Lake Huron and the Saginaw Bay Watershed

Community Meeting

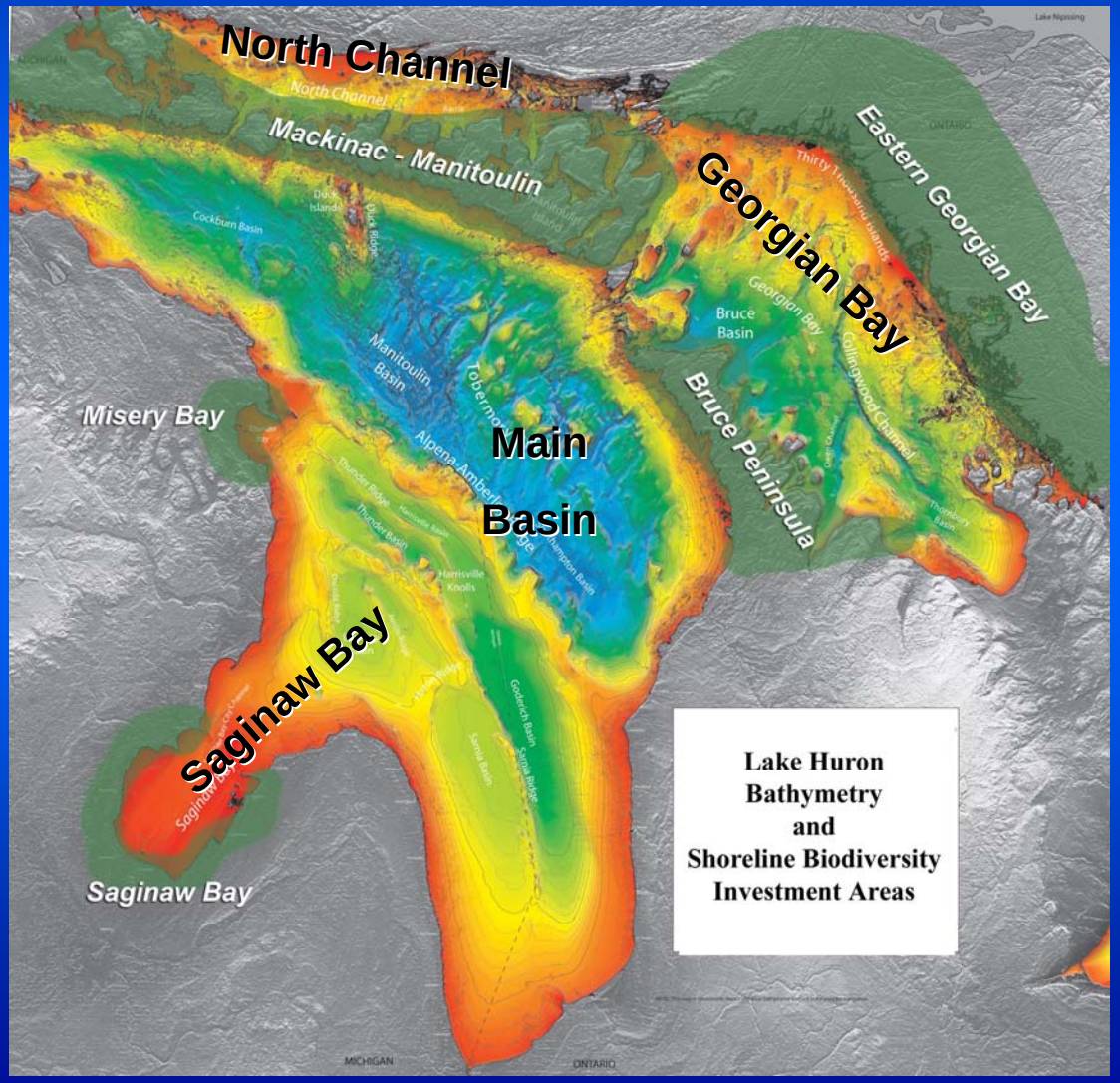
Saginaw, Michigan. U.S.A.

January 31, 2008

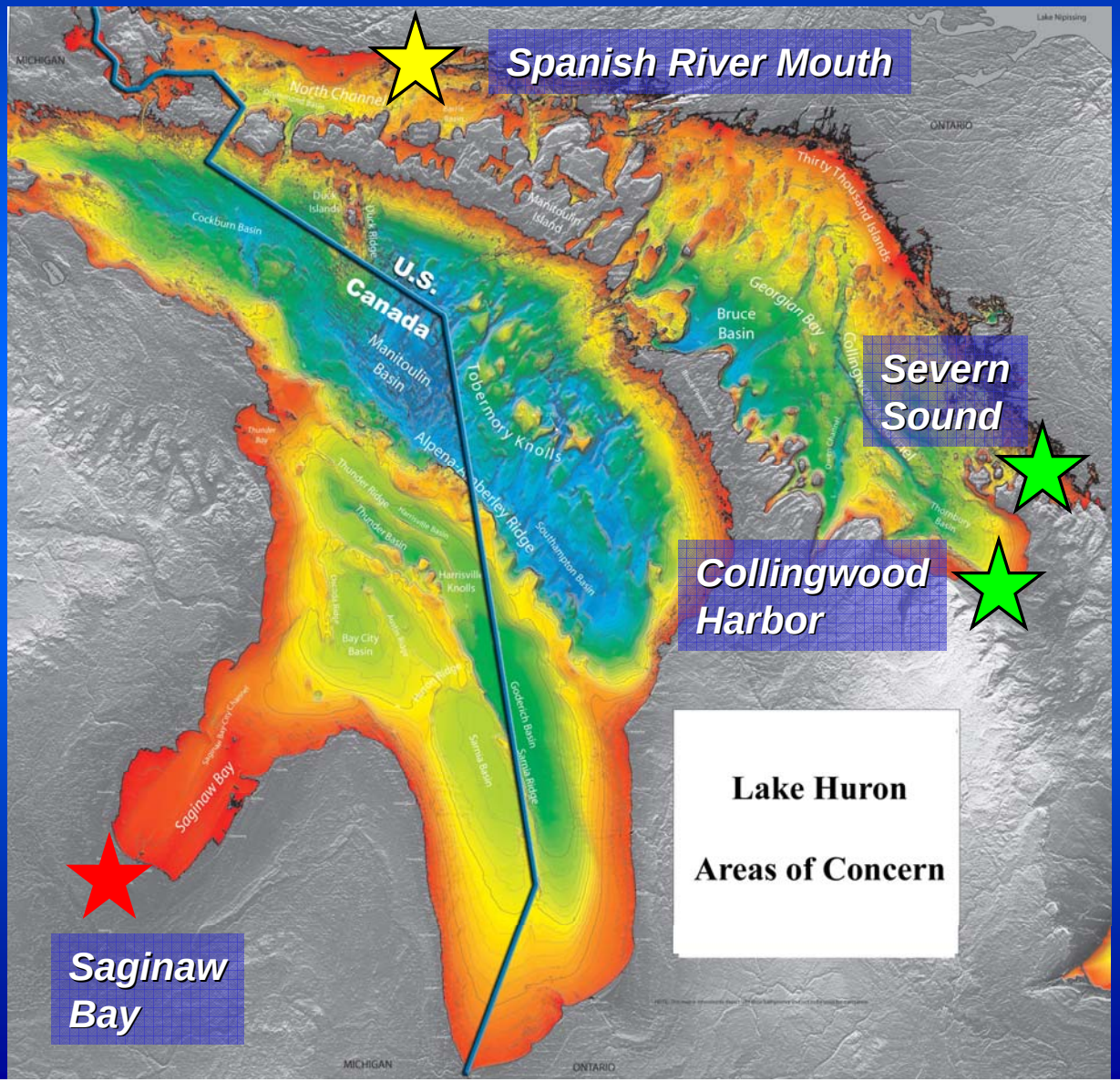
Lake Huron Overview

Lake Huron Watershed

- Fifth Largest Lake in the World
- Second Largest Great Lake
  - Length: 206 miles
  - Width: 183 miles
  - Average Depth: 194 feet
  - Area: 22,973 square miles
  - Average water retention time: 22 years
- Five Shoreline Biodiversity Investment Areas
  - Saginaw Bay
  - Misery Bay
  - Mackinac – Manitoulin
  - Eastern Georgian Bay
  - Bruce Peninsula

