



The State of Lake Huron

Presented by: Jim Bredin

Michigan Office of the Great Lakes

The Main Basins of Lake Huron

Volume:

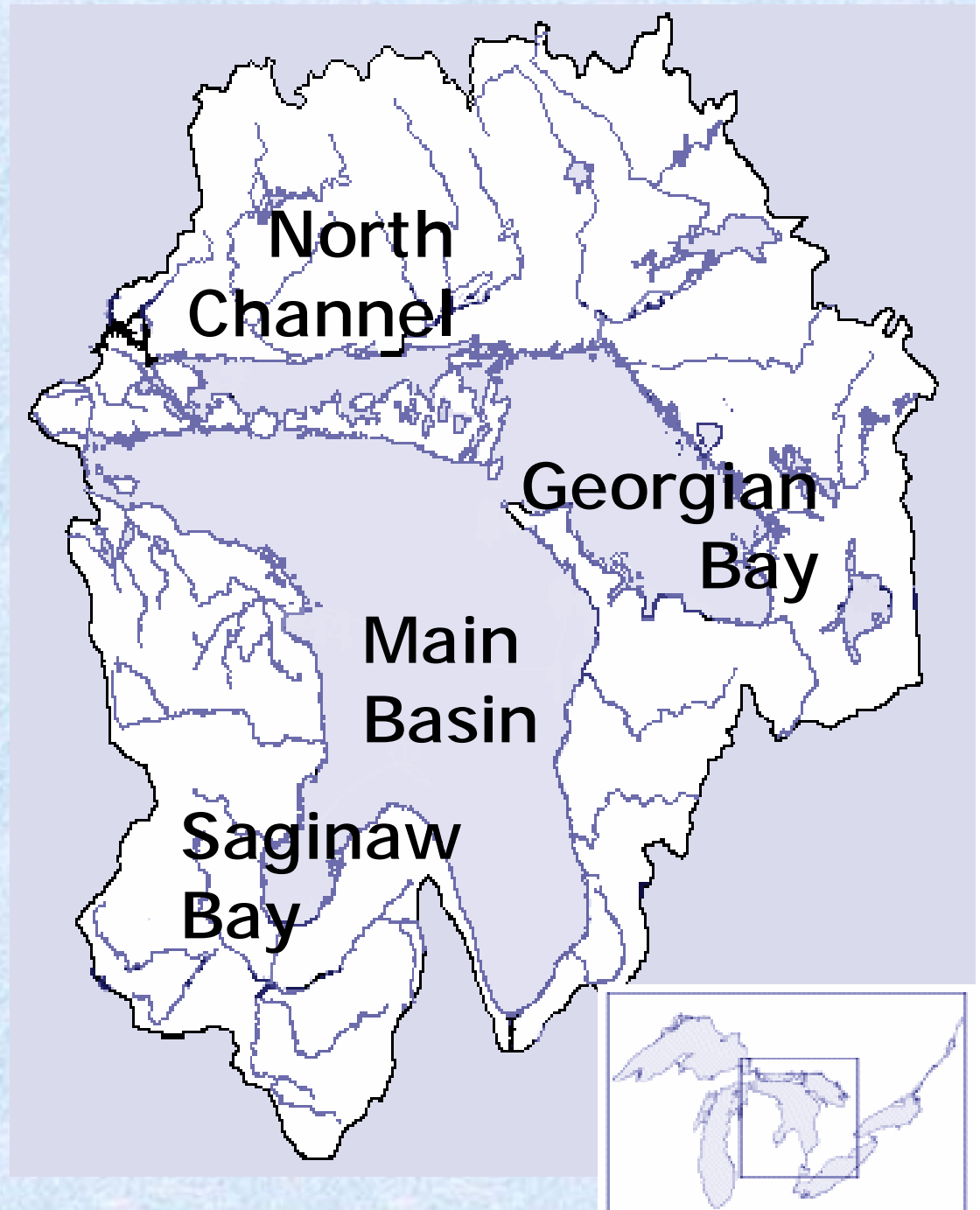
23,000 mi³ /
59,600 km³

Drainage Area:

51,700 mi² /
134,000 km²

Retention Time:

22 years





A Diversity of Ecosystems



Michigan, U.S.A.



A Diversity of Ecosystems



Georgian Bay, Canada.

Lake Huron Drainage Basin

Areas of Concern

- 1 St. Marys River
- 2 Spanish River
- 3 Saginaw River/Bay
- 4 Severn Sound
- 5 St. Clair River



Legend

- Cities/Towns
- International Border
- Tributaries
- Lake Huron Basin





Status of Lake Huron

- Historical sources of pollution, but relatively low pollution levels.
- Abundance of shoreline habitat, but increasing development pressure and hardening of shoreline.
- High diversity of aquatic and riparian species, yet continuing threat and spread of invasive species.
- Overall Status: Mixed





Impacts to Lake Huron Ecosystem Integrity

- Chemical:
 - Fish Consumption Advisories
 - Wildlife Health
- Biological:
 - Impaired Benthic Communities
 - Fish Community Alteration
- Physical:
 - Habitat Restoration/Protection



