.

Wood ducks prefer mature riparian corridors along streams, quiet backwaters of lakes and ponds bordered by large trees, and secluded wooded swamps. A male breeding wood duck is pictured top left.

The ODNR Division of Wildlife uses wood duck nest boxes to contribute to Ohio's wood duck population. State and flyway populations are monitored through summer banding coordinated through the Olentangy Research Station (Ashley, OH). The Magee Marsh Wildlife Area work unit maintains 85 nest boxes (shown top right picture) and bands approximately 100 wood ducks annually.

The wood duck's habit of nesting in cavities enables it to breed in areas lacking suitable ground cover. Peak breeding activity is February to early March in the south and mid-March to mid-April in the northern areas. Most nests are adjacent to or over water. The first broods normally appear during the first half of May. The young leave the nest soon after hatching, jumping from the nesting cavity to the ground. However, they are not capable of flight until they are eight or nine weeks of age.

[Learn more:](http://www.ohiodnr.com/tabid/6794/default.aspx) [www.ohiodnr.com/tabid/6794/default.aspx](http://www.ohiodnr.com/tabid/6794/default.aspx)

## [Learn More About Research Activities:](#)

ODNR Division of Wildlife Crane Creek Research Station  
at Magee Marsh State Wildlife Area  
Dave Sherman, Certified Wildlife Biologist® (419) 898-0960 x24  
Patrick Baranowski, Wildlife Area Supervisor (419) 898-0960 x30  
[www.dnr.state.oh.us/tabid/19778/default.aspx](http://www.dnr.state.oh.us/tabid/19778/default.aspx)



# Ottawa National

## Location:

14000 West  
State Route 2  
Oak Harbor, OH  
Carroll Township  
Benton Township  
(Ottawa County)  
Jerusalem Township  
(Lucas County)

## Latitude:

N 41° 36.13'

## Longitude:

W 83° 12.08'

## Waterbody:

Lake Erie  
Crane Creek

## Access

### Site Type:

Outdoor  
Wildlife

## Environments:

Coastal Wetlands  
Impounded Wetlands  
Coastal Estuary

Consistently ranked a top 10 birding spot in North America, the 4,755-acre Ottawa National Wildlife Refuge (ONWR) is located between Metzger Marsh (to the north-west) and Magee Marsh (to the east) state wildlife areas. Combined, the three sites include some of Ohio's finest remaining coastal wetlands – remnants of the Great Black Swamp. Less than 10 percent of the original acres of Lake Erie marshes and a few isolated patches of the once vast Black Swamp habitats remain, but these resources support a tremendous diversity of wildlife.

ONWR was established in 1961 under the authority of the Migratory Bird Conservation Act "...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds." Today, the refuge complex includes three national wildlife refuges: Ottawa, Cedar Point and West Sister Island, which, combined encompass almost 10,000 acres and represent a significant portion of the protected public lands in the Lake Erie coastal marsh region. The area surrounding the ONWR complex is dominated by agricultural land use with small towns and cities scattered throughout.

The management focus of the refuge is to protect, enhance and restore habitats for threatened and endangered species; provide suitable nesting habitat for migratory birds; provide spring and fall migration habitat for waterfowl and other migratory birds; provide habitat for native resident flora and fauna; and provide the public with wildlife-dependent recreation opportunities. Managing the marshes for wildlife involves raising and lowering water levels using water control structures, pumps and



# Wildlife Refuge

earthen dikes to alter the depth, timing and duration of wetland inundation and thereby manipulating wetland plant communities. These plant communities provide essential resources including food, nesting cover and migration stop-over habitat for migratory birds. Wetland management challenges include invasive species such as common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*) and flowering rush (*Butomus umbellatus*). The refuge has more than 10 miles of hiking trails, a 7-mile self-guided auto tour, and a state-of-the-art visitor center built in 2007 available for public use and wildlife dependent recreation.

