How Habitat Restoration on Belle Isle Can Help Mitigate Climate Change

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Friends of the Detroit River

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Scientists have predicted warmer, wetter, and wilder weather is coming, and this will be one of the greatest environmental challenges of the 21st Century.
photo credit: Michigan Sea Grant

How Climate Change is affecting our Great Lakes Shoreline

Coastal Flooding

Flooding on Belle Isle

How Climate Change is affecting our Great Lakes Shoreline

Coastal Flooding

Historic flooding in Detroit - 2019

How Climate Change is affecting our Great Lakes Shoreline

Coastal Flooding

Flooding in Elizabeth Park

How Climate Change is affecting our Great Lakes Shoreline

Erosion

Loomis Street Boat Launch in Ludington, MI

How Climate Change is affecting our Great Lakes Shoreline

Property Damage

Erosion claims beach house in Montague, Mi.

photo credit: Cory Morse | The Grand Rapids Press via AP

Wetlands Functions and Values

A vernal pool along the edge of the wet-mesic flatwoods forest, near Lake Okonoka, on Belle Isle.

Wetlands Functions and Values

On the Detroit River, wetlands provide fish with a unique and increasingly sparse spawning and nursery habitat.

drone footage credit: Keith Childress, Great Lakes Aggregates, LLC

Wetlands Functions and Values

Bald Eagles are now nesting at numerous location along the Detroit River including Belle Isle.

Wetlands Functions and Values

Rock bass, large mouth bass, yellow perch, northern pike and musky are becoming plentiful along the south shore of Belle Isle.

Wetlands Functions and Values

Lake Sturgeon are spawning in the new reefs off Belle Isle.

Wetlands Functions and Values

State threatened Easter Fox Snakes lounge in the newly restored habitat area at the Blue Heron Lagoon.

Value Provided by Coastal Wetlands

A Spotted Gar was observed in Lake Okonoka on Belle Isle – July 2019.

Wetlands Functions and Values

Beaver pelts – European settlers first economy

Detroit River International Wildlife Refuge Gateway - green infrastructure / eco tourism

Ship building - Detroit River

Modern steel making – both rivers

First Bessemer steel mill – Wyandotte

Machine shops

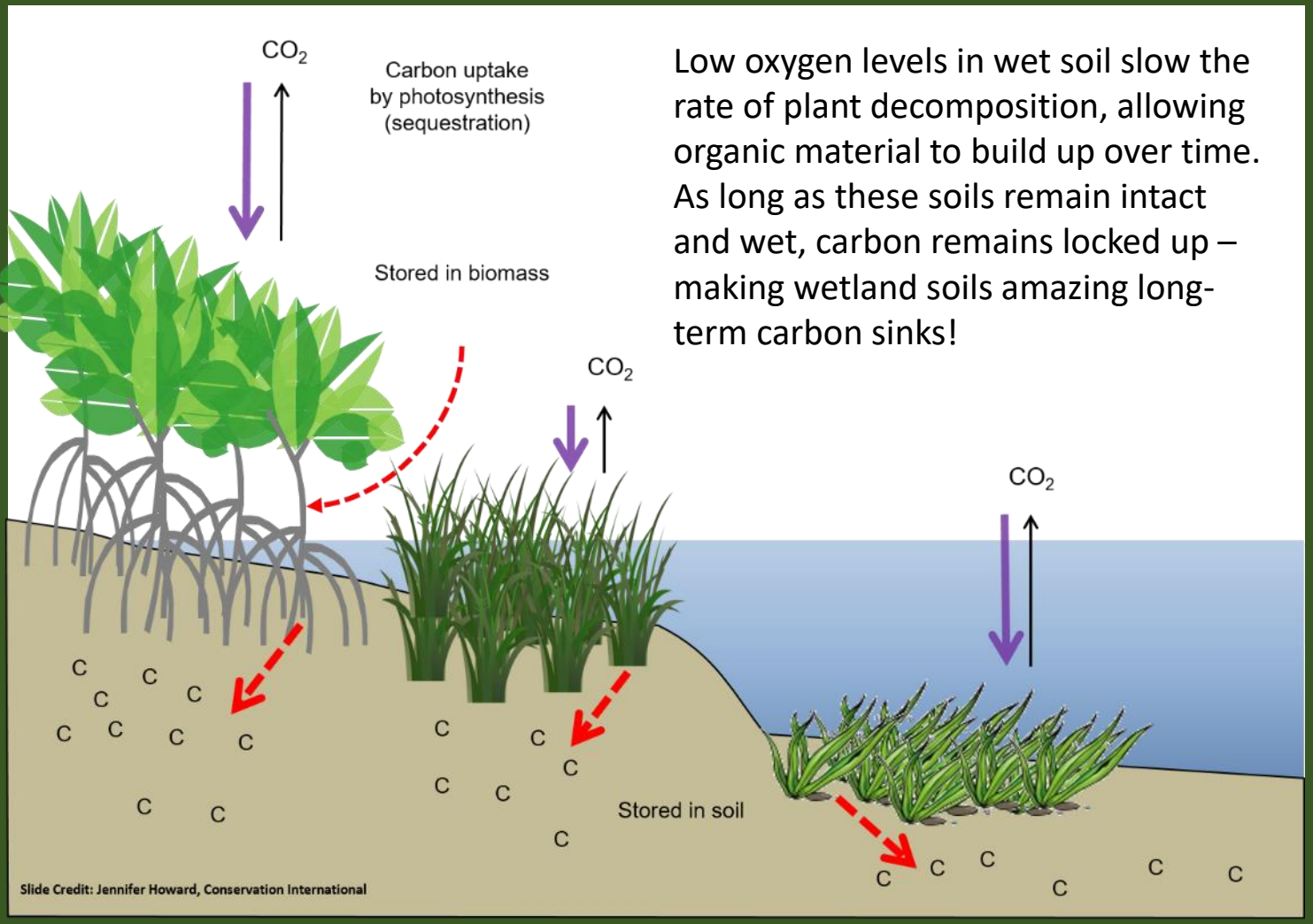
Automobile manufacturing – Rouge Plant

Michigan's Transitioning Economy always revolved around the Great Lakes.

Value Provided by Coastal Wetlands

Fishing tournaments along with the river's reputation for "good fishing" bring thousands of visitor to the Detroit Metro area every year.

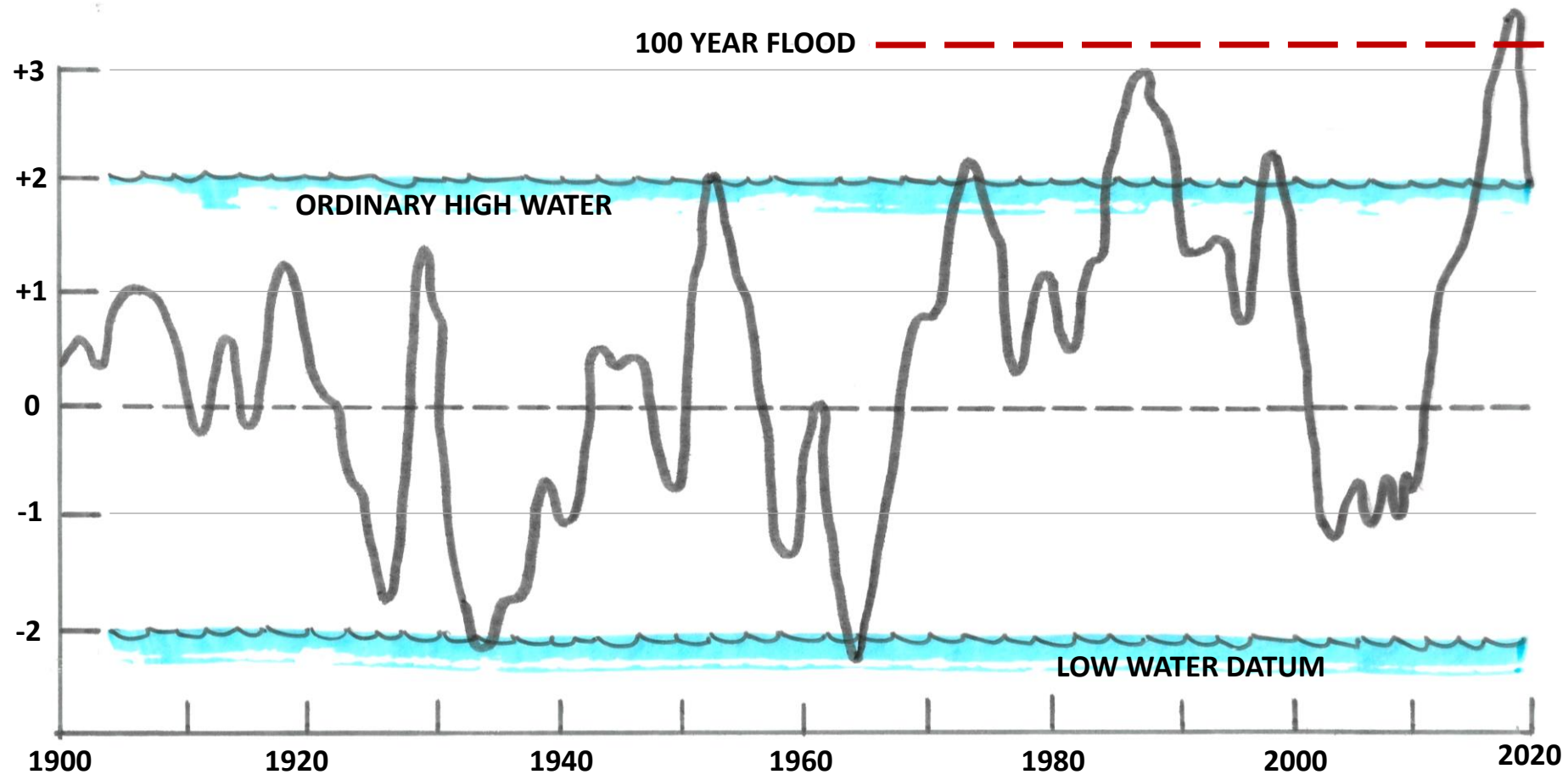
Wetlands Functions and Values



Low oxygen levels in wet soil slow the rate of plant decomposition, allowing organic material to build up over time. As long as these soils remain intact and wet, carbon remains locked up – making wetland soils amazing long-term carbon sinks!

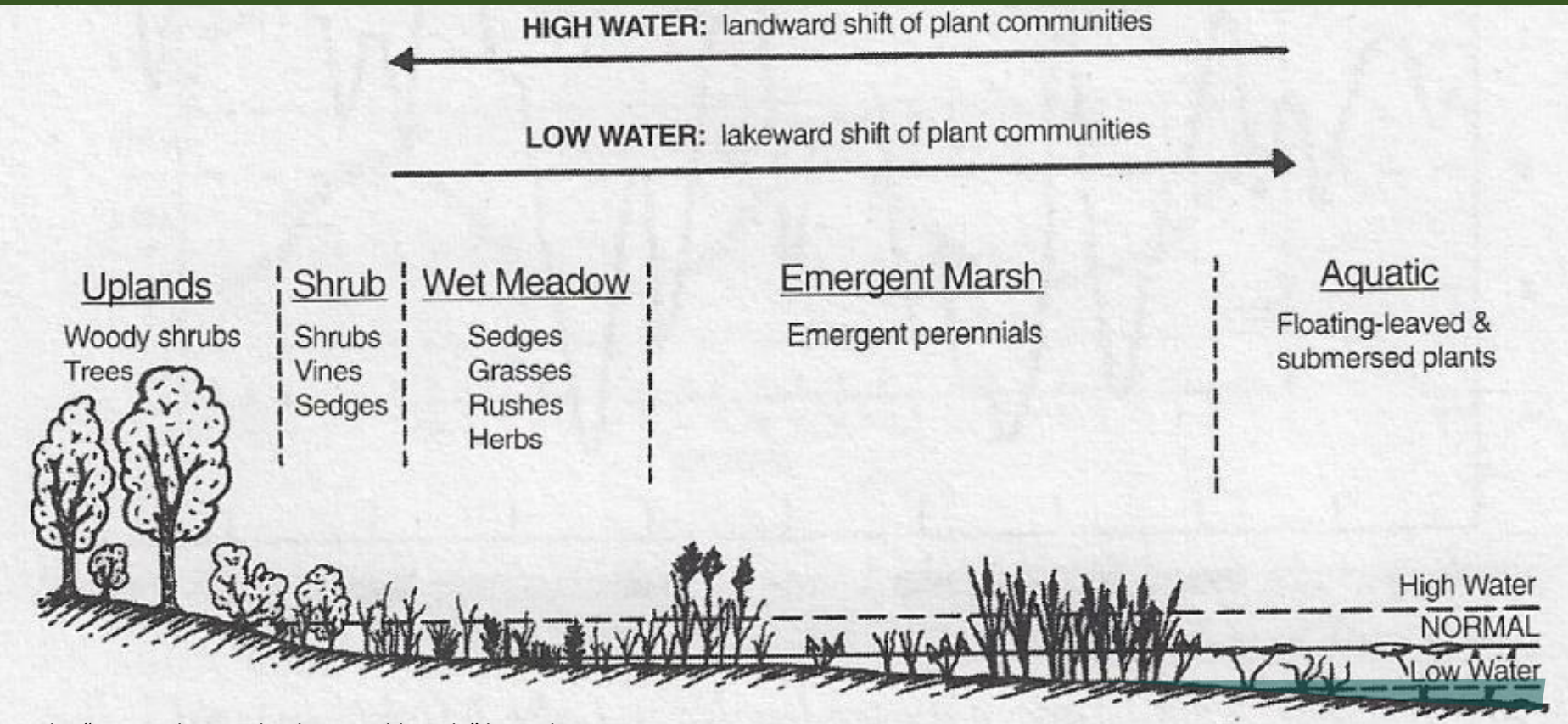
Coastal wetlands mitigate climate change by sequestering carbon and preventing its release into the atmosphere – a primary cause of climate change. Once absorbed, wetlands can store carbon in soils for centuries.

