

Lake Michigan Monitoring Program (LMMP)

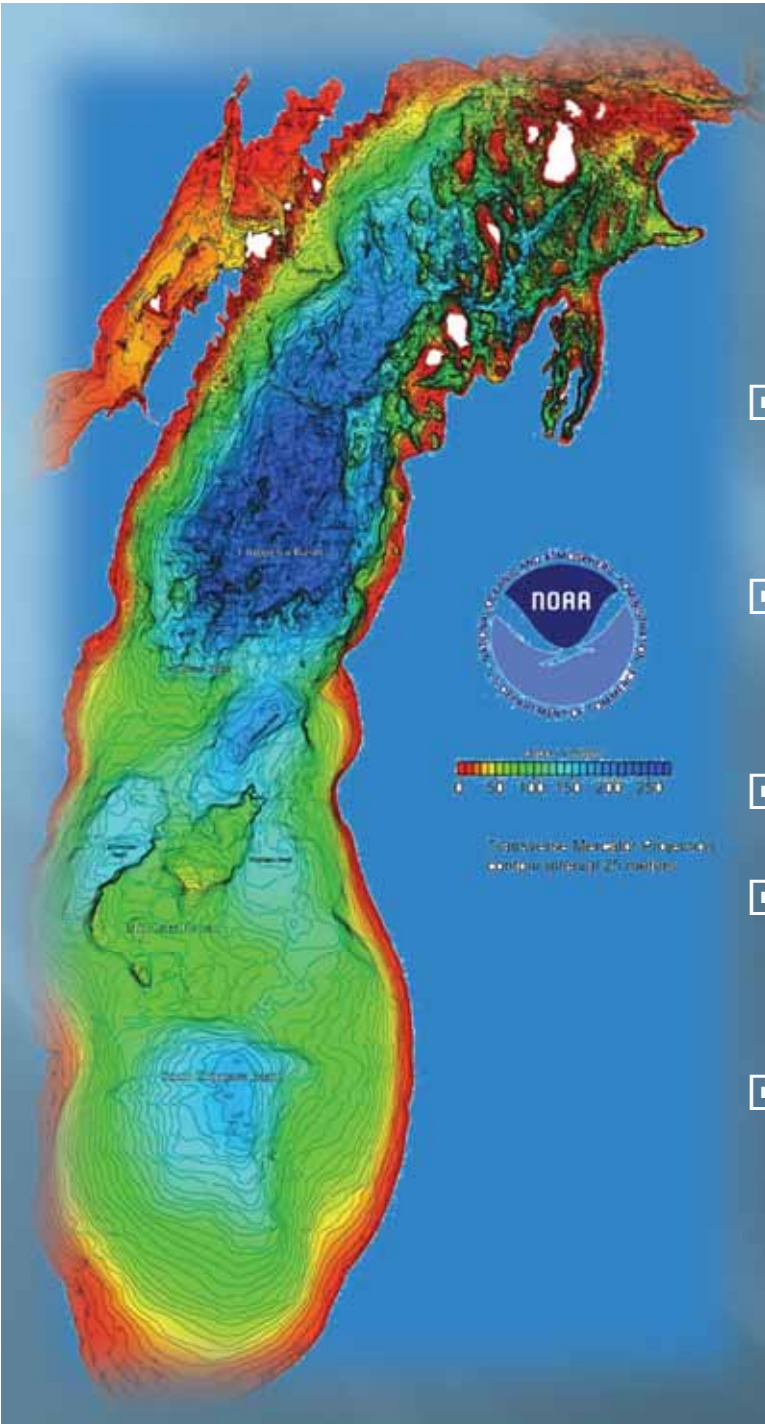


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Lake Michigan Facts

- ▣ 3rd largest of the Great Lakes by volume
- ▣ Largest body of freshwater entirely within US boundaries
- ▣ Maximum depth: 925ft
- ▣ 63 miles of Illinois coastline (1,640 miles lake-wide)
- ▣ Drinking water source for 8.5 million people in Illinois (10 million people lake-wide)