## Location Map:



## Learn More:

U.S. Fish and Wildlife Service  
 Ottawa National Wildlife Refuge  
 (419) 898-0014  
[www.fws.gov/midwest/ottawa](http://www.fws.gov/midwest/ottawa)



# Reconnecting Coastal

## New Strategies to Restore Wetland Function

**Location:**

14000 West State  
Route 2  
Oak Harbor, OH  
Carroll Township  
Benton Township  
(Ottawa County)  
Jerusalem Township  
(Lucas County)

**Latitude:**

N 41° 36.13'

**Longitude:**

W 83° 12.08'

**Waterbody:**

Lake Erie  
Crane Creek

**Access**

**Site Type:**

Outdoor  
Wildlife

**Environments:**

Coastal Wetlands  
Impounded Wetlands  
Coastal Estuary

Through a partnership between the U.S. Geological Survey's (USGS) Great Lakes Science Center, the U.S. Fish and Wildlife Service's Ottawa National Wildlife Refuge and Ducks Unlimited, a Great Lakes Restoration Initiative project was developed to re-establish the hydrologic connection between an intensively managed 95-acre impounded coastal marsh and Crane Creek, a small Lake Erie tributary.

The project's main objective was to evaluate how hydrologically reconnecting a previously diked wetland impacts biota including fish, mollusks and birds, and how the reconnection affects nutrient transport, nutrient cycling, water quality, flood storage and other abiotic conditions.

A hydrologic reconnection was established by building a fish passage structure in the dike dividing management unit 2B from Crane Creek. The USGS's Great Lakes Science Center staff conducted extensive pre- and post-construction monitoring to evaluate ecosystem-level changes resulting from the increased connectivity and restoration of lake level hydrology. Monitoring efforts revealed striking changes in water quality, hydrology and fish assemblages in the reconnected wetland. Nutrient concentrations, particularly phosphorus and nitrogen, were drastically reduced in waters pulsing through the reconnected wetland. Furthermore, quantitative sampling revealed extensive bi-directional movement of fish through the fish passage structure with significant post-connection increases in fish abundance and species richness within the reconnected wetland.



# Wetland Fish Habitat

After one year of study, data suggest that maintaining a hydrologic connection between diked and coastal wetlands in Lake Erie allows fish to use vegetated habitats for spawning and nursery habitat, reduces nutrient concentrations in coastal waters, and maintains productive habitats for migratory birds and other biota.

Location Map:



**Learn more:**

Kurt Kowalski, PhD –  
 U.S. Geological Survey - Great Lakes Science Center  
 (734) 214-9308  
[kkowalski@usgs.gov](mailto:kkowalski@usgs.gov)

Roy Kroll, Manager of  
 Conservation Programs – Ducks Unlimited, Inc. (734) 623-2000  
[rkroll@ducks.org](mailto:rkroll@ducks.org)

Jason Lewis, Refuge Manager –  
 Ottawa National Wildlife Refuge (419) 898-0014  
[Jason\\_Lewis@fws.gov](mailto:Jason_Lewis@fws.gov)



### Lucas County

Land Area: 340.4 sq. mi.  
Lake Area: 249.07 sq. mi.  
Coast: 25 miles. Public Access: 8.62 miles @15 sites

### Ottawa County

Land Area: 255.1 sq.mi.  
Lake Area: 318.28 sq.mi.  
Coast: 94 miles. Public Access: 14.46 miles @ 32 sites

### Sandusky County

Land Area: 409.2 sq.mi.  
Lake Area: 5.42 sq.mi.  
Coast: 13 miles. Public Access: 3.5 miles @ 1 site

### Erie County

Land Area: 254.5 sq.mi.  
Lake Area: 369.91 sq.mi.  
Coast: 68 miles. Public Access: 9.91 miles @ 41 sites

### Lorain County

Land Area: 492.6 sq. mi.  
Lake Area: 444.84 sq.mi.  
Coast: 23 miles. Public Access: 2.14 miles @ 15 sites

### Cuyahoga County

Land Area: 458.3 sq. mi.  
Lake Area: 805.09 sq.mi.  
Coast: 30 miles. Public Access: 6.06 miles @ 26 sites

### Lake County

Land Area: 228.2 sq. mi.  
Lake Area: 743.47 sq.mi.  
Coast: 31 miles. Public Access: 6.8 miles @ 28 sites