Water Level Fluctuations in the Great Lakes



Changes in Great Lakes water levels over prolonged periods of time is a natural occurrence with no apparent pattern.

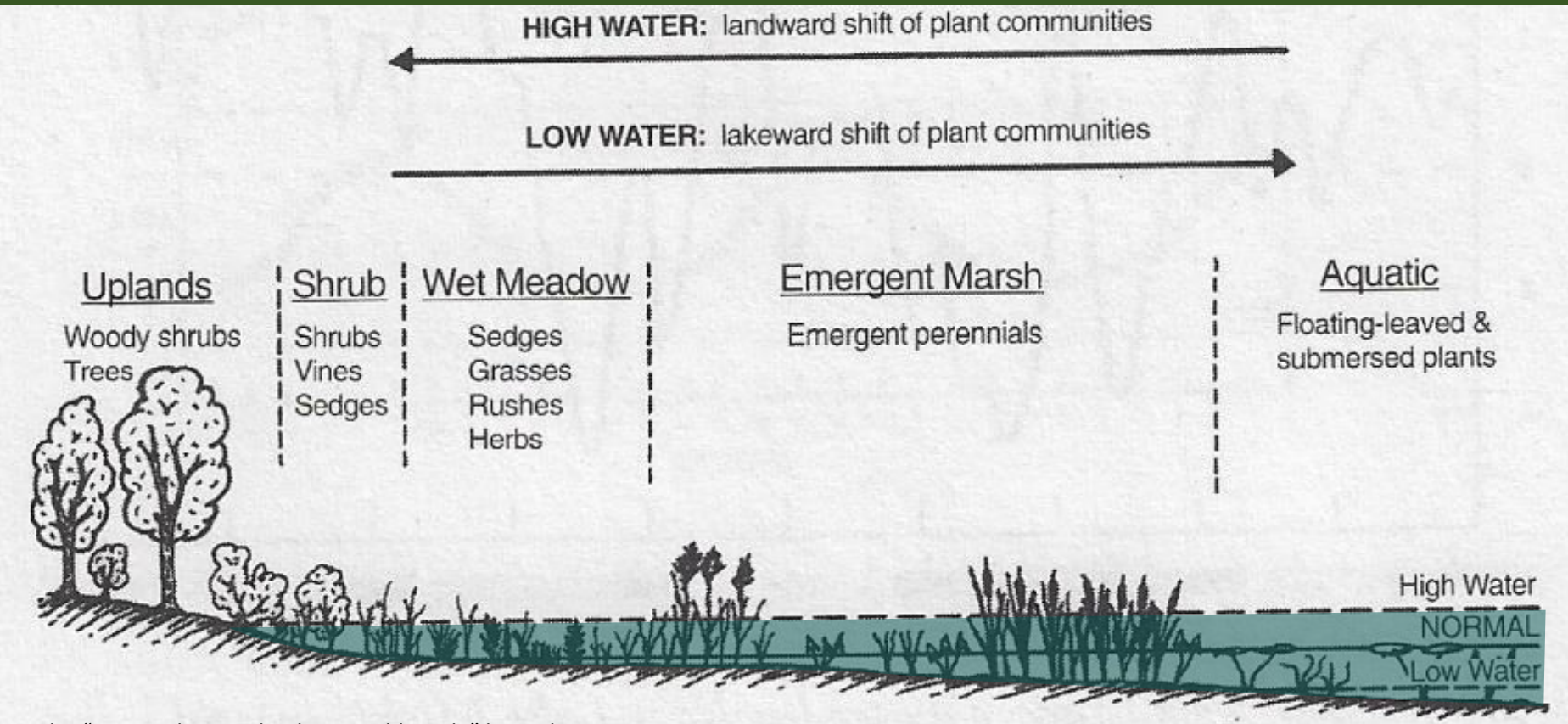
Water Level Fluctuations in the Great Lakes



Credit: "Great Lakes Wetlands – A Field Guide" by Walter J. Hoagman

Periodic change in water levels enhance the vitality of coastal wetlands. High water kills shrubs and causes vegetation to move inland. Low water allows shrubs to spread lakeward.

Water Level Fluctuations in the Great Lakes



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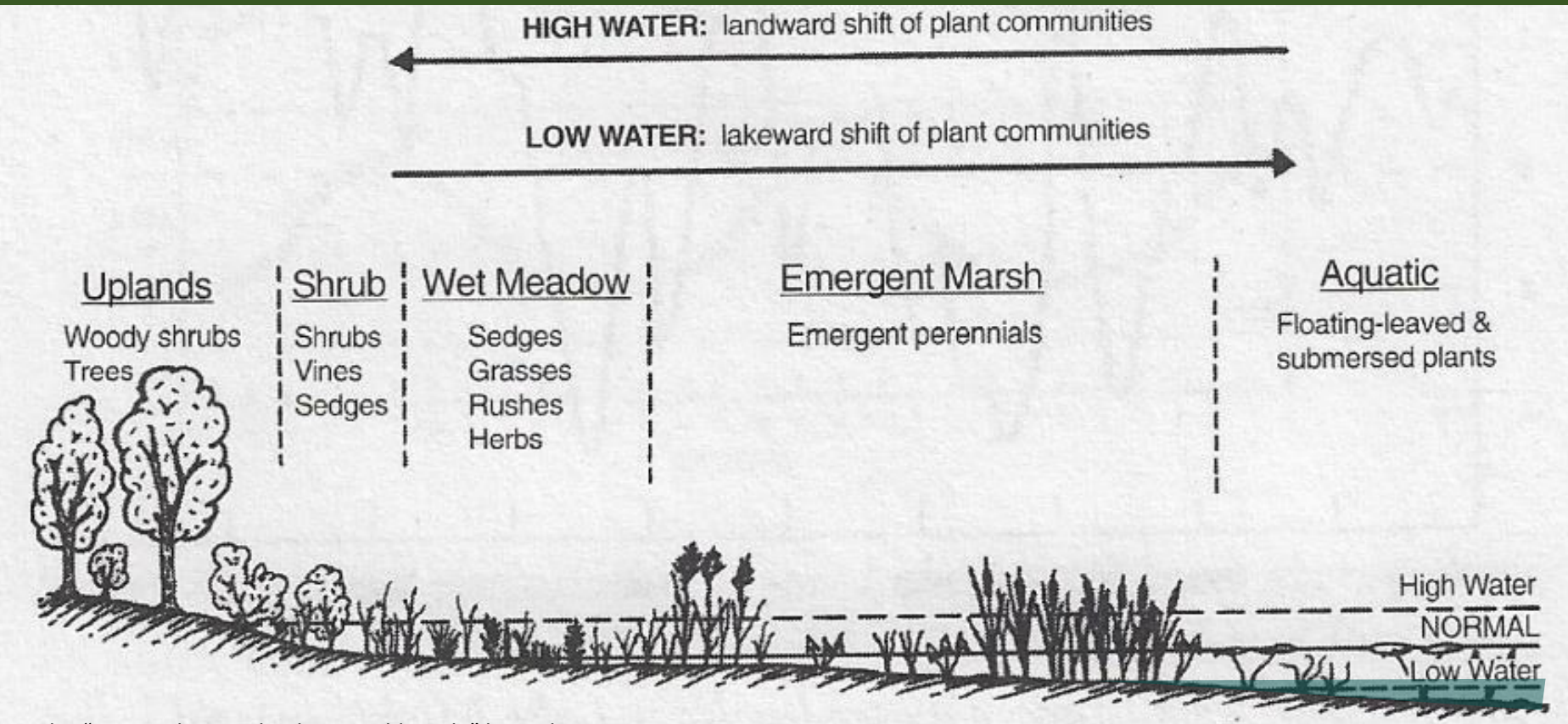

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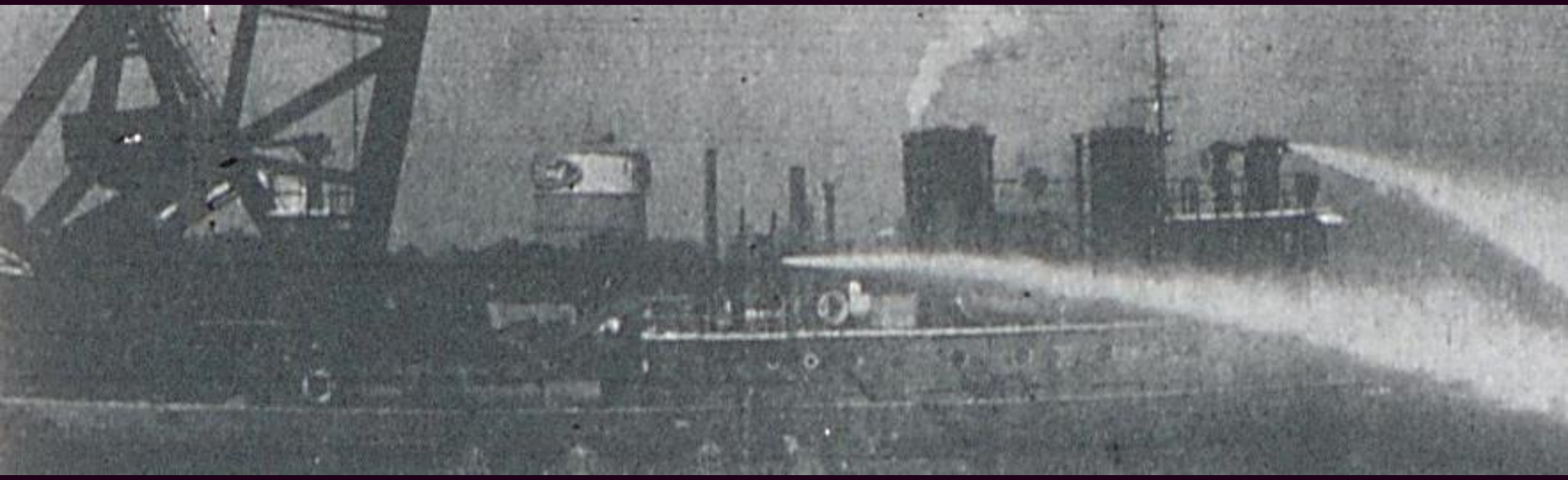
Coastal Wetland Decline in the Detroit River

Coastal wetlands have significantly diminished due to urbanization and shoreline hardening.

Coastal Wetland Decline in the Detroit River

The Industrial Revolution brought prosperity and channelization of the Detroit River – Livingston Channel.

Coastal Wetland Decline in the Detroit River



And Industrial Pollution…

Coastal Wetland Decline in the Detroit River

Combined Sewer Overflow

More than 25% of this region has combined sewers.

