Great Lakes Coastal Wetland Monitoring for Protection and Restoration

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The Great Lakes Coastal Wetlands Consortium

2000 GLNPO RFP for $1.2 million.

Develop and evaluate metrics and protocols for monitoring coastal wetland ecosystem health.

Based on SOLEC indicator approach.

Consortium was formed, facilitated by Great Lakes Commission.

Great Lakes Environmental Indicators (GLEI) project: separate program but some overlapping goals for coastal wetlands.

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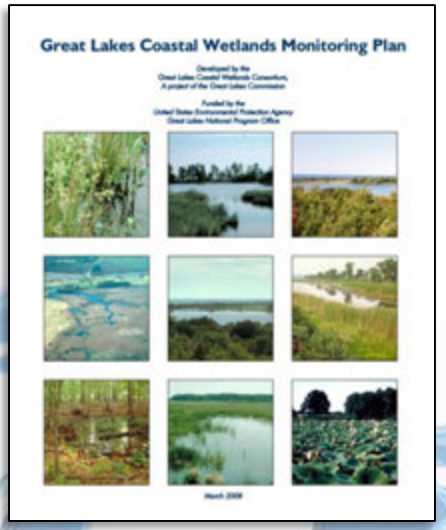
The Great Lakes Coastal Wetlands Consortium

2007: Consortium and GLEI combined efforts to ensure the best possible monitoring product

Consortium submitted final recommendations to EPA March 2008

2009: GLRI-GLNPO RFP for $10M to monitor coastal wetlands using GLCWC protocols

Awarded in 2010, sampling 2011-2015



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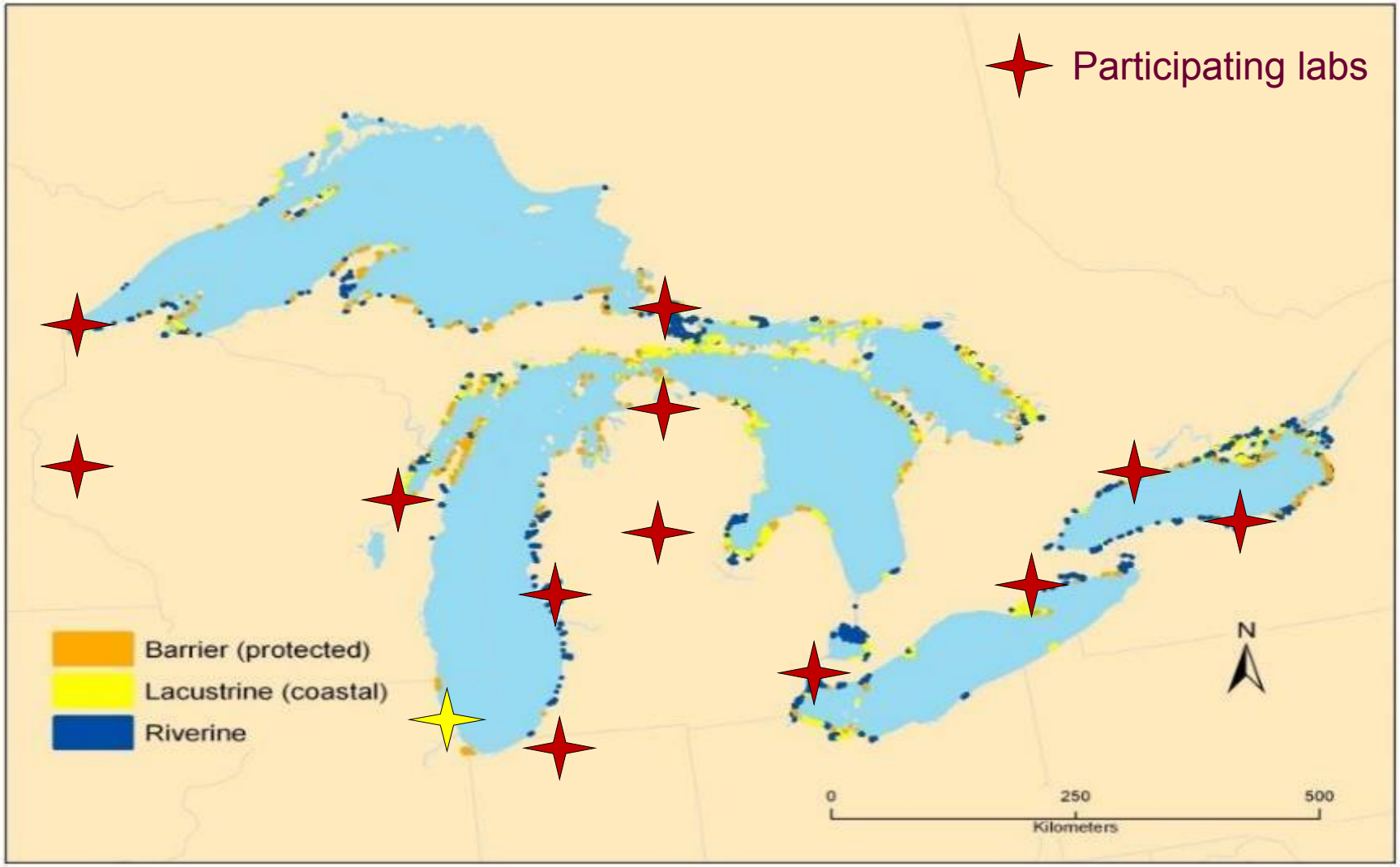
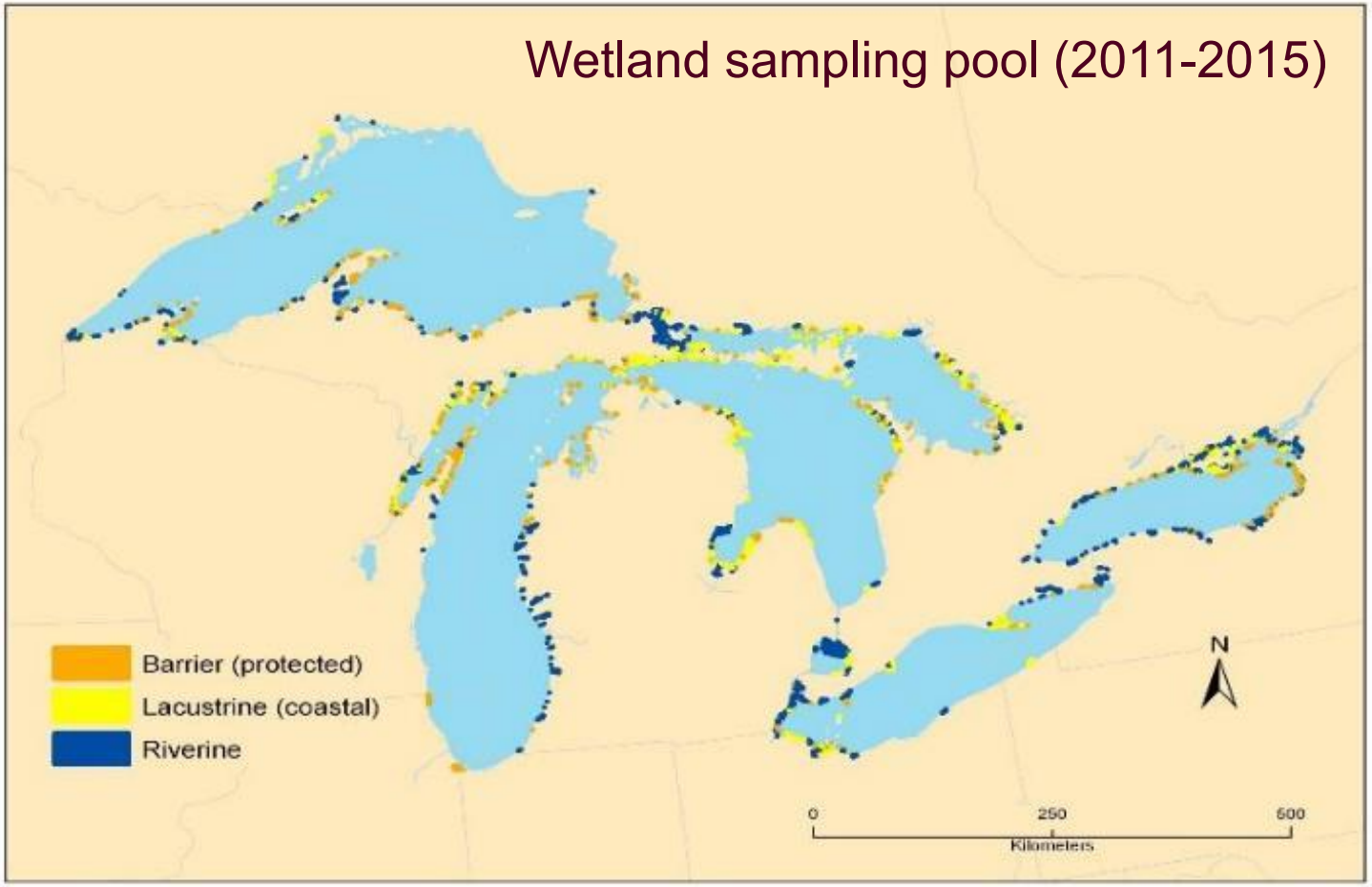
Large collaborative effort



