Update
National Coastal Condition Assessment
Great Lakes

June 2016

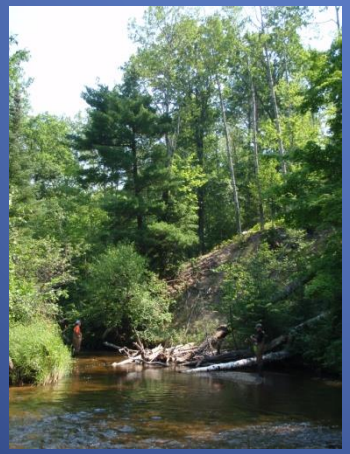
LMMCC

Mari Nord - USEPA Region 5

National Aquatic Resource Surveys (NARS)

- National and Regional Condition Assessment and how it changes over time.
- Capacity building for States and Tribes
- Promote collaboration

Lakes



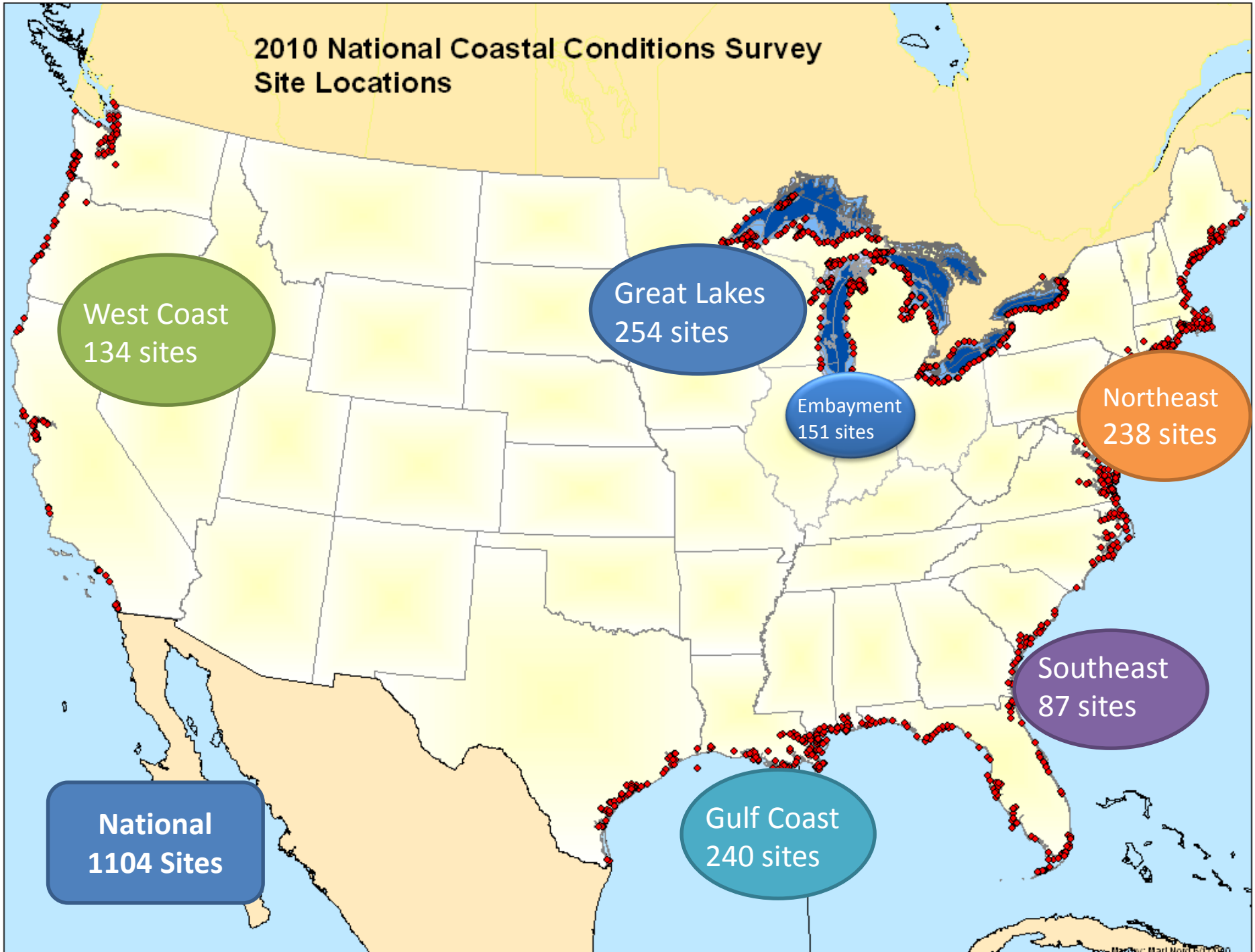
Streams and Rivers

Coastal

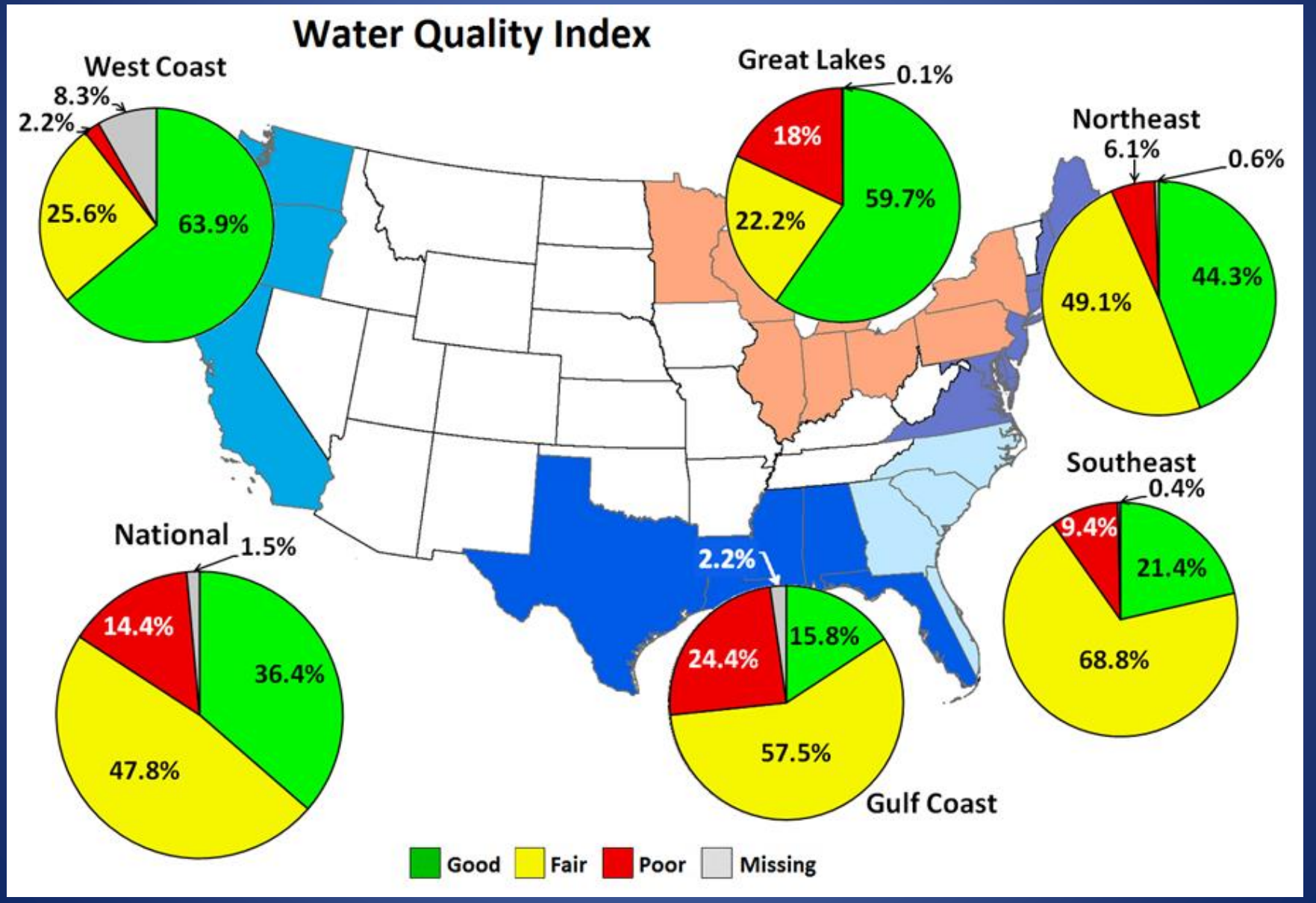
Wetlands

Basic Components of Surveys

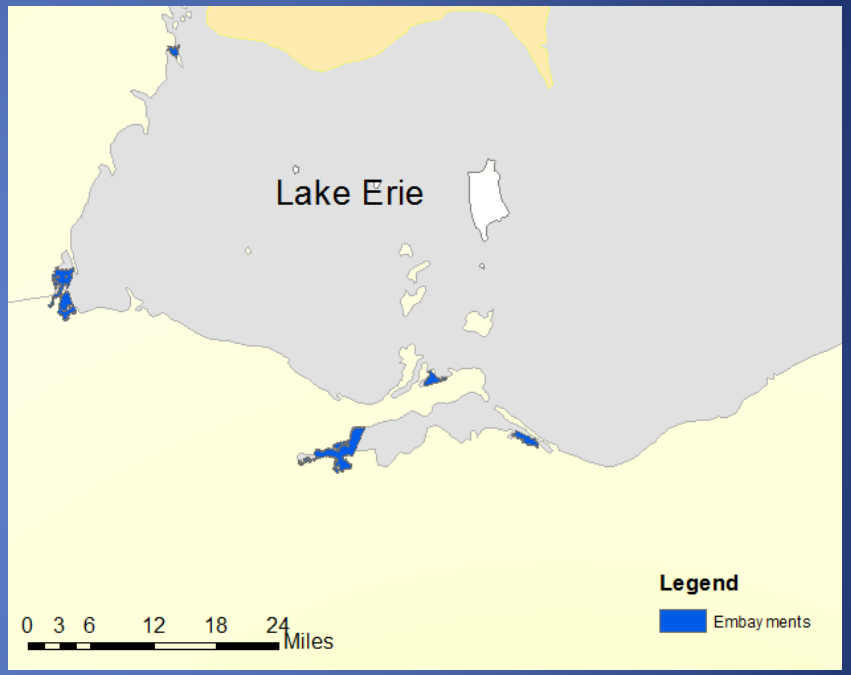
- Probabilistic design
- Index period: June-Sept
- Standard field and lab protocols
- National QA program and data management
- Cost effective (one crew one day)