“The beach is perfectly safe for children. Although the water is somewhat polluted due to the beach being below city sewers, nothing is to be feared unless the water is swallowed”

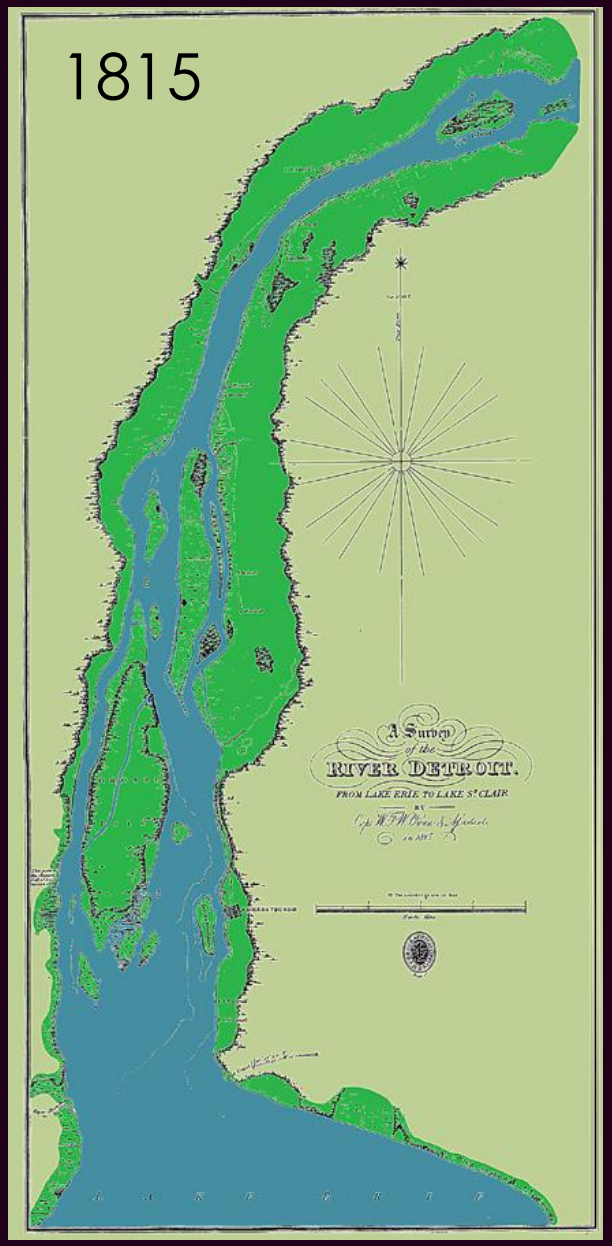
– Dr. Fred Adams, Medical Officer of Health, 1923

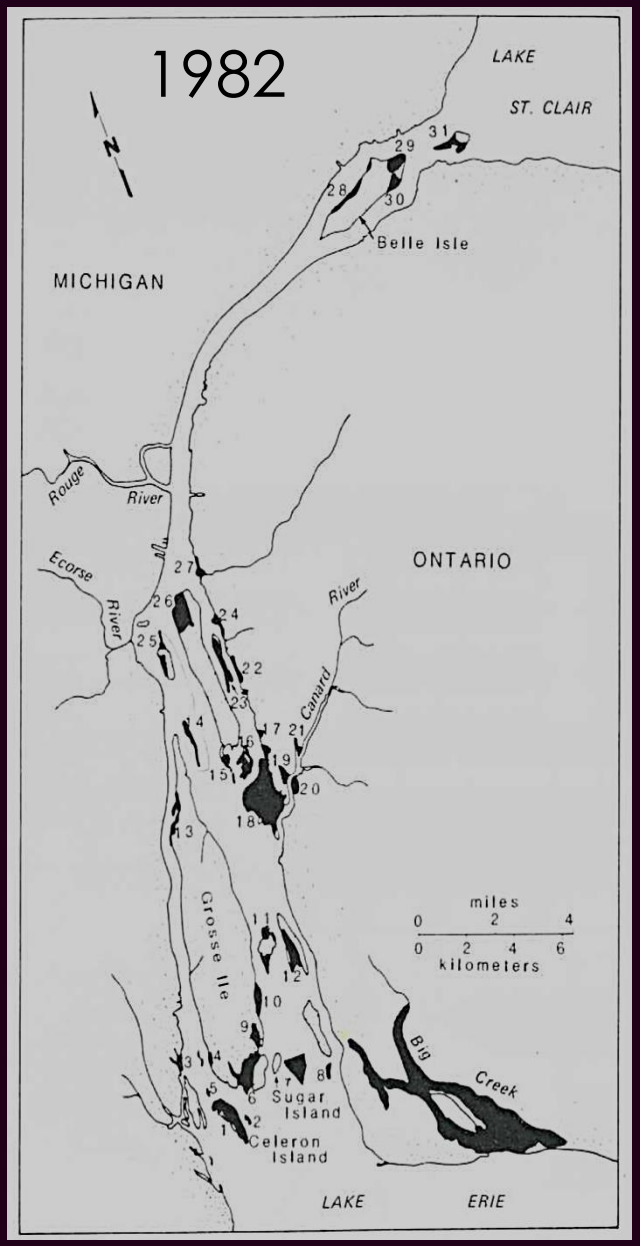
Coastal Wetland Decline in the Detroit River

In 1948, oil-soaked waterfowl carcasses were delivered to the steps of Michigan's Capitol in protest of lethal oil pollution in the Detroit River.

This event was a catalyst to Michigan's Industrial Pollution Program under the Federal Water Pollution Control Act of 1948.

Coastal Wetland Decline in the Detroit River





97% loss of U.S. coastal wetlands happened in less than 200 years.

The Detroit River is an:

Area of Concern (AOC)

Per 1987 amendments to the Great Lakes Water Quality Agreement between the U. S. and Canada.

P. A. C.
Detroit River Public Advisory Council

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MICHIGAN OFFICE OF THE GREAT LAKES

DETROIT RIVER
Canadian Public Advisory Council

DETROIT RIVER CANADIAN CLEANUP

FRIENDS of the DETROIT RIVER

TARGETS FOR REMOVAL OF THE LOSS OF FISH & WILDLIFE HABITAT
AND DEGRADATION OF FISH & WILDLIFE POPULATIONS
BENEFICIAL USE IMPAIRMENTS OF THE DETROIT RIVER AREA OF CONCERN

Prepared by:
Detroit River Public Advisory Council
Fish & Wildlife Technical Committee

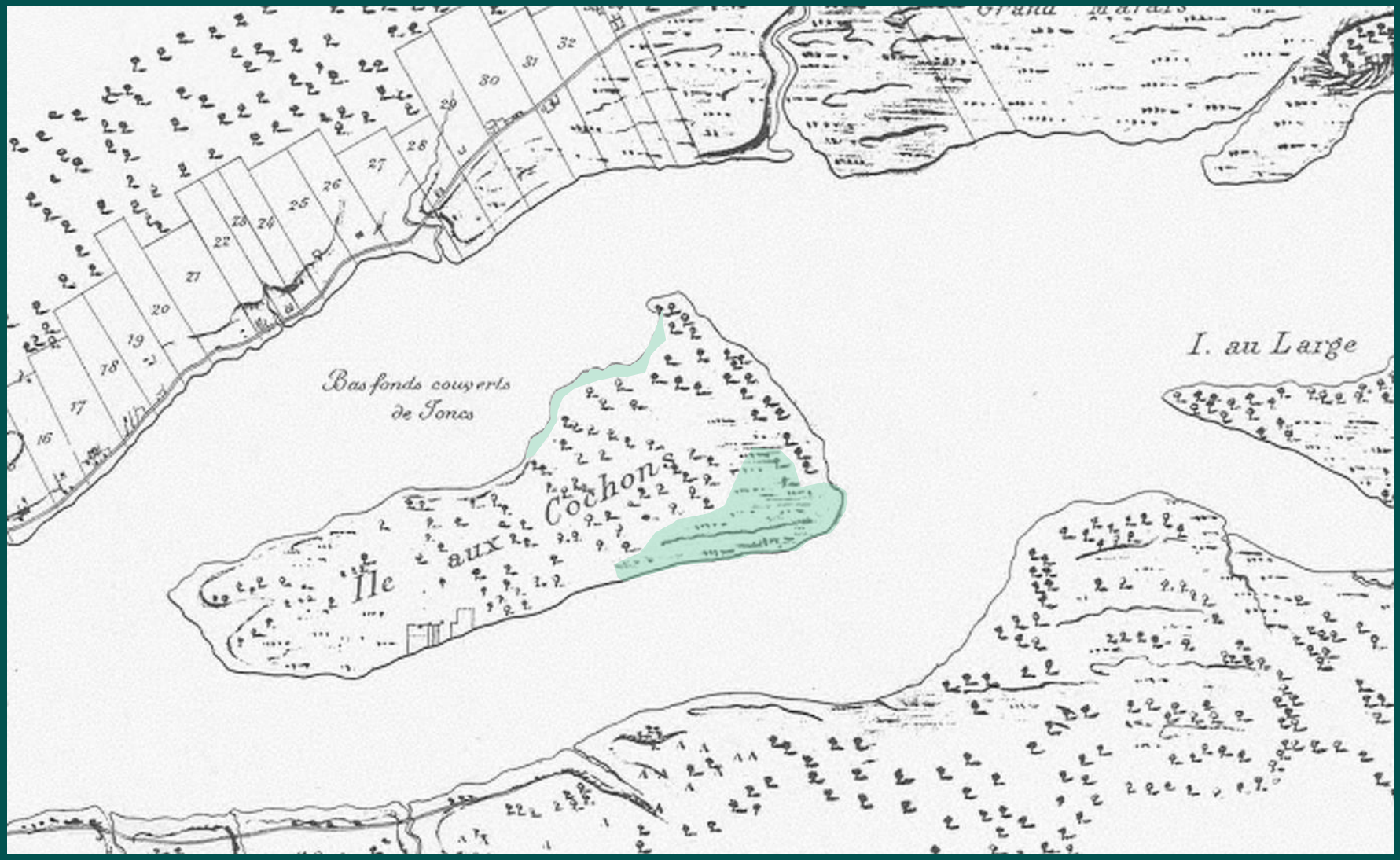
Submitted to:
Michigan Department of Environmental Quality
Office of the Great Lakes
Lansing, Michigan

Originally Adopted: April 17, 2009
Revised: May 12, 2014

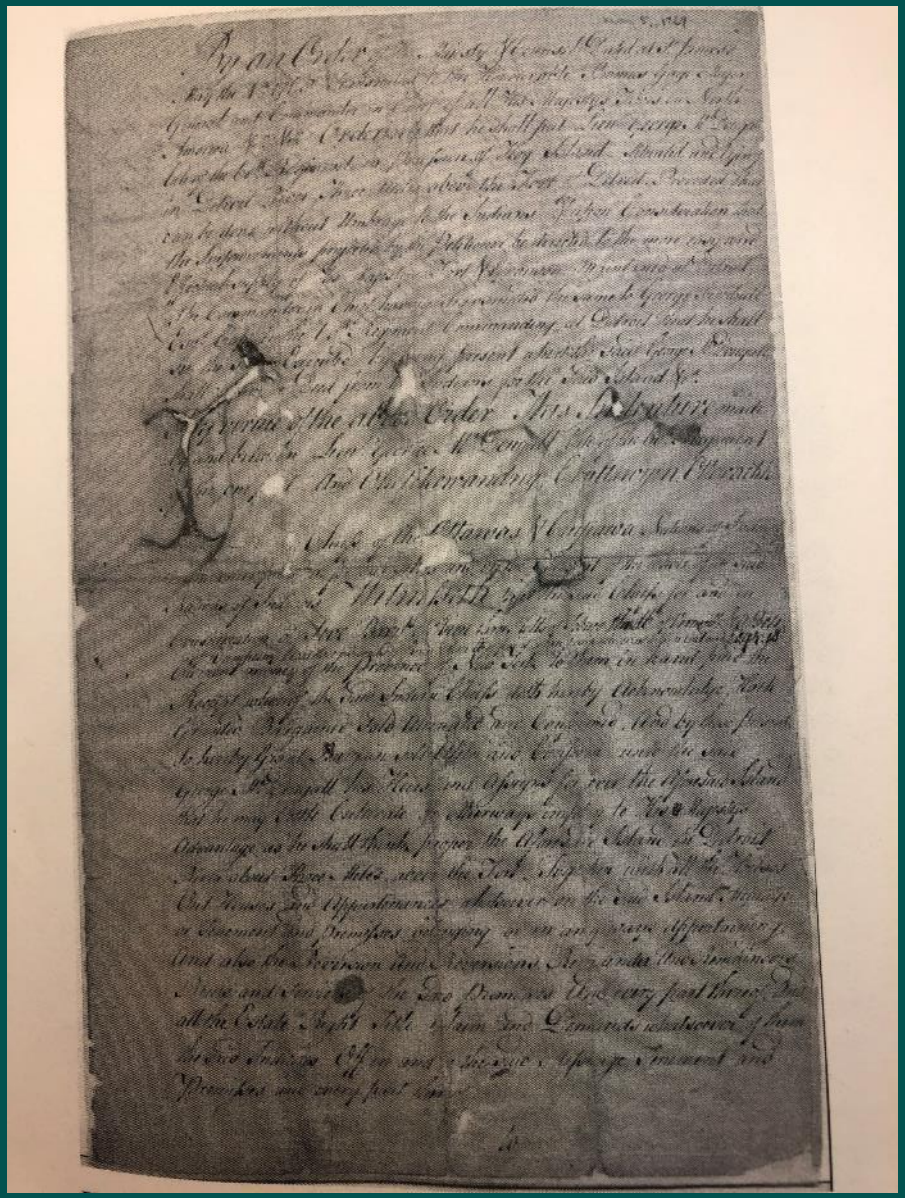
A guidance document for removing fish and wildlife related BUIs was completed in 2009 and revised in 2014.