### Ashtabula County

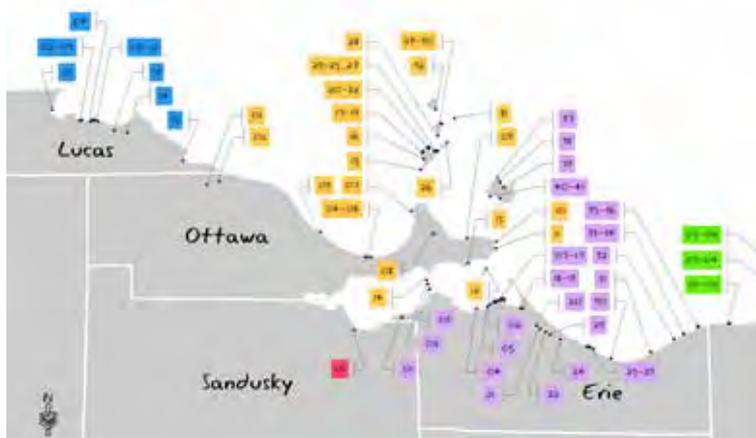
Land Area: 702.7 sq. mi.  
Lake Area: 643.16 sq.mi.  
Coast: 28 miles. Public Access: 3.91 miles @ 11 sites

# Visit Ohio's Coast

Ohio's 169 public access sites along Lake Erie, total over 55 miles of publicly accessible coast. The sites are spread over Ohio's eight coastal counties (listed at left) and account for more than 19,400 acres. They include state, county, city, village and township parks, preserves, reservations and wildlife areas; public cemeteries; memorials and monuments; lighthouses; end-of-road rights-of-way and scenic vistas. The sites include wetlands, dunes, sandy and cobble beaches, estuaries, commercial and recreational harbors, fishing piers and islands.

Each access site is mapped and listed online with amenity icons, location information, a site description, latitude and longitude coordinates, and interactive printable maps - all of which can be downloaded and printed at:

[LakeErie.ohiodnr.com/GoCoast](http://LakeErie.ohiodnr.com/GoCoast)





## 169 PLACES TO PLAY ALONG LAKE ERIE

### Ohio's Coastal Counties Visitors Bureaus



Toledo Convention and Visitors Bureau  
(Lucas County)  
[www.dotoledo.org](http://www.dotoledo.org)

Lake Erie Shores & Islands  
(Ottawa and Erie counties)  
[www.shoresandislands.com](http://www.shoresandislands.com)

Sandusky County Convention  
and Visitors Bureau  
[lakeeriestfavoriteighbor.com](http://lakeeriestfavoriteighbor.com)

Lorain County Visitors Bureau  
[www.visitloraincounty.com](http://www.visitloraincounty.com)

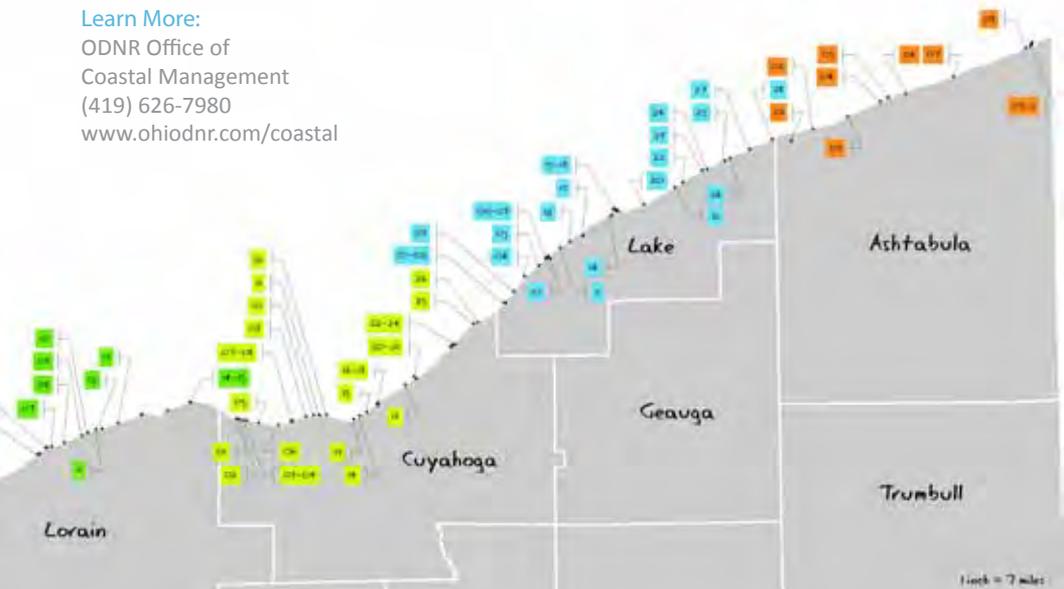
Positively Cleveland (Cuyahoga County)  
[www.positivelycleveland.com](http://www.positivelycleveland.com)