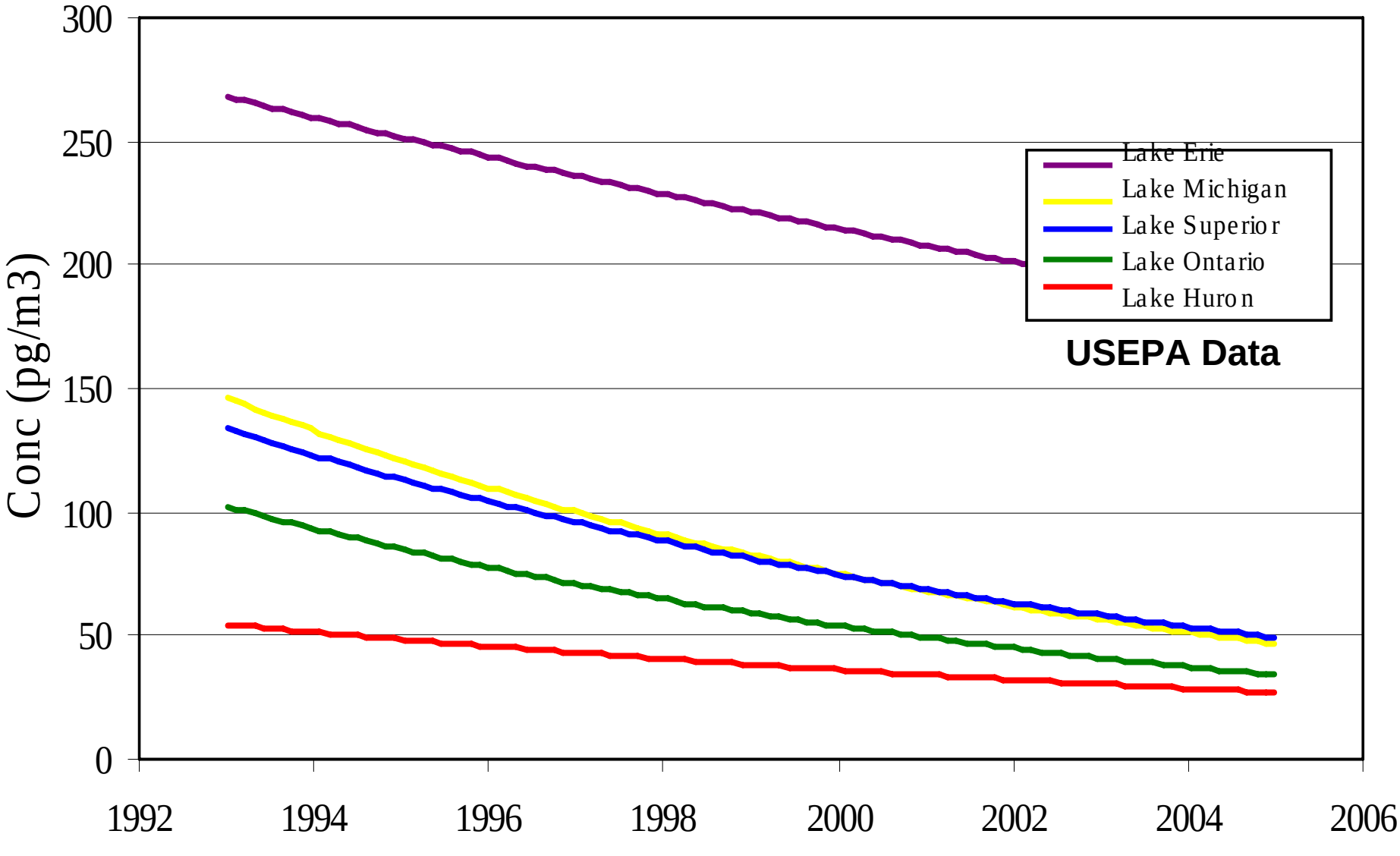


Lake Huron Management

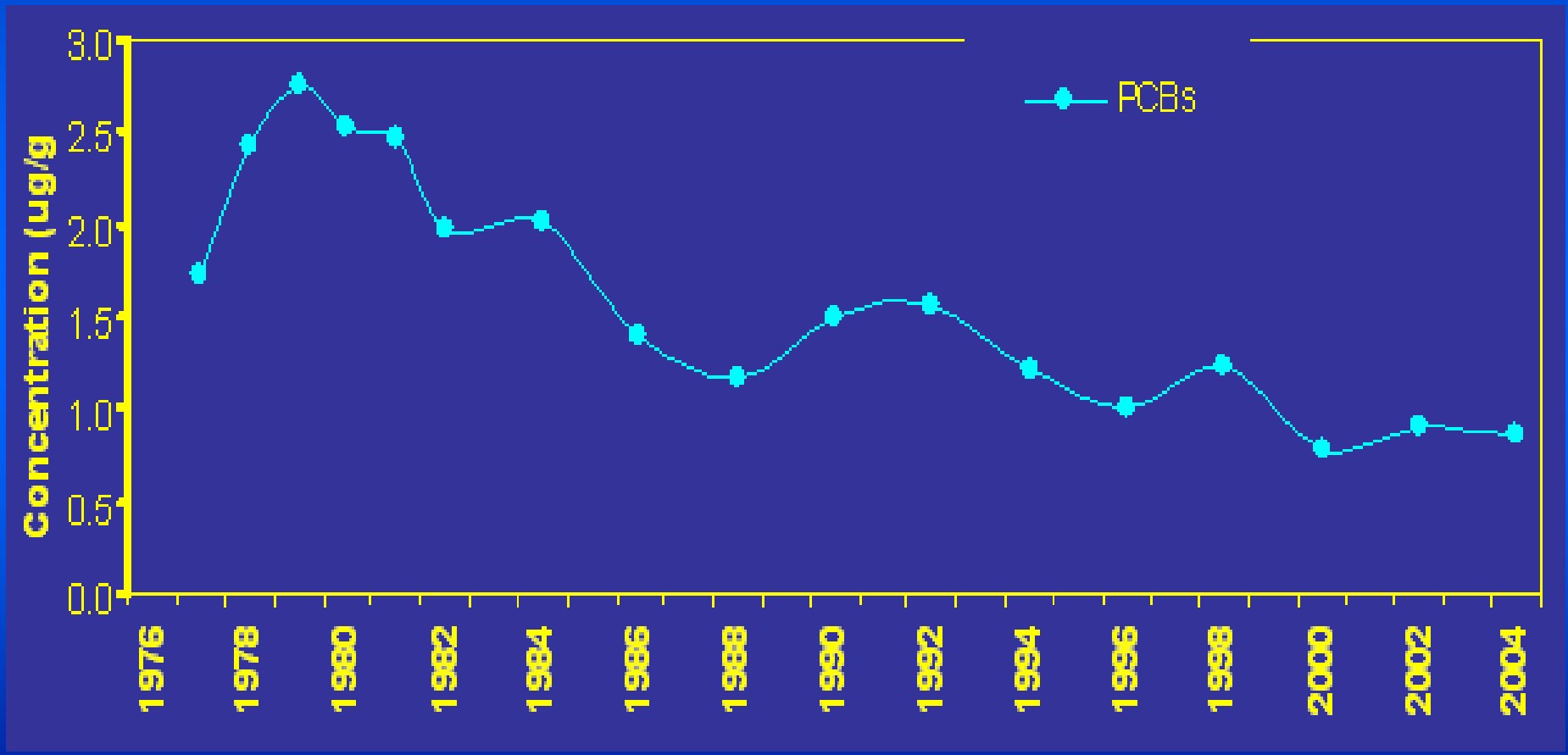



State of Lake Huron

PCBs in the Air Around the Great Lakes



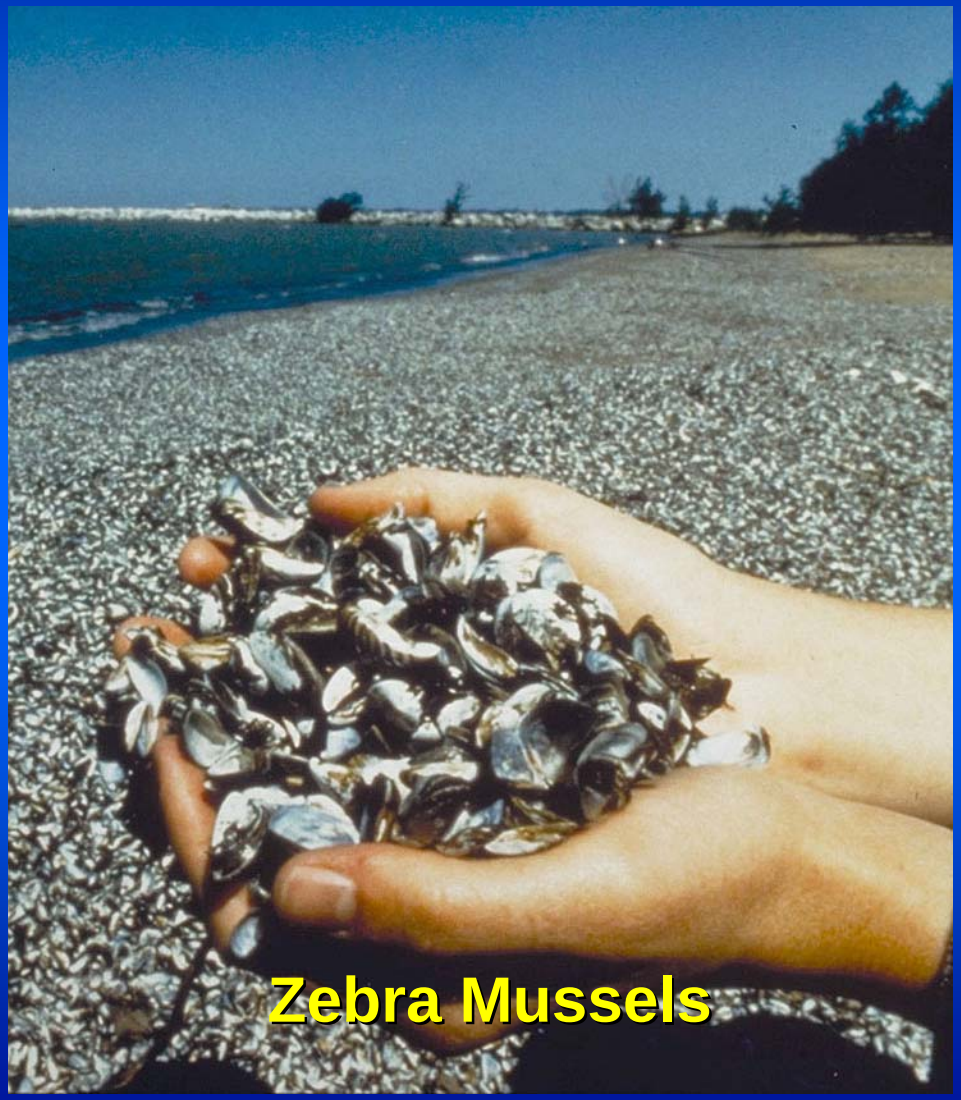
Lake Huron Open Water Trends: PCBs in Whole Lake Trout Samples



