

Sub-Watershed Projects Western Lake County, Ohio

First presented, April, 2016.

Project Partners / Acknowledgements:



Project Funding:

U.S. EPA – Great Lakes Restoration Initiative Program
Ohio – Great Lakes Commission
ODNR – Surface Water Improvement Fund
Ohio – Capital Budget Allocation
City of Mentor

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Water *Resilient* Cities

Climate Change, Infrastructure, Economies,
and Governance in the Great Lakes Basin

APRIL 21-22, 2016

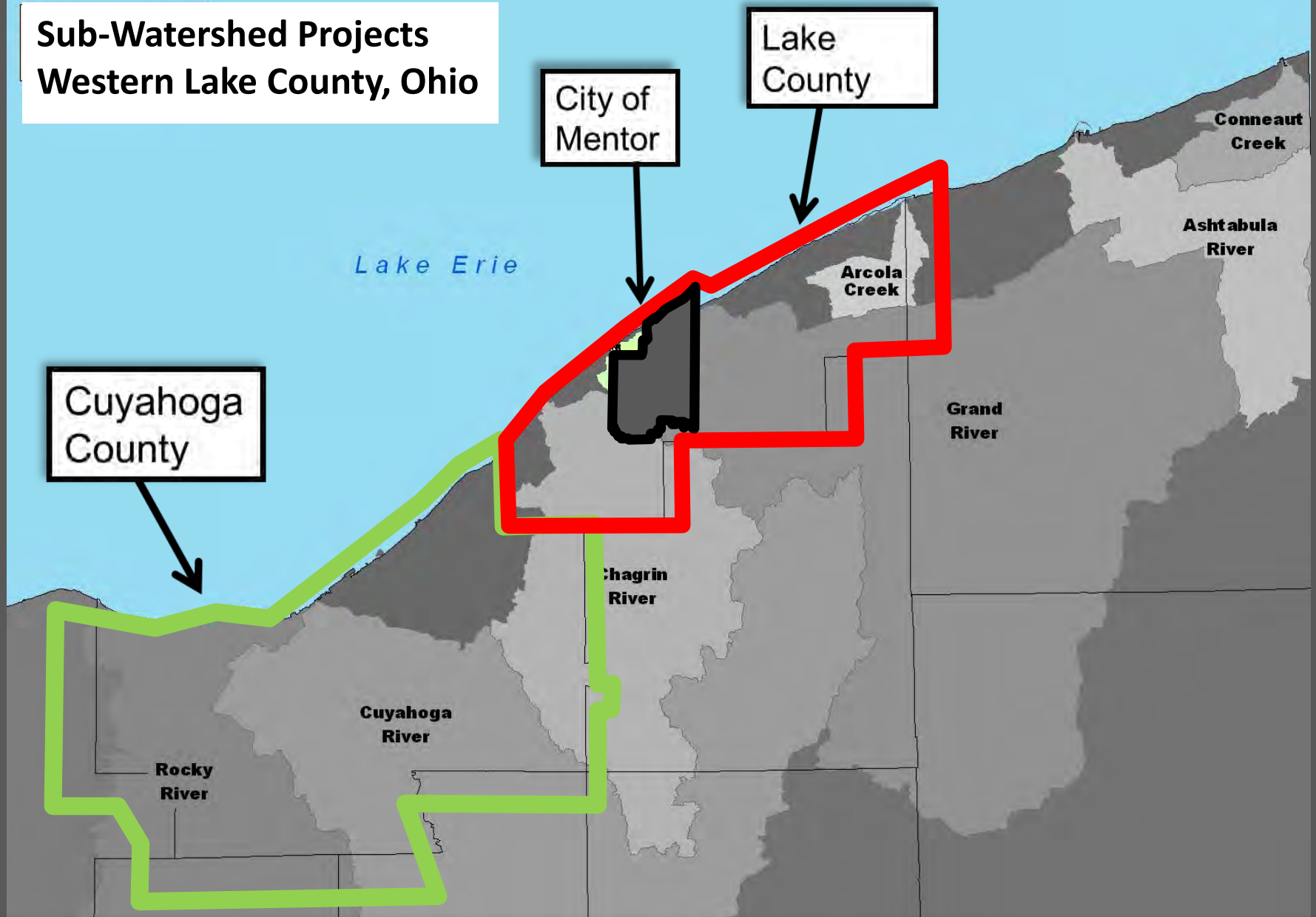


Maxine Goodman Levin
College of Urban Affairs

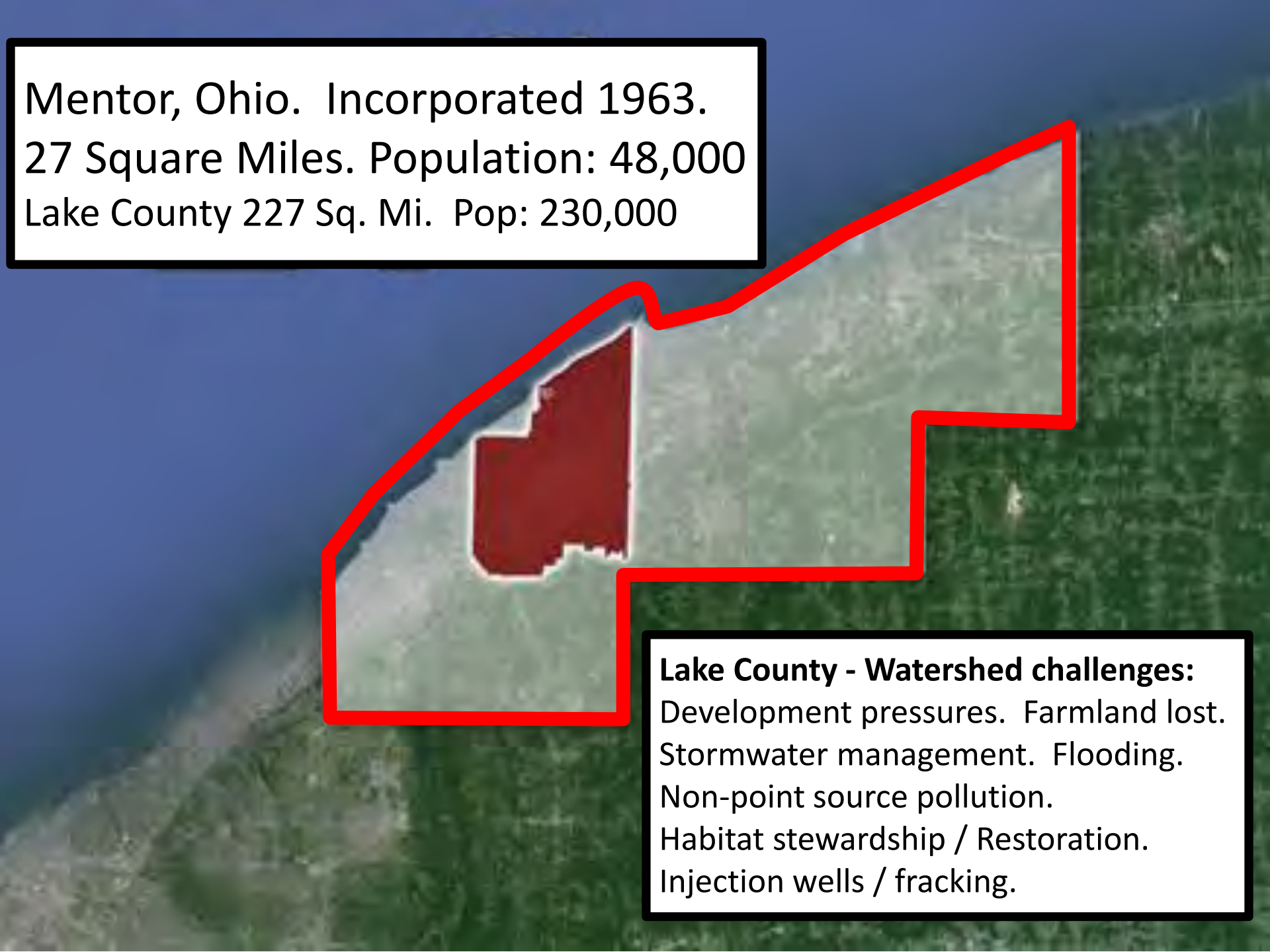
Wendy A. Kellogg, Associate Dean, Conference Chair

www.csuohio.edu/urban/events/Water-Resilient-Cities-Conference

Sub-Watershed Projects Western Lake County, Ohio



Developing successful watershed scale projects often requires partnerships that transcend jurisdictional boundaries. Non-profit partner organizations with appropriate missions and capacities can help small communities develop projects and programs to address distributed sub-watershed challenges .

An aerial photograph of Lake County, Ohio, with a red outline indicating the county's boundary. A smaller, solid red area within the county represents the city of Mentor. The background shows a mix of green fields and blue water.

Mentor, Ohio. Incorporated 1963.
27 Square Miles. Population: 48,000
Lake County 227 Sq. Mi. Pop: 230,000

Lake County - Watershed challenges:
Development pressures. Farmland lost.
Stormwater management. Flooding.
Non-point source pollution.
Habitat stewardship / Restoration.
Injection wells / fracking.

City Mentor - Watershed challenges:

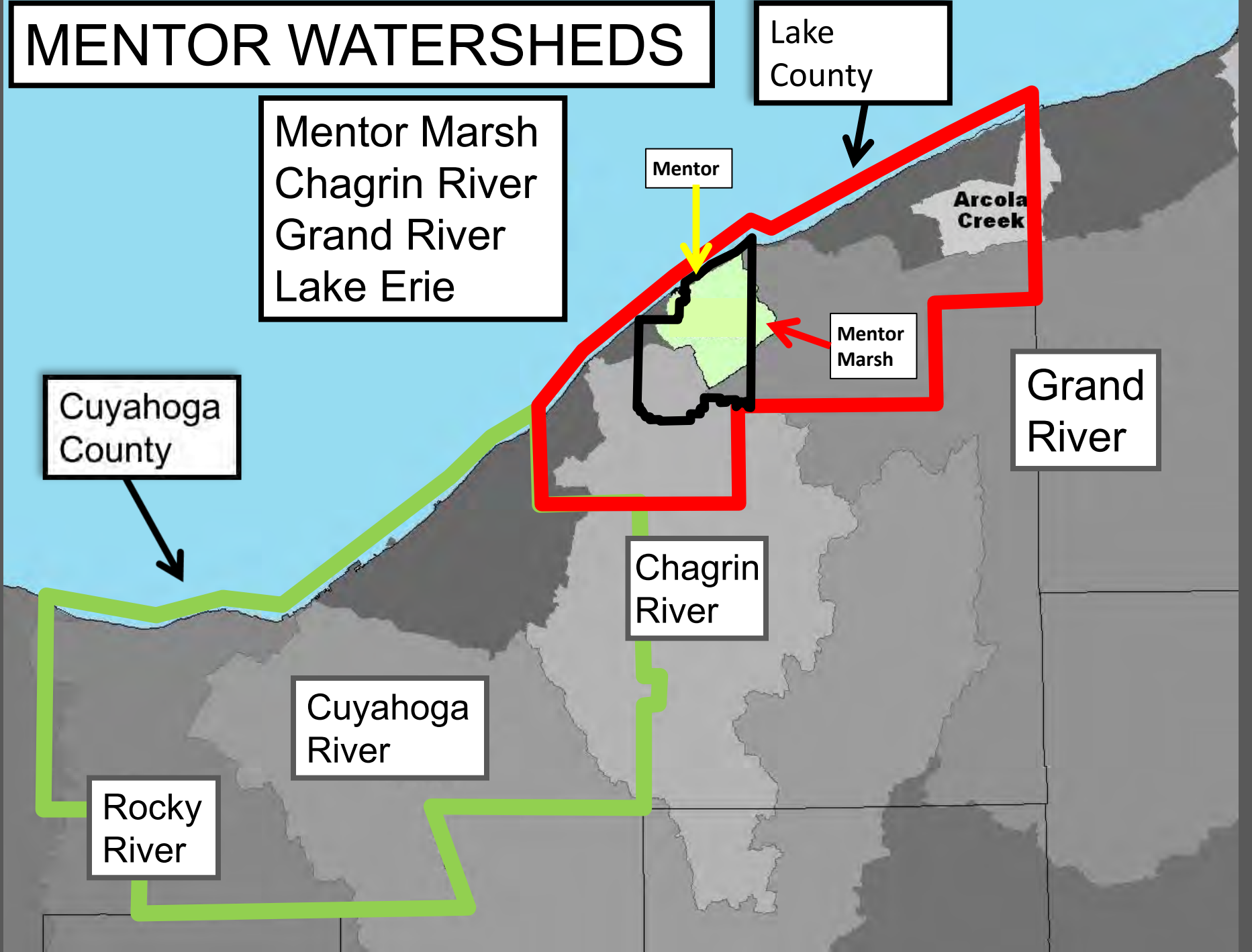
Development pressure. Stormwater management.
Occasional flooding. Non-point source pollution.
Habitat restoration. Salinity.

Mentor



Lake County

MENTOR WATERSHEDS



Lake County

Mentor Marsh
Chagrin River
Grand River
Lake Erie

Mentor

Arcola Creek

Mentor Marsh

Grand River

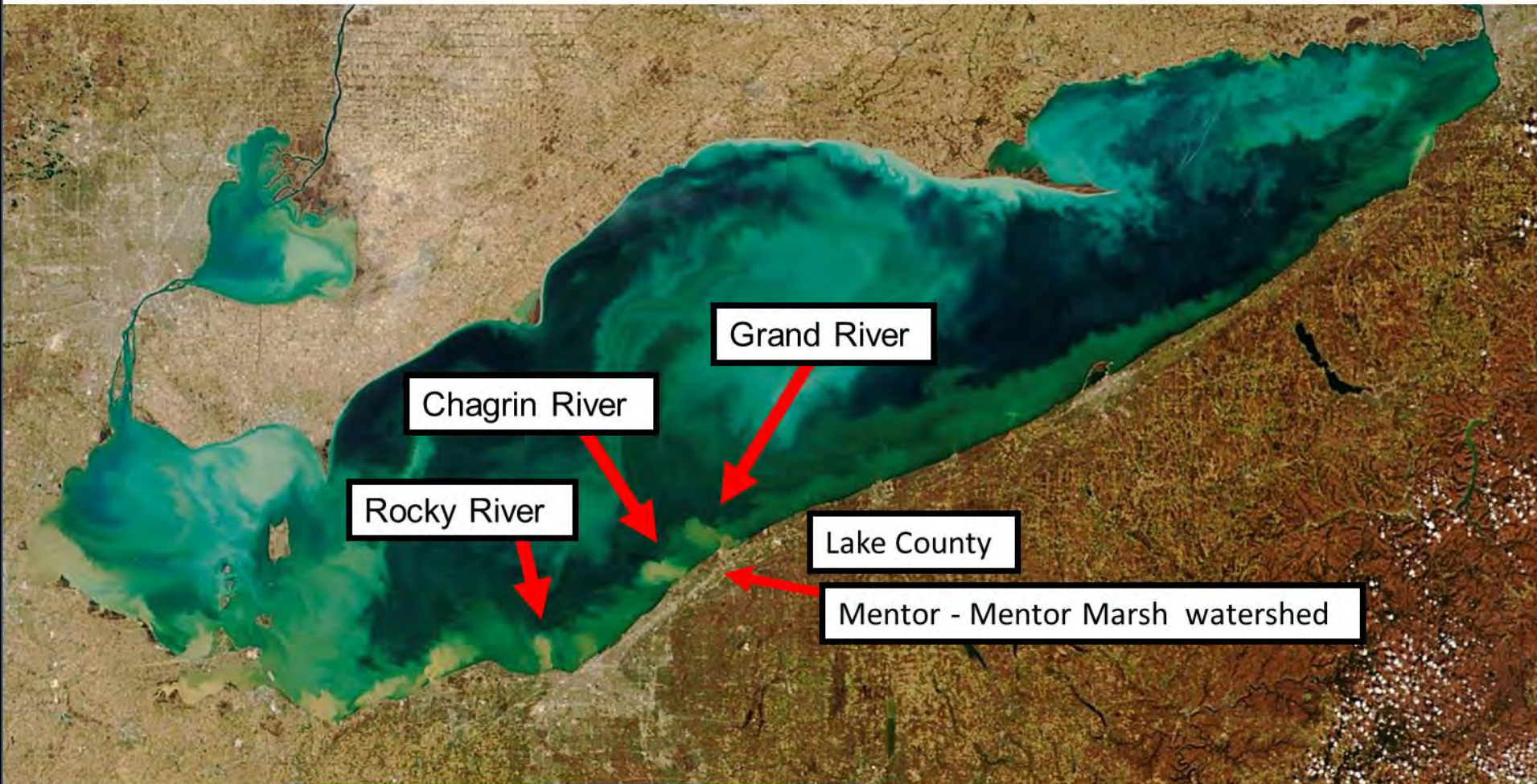
Cuyahoga County

Chagrin River

Cuyahoga River

Rocky River

Algae blooms, sedimentation via rivers, streams, bottom currents
River plumes within Lake and Cuyahoga County clearly visible.



Greater Cleveland - Cuyahoga County

[Source: http://earthobservatory.nasa.gov/IOTD/view.php?id=77506&eocn=image&eoci=related_image](http://earthobservatory.nasa.gov/IOTD/view.php?id=77506&eocn=image&eoci=related_image)

Lake Erie, the shallowest, warmest – and most biologically diverse of the Great Lakes. It is vulnerable to sediment and nutrient loading, and related environmental impacts.



Grand River Sediment Plume

Chagrin River Sediment Plume

Rocky River Sediment Plume

Mentor Marsh watershed

Mentor & Lake County

Greater Cleveland & Cuyahoga County

The Mentor Marsh watershed provides important ecosystem functions such as habitat, trapping sediments & impurities. 90 % of Lake Erie coastal wetlands have disappeared.

PROJECTS, WATERWAYS and WATERSHEDS

Lake Erie

7 Project Sites
\$3.8 M.

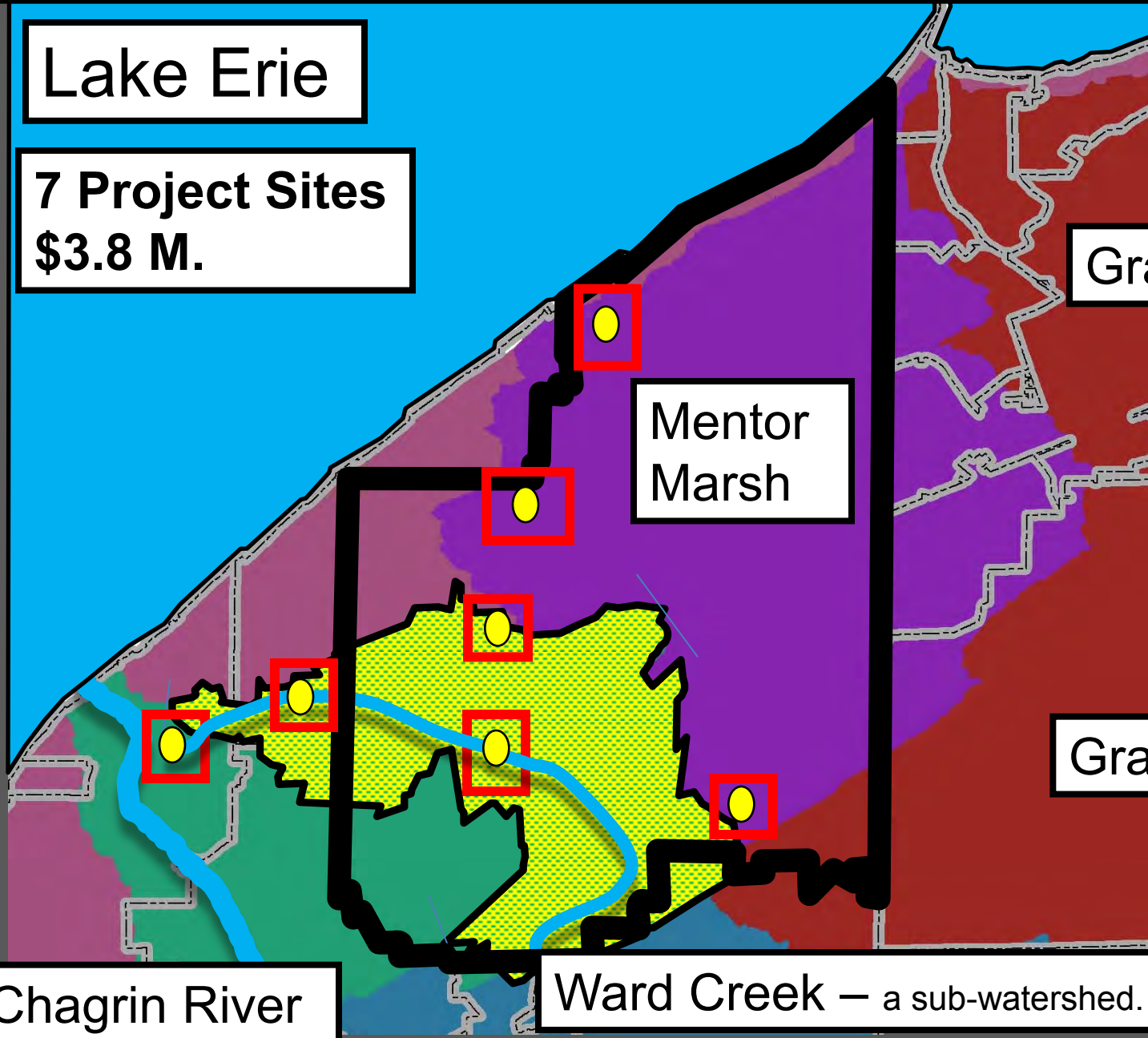
Grand River

Mentor Marsh

Grand River

Chagrin River

Ward Creek — a sub-watershed.