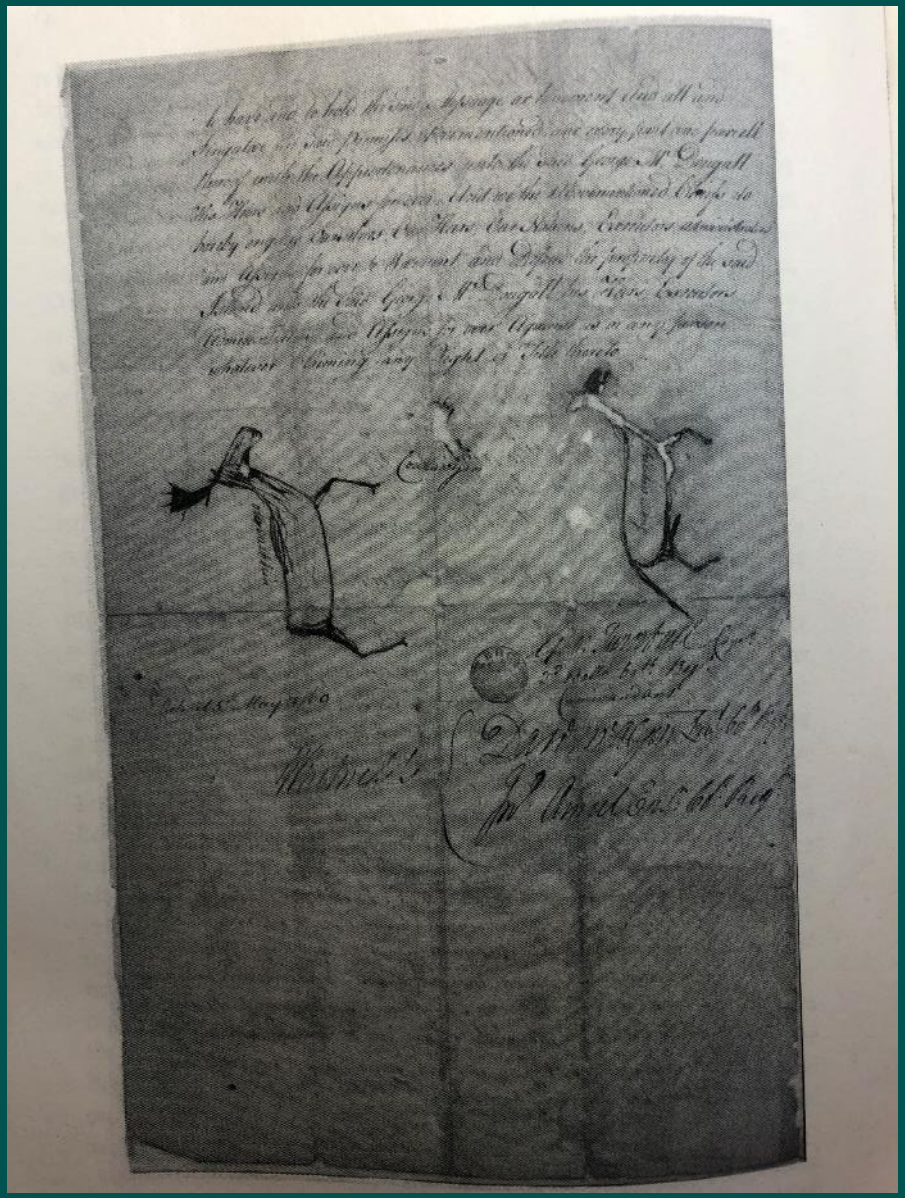
Doors opened for funding!

Coastal Wetland Decline at Belle Isle



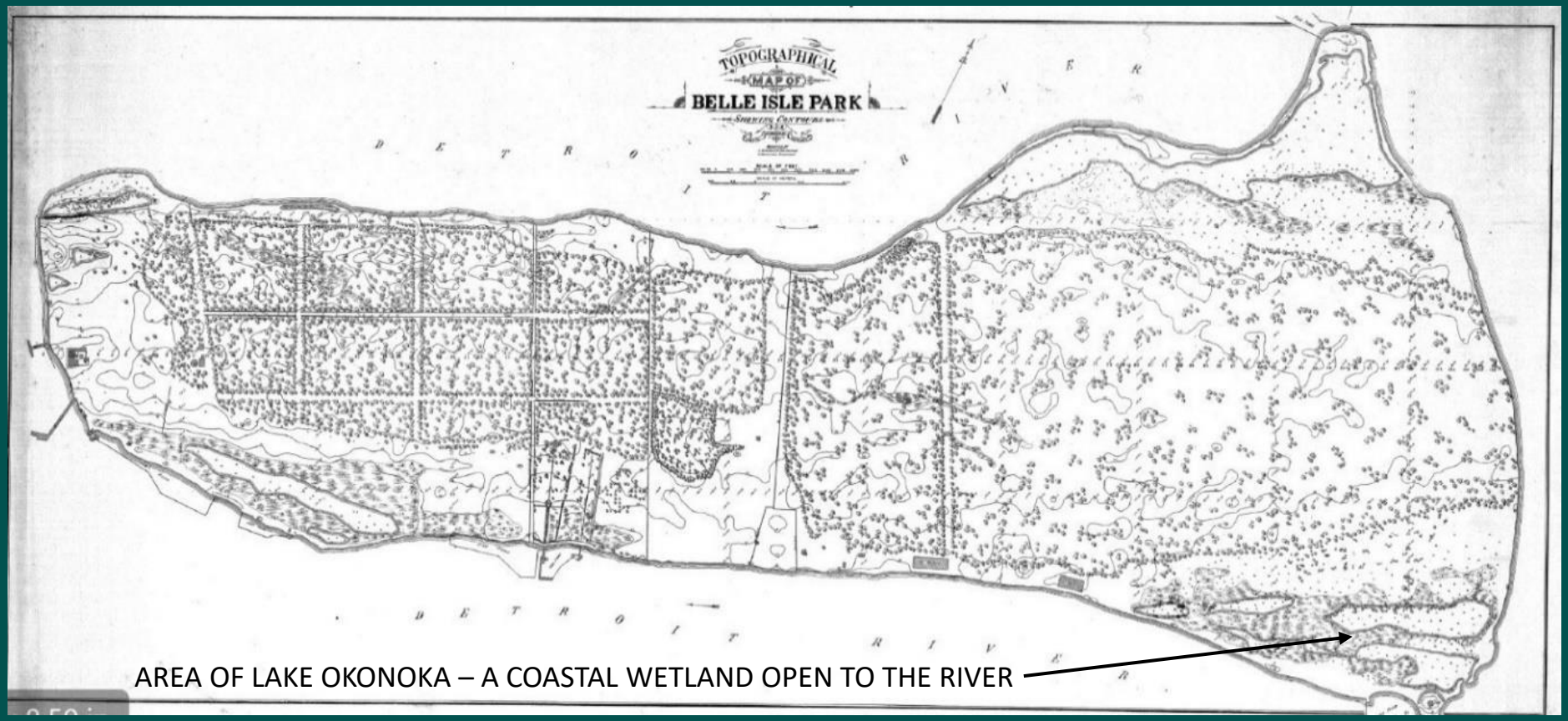
Prior to 1796 coastal wetlands existed on Belle Isle's north and south shores like what existed along most of the Detroit River shoreline.





