Lake Michigan LAMP and State of the Lake

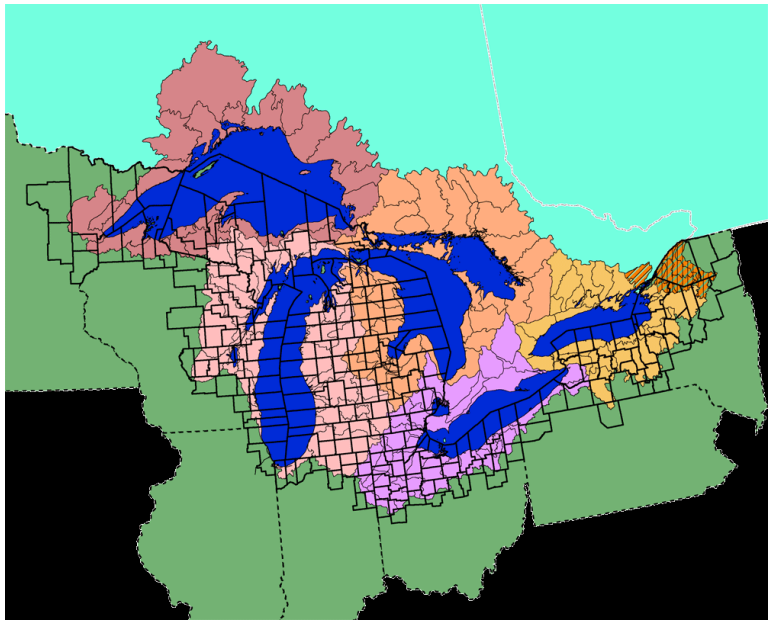
Michael Spinar
Indiana Department of
Environmental Management

Lake Michigan
Lakewide Action and Management Plan

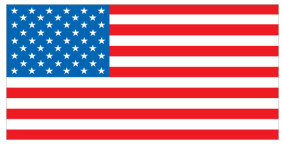
PART I:
GREAT LAKES WATER QUALITY AGREEMENT AND THE LAKE MICHIGAN LAMP

Importance of the Great Lakes

- The Great Lakes are vital to the social and economic well-being of both the United States and Canada.
  - Largest readily available source of freshwater in the world
  - Provides drinking water for nearly 41 million people
  - Supports a $4 billion sports fishery industry
  - Allows for 200 million tons of commercial shipping annually



- However, pollution and other human-caused ecosystem impacts have the potential to damage this natural resource.



Great Lakes Water Quality Agreement

- The GLWQA was signed by the United States and Canada in 1972
  - Cooperation required to protect this binational resource
  - Initially focused on lowering quantities of nutrients (phosphorus) and pollutants (such as oils and heavy metals) entering the Great Lakes
- Agreement was amended (and expanded) in 1978, 1983, 1987, and 2012.
- Currently consists of:
  - 9 General Objectives (broad ecosystem goals)
  - 13 Articles ("nuts and bolts" of implementation)
  - 10 issue-specific Annexes

GLWQA General Objectives

1. Be a source of safe, high quality drinking water	2. Allow for safe swimming and other recreational use	3. Allow for human consumption of fish & wildlife free from pollutant concerns	4. Be free from pollutant impacts
5. Support habitat (including wetlands) for native species	6. Be free from nutrient impacts	7. Be free from the introduction and impact of invasive species	8. Be free from contaminated groundwater impacts