2010 National Coastal Conditions Survey
Site Locations
West Coast
134 sites
Great Lakes
254 sites
Embayment
151 sites
Northeast
238 sites
Southeast
87 sites
Gulf Coast
240 sites
National
1104 Sites

NCCA 2010 Water Quality



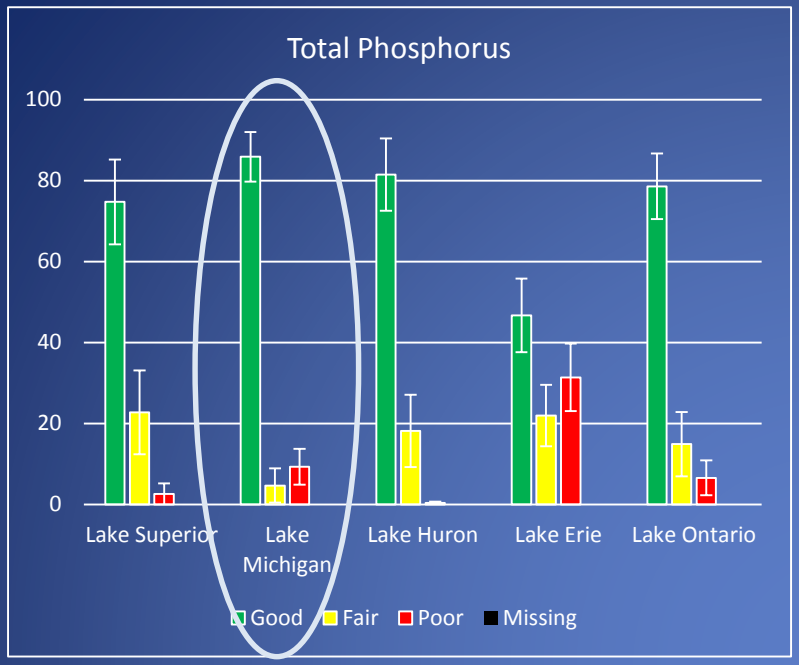
GL Sample Framework

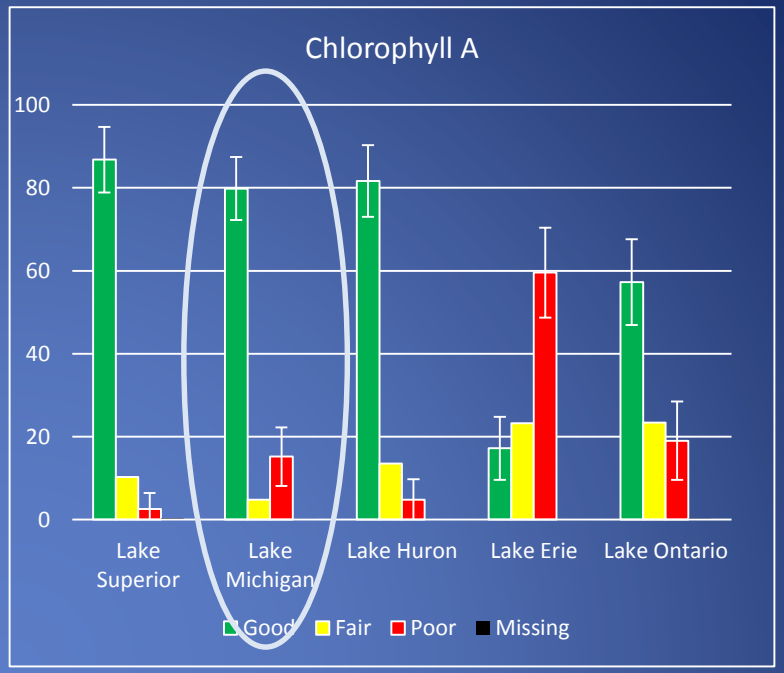


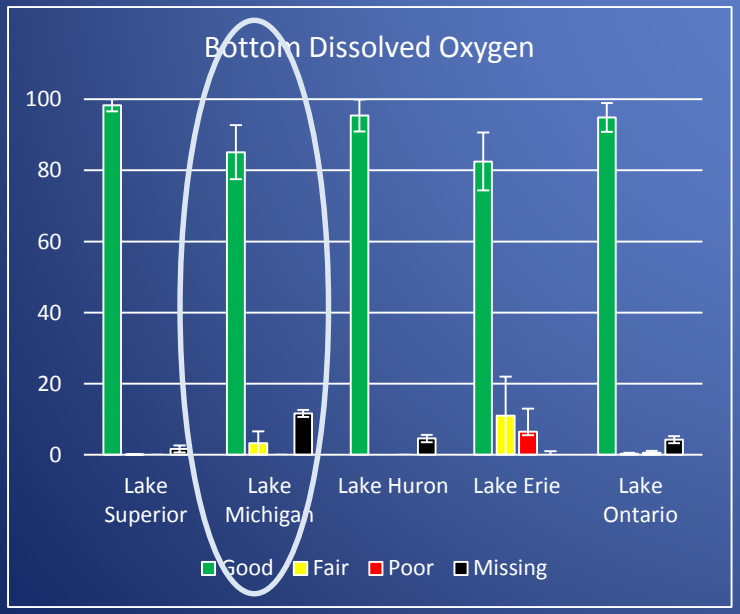
- Nearshore - No more than 5km out or 30m deep.
- Embayments – small and medium – 1-100km^2

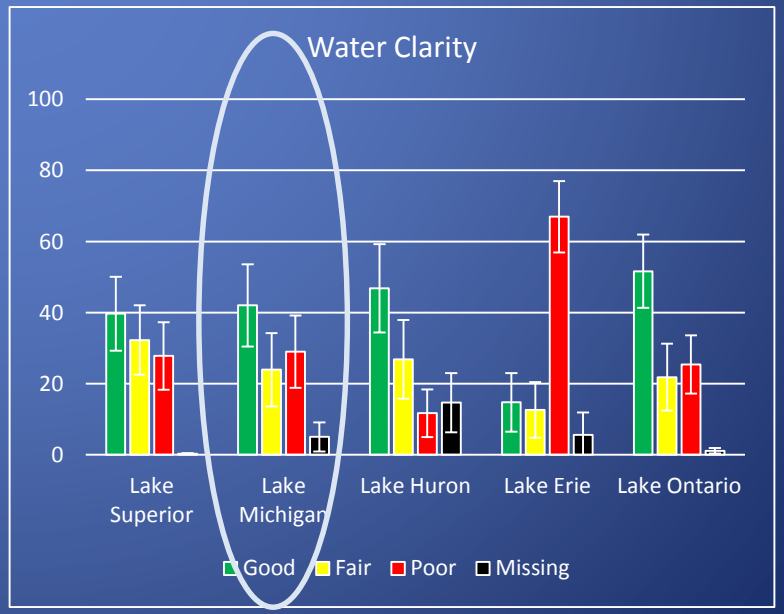
NCCA GL Water Quality thresholds

Lake/Basin	Chl A (ug/L)		Total Phosphorus (ug/L)		Dissolved Oxygen (mg/L)		Secchi Depth (m)		Lake Basin Trophic Condition
	Good/Fair	Fair/Poor	G/F	F/P	G/F	F/P	G/F	F/P	
Superior	1.3	2.6	5	10	5	2	8	5.3	Oligotrophic
Michigan	1.8	2.6	7	10	5	2	6.7	5.3	Oligotrophic
Huron	1.3	2.6	5	10	5	2	8	5.3	Oligotrophic
Saginaw Bay	3.6	6	15	32	5	2	3.9	2.1	Mesotrophic
Western Erie	3.6	6	15	32	5	2	3.9	2.1	Mesotrophic
Central Erie	2.6	3.6	10	15	5	2	5.3	3.9	Oligomesotrophic
