

The State of the Lake Huron Fish Community in 1999



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Lake Huron first
Great Lakes
discovered by
European explorers.



Royal Ontario Museum



Lake Huron
ecosystem
undergone
many changes
since that
time.

Fisheries collapsed by the 1950s from sea lamprey predation and over fishing



Alewife invaded and their population exploded





Environment Canada

- With no predators to control nuisance species, die-offs of alewives were common.
- Beaches littered for miles during 1960s
- Fishing and tourism detrimentally affected



MDNR



MDNR



Sea lamprey control allowed stocking and survival of Pacific salmon, lake trout and other predators.



Restocking controlled alewife and smelt, prevented alewife die-offs while providing exceptionally good fishing.



Recovery of recreational & commercial fisheries in Great Lakes

major success story in fisheries management



Historic Lake
Huron Ecosystem



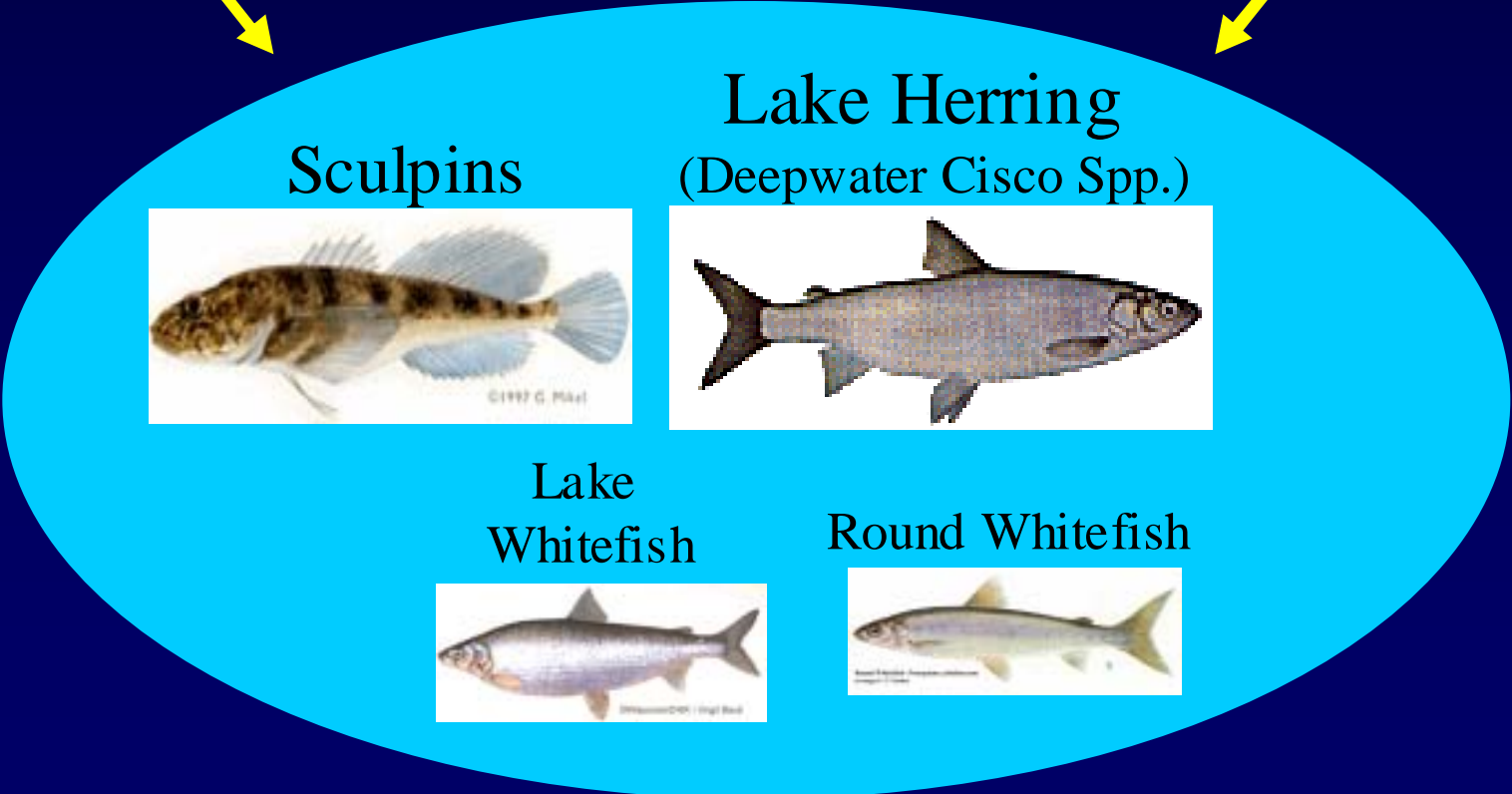
Lake Trout



Walleye



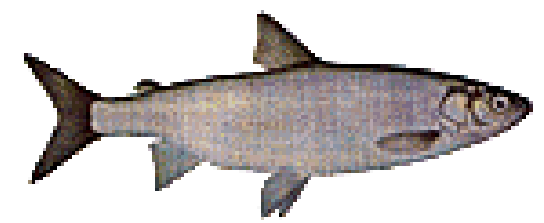
Burbot



Lake Herring

(Deepwater Cisco Spp.)

