

Ohio Department of Natural Resources Office of Coastal Management ★

Ohio Coastal Management Program
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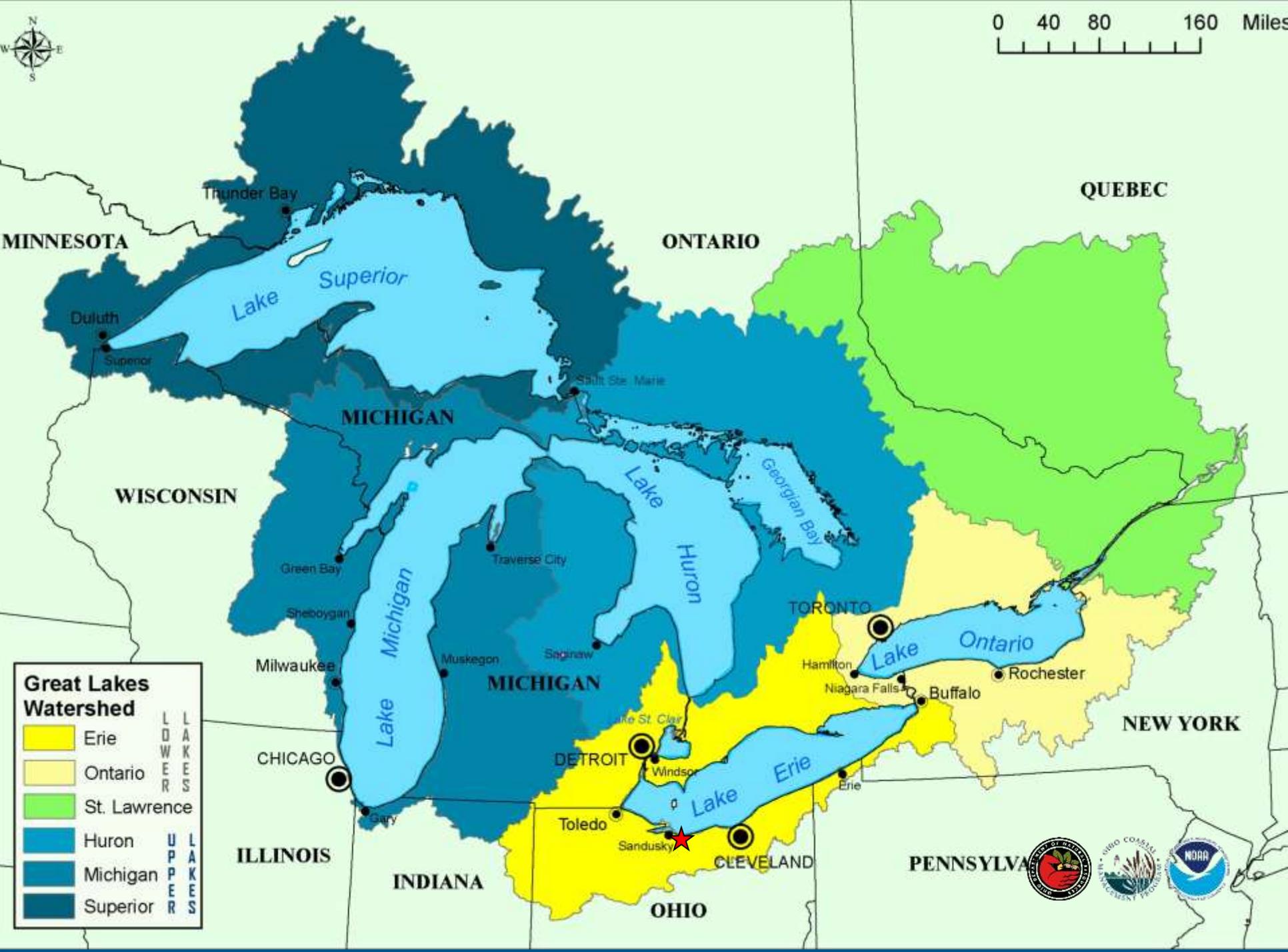
Lake Erie