Eastern Erie	2.6	3.6	10	15	5	2	5.3	3.9	Oligomesotrophic
Ontario	2.6	3.6	10	15	5	2	5.3	3.9	Oligomesotrophic


Total Phosphorus
100
80
60
40
20
0
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Good
Fair
Poor
Missing


Chlorophyll A
100
80
60
40
20
0
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Good
Fair
Poor
Missing

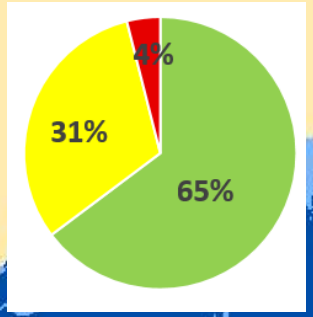

Bottom Dissolved Oxygen
100
80
60
40
20
0
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Good
Fair
Poor
Missing

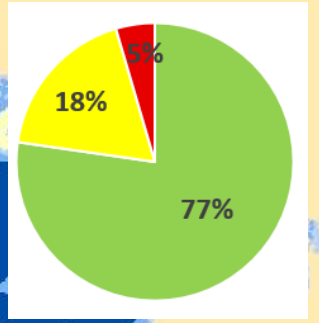

Water Clarity
100
80
60
40
20
0
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Good
Fair
Poor
Missing

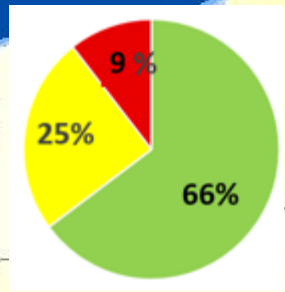
NCCA Water Quality Index

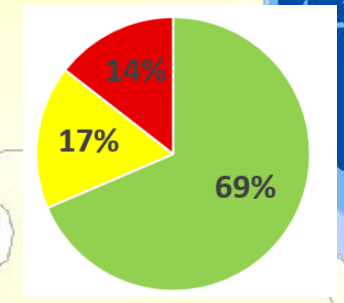
Rank	Good	Fair	Poor
Water Quality Index	No component indicators are rated poor, and a maximum of one is rated fair.	One component indicator is rated poor, or two or more component indicators are rated fair.	Two or more component indicators are rated poor.

