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# Environment Canada's Great Lakes Environmental Monitoring Programs

**Alice Dove and Melanie Neilson**  
**Water Science & Technology**  
**Environment Canada**

*GLBTS Substance and Sector Workgroup Meeting, June 2, 2008*

*Burlington, Ontario*



# Overview

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- EC's Great Lakes monitoring programs
- Policy drivers
- Outcomes of Great Lakes monitoring – what have we achieved?



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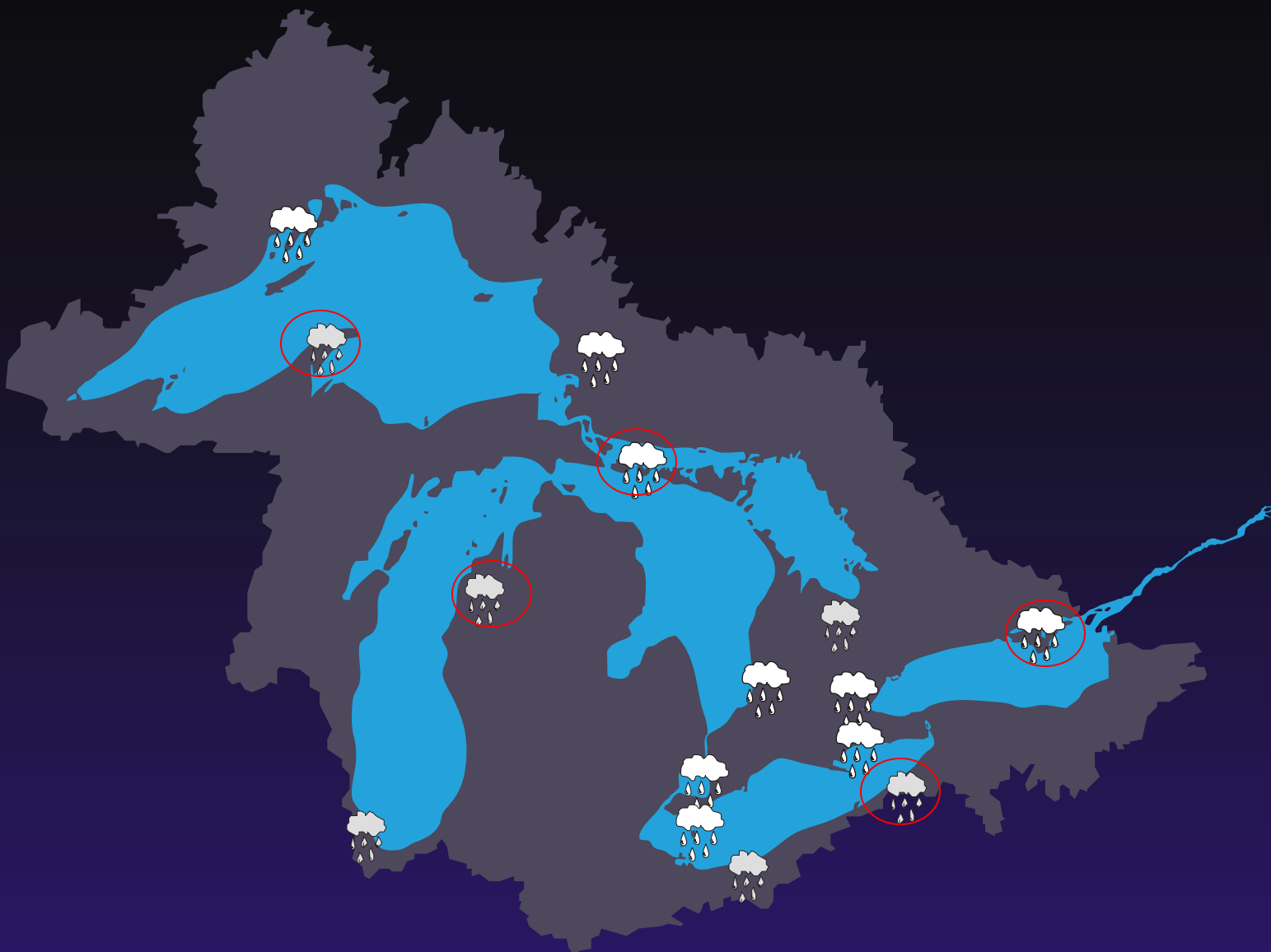
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Integrated Atmospheric Deposition Network



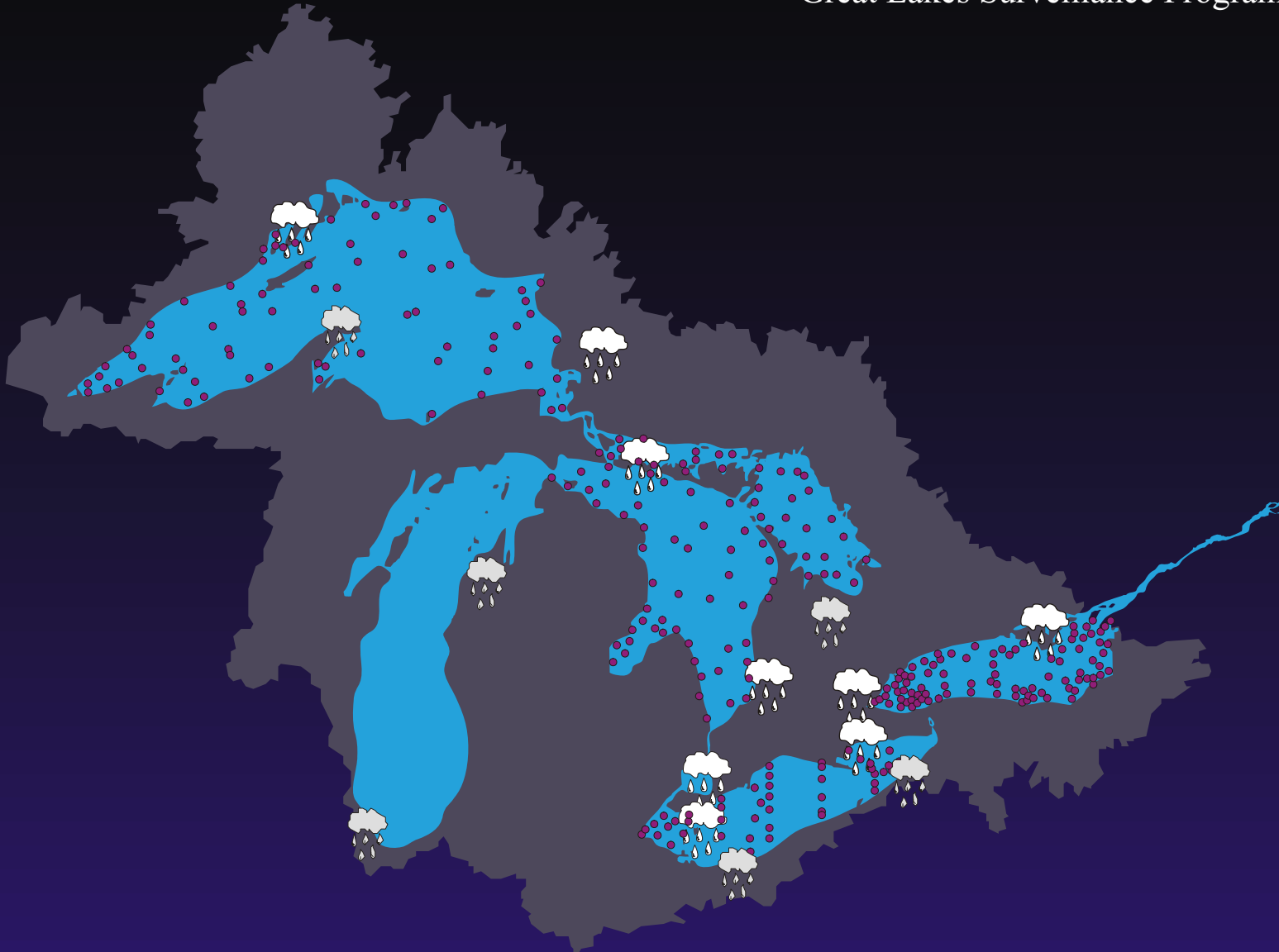
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Integrated Atmospheric Deposition Network