Source: USEPA-GLNPO

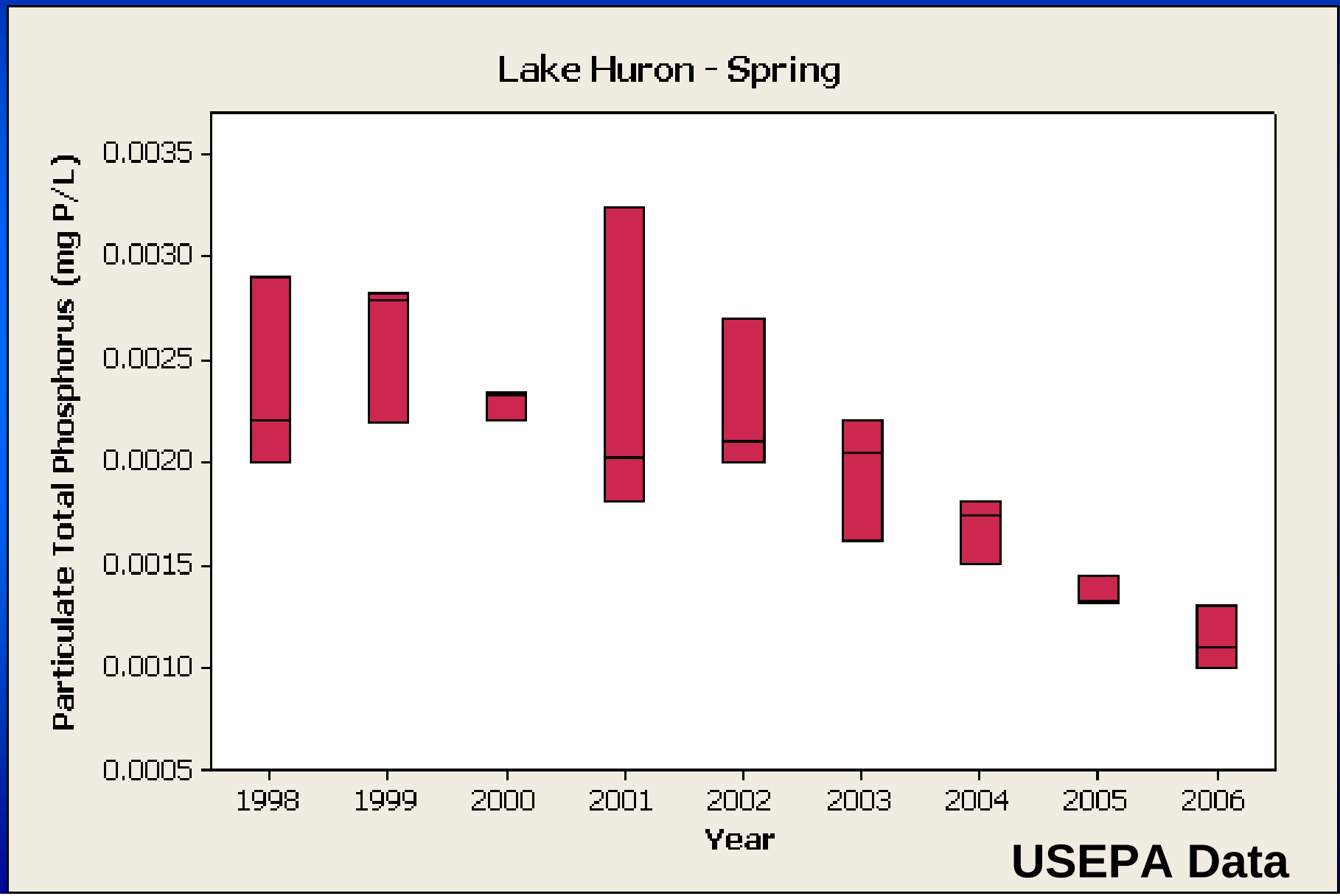
Invasive Species

Phragmites



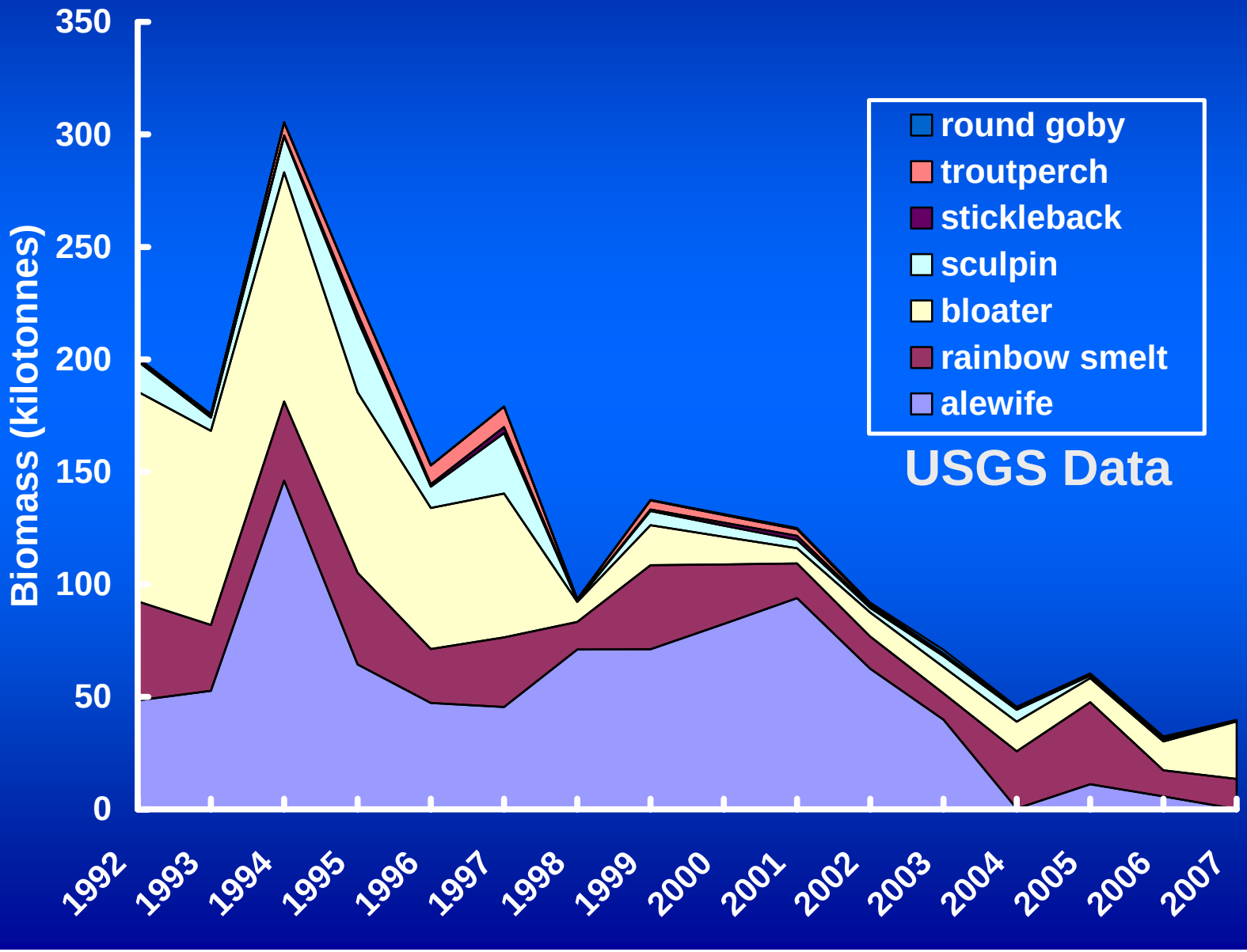
Zebra Mussels

Phosphorus in Lake Huron



USEPA Data

Declines in Prey Fish in Lake Huron



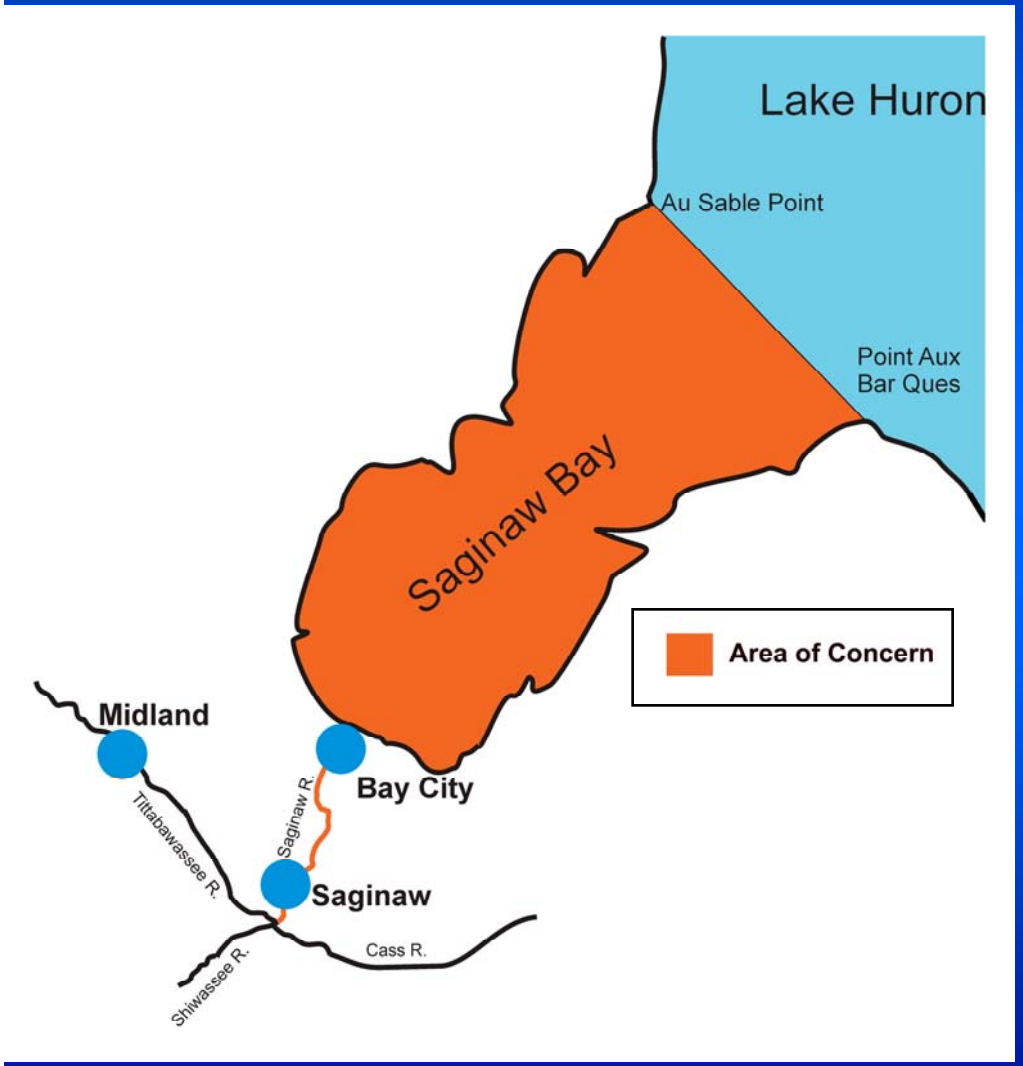
Beach Fouling “Muck”