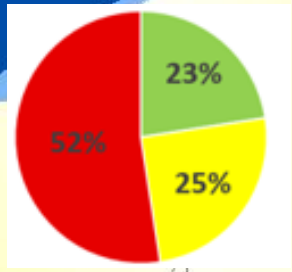
Water Quality Index
Nearshore Base Sites



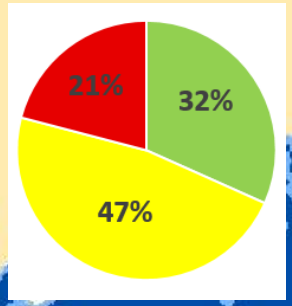


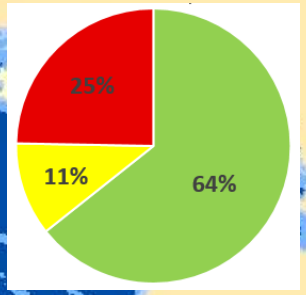


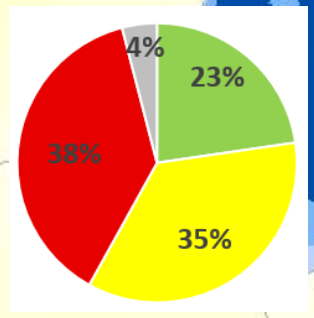


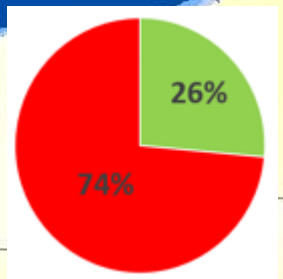


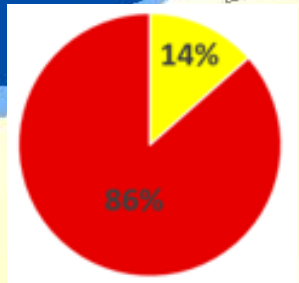
Water Quality Index
Embayments Only



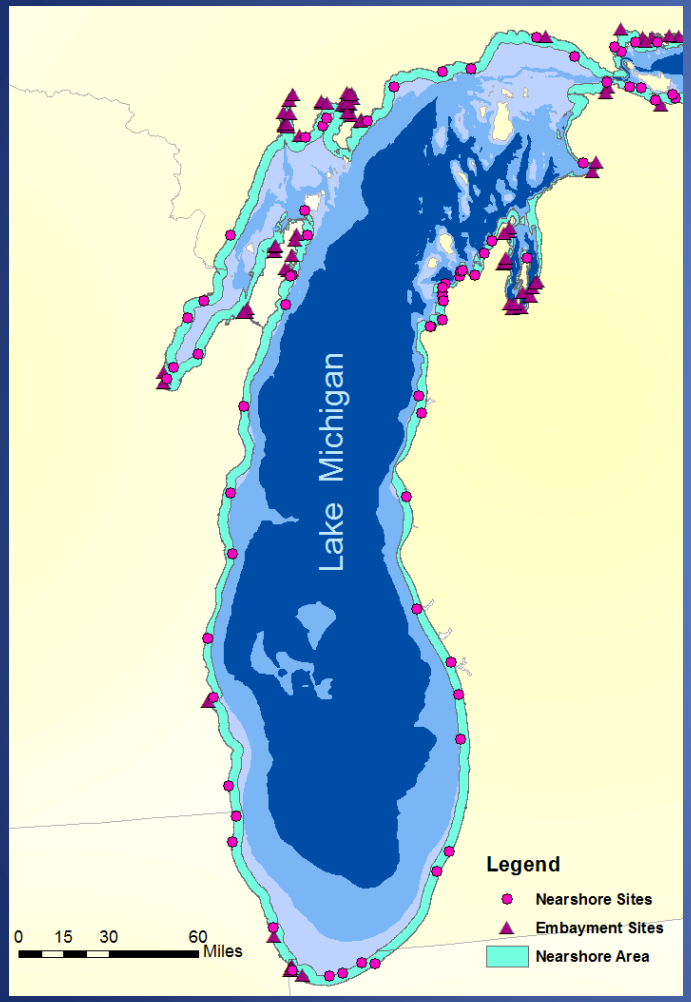


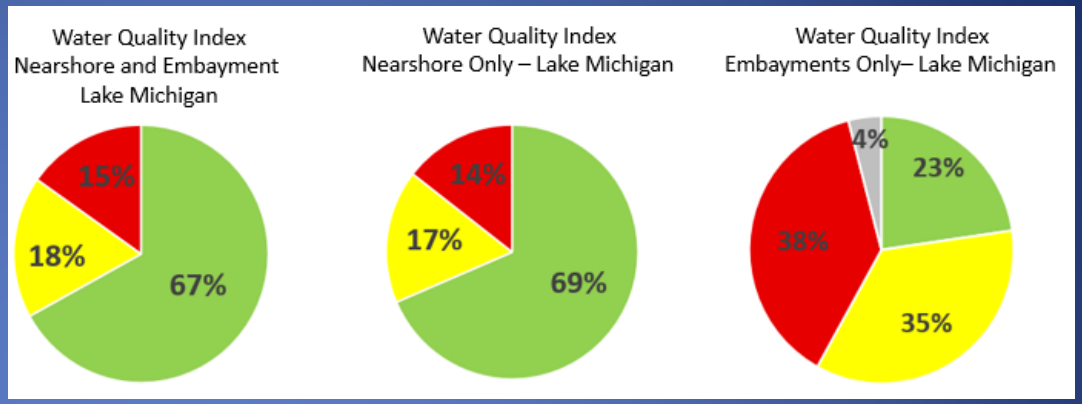


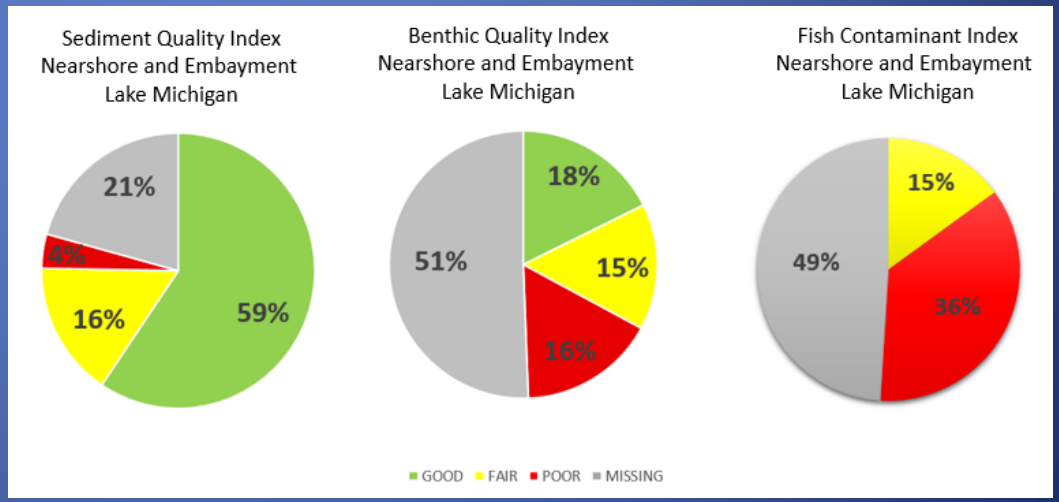


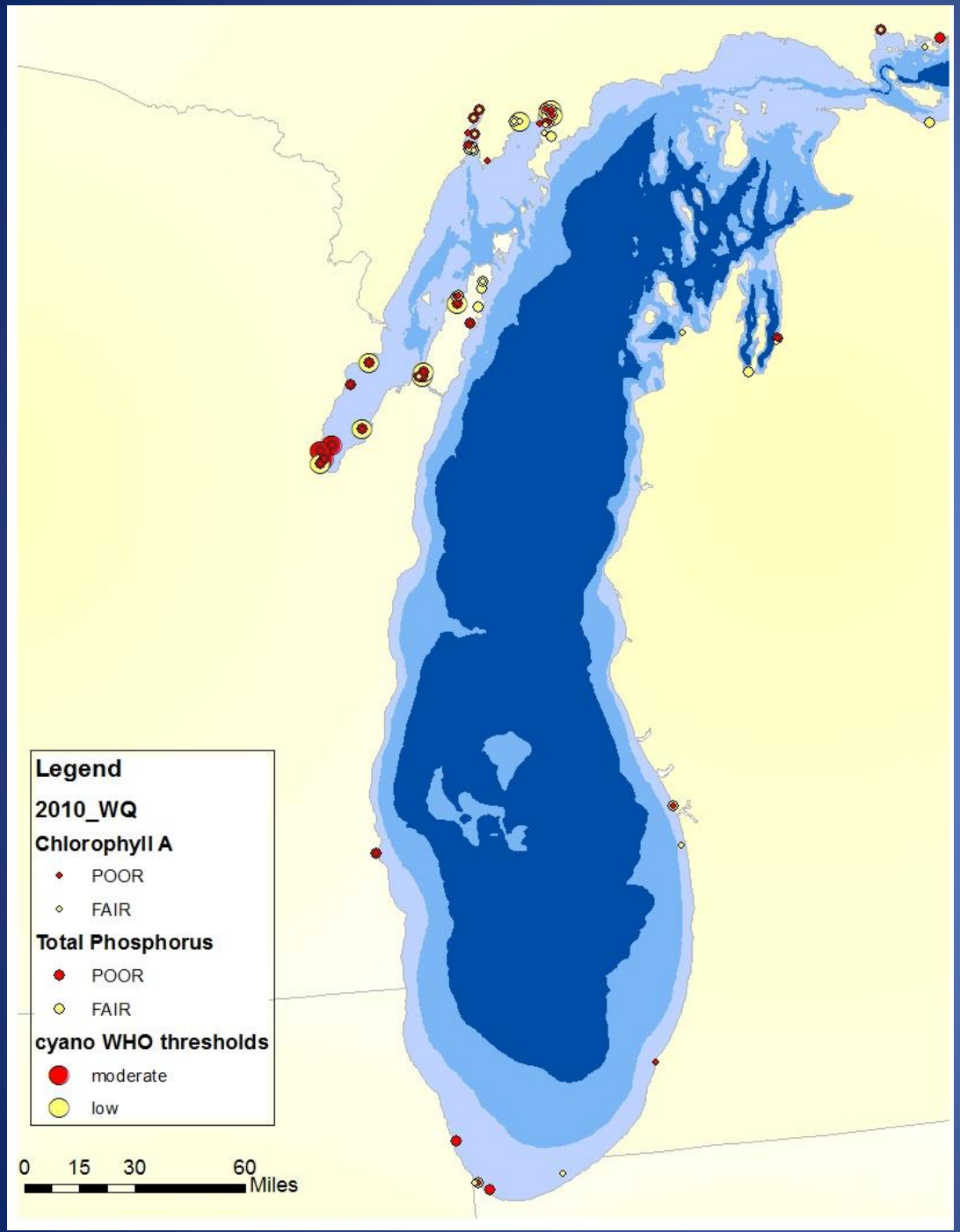


Lake Michigan Condition Assessment

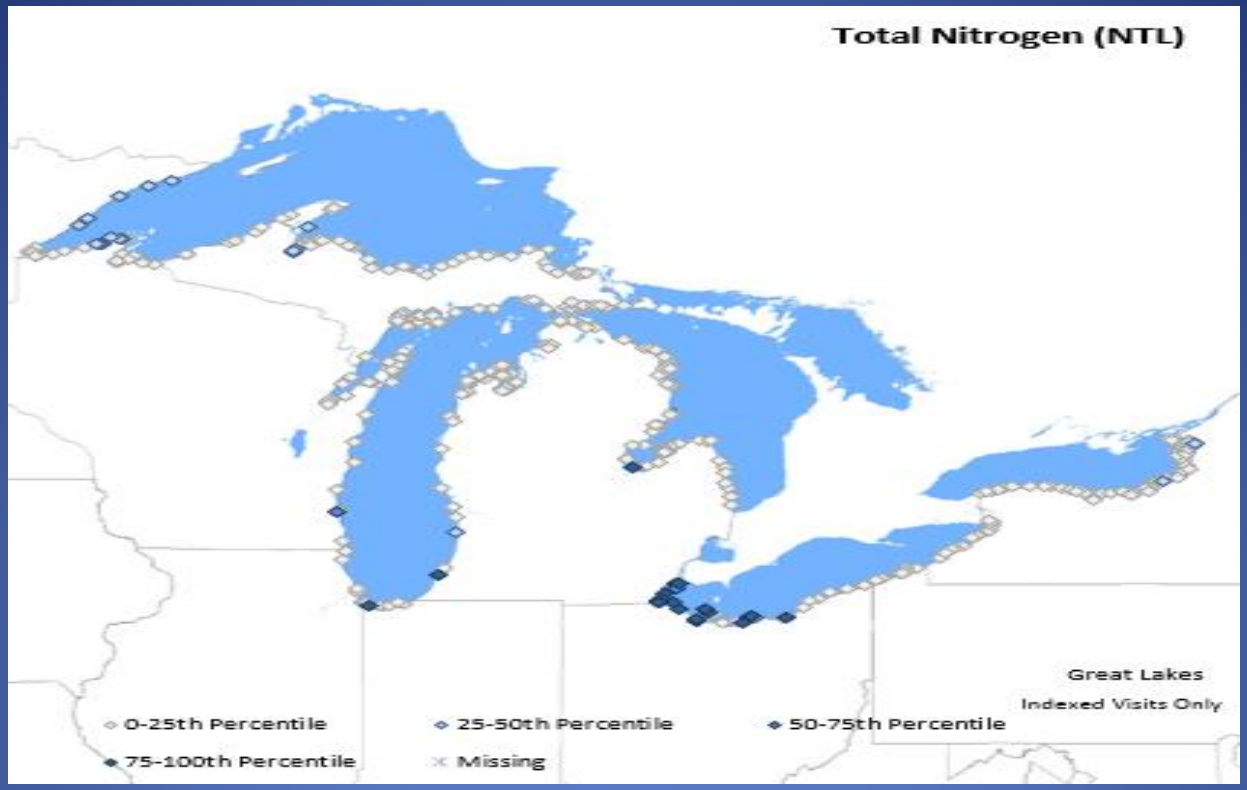


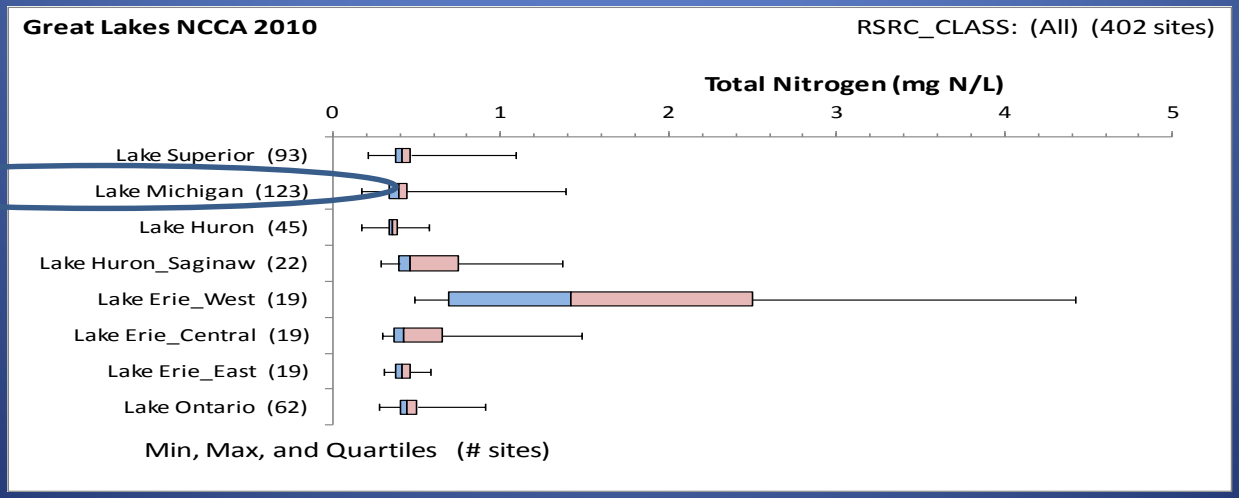






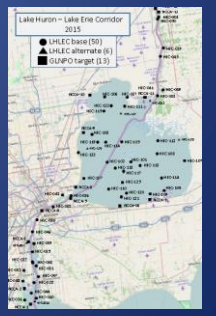