Great Lakes Surveillance Program



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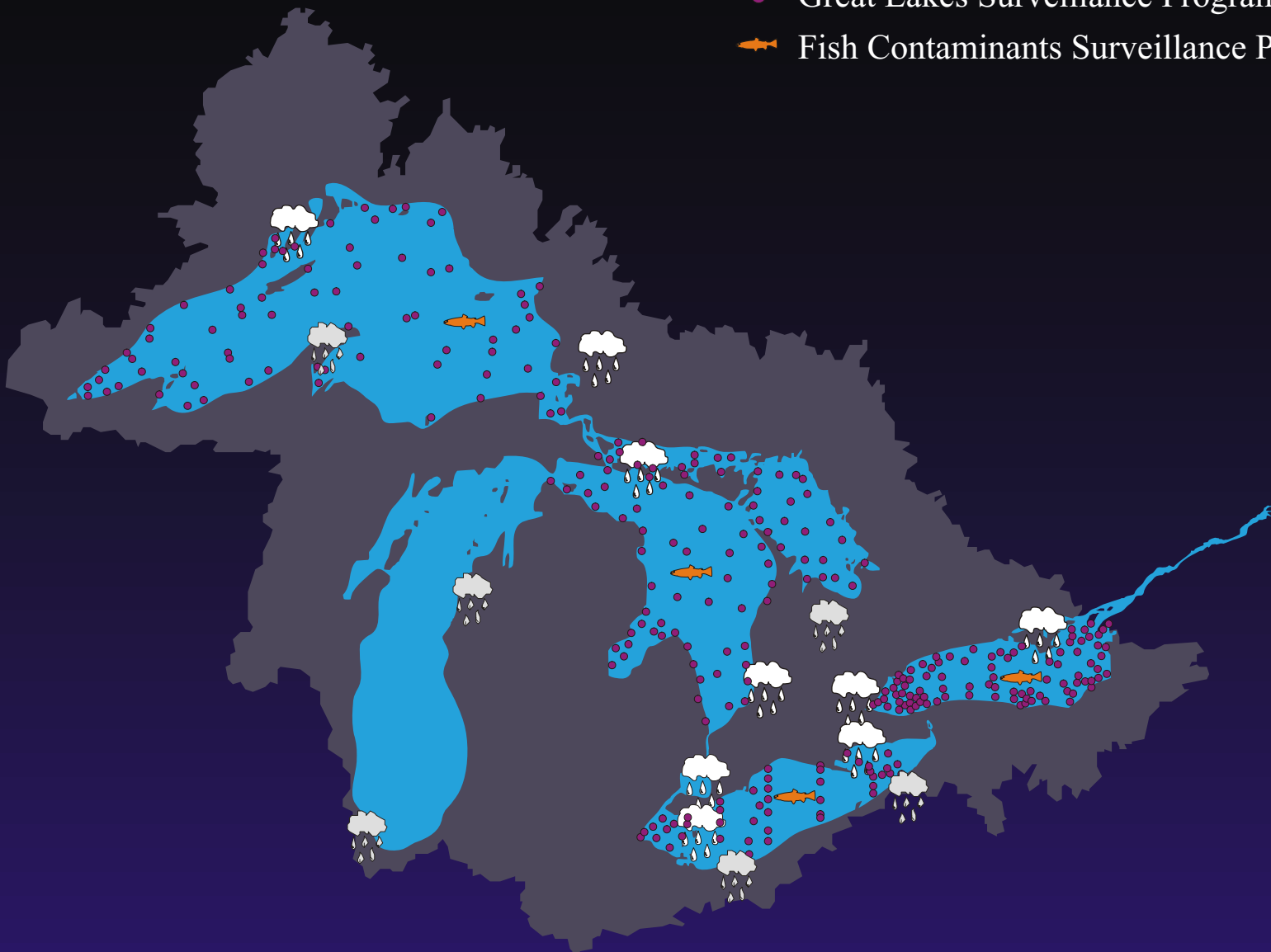
Integrated Atmospheric Deposition Network