Our Water Resource

Huron Lions Club - November 28, 2012

Huron, Ohio





0 40 80 160 Miles

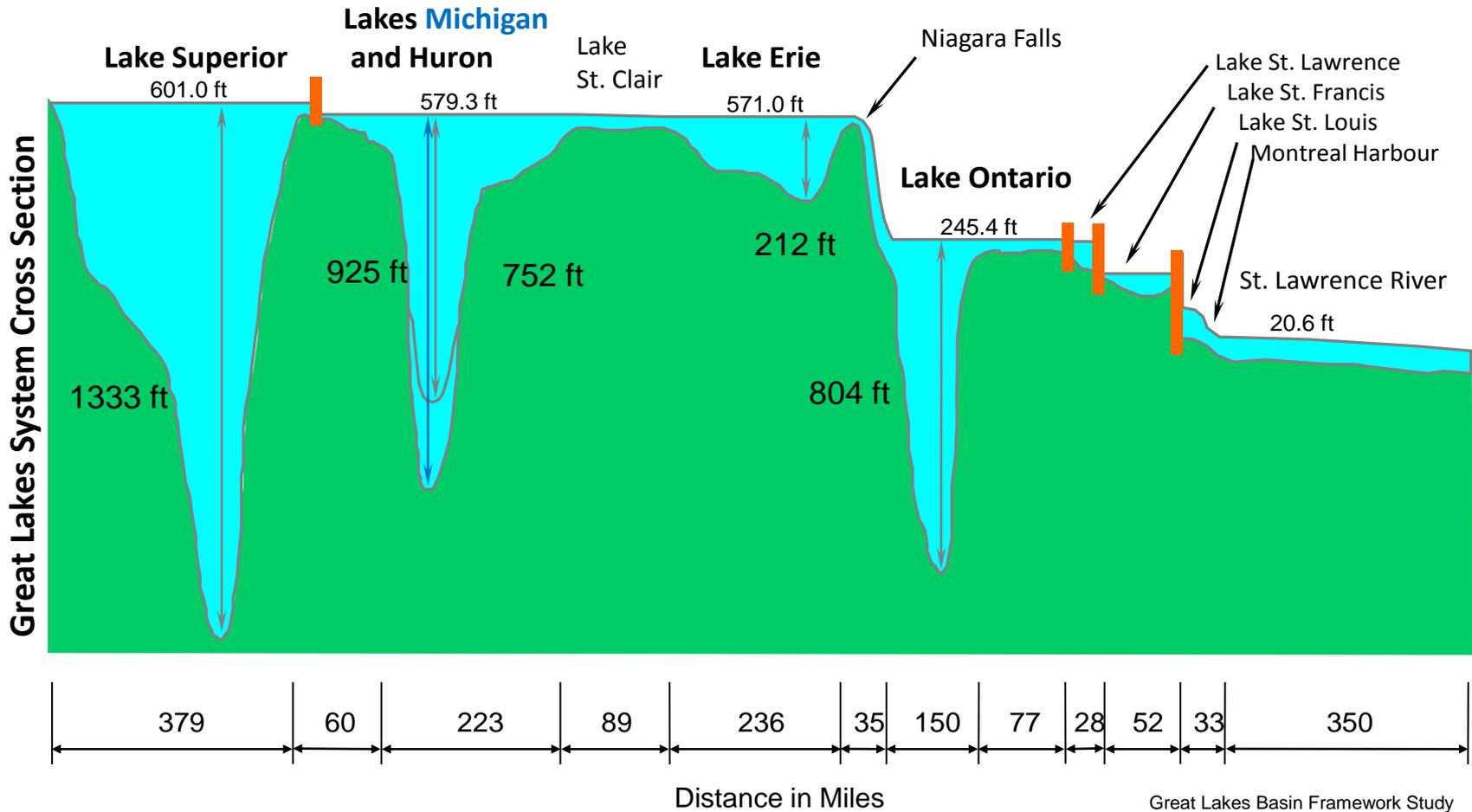
Great Lakes Watershed

	Erie	L
	Ontario	O
	St. Lawrence	S
	Huron	H
	Michigan	M
	Superior	S

LOWER LAKE UPPER LAKE



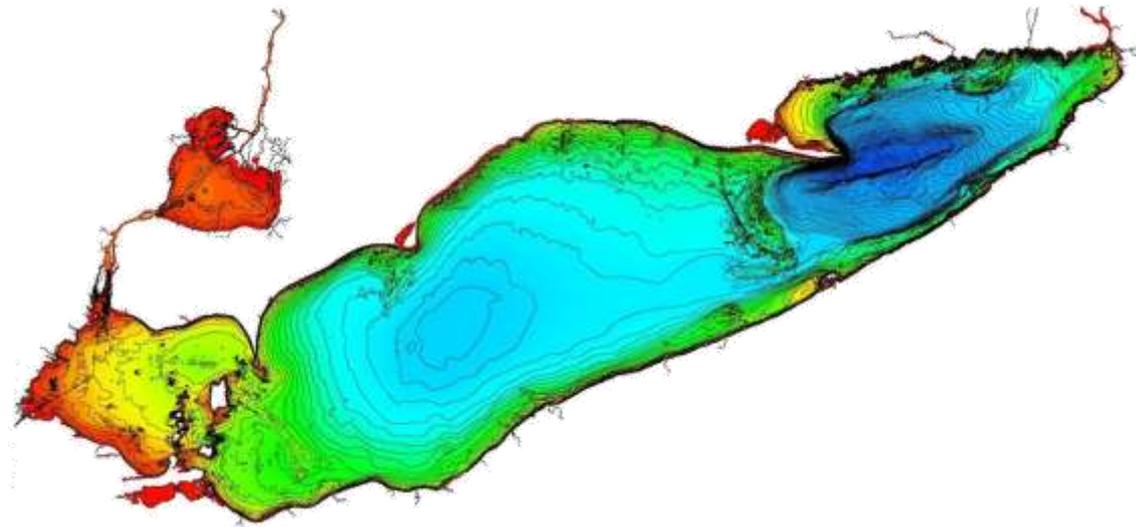
Lake Erie, one of the five Great Lakes, is a body of fresh water with many features.