Sculpins



Lake
Whitefish



Round Whitefish



Current Lake
Huron Ecosystem



Chinook Salmon



Rainbow Trout



Lake Trout



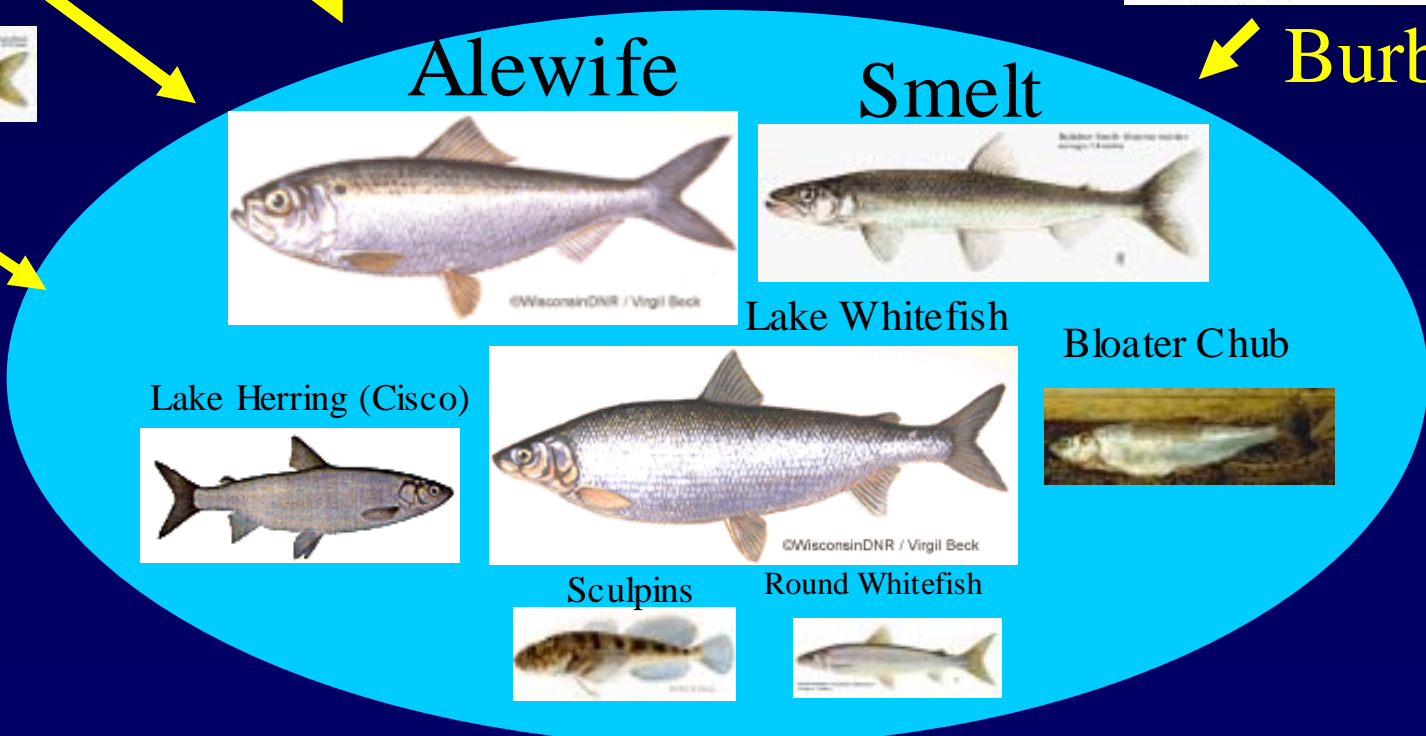
Burbot



Brown Trout



Walleye



Lake Whitefish



Lake Herring (Cisco)



Sculpins



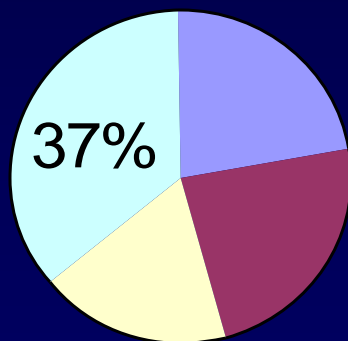
Round Whitefish



Bloater Chub

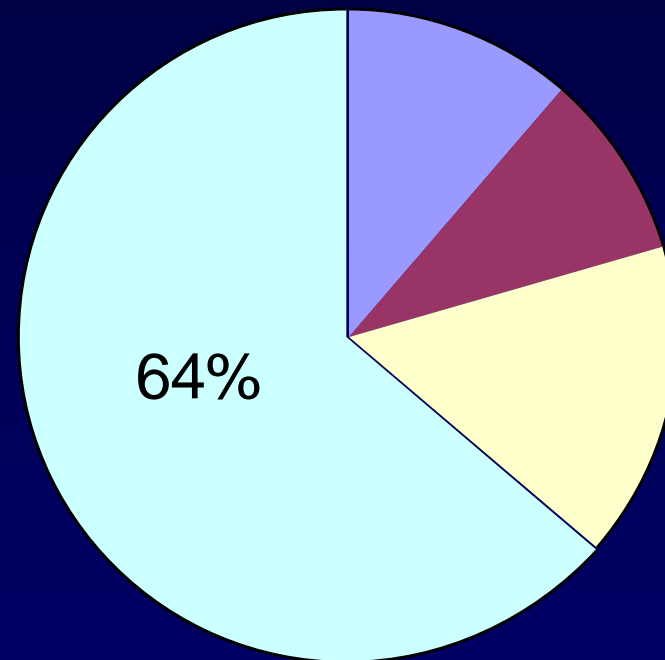
1998 Predator Biomass

11.6 metric tons



1998 Consumption by key predators

44 metric tons



FISH-COMMUNITY OBJECTIVES FOR
LAKE HURON



Great Lakes Fishery Commission

SPECIAL PUBLICATION 95-1

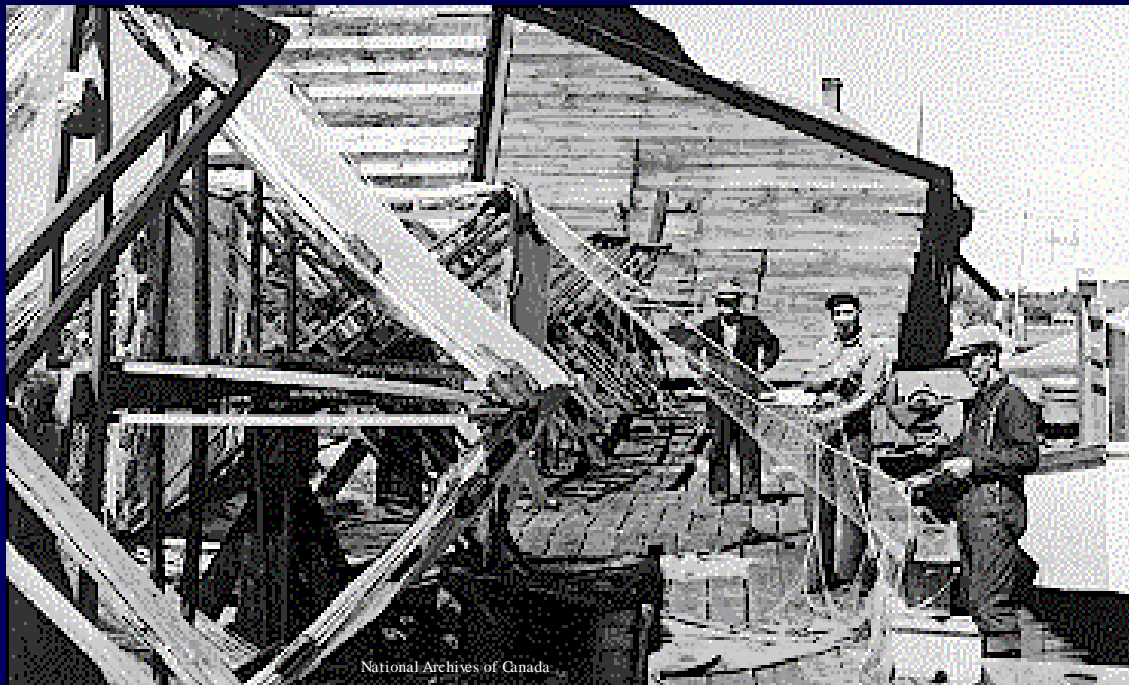
- In 1990's GLFC coordinated Fish Community Objectives for each Great Lake.
- In most cases fish community objectives have yield targets based on historic landings from 1912-1940.



Are historic
harvest
levels
sustainable ?



Grey County Museum



National Archives of Canada

Comparing current
harvest with
historic levels is
valuable exercise
but needs to be
done in context.