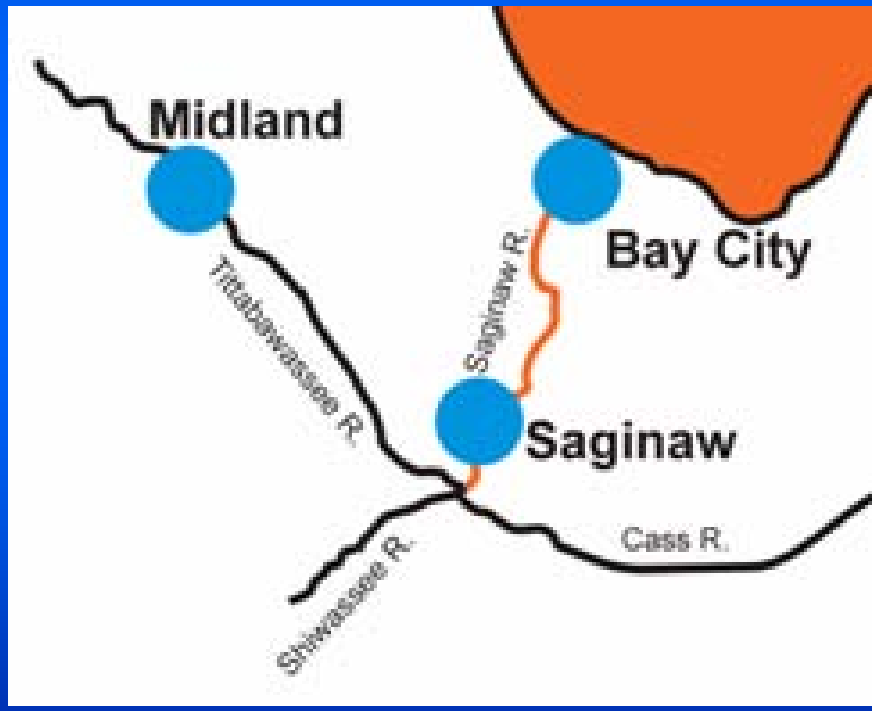
Summary: State of Lake Huron

- Many high quality areas need protection.
- Toxics in open lake declining but still above targets.
- Invasive species disrupting the ecosystem including the food web and wetlands.
- Unprecedented decline in nutrients.
- Nearshore over-enrichment problems.

Saginaw Bay

The Saginaw River and Bay Area of Concern





Remedial Action Plan Program



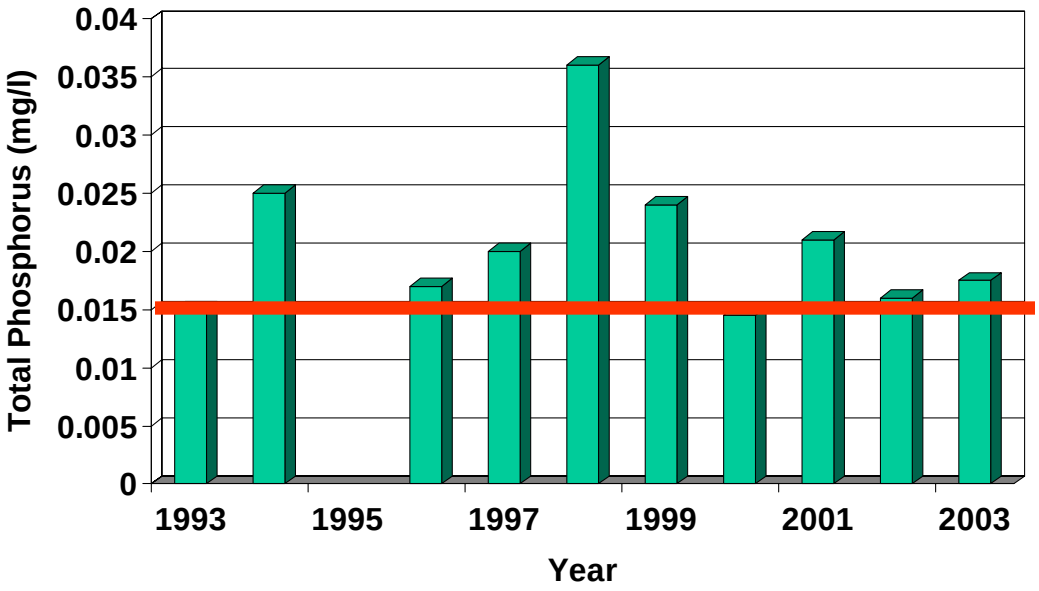
- Required under Annex 2 of the U.S-Canadian Great Lakes Water Quality Agreement and the Clean Water Act .
- Restore “beneficial uses” of area, consistent with locally defined goals.
- Characterized by:
  - Problem definition
  - Selection and implementation of remedial measures
  - Establish delisting criteria
  - Delisting/Monitoring
- Public Involvement.
- Many Partners.

Saginaw River and Bay Area of Concern

Of the 14 potential beneficial use impairments, 12 are impaired in the Saginaw River and Bay Area of Concern:

- Restrictions on fish and wildlife consumption
- Eutrophication or undesirable algae
- Tainting of fish and wildlife flavor
- Restrictions on drinking water consumption, or taste and odor
- Degradation of fish and wildlife populations
- Beach closings
- Degradation of aesthetics
- Bird or animal deformities or reproduction problems
- Degradation of benthos
- Degradation of phytoplankton and zooplankton populations
- Restriction on dredging activities
- Loss of fish and wildlife habitat

Saginaw Bay Excessive Algal Growth



Source: MDEQ

Addressing the Nutrient Management Challenge

- **Short Term:** EPA will work with the State of Michigan to track down phosphorus sources in the Saginaw Bay watershed.
- **Long Term:** EPA will work with NOAA's on their recently announced "Multi-Stressor" project to re-assess water quality goals taking into account the new Bay ecosystem.