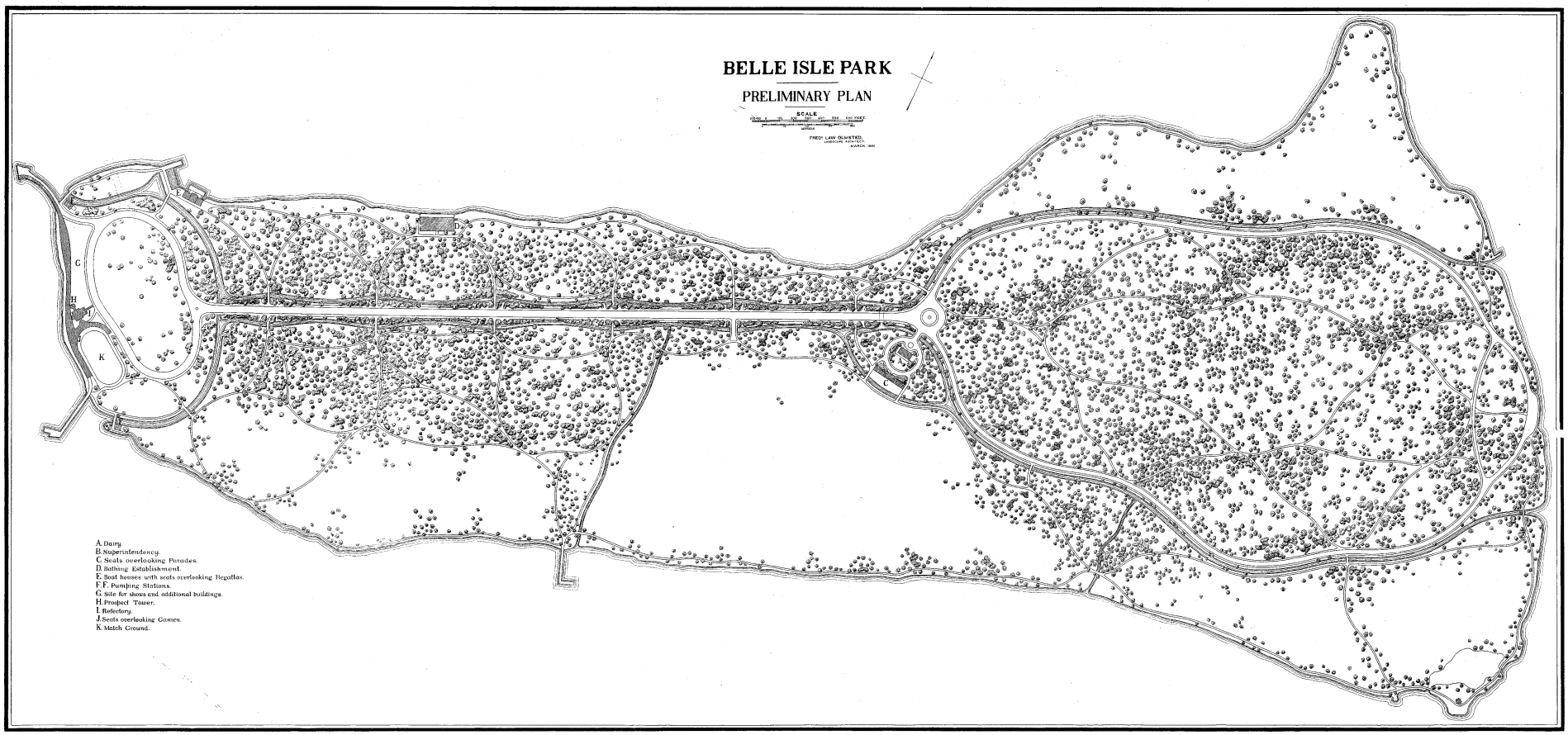
Property transfer deed for Belle Isle

Coastal Wetland Decline in the Detroit River



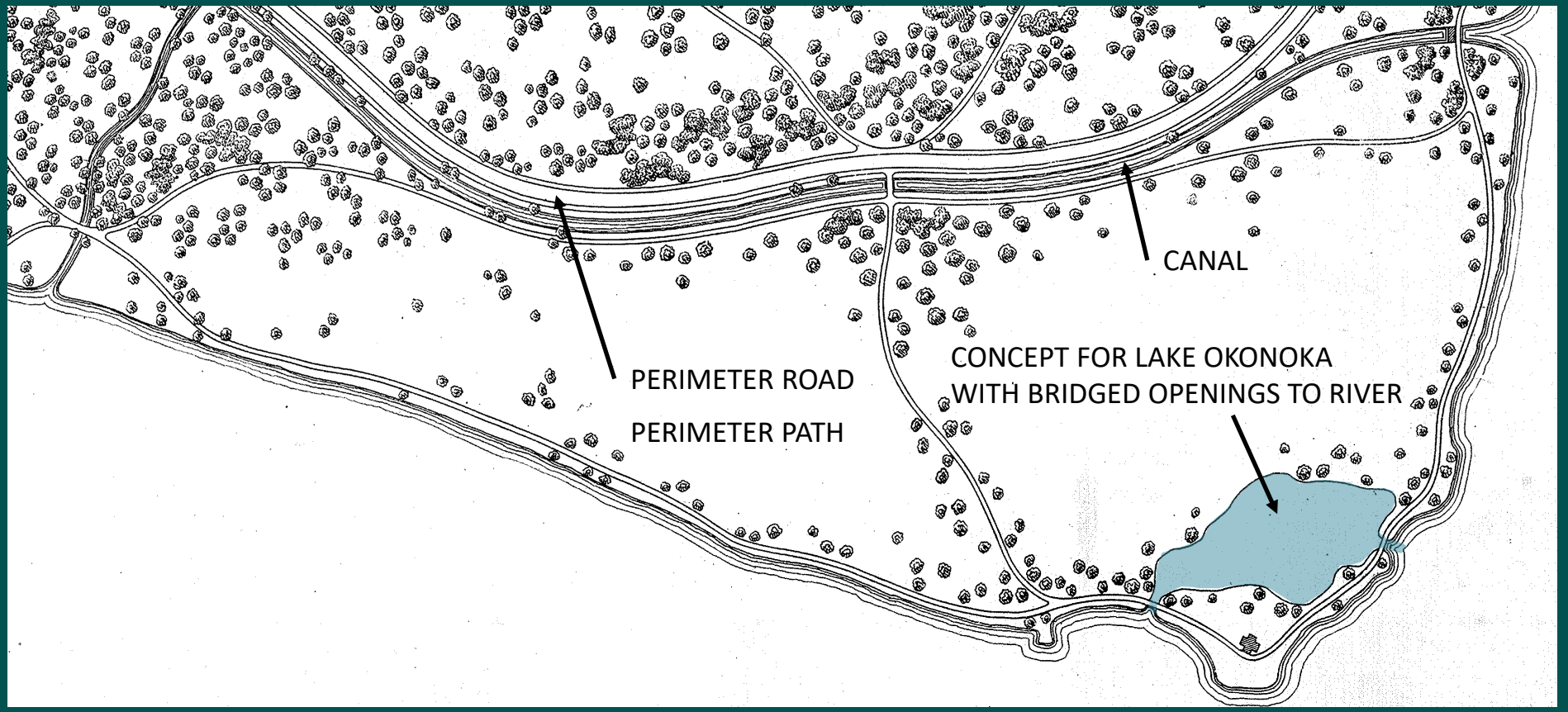
Historical map of Belle Isle (1882) shows Lake Okonoka as a coastal wetland and the flatwoods forest dominating the eastern half of the island – approximately 2 short lifetimes ago – a condition that existed for thousands of years prior to Belle Isle becoming a park.

Coastal Wetland Decline in the Detroit River



Fredrick Law Olmsted's plan of 1883 proposed a central road terminating with a loop drive at the isle's east end, a perimeter pathway, and a small lake on the southeast shore where the coastal wetland existed.

Coastal Wetland Decline in the Detroit River

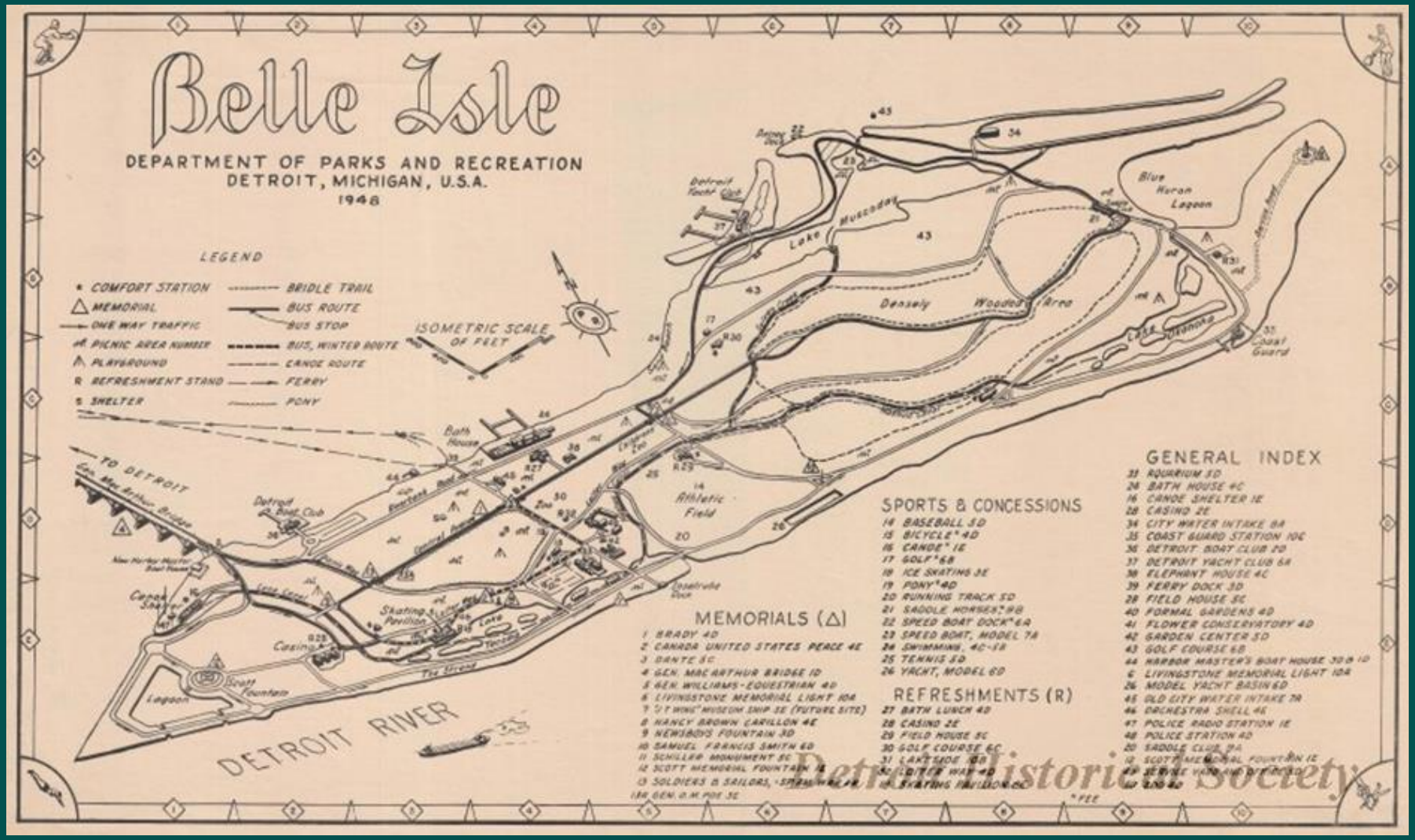


Zooming in on the plan, the lake was proposed to have bridged openings to the river.

Coastal Wetland Decline in the Detroit River

By 1897, dredging of Lake Okonoka was completed, and a perimeter road along the island's edge was constructed with bridged openings or culvert pipes connecting Lake Okonoka and Lake Muskoday to the Detroit River.

Coastal Wetland Decline in the Detroit River



City of Detroit plan for Belle Isle – 1948 shows excavated material from downtown Detroit used to fill in the area that now creates Blue Heron Lagoon.

Coastal Wetland Decline in the Detroit River

A 1952 aerial photo shows the lagoon still open to the river.

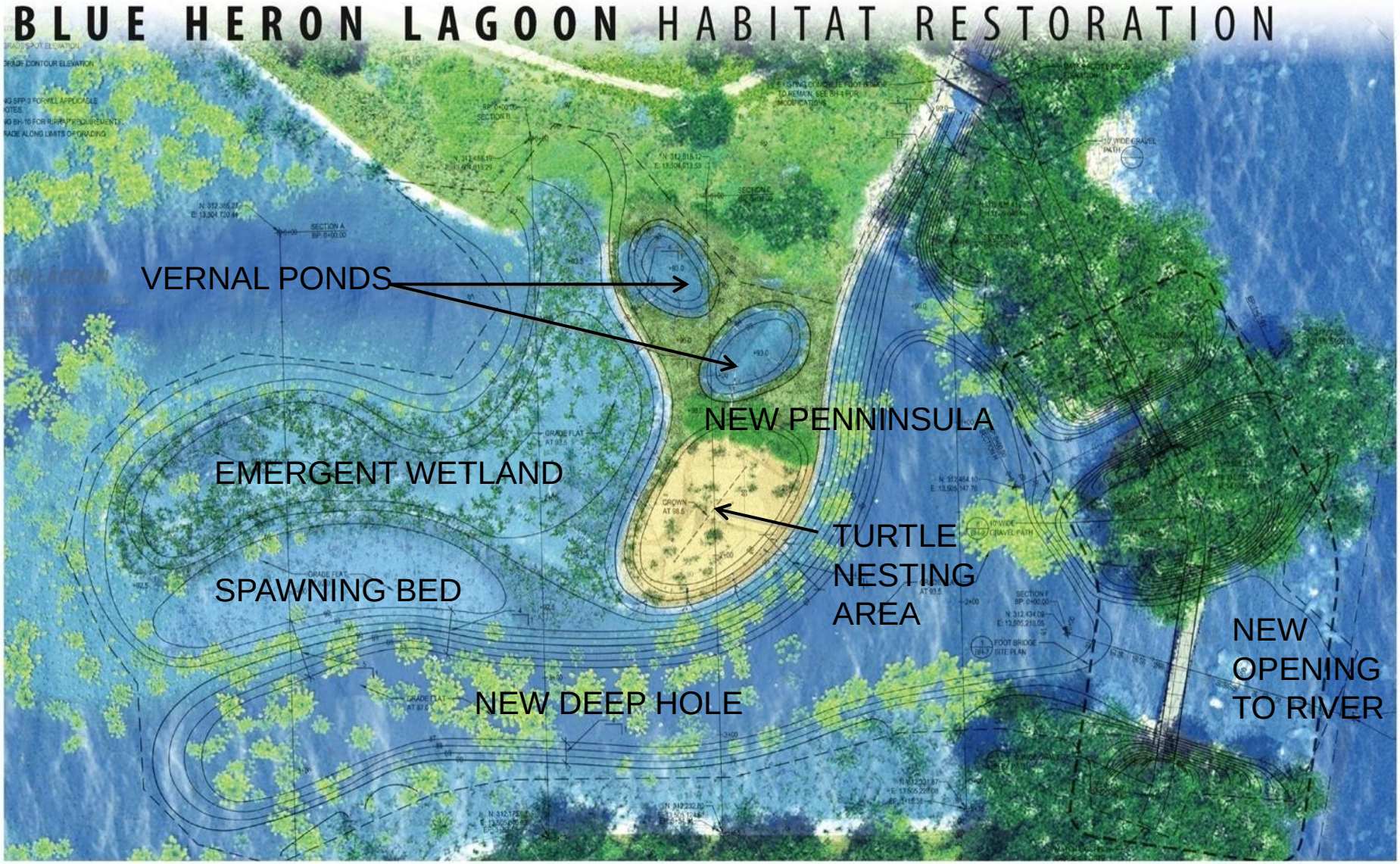
Coastal Wetland Decline in the Detroit River

By 1956, the lagoon was isolated from the river by an earthen isthmus equipped with control apparatus to regulate the water level in the island's internal water bodies.

