

Partnering to Build Environmental Literacy: Ohio's Successes in Lake Erie Education and Outreach

a presentation to the NOAA Education Council (type of brief: informational)

Ohio

**Lake Erie
Commission**

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June 15th, 2011

Ohiodnr.com/LakeErieLiteracy

The purpose of this presentation is to:

- Update the NOAA Education Council on the development of the Lake Erie Literacy Principles and Concepts (LELPC)
- Describe the main Partners that developed the LELPC including why the LELPC are needed.
- Explain the how the LELPC were developed and what they include.
- Explain how the LELPC are being used and plans for the future.

Lake Erie Partnership for Education, Research and Outreach

- *Original members:*



- Ohio Lake Erie Commission
- Ohio Department of Natural Resources (ODNR) Office of Coastal Management
- ODNR Division of Wildlife - Old Woman Creek National Estuarine Research Reserve, and
- The Ohio Sea Grant College Program

Lake Erie Partnership for Education, Research and Outreach

Why formed?

- Develop a unified Lake Erie Education and Outreach plan linked to the 20-year NOAA Education Plan goals of environmental literacy and developing a future workforce.
- Maximize funding & personnel
- Share partners' information
- Speak with one voice to enhance public repositoire.
- We share a mutual goal...





Helping people improve Lake Erie. We envision...

Lake Erie-literate citizens making informed decisions and taking personal actions that create a healthier lake and watershed.

MINNESOTA

ONTARIO

WISCONSIN

Great Lakes Watershed

- Erie
- Huron
- Michigan
- Ontario
- St. Lawrence
- Superior

Milwaukee

CHICAGO

ILLINOIS

INDIANA

OHIO

PENNSYLVANIA

DETOIT

Toledo

CLEVELAND

Niag.

Buffalo



How do we achieve Lake Erie literacy?

- **NEED: unified method to communicate about Lake Erie**
 - Easy to understand
 - Consistent and accurate
 - Expanded current outreach & bridge gaps between stakeholders
 - Increased visibility: rise to the top of the internet information pile.
 - Can be used by others (local partners, NGOs, etc.)



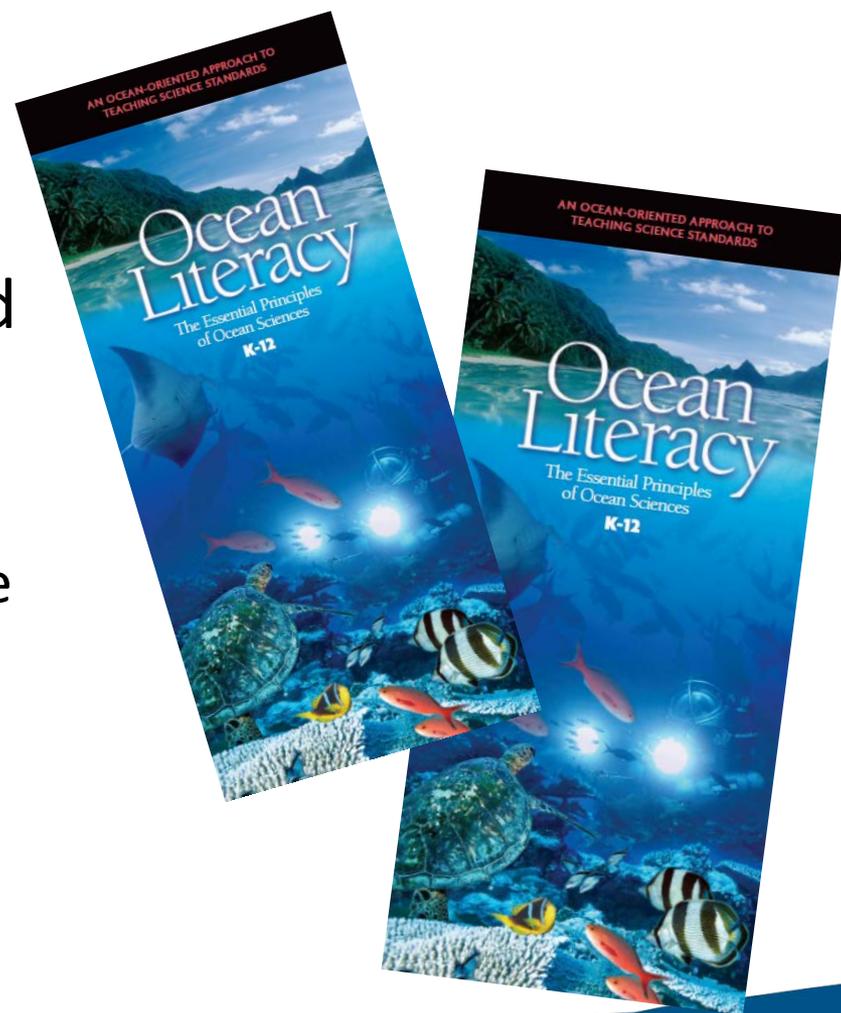
Environmental Literacy Example?

Ocean Literacy Principles:

An understanding of the ocean's influence on you and your influence on the ocean.

- 7 principles + their concepts
- Matched with national science education standards for K-12.

www.oceanliteracy.net



Ohio has an Ocean?