- #9: Be free from other impacts to water quality

GLWQA Issue-Specific Annexes

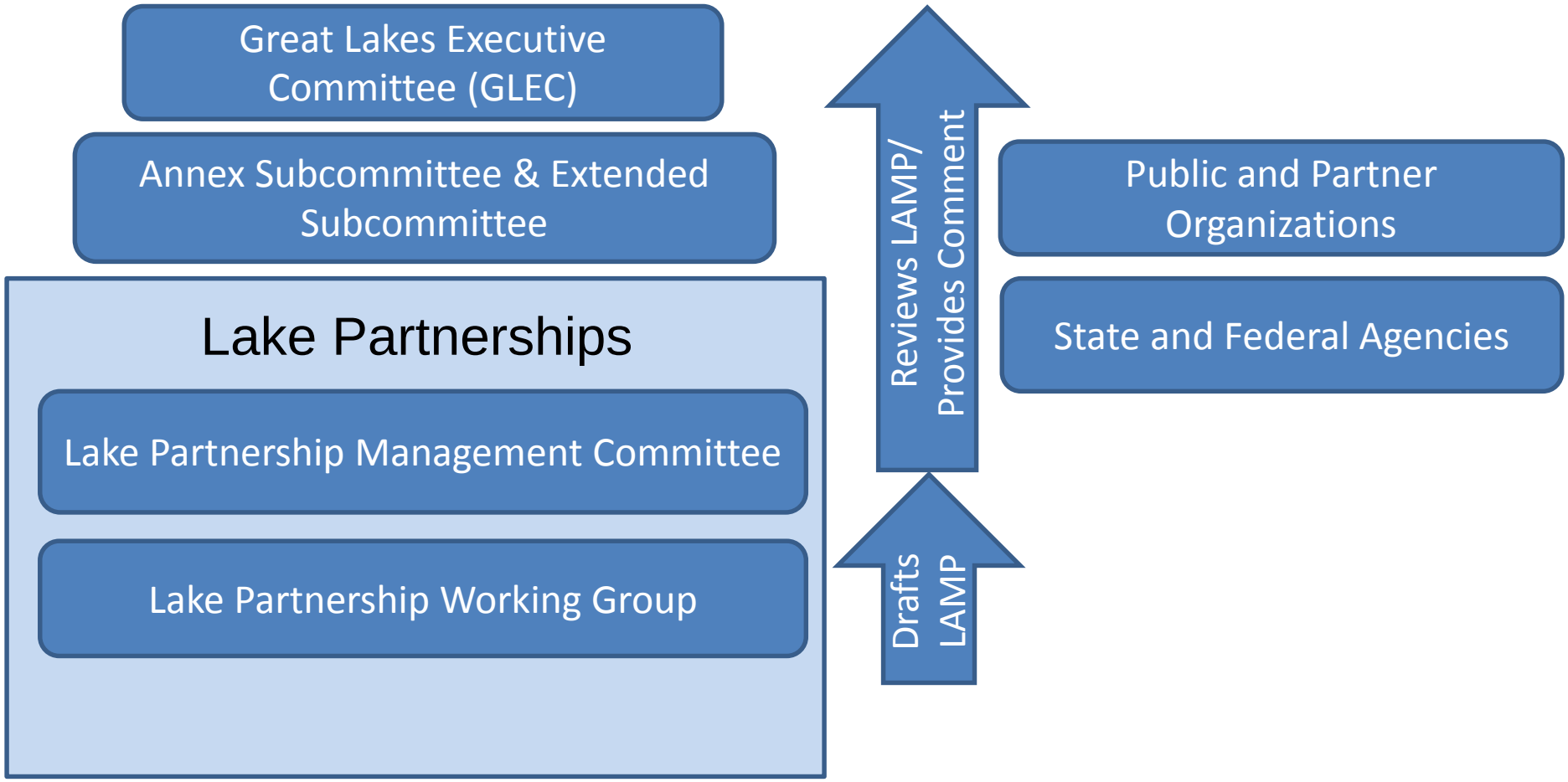
Annex 2 Tasks

- ✓ Develop five-year Lakewide Action and Management Plans (LAMPs) for each Great Lake
- ✓ Track LAMP implementation
- ✓ Develop a Nearshore Framework
- ✓ Set priorities for Cooperative Science and Monitoring Initiative (CSMI) under Annex 10.
- ✓ Develop Lake Ecosystem Objectives and Substance Objectives as appropriate.
- ✓ Conduct outreach and engagement