Belle Isle Projects Funded by the Great Lakes Restoration Initiative

Blue Heron Lagoon

Blue Heron Lagoon



2012.06.24

JJR ECT Environmental Consulting & Technology, Inc.

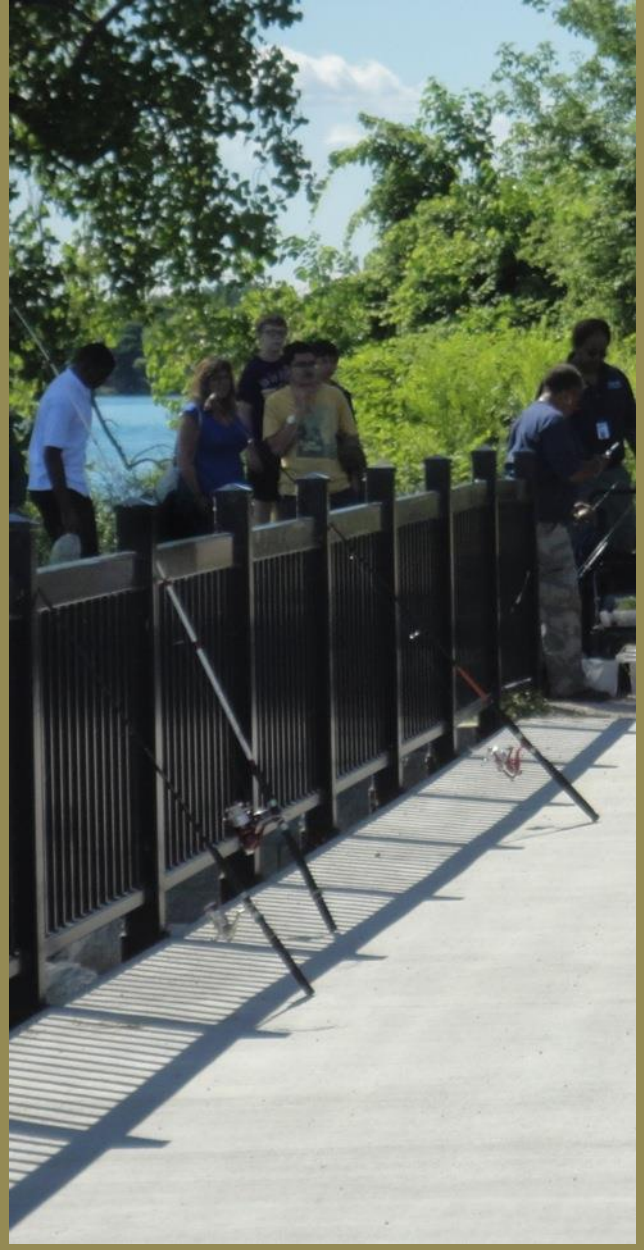
FRIENDS of the DETROIT RIVER

Blue Heron Lagoon

Shoreline planting was completed by local high school students.

Blue Heron Lagoon

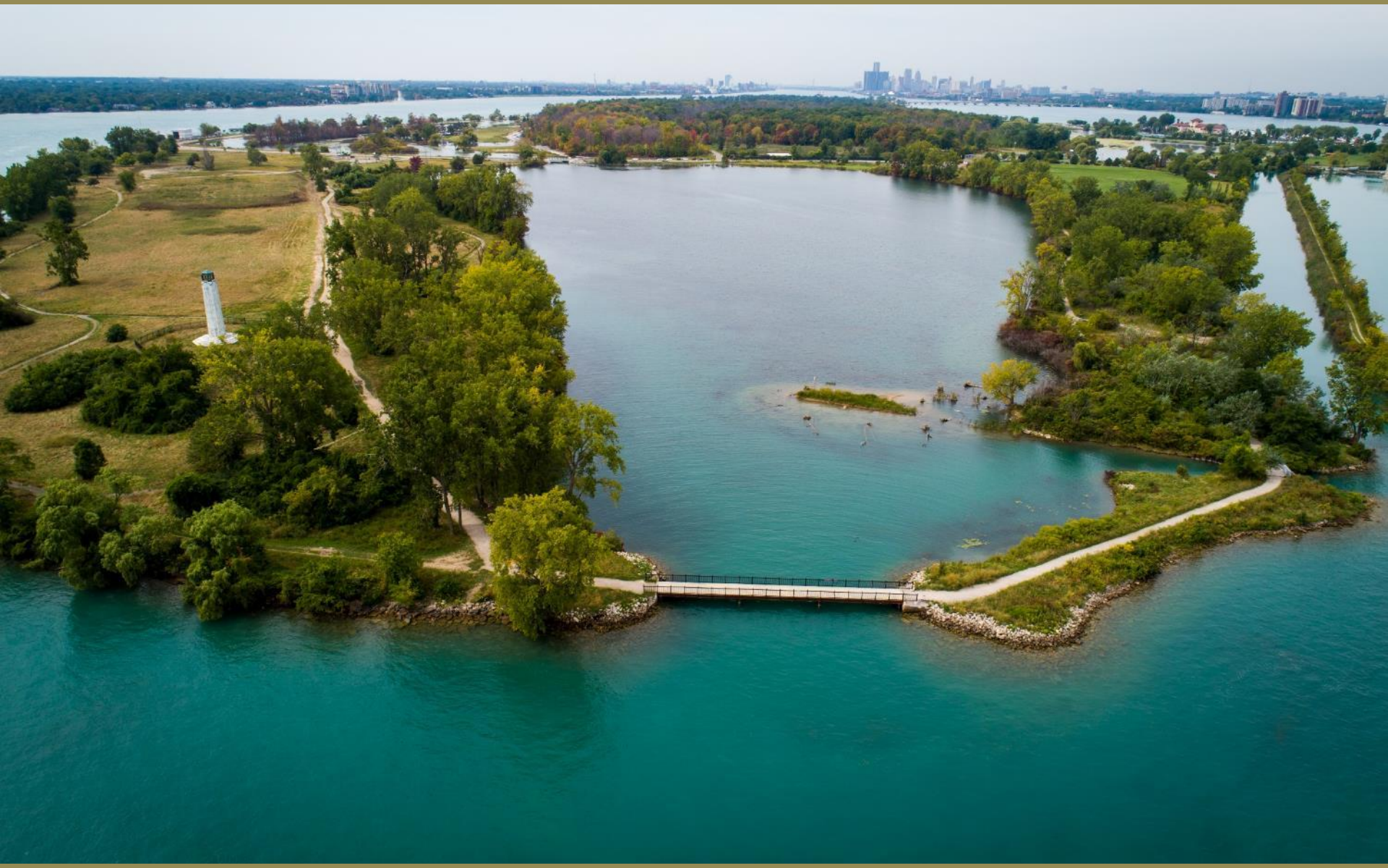
July of 2013



July of 2014: Cleaner water, more fish and amazed site visitors….

Blue Heron Lagoon

Blue Heron Lagoon



Great Lakes water and fish entering Blue Heron Lagoon for journey to Lake Okonoka

Belle Isle Spawning Reef Projects

Belle Isle Spawning Reef Projects

Underwater Images of Lake Sturgeon and Sturgeon Eggs

South Fishing Pier

South Fishing Pier

2011.11.03

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Final stones in breakwater are placed.

September of 2013

Lake Okonoka

Lake Okonoka

Lake Okonoka

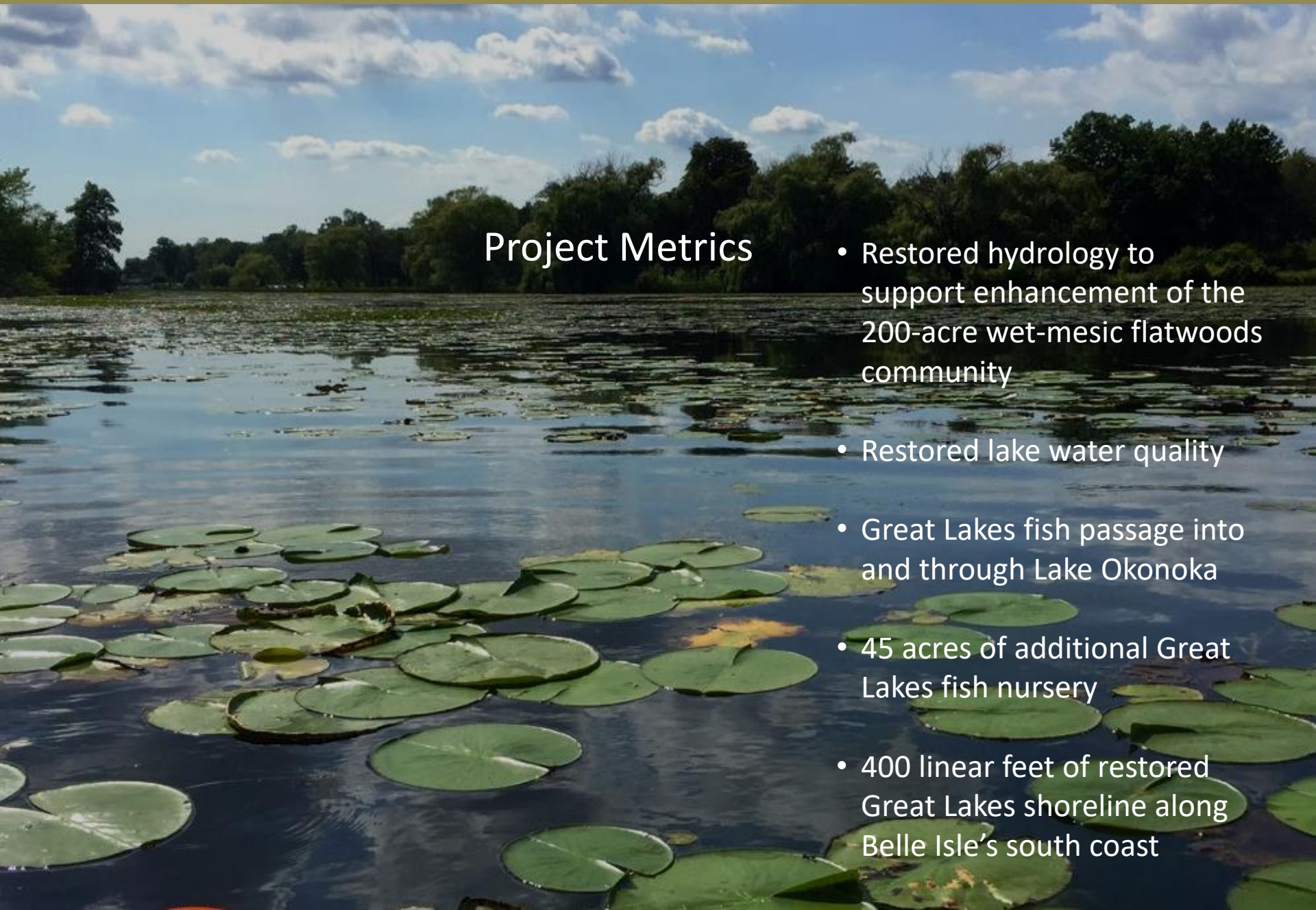
09-10-19: New opening and bridge between Blue Heron Lagoon and Lake Okonoka

Lake Okonoka Habitat Restoration Project Master Plan

Lake Okonoka

11-29-17: Channel excavation continues through the Lake.