Great Lakes Surveillance Program

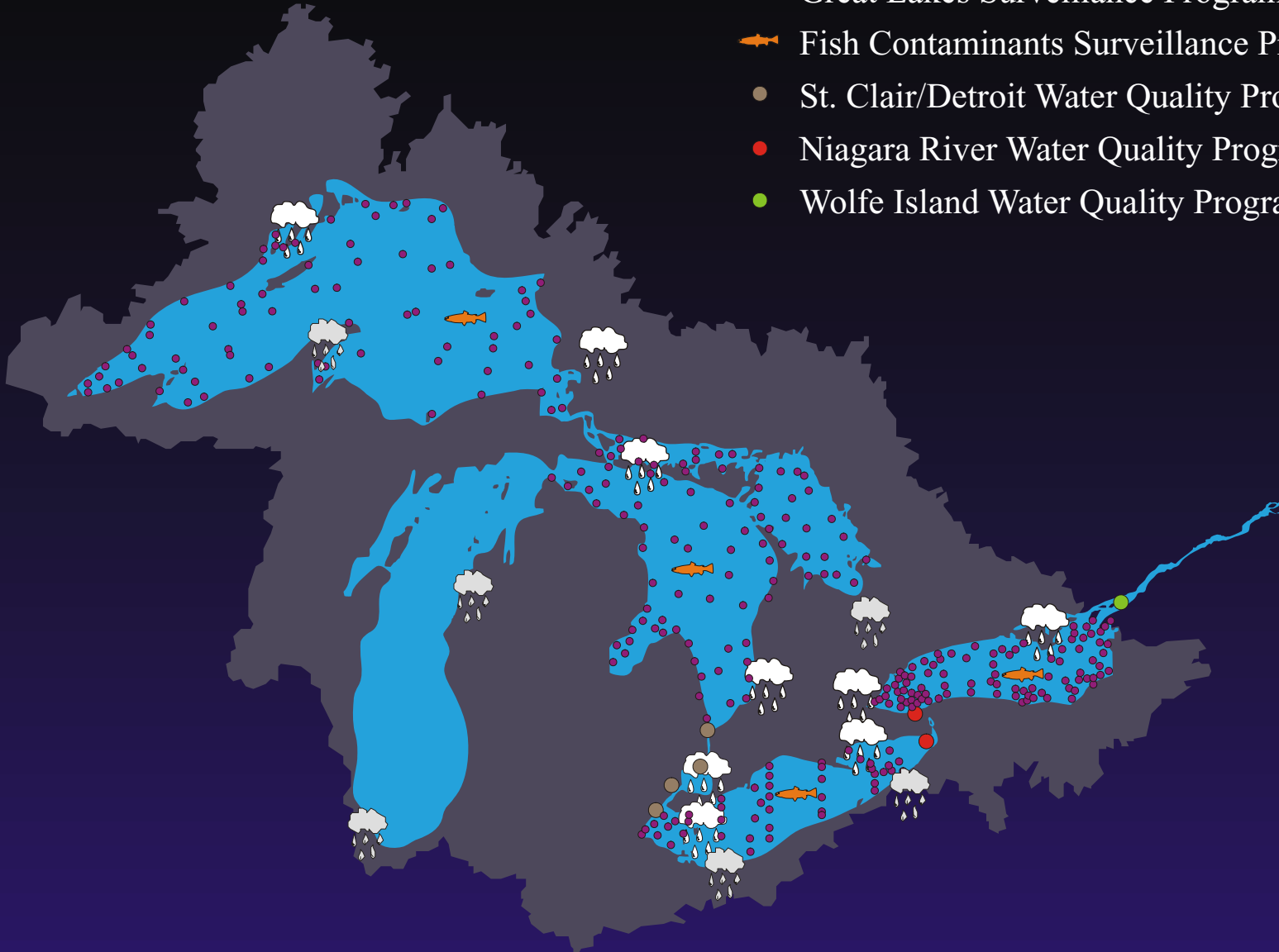


Fish Contaminants Surveillance Program










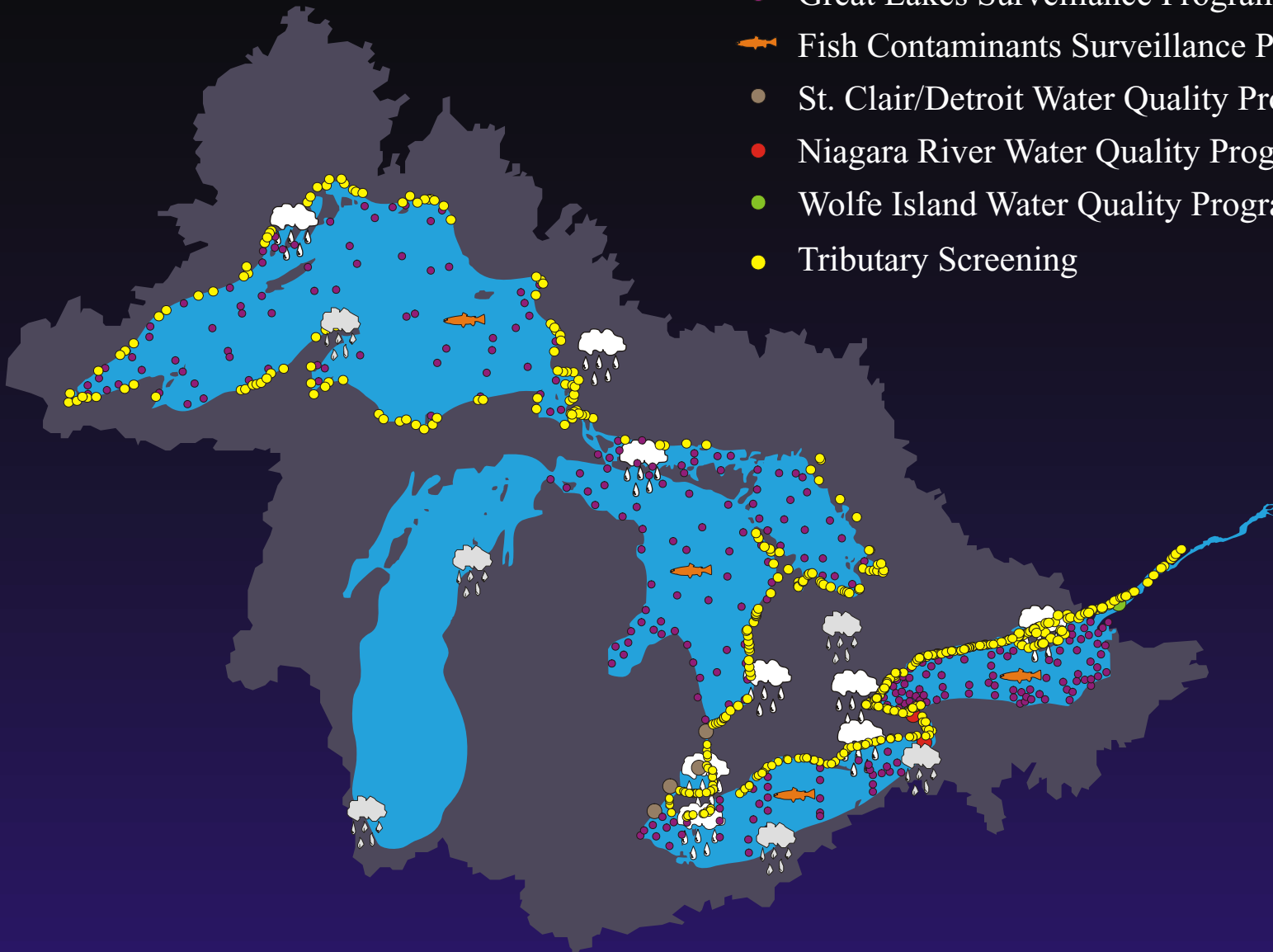
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-  Integrated Atmospheric Deposition Network
-  Great Lakes Surveillance Program
-  Fish Contaminants Surveillance Program
-  St. Clair/Detroit Water Quality Program
-  Niagara River Water Quality Program
-  Wolfe Island Water Quality Program











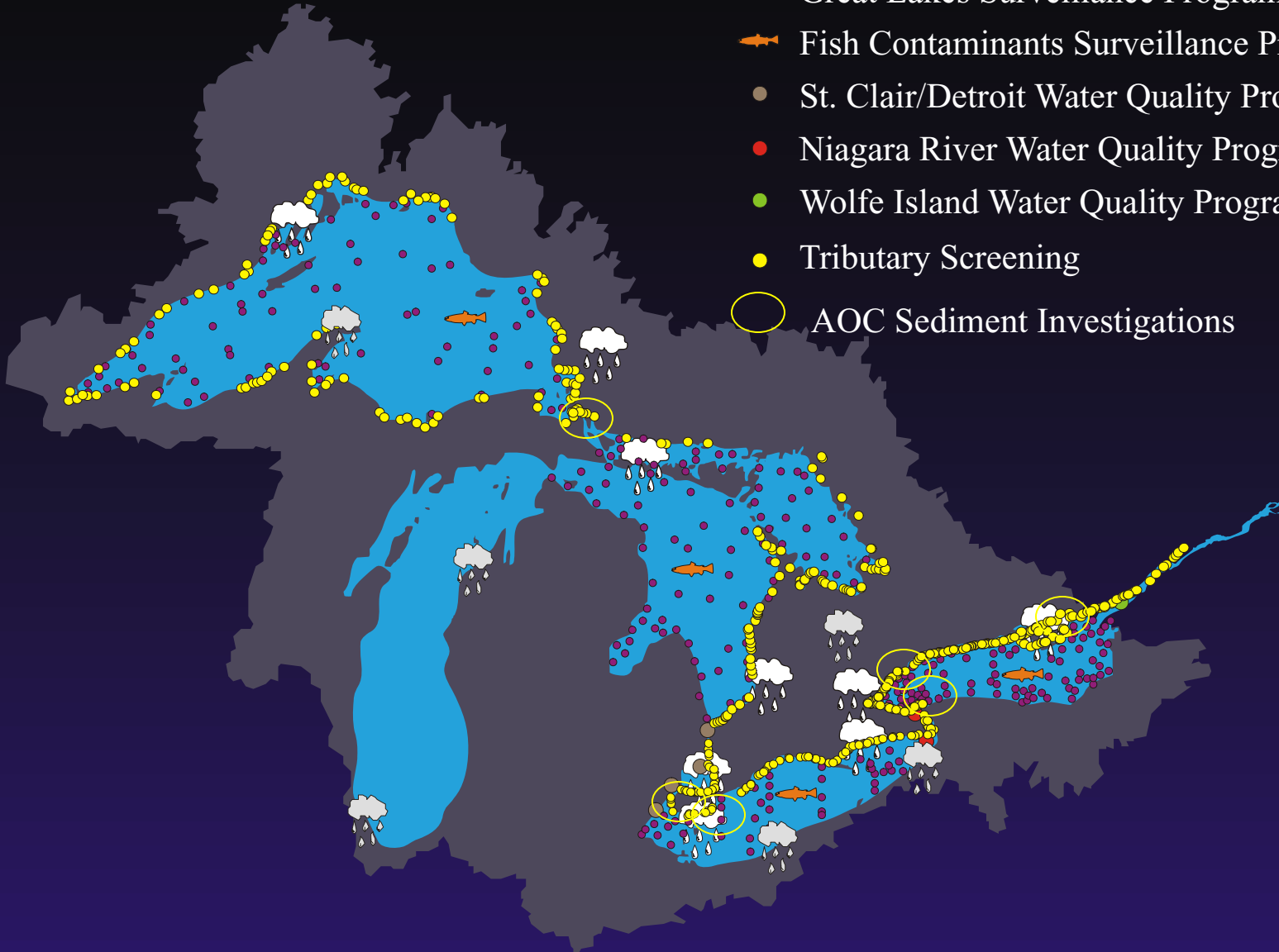
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-  Tributary Screening



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-  Tributary Screening
-  AOC Sediment Investigations