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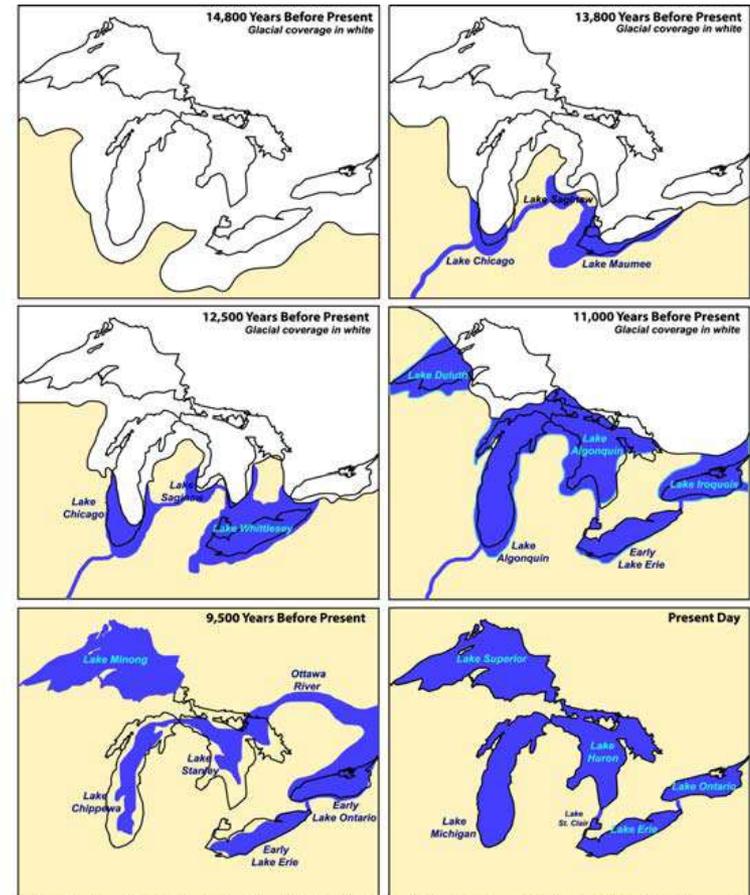
Lake Erie is the:

- 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.



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

Lake Erie influences local and regional weather and climate.

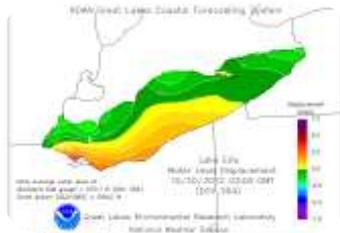
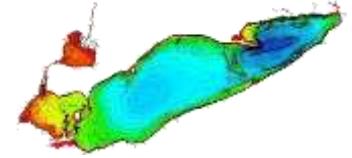
- Lake Erie's moderates the local climate
- Changes in Lake Erie's circulation, water temperature and ice cover can produce changes in local weather
 - Snow belt from Cleveland to Buffalo
 - Precipitation can be traced to water evaporated from Lake Erie
- Lake Erie is influenced by global weather patterns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

Weather
what is happening
outside right now.

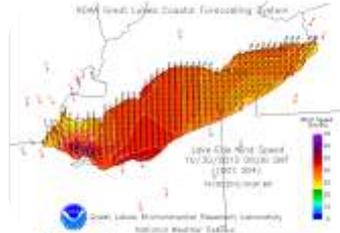
Climate
average weather in a
location over a long
period of time.



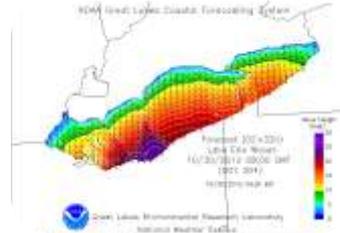
Lake Erie influences local and regional weather and climate. *(Superstorm Sandy 10/30/12 am)*



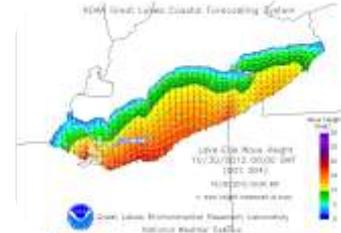
Water Level Displacement



Wind Speed@ midnight



Waves – Forecast @ 4 am



Waves – Nowcast @ 2 am



Cleveland Harbor Lighthouse



East 55th Street Marina (I-90)



Vermilion breakwater (by Scott Dommin)



Vermilion River Breakwater and West Jetty (8/20/12)



Lake Erie influences local and regional weather and climate. (Superstorm Sandy Effects 10/30/12 pm)



Edgewater Marina,
Cleveland



Edgewater Marina,
Cleveland



Edgewater Marina,
Cleveland



Edgewater Marina,
Cleveland



Edgewater Marina,
Cleveland



Edgewater Marina,
Cleveland



East 55th Street
Marina, Cleveland



White Pelican Sandusky
Boathouse Channels

Lake Erie influences local and regional weather and climate. (Superstorm Sandy -Cleanups 11/10/12)



