The State of Lake Huron

Presented by: Jim Bredin

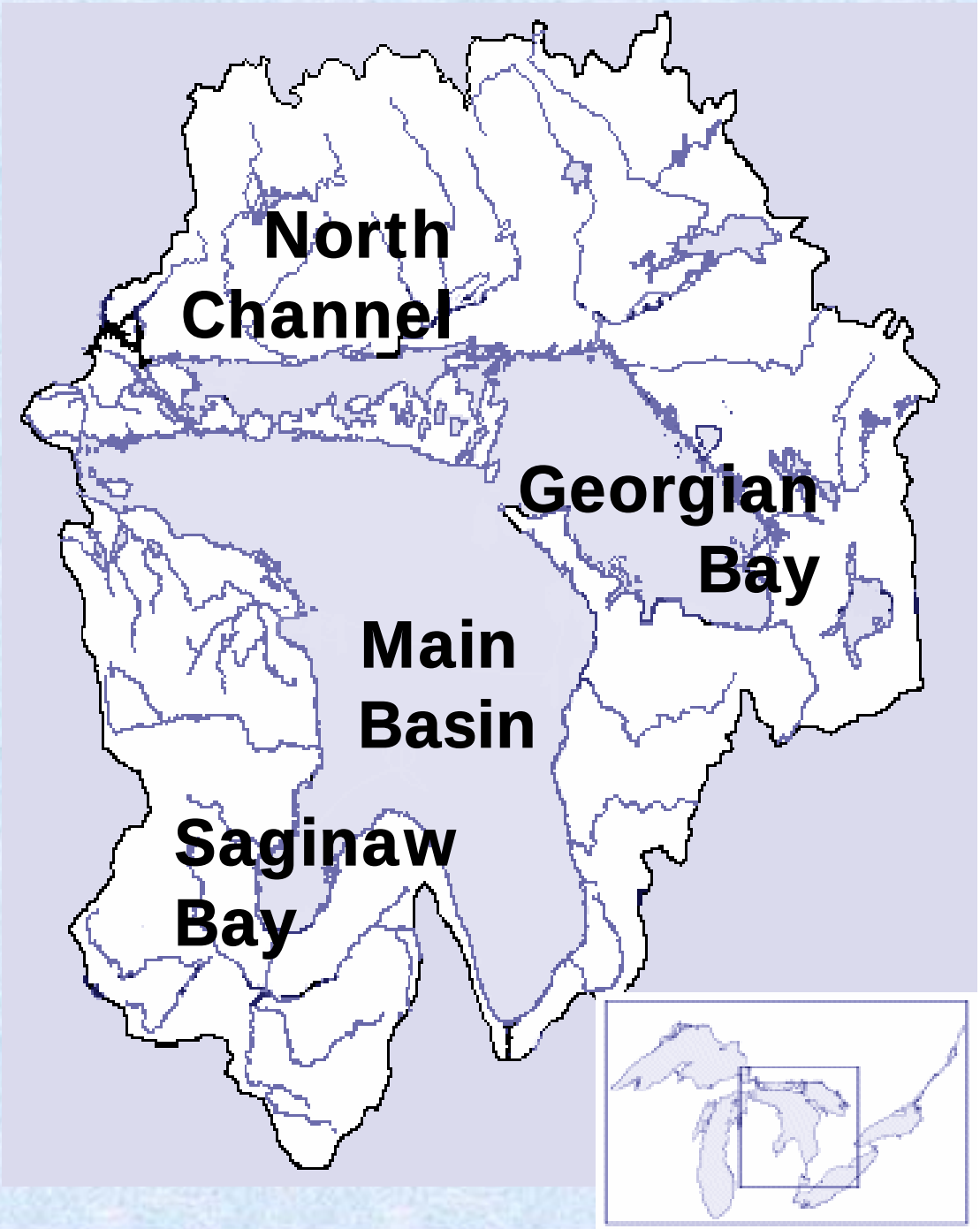
Michigan Office of the Great Lakes

The Main Basins of Lake Huron

Volume:
23,000 mi^3 /
59,600 km^3

Drainage Area:
51,700 mi^2 /
134,000 km^2

Retention Time:
22 years



A Diversity of Ecosystems

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
Sudbury
North Bay
Lake Nipissing
Elliot Lake
Sault Ste. Marie
North Channel
Little Current
ONTARIO
Huntsville
Parry Sound
Mackinaw City
Cheboygan
Georgian Bay
Tobermory
Alpena
Midland
Orillia
Wiarton
Lake Simcoe
Barrie
Lake Huron
Owen Sound
Collingwood
MICHIGAN
Newmarket
Goderich
Saginaw Bay
Midland
Bay City
Saginaw
Flint
Owosso
Lake St. Clair
N
50 0 50 100 Kilometers
40 0 40 80 Miles
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