Most of the Mentor city watershed drains into the Mentor Marsh

Mentor Marsh Watershed
28.6 Sq. Mi.

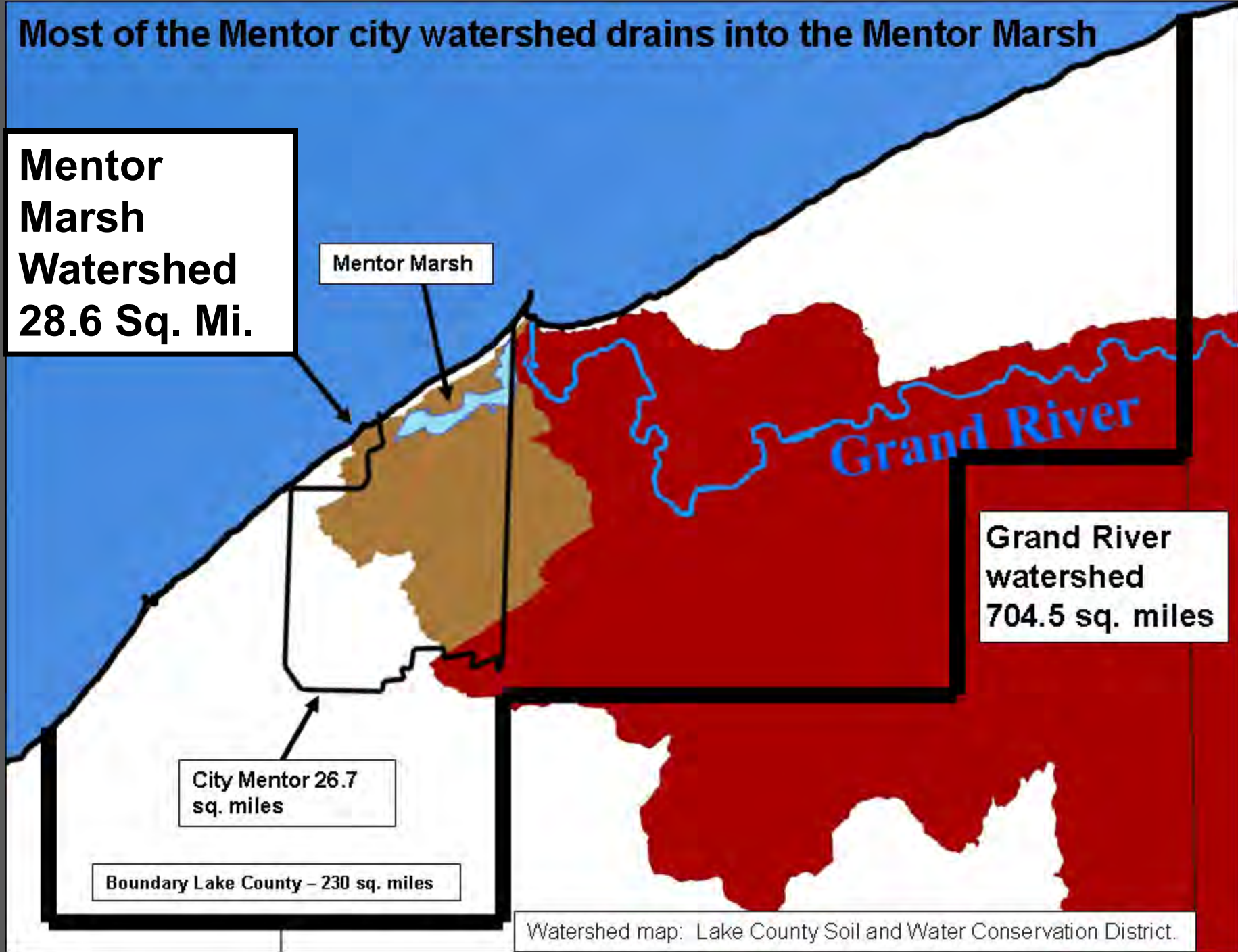
Mentor Marsh

Grand River

Grand River watershed
704.5 sq. miles

City Mentor 26.7 sq. miles

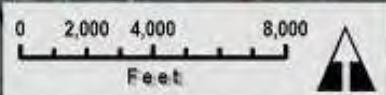
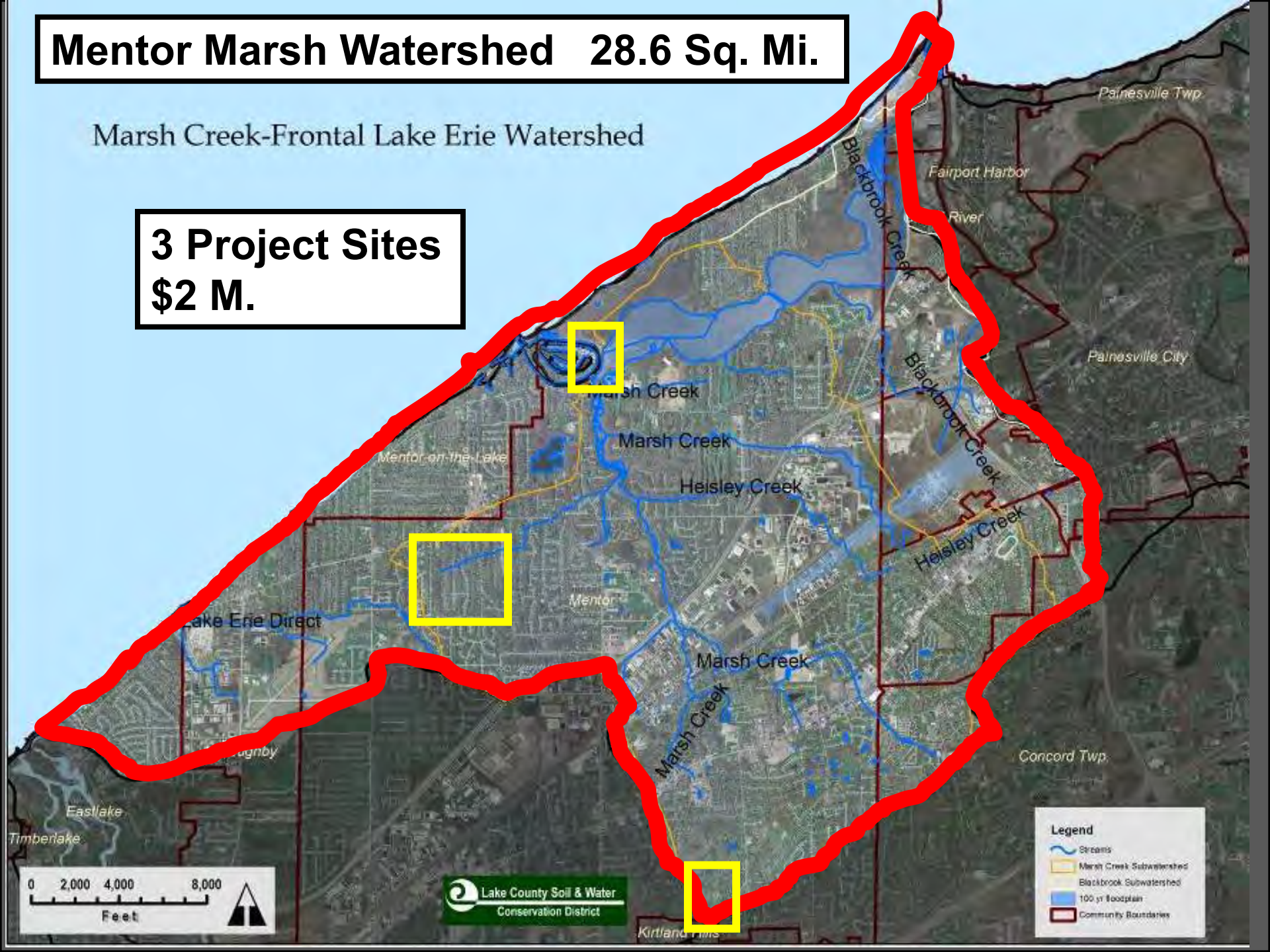
Boundary Lake County - 230 sq. miles



Mentor Marsh Watershed 28.6 Sq. Mi.

Marsh Creek-Frontal Lake Erie Watershed

3 Project Sites
\$2 M.



Legend

- Streams
- Marsh Creek Subwatershed
- Blackbrook Subwatershed
- 100 ft floodplain
- Community Boundaries

Mentor Marsh Ecosystem

Mentor Marsh is a defining feature of a complex ecosystem along five miles of Lake Erie coastline that runs from the Mentor Marina and Nature Preserve (below left) to Headlands State Park and Beach (upper right)



Well maintained waterfront infrastructure and environmental stewardship bring economic vitality based on recreational economy and tourism along Lake Erie's coast.



Lake County's signature natural areas and waterfront amenities: Lake Erie. Grand River. Mentor Harbor and Marinas. Headlands Beach State Park. Mentor Marsh City and State Nature Preserves. Fairport Harbor Beach & Marina. Grand River Marinas.

A woman with her hair in a ponytail, wearing a white t-shirt and blue jeans, is seen from the back, looking through binoculars. She is standing on a wooden walkway overlooking a marsh. The marsh is filled with tall, golden-brown reeds (Phragmites) and green bushes. In the background, there is a line of trees under a clear sky.

Challenges: Habitat degradation. Salinity.

What this visitor is looking at, though perhaps visually appealing, at first glance, is not the natural environment for this ecosystem. The Marsh was overrun by Phragmites – an invasive species, in the late 1960's, due to spikes in water salinity that fundamentally altered this woody marsh environment.

Watershed Challenges: Habitat degradation, Salinity, Fires.