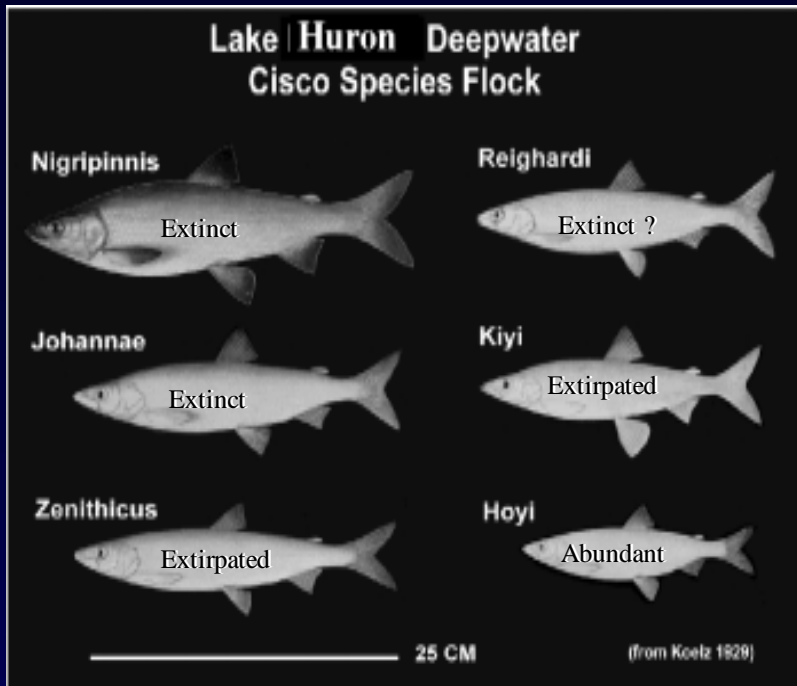
1 The Goderich fishing fleet, 1884.

Ontario. Dept. of Fisheries, *Fifth Annual Report ... 1903* (Toronto: L.K. Cameron, King's Printer, 1904), p. ii; National Library of Canada, NL 13100.



Parry Sound Public Library

- Historic yield may provide idea of what fully recovered fish community might sustain rather than a specific target.
- Need to target some form of historic fish community structure dominated by self-sustaining populations of top predators.



- Historic yields may not be achievable or sustainable due to changes in the predator/prey community.

- Non-native prey (alewife and smelt) may not be able to sustain historic yields.
- These prey not as efficient in harnessing primary and secondary production of lake.



- Introduction of non-natives species may divert much of the primary and secondary production to areas not utilized by introduced salmonids.
- Native lake trout would have once utilized some portion of the benthic prey.

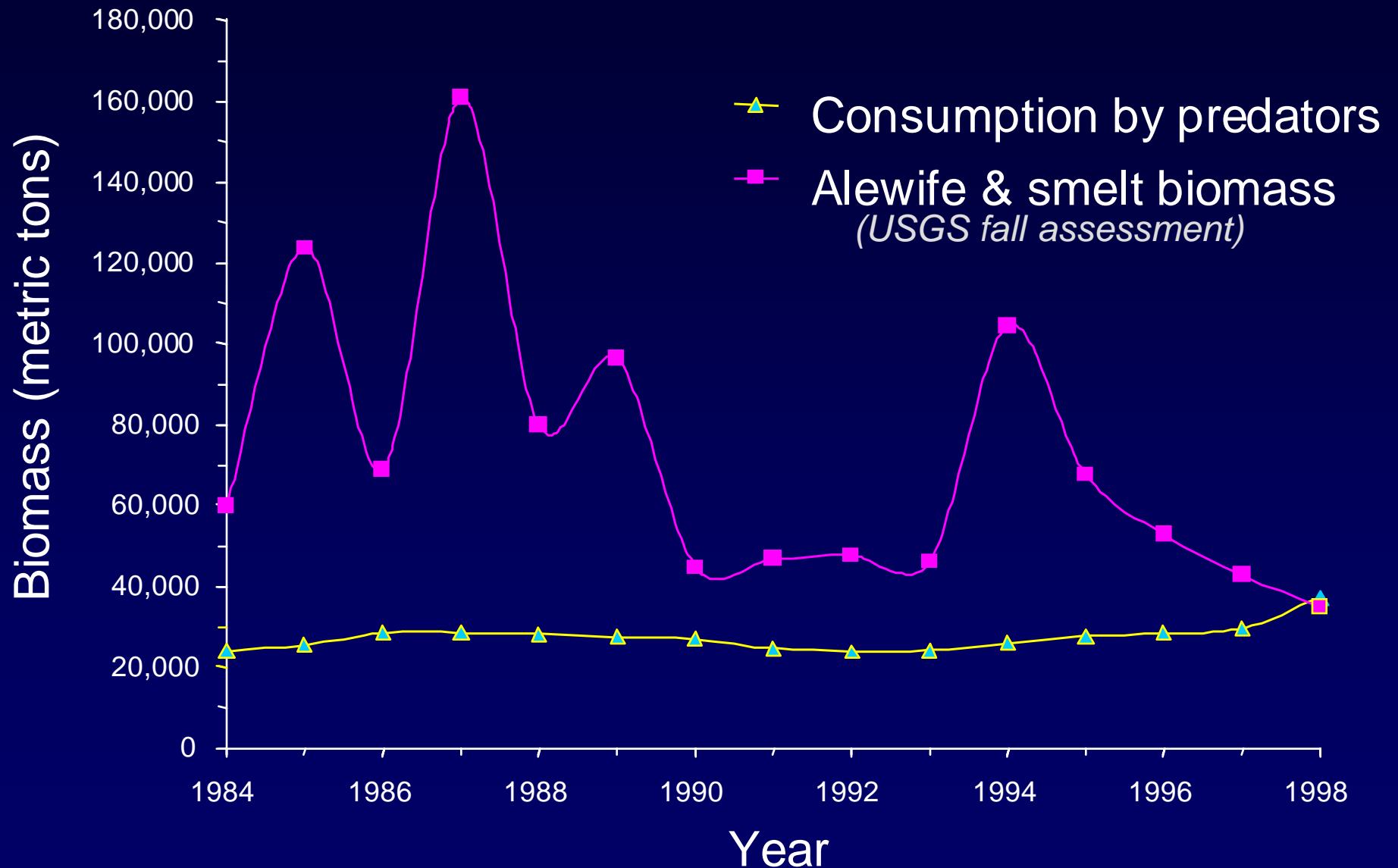
Zebra mussel
(*Dreissena polymorpha*)



Spiny Water Flea
(*Bythotrephes cederstroemi*)



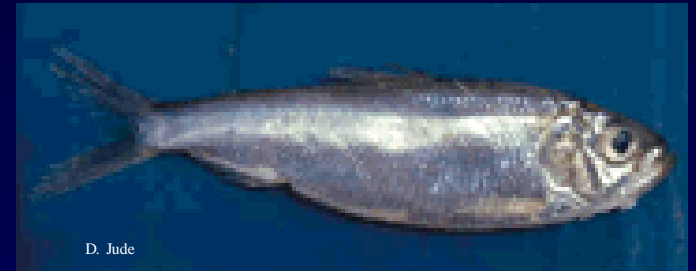
Comparison of estimated predator consumption (modeling) to alewife and smelt biomass in the main basin, 1984-1998





- Alewife and smelt may limit FCO's attainment through egg and fry predation and competition.