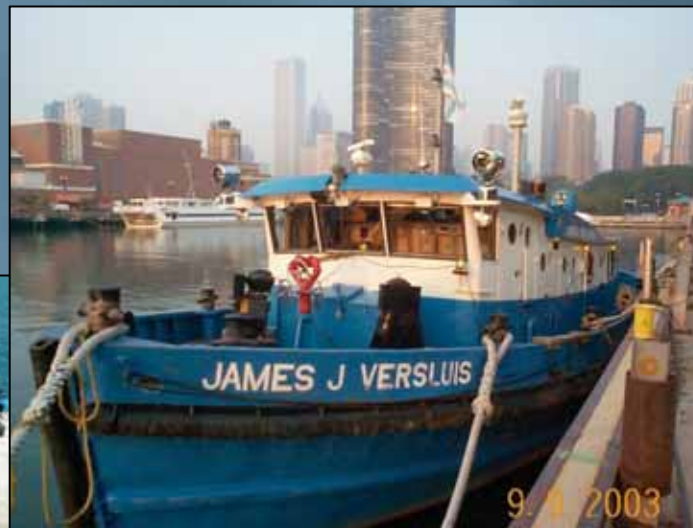


Why Is IEPA Monitoring Lake Michigan ?

- ▣ Recognizing the great importance of Lake Michigan as a natural asset, the 75th Illinois General Assembly authorized Illinois EPA through 615 ILCS 5/14a of the Rivers, Lakes, and Streams Act to “...regularly conduct water quality and lake bed surveys to evaluate the ecology and quality of water in Lake Michigan.”
- ▣ The Federal Water Pollution Control Act Amendments of 1972 (PL-92-500) and subsequent amendments (collectively called the Clean Water Act or “CWA”), namely Sections 305(b) and 303(d), require the biennial assessment of the nations surface water resources.

LMMP 1977-2008

- ▣ Collaborative effort with the City of Chicago
- ▣ 21 water quality stations
- ▣ City of Chicago tug boat (docked at Jardine Water Purification Plant)



LMMP Redesign 2009

- ▣ Four Main Components
 - Nearshore Survey
 - Harbor Monitoring
 - Public Water Supply/
Fixed Station
 - Shoreline/ Beach
Assessment (sampling
conducted by other
agencies)
- ▣ IEPA boat purchased 2010
- ▣ Implemented new
program 2010