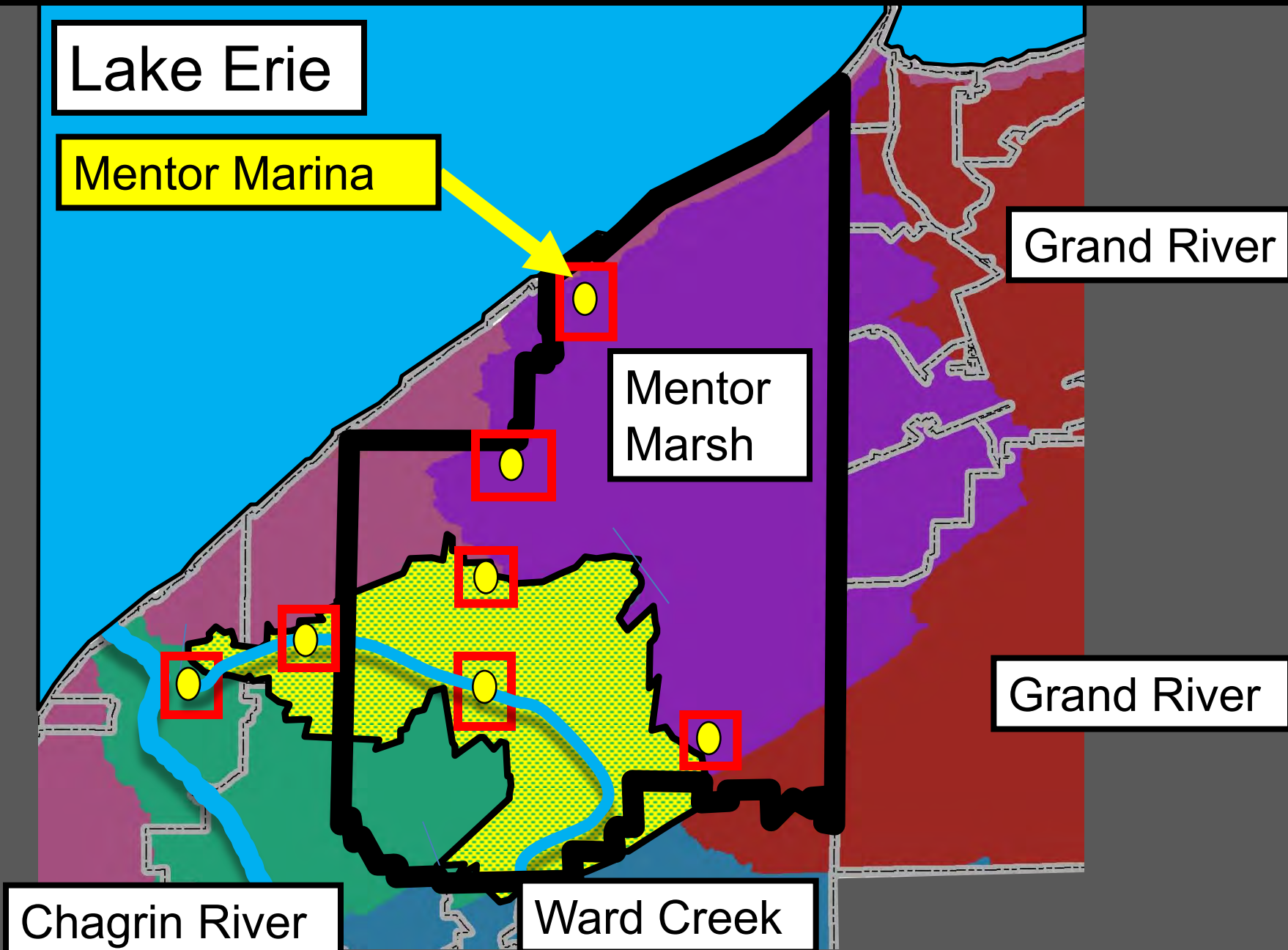
Phragmites are both salt tolerant -- and flammable during part of their annual cycle. There have been 13 Marsh fires – some of them very large, since the late 1970's.



Watershed Challenges: Habitat degradation, Salinity, Fires.

The Marsh fires, in this context, also pose a potential public safety hazard – and an ironic consequence of poor water quality management.

PROJECTS, WATERWAYS and WATERSHEDS



Mentor Marsh – a complex estuary system



**Marina
Lot and
Trailhead**

**MENTOR MARINA Project Cost: \$540,000. US-EPA - GLRI / City Mentor
Permeable Paver System / Bio-Swales. On-site water treatment.
Performance: 790,000 Gals. / yr. Clean water. Lower temperature.**



Work in progress image April, 2016

Significance: Gateway to City Nature Preserve – Education / Outreach.

Reduce site pollution impacts within local compromised ecosystem.

This project is one action step within a larger tapestry of habitat restoration work now underway by a consortium of groups that includes; The Cleveland Museum of Natural History, The Nature Conservancy, Chagrin River Watershed Partners, Lake County Soil and Water Conservation District, U.S. EPA, The City of Mentor.



Mentor Marsh - Western Basin

The Past as Model for Future



Boaters enjoying a day on the Marsh in 1923.

Photo Courtesy City of Mentor Public Information Office.

Potential Future: Active stewardship. Green investments.

Example image of environment stewardship providing good water quality, habitat and recreational benefits.

Get Active

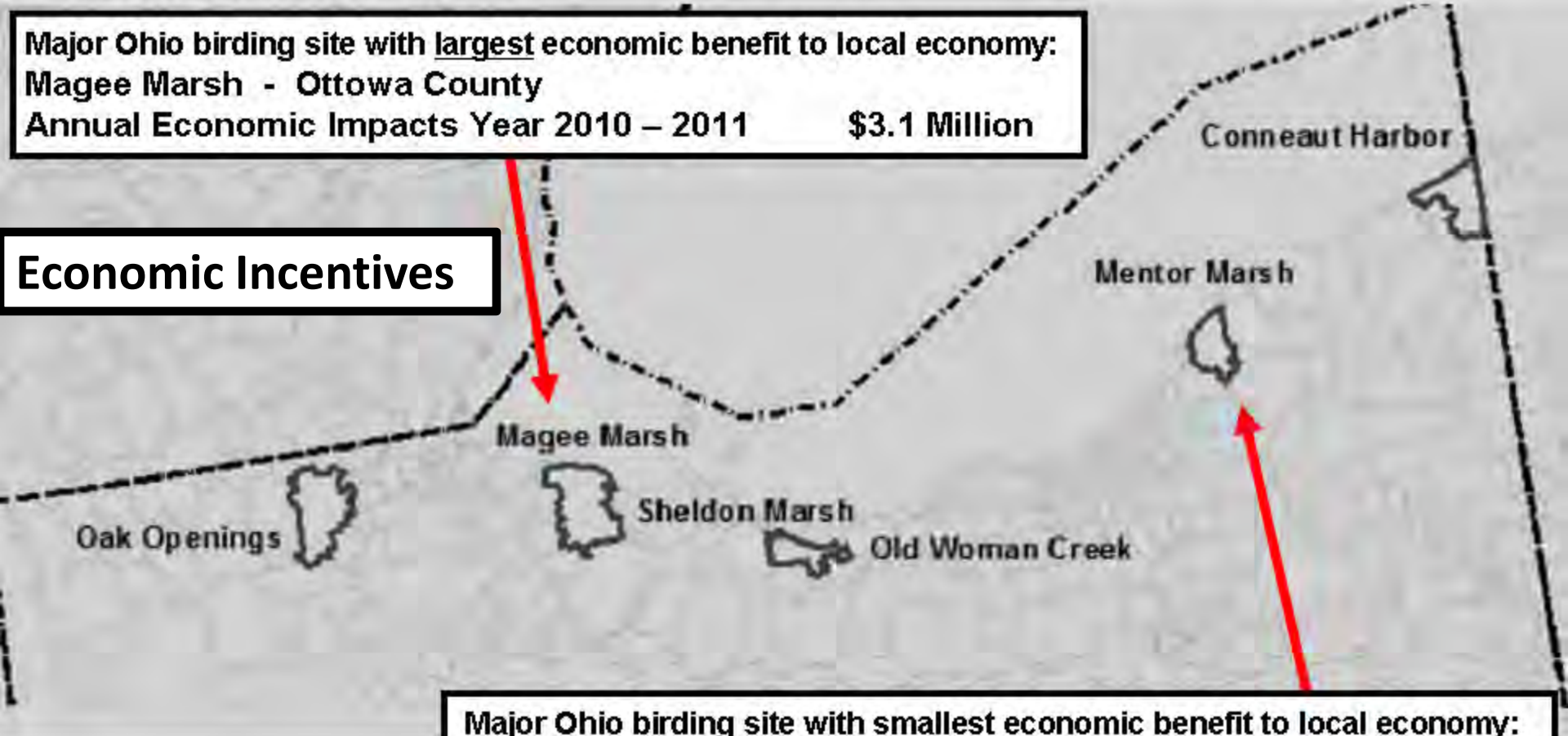
- Paddle
through a land of floating cattail mats and ponds dotted with lily pads. Launch your canoe or kayak at the Marsh Boardwalk. Canoe rentals are available from June through September at the Cattail Café. Prefer a guide? Join our Freighter Canoe Hike, offered daily in July and August.
- Bike
the 4 km Centennial Bike and Hike trail through the lush forest. Start at the Marsh Boardwalk and bike to the Visitor Centre or the Tip. Bike rentals are available at the Cattail Café.
- Hike
one of our eight trails suitable for all abilities. Discover Point Pelee's five unique Carolinian habitats: dry forest, swamp forest, savannah, marsh and beach.

Image source: Pelee Point National Park – Ontario, Canada. Northern shore of Lake Erie.

The benefits of recreational and scenic coastal assets for local economies are increased by improved transportation networks and convenient access

Major Ohio birding site with largest economic benefit to local economy:
Magee Marsh - Ottawa County
Annual Economic Impacts Year 2010 – 2011 \$3.1 Million

Economic Incentives



Major Ohio birding site with smallest economic benefit to local economy:
Mentor Marsh - Lake County
Annual Economic Impacts Year 2010 – 2011 \$58,000

Source:
Study of socio-economic impacts of bird watching at six major birding sites along the Lake Erie coastline.
March 2012 – Ohio State University – Ohio Sea Grant

Is it the Carolina Low Country or *Mentor, Ohio?*

Economic Incentives

Mentor

Life on the Lake

...d be forgiven for mistaking the
and lovely Mentor Marsh for
abled Carolina Low Country.

But these 1,100 acres of wetlands,
scenic trails, boardwalks and
overlooks are located on Ohio's North
Coast. With more than 250 species
recorded, no wonder birders flock
here for the seasonal migrations.

A HAVEN FOR BIRDS AND THOSE THAT ENJOY THEM.

Visit cityofmentor.com/visit/birding,
or call 440-974-5794.

Cleveland Museum of
NATURAL HISTORY



Source: Bird Watcher's Digest March / April 2012. pg. 91.

Mentor Marsh is being marketed in print as a destination for bird watching. The picture above is the Wade-Robin Boardwalk – site of intensive restoration work by CMNH.

This work demonstrated that native seed bank will regenerate when Phragmites are abated.

Is it the Carolina Low Country or *Mentor, Ohio?*

You'd be forgiven for mistaking the
lush and lovely Mentor Marsh for
the fabled Carolina Low Country.

Mentor

Life on the Lake

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Cleveland Museum of
NATURAL HISTORY



Northeast Ohio's



Birding Mecca

Lake County has long
been a major destination
for birds and birders alike.
Over 330 bird species
have been reported from
the county, and
approximately 250 of
those, many using the
Migratory Flyway
migration route, stop to rest
and feed on the Lake Erie
shore and penlands of
Lake County, Ohio. During
spring and fall migration
periods, observers can find
as many as 20 species of
colorful Neotropical
warbler species nesting
the Lake County shore. More
birds such as Purple
Sandpiper, Longspurred
Owl, Le Conte's and
Nelson's sparrows are
regular visitors to the
county. Join the birders'
brigade, some
travelling up to 400
miles, to Lake County,
Ohio, Lake Erie and
Coastal Getzway Ohio.