- Alewife predation by salmonine predators implications for early mortality syndrome.



- High levels thiaminase in alewife (and smelt), breaks down thiamine in predators and leaves eggs low in essential vitamin and high mortality.



- Chinook salmon diet, should be especially susceptible.

- Great Lakes fisheries communities have been greatly affected by sea lamprey.
- St. Marys River largest source of sea lamprey in Great Lakes.



- Exceeding production from all other tributaries combined.
- Chemically treated in 1998/99, early results encouraging, but sea lamprey continue to impede achievement of FCO's for species such as lake trout.

- Sea lamprey abundance above targets for 2000.
- 80% reduction by 2010 difficult to achieve without increased control on St. Marys and other tributaries.
- Appears Saginaw River contributing to sea lamprey numbers much higher than previously assumed.



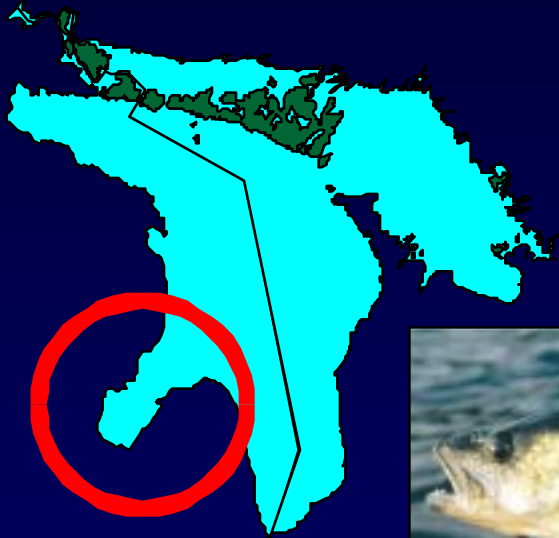
- Lack of some understanding of linkages between fish production and habitat supply.



- Habitat objectives for Lake Huron may be technically achievable, but political and human limitations may make them unattainable.



- Achievement of FCO's for walleye, yellow perch, channel catfish and lake herring requires habitat rehabilitation of Saginaw Bay.

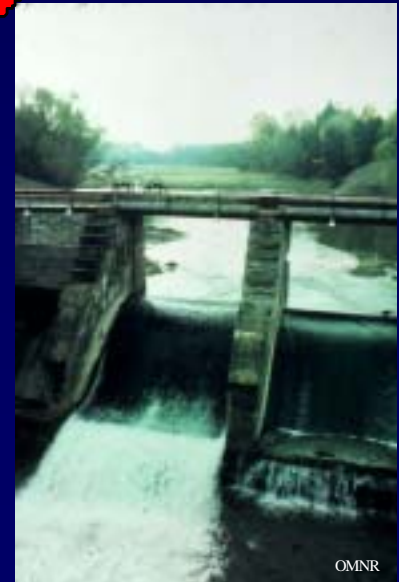
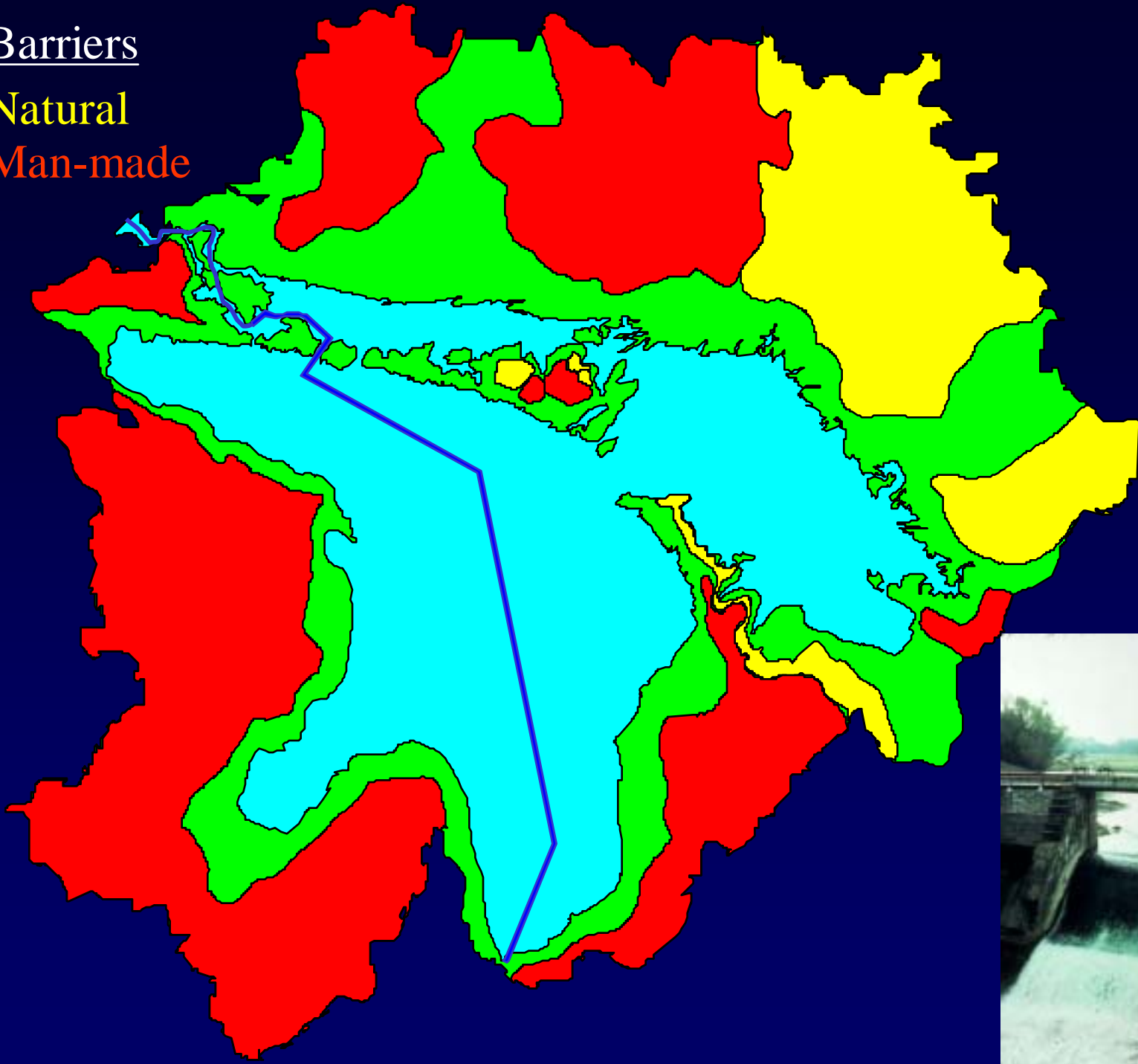