Chemical Integrity

- Fish Consumption Advisories
- Wildlife Contaminants

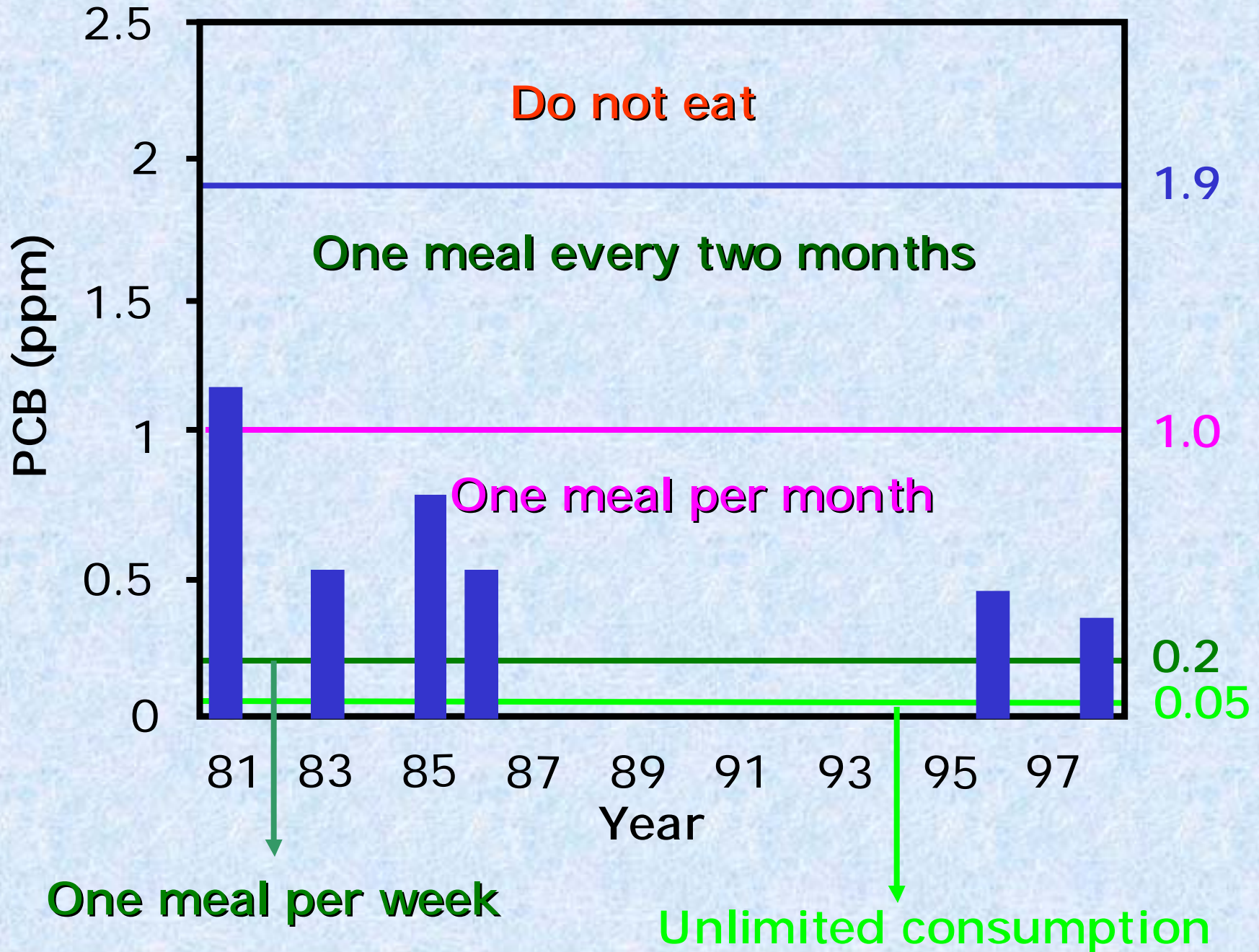




Chemical Integrity

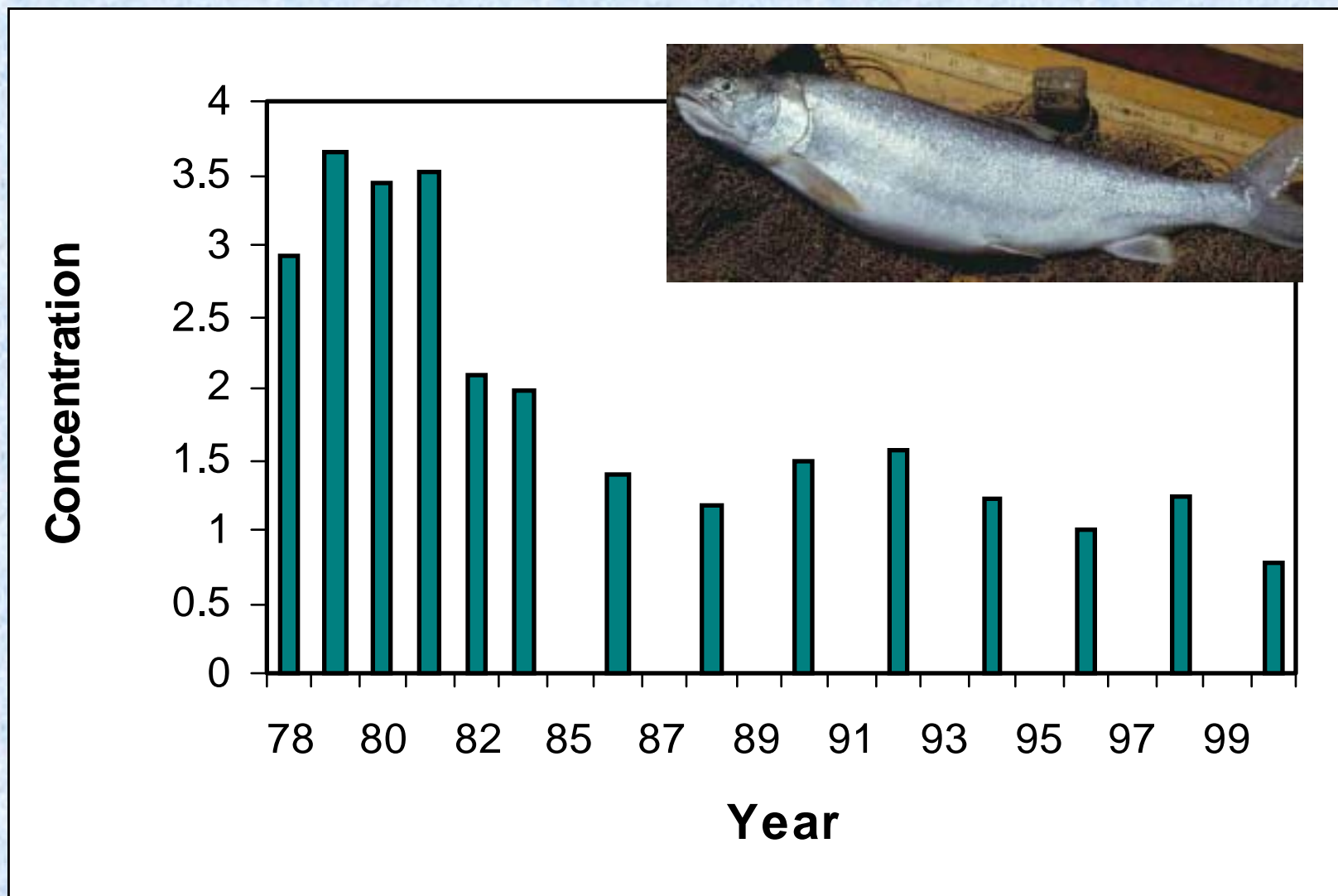
- Main SOLEC Indicators
 - **Contaminants in Edible Fish Tissue**
 - Contaminants in Young-of-the-Year Spottail Shiners
 - **Contaminants in Colonial Nesting Waterbirds**
 - Atmospheric Deposition of Toxic Chemicals
 - Toxic Chemical Concentrations in Offshore Waters
 - **Phosphorus Concentrations and Loadings**

