The State of Lake Huron

Presented by: Jim Bredin
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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
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

- Do not eat
- One meal every two months
- One meal per month
- One meal per week
- Unlimited consumption

Year:
- 1981
- 1983
- 1985
- 1987
- 1989
- 1991
- 1993
- 1995
- 1997

PCB (ppm):
- 0.05
- 0.2
- 1.0
- 1.9
- 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
Biological Ecosystem Integrity

- Changes in Lower Food Web
- Fish Community Alteration
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

- rainbow smelt (44%)
- alewife 28%
- sculpins 10%
- coregonids 6%
- other species 12%

Source: USGS
Biomass of Major Prey Fishes

- **Biomass (10,000 Tons)**

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<tr>
<th>Year</th>
<th>Other</th>
<th>Smelt</th>
<th>Bloater</th>
<th>Alewife</th>
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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

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Fish Caught</th>
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<td>1986</td>
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<td>2000</td>
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Walleye Yield (Catch) thought to be attributable to Natural Reproduction
Round Goby Abundance in Thunder Bay

Percent of Total Catch

Year

1998
1999
2000
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)
Au Sable River Gradient Distribution
from South Branch Au Sable River to river mouth
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:

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