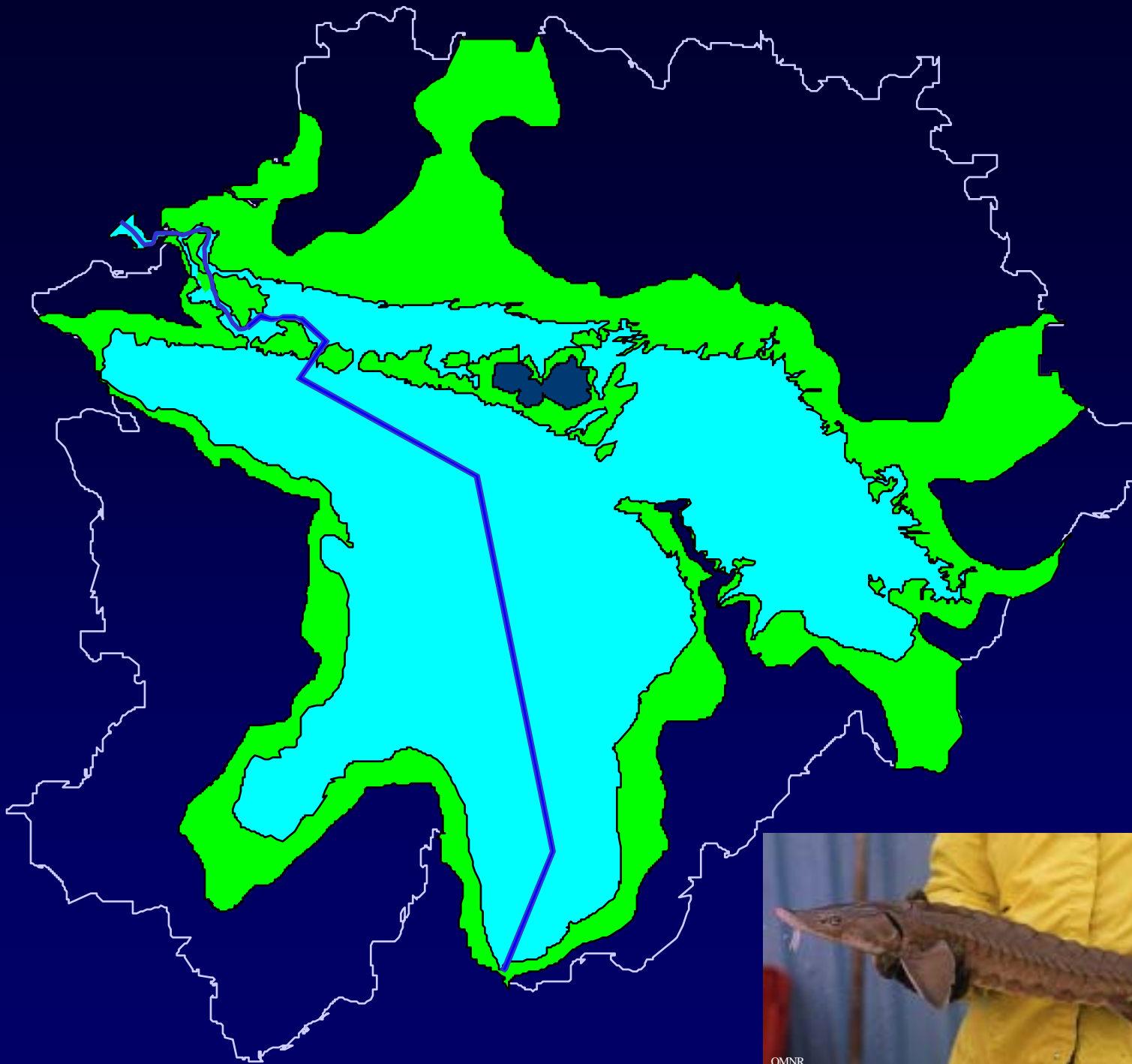
- Bay historically most productive area of lake and accounted for much of lakewide yield of these species.

Barriers

Natural

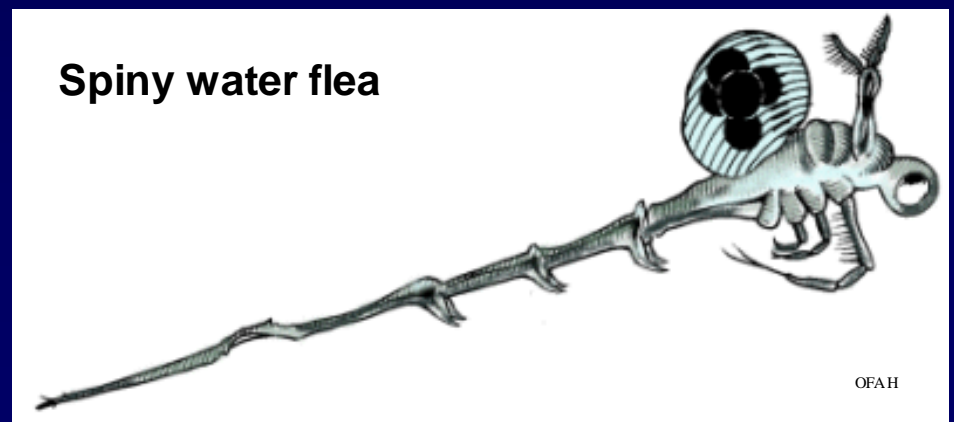
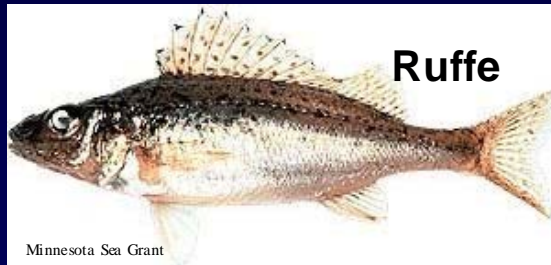
Man-made