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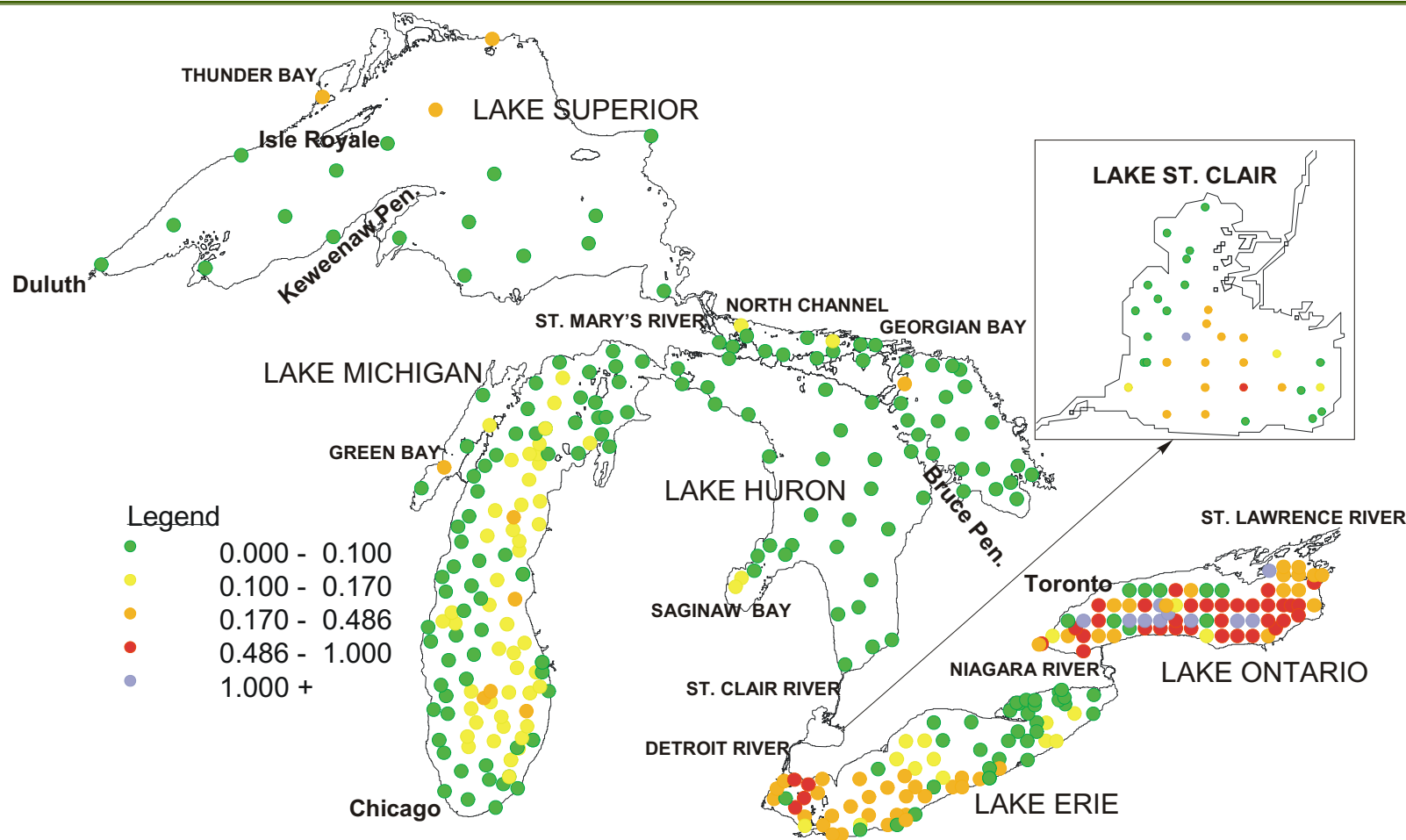


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-  Wolfe Island Water Quality Program
-  Tributary Screening
-  Herring Gull Egg Monitoring Program



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# EC's Great Lakes Programs: Basinwide Bottom Sediment Surveys



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# Great Lakes Bottom Sediment: Data Availability

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## Historic Data

- Lake Ontario 1968
- Lake Huron 1969
- Lake St. Clair 1970
- Lake Erie 1971
- Lake Superior 1973
- Lake Michigan 1969-1970
- Lake Michigan 1975

## Most Recent Data

- Lake Ontario 1998
- Lake Huron 2002
- Lake St. Clair 2000
- Lake Erie 1997-1998
- Lake Superior 2000
- Lake Michigan 1994-1996



# Policy Drivers

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- Canadian Environmental Protection Act, CEPA
- Chemical Management Plan
- Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem
- Canada-US Great Lakes Water Quality Agreement
- Binational Toxics Strategy
- Niagara River Toxics Management Plan



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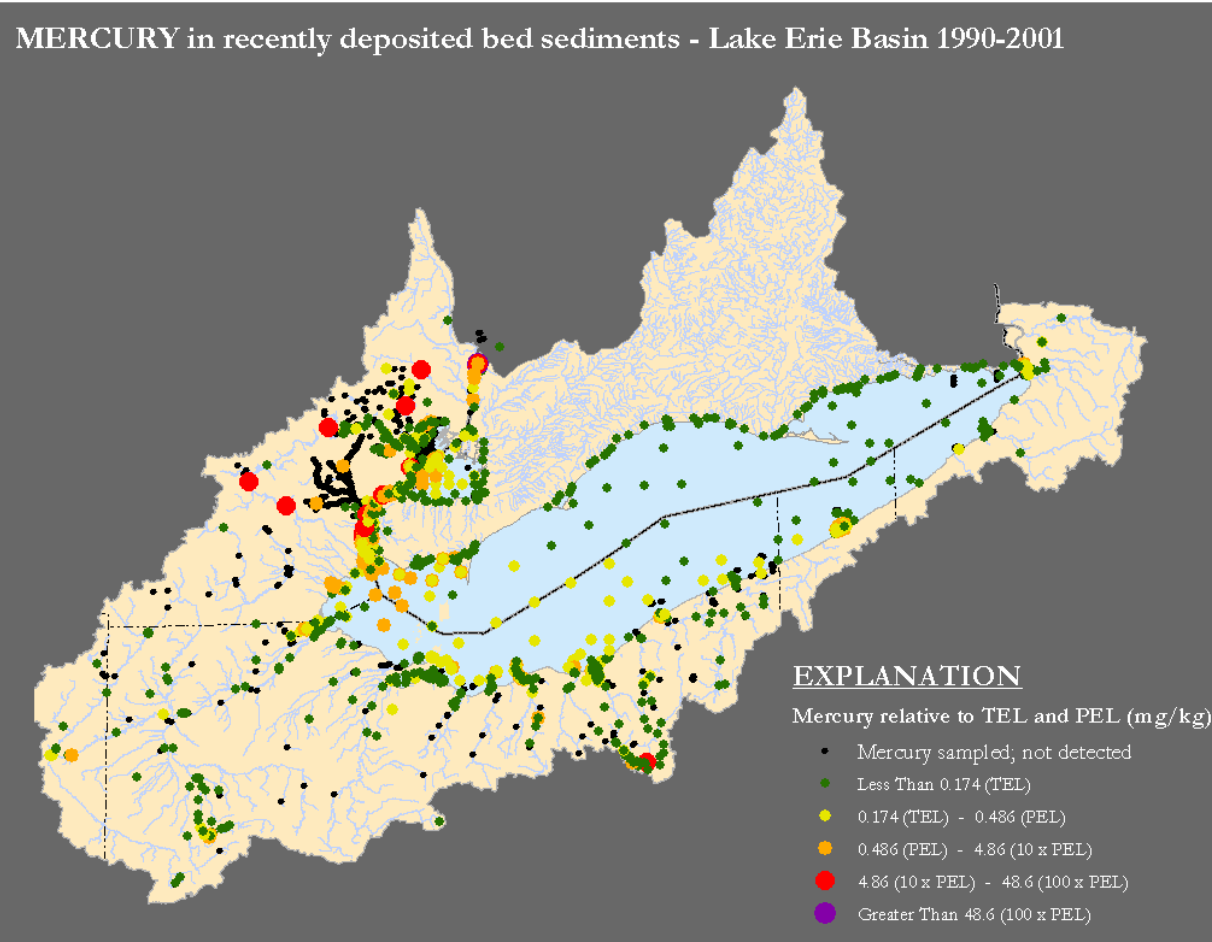
# EC's Great Lakes Monitoring Programs: Utility of the information

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- Assessment against sediment, water, fish and wildlife criteria.
- Status and trend information, including historical trends.
- Identification of potential sources.
- Performance measurement: success of implemented risk management decisions.
- To aid in understanding of fish and wildlife health effects.