Coastal Wetlands

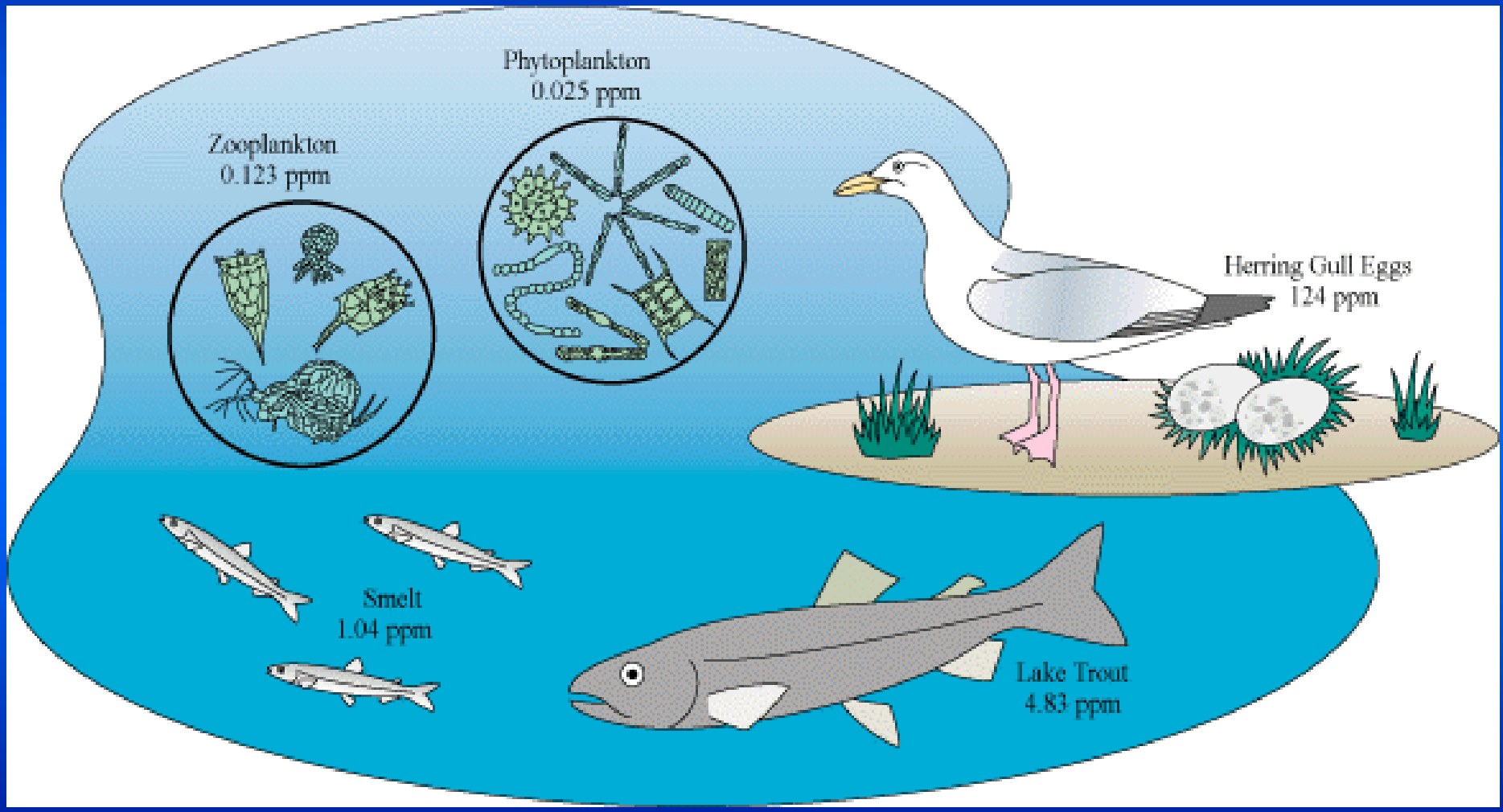
Healthy Wetland

Invaded by *Phragmites* Reed

Controlling the Spread

- EPA and the State of Michigan are testing *Phragmites* control methods at Hampton Township site.
- Real-world techniques for use within the Saginaw Bay environment.

Concentration by Food Chain



Source: The Great Lakes: An Environmental Atlas and Resource Book

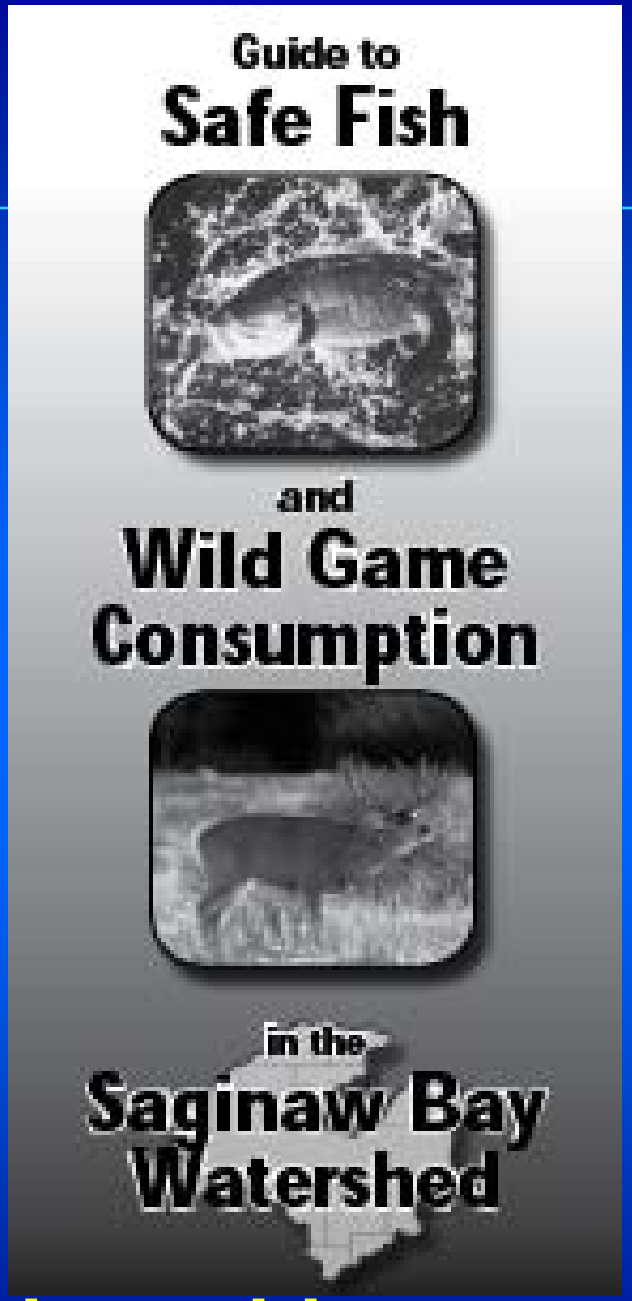
Fish Consumption Advisories

Lake Huron:

- PCBs
- Dioxins

Saginaw Bay:

- PCBs
- Dioxins
- Mercury

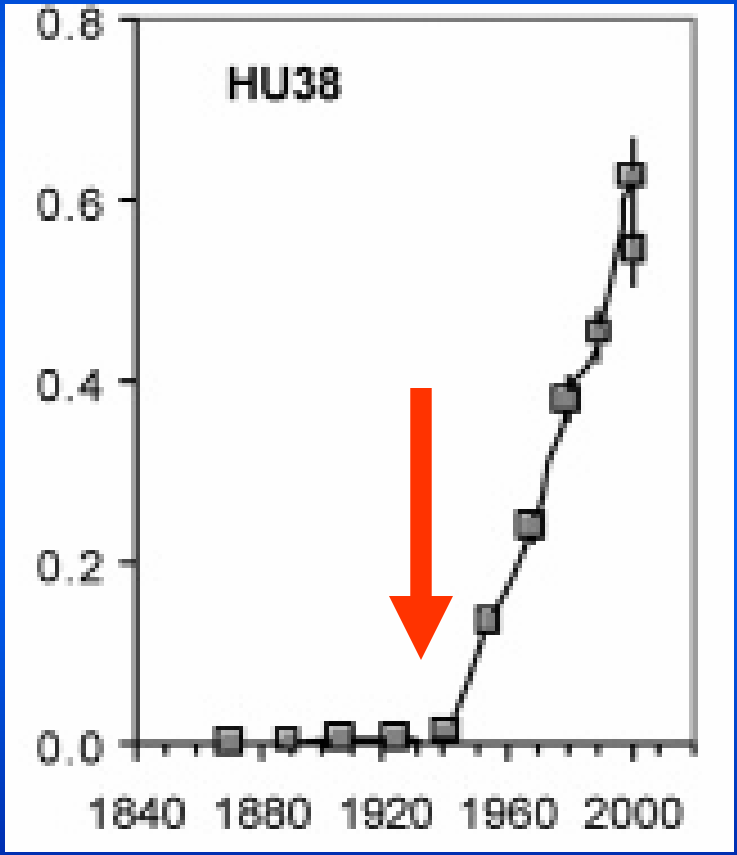


…for specifics, refer to the guide.

Looking into History: Deep Water Sediment Cores

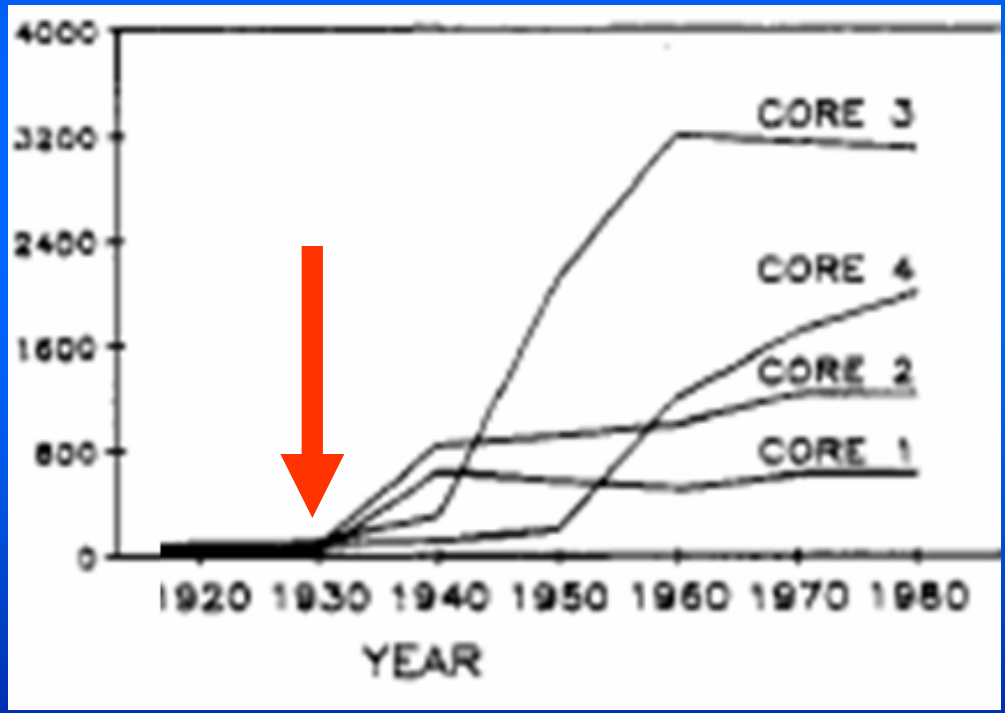
PCBs and Dioxin in Dated Lake Huron Sediment Cores

