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The Role of Science in Lake Simcoe Protection

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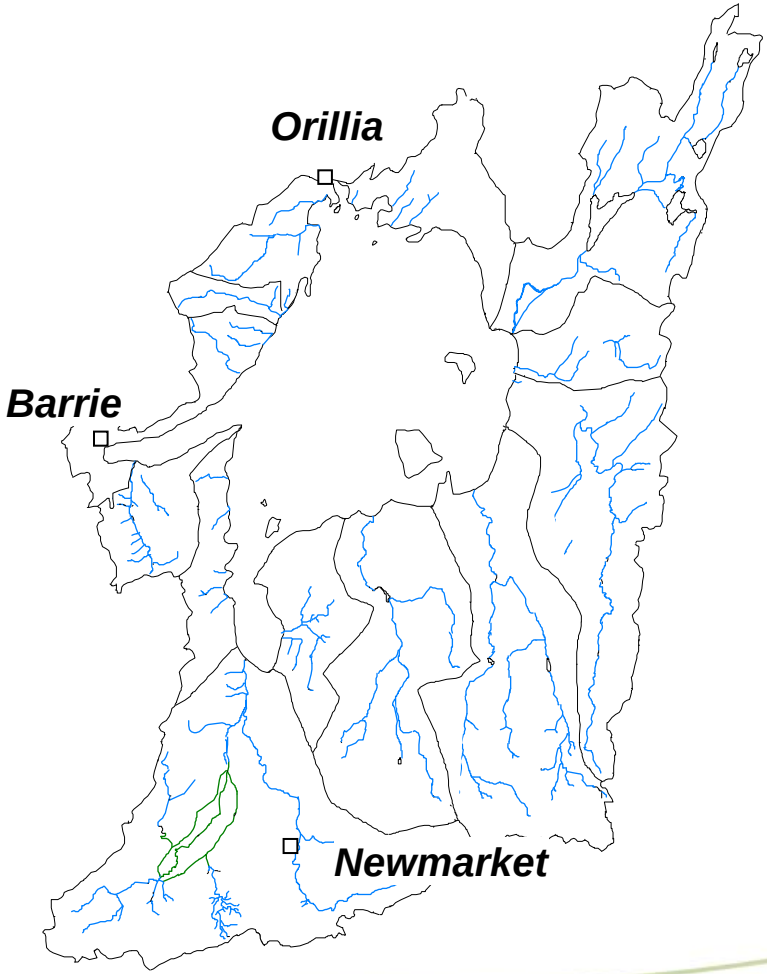
About Lake Simcoe

Largest inland lake in Southern Ontario

- lake area: 722 km^2
- watershed area: 2,899 km^2

Popular for recreation and angling

- Easily accessible to 2/3 of Ontario's population
- > $200 million/yr
- > 1 million angler hrs/yr



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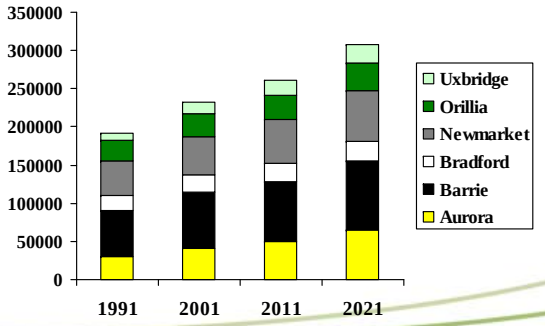
Currently on the Watershed

- 23 municipalities
  - Drinking water source for 6 communities
  - 15 sewage treatment plants

- 12% is urbanized, area is increasing
  - Increase in urban land cover (85 km^2 in 1991 to 285 km^2 in 2001)

- 47% of catchment is agricultural
  - e.g., Holland Marsh



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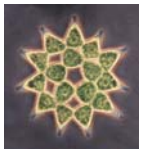
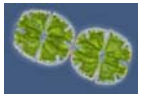
Water Quality Issues