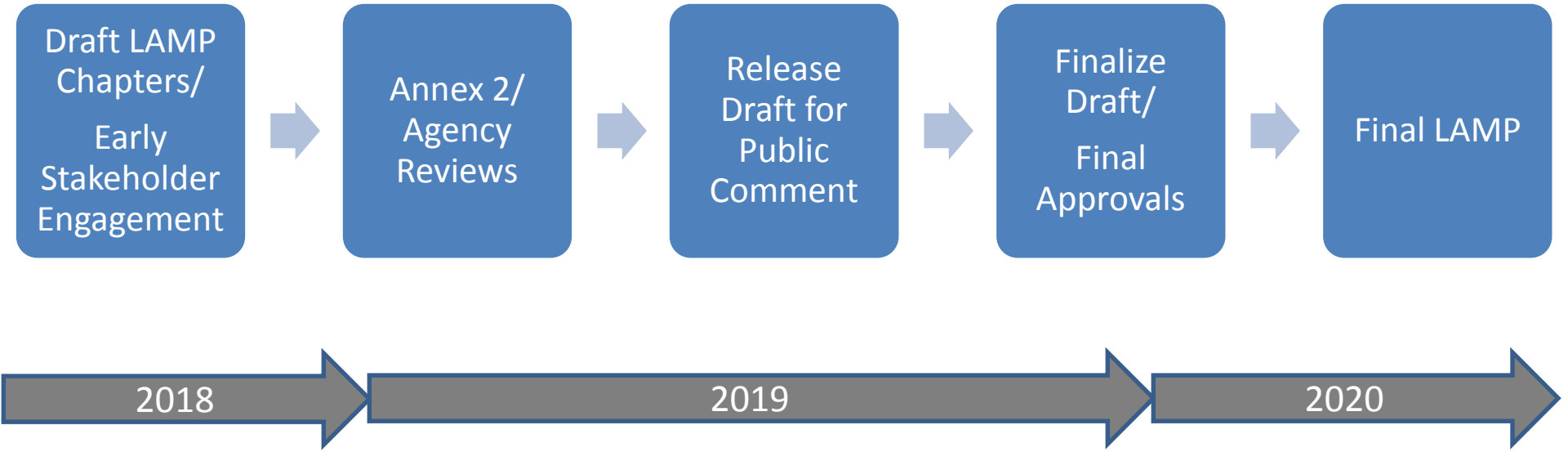
What is a LAMP?

- The 1987 GLWQA called for **La**kewide **M**anagement **P**lans (**LaMP**s) to be developed for each Great Lake
  - A LaMP was a plan for restoring or protecting beneficial uses in open lake water taking into account the whole ecosystem
  - Lake Michigan LaMPs released biennially from 2000-2008
- The 2012 GLWQA required a greater focus on protective or restorative ***actions*** to meet the 9 General Objectives
- First generation **L**akewide **A**ction and **M**anagement **P**lans (**LAMP**s) have been released for Superior and Huron (see Binational.net)

Who Develops Each LAMP?



Current LAMP Timetable



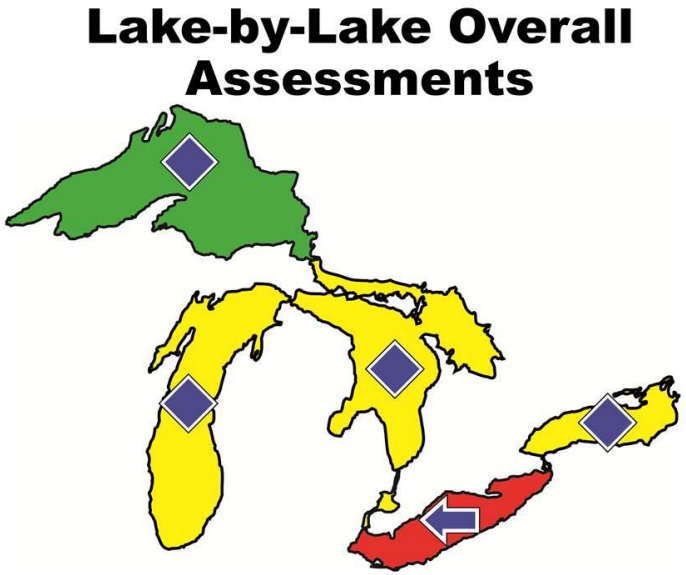
How Can You Get Involved?

- Watch for opportunities to provide comment via:
  - Great Lakes Information Network (https://www.glc.org/glin)
  - Binational.net
- Contact a member of the Lake Michigan Partnership Working Group
- Participate in partnership outreach opportunities

Information for those in Indiana will be available via IDEM's LAMP website:
www.idem.IN.gov/lakemichigan/lamp

PART II:
THE STATE OF LAKE MICHIGAN

How is Lake Michigan?