PCBs (ng/cm^2/yr)



Source: Song, W. et al. 2005. ES&T. 39, 3474-3479 (1985)

Dioxins (ppt)

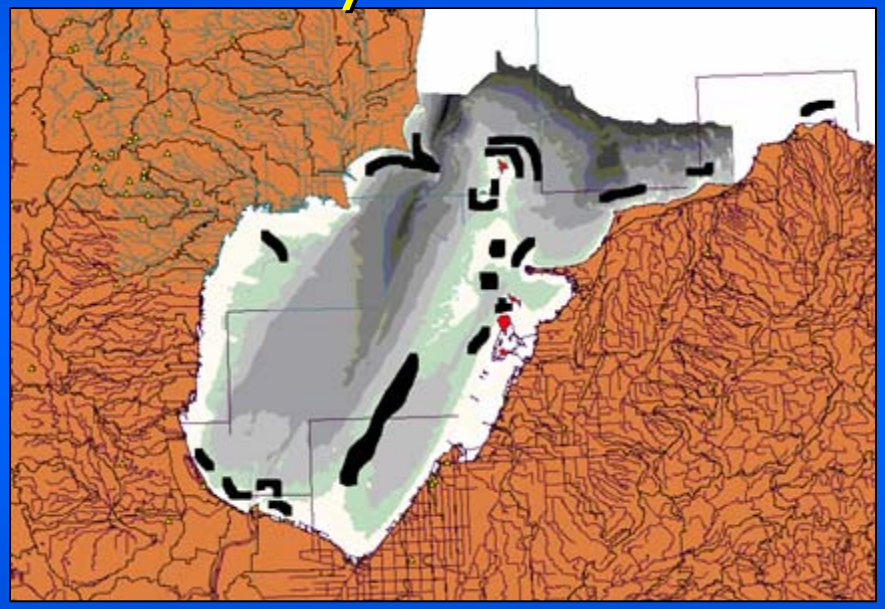


Souce: Czuczwa & Hites (1986)