Great Lakes Coastal Wetland Monitoring Program

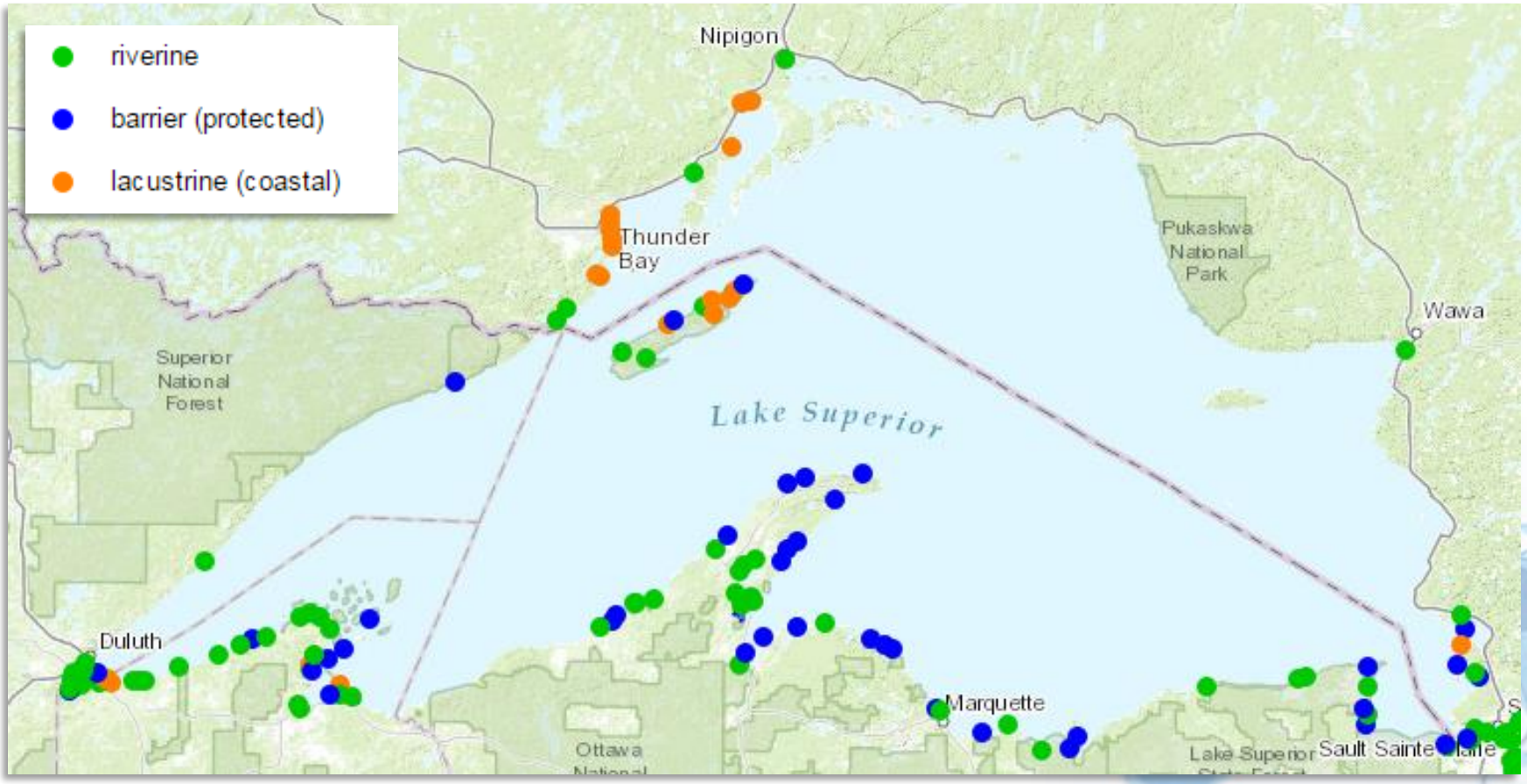
~1000 coastal wetlands over 5 years

- Wetlands >4 ha. in area
- Surface water connection to Great Lakes



Lake Superior

Sampled (2011-2014): 71 wetlands
Scheduled (2015): 37 wetlands



Statistical Design

- Stratify by ecoregion, lake, and wetland type.
- Randomly draw wetlands from each strata for each sampling year.
- Re-sample subsets 2 consecutive years.
- Good estimates of spatial and temporal variation.
- Additional targeted sampling at restoration sites (pre- and post-restoration).

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Great Lakes Coastal Wetland Monitoring Program

~1000 coastal wetlands over 5 years

- Chemical/Physical Uzarski et al. 2008
- Invertebrates Uzarski et al. 2004
- Fish Uzarski et al. 2005
- Plants Albert 2008
- Birds Grabas et al. 2008
- Amphibians Timmermans et al. 2008

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Quantify ecosystem disturbance
Indices of Biotic Integrity

- Reference Conditions: (>85 to 100% of possible score)
- Mildly Impacted: (>70% to 85% of possible score)
- Moderately Impacted: (>50 to 70% of possible score)
- Moderately Degraded: (>30 to 50% of possible score)
- Degraded: (>15 to 30% of possible score)
- Extremely Degraded: (0 to 15% of possible score)