Became especially apparent in the late 1970s

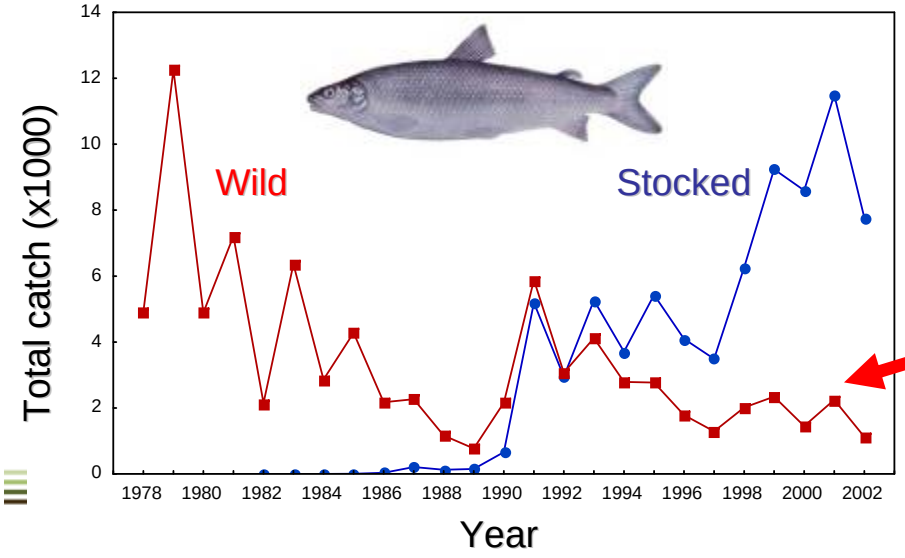
1. Intense macrophyte beds on shoreline



2. Algal blooms in open water
3. Coldwater fish declines



- Lake trout (1950-1970)
- Lake whitefish (1960-1980)
- Lake herring (1980-1990)



MNR Lake Simcoe Fisheries Assessment Unit data

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Lake Simcoe Environmental Management Strategy (LSEMS) 1986 - 2007

LSEMS studies identified excessive phosphorus loading as the primary issue

Strategies were implemented to reduce loads:

✓ Diversion of sewage from Newmarket and Aurora in 1984 into the York-Durham sewage system (~9 tonnes/yr)

✓ Sewage treatment plants (since 1989): new discharges and increases in TP loading limit from existing plants prohibited

- Limit ≤ 0.3 mg/L; Current range: 0.1 mg/L to 0.3 mg/L

✓ Urban stormwater runoff – highest level design for stormwater detention ponds required for new development since mid-1990s; retrofit projects undertaken

✓ Landowner incentive programs

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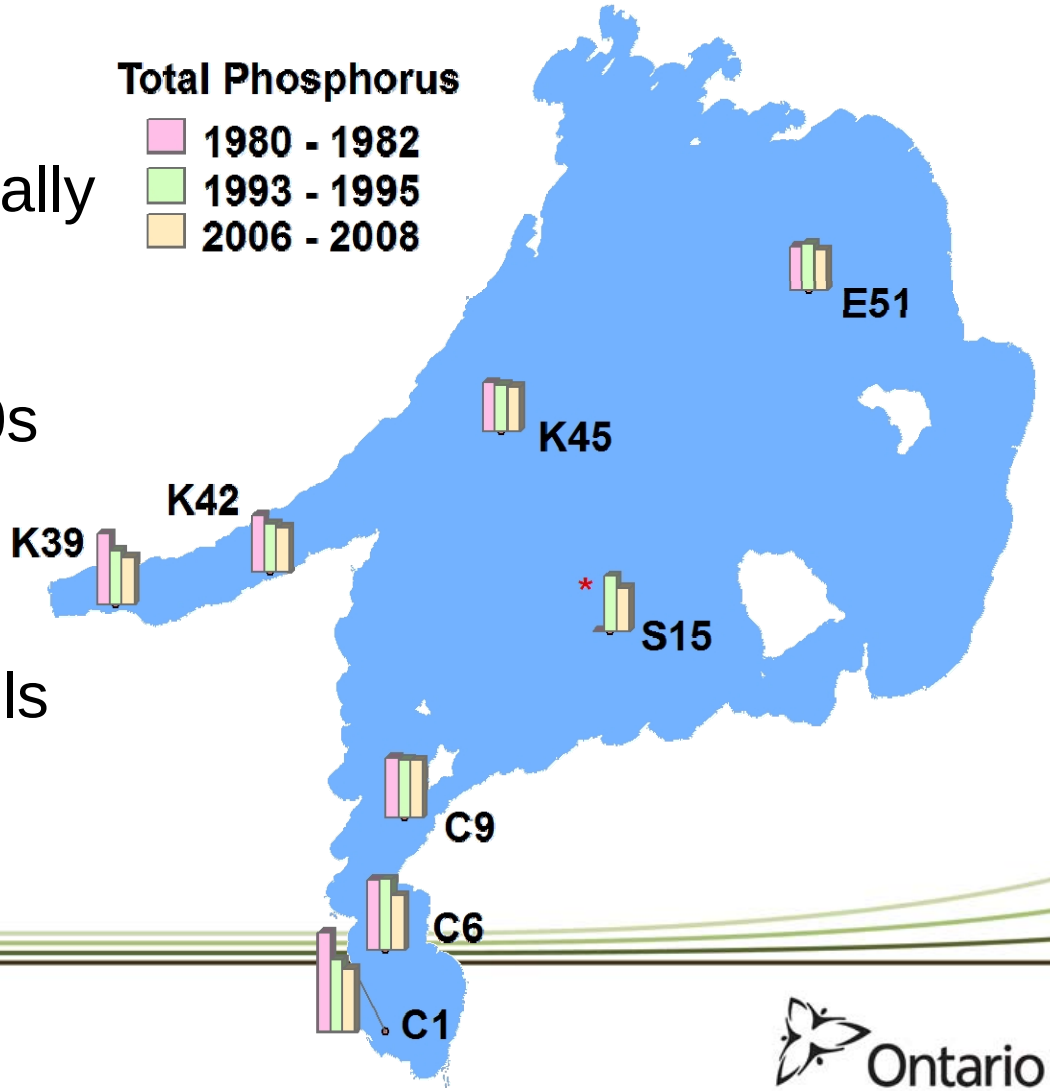
Phosphorus Concentrations