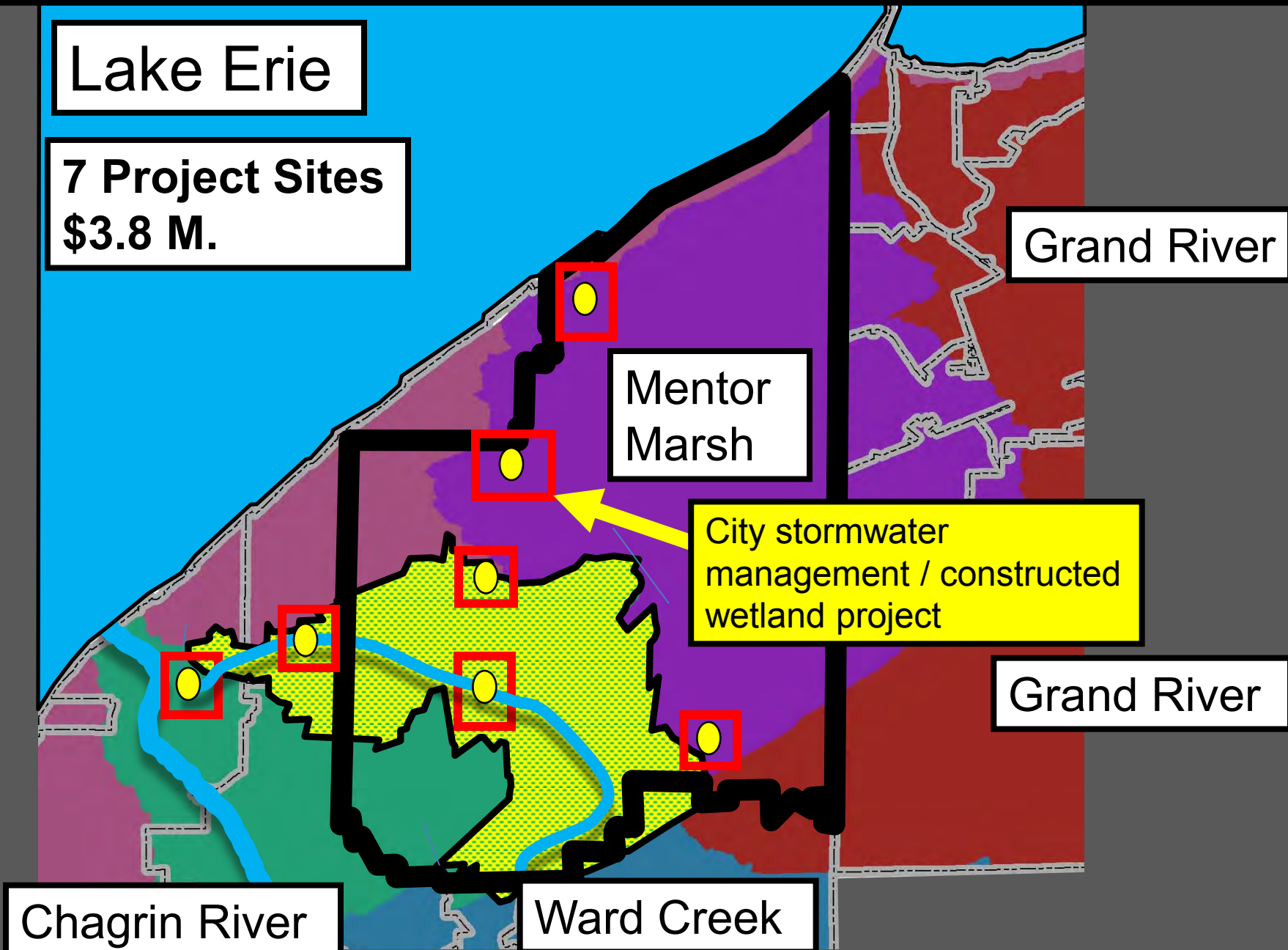


lakevisit.com
800-368-LAKE



www.lakevisit.com | Twitter @LakeCountyOH | Facebook Lake County Ohio Welcome Bureau

PROJECTS, WATERWAYS and WATERSHEDS



DALE R. RICE DETENTION BASIN

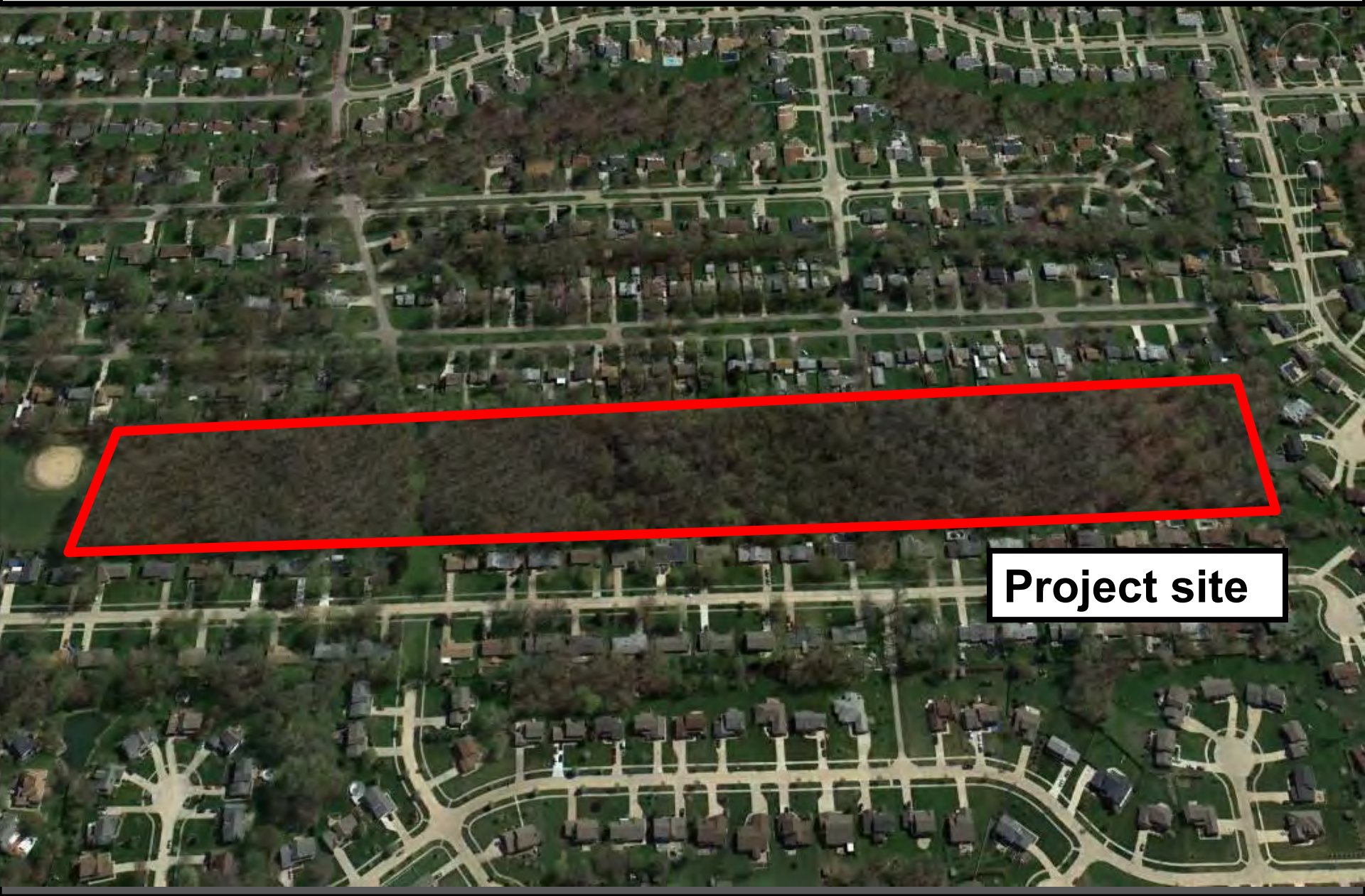
Lakeshore Blvd.

St. James Dr.



Neighborhood-scale watershed improvement projects.

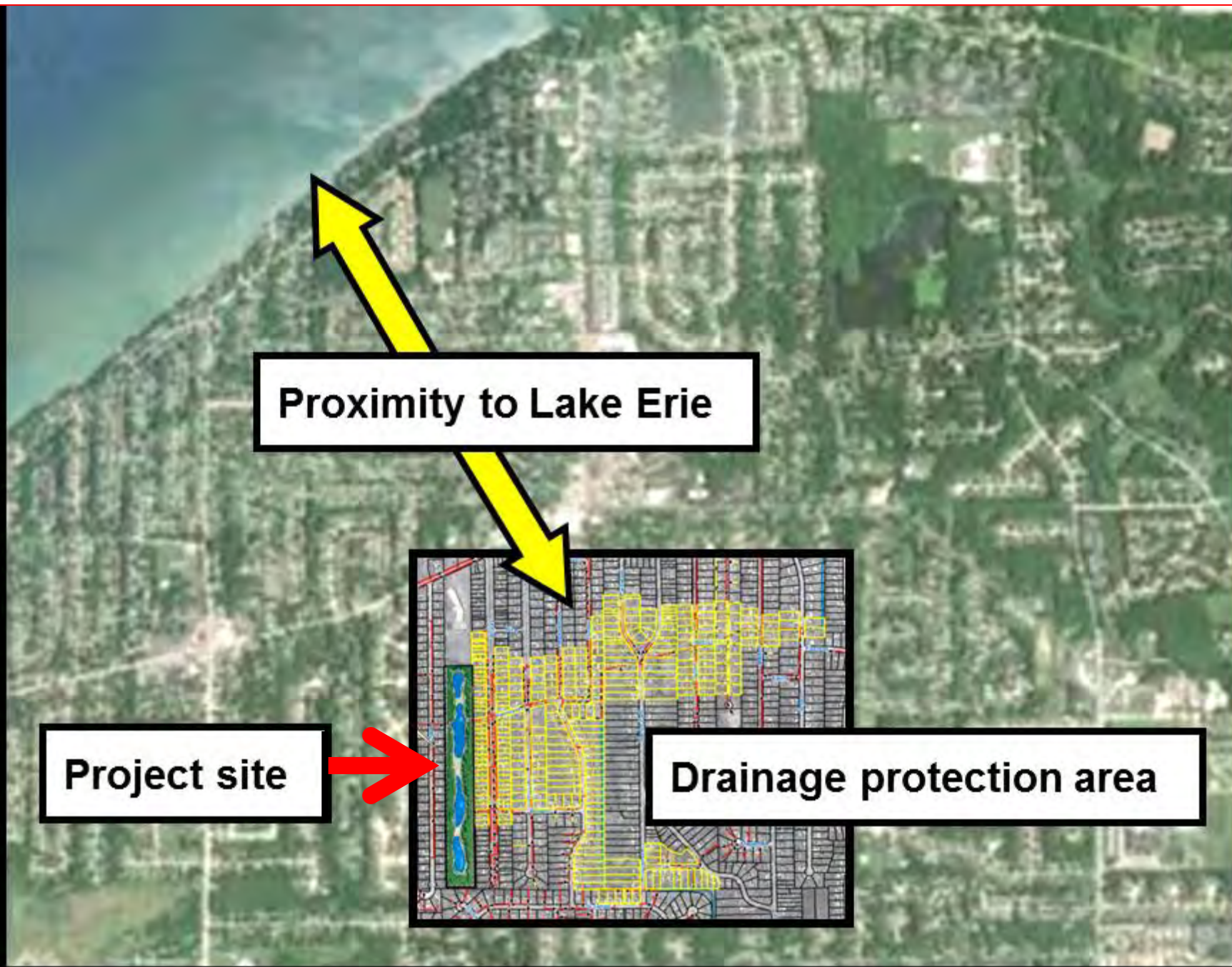
Rice Constructed Wetland Project – will improve stormwater management.