Euclid Beach - Cleveland Lakefront State Park



Villa Angela Beach - Cleveland Lakefront SP



East 55th Street Marina, Cleveland Lakefront SP



East 55th Street Marina, Cleveland Lakefront SP



Euclid Beach - Cleveland Lakefront State Park



Villa Angela Beach - Cleveland Lakefront SP

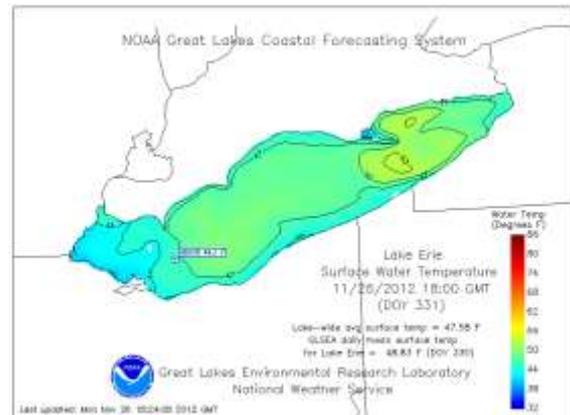
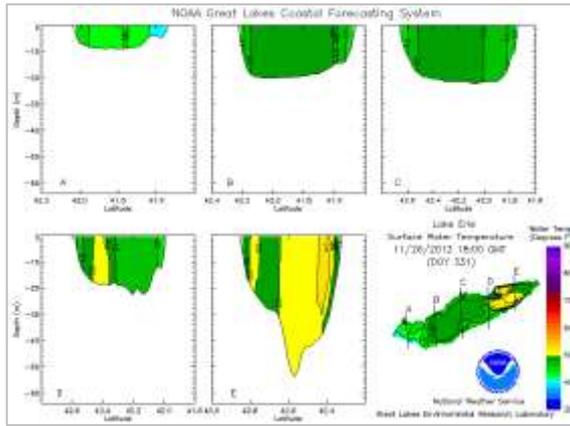