# 1. Assessment against sediment criteria..



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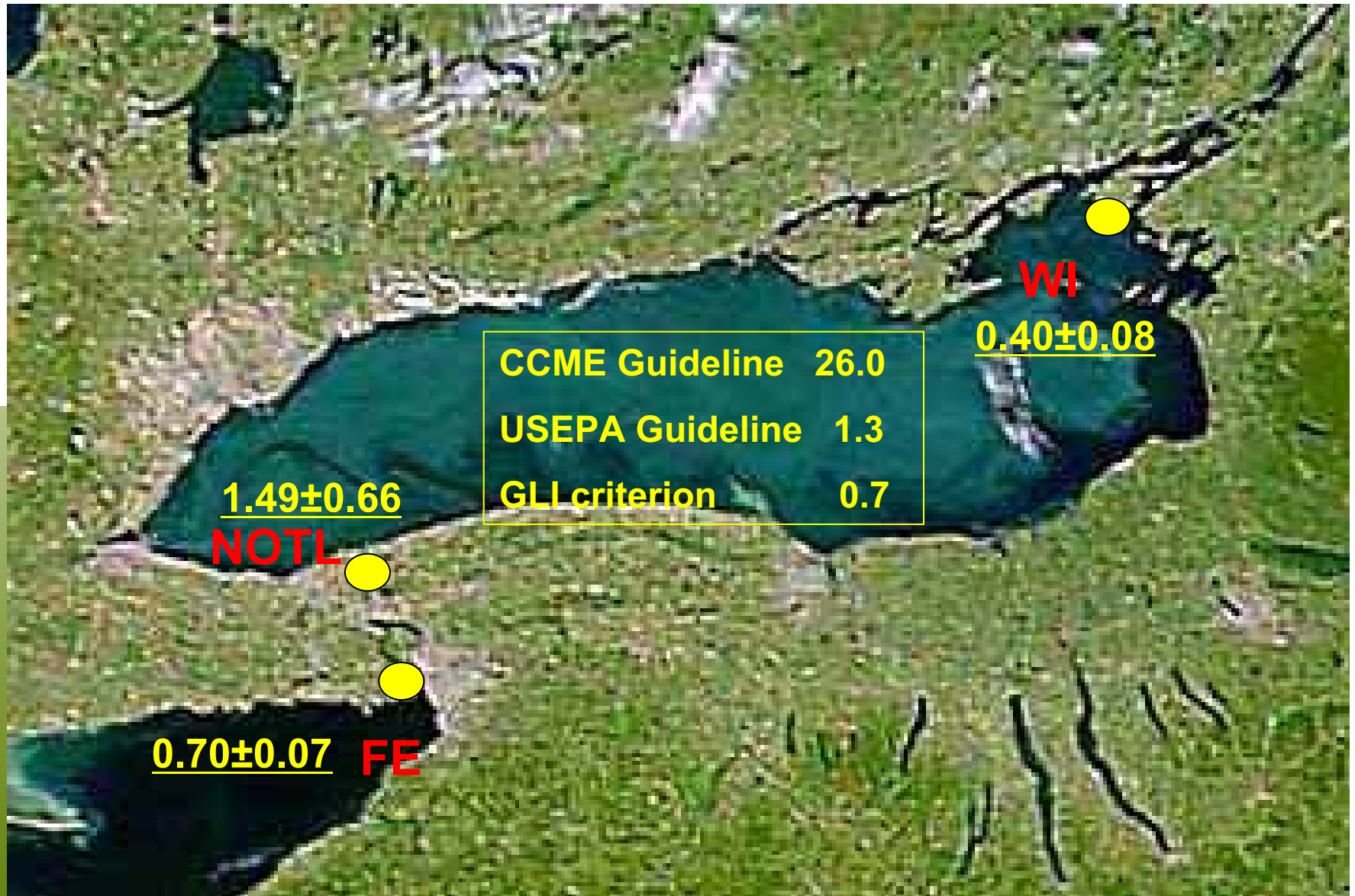


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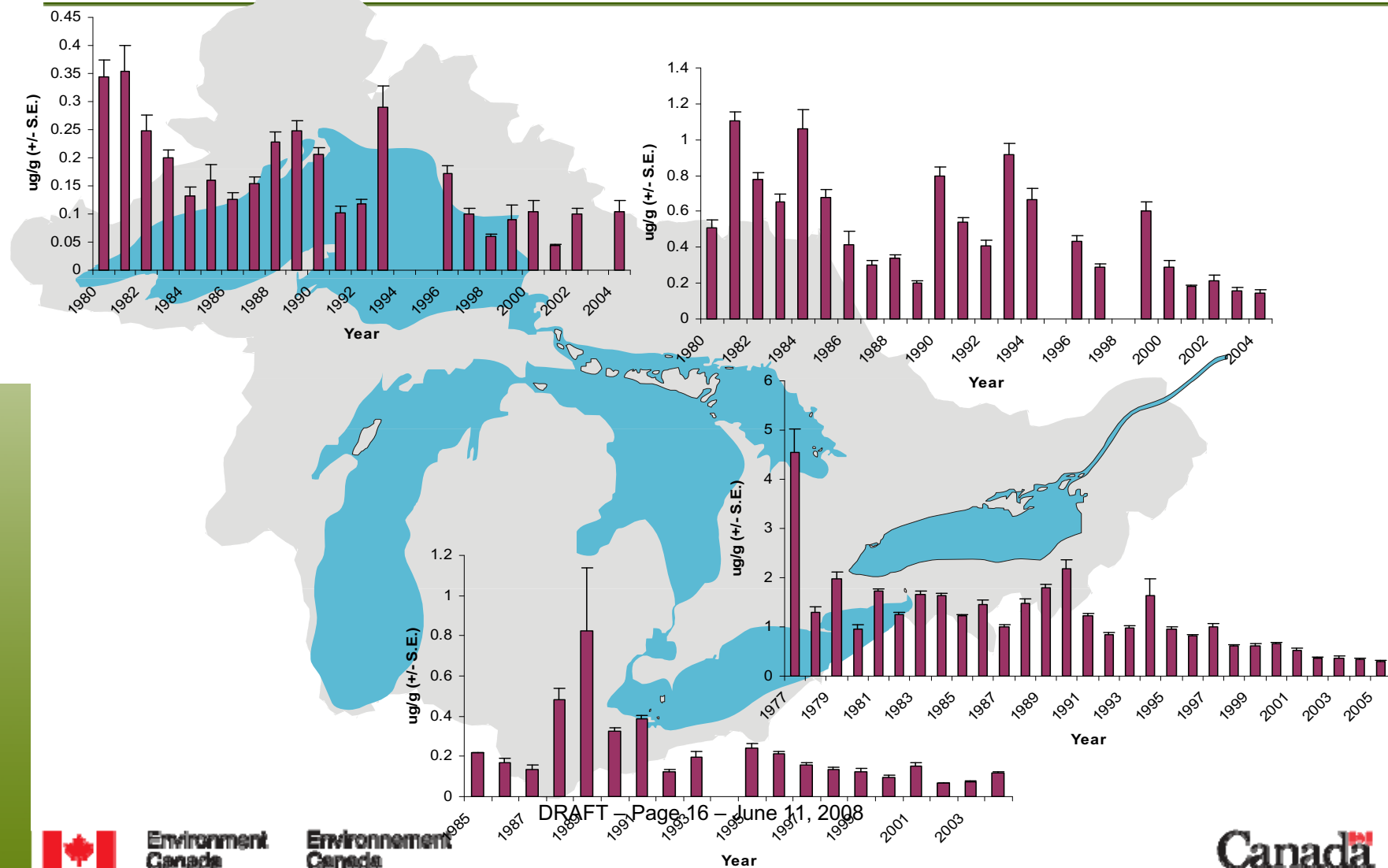
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## .. and water criteria



# 2. Status and trend Information...

[DDT trends in Great Lakes lake trout (SOLEC, 2005)]