**Life In The Ocean
Depends On You.**
Keep It Clean.

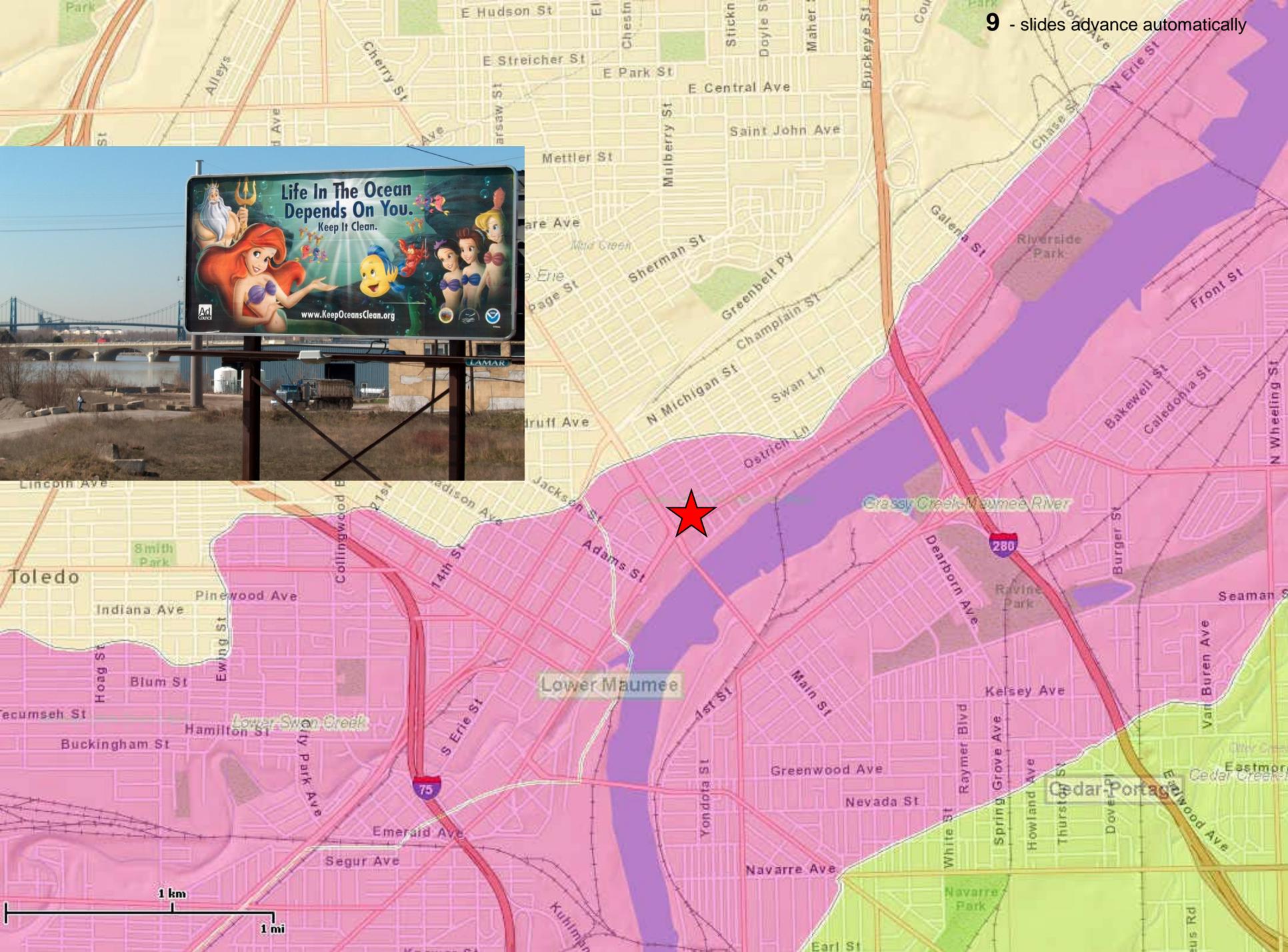
www.KeepOceansClean.org

Ad Council

NOAA

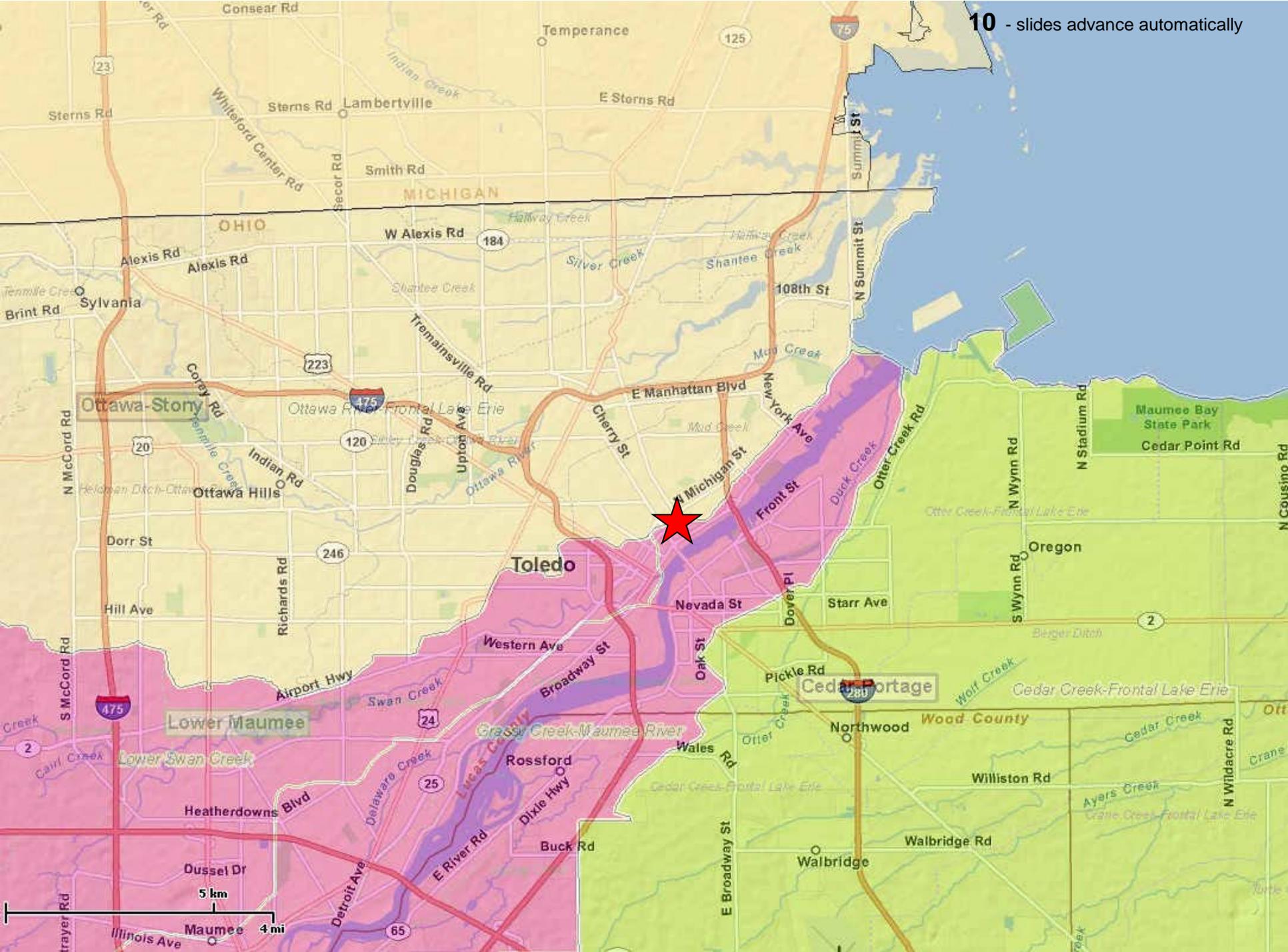
LAMAR