East 55th Street Marina, Cleveland

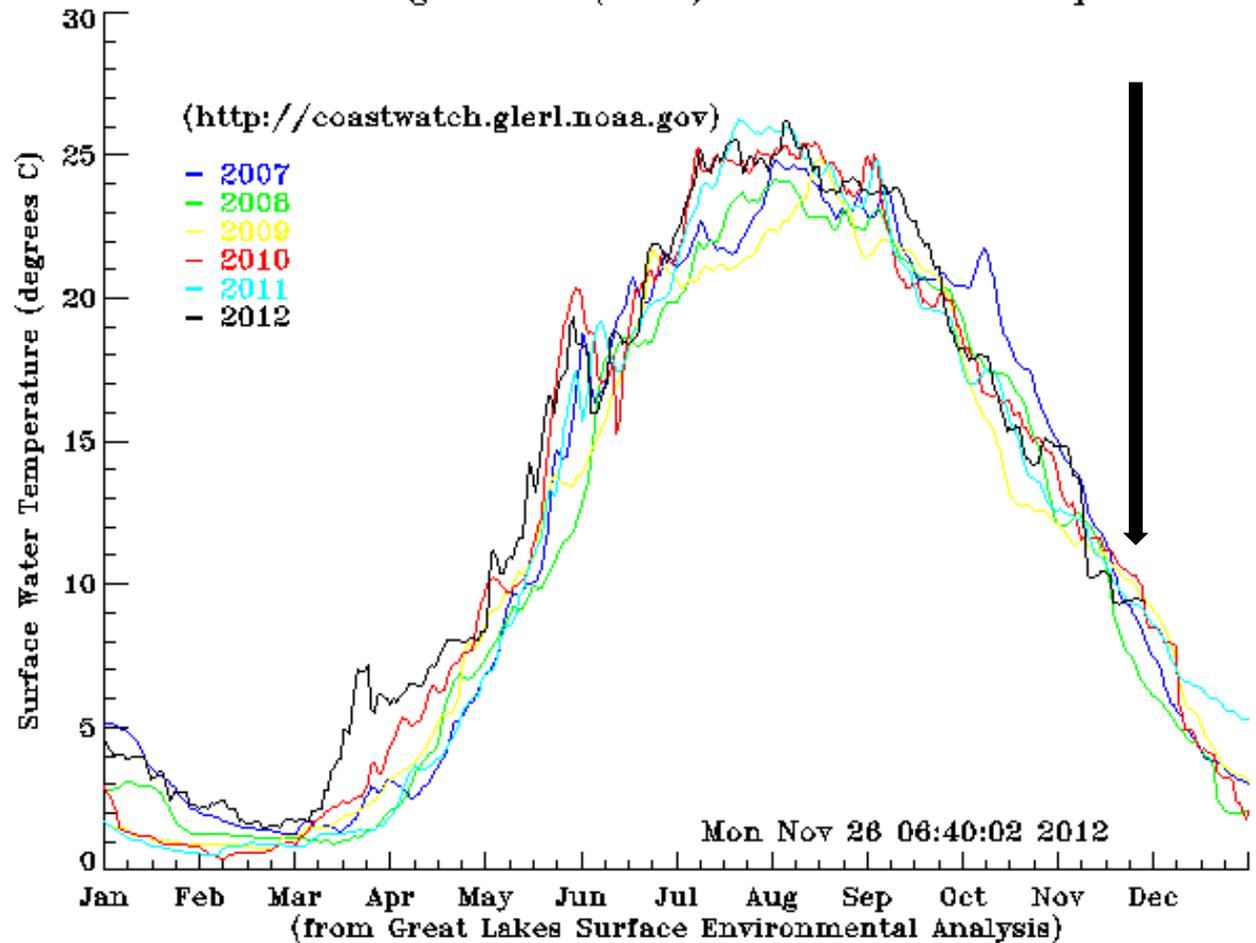


East 55th Street Marina, Cleveland Lakefront SP

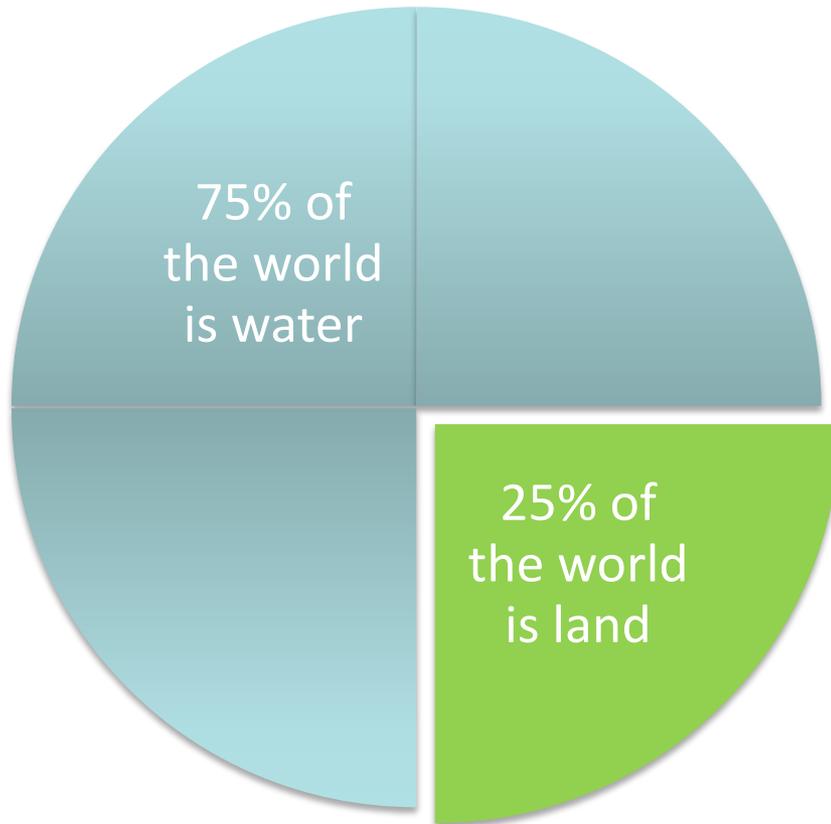
Lake Erie influences local and regional weather and climate.



Lake Erie Average GLSEA (1024) Surface Water Temperature



*Water makes Earth habitable;
Fresh Water sustains life on land.*



Water makes Earth habitable; Fresh Water sustains life on land.



Of the 75%
of the world
that is
water, 3% is
fresh H₂O.

1% of the
freshwater
is usable

Of the 1%,
some is
surface water
& some is
ground water.

Of the **FRESH, USABLE** surface water,
20% is found in the Great Lakes system

2.1% is in Lake Erie

drinking water for 11 million people

3 million Ohioans

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, lake sturgeon.

Life cycles in Lake Erie have been altered by invasive plant and animal species.

More fish are caught out of Lake Erie every year than the other four Great Lakes combined.

Lake Erie's ecosystem provides habitat for species to thrive.



Lake Erie is socially, economically & environmentally significant.

SOCIALLY:

- A key element in the formation of the United States: Northwest Ordinance, War of 1812 Battle of Lake Erie, Civil War/Underground Railroad.
- Festivals, community celebrations, pro-sports teams
- Recreation, fitness challenges, family outings



ENVIRONMENTALLY:

- A representative model for environmental management
- Smallest Great Lake = problems appear/solutions work first.



ECONOMICALLY:

- More than 119,000 Ohio jobs are directly linked to Lake Erie-region visitors who spend more than \$10.7 billion annually.
 - Birding, Boating, Island visitors, Camping, Fishing
- Shipping – Great Lakes Carriers Association



Lake Erie and humans in its watershed are connected.



Lake Erie impacts us.

We impact the lake and watershed.



Supplies freshwater

Influences the weather, culture & human health.

Source of food, minerals, energy, recreation and jobs.

Transportation highway

Plays a role in national security.

Lake Erie is affected by decisions and actions of people throughout its watershed.

Anything in the watershed can be washed by rain into a river... and then into Lake Erie.

Moderates the climate



Lake Erie and humans in its watershed are connected.

CHALLENGES We impact the lake and watershed

- Changing water levels over a range of scales
 - Long-term
 - Seasonal
 - Short-term
- Climate change impacts
 - Water levels
 - Storm frequency and magnitude
 - Temperature
 - Timing
- Water level regulation
- Land-use change
- Loadings/water quality degradation
- Shoreline development
- Erosion and irreversible lakebed downcutting
- Sand management
- Public access
- Invasive species
- Habitat loss and degradation



Departmental Priorities are connected.