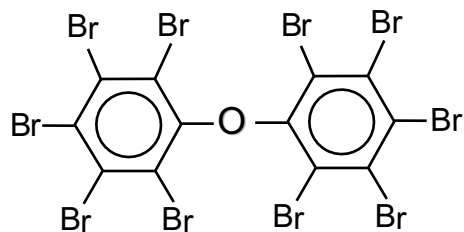
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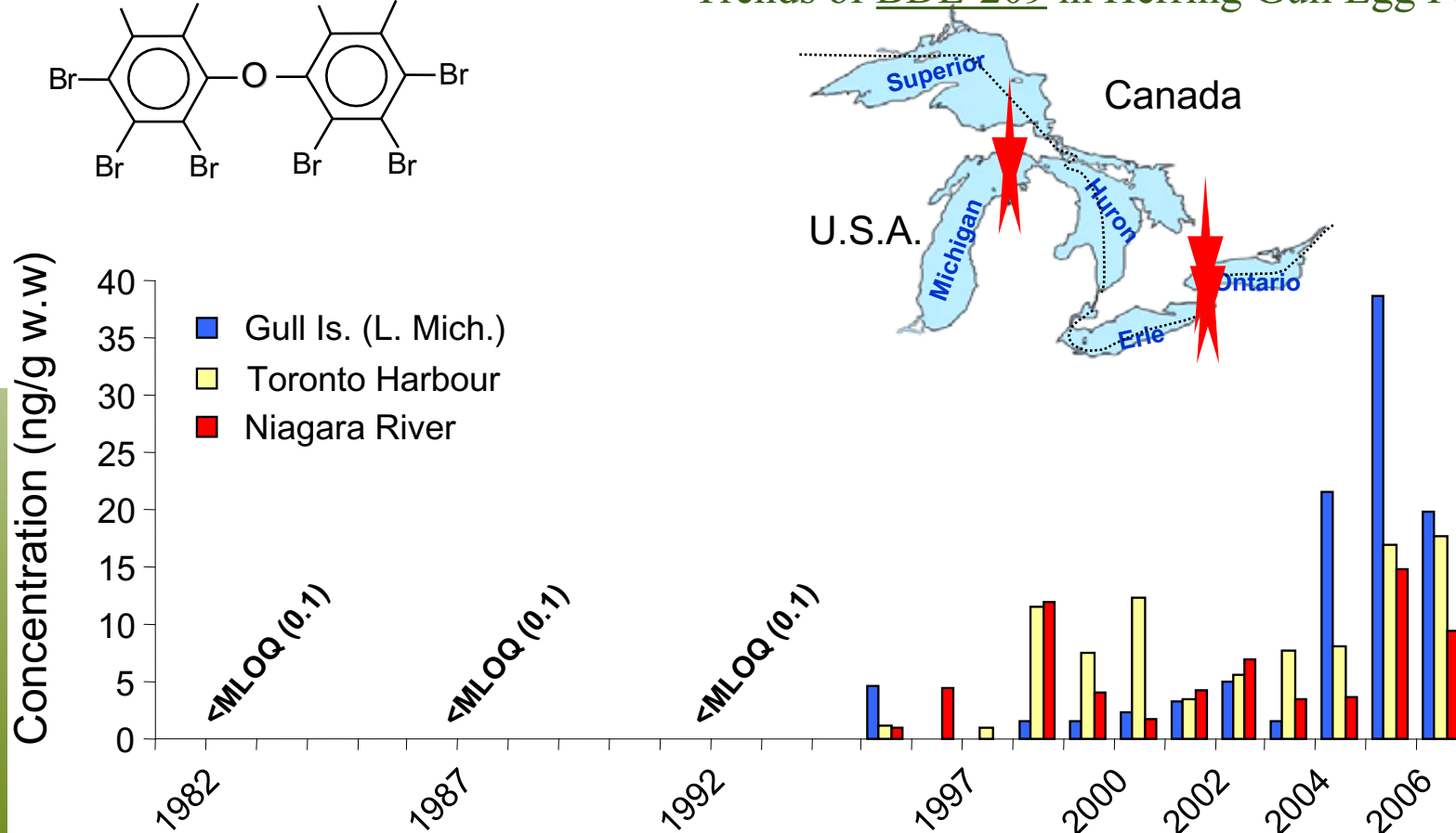
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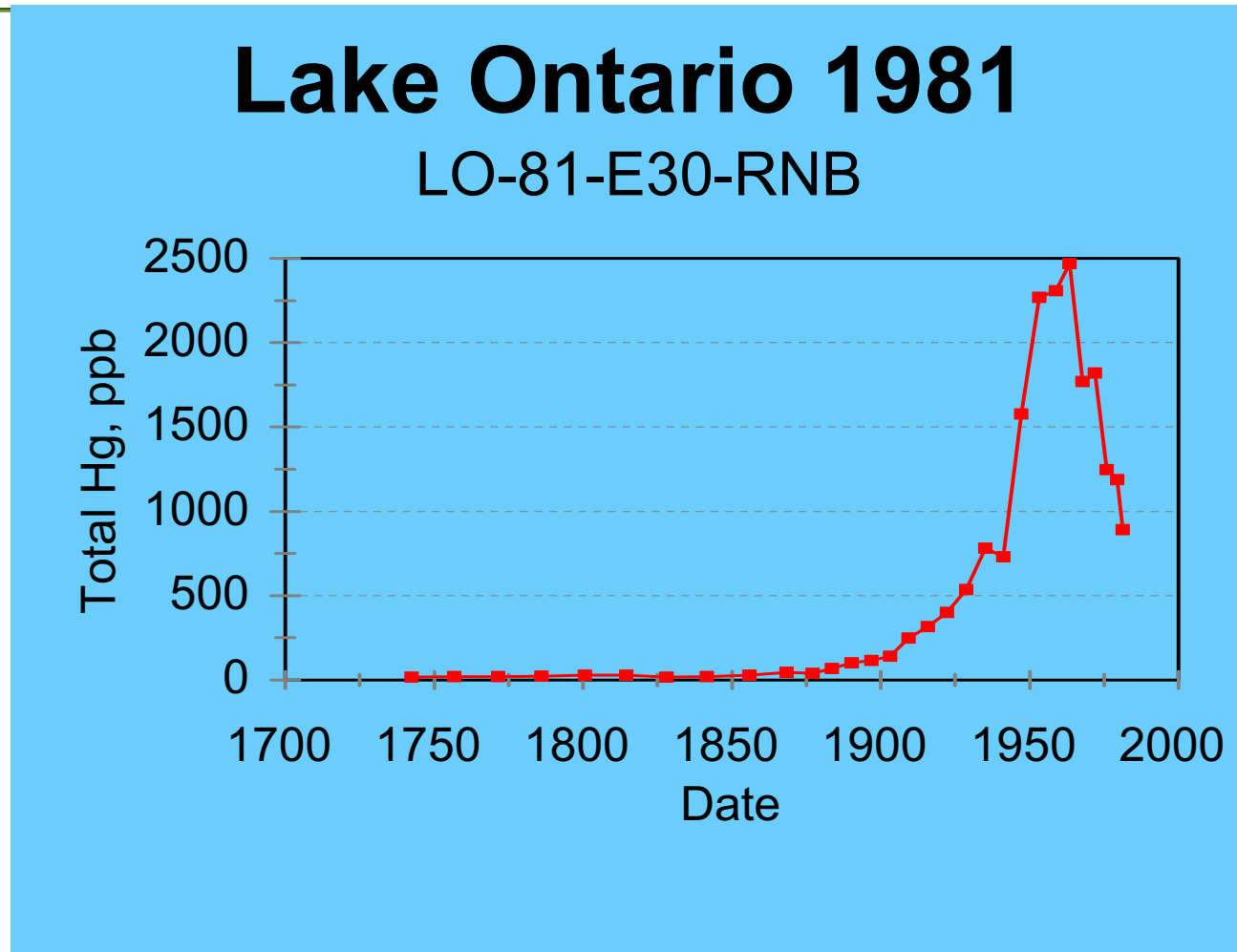
# ...also from archives for determining trends in emerging chemicals



Trends of BDE-209 in Herring Gull Egg Pools



# ...and from sediment cores for determining historical trends



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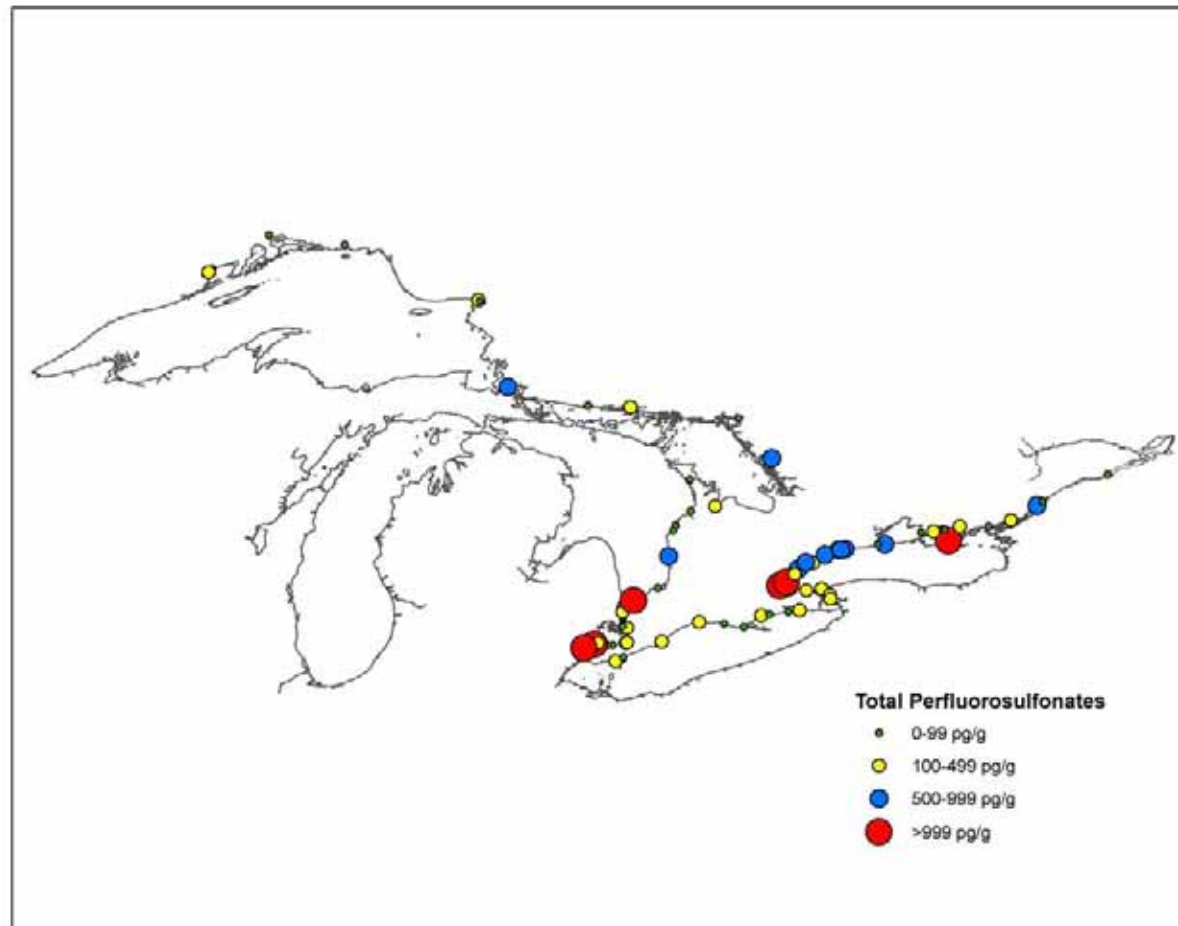
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# 3. Identification of potential sources