Nearshore Survey

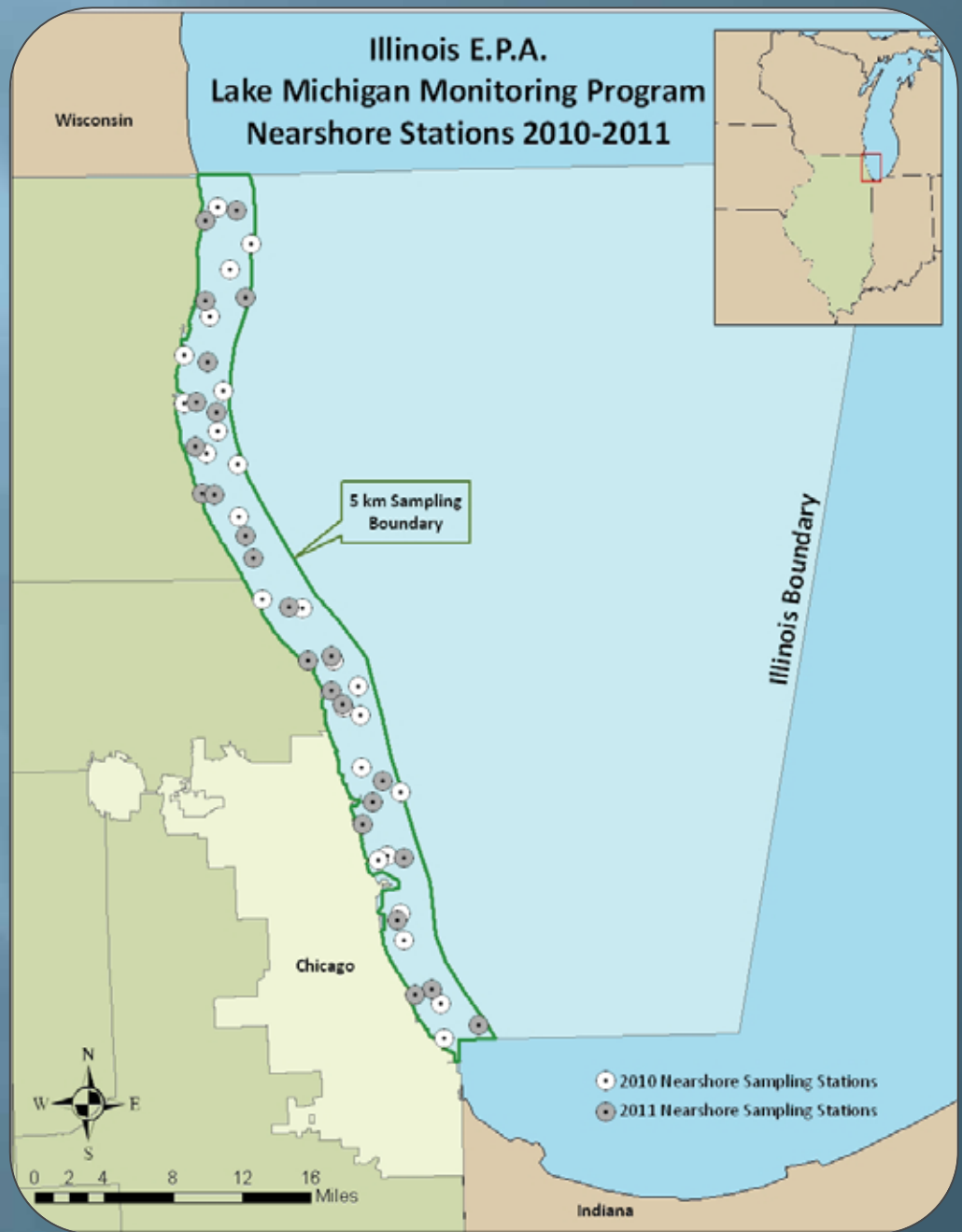
- Probabilistic Design
 - Tony Olsen; Jack Kelly, USEPA
 - Follows design of National Coastal Conditions Assessment (NCCA) survey
- Nearshore defined as: 5km from shore, or 30m depth, whichever comes first
- 50 stations sampled over 2 year sampling cycle (25 stations per year)
- 3 times per year – May, July, September