Lake County Visitors Bureau  
[www.lakevisit.com](http://www.lakevisit.com)

Ashtabula County Visitors Bureau  
[www.visitashtabulacounty.com](http://www.visitashtabulacounty.com)

#### Learn More:

ODNR Office of  
Coastal Management  
(419) 626-7980  
[www.ohiodnr.com/coastal](http://www.ohiodnr.com/coastal)





# Acknowledgements

State of Ohio  
Department of Natural Resources (ODNR)  
[www.ohiodnr.com](http://www.ohiodnr.com)

ODNR Division of Wildlife  
Crane Creek Wildlife Research Station at  
Magee Marsh State Wildlife Area  
13229 West State Route 2  
Oak Harbor, Ohio 43449  
(419) 898-0960

ODNR Division of Wildlife  
Old Woman Creek National Estuarine  
Research Reserve and State Nature Preserve  
2514 Cleveland Road E., Huron, Ohio 44839  
(419) 433-4601 [www.oldwomancreek.com](http://www.oldwomancreek.com)

ODNR Office of Coastal Management  
105 West Shoreline Drive  
Sandusky OH 44870  
(419) 626-7980  
[www.ohiodnr.com/coastal](http://www.ohiodnr.com/coastal)  
[coastal@dnr.state.oh.us](mailto:coastal@dnr.state.oh.us)

National Oceanic and Atmospheric Administration  
Office of Ocean and Coastal Resources Management  
*(provides funding to ODNR Old Woman Creek and  
ODNR Office of Coastal Management)*  
[www.coastalmanagement.noaa.gov](http://www.coastalmanagement.noaa.gov)

U.S. Fish and Wildlife Service  
Ottawa National Wildlife Refuge  
14000 West State Route 2  
Oak Harbor, OH 43449  
(419) 898-0014  
[www.fws.gov/midwest/ottawa](http://www.fws.gov/midwest/ottawa)





U.S. Geological Survey

Great Lakes Science Center  
1451 Green Road, Ann Arbor, MI 48105,  
(734) 214-9308  
[www.glsc.usgs.gov](http://www.glsc.usgs.gov)



The Nature Conservancy

Ohio Field Office  
6375 Riverside Drive, Suite 100  
Dublin, OH 43017  
(614) 717-2770  
[www.nature.org](http://www.nature.org)  
[ohio@tnc.org](mailto:ohio@tnc.org)



Ducks Unlimited, Inc.

[www.ducks.org](http://www.ducks.org)  
Great Lakes/Atlantic Regional Office, 1220  
Eisenhower Place  
Ann Arbor, MI 48108  
(734) 623-2000  
[www.ducks.org/ohio](http://www.ducks.org/ohio)



Ottawa County Soil and Water

Conservation District  
240 W. Lake Street  
Oak Harbor, Ohio 43449  
(419) 898-1595  
[www.ottawaswcd.com](http://www.ottawaswcd.com)



Erie County Soil and Water

Conservation District  
2900 Columbus Avenue, Room 131  
Sandusky, OH 44870  
(419) 626-5211  
[www.eriesoilandwater.org](http://www.eriesoilandwater.org)



# Maps and Notes

## State of Ohio:

Ohio includes 44,825 sq. miles and 2.25 million acres (3,516 sq. miles) in Lake Erie. Ohio's Lake Erie Watershed is green and Ohio's coastal counties are colored to correspond with the county colors used in Ohio's Lake Erie Public Access Guide. Ohio's capital, Columbus, is located in Franklin County.



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National Estuarine Research Reserves:

Great Lakes Region NERR states are shown in purple on this map produced by NOAA.



Great Lakes Watersheds:

Lake Erie's Watershed is shown in bright yellow on this map produced by the ODNR Office of Coastal Management.



Lake Erie Watersheds:

Lake Erie's subwatershed are shown on this map produced by the ODNR Office of Coastal Management.

View more maps online: [LakeErie.ohiodnr.com/Atlas](http://LakeErie.ohiodnr.com/Atlas)