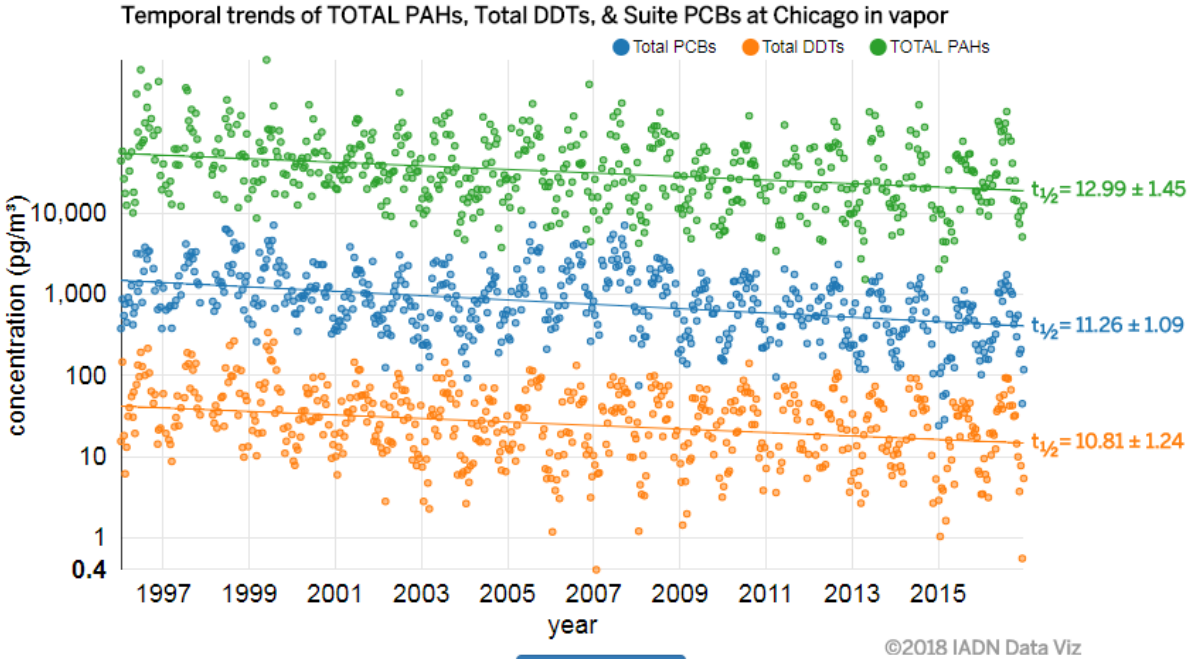
2017 State of the Great Lakes Report

Overall: Fair and Unchanging*

* Based on 8 indicators and 44 sub-indicators

	GENERAL OBJECTIVE	STATUS	Trend
1	Be a source of safe, high-quality drinking water.	Good	Unchanging
2	Allow for unrestricted swimming and other recreational use.	Good	Unchanging
3	Allow for unrestricted human consumption of the fish and wildlife.	Fair	Improving
4	Be free from pollutants that could harm people, wildlife or organisms.	Fair to Good	Improving to Unchanging
5	Support healthy and productive habitats to sustain our native species.	Mixed	Mixed
6	Be free from nutrients that promote unsightly algae or toxic blooms.	Fair/Poor	Deteriorating / Undetermined
7	Be free from aquatic and terrestrial invasive species.	Poor	Deteriorating
8	Be free from the harmful impacts of contaminated groundwater.	Fair (West) / Undetermined (East)	Undetermined