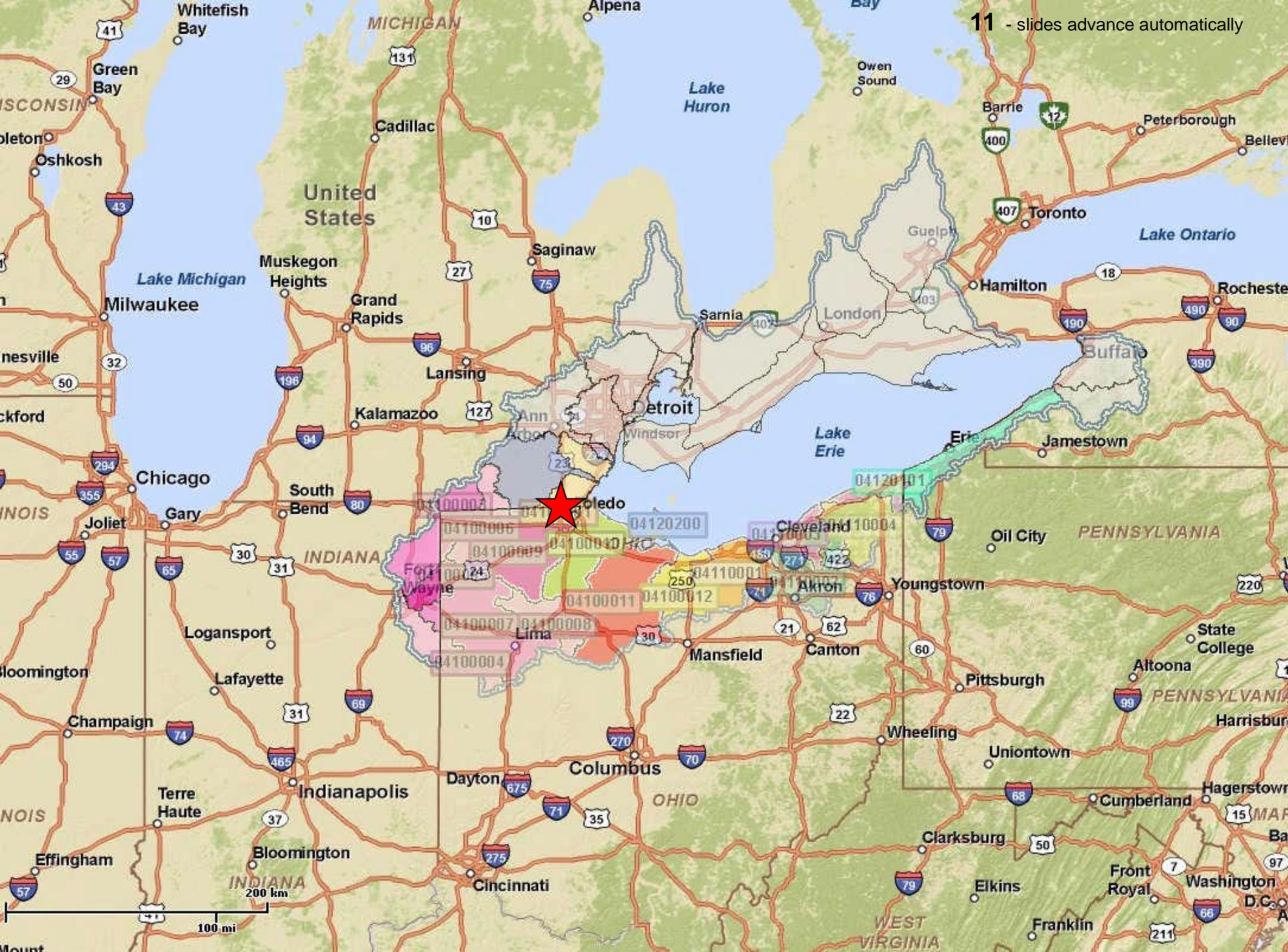
Billboard overlooking the Maumee River in Lucas County.



Life In The Ocean
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www.KeepOceansClean.org