PCBs in Lake Huron Coho Salmon





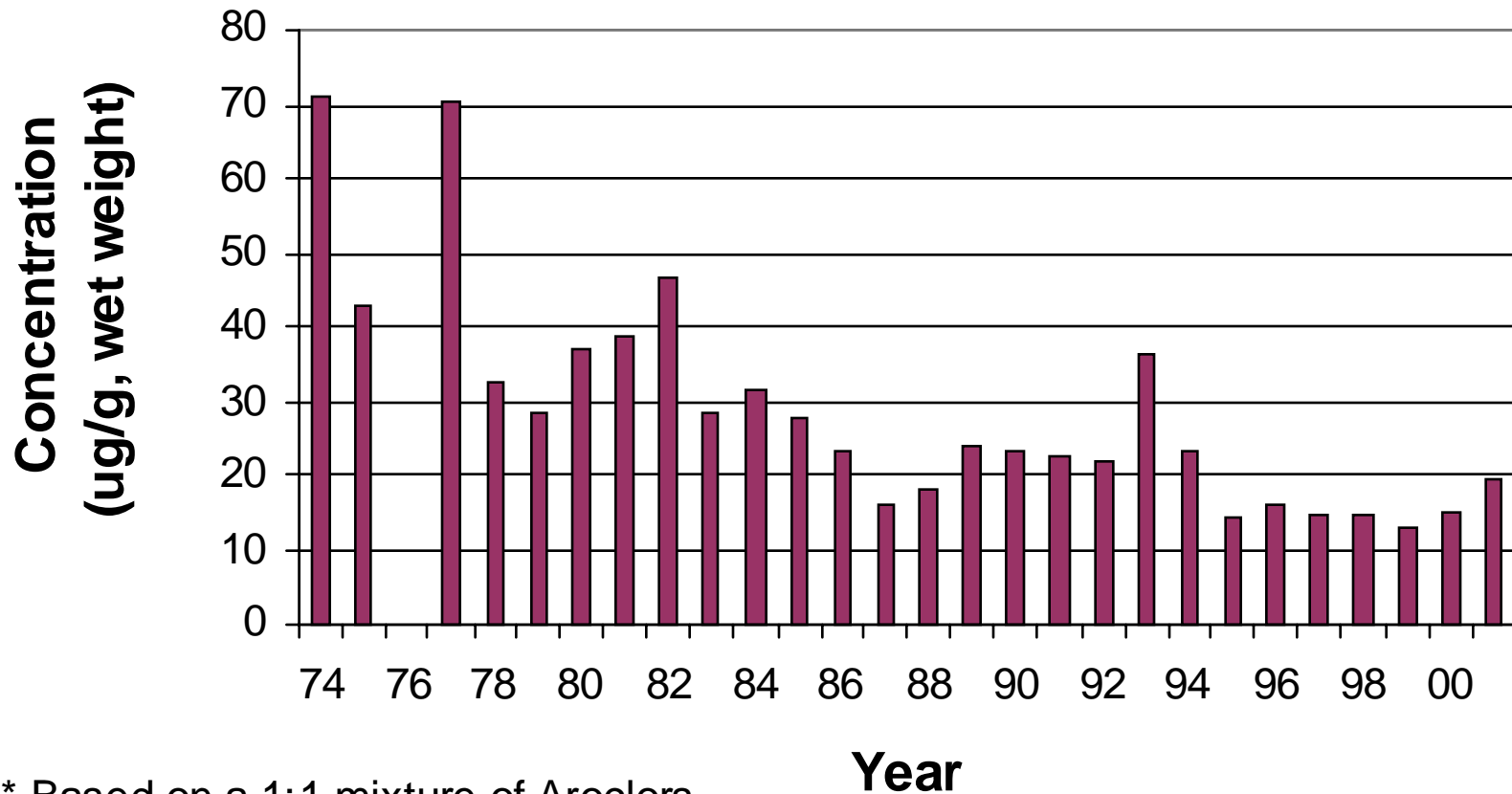
PCBs in Huron Lake Trout (ug/g wet weight)





Lake Huron Total PCBs* in Herring Gull Eggs

(1974-79 values based on two sites, Chantry and Double Islands; 1980-present values include Saginaw Bay site as well.)

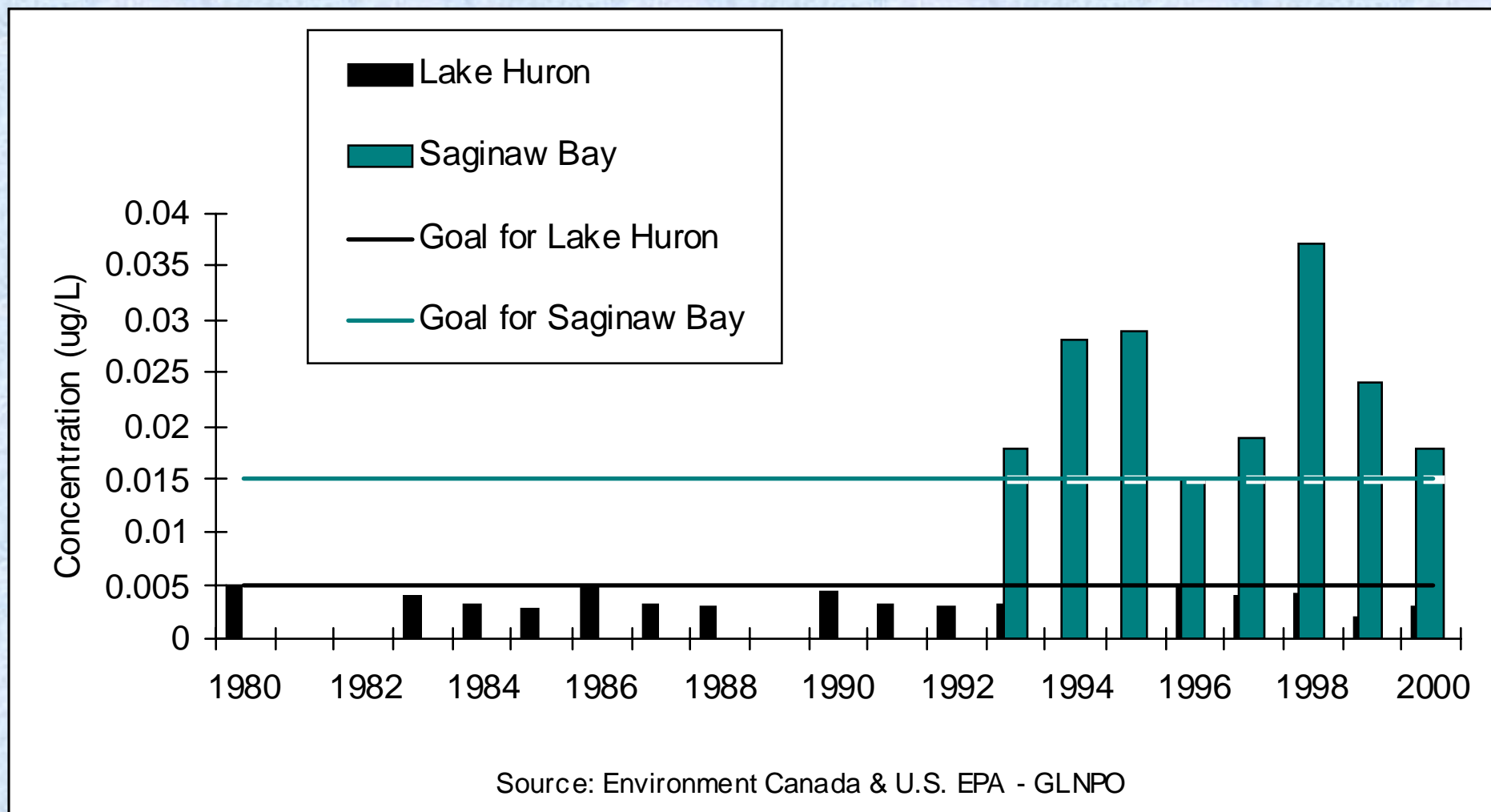


* Based on a 1:1 mixture of Aroclors

1254:1260



Total Phosphorus





Biological Ecosystem Integrity

- Changes in Lower Food Web
- Fish Community Alteration



Biological Integrity – Lower Food Web

- Main SOLEC Indicators
 - Benthos Diversity and Abundance
 - Diporeia (as part of Lake Trout and Scud indicator)
 - Preyfish Population
 - Zooplankton
 - E. coli and Fecal Coliform Levels in Nearshore Recreational Waters