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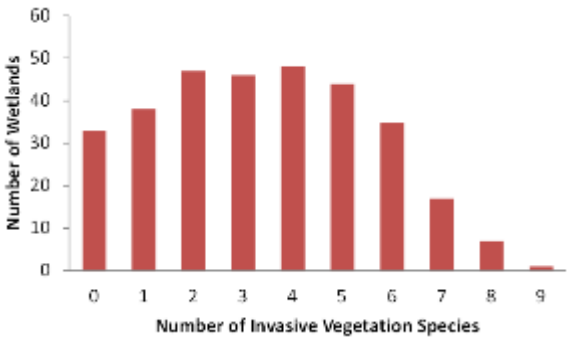
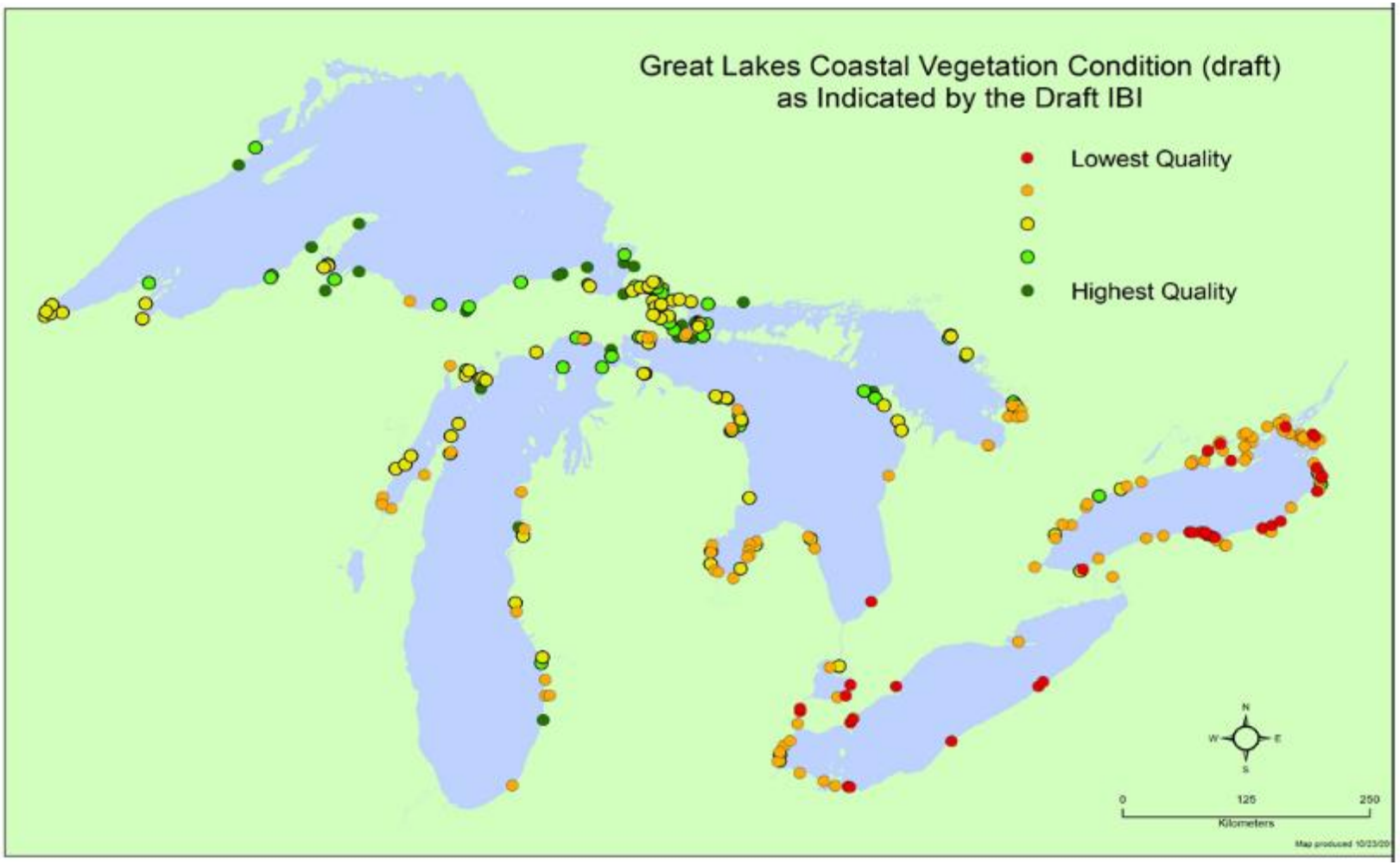
Summarized Results, 2011-2013