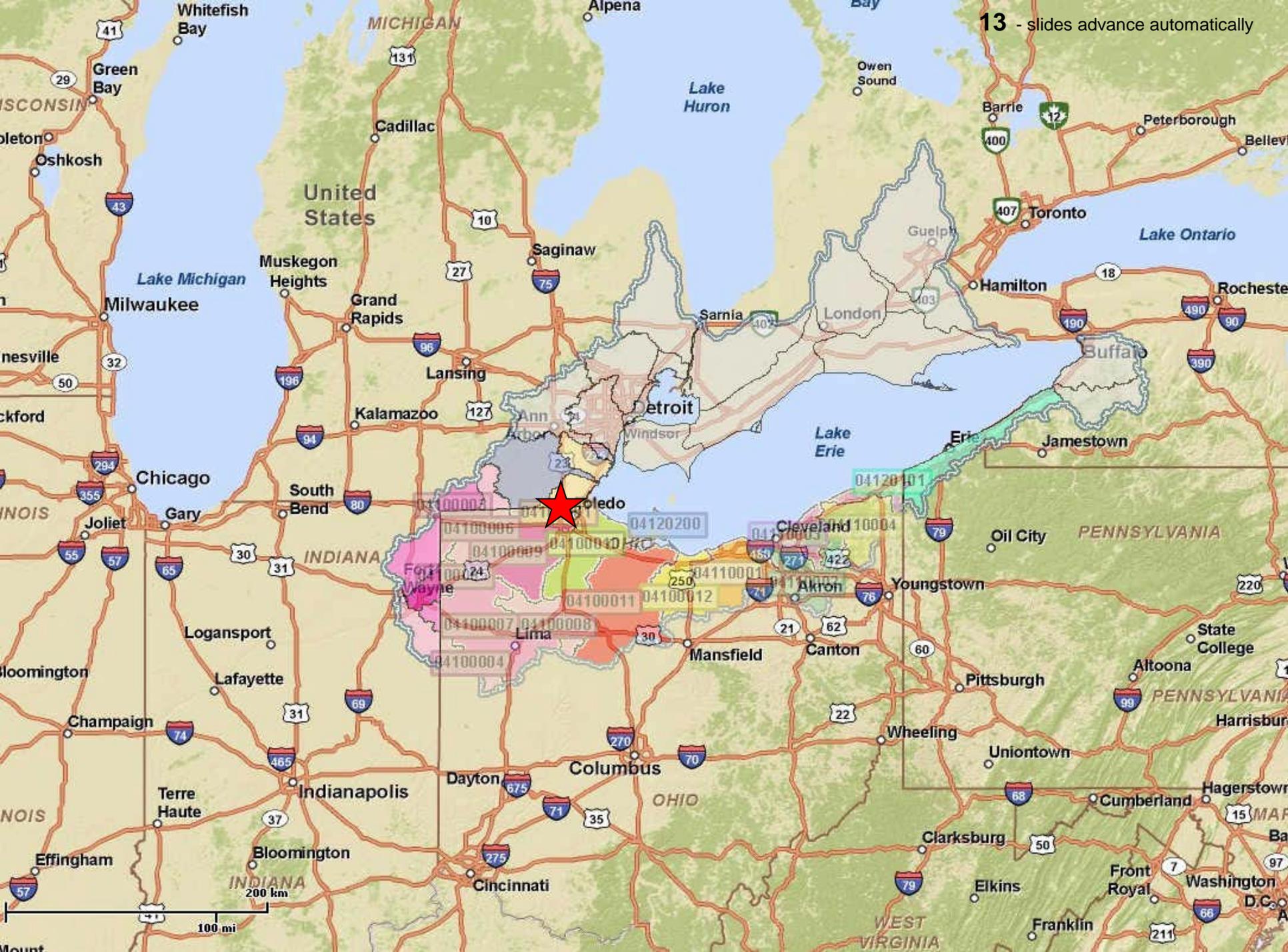


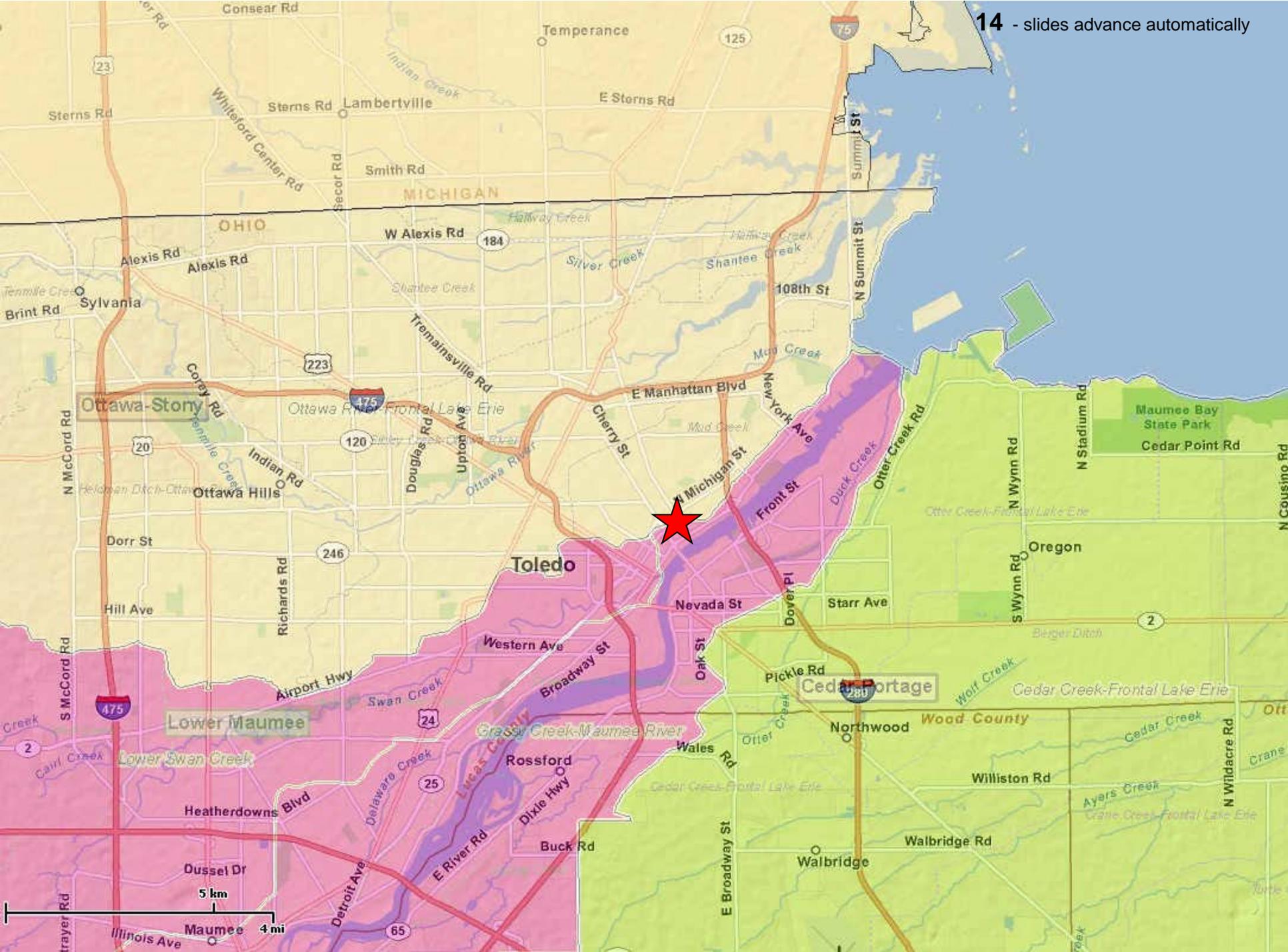


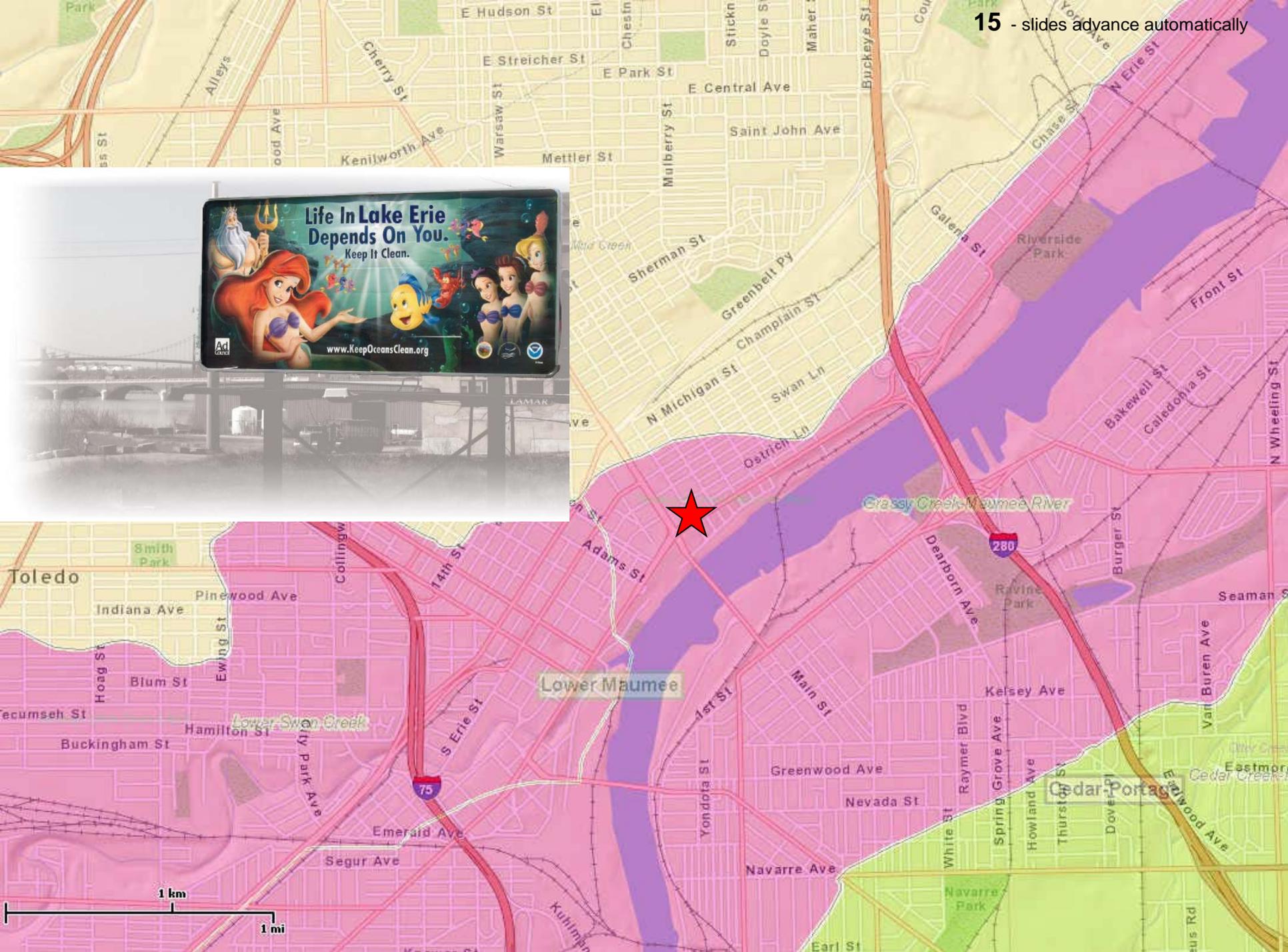




415.29 miles







Lower Maumee

Grassy Creek Maumee River

Lower Swan Creek

Older Portage

Toledo



To overcome disconnect between ocean and lake

Bridging Ocean Literacy to Lake Erie

We need to teach that:

- Ohio has a coast
- That coast is on Lake Erie, a shared fresh water resource.
- Lake Erie is part of something bigger and is connected to the world water cycle.
- Lake Erie influences our lives...and we CAN influence the water body's health.



Bridging Ocean Literacy to Lake Erie will:

- Provide a local context to which people can relate.
- Create platform for hands-on placed-based education programs using scientific inquiry.
- Empower people with tools & knowledge to improve their daily lives (via environmental improvements).
- Bridge user groups who need the most recent information about Lake Erie and its resources.



Lake Literacy Principles

- Creating bridges between groups



Lake Erie Literacy

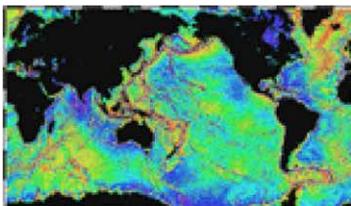
is an understanding of Lake Erie's influence on you and your influence on Lake Erie.

A Lake Erie literate person:

- Understands the characteristics, functioning and value of Lake Erie.
- Communicates accurately about Lake Erie's influence on systems and people in and beyond its watershed; and
- Makes informed and responsible decisions regarding Lake Erie and the resources of its watershed.



<h2>Ocean Literacy Principles</h2> <p>Released in 2006</p>	G r e a t L a k e s L i t e r a c y	<h2>Lake Erie Literacy Principles</h2> <p>First presented spring 2009</p>
1. The Earth has one big ocean with many features.		1. Lake Erie, one of the five Great Lakes, is a body of fresh water with many features.
2. The ocean and life in the ocean shape the features of the Earth.		2. Natural forces formed and continue to shape Lake Erie and its watershed.
3. The ocean is a major influence on weather and climate.		3. Lake Erie influences regional weather and climate.
4. The ocean makes Earth habitable.		4. Water makes Earth habitable; fresh water sustains life.
5. The ocean supports a great diversity of life and ecosystems.		5. Lake Erie supports a great diversity of life and ecosystems.
6. The ocean and humans are inextricably interconnected.		6. Lake Erie and humans in its watershed are inextricably interconnected.
7. The ocean is largely unexplored.		7. Exploration and understanding of Lake Erie is ongoing.
		8. Lake Erie is socially, economically, and environmentally significant.



Principle

Ocean Literacy

Great Lakes Literacy

Lake Erie Literacy

- 1 The Earth has one big ocean with many features.
- 2 The ocean and life in the ocean shape the features of the Earth.
- 3 The ocean is a major influence on weather and climate.
- 4 The ocean makes Earth habitable.
- 5 The ocean supports a great diversity of life and ecosystems.
- 6 The ocean and humans are inextricably interconnected.
- 7 The ocean is largely unexplored.
- 8

The Great Lakes, bodies of fresh water with many features, are connected to each other and to the world ocean.

Natural forces formed the Great Lakes; the lakes continue to shape the features of their watershed.

The Great Lakes influence local and regional weather and climate.

Water makes Earth habitable; fresh water sustains life on land.

The Great Lakes support a broad diversity of life and ecosystems.

The Great Lakes and humans in their watersheds are inextricably interconnected.

Much remains to be learned about the Great Lakes.

The Great Lakes are socially, economically, and environmentally significant to the region, the nation and the planet.

Lake Erie, one of the five Great Lakes, is a body of fresh water with many features.

Natural forces formed and continue to shape Lake Erie and its watershed.

Lake Erie influences local and regional weather and climate.

Water makes Earth habitable; fresh water sustains life on land.

Lake Erie supports a broad diversity of life and ecosystems.

Lake Erie and humans in its watersheds are inextricably interconnected.

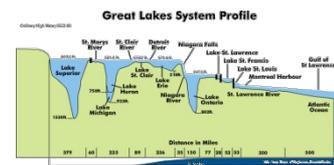
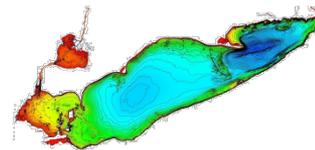
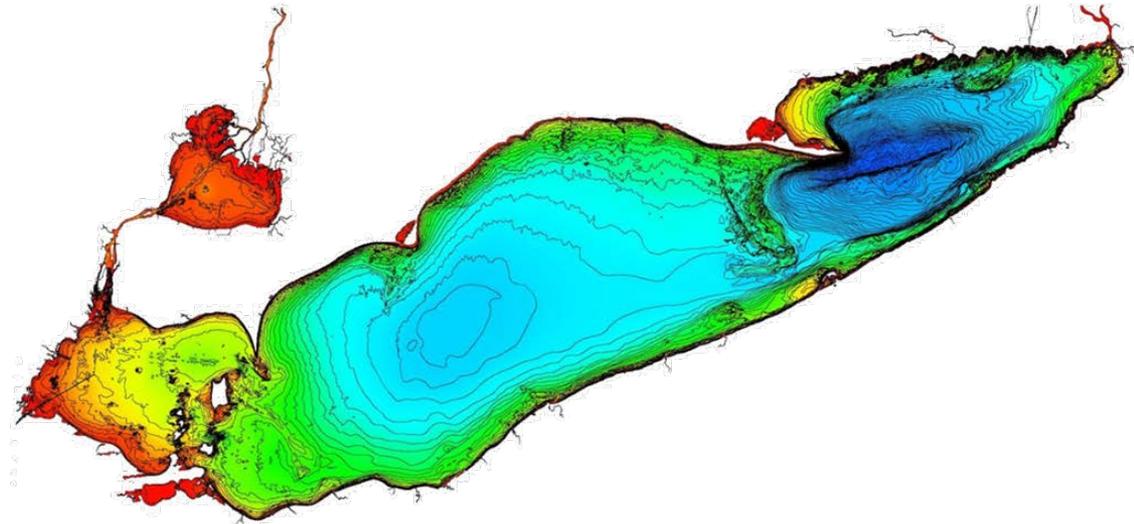
Much remains to be learned about Lake Erie.