Project site

**Project will address persistent flooding in 125 acre residential area.
Support access to emergency services during flood events.
Reduce sanitary backflows, improve water quality drainage to Lake Erie.
Cost: \$1.2 million. \$350,000 grant funded – State of Ohio.**



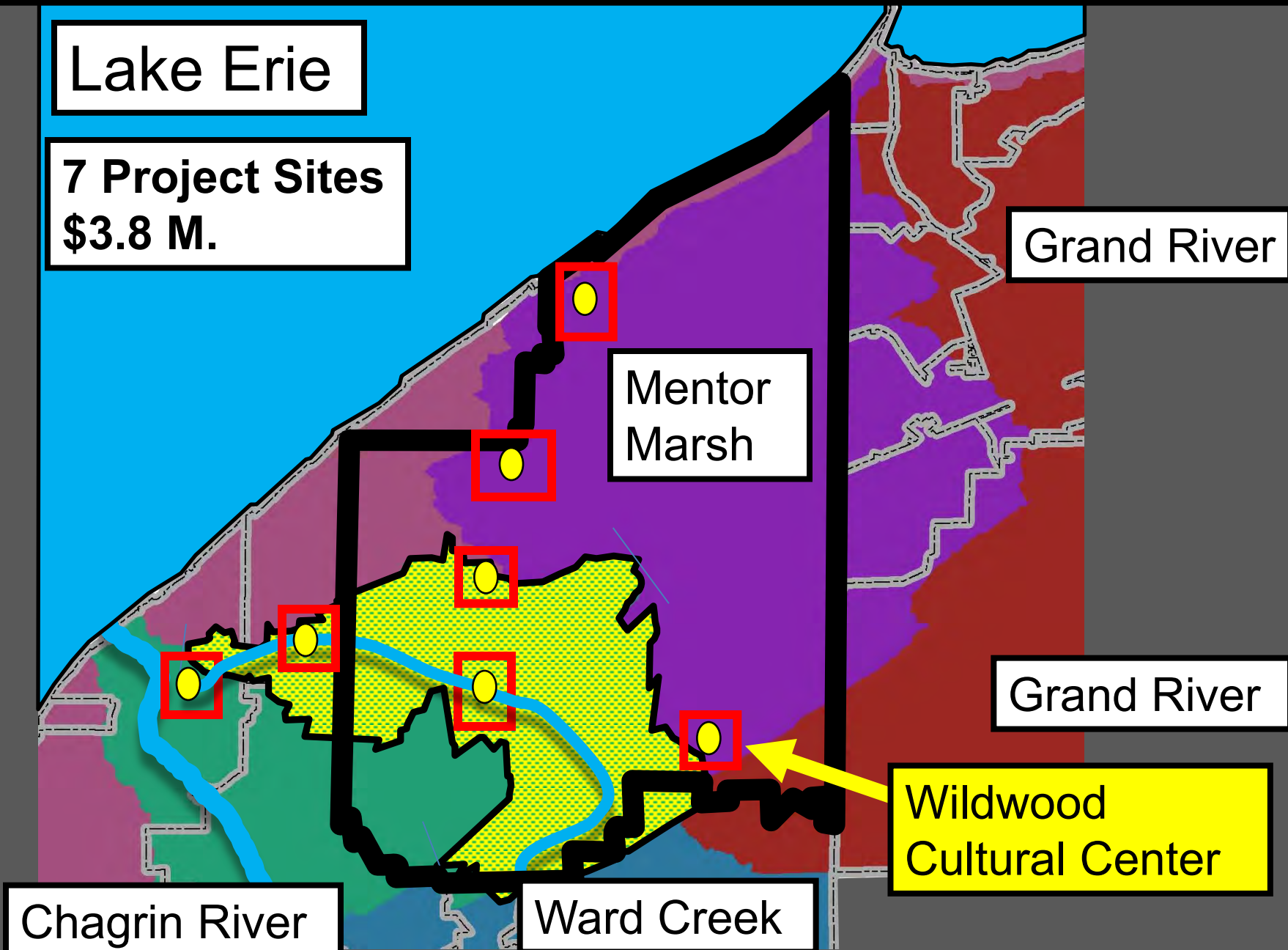


Proximity to Lake Erie

Project site

Drainage protection area

PROJECTS, WATERWAYS and WATERSHEDS



**At the headwaters of the Mentor Marsh Watershed:
Wildwood Cultural Arts Center – Permeable Paver Parking Lot
\$120,000 – ODNR – Surface Water Improvement Fund (SWIF).**



Before image

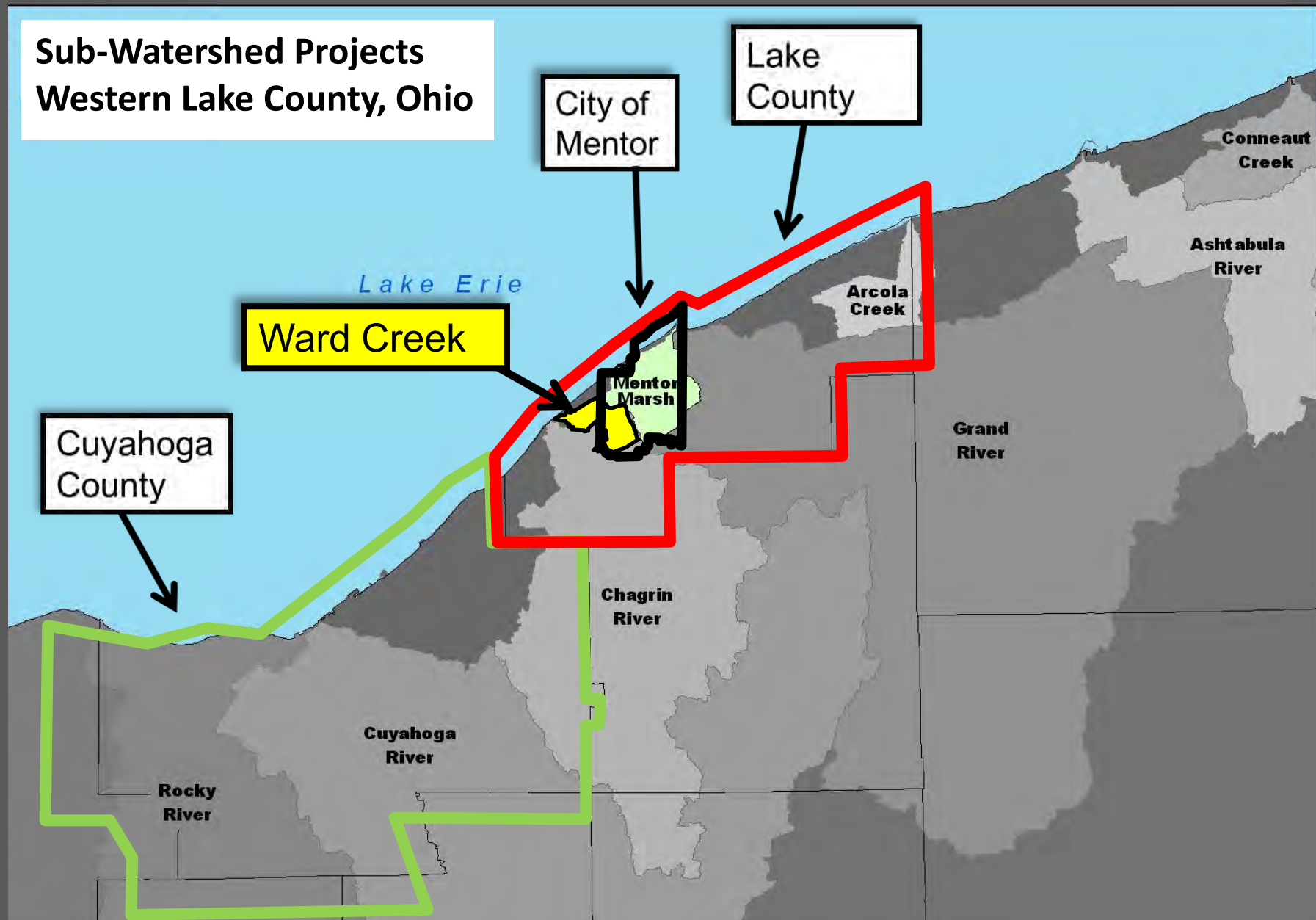


Mentor Marsh Watershed - Wildwood Cultural Arts Center

Permeable paver system / parking lot upgrades. New bioretention basins added to work in tandem with paver system. \$120,000 grant – ODNR Surface Waters Improvement Fund.

- Project significance: Wildwood Center facility is located within actively used 35-acre park site.
- Educational / promotional benefit. Center is programmed year-round with indoor / outdoor activities, including classes, facility rentals, events, and urban gardening program adjacent to lot.
- Project serves stormwater management on site and will have visual appeal.

**Sub-Watershed Projects
Western Lake County, Ohio**



The Ward Creek sub-watershed was the focus of a GLRI (Great Lakes Restoration Initiative) project that targeted several sites within separate jurisdictions.