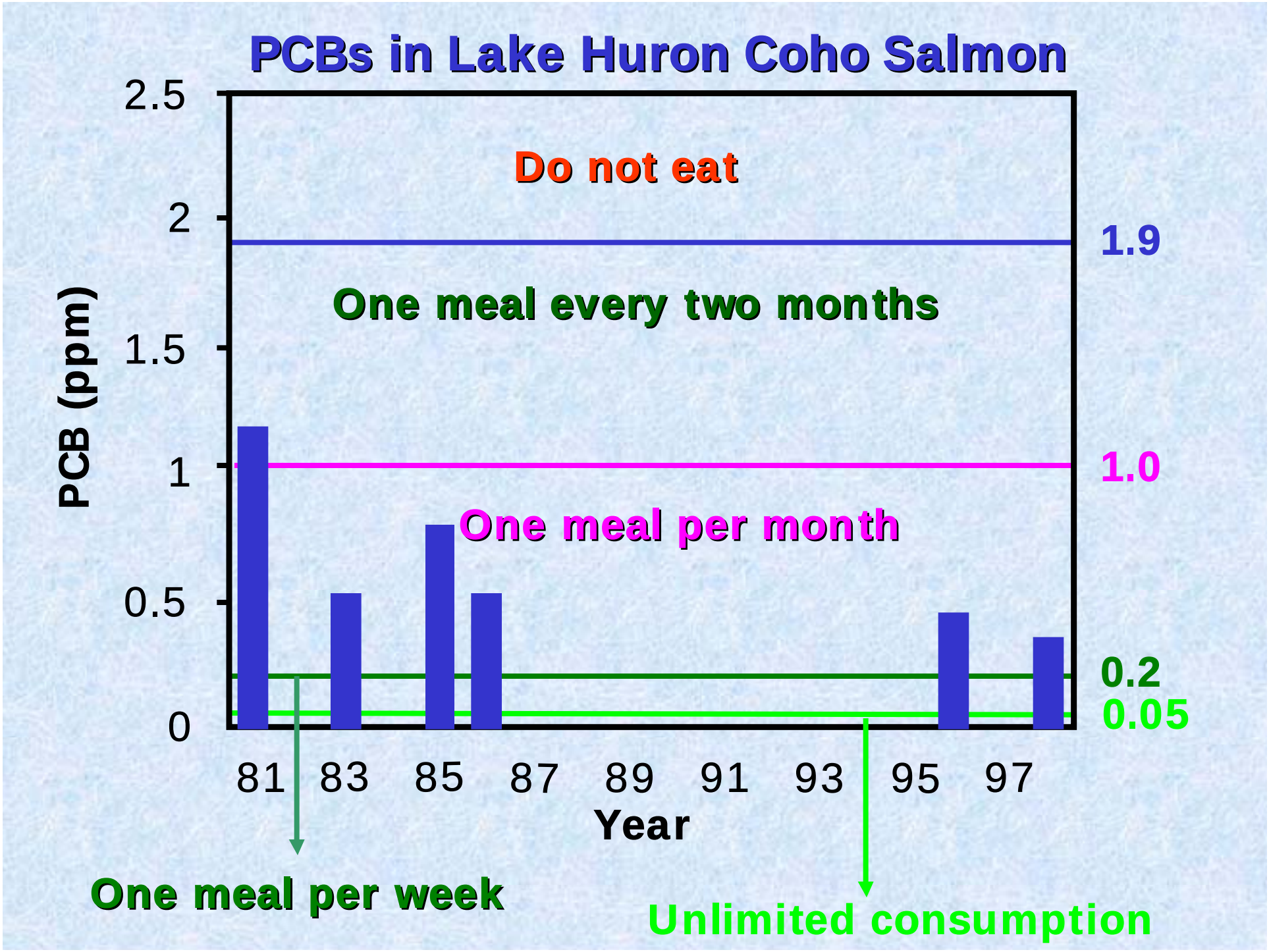
- Chemical:
  - Fish Consumption Advisories
  - Wildlife Health
- Biological:
  - Impaired Benthic Communities
  - Fish Community Alteration
- Physical:
  - Habitat Restoration/Protection

Chemical Integrity

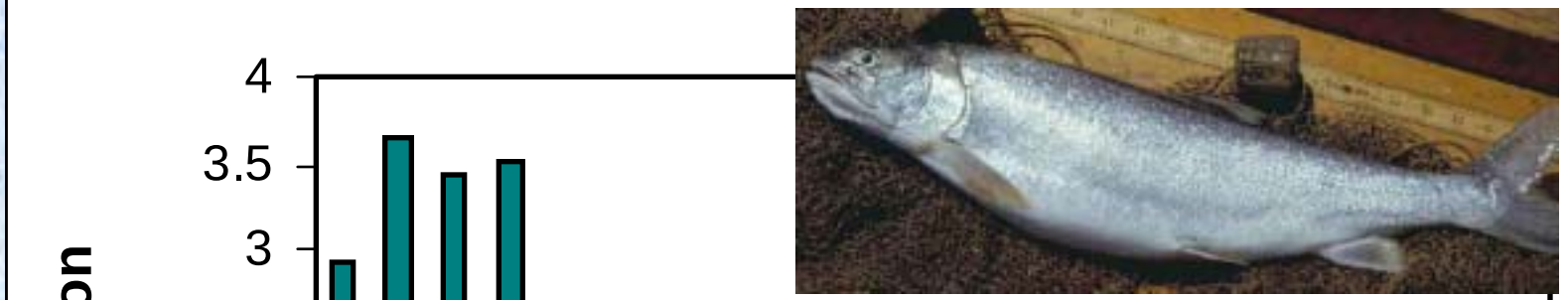
- Fish Consumption Advisories
- Wildlife Contaminants