Total phosphorus concentrations have generally decreased in response to decreased nutrient loads during the 1980s and 1990s

Still higher than target levels



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Lake Simcoe Protection since 2007

Federal Funding:

- $30 million over five years (starting 2007 - 08) via the Lake Simcoe Clean-Up Fund with a focus on reducing phosphorus loading
- $29 million in funding in 2012-2017 via a Lake Simcoe South-eastern Georgian Bay Clean-Up Fund

Provincial Commitments:

- July 6, 2007- the Premier announced Lake Simcoe Protection Act
- December 10, 2008 - Act received Royal Assent
- July 2009 - Lake Simcoe Protection Plan released; funding for research, monitoring and stewardship

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Lake Simcoe Protection Act
Monitoring and Research

- Objective (g) – to provide for ongoing scientific research and monitoring related to the ecological health of the Lake Simcoe watershed

- Section 11: "If a public body is identified in the …Plan as being responsible for the implementation of a policy governing monitoring, the public body shall comply with any obligations imposed on it by the policy"

- Section 12: Adaptive – reports at least every 5 years on results of monitoring programs and extent to which objectives are being achieved

- Section 13: Allows for amendments to the Lake Simcoe Protection Plan if objectives are not being met

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Lake Simcoe Protection Act (cont'd)

➢ Section 18; Establishment of a **Lake Simcoe Science Committee** to review the environmental conditions of Lake Simcoe and provide advice to the Minister on:

- the state of the resource
- protection of the lake and its watershed
- research needs to support implementation of the Plan
- monitoring strategies
- whether proposed amendments to the Plan are consistent with the precautionary principle

➢ Section 19: Establishment of a **Lake Simcoe Coordinating Committee**, focused on implementation of the Plan

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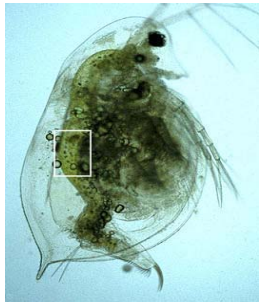

Lake Simcoe Protection Plan

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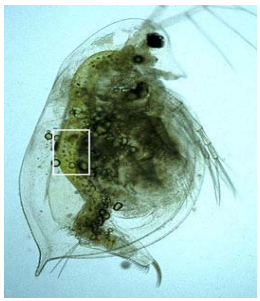

Lake Simcoe Science Advisory Committee

Committee used its expertise and existing science to:

- Evaluate the present **state of the lake** and its watershed,
- Identify current and emerging pressures (**stressors**) on the lake and its watershed,
- Advise on **management approaches** to mitigate the impact of these stressors, and
- Propose a refined or enhanced **monitoring** framework to support the proposed Lake Simcoe Protection Plan.