PROJECTS, WATERWAYS and WATERSHEDS

Lake Erie

7 Project Sites
\$3.8 M.

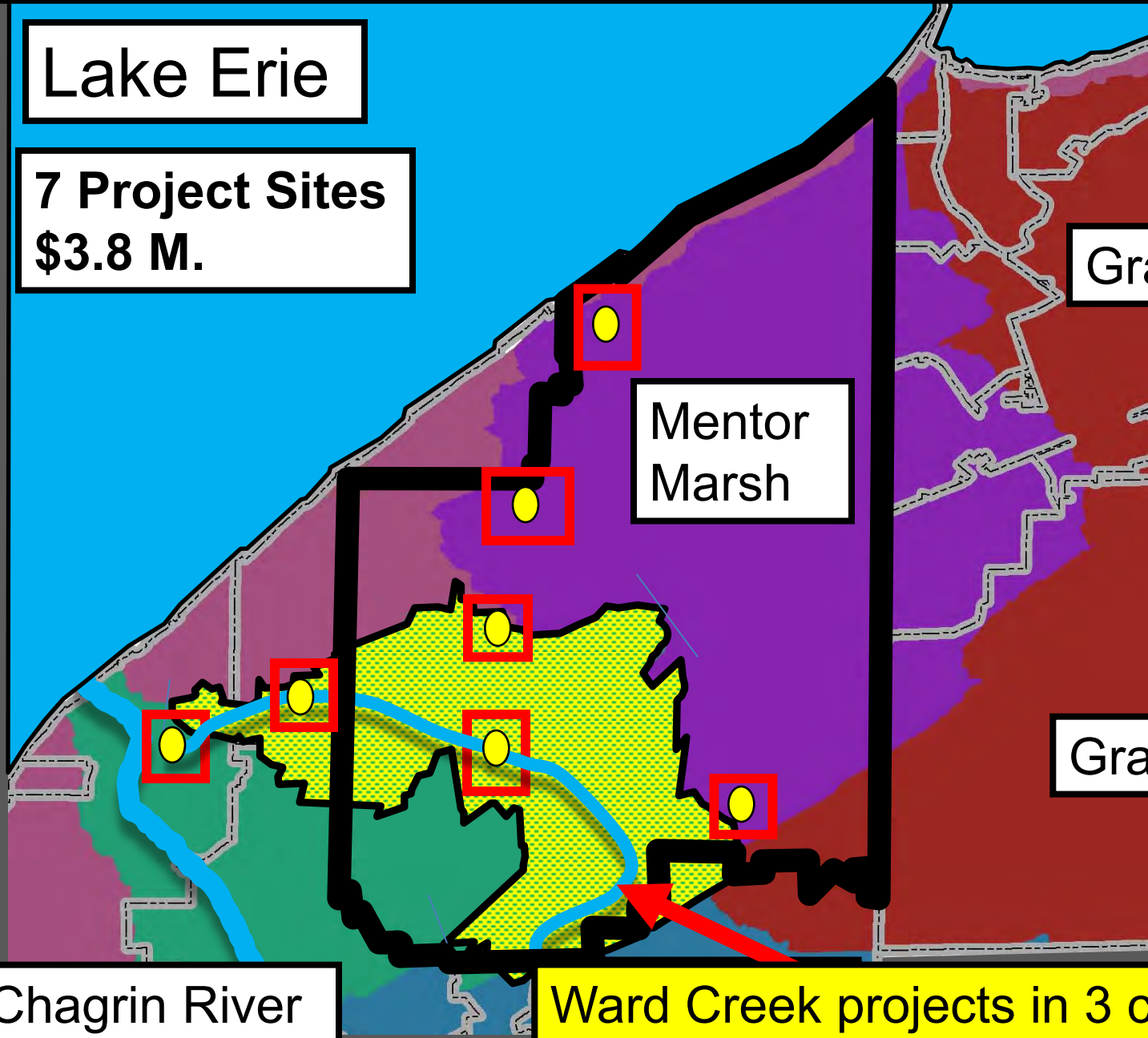
Grand River

Mentor
Marsh

Grand River

Chagrin River

Ward Creek projects in 3 cities



Lake
Erie

US EPA – Great Lakes Restoration Initiative - 2012-2015.

Ward Creek Project Target Sites Total Project: \$770,000.

Willoughby Site

Eastlake
Site

Mentor –
Willoughby
Boundary

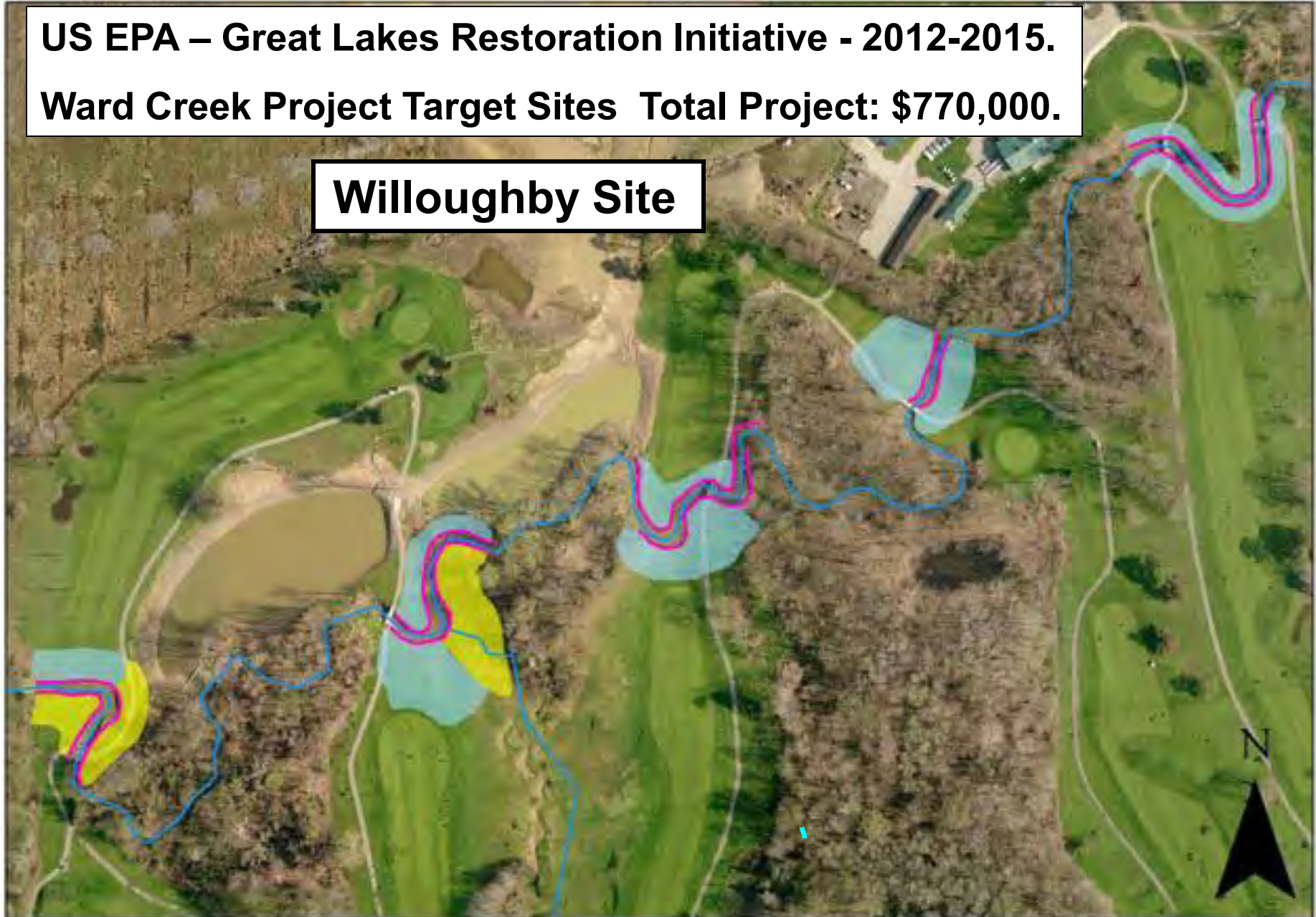
Mentor Site



US EPA – Great Lakes Restoration Initiative - 2012-2015.

Ward Creek Project Target Sites Total Project: \$770,000.

Willoughby Site



Example Willoughby Site



Before image. Goal was re-establishment of riparian streambank environment, with multiple benefits: Visual appeal, erosion control and reduction of sediment load, improvement in water quality.

Lake Erie

**US EPA – Great Lakes Restoration Initiative - 2012-2015.
Ward Creek Project Target Sites Total Project: \$770,000.**



Willoughby Site

Eastlake Site

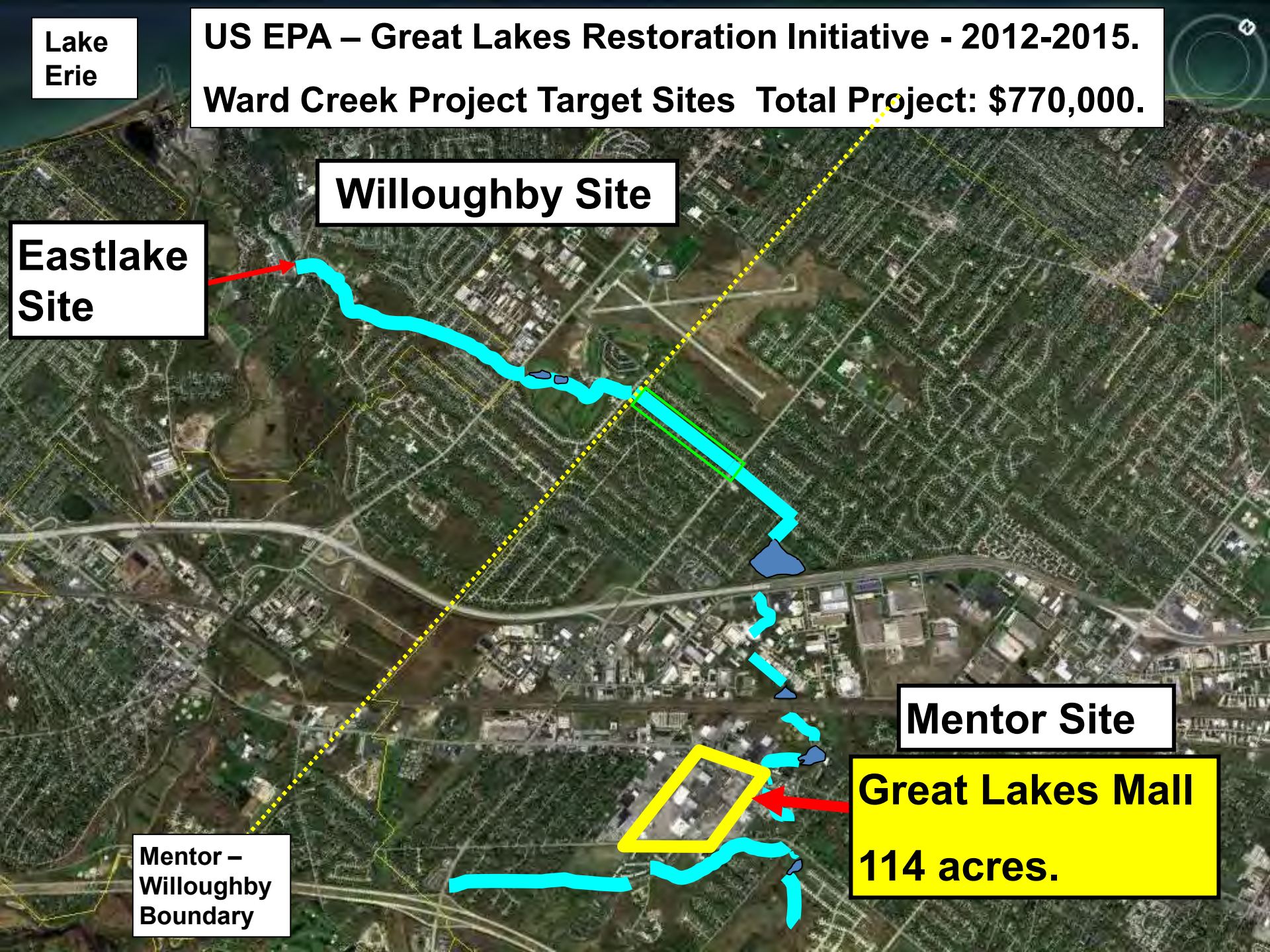


Mentor Site

**Great Lakes Mall
114 acres.**



**Mentor –
Willoughby
Boundary**





Ward Creek

**Garfield Park:
75 acres.**

**President
James A.
Garfield Home
National Park
Service site**

**Great Lakes Mall:
114 acres.**

Challenge and opportunity:

Water flowing from the Mall, a 114-acre site of largely impervious rooftops and asphalt lots, gathers and drains water into one pipe at point just upstream from City park. Park facility experienced periodic flooding and damage from peak stormwater flows. Park pond also silting up, requiring dredging.