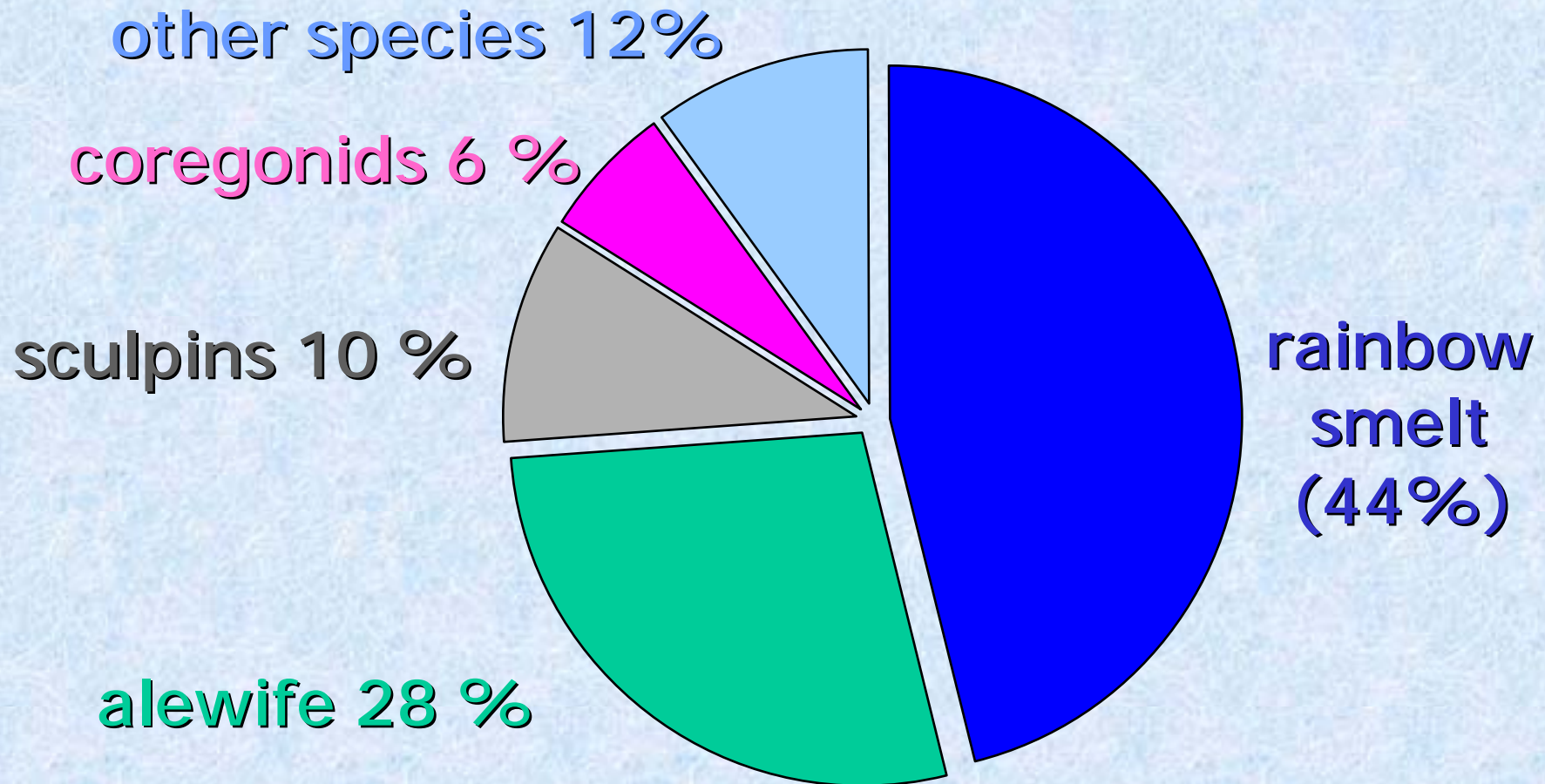


Benthic Communities

- Invasion of zebra mussel and other species
- Studies to investigate changes in benthic species and biomass, especially *Diporeia*
- Fish communities respond by altering food sources or face declining populations