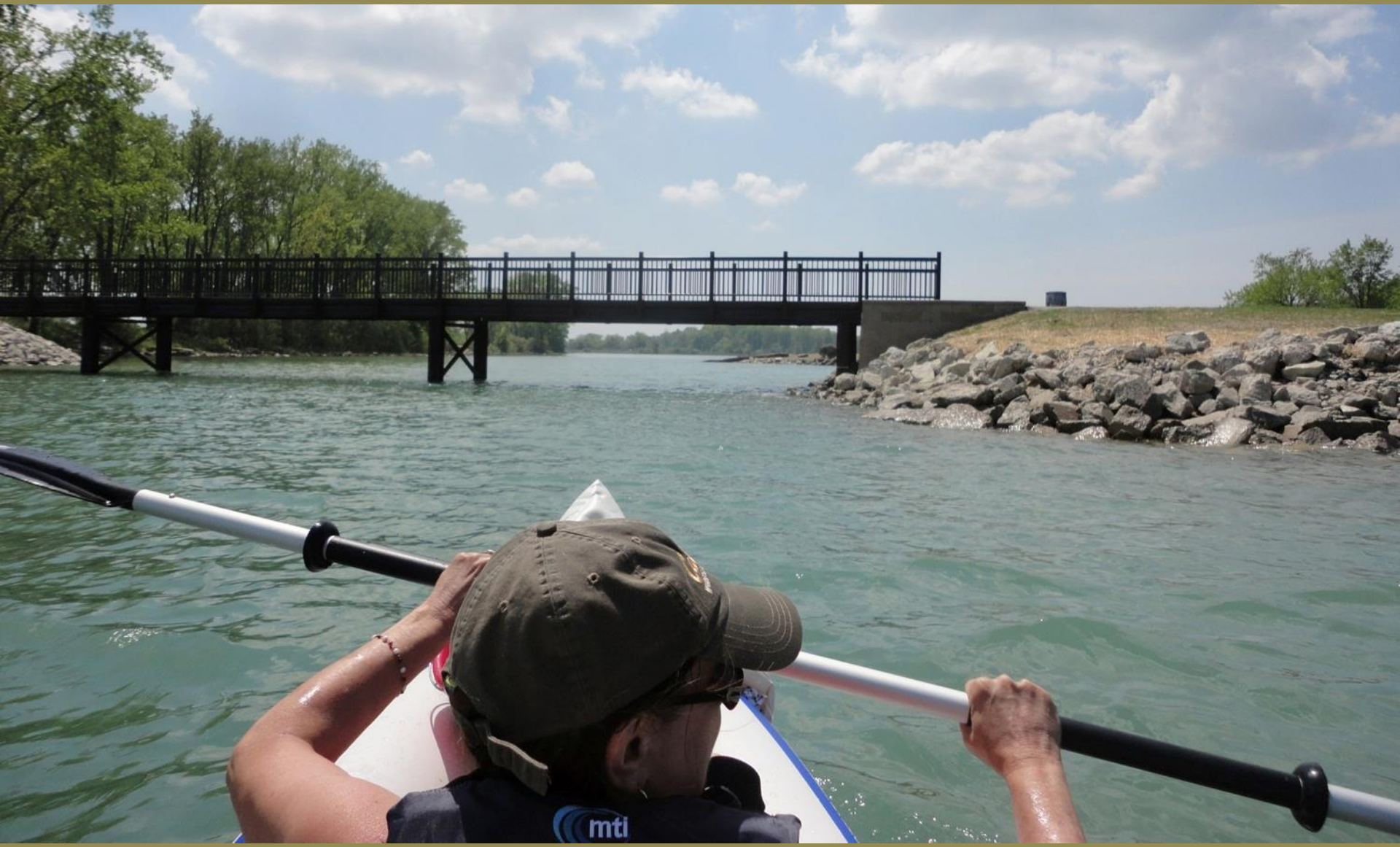
Lake Okonoka



Project Metrics

- Restored hydrology to support enhancement of the 200-acre wet-mesic flatwoods community
- Restored lake water quality
- Great Lakes fish passage into and through Lake Okonoka
- 45 acres of additional Great Lakes fish nursery
- 400 linear feet of restored Great Lakes shoreline along Belle Isle’s south coast

Lake Okonoka



Kayaking and fishing experiences on Belle Isle will be greatly enhanced.

Wet-mesic Flatwoods Forest

Wet-mesic Flatwoods Forest

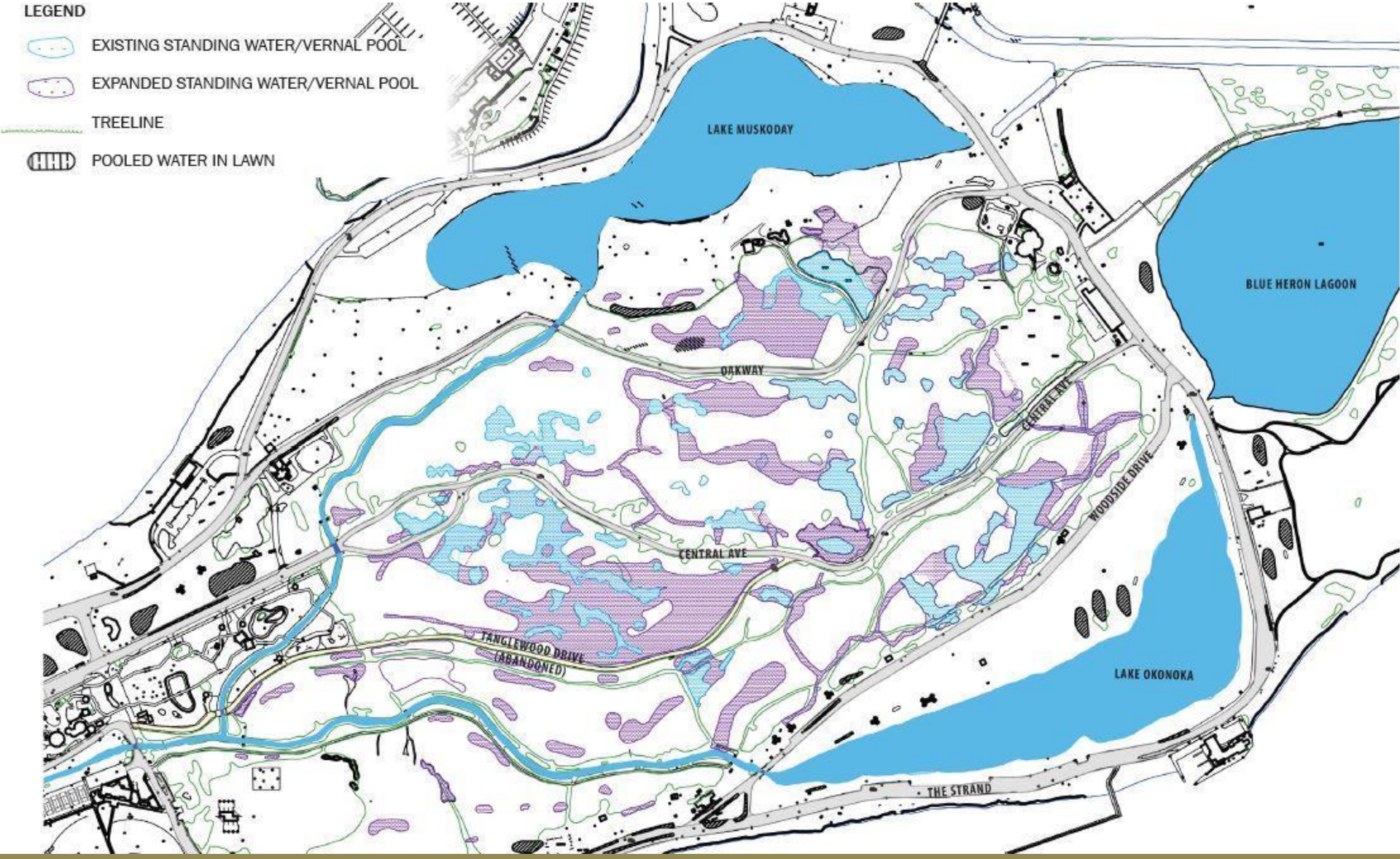
Historic Drainage Patterns – slow seepage to coastal wetlands.

Wet-mesic Flatwoods Forest

Roads parking and trails create drainage barriers.

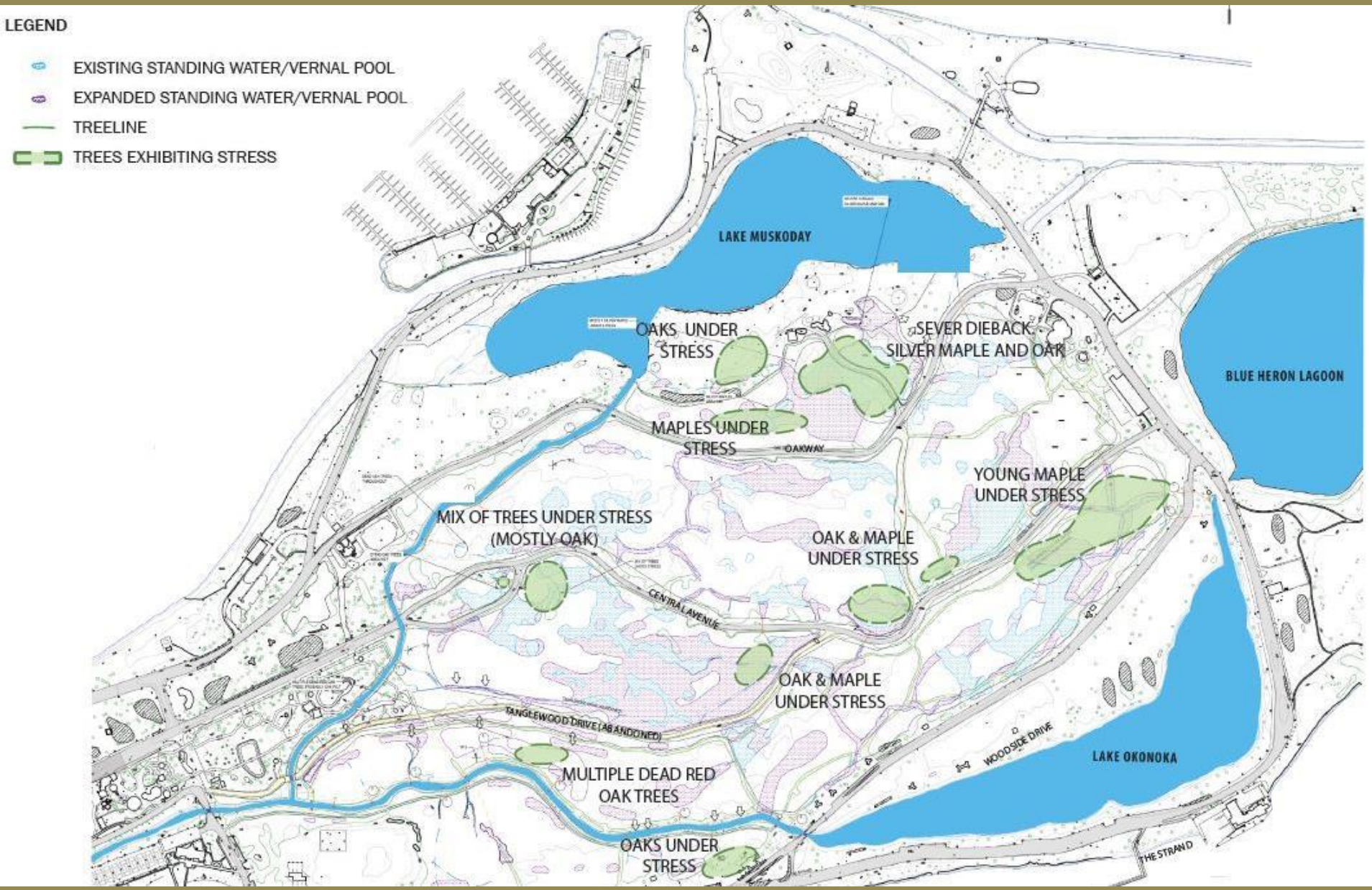

Detroit River
Detroit Yacht Club
Lake Muskoday
Lakeside Dr
Blue Heron Lagoon
Old Golf Course
Riverbank Dr
Belle Isle Beach
Oakway Dr
Sylvan Canal
Wildwood St
G
I
F
H
E
D
Belle Isle Park
Central Ave
Shadowrock St
C
J
Riverbank Dr
Central Ave
Tanglewood St
Lake Okonoka
Woodside Dr
B
US Coast Guard Station Belle Isle
Nashua Canal
Lake Way
Vista Dr
The Strand
A
Vista Dr
Detroit River

Wet-mesic Flatwoods Forest



Analysis of forest hydrology shows large areas of pooling.