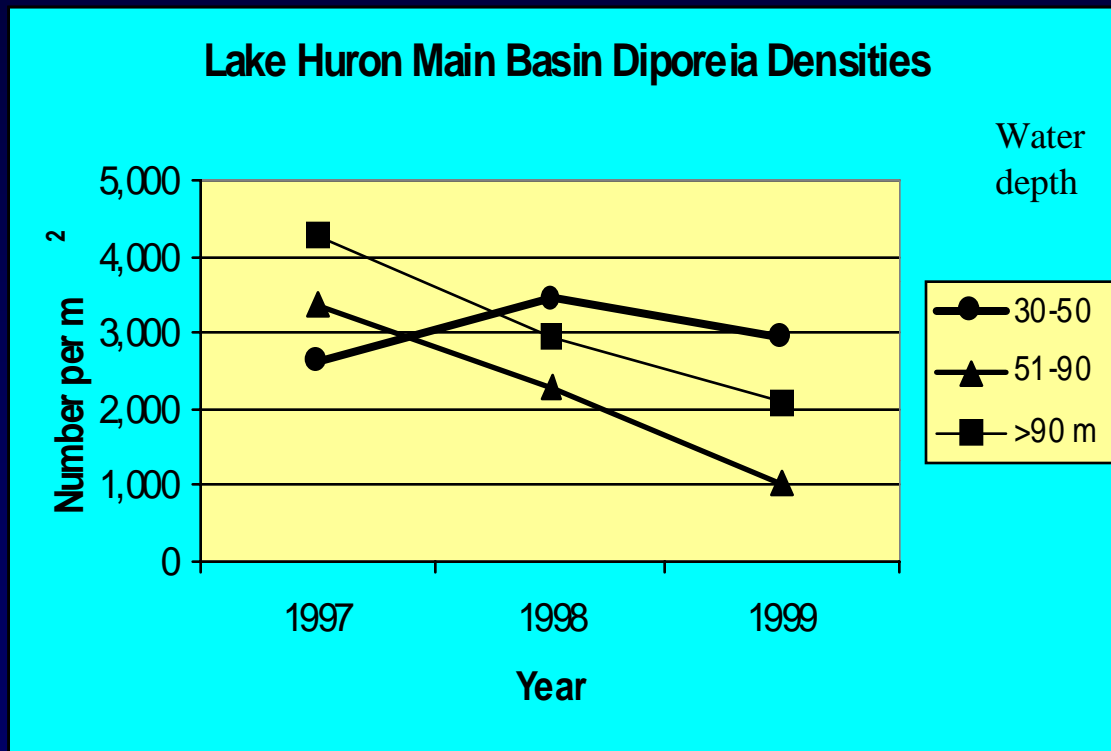


OMNR

- Recent invading species heighten uncertainty for expectations of the Lake Huron ecosystem.

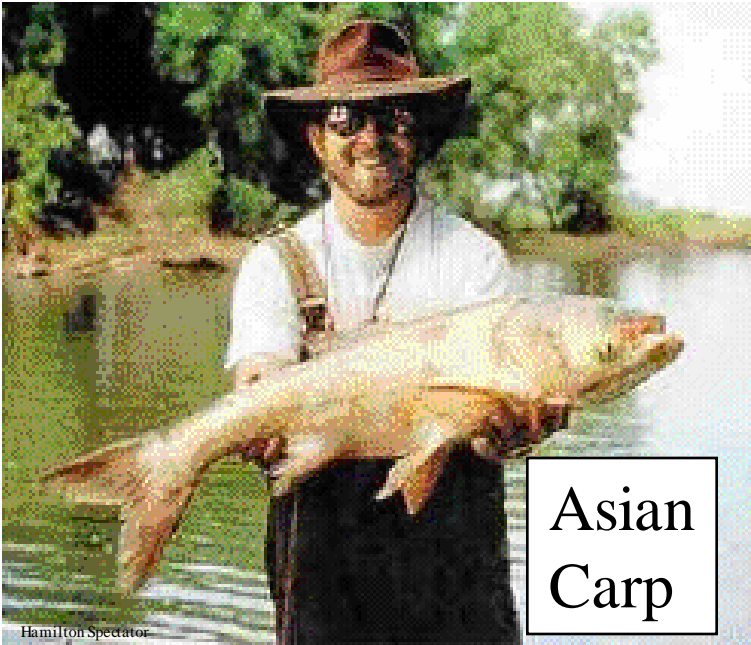


- Suspicion zebra mussels contribute to reduction and elimination of *Diporeia* (important invertebrate food [amphipod] for fish including lake whitefish).

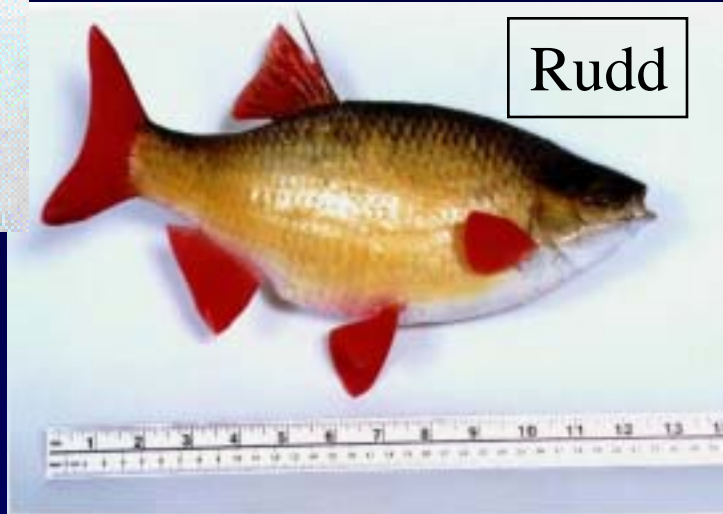


- Similar to situation occurring on Lake Michigan and western Lake Ontario.

- Disruptions of food web may degrade Lake Huron ecosystem.



Asian
Carp



Rudd

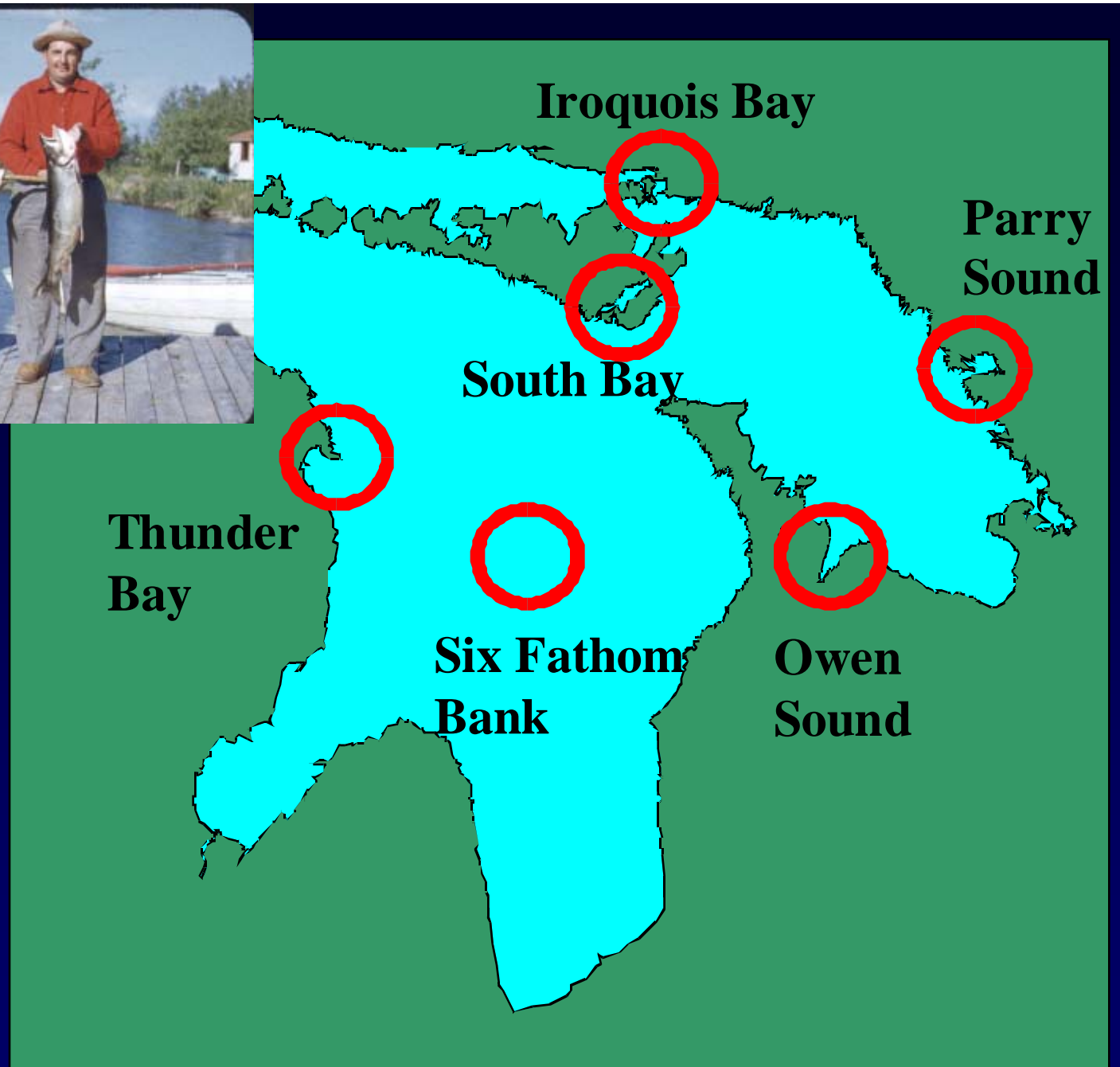
- New non-native species introductions make predictions for a changing ecosystem difficult.
- Limiting future introductions a priority FCO.