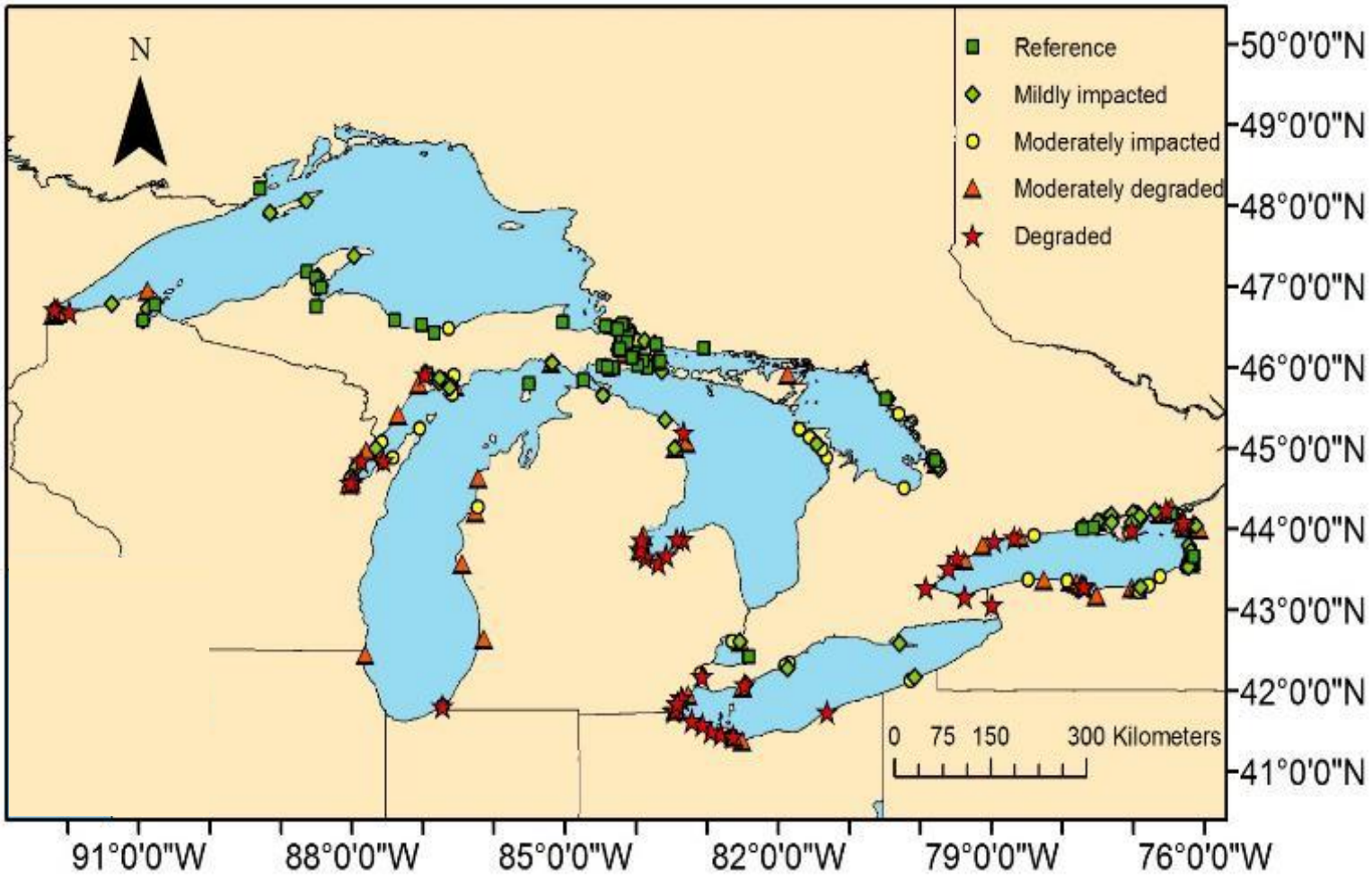
Vegetation IBI





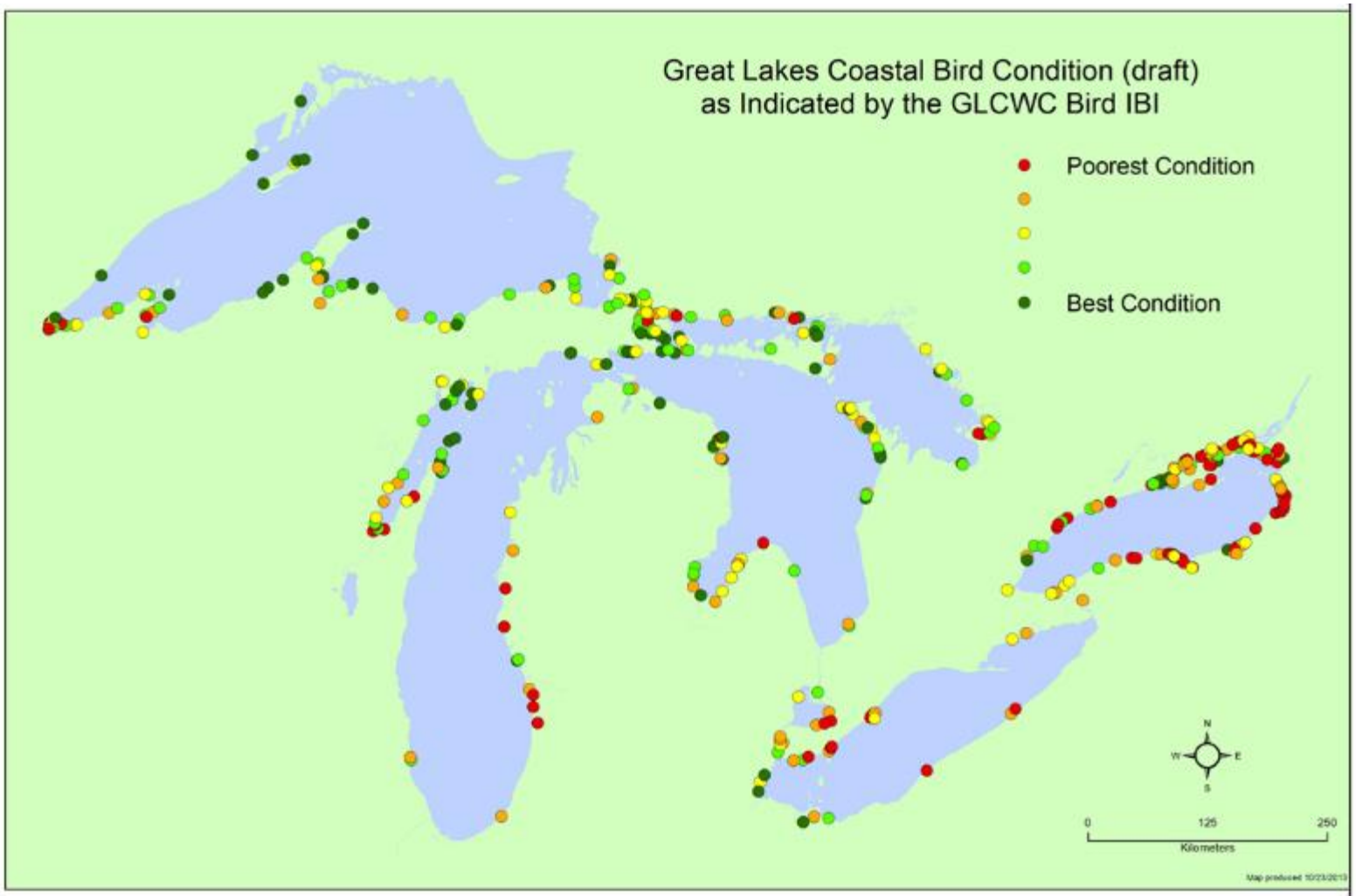
Summarized Results, 2011-2013

Fish IBI



Summarized Results, 2011-2013

Bird IBI



IBIs Using Different Taxa

- Different organisms indicate disturbance at different scales
  - Plants = coarse scale
  - Invertebrates = local scale
  - Fish = intermediate scale