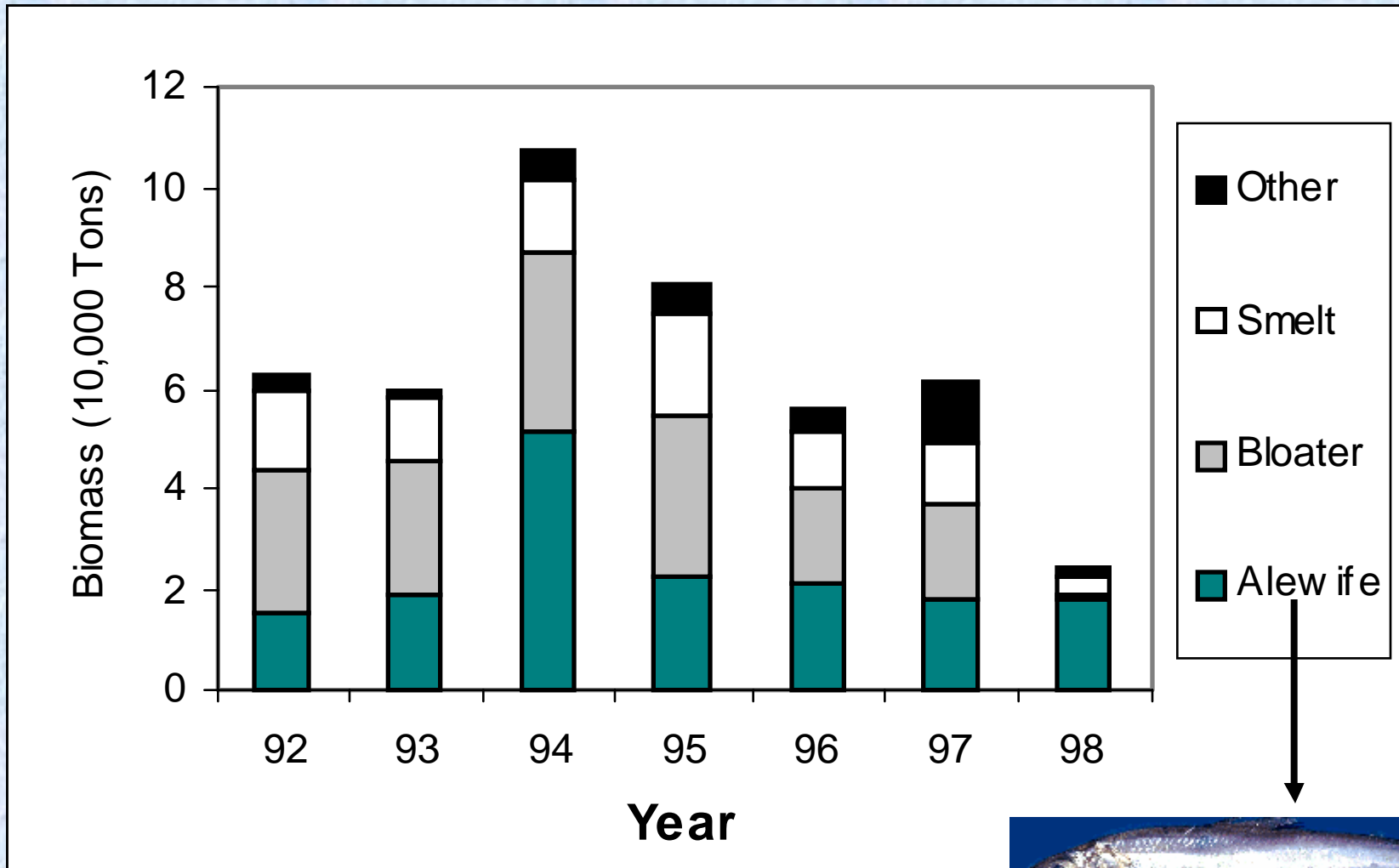
Preyfish Population



Source: USGS



Biomass of Major Prey Fishes



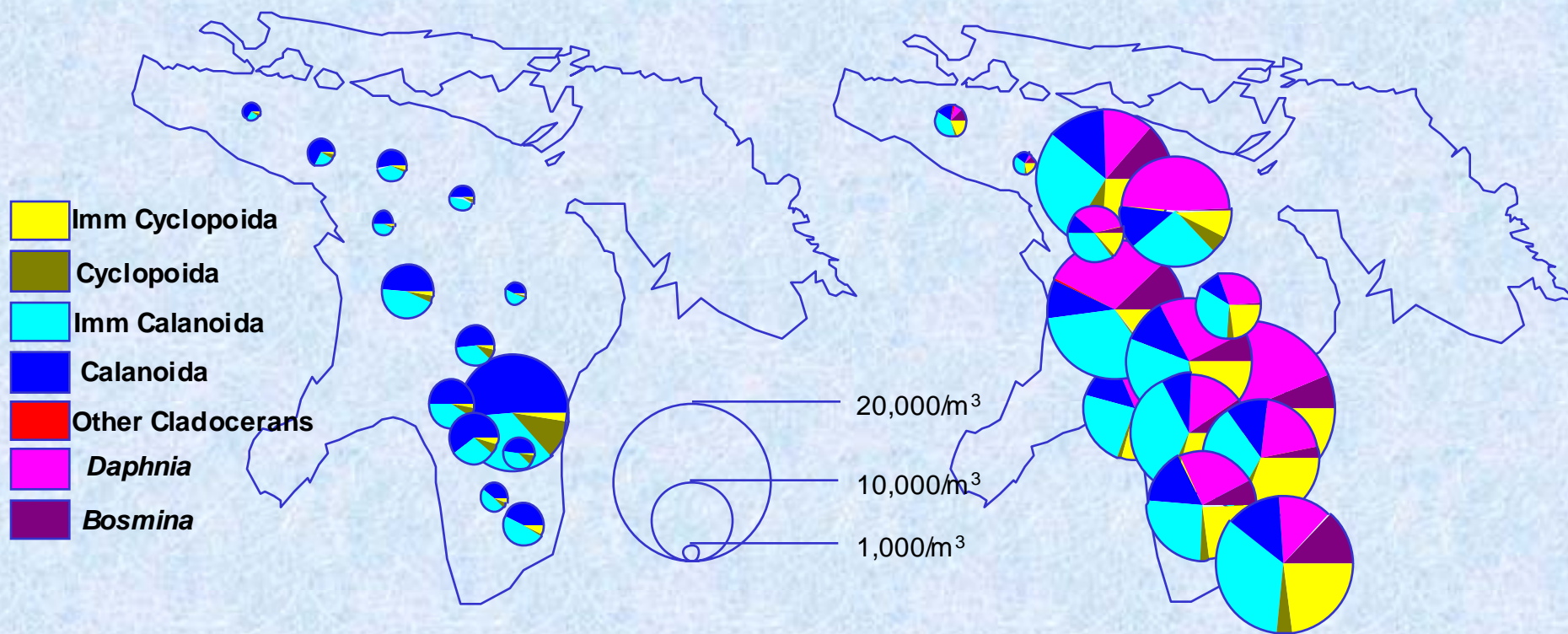


Source: U.S. EPA

Zooplankton

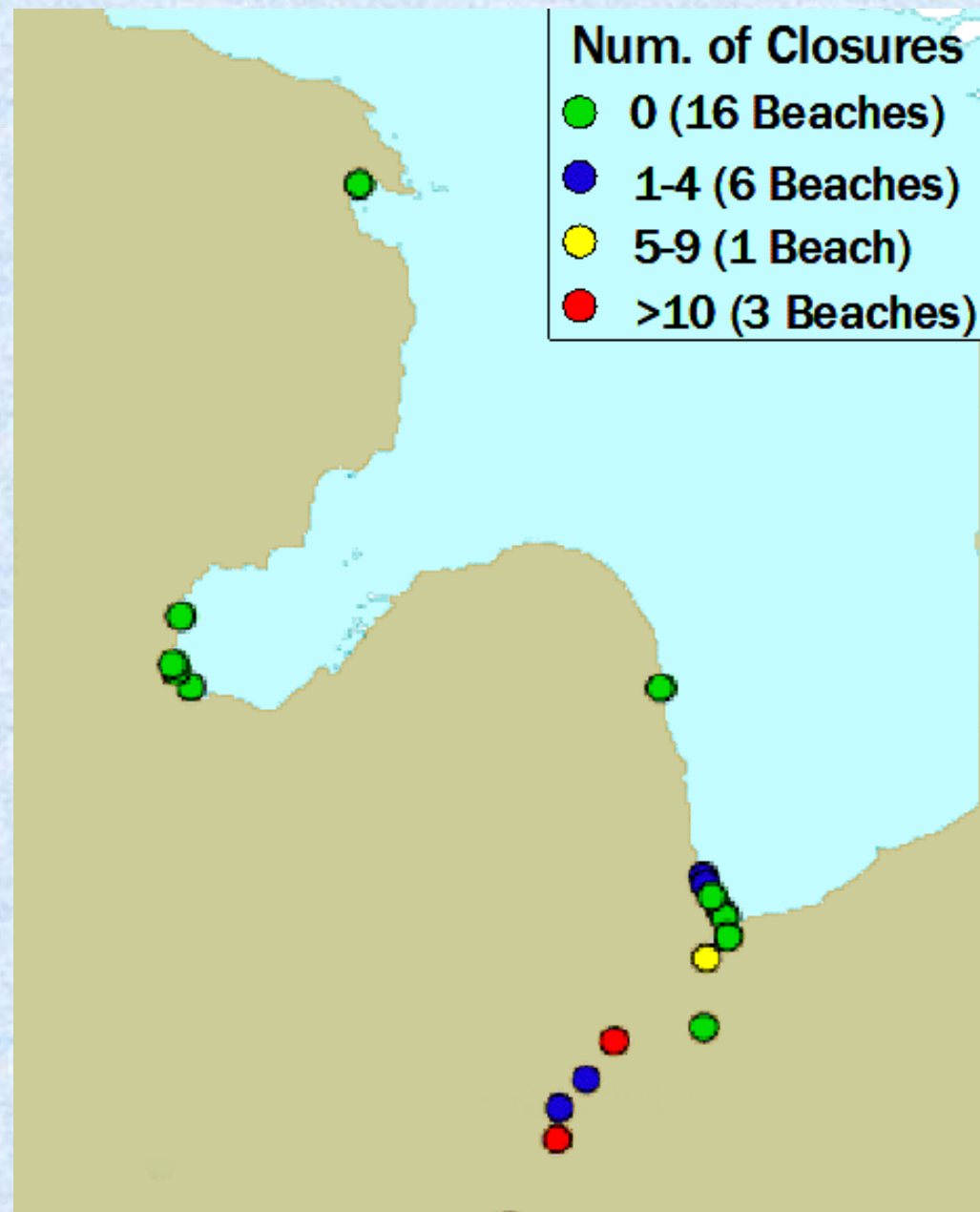
Spring 1998

Summer 1998



Lake Huron, Lake St. Clair, St. Clair River and Detroit River

Beach Closings 2001





Biological Integrity - Fish Community Indicators

Main SOLEC Indicators:

- Walleye and Hexagenia
- Exotic Species
- Fish Habitat
- Sea Lamprey
- Salmon and Trout



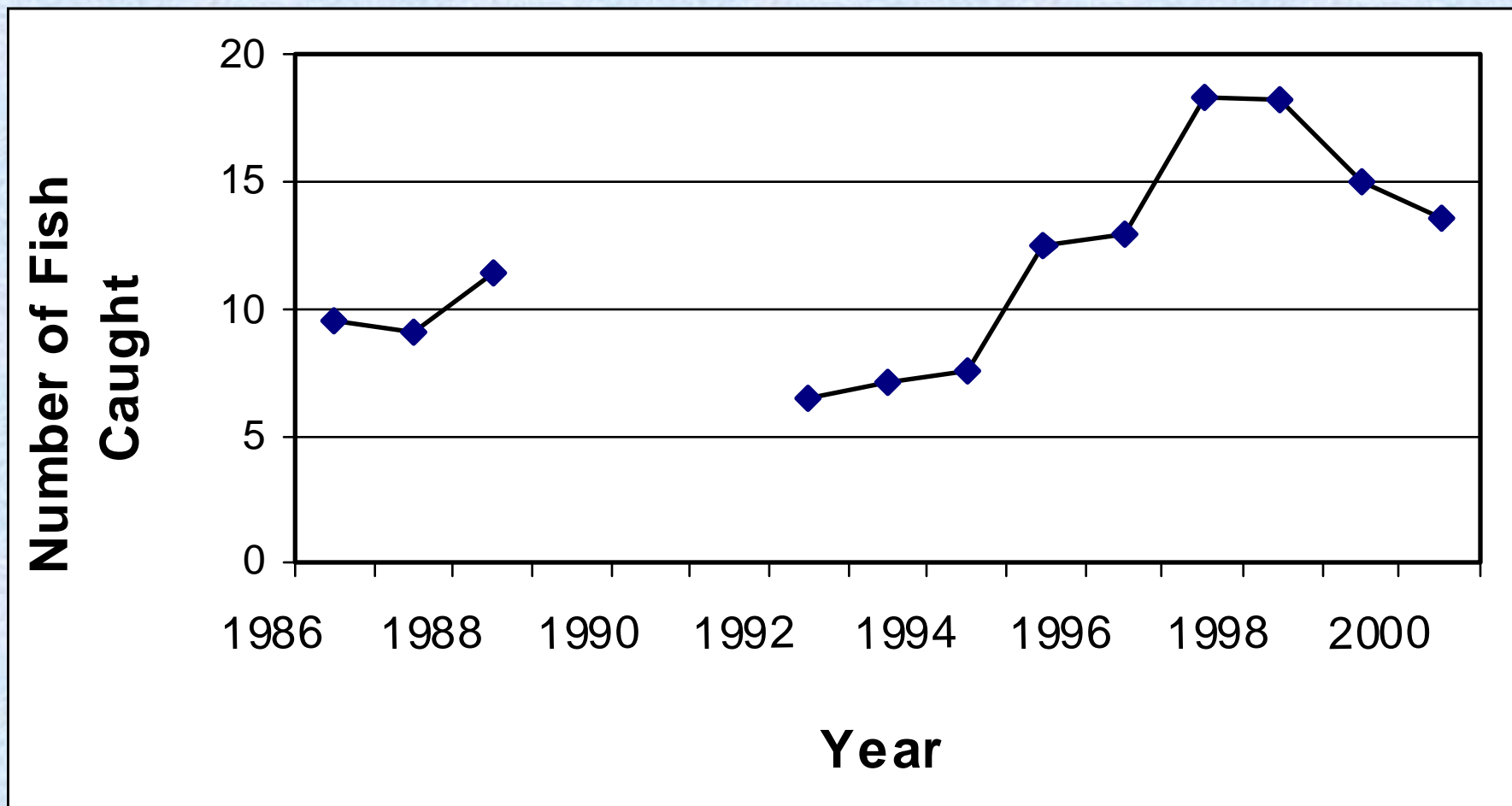
Fish Community Alteration

- Improvements in fishery over last several decades
- Decreased contaminant levels
- Good habitat, some tributaries are stressed