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

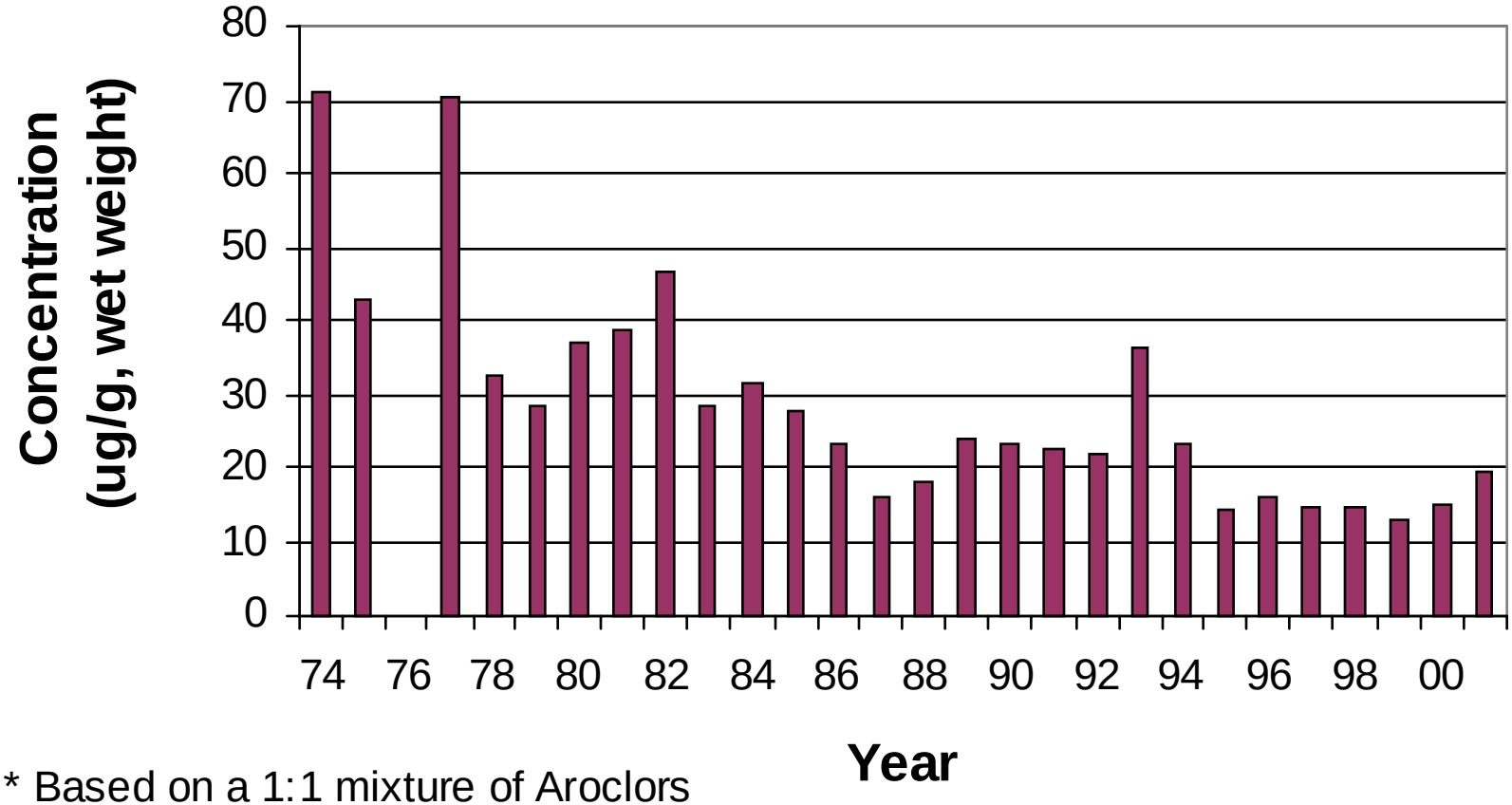

PCBs in Lake Huron Coho Salmon
PCB (ppm)
2.5
2
1.5
1
0.5
0
Do not eat
1.9
One meal every two months
1.0
One meal per month
0.2
0.05
81
83
85
87
89
91
93
95
97
Year
One meal per week
Unlimited consumption

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



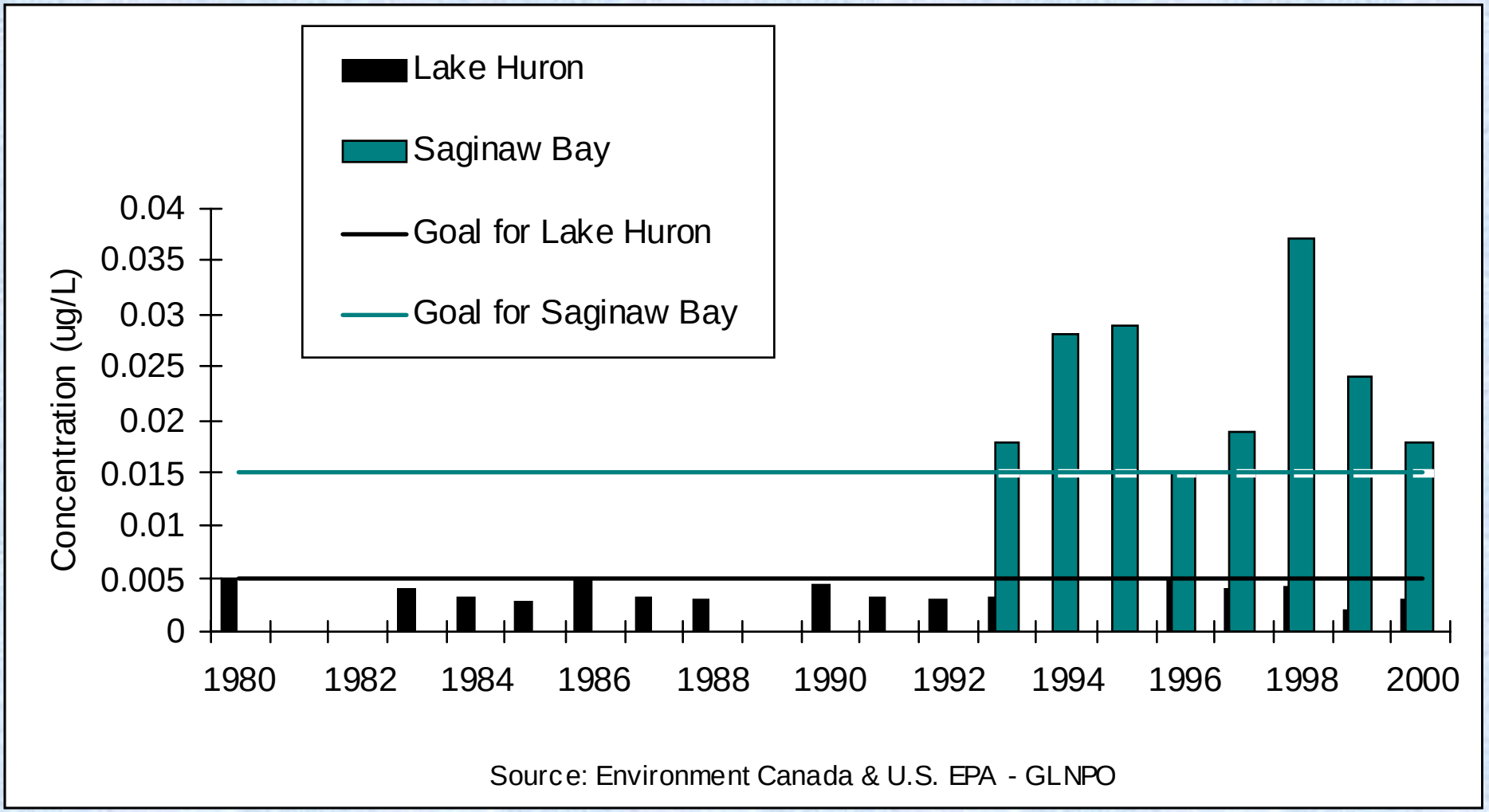
Lake Huron Total PCBs* in Herring Gull Eggs