Nearshore Survey

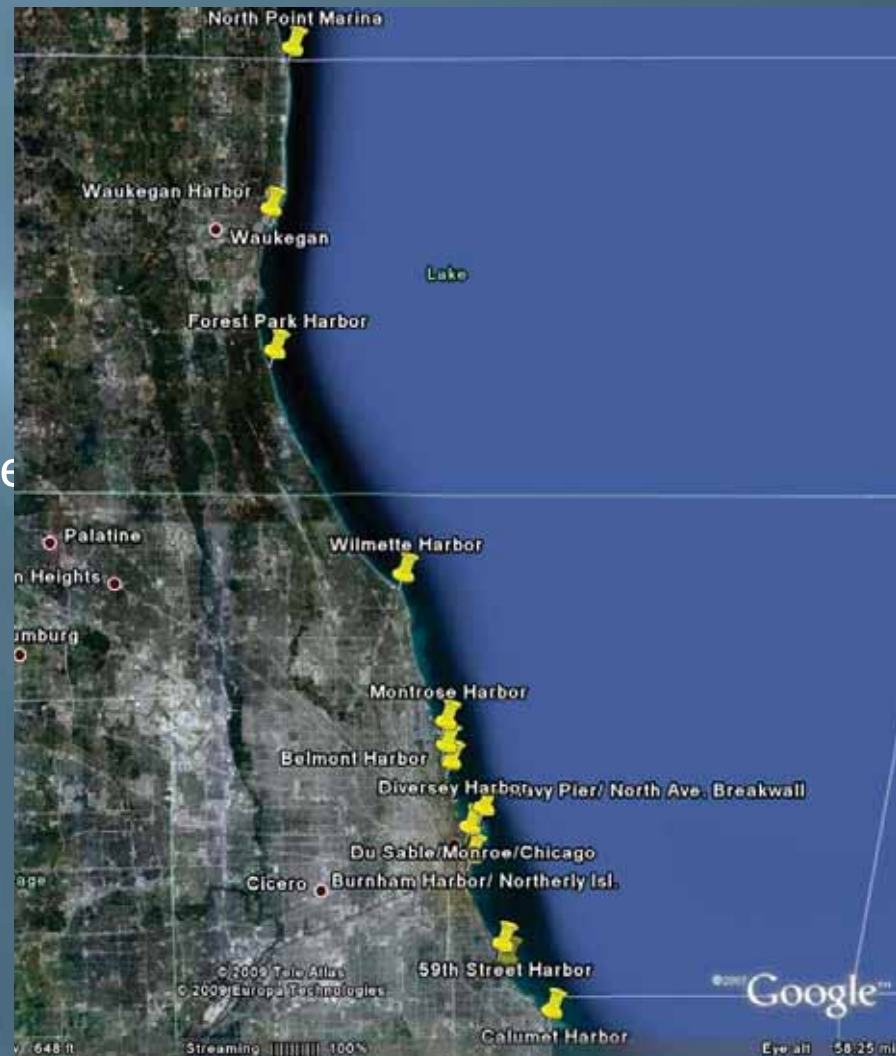
- ▣ Near-surface (0.5m depth) water quality at all stations
- ▣ Expanded Stations
 - 10 stations of the 50 (5 stations per year)
 - Near-surface water quality with additional parameters
 - Near-bottom (1m off bottom) water quality
 - Temperature/ Dissolved Oxygen profile





Harbor Monitoring

- 12 Harbors along Illinois coastline
- 2 to 3 harbors per year; 5 year rotating cycle
- 1 to 4 stations per harbor depending on size
- Water quality at near-surface (0.5m depth) and near-bottom (1 station per harbor)
- Samples taken 3 times throughout year
- Sediment collected 1 time during the year



Public Water Supply/ Fixed Station

- ▣ 3 to 5 stations per year
- ▣ Sampled at the intakes offshore
- ▣ Water quality samples taken at 1m off the bottom as “intake depth”
- ▣ Samples also taken at near-surface (0.5m depth)



Water Quality Parameters

Component	Nearshore	Expanded Nearshore	Harbors	Public Water Supply/Fixed
Total Nutrients	X	X	X	X
Dissolved Phosphorus		X	X	X
Total Metals	X	X	X	X
Dissolved Metals		X	X	X
Chloride	X	X	X	X
Fluoride	X	X	X	X
Sulfate	X	X	X	X
Total Organic Carbon		X	X	X
Total Dissolved Solids	X	X	X	X
Total Suspended Solids	X	X	X	X
Volatile Suspended Solids	X	X	X	X
Cyanide		X	X	X
Phenols		X	X	X
Organics/Pesticides		X		X
Chlorophyll a		X	X	X
Turbidity		X	X	X
Secchi Disk Transparency		X	X	X
Conductivity	X	X	X	X
pH	X	X	X	X
Water Temperature	X			
Dissolved Oxygen	X			
Temperature/Dissolved Oxygen Profile		X	X	X
Phytoplankton Identification and Cell Counts		X	X	X
Sediment Organics/Pesticides			X	
Sediment Percent Total Solids			X	
Sediment Volatile Solids			X	
Sediment Total Organic Carbon			X	
Sediment Phosphorus			X	
Sediment Total Kjeldahl Nitrogen			X	
Sediment Metals			X	
Sediment Mercury			X	