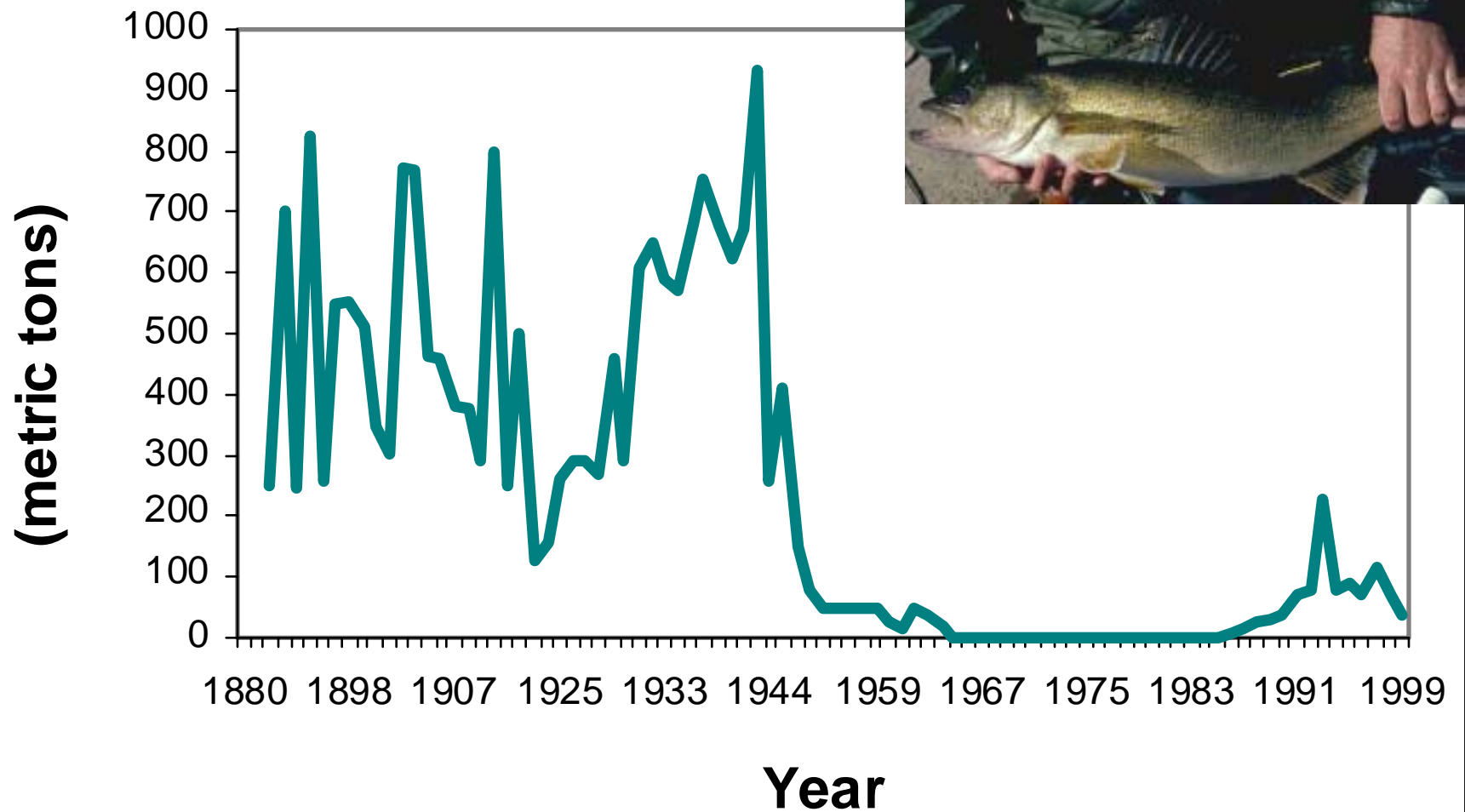




Number of Trout and Salmon Caught per 100 hours of Angler Effort

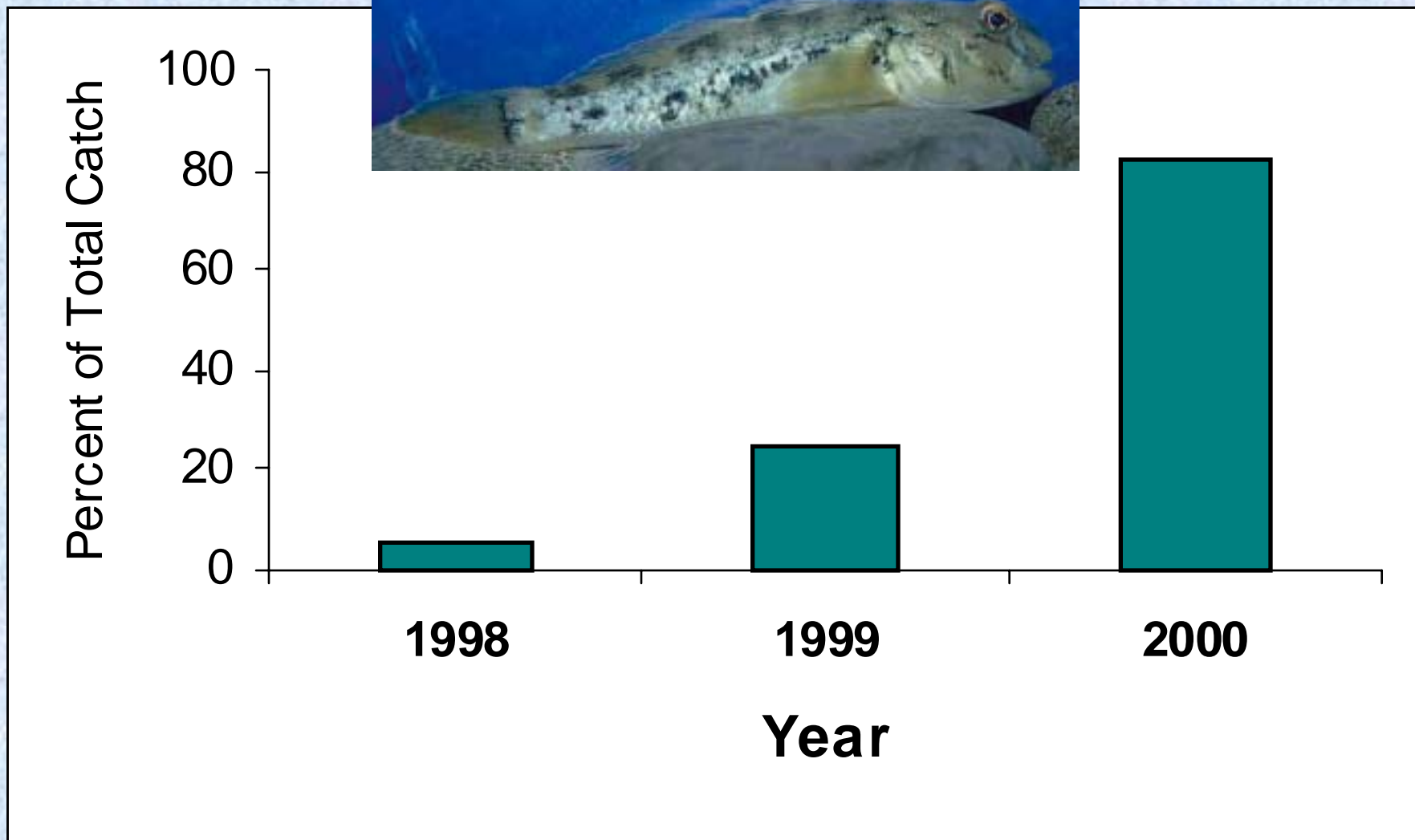


Walleye Yield (Catch) thought to be attributable to Natural Reproduction





Round Goby Abundance in Thunder Bay



A photograph of a stream with a fence in the background. The stream is in the foreground, and the fence is in the middle ground. The background is a dense forest of trees. The text "Physical Integrity" is overlaid on the image.

Physical Integrity

Major Issues:

- Structural barriers between stream reaches (connectivity of habitat)



Physical Integrity

- Main SOLEC Indicators:
 - **Habitat fragmentation**
 - Sediment flowing into coastal wetlands
 - Coastal wetland area by type
 - Extent of hardened shoreline
 - Protected nearshore areas



Habitat Fragmentation

- Dams impound highest-gradient rapids and block migrations of Lake Huron fishes
 - Species affected include trout, salmon, lake sturgeon, whitefish, walleye
- Dams disrupt sediment transport needed to maintain delta wetlands at river mouths
 - Species affected include yellow perch, northern pike, muskellunge



Habitat Fragmentation

- Inundate rare, high quality habitats
- Disrupt woody debris transport
- Increase summer temperatures and prevent night-time cooling
- Reduce aquatic insect diversity and density
- Also prevents non-native species, including lamprey from reaching upstream areas



Lake Sturgeon Objective: To increase the species' abundance to the extent that it no longer has threatened status in U.S. waters .