[Great Lakes Tributary Screening for PFSs (Burniston et al., 2007)]



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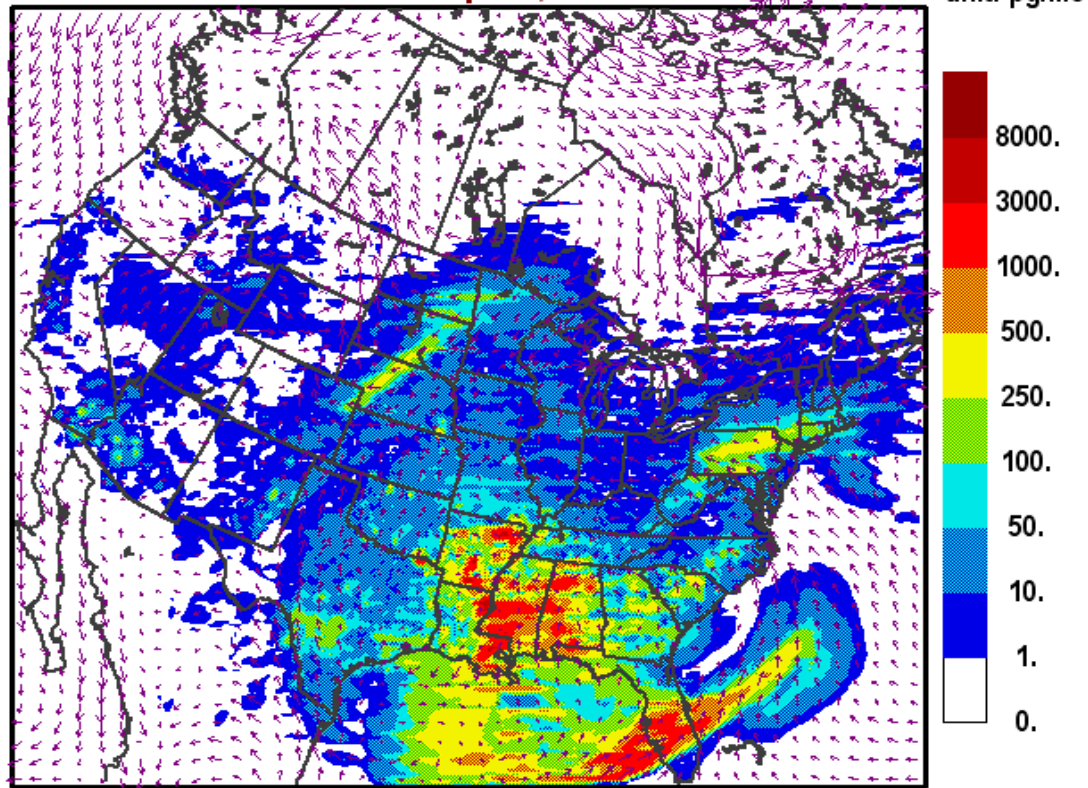
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# ... even sources from afar

Toxaphene Air Concentration at 1.5m  
00 LST Sep. 01, 2000



Air Quality Research Division  
Environment Canada

PI: J. Ma, S. Venkatesh  
Graphics by: P. Cheung

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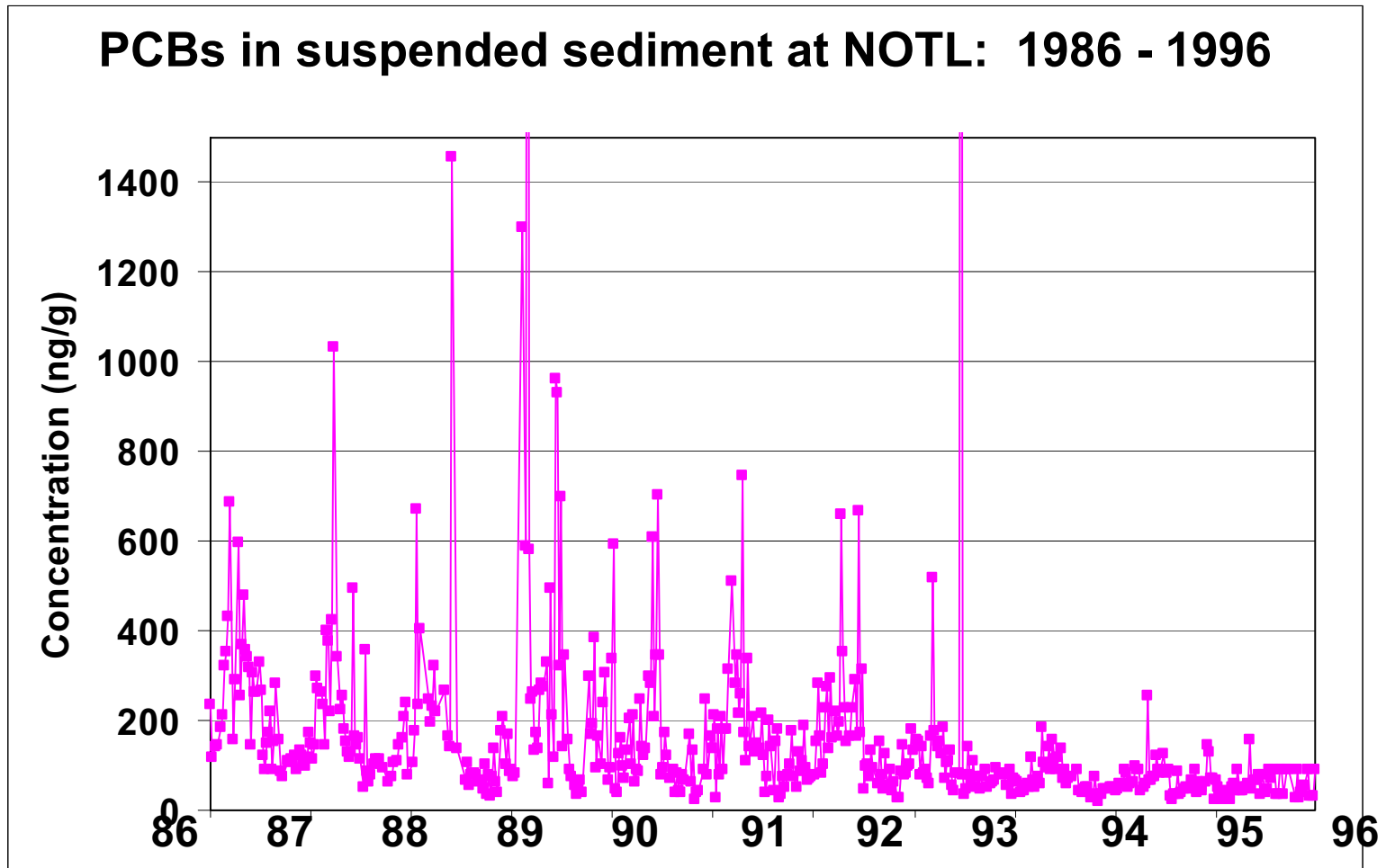