Addressing These

We impact the lake and watershed

- Changing water levels over a range of scales
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Departmental Priorities

Addressing the CHALLENGES

- Loadings/water quality degradation



HAB

- Harmful algal blooms (HABs)



ohioalgaefinfo.com or 1-800-OHBEACH



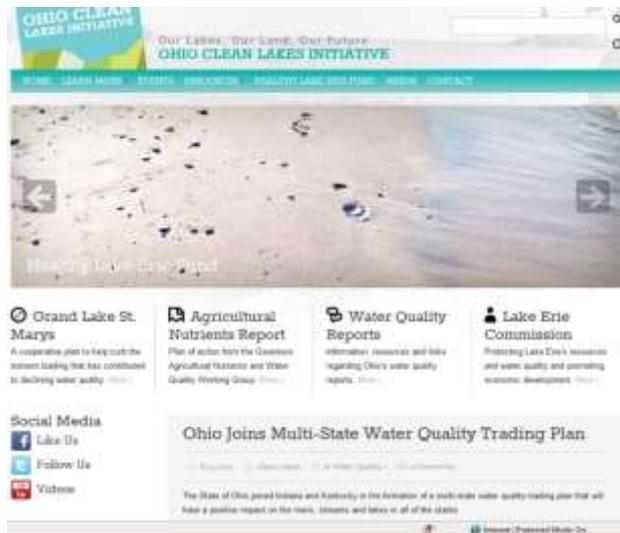
duck weed



Departmental Priorities

Addressing the CHALLENGES

- Loadings/water quality degradation



- Harmful algal blooms (HABs)
 - ohioalgaeinfo.com
- Clean Lakes Initiative (ODNR, OEPA, ODA)
 - www2.ohiodnr.com/cleanlakes
- Healthy Lake Erie Fund (\$3 million)
 - for projects in the Western Lake Erie Basin that help address the Ag nutrient issue
 - monitor the condition of Lake Erie
 - testing for the soil in the Western Lake Erie Basin
 - support innovative pilot projects to reduce nutrient loadings and control algal growth
 - assist farmers in soil testing, developing of Nutrient Management Plans, training on fertilizer application, growth of cover crops and installation of controlled drainage devices.



Departmental Priorities

Addressing the CHALLENGES

- Loadings/water quality degradation



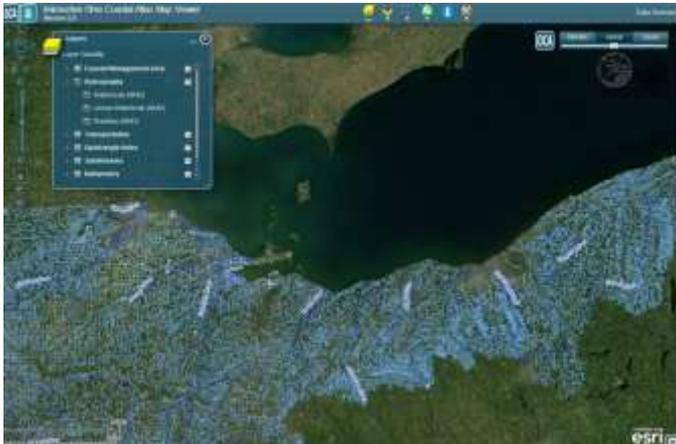
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- Healthy Lake Erie Fund (\$3 million)
- “4R” program (source, rate, time, place)
 - www.nutrientstewardship.com



Departmental Priorities

Addressing the CHALLENGES

- Loadings/water quality degradation



- Harmful algal blooms (HABs)
 - ohioalgaefinfo.com
- Clean Lakes Initiative (ODNR, OEPA, ODA)
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- Healthy Lake Erie Fund (\$3 million)
- “4R” program (source, rate, time, place)
 - www.nutrientstewardship.com
- Restoration of natural flow regimes (control drainage devices)



Departmental Priorities

Addressing the CHALLENGES

- Invasive species



- eDNA, Asian Carp
 - www.ohiodnr.com/tabid/24070/Default.aspx
- Stop Aquatic Hitchhikers: Clean. Drain. Dry.



**STOP AQUATIC
HITCHHIKERS!**

Prevent the transport of nuisance species.
Clean all recreational equipment.
www.ProtectYourWaters.net

- Continue to manage and maintain a world-class sport-fishery
 - Ohio's Lake Erie Fishery value: \$800 million annually.



Departmental Priorities

CHALLENGES

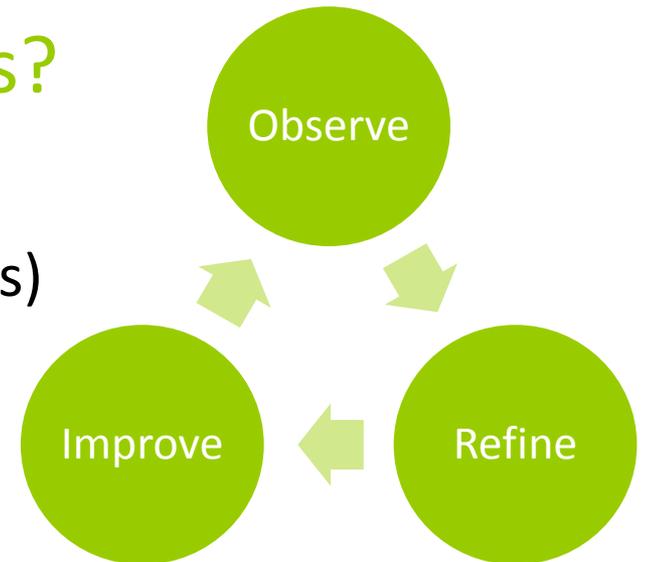
We impact the lake and watershed.