- Individual wetland does not experience disturbance uniformly
  - Based on hydrology
  - Gradient from terrestrial to true aquatic

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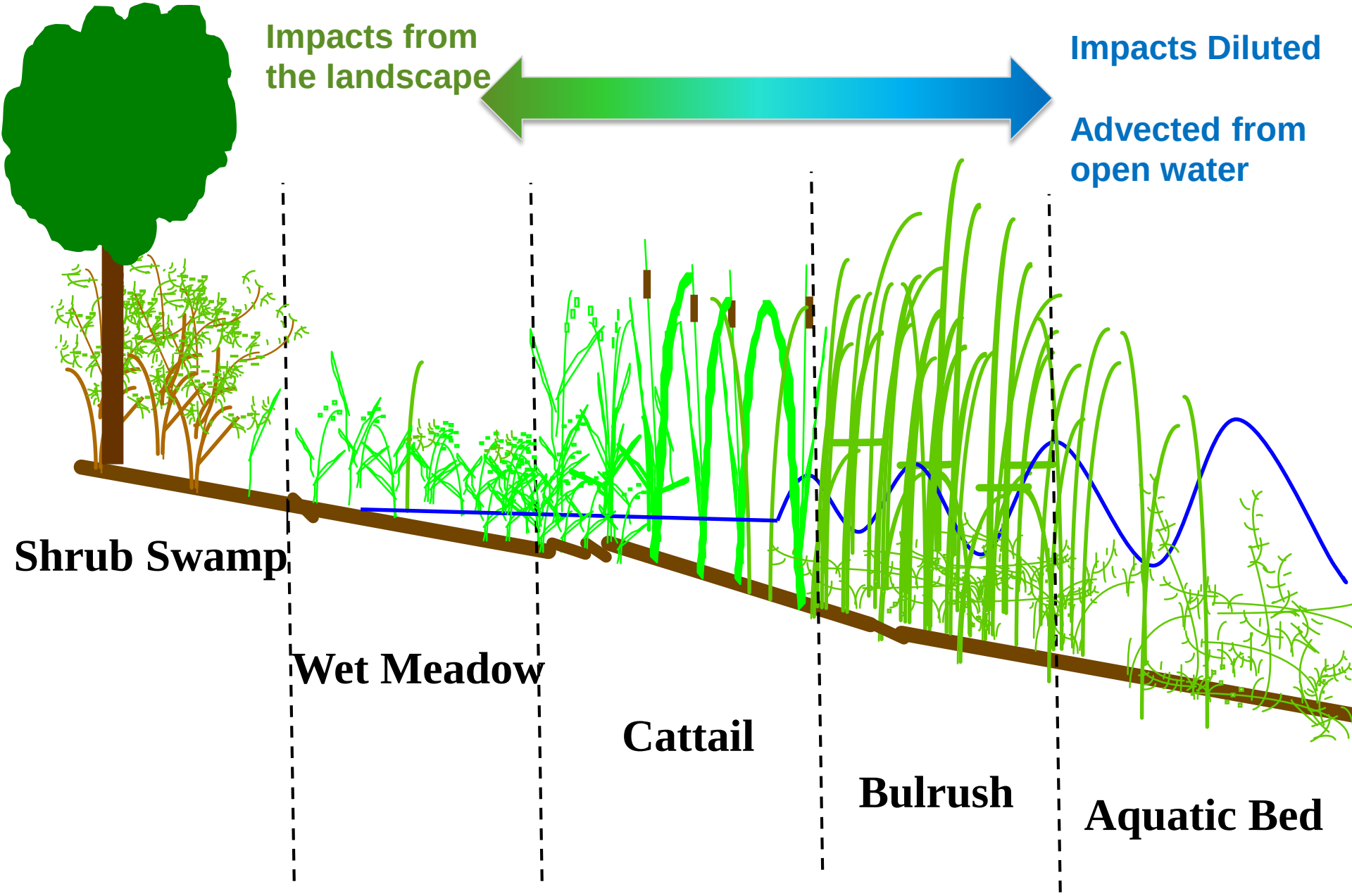
Impacts from
the landscape
Impacts Diluted
Advected from
open water
Shrub Swamp
Wet Meadow
Cattail
Bulrush
Aquatic Bed