Fanwort



Six sites of
lake trout
natural
reproduction.



Wild lake trout spawner catch per unit effort, 1988 to 2001, Horse Island site, Parry Sound.



What worked for Parry Sound:



- Effective sea lamprey control
- Stocking of progeny from native stocks
- Stocking at levels exceeding 4.5 yearlings/ha
- Significant exploitation control
- Cessation of stocking when sufficient natural reproduction occurs
- Protection of fish during all times of the year



Despite successes:
sea lamprey, commercial & sportfishing harvest
continue to impede further success.

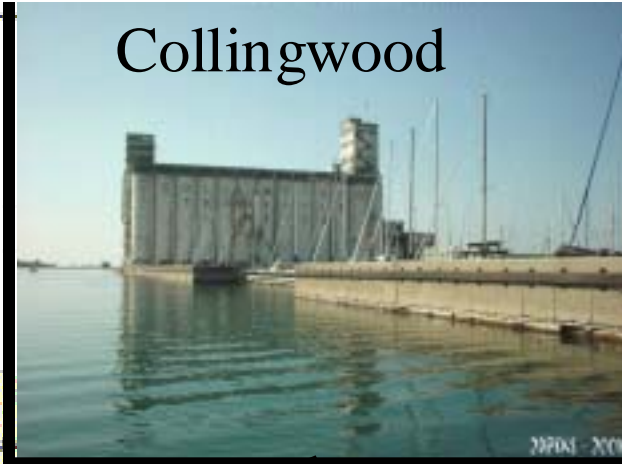


Why Lake Trout ?

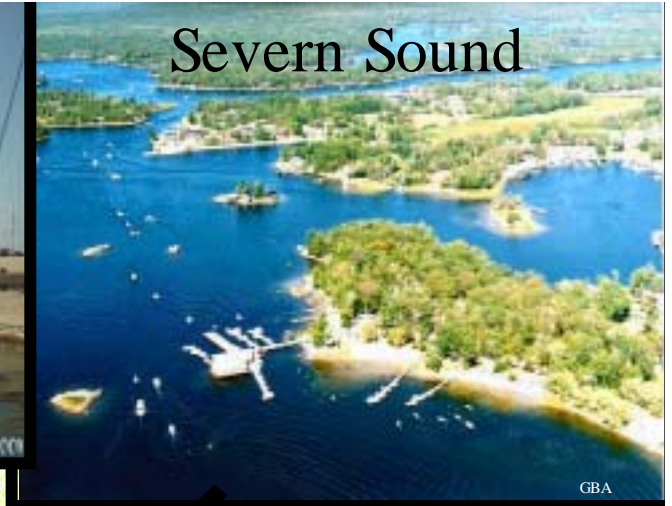
- Healthy lake trout = healthy environment (barometer)
- Broad niche - deep/shallow water, inshore/offshore
- Original native keystone predator in Lake Huron
- Best suited as dominant predator (adapted)
- Food requirements varied resulting in stable populations
- Remain in lake basins where stocked
- Potentially self-sustaining
- Can provide economic returns for commercial and sport fisheries.
- Cultural value to commercial, sport fisheries and First Nations.