Shoreline/ Beach Assessment

- ▣ 51 beaches along 63 miles of Illinois shoreline
- ▣ Sampled by municipalities and county health departments
- ▣ Beaches sampled for E.coli bacteria; elevated levels will close beaches to bathers
- ▣ IEPA uses beach closing data for Integrated Report (305(b)/ 303(d)) assessments

Sampling Boat

- ▣ Steiger Craft 255 DV Pilothouse boat
 - 25.5' hull length (fiberglass)
 - 250hp Suzuki outboard, 9.9hp high-output Suzuki outboard (emergency backup)
 - Size allows the boat to be trailered
 - $\frac{3}{4}$ enclosed cabin
 - Large work deck
 - Garmin electronics: Chart plotter/ GPS, VHF ship-to-shore radio, sonar





Sampling Equipment

- ▣ 8.2L Van Dorn-style Beta Bottle
- ▣ 1.2L Stainless Steel Kemmerer
- ▣ Hydrolab Minisonde 5a
- ▣ Weighted Bottle Sampler
- ▣ 20cm Secchi Disk
- ▣ Petite Ponar Dredge (harbor sediment sampling)



Assessment And Reporting

What does IEPA do with the data?

- ▣ Illinois Integrated Water Quality Report And Section 303(d) List
 - Report generated every 2 years
 - Most recent 3 years of available data used

- ▣ Lake Michigan Basin water quality standards
 - Illinois Pollution Control Board (35 Ill. Adm. Code 302, Subpart E)

- ▣ Public and Food Processing Water Supply Standards
 - Illinois Pollution Control Board (35 Ill. Adm. Code 302, Subpart C)