Metric development and improvement

- Enormous amount of data
  - Continue to develop new metrics
  - Continue testing existing metrics
  - Maintain consistent sampling protocols
  - Build flexibility for updates into decision support tools

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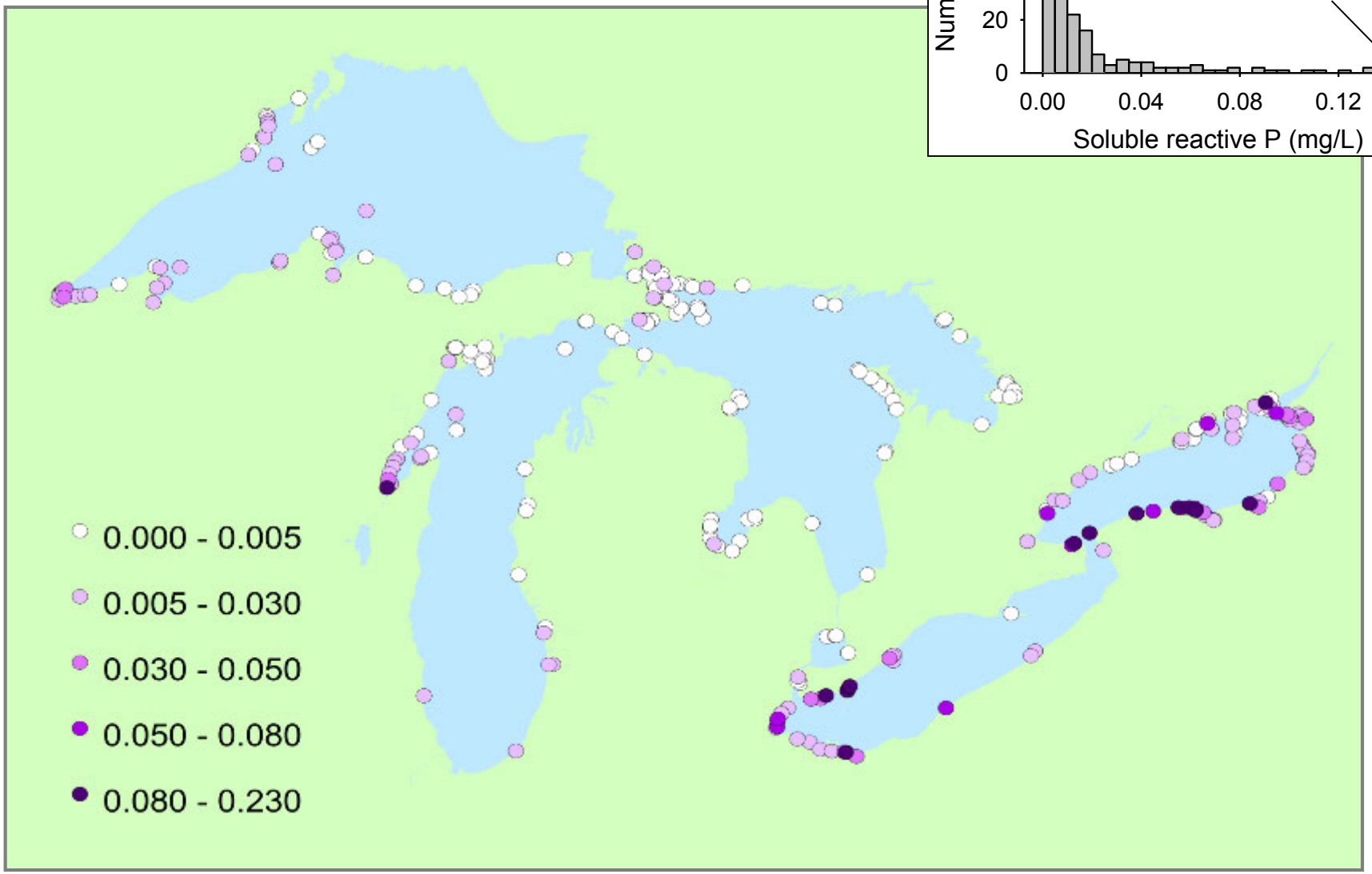
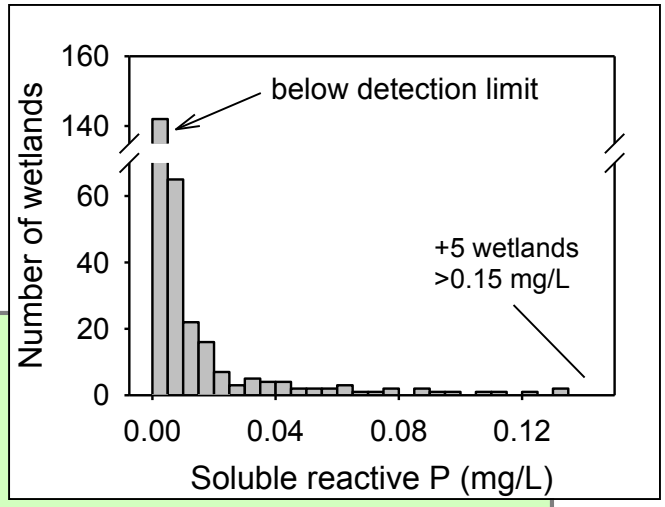
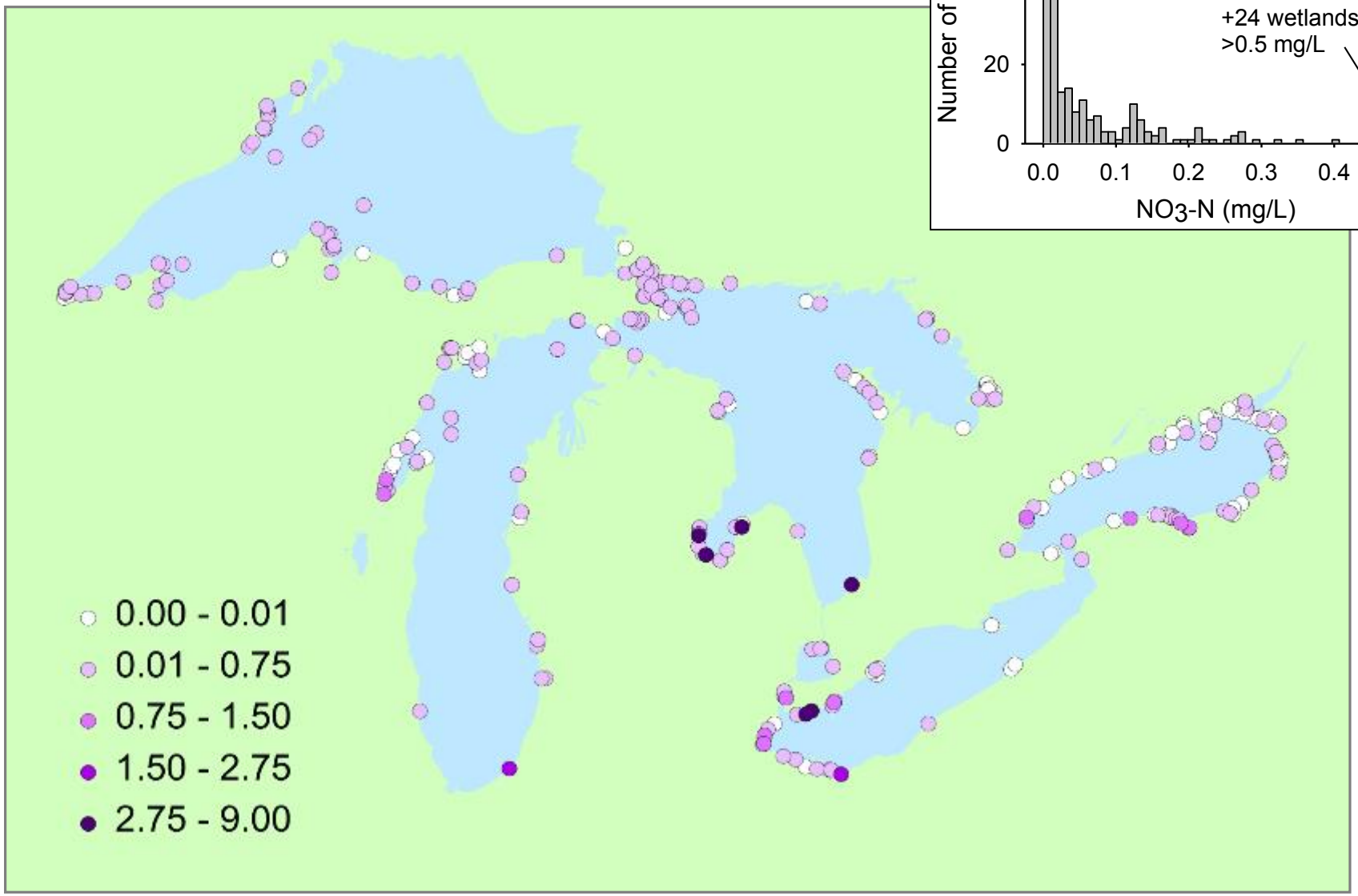
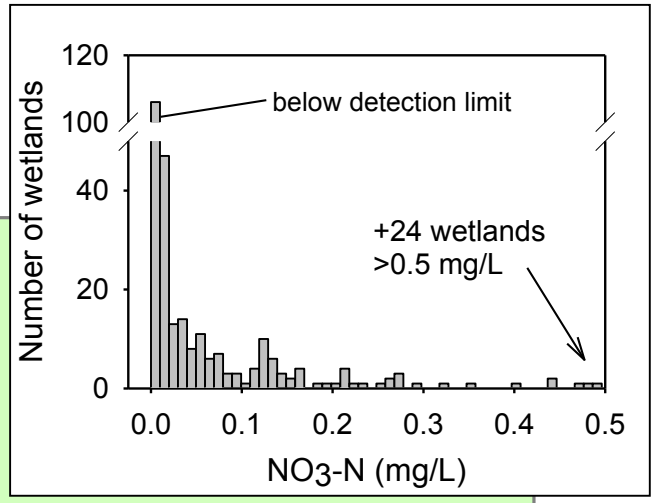
Soluble Reactive P (mg L^{-1})