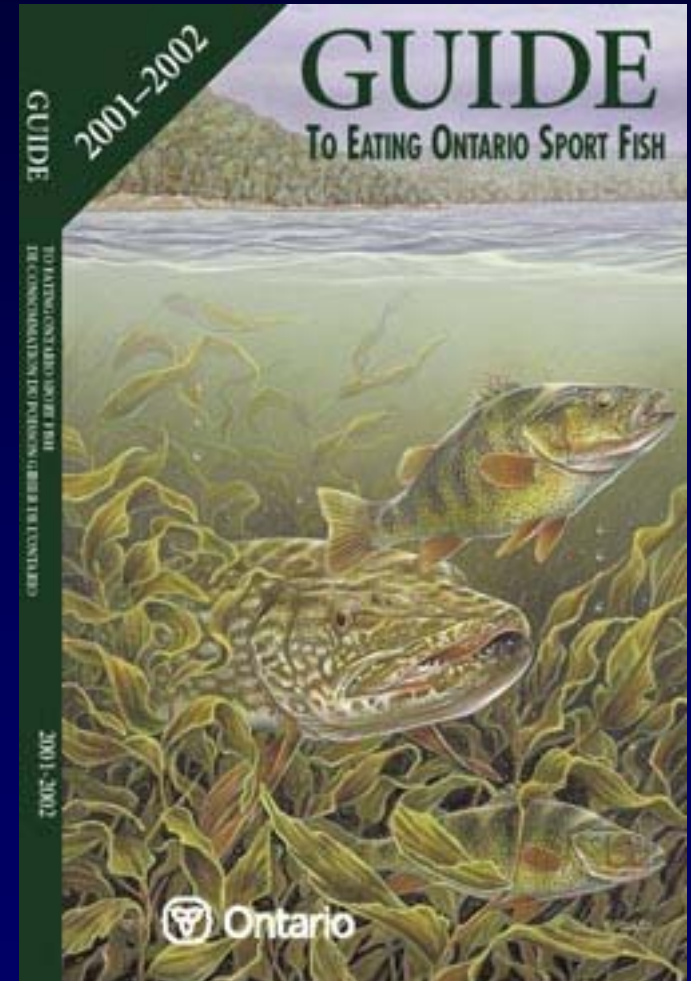
Collingwood



Severn Sound

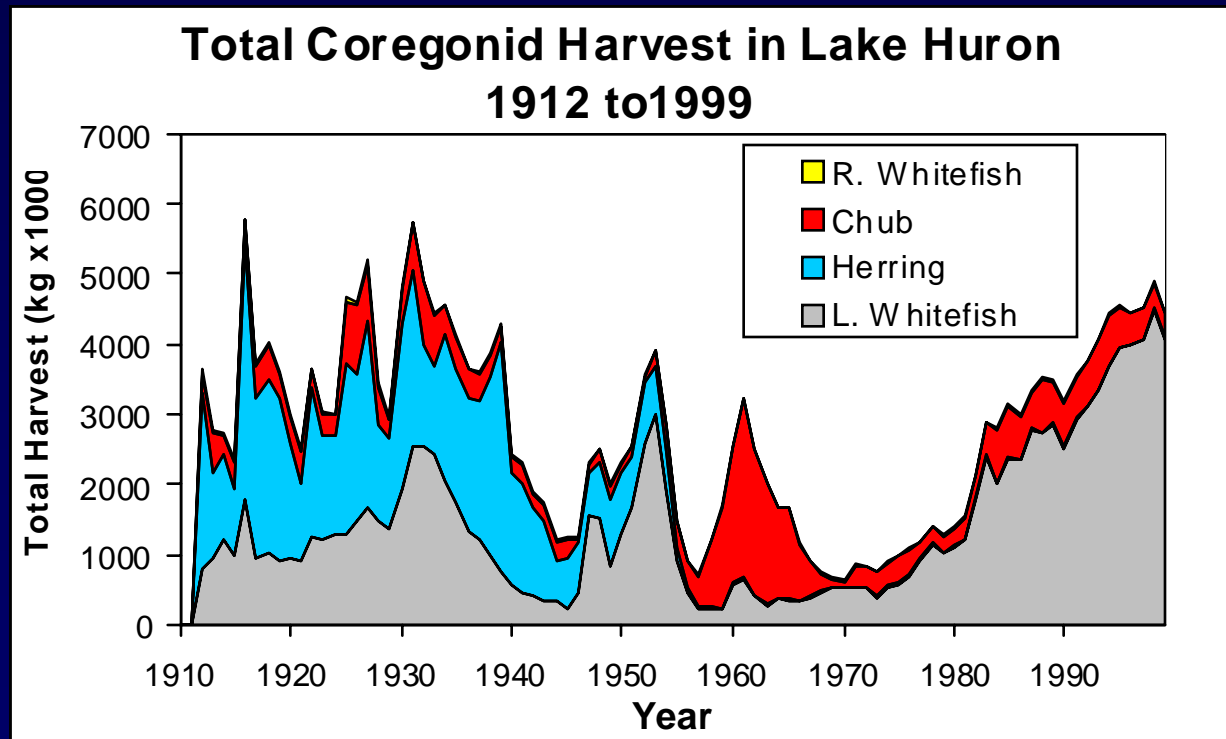


- Need to strive to reduce direct discharge and long-range atmospheric loading of contaminants.
- Required to remove fish species from consumption advisories and meet the contaminant objectives of the GLWQA.





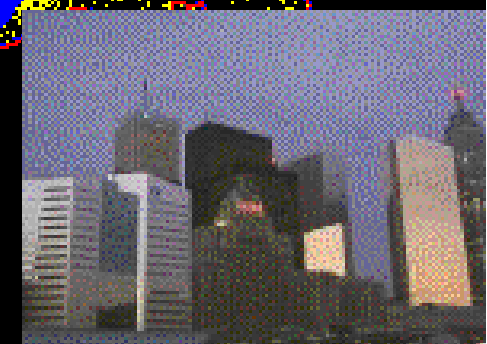
Despite concerns with *Diporeia* declines lake whitefish yields continue to be maintained at all time historic levels.



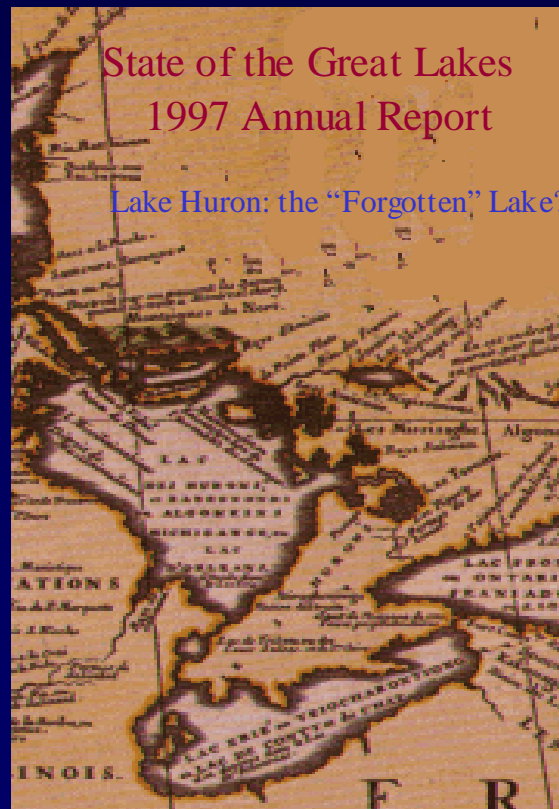
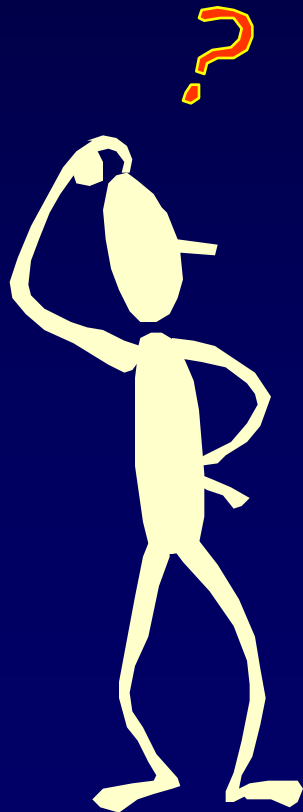


Distribution of Population

1 dot represents 2500 people

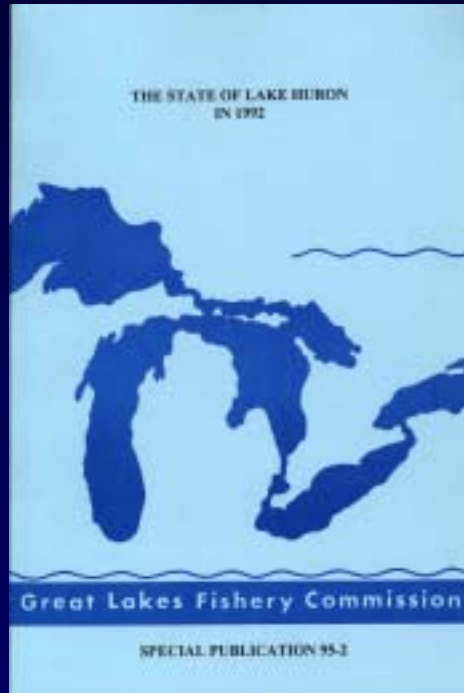


- Lake Huron previously termed “The Forgotten Lake”.
- General feeling fundamentally in better “shape” than other Great Lakes.





Ministry of Natural Resources / Ministère des Richesses naturelles



Fisheries and Oceans Canada / Pêches et Océans Canada