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## 4. Tracking the success of remediation at hazardous waste sites



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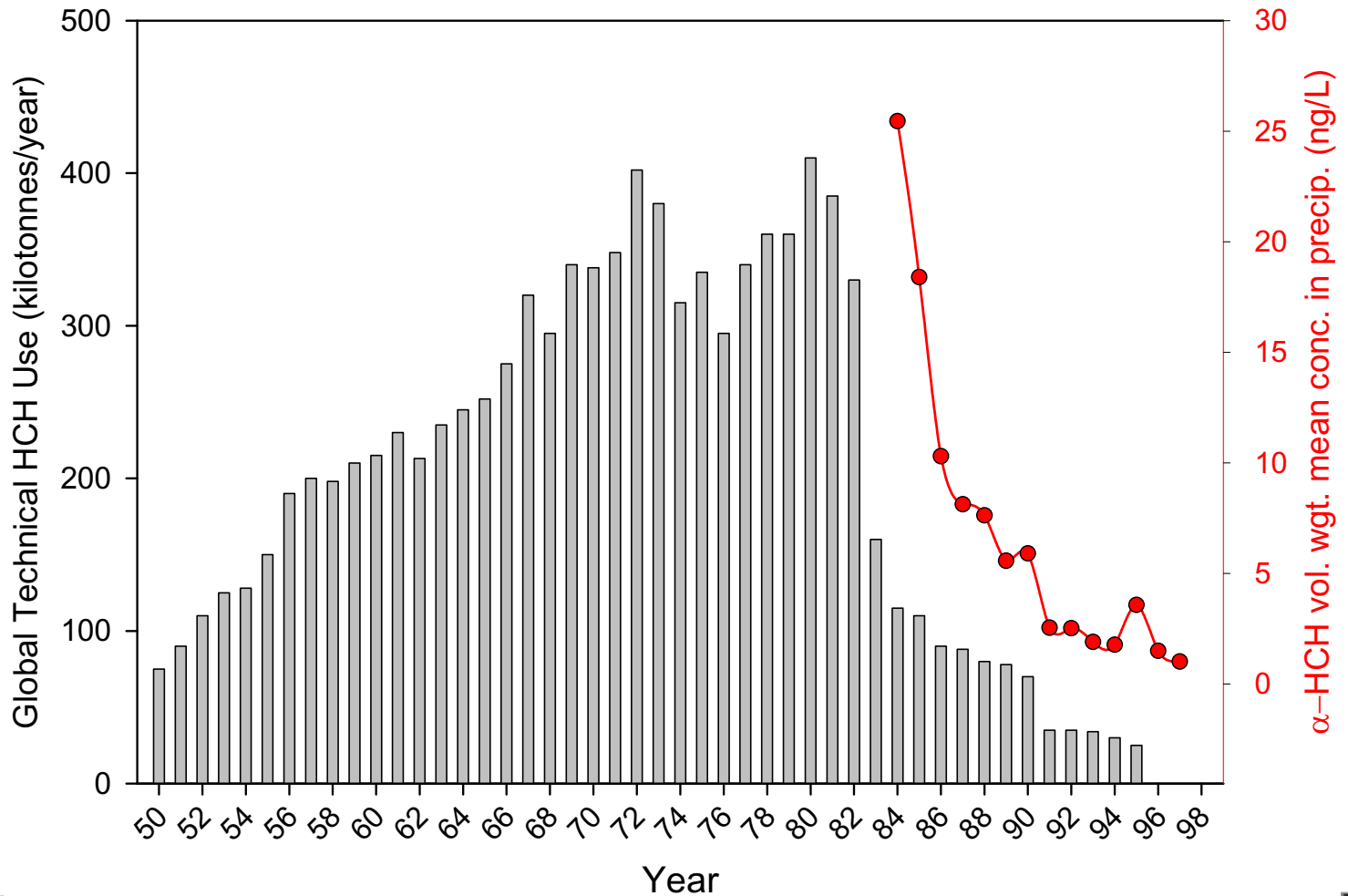
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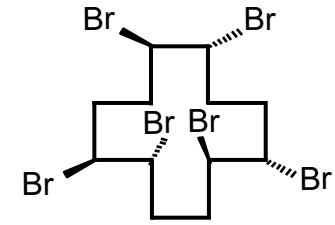
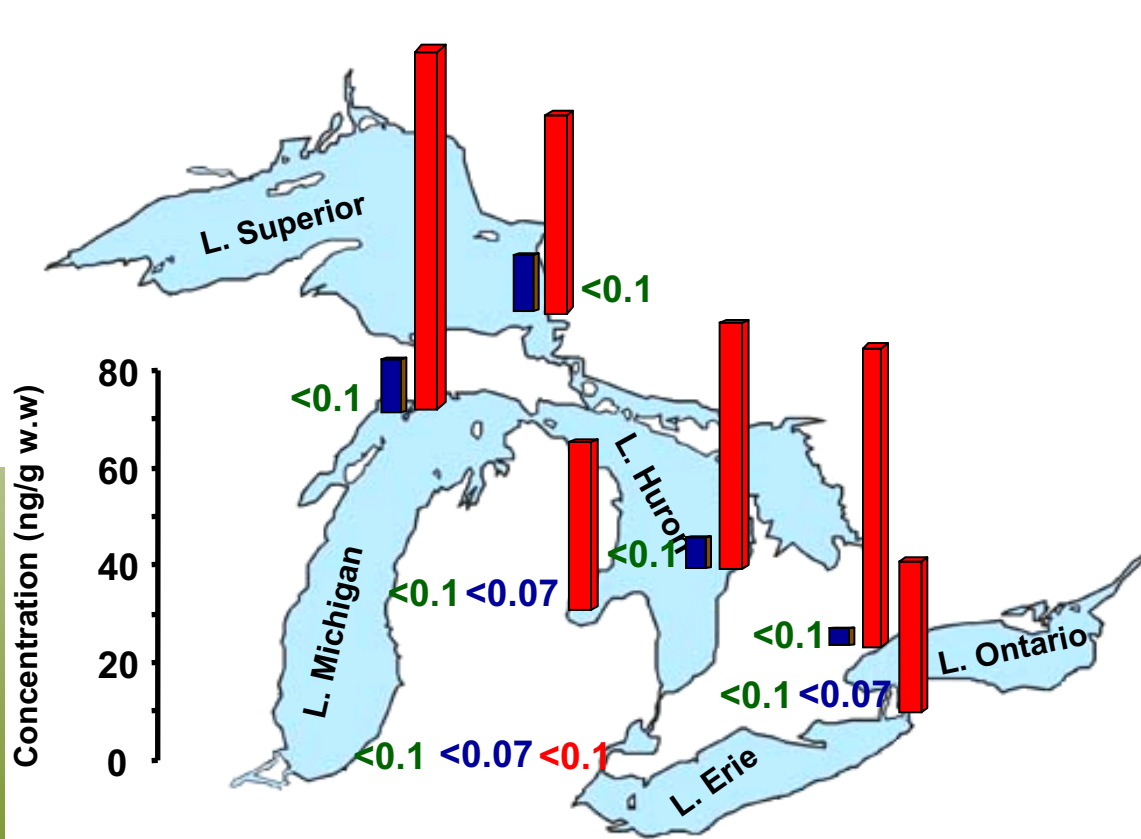
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# 5. Response to global actions

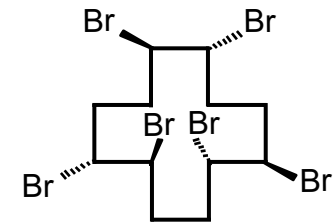
[Global use of Technical HCH and  $\alpha$ -HCH precipitation concentrations in Lake Superior (IADN Steering Committee, 2002)]



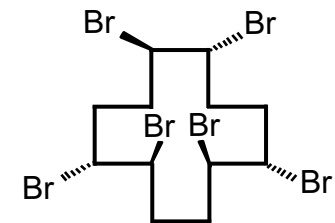
# 6. To aid in understanding of fish and wildlife health effects.



$\alpha$ -HBCD



$\gamma$ -HBCD



$\beta$ -HBCD

Isomer-Specific Hexabromocyclododecane (HBCD) in Herring Gull Egg Pools, 2006 [Letcher et al. 2008, in prep]



# QUESTIONS

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