Lake Erie is socially, economically and environmentally significant to the region and nation.

1. Lake Erie, one of the five Great Lakes, is a body of fresh water with many features.

Lake Erie is the:

- shallowest, warmest and most biologically productive Great Lake.
- connected to the other Great Lakes which together form a watershed that drains to the Atlantic Ocean.
- finite and its resources are limited.



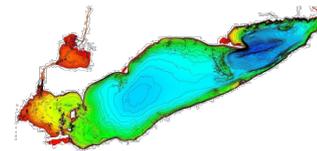
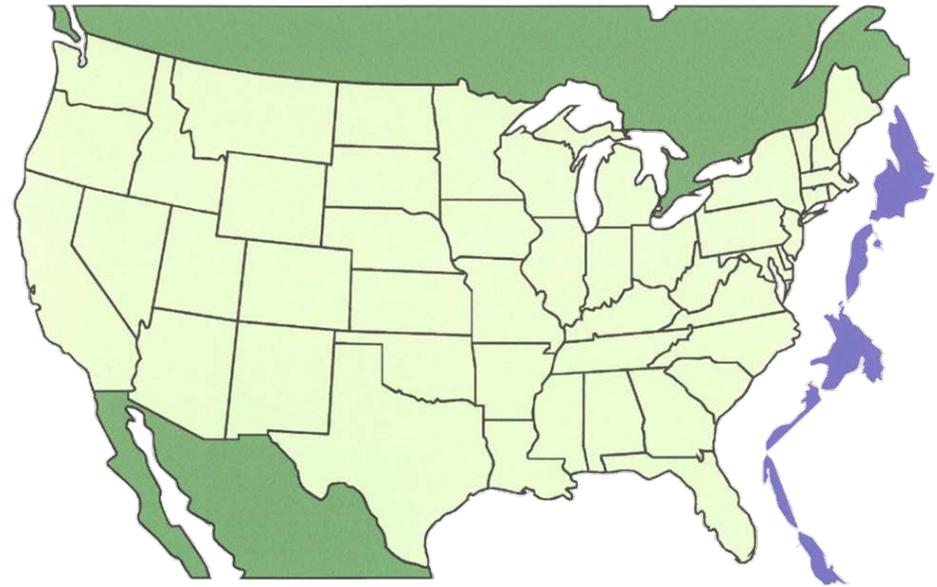
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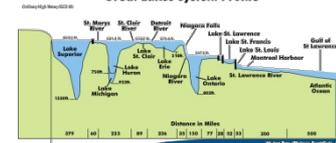
Great Lakes Coastlines



Great Lakes Coastlines



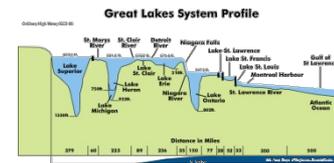
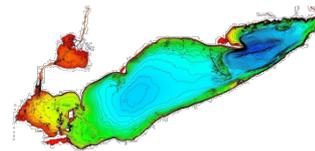
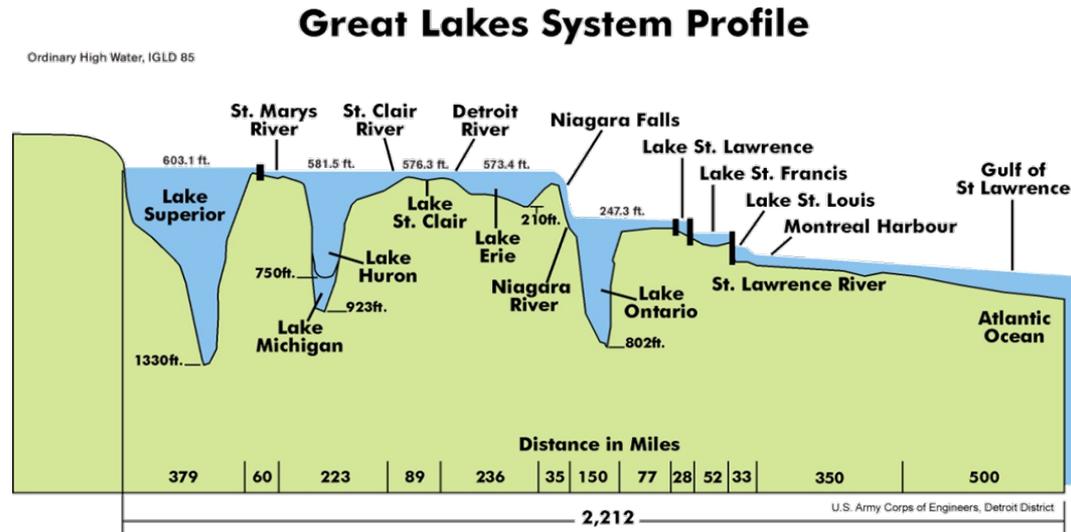
Great Lakes System Profile



1. Lake Erie, one of the five Great Lakes, is a body of fresh water with many features.

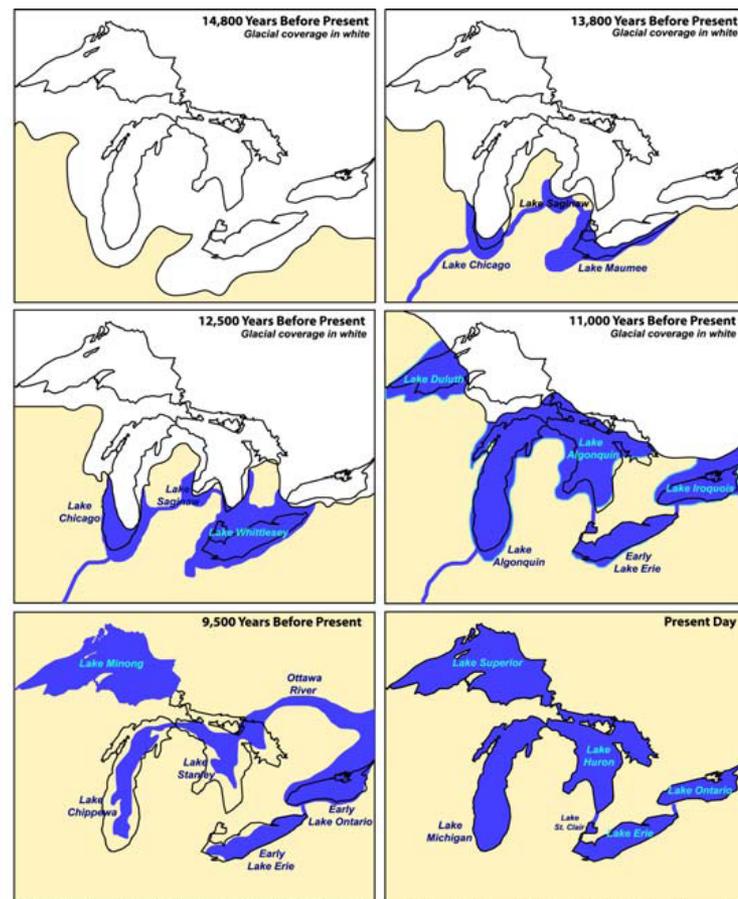
Lake Erie is the:

- shallowest, warmest and most biologically productive Great Lake.
- connected to the other Great Lakes which together form a watershed that drains to the Atlantic Ocean.
- finite and its resources are limited.