Nitrate-N (mg L^{-1})





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great lakes cwm coastal wetland monitoring

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Welcome to the Great Lakes Coastal Wetland Monitoring Project (CWM) data website.

This project is sampling Great Lakes coastal wetland biota, habitat, and water quality to provide information on coastal wetland condition using fish, birds, calling amphibians,

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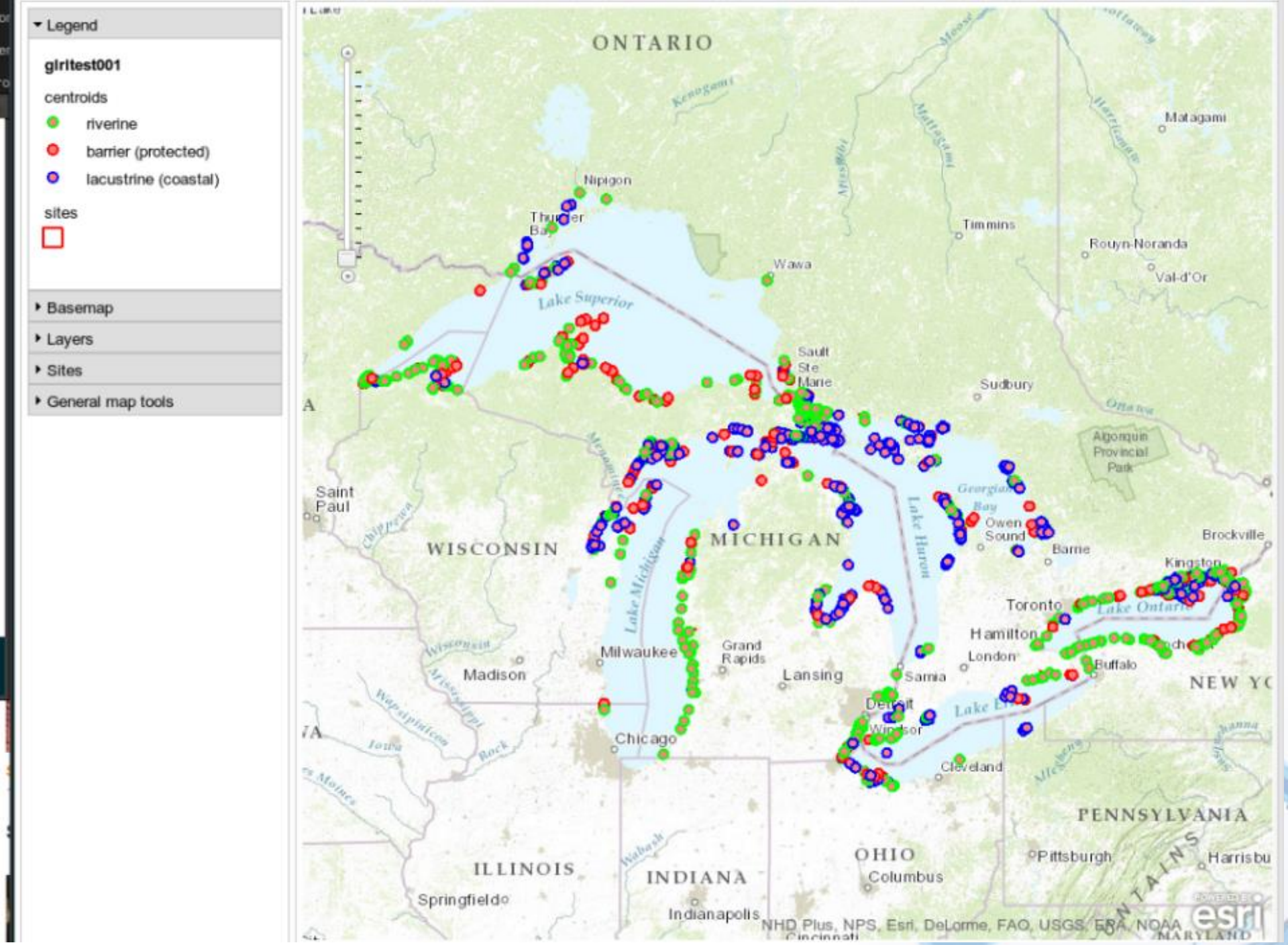
Legend
glritest001
centroids
riverine
barrier (protected)
lacustrine (coastal)
sites
Basemap
Layers
Sites
General map tools
ONTARIO
Nipigon
Thunder Bay
Wawa
Timmins
Matagami
Rouyn-Noranda
Val-d'Or
Lake Superior
Sault Ste Marie
Sudbury
Algonquin Provincial Park
Georgian Bay
Owen Sound
Barrie
Brockville
Kingston
Toronto
Lake Ontario
Hamilton
London
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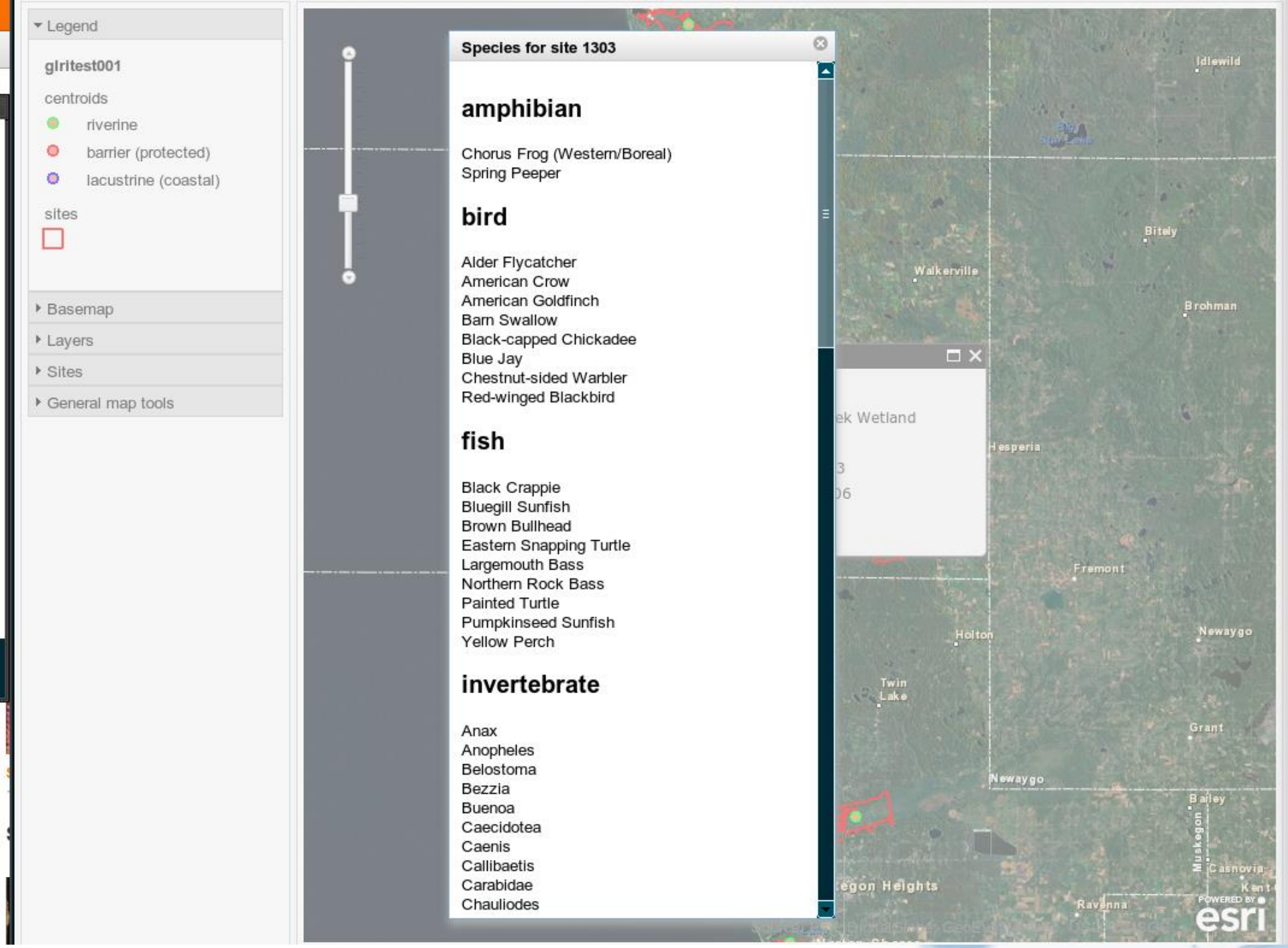
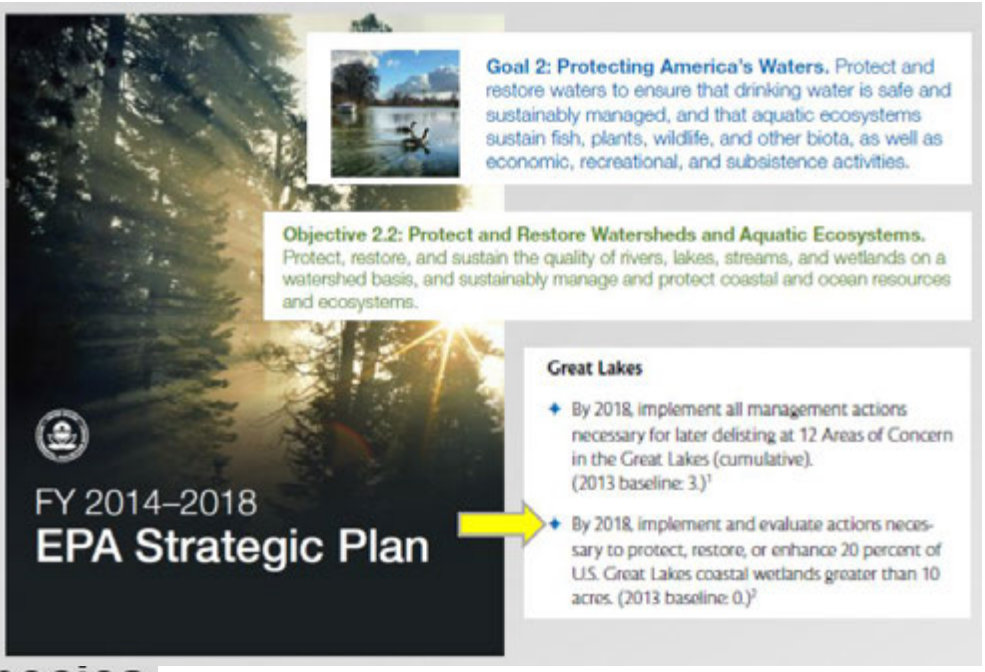
NHD Plus, NPS, Esri, DeLorme, FAO, USGS, EPA, NOAA
esri


Legend
glritest001
centroids
riverine
barrier (protected)
lacustrine (coastal)
sites
Basemap
Layers
Sites
General map tools
Species for site 1303
amphibian
Chorus Frog (Western/Boreal)
Spring Peeper
bird
Alder Flycatcher
American Crow
American Goldfinch
Barn Swallow
Black-capped Chickadee
Blue Jay
Chestnut-sided Warbler
Red-winged Blackbird
fish
Black Crappie
Bluegill Sunfish
Brown Bullhead
Eastern Snapping Turtle
Largemouth Bass
Northern Rock Bass
Painted Turtle
Pumpkinseed Sunfish
Yellow Perch
invertebrate
Anax
Anopheles
Belostoma
Bezzia
Buenoa
Caecidotea
Caenis
Callibaetis
Carabidae
Chauliodes
Idlewild
Bitely
Walkerville
Brohman
Hesperia
Fremont
Holton
Newaygo
Twin Lake
Grant
Barley
Muskegon
Casnovia
Kent
Ravenna
POWERED BY esri