(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



Source: Environment Canada & U.S. EPA - GLNPO

Biological Ecosystem Integrity

- Changes in Lower Food Web
- Fish Community Alteration

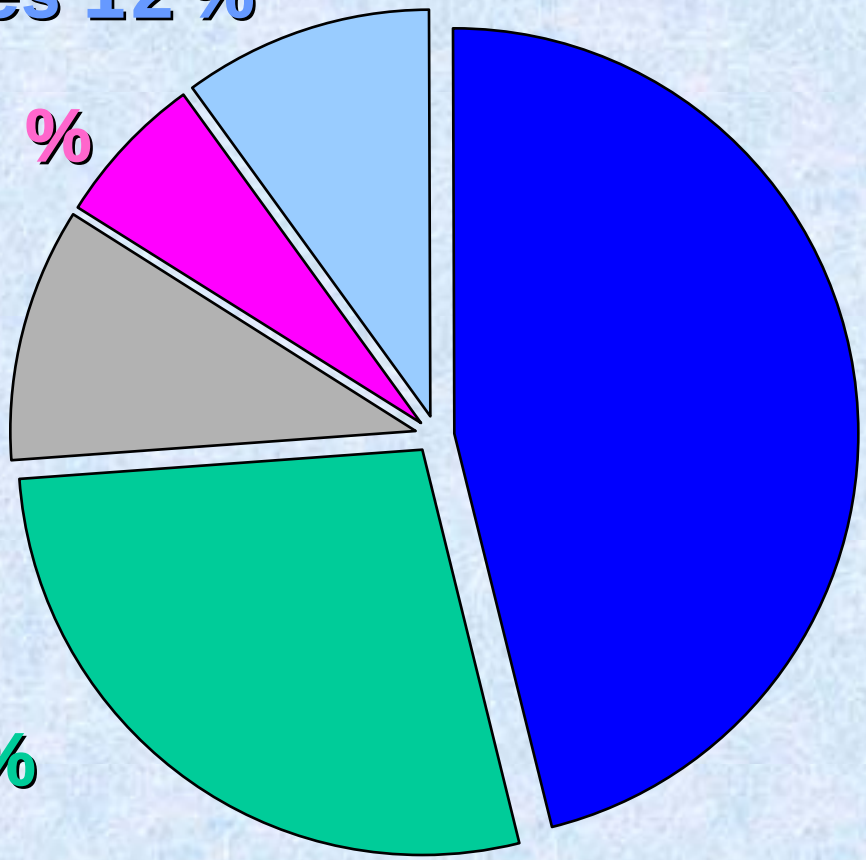
Biological Integrity – Lower Food Web

- 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

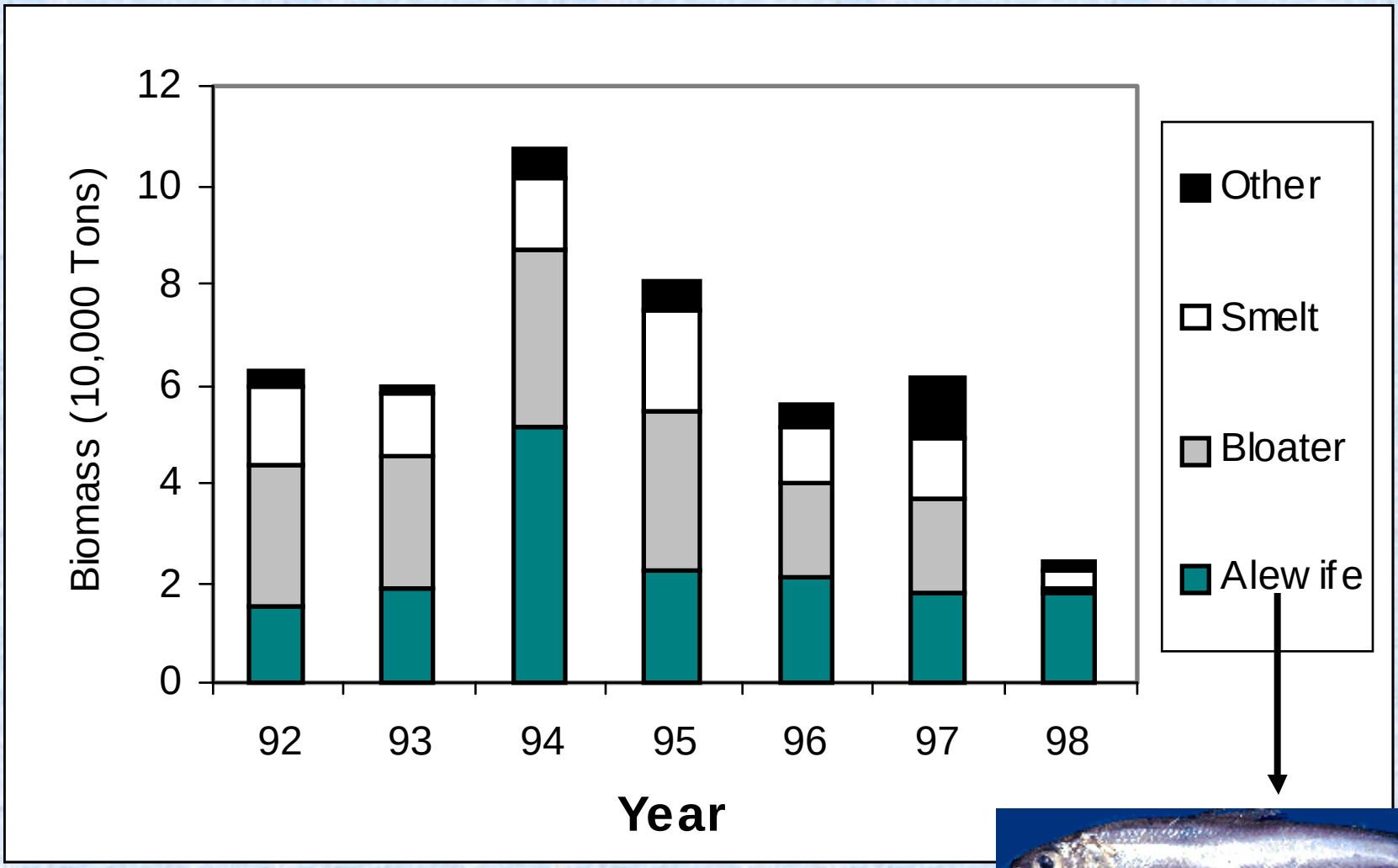
- Invasion of zebra mussel and other species
- Studies to investigate changes in benthic species and biomass, especially Diporeia
- Fish communities respond by altering food sources or face declining populations