2. Natural forces formed and continue to shape Lake Erie and its watershed.

- Lake Formation
 - Salt deposits beneath Lake Erie
 - Glacial gouging
 - Isostatic rebound is ongoing
- Lake levels
 - Fluctuate
 - Have been recorded 150+ years
 - can effect erosion and accretion

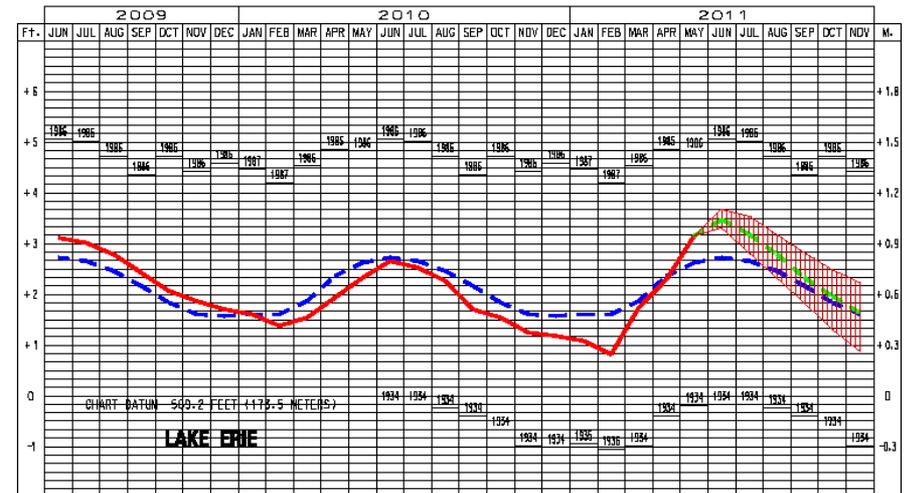


Glacial evolution and stages of Great Lakes formation - After J.L. Hough, 1958, Geology of the Great Lakes, University of Illinois Press, pp. 284-96. Redrawn by ODNR Office of Coastal Management, 2005

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LAKE ERIE WATER LEVELS – JUNE 2011



3. Lake Erie influences local and regional weather and climate.

- Lake Erie's moderates the local climate
- Changes in Lake Erie's circulation, water temperature and ice cover can produce changes in local weather
 - snow belt from Cleveland to Buffalo
 - Precipitation can be traced to water evaporated from Lake Erie
- Lake Erie is influenced by global climate change

Weather

what is happening outside
right now.

Climate

average weather in a
location over a long
period of time.



4. Water makes Earth habitable; Fresh Water sustains life.

- Fresh water has unique properties.
- All organisms in Lake Erie's watershed need a source of freshwater to survive.
 - Lake Erie contains 2.1% of the Great Lakes fresh surface water.
 - The Great Lakes contain 95% of North America's and 20 percent of the world's fresh surface water.



5. Lake Erie supports a great diversity of life and ecosystems.

- Life in Lake Erie ranges in size from the smallest blue-green bacteria to the largest animal that still lives in the lake, lake sturgeon.
- Life cycles in Lake Erie have been altered by invasive plant and animal species.
- Lake Erie's ecosystem provides habitat for unique species to thrive.



6. *Lake Erie and humans in its watershed are connected.*

Lake Erie impacts us. It...

- ...supplies freshwater
- moderates the climate,
- influences the weather, culture & human health.
- ...is a source of food, mineral and energy resources, recreation and jobs.
- ... is a transportation highway
- ...plays a role in national security.

We impact the lake and watershed.

- Lake Erie is affected by the decisions and actions of people throughout its watershed
- Anything that is in the Lake Erie Watershed can be washed by rain into a river... and then into Lake Erie.



7. Exploration and understanding of Lake Erie is ongoing.

- Better resource protection and conservation
- New technologies expand our ability to explore.
- Ecosystem models help us understand the complexity of Lake Erie and its role in the Great Lakes and the Earth.
- Collaboration required



8. Lake Erie is socially, economically & environmentally significant.

- A key element in the formation of the United States:
 - Northwest Ordinance,
 - Battle of Lake Erie during the War of 1812
 - Underground Railroad.
- Today used as a representative model for environmental management.
- *More than 119,000 Ohio jobs are directly linked to Lake Erie-region visitors who spend more than \$10.7 billion annually.*





Already in Use

Lake Erie Literacy Principles & Concepts

- WGTE - Lake Erie Legacy Project
 - Companion K12 Student Activities and Teacher Resources
- Programs for students
- Kidsville News
- Trainings for teachers & resource professionals
- Presentations for adults
- CZ 2011 and future projects



Already in Use

Lake Erie Literacy Principles and Concepts



WGTE - Lake Erie Legacy Project

- 8-part video series
- Explores the natural beauty of Ohio's great lake & how people/communities can help protect and restore the lake wetlands and watersheds.
- Features interviews with scientists explaining:
 - Their Lake Erie research
 - How people's actions can help protect and restore the lake
- Video content mapped to LELPC.

Already in Use

Lake Erie Literacy Principles and Concepts



WGTE Companion K12 Student Activities and Teacher Resources

- Will follow the 5E model
- Will link to other NOAA, ODNR and partner resource websites
- Will include links to Ohio and related teaching standards
- Showcased in the Old Woman Creek NERR Visitor Center exhibits which will open to public September 2011

Already in Use

Lake Erie Literacy Principles and Concepts

WGTE Companion K12 Student Activities and Teacher Resources

Three Examples:



- **Polluted Runoff in Lake Erie: the Storm Connection.**
 - Grades 4-6
 - Features 2 videos: Polluted Runoff, and Weather
- **Targeting Aquatic Invaders in Lake Erie: What You Can Do To Help.**
 - Grades 9-12
 - Features 2 videos: Aquatic Invasive Species, and Climate
- **Wetland's Functions and Values to Lake Erie: Take a look at the data!**
 - Grades 7-8
 - Features 2 videos: Wetlands Protect Water Quality, and Wetlands Breaking Down Pollution

Already in Use

Lake Erie Literacy Principles and Concepts

- Programs for students

- Pre-K to high school
- Ohio Envirothon
- Workforce exploration days



Already in Use

Lake Erie Literacy Principles and Concepts



National Rip Current Awareness Week, June 5-11, 2011 - Learn more: www.ripcurrents.noaa.gov
Explore Ohio's Shore: Swim SAFELY With a Buddy.
 Lake Erie is socially significant to the region. Natural forces continue to shape Lake Erie.

Quesha: What is 240 miles long, 57 miles wide, 210 feet deep and shaped like a bathtub?

Answers: My dream because right with mountains of whipped cream on top?

Quesha: No, Truman. Calling that would give you a bellyache. Guess again.