- Minimize impacts to land, air, water.

How will we meet the challenges?

– Adaptive Management

- Best Management Practices (BMPs)
- Innovative Solutions
- Working together



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

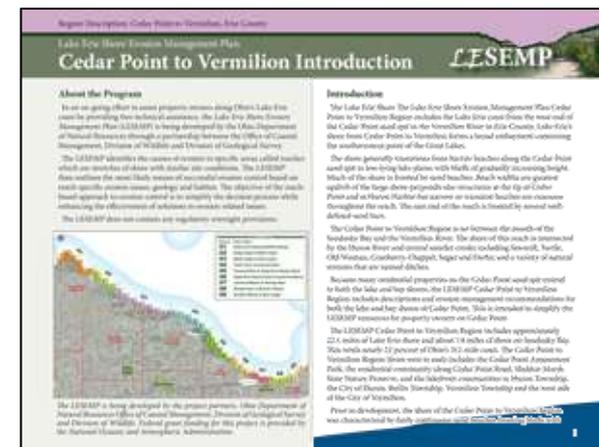




Office of Coastal Management Initiatives

- Lake Erie Shore Erosion Management Plan
 - Reaches identified by coastal characteristics and erodibility.
 - Provides information to coastal property owners and guidance as to appropriate methods of erosion control by coastal reach.
 - Various reaches finalized and factsheets are online.
 - Reach from Vermilion to Cleveland Harbor is under development.

<http://LakeErie.ohiodnr.com/Erosion>





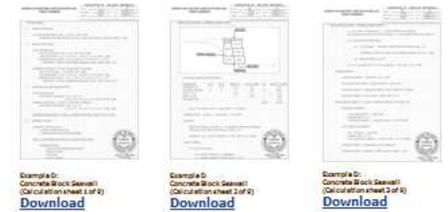
Office of Coastal Management Initiatives

- Ohio Coastal Design Manual
 - Demonstrates how structures along the shore of Lake Erie should be designed and how coastal engineering principles are best applied.
 - Printed manual can be downloaded online or viewed as a webpage.
 - Additional chapters being developed.

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



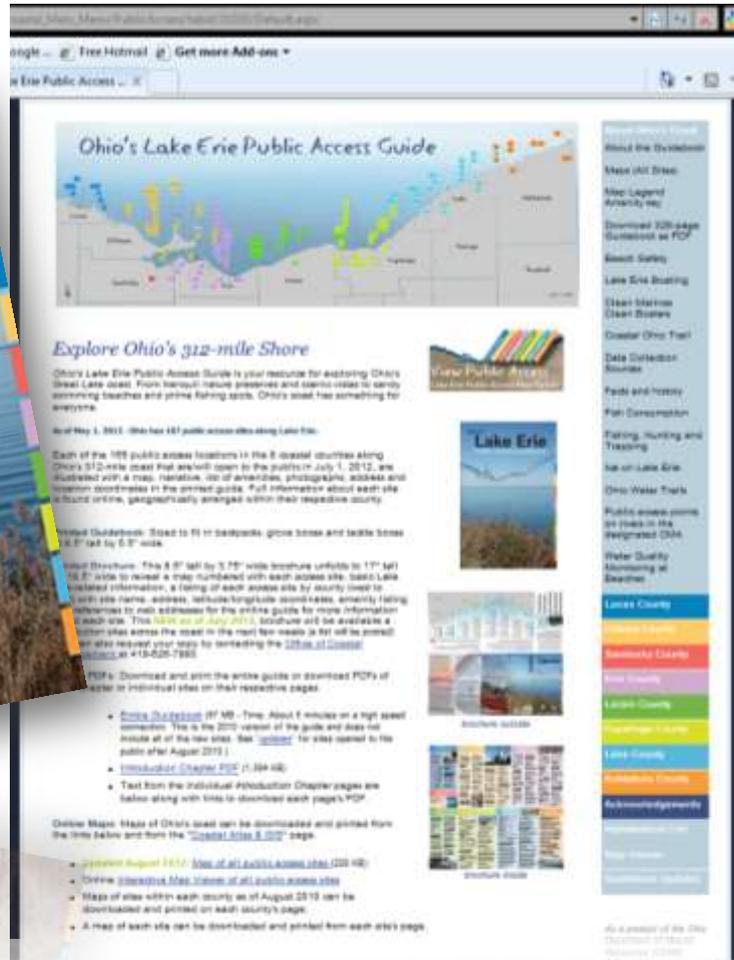
Design Drawings





Access to the Coast . . .

and Watershed



Coming soon: a companion Document focusing on Public Access Sites on Ohio's main Lake Erie Tributaries:

- Ottawa River
- Maumee River
- Toussaint River
- Portage River
- Sandusky River
- Huron River including West Branch
- Vermilion River
- Black River with East & West branches
- Rocky River with East & West branches
- Cuyahoga River
- Chagrin River
- Grand River
- Ashtabula River
- Conneaut Creek

<http://LakeErie.ohiodnr.com/GoCoast>



Ohio Coastal Atlas

Available Data Layers

- [Engineering and Surveying](#)
- [Lake Erie Environment](#)
- [Lake Erie Public Access](#)
- [Lake Erie Shore Erosion Management](#)
- [Lake Erie Watershed](#)
- [Ports, Harbors and Recreational Boating](#)
- [School Districts](#)
- [Population \(census\)](#)
- [More!!](#)