Preyfish Population



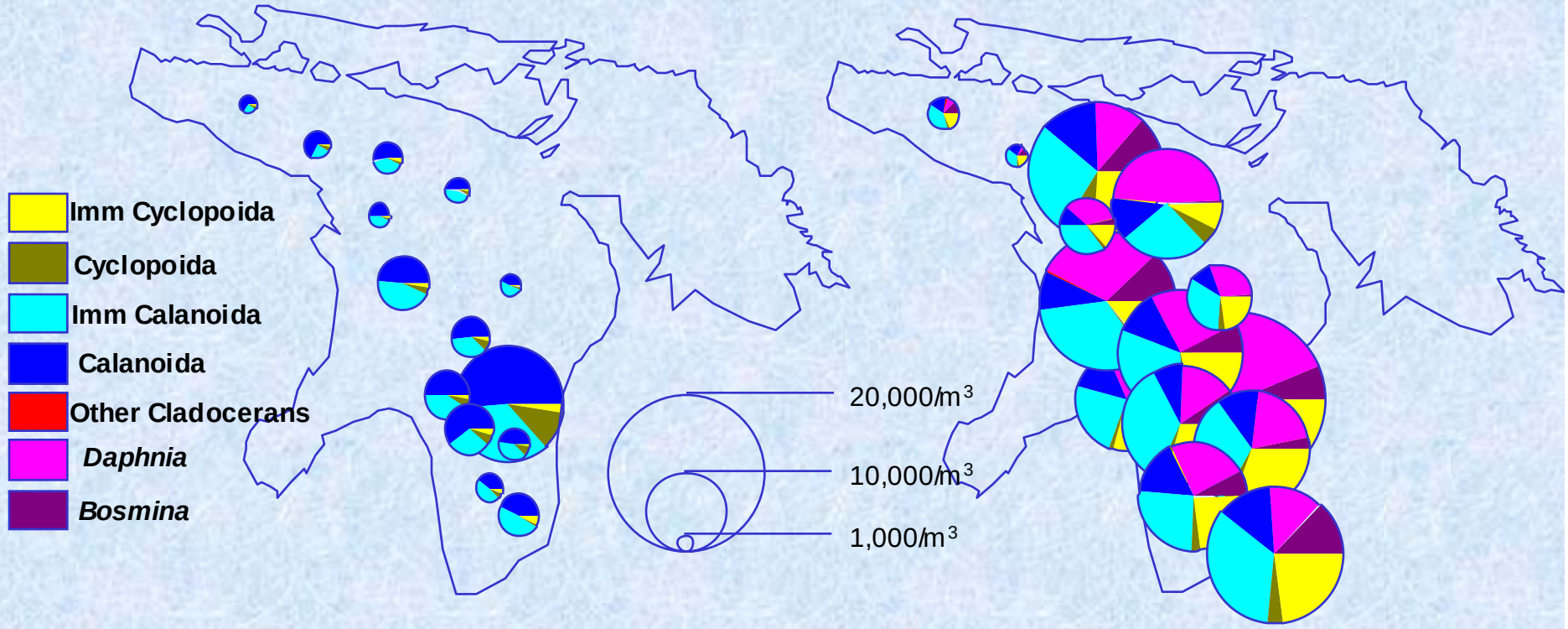
Source: USGS

Biomass of Major Prey Fishes



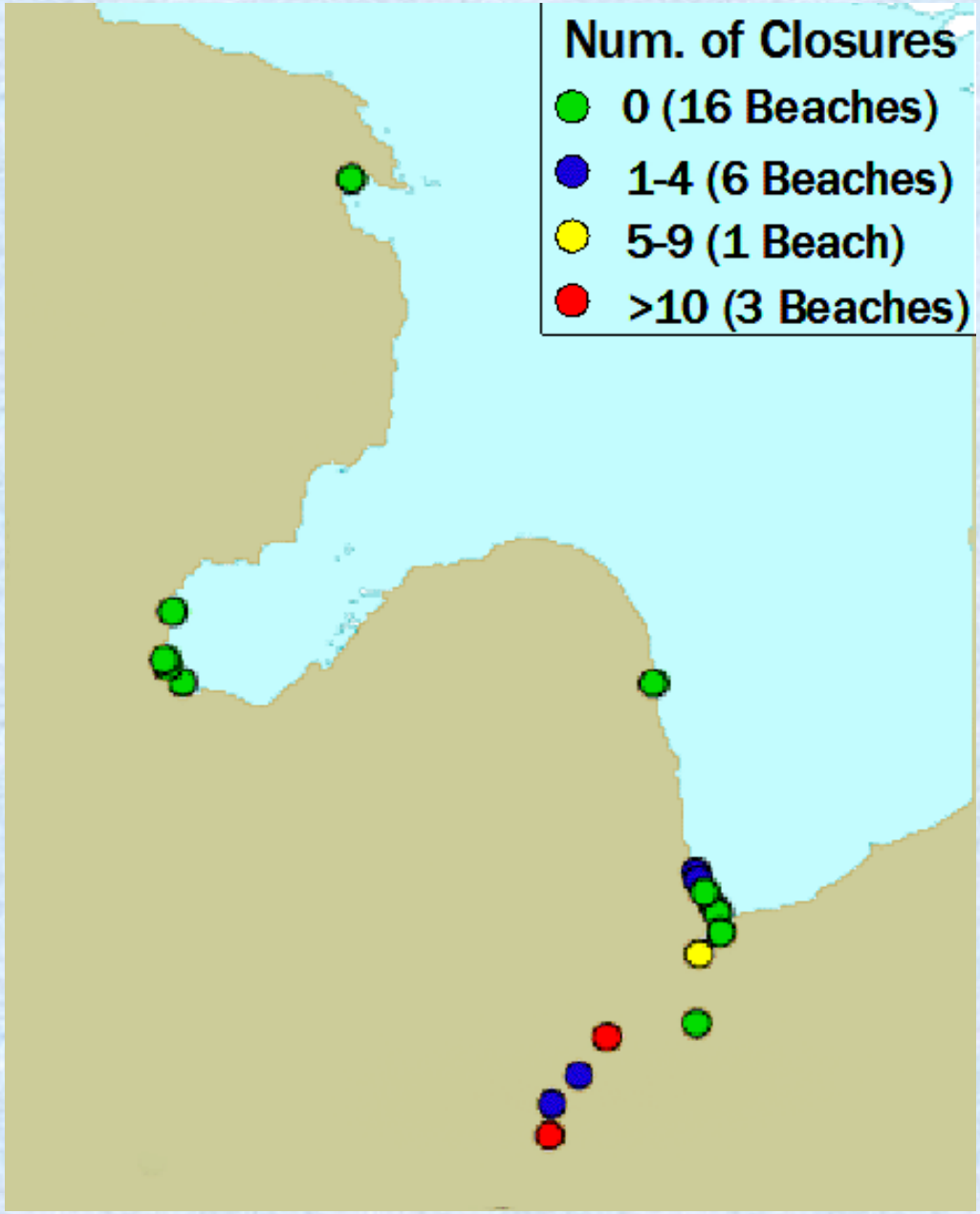
Source: U.S. EPA

Zooplankton



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

Beach Closings 2001



Biological Integrity - Fish Community Indicators

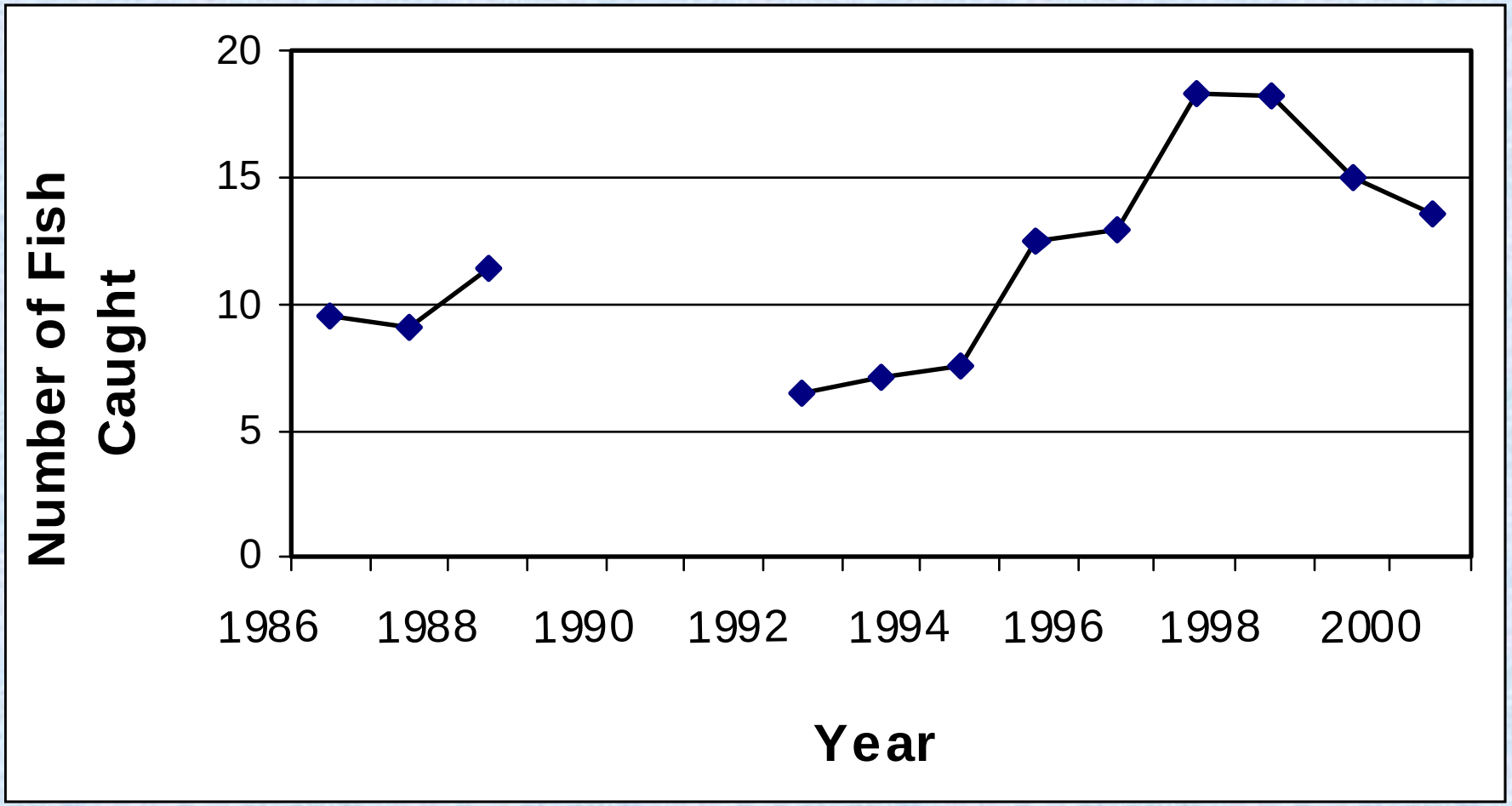
Main SOLEC Indicators:

- 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

Physical Integrity

Major Issues:

- Structural barriers between stream reaches (connectivity of habitat)

Physical Integrity

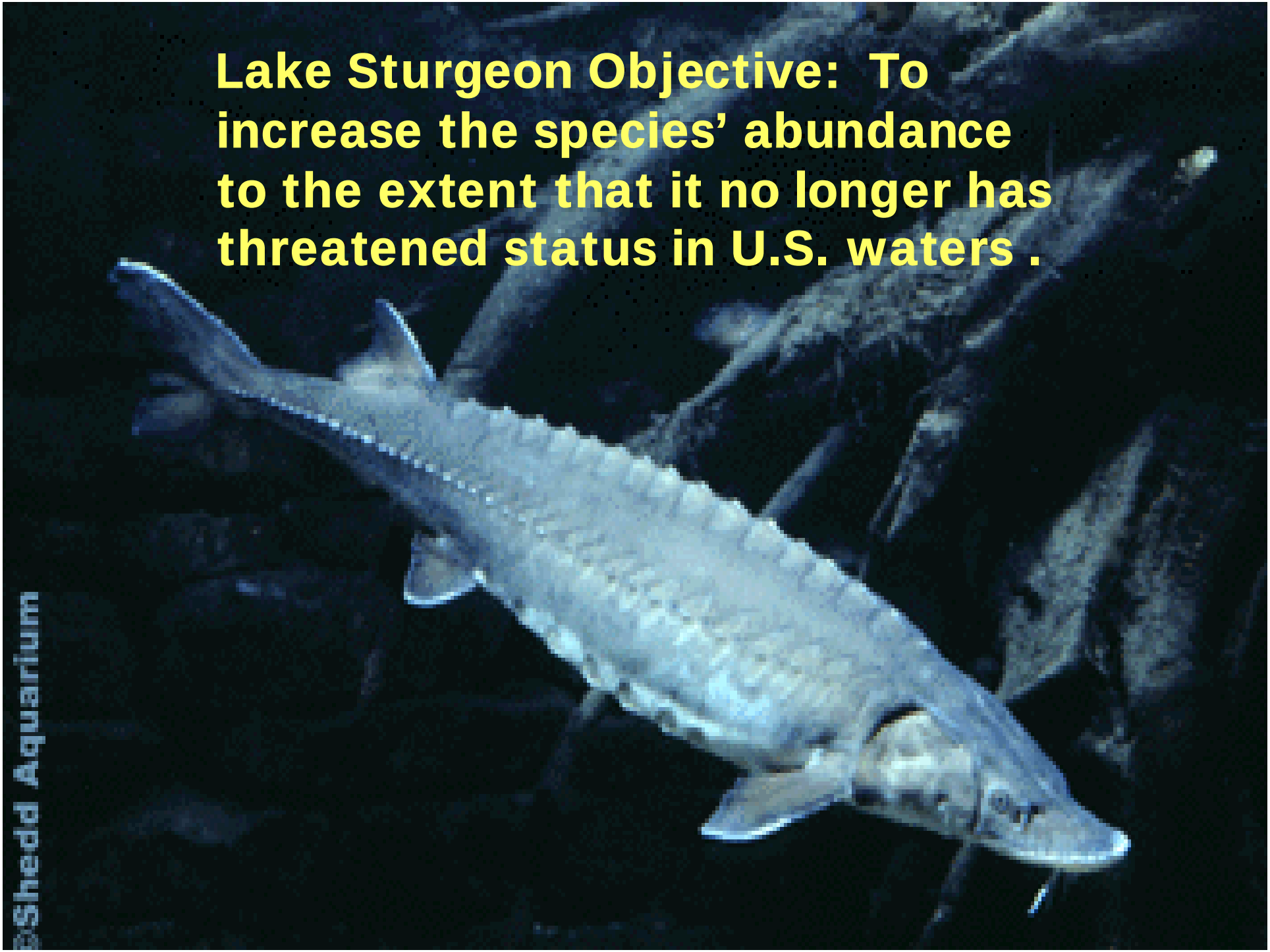
- Main SOLEC Indicators:
  - Habitat fragmentation
  - Sediment flowing into coastal wetlands
  - Coastal wetland area by type
  - Extent of hardened shoreline
  - Protected nearshore areas