Assessment And Reporting

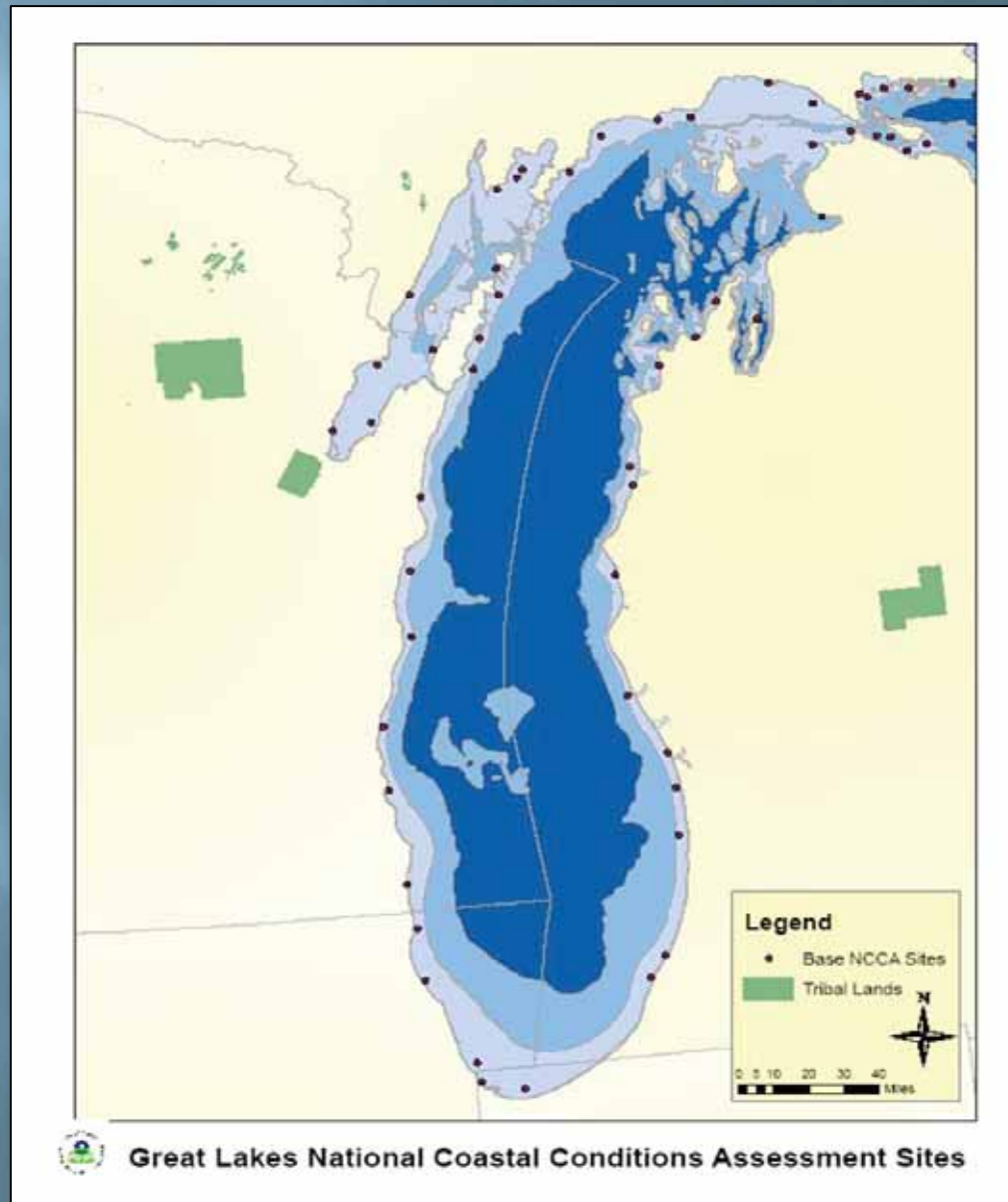
▣ Beneficial Uses

- Aquatic Life Use (is aquatic life in the lake happy?)
- Aesthetic Quality Use (is the lake visually appealing?)
- Primary Contact Use (described as prolonged and intimate contact with the water and risk of ingesting water is considerable, such as swimming or water skiing)
- Secondary Contact Use (described as incidental or accidental contact with the water and risk of ingesting water is minimal, such as boating or fishing)
- Public And Food Processing Water Supply Use (can you use the water for drinking water purposes?)
- Fish Consumption Use (can you eat the fish?)

National Coastal Conditions Assessment (NCCA)

- ▣ Part of the USEPA National Aquatic Resource Surveys
 - National Lakes Assessment (NLA)
 - National Rivers And Streams Assessment (NRSA)
 - National Wetland Condition Assessment (NWCA)
- ▣ IEPA participated in 2010 (this was the first time the Great Lakes were included in the NCCA)
- ▣ 50 stations per Great Lake
- ▣ Illinois had 3 stations, also sampled 2 Indiana stations
- ▣ Water quality, physical habitat, sediment, benthos, fish, invasive species
- ▣ Next NCCA sampling will be in 2015

2010 NCCA Lake Michigan Stations



Future LMMP

- ▣ NCCA sampling 2015
- ▣ Continue to refine Nearshore probabilistic design
- ▣ Waukegan Harbor Area Of Concern (AOC)
- ▣ Special studies
- ▣ Collaborations with other Agencies



A dramatic sky over a body of water. The sky is filled with dark, heavy clouds, with a bright light source breaking through near the horizon, creating a glow. The water is dark and textured with small waves. The word "Questions?" is overlaid in the center in a white, sans-serif font with a slight shadow.

Questions ?