Examples of restoration and conservation efforts supported by our data

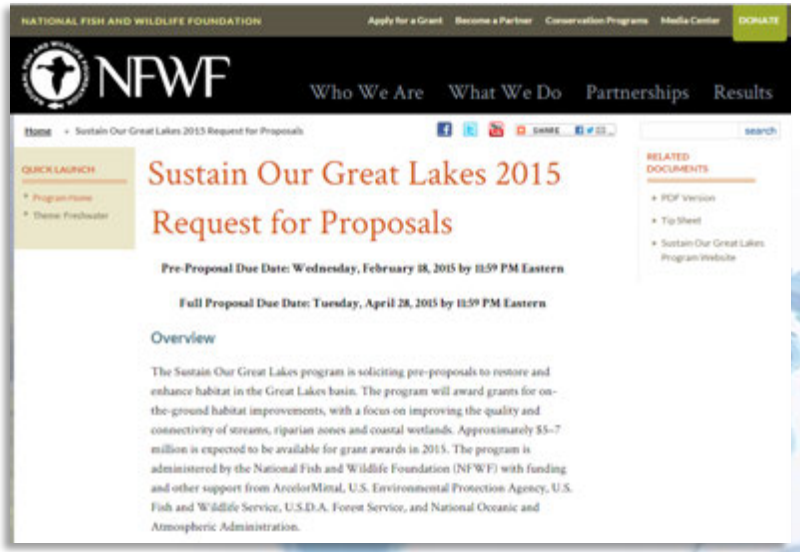
- State of Michigan, Department of Natural Resources
  - St. Marys River & Little Rapids area – monitoring fish and benthos conditions to aid in delisting Beneficial Use Impairments in AOCs
  - William C. Sterling State Park, Lake Erie – evaluation of wetland restoration efforts especially in regards to vegetation, fish, and shorebirds
- Ducks Unlimited
  - Rochester Embayment Area of Concern, Braddock Bay – pre-restoration monitoring for restoring native sedge meadow habitat
- Minnesota Pollution Control Agency
  - Lower St. Louis River Area of Concern – large-scale habitat restoration for removing beneficial use impairments
- New York State Department of Environmental Conservation
  - Lakeview Wildlife Management Area – habitat monitoring and marsh bird data collection for the statewide Marsh Bird Monitoring Program
- Fond du Lac Environmental Program
  - Spirit Lake and Kilchliss Meadows, St. Louis River Estuary – pre-restoration monitoring for aquatic vegetation restoration and habitat improvement
- State of Wisconsin Department of Natural Resources
  - Clough Island, St. Louis River estuary – pre-restoration habitat assessment to establish baseline conditions
  - Wisconsin coast of Lake Superior – habitat monitoring especially with regards to rare species observation, invasive species detection, and climate change effects.



GLRI Action Plan II: Habitat and Species

Measures of Progress with Annual Targets	Baseline/Universe	2015 Target	2016 Target	2017 Target	2018 Target	2019 Target
• Number of miles of Great Lakes tributaries reopened by GLRI-funded projects	Baseline: 1,900 Universe: N/A	2,200	2,500	2,800	3,100	3,400
• Number of miles of Great Lakes shoreline and riparian corridors protected, restored and enhanced by GLRI-funded projects*	Baseline: 0 Universe: N/A	75	100	175	225	300
• Number of acres of Great Lakes coastal wetlands protected, restored and enhanced by GLRI-funded projects*	Baseline: 0 Universe: 260,000	7,000	15,000	30,000	52,000	60,000
• Number of acres of other habitats in the Great Lakes basin protected, restored and enhanced by GLRI-funded projects	Baseline: 117,000 Universe: 1,290,000	127,000	147,000	167,000	187,000	207,000

*This Measure of Progress is a modification of an Action Plan I Measure of Progress that has been modifie
funded by GLRI. The baseline is zero because the new Action Plan II Measure of Progress is not the same m
Progress.



Wednesday, March 18, 2015

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Snail harmful to ducks spreading in Great Lakes

by NBC25 Newsroom

Posted: 12.16.2014 at 8:32 AM

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MUSKEGON (AP) – Scientists say an invasive European snail that carries parasites fatal to some aquatic birds is spreading across the Great Lakes region.

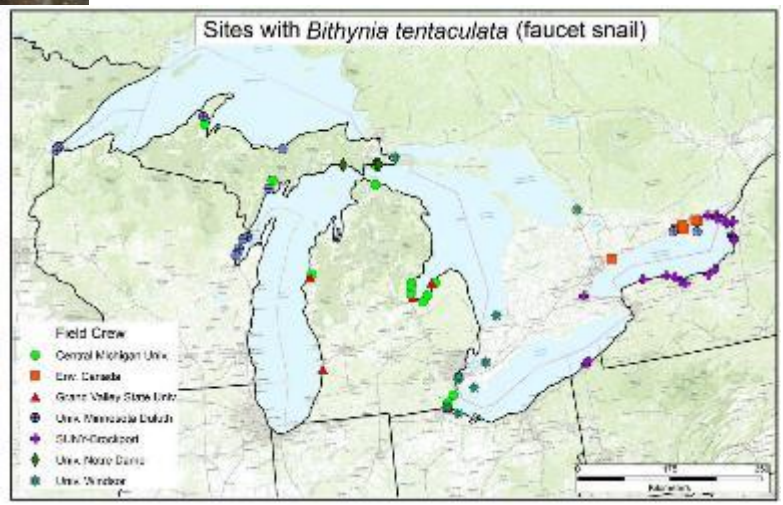
Researchers with 10 universities and the U.S. Environmental Protection Agency have detected faucet snails in many new locations over a three-year period.

The snails harbor intestinal flukes that kill ducks and waterbirds known as coots. When birds eat the snails, the parasites attack the birds' internal organs.

The faucet snail is about a half-inch in height at full size. It ranges in color from brown to black and has a distinctive whorl of concentric circles resembling tree rings on its shell opening cover.

It spreads easily and is hard to kill.

Carl Ruetz of Grand Valley State University's Annis Water Resources Institute said Monday the discovery was made as scientists monitored the condition of Great Lakes wetlands



Thursday, April 2, 2015

Great Lakes Science in Action

An Interdisciplinary and Multi-Institutional Approach

Central Michigan University College of Science and Technology
Institute for Great Lakes Research

1:00 PM to 5:00 PM
French Auditorium
in the Education and Human Services Building

with Special Guest Debbie Stabenow,
U.S. Senator and Co-Chair of the Senate Great Lakes Task Force

Join us for a discussion of Great Lakes restoration and conservation efforts and their impact on the regional economy. Along with policy panels, scientists will provide updates on collaborative Great Lakes research, including invasive species affecting the annual $7.5 billion fishery, along with Great Lakes fisheries threats, status and trends.

U.S. Senator Debbie Stabenow is the Co-Chair of the bipartisan Senate Great Lakes Task Force, where she is the leader in Congress in the fight to protect the Great Lakes.

Funding for this work was provided by the Great Lakes National Program Office under the United States Environmental Protection Agency, grant number GL-00E00612-0. Although the research described in this work has been partly funded by the US EPA, it has not been subjected to the agency's required peer and policy review and therefore does not necessarily reflect the views of the agency and no official endorsement should be inferred.

Collaborators