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

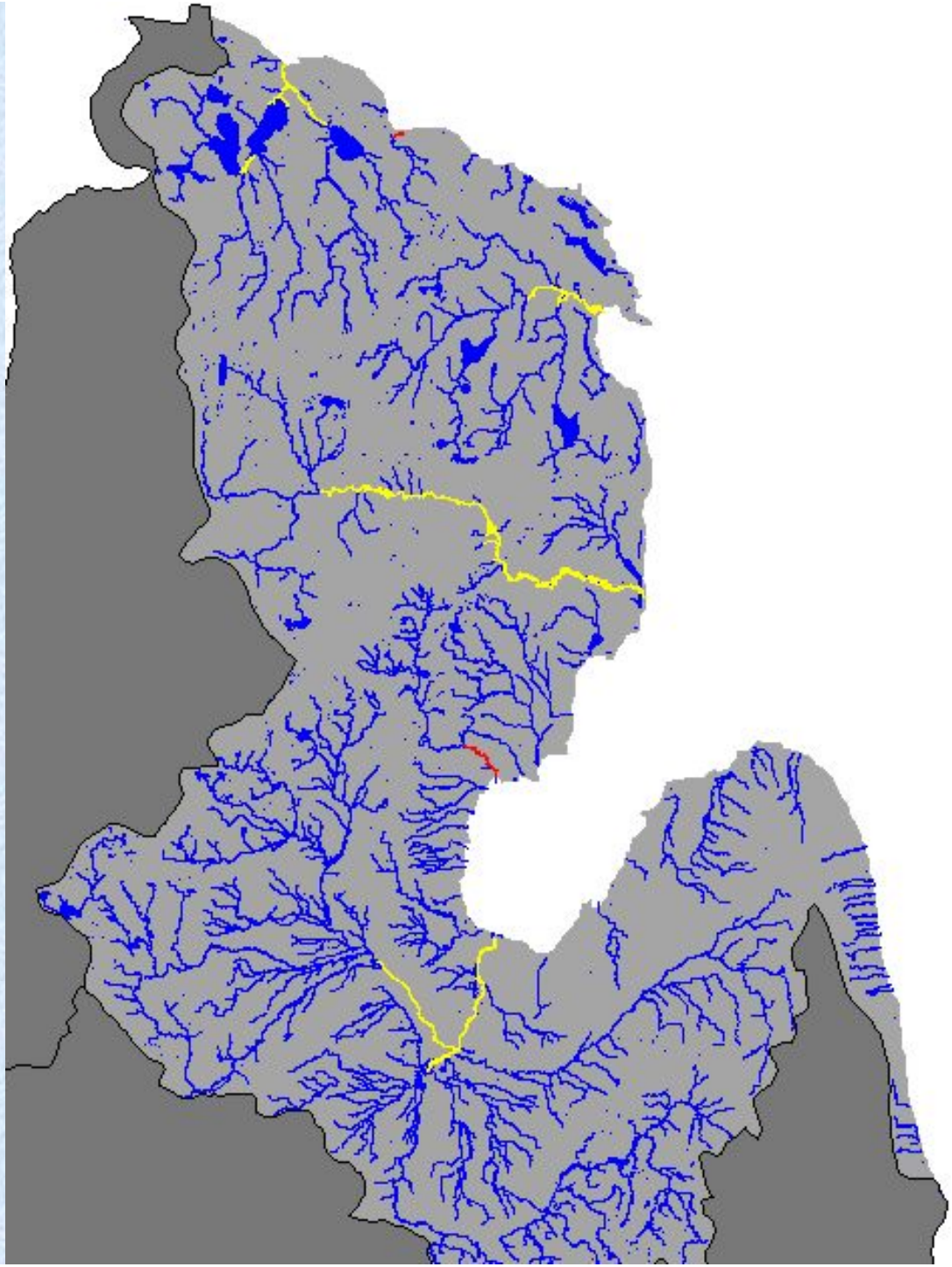
- Inundate rare, high quality habitats
- Disrupt woody debris transport
- Increase summer temperatures and prevent night-time cooling
- Reduce aquatic insect diversity and density
- Also prevents non-native species, including lamprey from reaching upstream areas