<http://LakeErie.ohiodnr.com/Atlas>

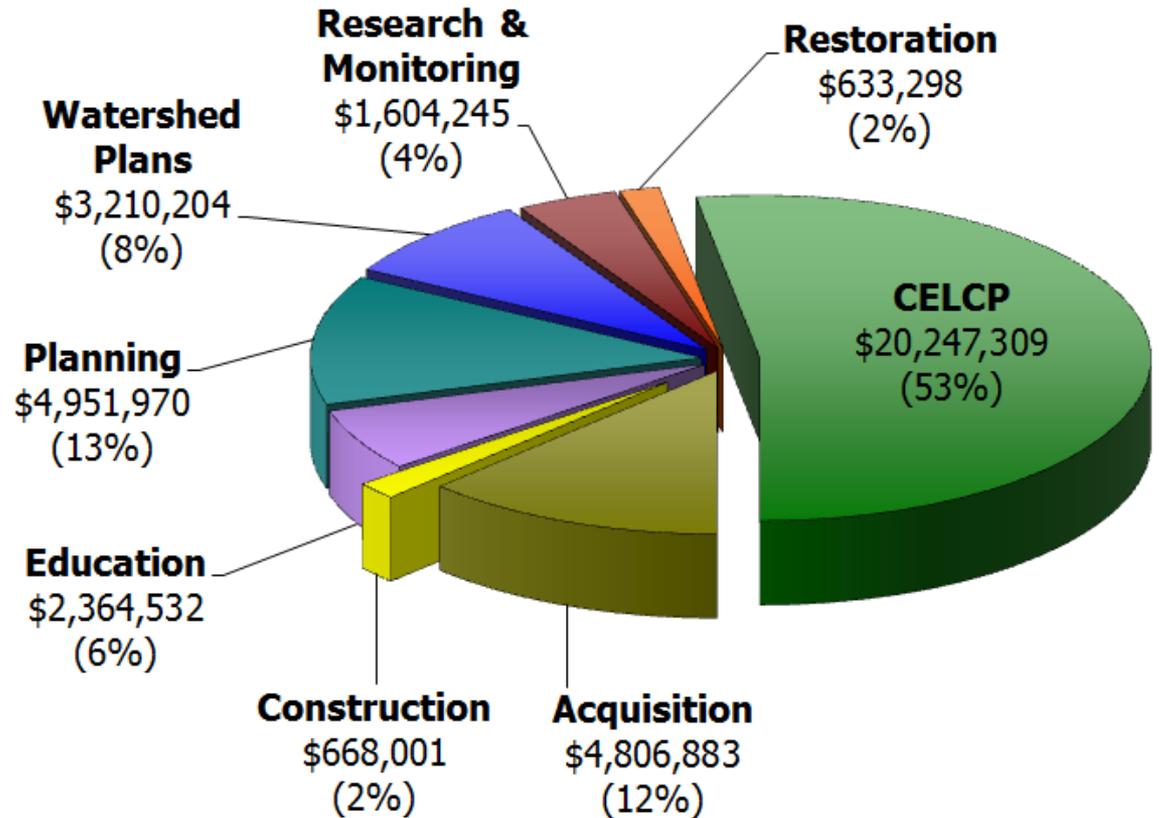


Coastal Management Assistance Grants

FY2014 Priorities:

- Water Quality
- Coastal Planning
- Coastal Resource Management Education and Outreach
- Research and Data Collection

Ohio Coastal Management Grants by Award Category 1998-2012



<http://LakeErie.ohiodnr.com/Grants>



Office of Coastal Management Initiatives:

Outreach and Education

LELP 1 - [Lake Erie, one of the five Great Lakes, is a body of fresh water with many features.](#)

LELP 2 [Natural forces formed and continue to shape Lake Erie and its watershed.](#)

LELP 3 - [Lake Erie influences local and regional weather and climate.](#)

LELP 4 - [Water makes Earth habitable; fresh water sustains life on land.](#)

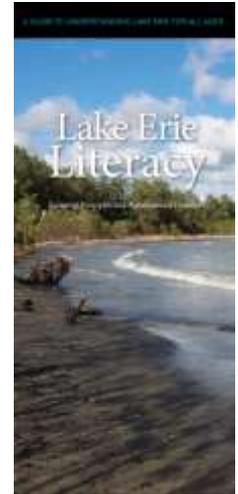
LELP 5 - [Lake Erie supports a broad diversity of life and ecosystems.](#)

LELP 6 - [Lake Erie and humans in its watersheds are inextricably interconnected.](#)

LELP 7 - [Much remains to be learned about Lake Erie.](#)

LELP 8 - [Lake Erie is socially, economically and environmentally significant to the region and nation.](#)

- Lake Erie Literacy Principles and Concepts finalized, presented at CZ2011 and aligned with the National Science Education Standards.
- Were used to write a monthly full-page feature story in a newspaper distributed to more than 32 schools (K-6) in 3 of Ohio's coastal counties which won national awards.
- Has been used TODAY. Do the headings at left look familiar?



[http:// Ohiodnr.com/LakeErieLiteracy](http://Ohiodnr.com/LakeErieLiteracy)



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