Movement of Water and Sediment In Saginaw Bay

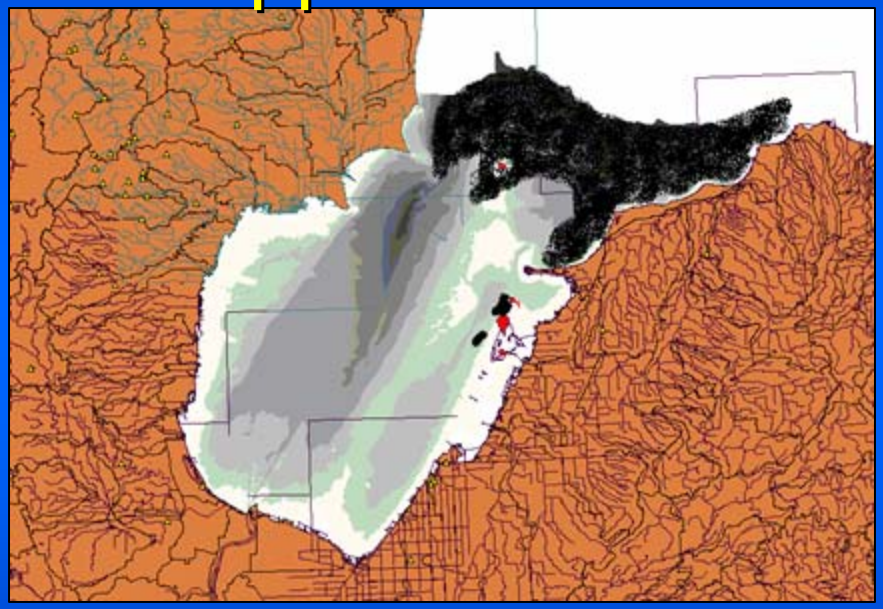
Sediment Movement: Saginaw Bay

Walleye Reefs



1940s

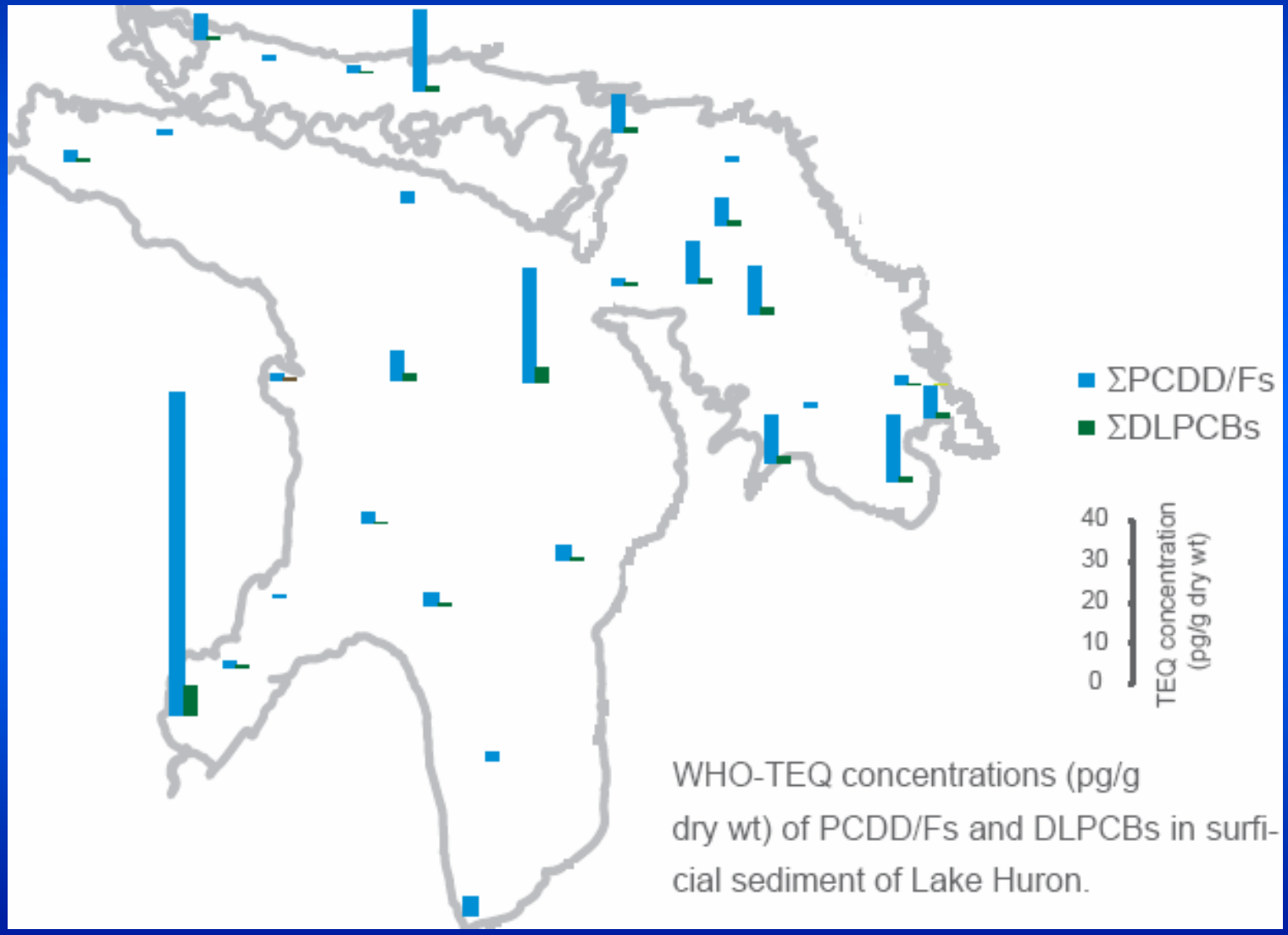
Mapped Reefs



1990s

Source: SOLEC 2004, Dave Fielder, MDNR

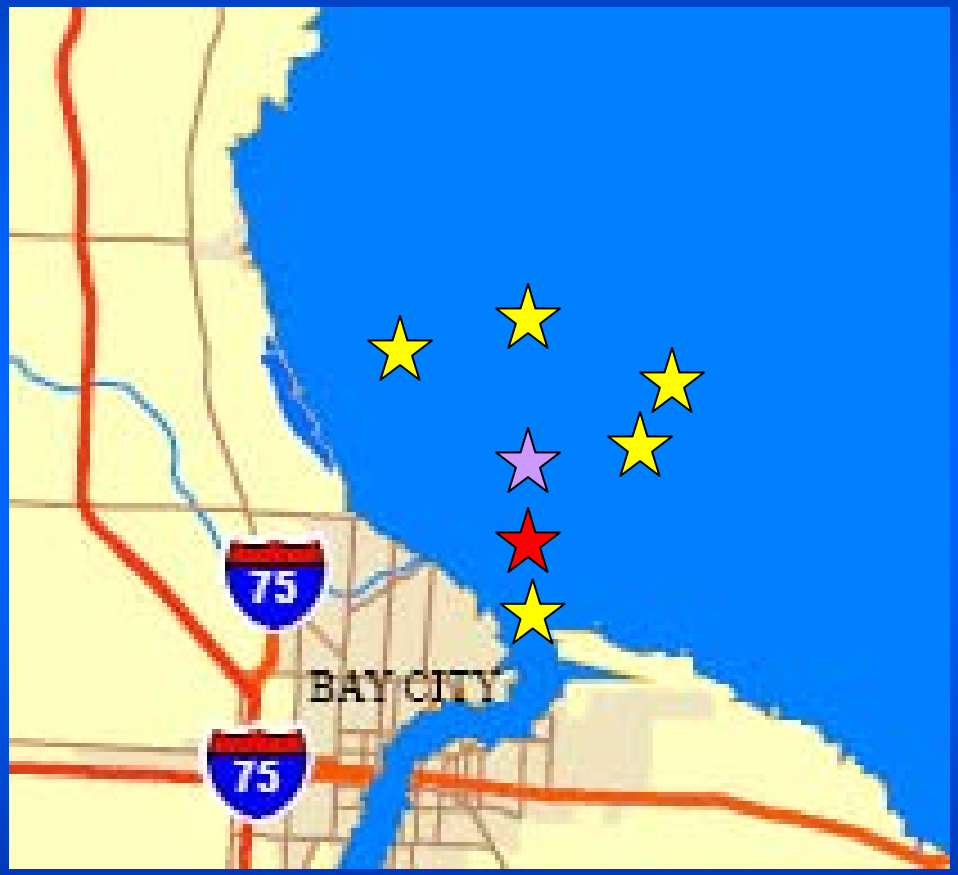
Dioxin in Lake Huron Open Water Surface Sediments



WHO-TEQ concentrations (pg/g dry wt) of PCDD/Fs and DLPCBs in surficial sediment of Lake Huron.