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

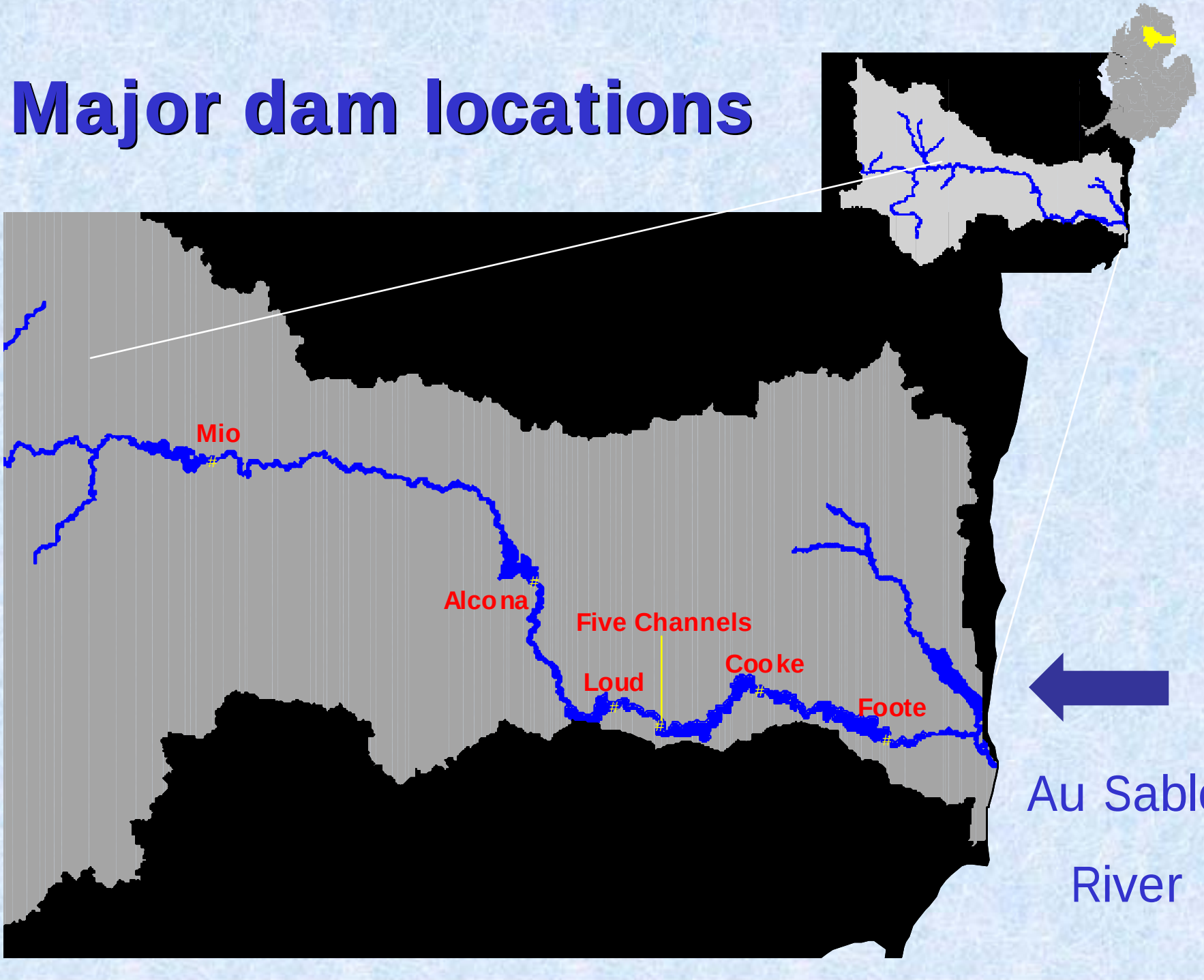
Lake sturgeon potential

Yellow= high
Red= medium

Source: Lake Sturgeon Rehabilitation Strategy (MDNR Fish Division)

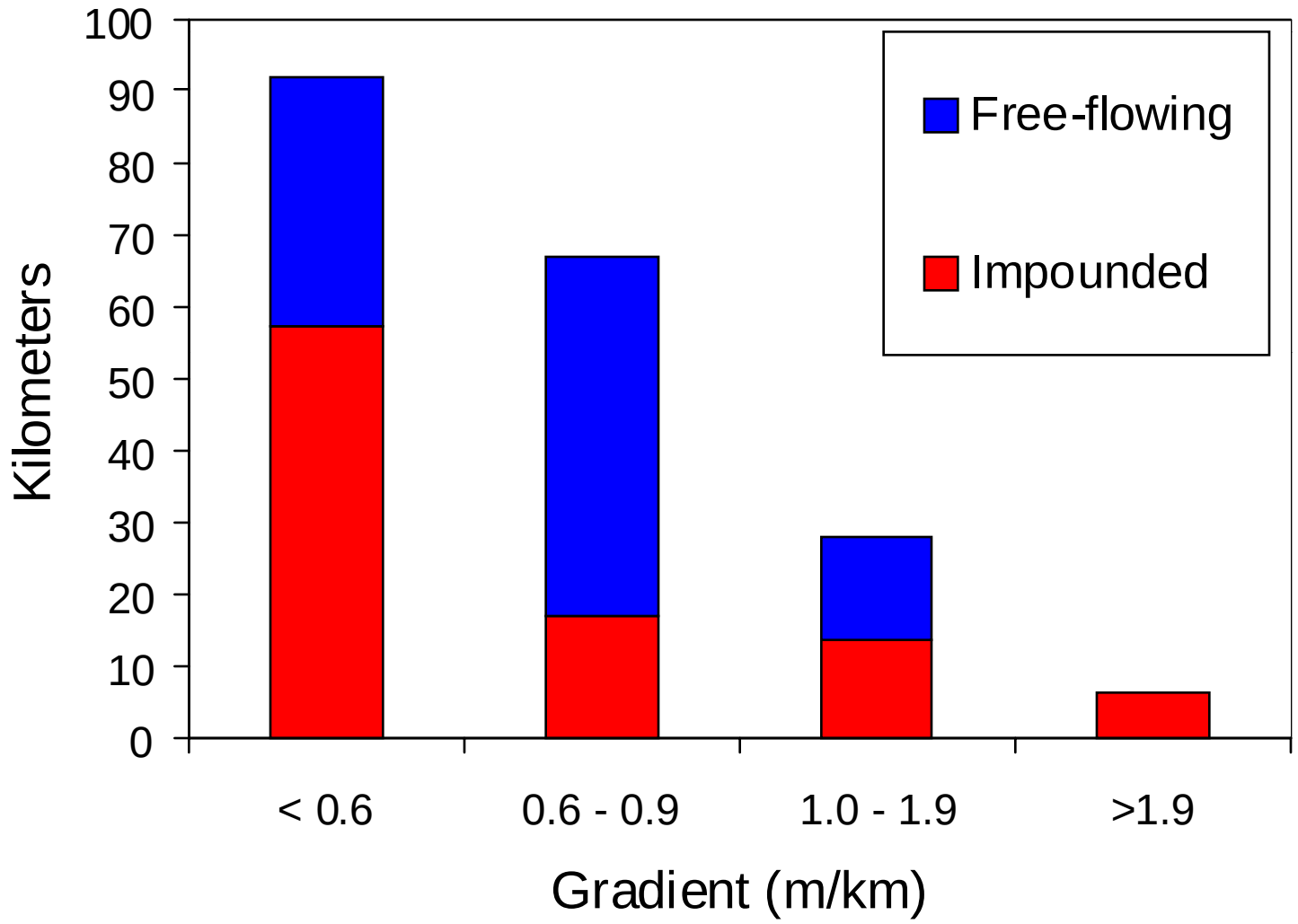


Major dam locations



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