Project proposal was to retrofit portions of Mall site to infiltrate stormwater runoff from a 2-year, 24-hour storm event. This would reduce stormwater volume and treat nutrients, sediment and temperature in urban runoff – which supports the goal of improving water quality flowing into Lake Erie.



Great Lakes Mall in 1962.

Challenge and Opportunity: Great Lakes Mall

One of NE Ohio's first shopping malls in a suburban / exurban setting.

114-acre site comprises 7% of Ward Creek watershed, and is largely impervious (asphalt parking lots and rooftops). The old on-site stormwater system, built before establishment of the City of Mentor, promotes non-point source pollution.



View above – Parking lot and entry to Mall food court – the most actively used parking area of shopping center. The Great Lake Mall receives six million visitors annually.

Challenge and Opportunity: Project was atypical use of GLRI funds for private property client.

City and County had few compliance mechanisms to require stormwater management improvements.

Site owners were under no mandate to improve on-site stormwater management. Retail tenant lease agreements required that project had to be accomplished with no net loss of parking spots.

\$350,000 US EPA GLRI grant offered incentive to create on-site infiltration of stormwater management through, 'green' infrastructure. The project ultimately meshed with owners desire to add lifestyle center qualities and visual appeal to Mall through outdoor shopping / dining opportunities.

Project Plan: Capture significant amount of rooftop water.

Permeable paver / infiltration chamber system. Green trenches / trees. No loss of parking spaces.

Soil tests showed that site has remarkable water infiltration rates - paved over by acres of asphalt.



Project Partners:

- Simon Property Group
- Glimcher Group
- GLM Management



Stormwater Drainage and Project Construction Areas

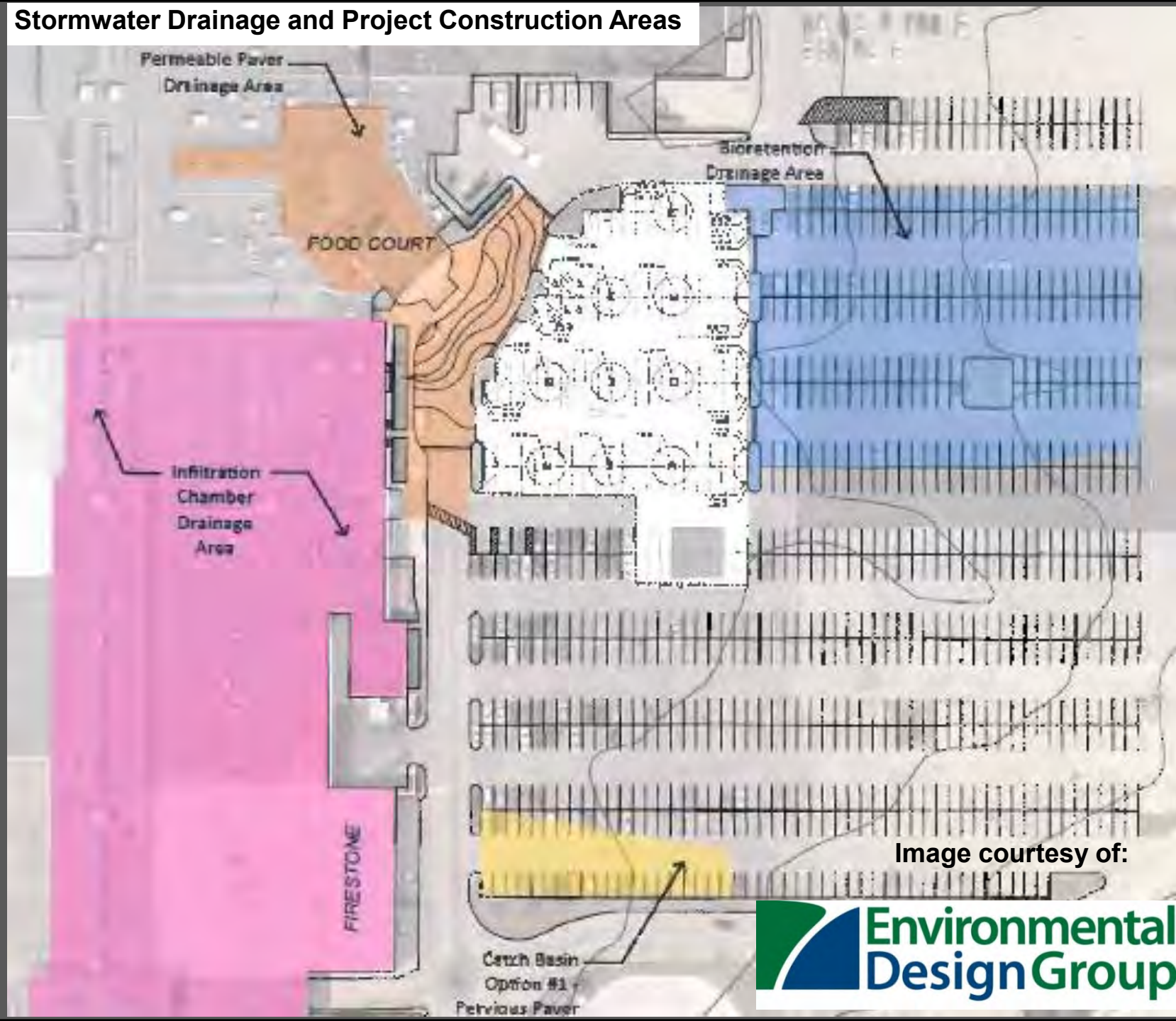


Image courtesy of:



Project details:



Permeable paver surface

Methods used:

New drainage system with 'green' trenches and small drainage islands with trees and suitable soil and plantings.

Rooftop water directed into permeable paver area and infiltration chambers below ground.

Improved drainage system in lot

Infiltration chambers underground



Images courtesy of:



Project Significance:
Public-private partnership. Owners are REIT with similar commercial properties.

Mentor

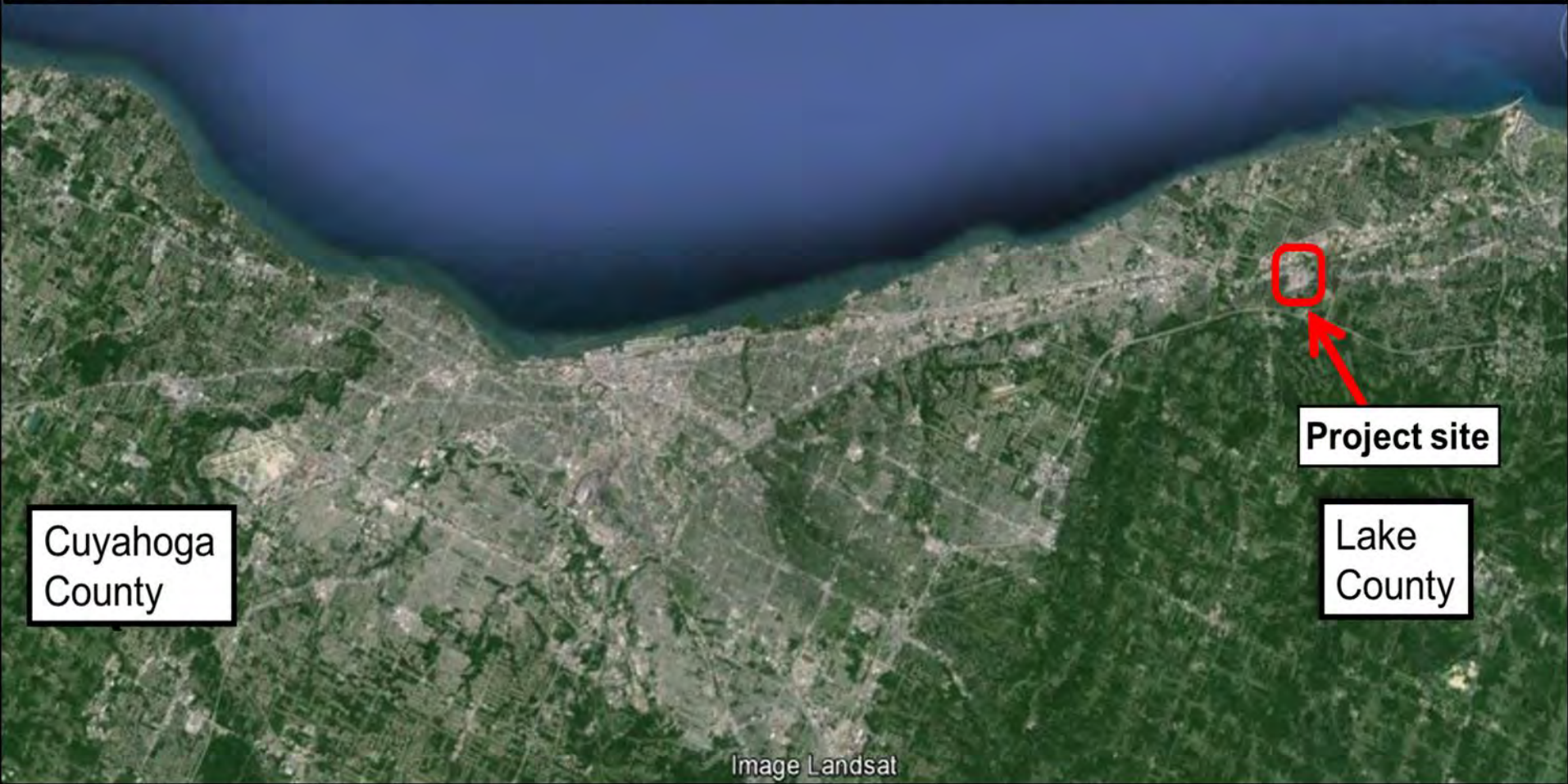
Project site

Lake County



Project Significance: Potential for replication.

Glacial deposits of sand and gravel are common in NE Ohio coastal communities. First settlement patterns and early commercial roads followed old beach ridges.



Other sites in NE Ohio have similar characteristics. Altogether, these hold potential for stormwater management and water quality retrofits on commercial properties.

Sub-Watershed Projects Western Lake County, Ohio

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