- Sites with higher levels of TP and Chlorophyll A and Cyanobacterial counts are found in the Green Bay area.
- 4 sites along the southern region of Lake Michigan had Total Phosphorus levels that exceeded 10ppm


Total Nitrogen (NTL)
Great Lakes
Indexed Visits Only
0-25th Percentile
25-50th Percentile
50-75th Percentile
75-100th Percentile
Missing


Great Lakes NCCA 2010
RSRC_CLASS: (All) (402 sites)
Total Nitrogen (mg N/L)
0
1
2
3
4
5
Lake Superior (93)
Lake Michigan (123)
Lake Huron (45)
Lake Huron_Saginaw (22)
Lake Erie_West (19)
Lake Erie_Central (19)
Lake Erie_East (19)
Lake Ontario (62)
Min, Max, and Quartiles (# sites)

Enhancements/ Collaborations

- Embayment Study
- Phytoplankton Study
- Underwater Video Study
- Human Health Fish Tissue Study
- National Park Service Study (2010)
- Lake Erie Subbasin study (2015)
- HABs study (2015)
- Connecting Channels Study (2014)
- State level Studies (IL, WI and OH)
- University of Windsor (J. Ciborowski)



NCCA Parameters

Water Quality Index:

- Water Clarity – Secchi, PAR
- DO, Temp, pH, conductivity
- Chlorophyll *a*
- Nutrients (TP, TN, DIP, DIN)
- Chloride and Sulfate

Biological Quality Index:

- Benthic Community
- Underwater video

Sediment Quality Index:

- Toxicity (10-day amphipod survival)
- Contaminants (PAHs, PCBs, Metals, Pesticides)
- TOC
- Grain Size

Ecological Fish Tissue Quality Index:

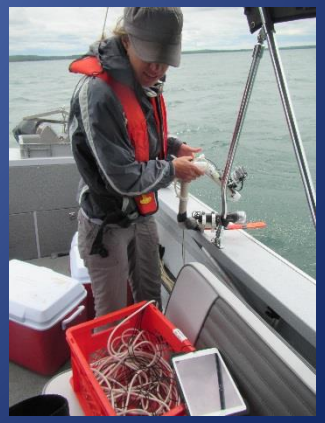
- Whole-Fish Contaminant Burden

Human Health Indicators:

- Fillet – Fish Contaminant Burden
- Fish Plug for Mercury
- Enterococci
- Microcystin/ Algal Toxins
- Phytoplankton

Next Steps

- Workgroups
- Data analysis and report for 2015 survey
- Preparation for 2020
- Collaborative Opportunities



Thank You

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www.epa.gov/national-aquatic-resource-surveys/ncca

USGS – HABS Enhancement

- anatoxin-A
- cylindrospermopsin,
- microcystin-LA,
- microcystin-LF,
- microcystin-LR,
- microcystin-LW,
- microcystin-LY,
- microcystin-RR,
- microcystin-YR,
- microcystin-WR,
- microcystin-HtYR,
- microcystin-HiLR.