Challenge: Atmospheric Deposition



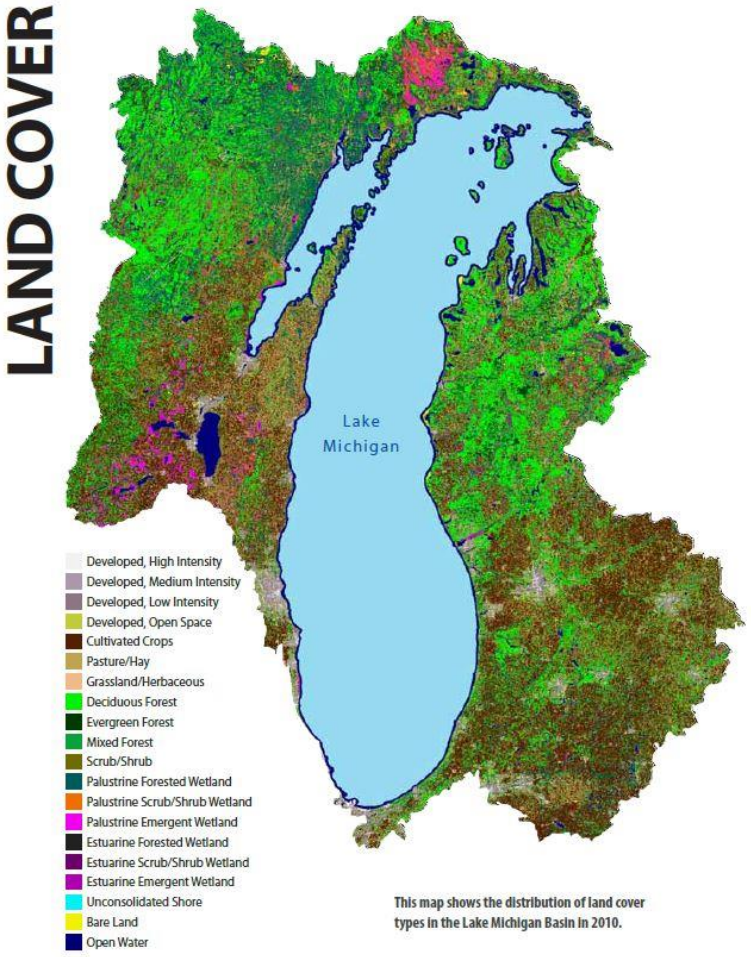
Lake Michigan Mercury Sources

Credit: USGS

Challenge: Urbanization

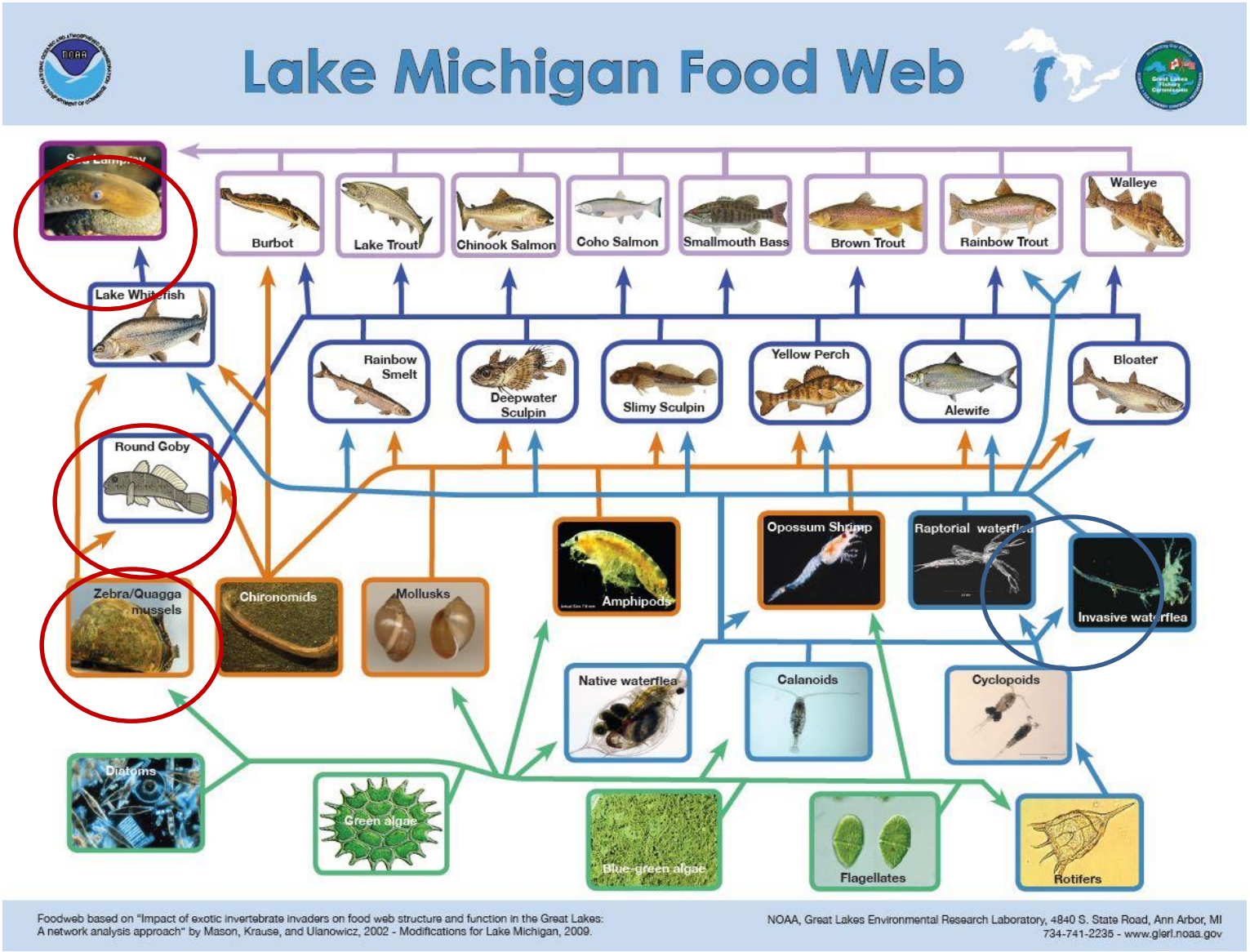
Type	Area (mi^2)	% Basin (2010)	Change * (1985-2010)
Agriculture	14,837	31.8	-227 mi^2
Forest	13,673	29.3	-254 mi^2
Wetland	9,166	19.6	+13 mi^2
Developed	3,328	7.1	+509 mi^2
Water	2,954	6.3	-23 mi^2
Grass	1,456	3.1	-164 mi^2
Scrub	1,050	2.3	+93 mi^2
Barren	201	0.4	+53 mi^2