Answers: The biggest bathtub you ever?

Quesha: Wrong again, but I'll give you two new clues. It is my favorite playground and it holds 52.7 billion gallons of water.

Answers: Well it's not water and ice cream, then it has to be Lake Erie. But how is Lake Erie a playground?

Quesha: People young and old, big and small board to Lake Erie every year to play, to boat and sail, to fish, to walk the shore and swim at the beach. Socially, Lake Erie is very important to the region. Cities and towns across Ohio's 320 mile coast hold festivals, parades and parties to celebrate Lake Erie and the natural resources it holds.

Answers: Celebrating our resources... you mean like the Port Clinton Wildlife Festival that just went on?

Quesha: I mean do. And the volunteers traveling to the lake help support jobs for the people who live in the area.

Quesha: It is pretty great to just go outside and explore the shore. There's nothing better than wading back between your toes. In fact, I was just on my way to the beach to go swimming.

Quesha: By yourself? You shouldn't go swimming by yourself!

Answers: Why not?

Quesha: Lake Erie is our playground. And just like jungle-gyms, the Lake Erie playground has safety guidelines. "Swim with a Buddy" is not only one of Ohio's Explore the Coastline activities, it's also the number one safety rule to remember when swimming at coastal beaches.

Quesha: But why do you need a buddy to swim? When I look across at my neighbor's pool, I had to swim on top of my friend to pass the test.

Answers: Swimming in Lake Erie is not the same as swimming in a pool. Pools' bottoms are smooth and you know how deep the bottom is because it doesn't change. But on Lake Erie, there are natural forces at work—wind, water and waves—that are always changing the shape of the shore and nearshore. The nearshore area is the part of the lake covered by water that is right beside the part of the beach that doesn't have water on it. Waves affect the nearshore.

Quesha: How you telling me that my playground is moving?

Answers: It sure is. The shore and nearshore areas are always changing. Sometimes, like when waves are small, the shore/nearshore does not change much. But when the waves are big, they can change a lot.

Quesha: How so?

Answers: When you walk 20 feet out into the water today, it might only be an inch or two away from you tomorrow. But tonight, a storm comes. The waves can move the sand underneath. Then tomorrow, when you walk into the lake at the same spot the water may be over your head. So every time you go to the beach you should walk out slowly and walk around the area of nearshore you'll be playing in to make sure you don't go out too far and get in over your head.

Learn more: ohiodnr.com/coastal

Kidsville News

- Free monthly newspaper
 - 32 schools in two Ohio coastal counties (Erie & Ottawa)
 - libraries, coffee shops, stores, etc.
- Full-page story featuring one of the LELPC.
 - Each lesson is a conversation and adventure.
- **March 2011:** received the *National Kidsville News Publisher's Award* for Best Use of a KN Publication to Provide Local Educational Content.
- www.ohiodnr.com/tabid/9372/Default.aspx

Already in Use

Lake Erie Literacy Principles and Concepts

Trainings for Teachers & Resource Professionals

Examples:

- Ohio Envirothon Teachers
- Managers of Ohio's Swimming Beaches
- Environmental Education Council of Ohio Conference fieldtrip
- Black Swamp Teacher Training in Lake Erie's Western Basin
- Advisory council



Already in Use

Lake Erie Literacy Principles and Concepts

- Presentations for Adults
 - P2. Natural Forces ...
 - Why are there salt mines beneath Lake Erie?
 - Salt mines = funding source for the Office of Coastal Management.
 - What effects current shape of Ohio's coast?
 - Wind, waves, water, seiche, storm surge
 - Human's actions
 - Explain why OCMP has a regulatory component for structures built along shore.
 - Estuary Explorations Community Education Programs
 - Cross reference how a presentation aligns with LELPC



Ohio's North Coast: Lake Erie's Issues and Opportunities
 26th Annual Ohio Environment, Energy and Resources Law Seminar - April 7-9, 2011

Lake Erie Ports are Transportation Facilities

<ul style="list-style-type: none"> • Issues <ul style="list-style-type: none"> – Maintenance <ul style="list-style-type: none"> • Dredging • Maintenance – Dredge Disposal <ul style="list-style-type: none"> • Water Quality • Phosporus Path – Climate Variation <ul style="list-style-type: none"> • Sea Level Rise (SLR) • Higher Storms? • More frequent storms? 	<ul style="list-style-type: none"> • Opportunities <ul style="list-style-type: none"> – Economic <ul style="list-style-type: none"> • Jobs – Social <ul style="list-style-type: none"> • Improve quality of life • More recreational opportunities – Environmental <ul style="list-style-type: none"> • Recreational Boating • Boating Wetlands • Boating Wetland Areas • Boating Support Facilities
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Future Use

Lake Erie Literacy Principles and Concepts

- CZ 2011
- The future:
 - Examples:
 - Teacher trainings by OWC NERR & Ohio Coastal Training Program
 - funded through variety of federal, state and local foundation funds.
 - Exploring expanding the WGTE videos into larger educational movies



For more information, please contact:

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★ **Ohio Sea Grant** | ohioseagrant.osu.edu



Ohio Lake Erie Commission

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ohiodnr.com/LakeErieLiteracy

Back-up Slide



This presentation aligns with:

Lake Erie Literacy

Principle 3: Lake Erie influence local and regional weather and climate.

E. Lake Erie is influenced by larger climate change patterns affecting North America and the world. Climate patterns in the Great Lakes region are changing with warmer more variable precipitation patterns predicted. Winters are likely to become wetter and summers drier, increasing the frequency of floods and droughts.

Principle 8 - The Great Lakes are socially, economically, and environmentally significant to the region and nation.

D. Waterborne commerce moves millions of tons of cargo annually through the Great Lakes. Shipping is an economically efficient method of transporting raw materials, finished goods and agricultural products. However, shipping is also a vector for non-native species, several of which may be detrimental to the Great Lakes ecosystem.

Principle 6: Lake Erie and humans in its watersheds are inextricably interconnected.

C: Lake Erie is directly affected by the decisions and actions of people throughout its watershed which includes parts of the states of Michigan, Ohio, Indiana, Pennsylvania, New York and the Canadian province of Ontario, and tribal lands. Lake Erie is also impacted by the decisions of people living in the watersheds of the upper Great Lakes (Superior, Huron and Michigan) because water from these lakes and their watersheds flows into Lake Erie.

D: Local and national laws, regulations and resource management affect what is put into and taken out of Lake Erie. Coastal development and industrial or commercial activities throughout the watershed can lead to point and non-point source pollution. Humans have altered the biology of the lakes and the viability of species through harvesting, species introduction, habitat alteration and nutrient and contaminant loading.

E: Lake Erie, its coast and watershed are impacted by land use decisions, water use decisions and natural hazards. Physical modifications (changes to beaches, shores and rivers) can exacerbate effects of erosion, storm surges and lake-level changes.

H: To ensure continued availability of Lake Erie assets, people must live in ways that sustain the lakes. Individual and collective actions are needed to effectively conserve and manage lake resources for the benefit of all.