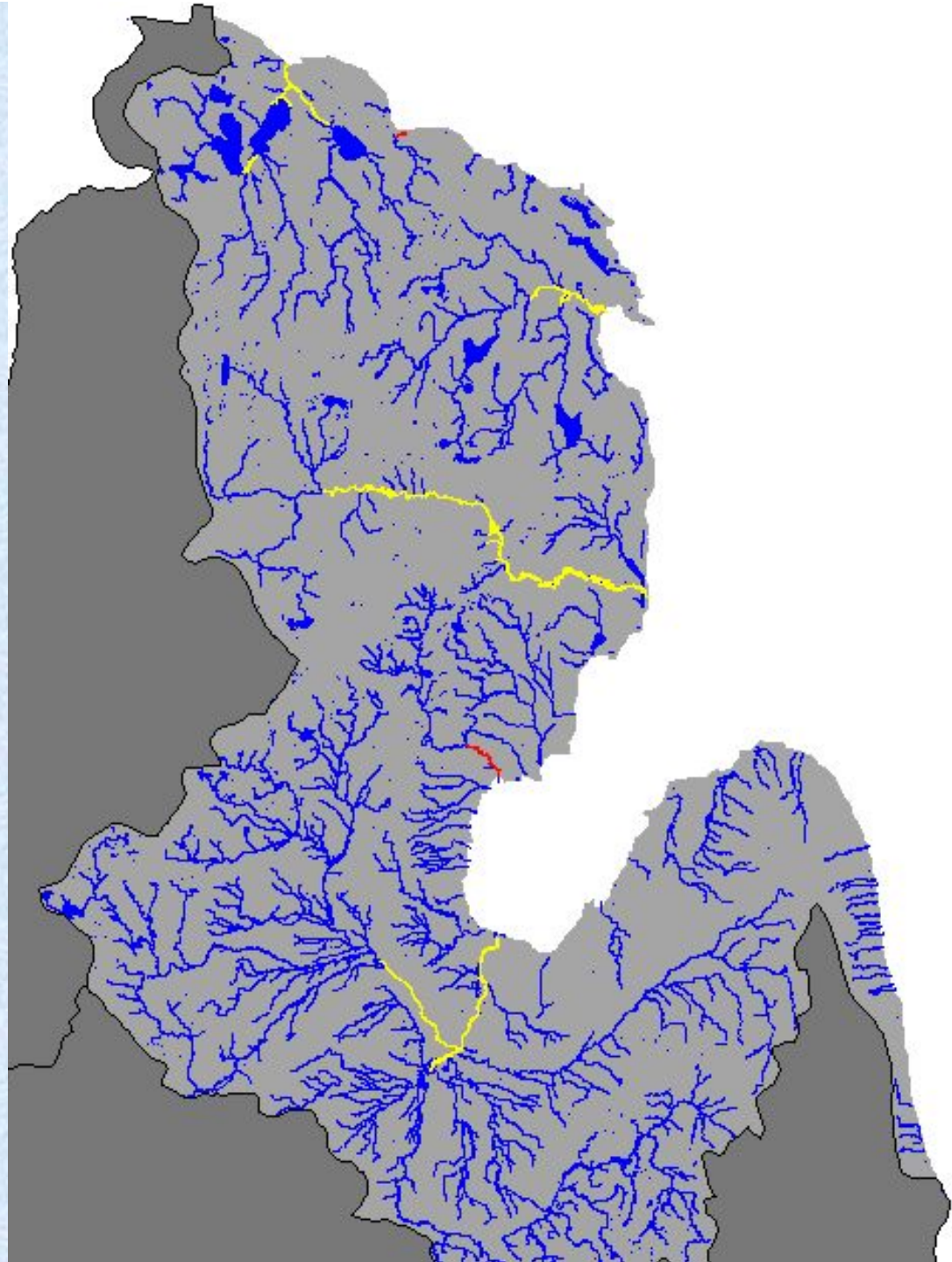




Lake sturgeon potential

Yellow= high
Red= medium

Source: Lake Sturgeon
Rehabilitation Strategy
(MDNR Fish Division)

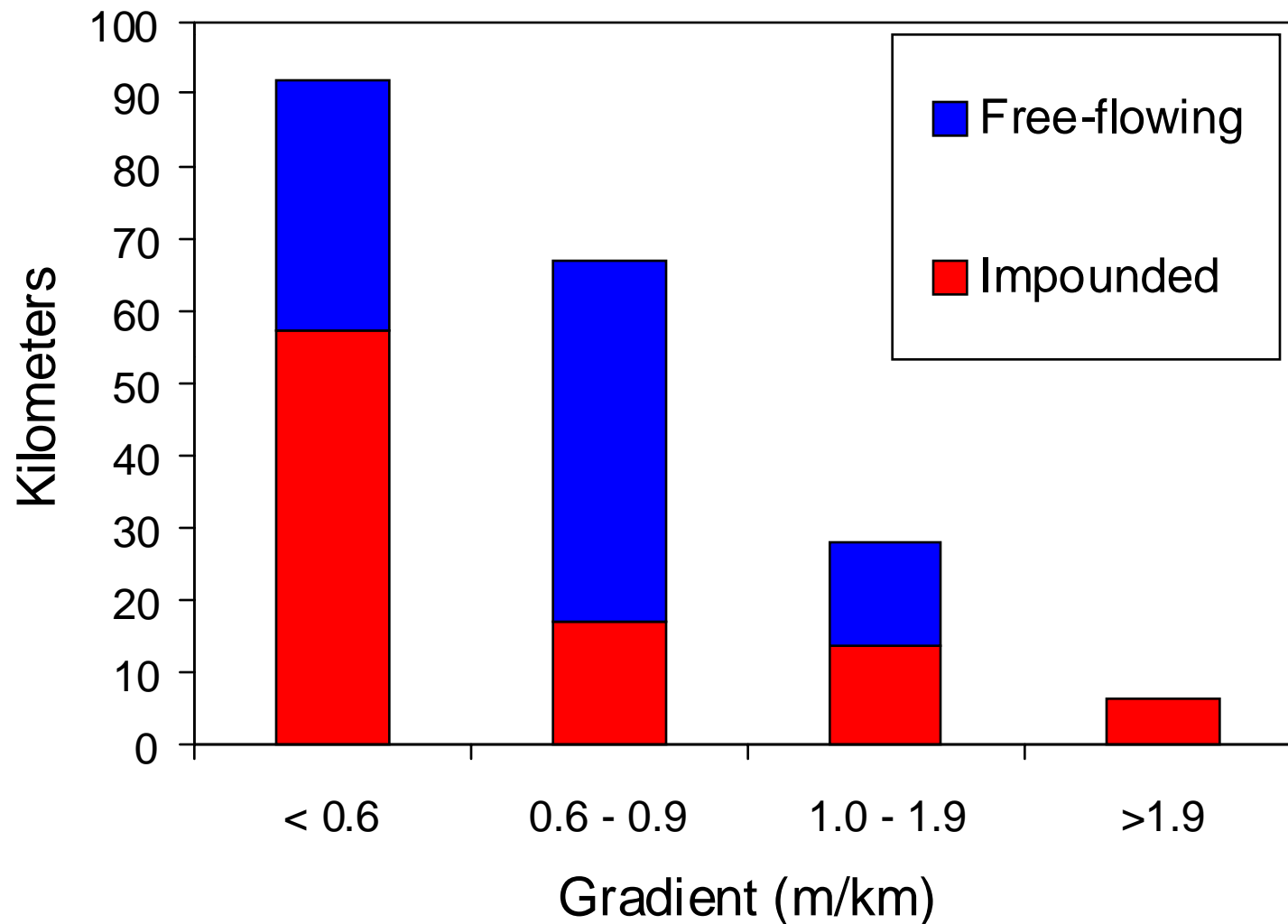


Major dam locations



Au Sable River Gradient Distribution

from South Branch Au Sable River to river mouth





Biological potential of Lake Huron Streams

- Biological potential of existing high-gradient habitats between Mio and Foote dams: 14,440 Adult lake sturgeon.
- *The Lake Huron watershed has a great, untapped biological potential.*



Actions Needed to Restore Ecosystem Integrity

- Complete on-going sediment cleanups (Saginaw River/Pine River)
- Provide support to AOCs
- Monitor atmospheric inputs
- Lakewide monitoring coordination
- Minimizing the impact of non-native species



Additional Actions Needed...

- Provide fish passage to high quality areas
- Develop alternatives to activities that harden the shoreline
- Identify important coastal wetland areas
- Control nonpoint source of pollution
- Improve coordination between Great Lakes agencies and community partnerships



On-going Lake Huron Efforts

- Lake Huron GIS System development.
- Working closely with the GLFC Lake Huron Committee on Environmental Objectives development.
- Combining effort towards implementation of the Lake Huron Binational Partnership.





Lake Huron Binational Partnership

For additional
information contact:

Jim Bredin,
Michigan Office
of the Great Lakes

James Schardt, USEPA
Great Lakes National Program Office

Janette Anderson, Environment Canada