* Total area of change is 6% of Lake Michigan basin



Credit: NOAA

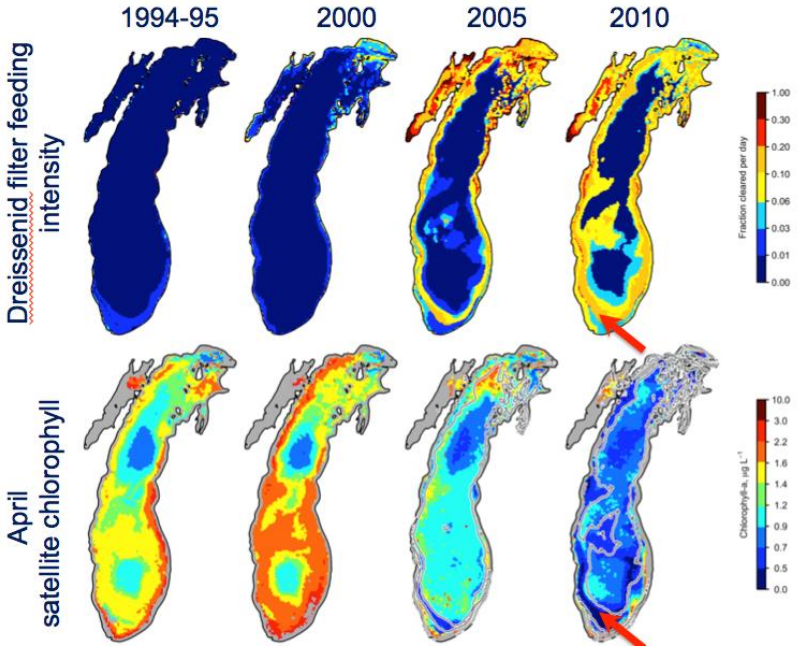
Challenge: Invasive Species



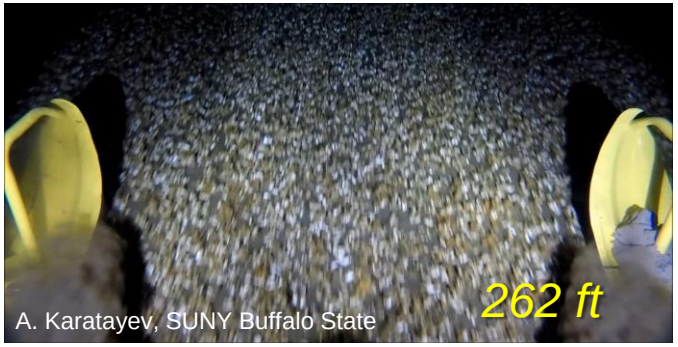
Credit: NOAA

Spotlight: Quagga Mussels

- Native to Ukraine and the Caspian Sea
- Introduced in ballast water
- Outcompete zebra mussels
- Prolific filter feeders
  - Reduce food for zooplankton
  - Increase water transparency
- Accumulation of pseudofeces leads to anoxic environments and concentrates pollutants



Cooperative Institute for Great Lakes Research



Questions?

Michael Spinar
Lake Michigan LAMP Program Coordinator
Indiana Department of Environmental Management
Office of Program Support

IDEM Northwest Regional Office
330 W. US HWY 30
Valparaiso, IN 46385
(219) 464-0437

Email: mspinar@idem.IN.gov

Website: www.idem.IN.gov/lakemichigan/lamp