Source: Environment Canada 2002 and 2004

Saginaw Bay Sediment Sampling 2004

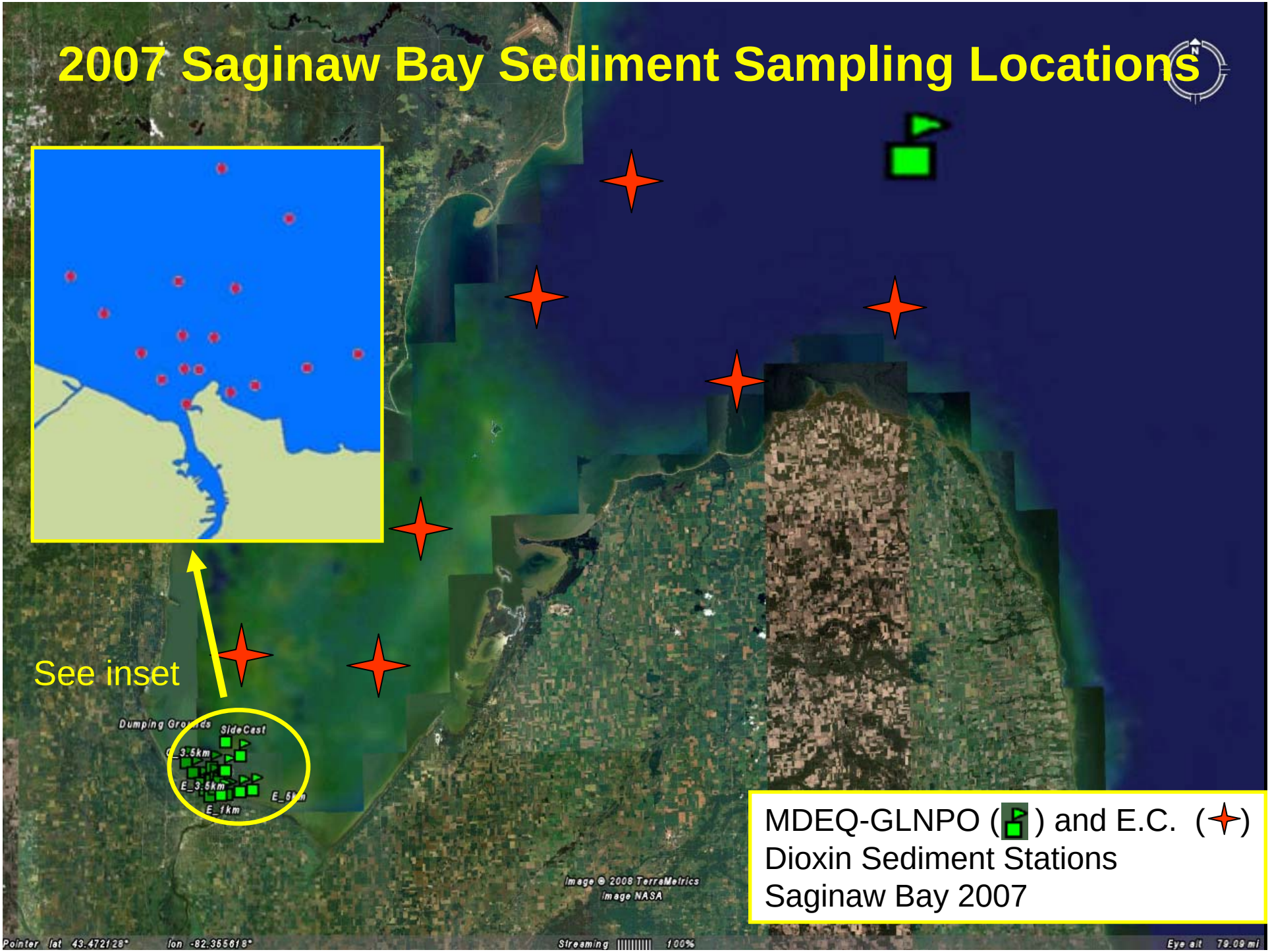


Legend:

- ★ <30
- ★ >250
- ★ >1,000

Units: ppt TEQ (D/F/CoPCB)

Source: MDEQ


2007 Saginaw Bay Sediment Sampling Locations
See inset
SideCast
E_3.5km
E_1km
MDEQ-GLNPO ( ) and E.C. ( )
Dioxin Sediment Stations
Saginaw Bay 2007