Wet-mesic Flatwoods Forest

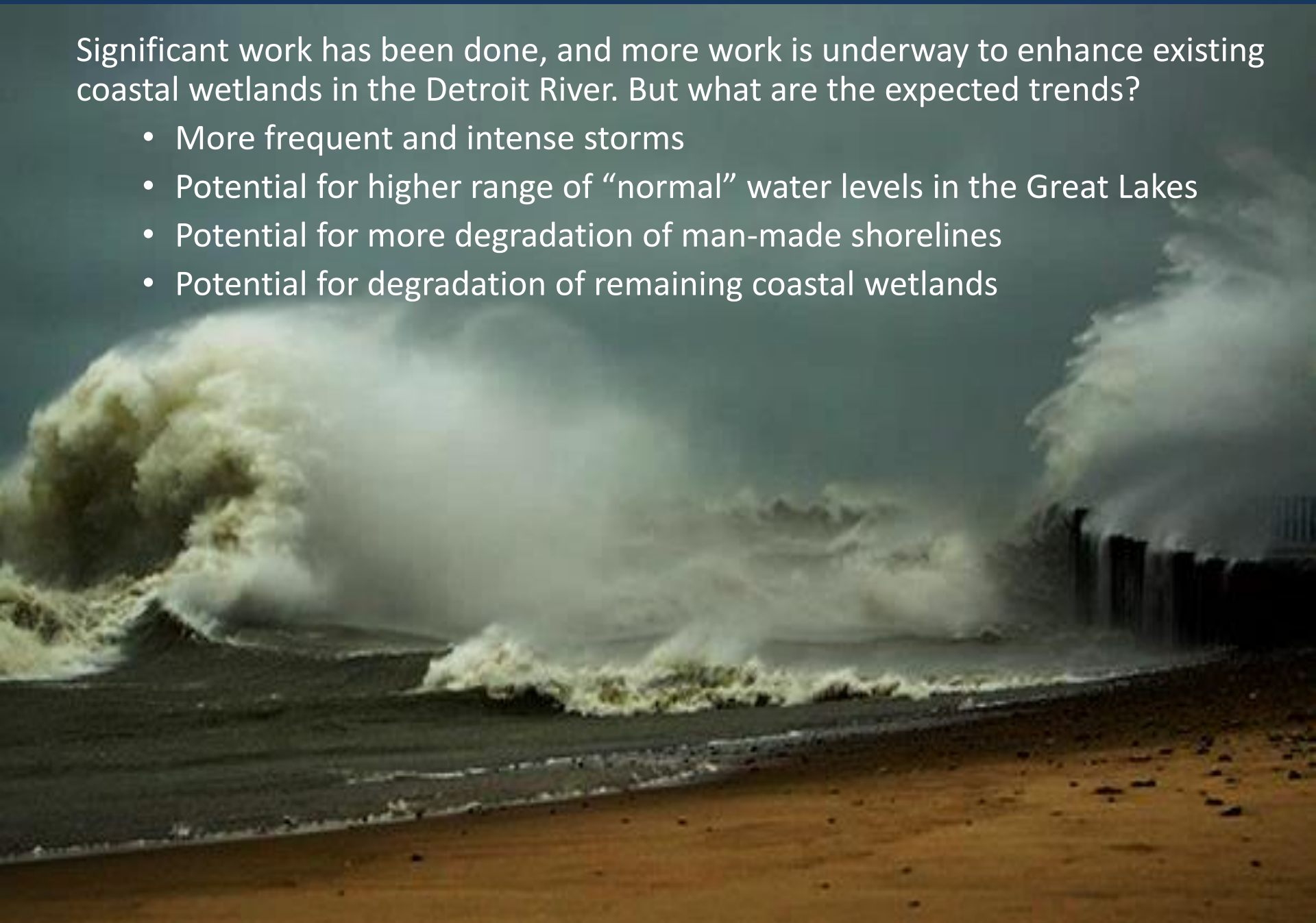


Trees in stress show up in areas where drainage is blocked.

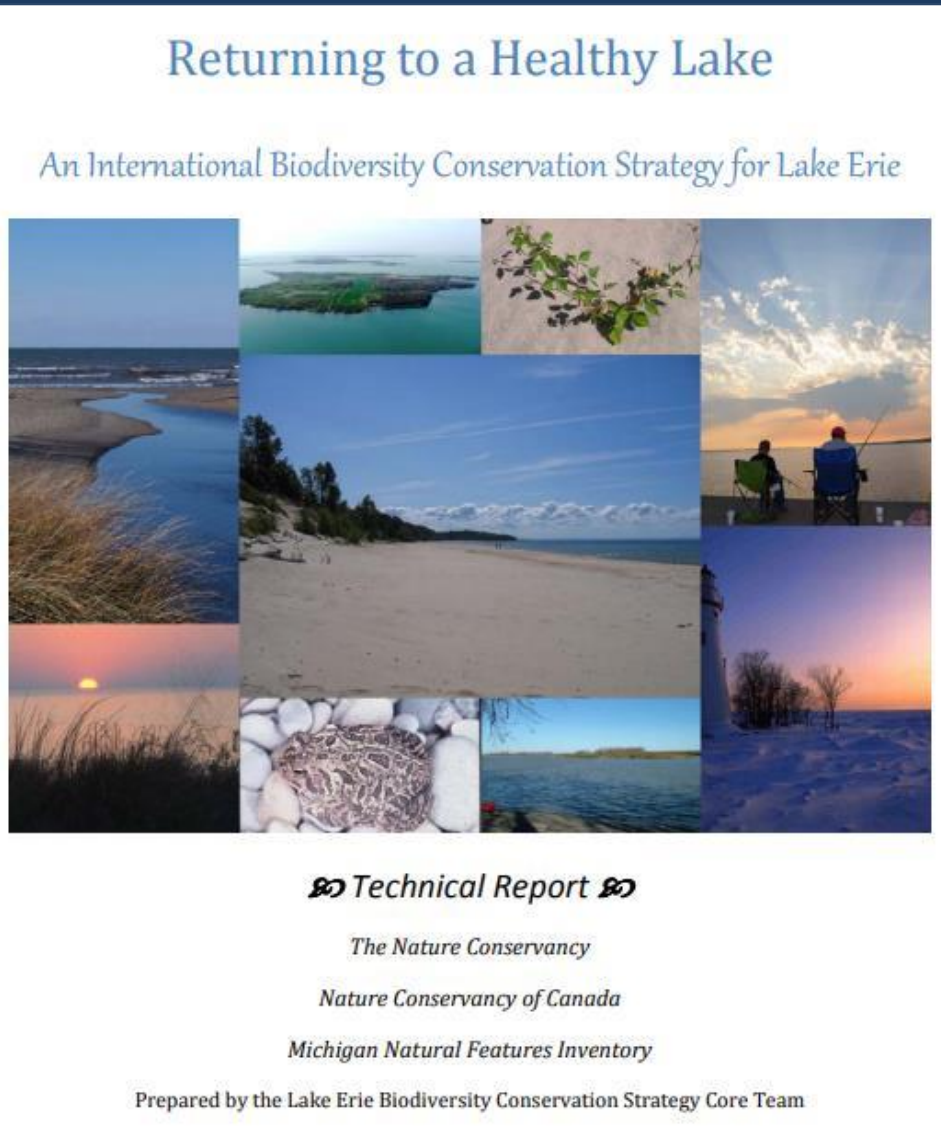
Expected Trends

Significant work has been done, and more work is underway to enhance existing coastal wetlands in the Detroit River. But what are the expected trends?

- More frequent and intense storms
- Potential for higher range of “normal” water levels in the Great Lakes
- Potential for more degradation of man-made shorelines
- Potential for degradation of remaining coastal wetlands



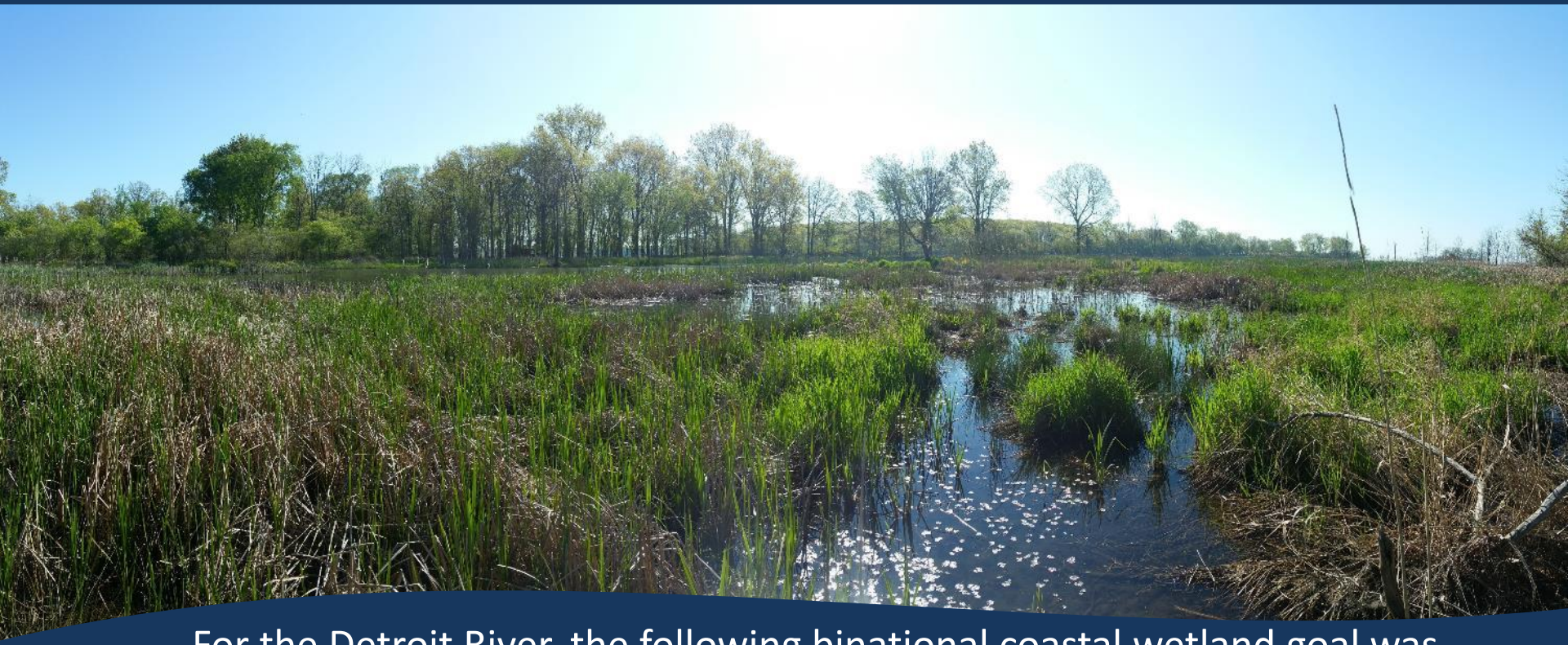
Recommendations: Adopt LEBCS goal.



The Nature Conservancy

The Lake Erie Biodiversity Conservation Strategy is a binational initiative designed to support the efforts of the Lake Erie LAMP by identifying specific strategies and actions to protect and conserve the native biodiversity of Lake Erie.

Recommendations: Adopt LEBCS goal.



For the Detroit River, the following binational coastal wetland goal was established:

> *By 2030 coastal wetlands in the Detroit River will comprise at least 25% of their historical area.*

Currently, National Wetlands Inventory data show only 138 acres of connected wetlands remain. That means that the Detroit River would have to achieve a net gain of 1,117 acres of coastal wetlands over the approximately next 10 years.

A Snapshot of Events in 2019

- Lake Okonoka is opened to the Blue Heron Lagoon.
- Water levels in the Great Lakes exceed record high levels.
- Great Lakes shorelines experience flooding.
- **UN releases report on biodiversity indicating 1 million species will become extinct in the next two decades, and coastal wetlands are among the largest challenges to rethink.**

Our region is among few leading the world to address this problem.

FRIENDS of the DETROIT RIVER
www.detroitriver.org

DEPARTMENT OF NATURAL RESOURCES
DNR
MICHIGAN

Thanks for listening!