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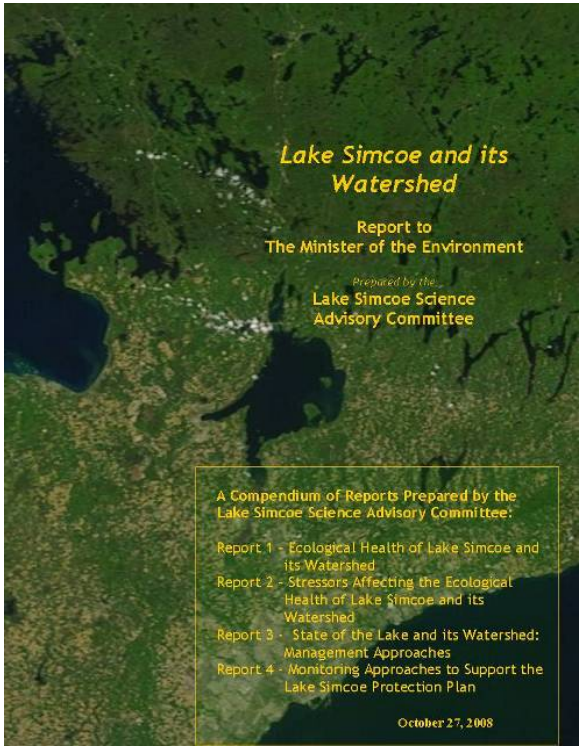
Science Committee (cont'd)

- 17 Meetings – March to December 2009
- Meeting minutes / advice on specific topics and questions identified by the policy team
- Report:
  - 18 objectives
  - e.g., dissolved oxygen 7 mg/L
  - 42 recommendations
  - Framework for monitoring and adaptive management



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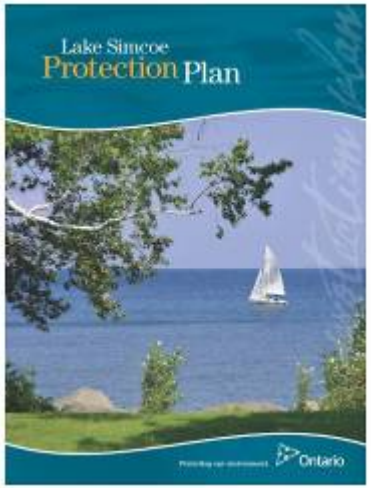
Monitoring and Research in the Proposed Lake Simcoe Protection Plan

- Guiding principles include:
  - An **ecosystem approach** – Lake Simcoe and its watershed as an interconnected system
  - A **precautionary approach** – Caution will be exercised in favour of the environment where there is uncertainty about environmental risks
  - An **adaptive management approach** – Continuously improve and adapt actions incorporating new knowledge and innovation from ongoing science and monitoring
- Each of the policy themes in the plan to address the stressors identified includes targets and indicators to be monitored to assess the effectiveness of policies
- Immediate research needs are identified

Stressors Outlined in the Plan



1. Nutrients
   - mainly phosphorus
2. Pollutants
   - metals, chloride and organic contaminants
3. Pathogens
4. Climate change
5. Introduced species
6. Shoreline disturbance and loss of natural heritage
7. Water extraction
8. Recreational activities

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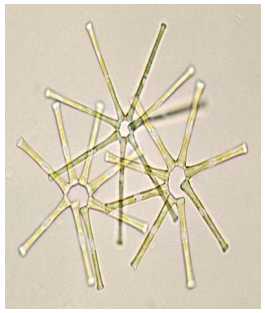

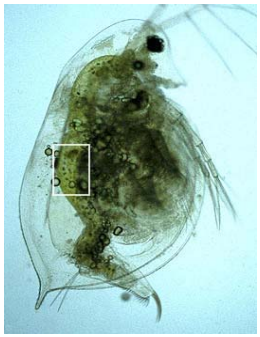

Priority Objectives

Priority objectives include:

- Restoring a self-sustaining coldwater fish community
- Reducing loads of phosphorus and other pollutants to the lake and its tributaries;
- Minimizing the impacts of invasive species by preventing new species from entering the system;
- Maximizing the protection of shorelines, wetlands, intact core natural habitats and corridor linkages; and
- Promoting sustainable activities and land uses that minimize impacts to the lake and its watershed.

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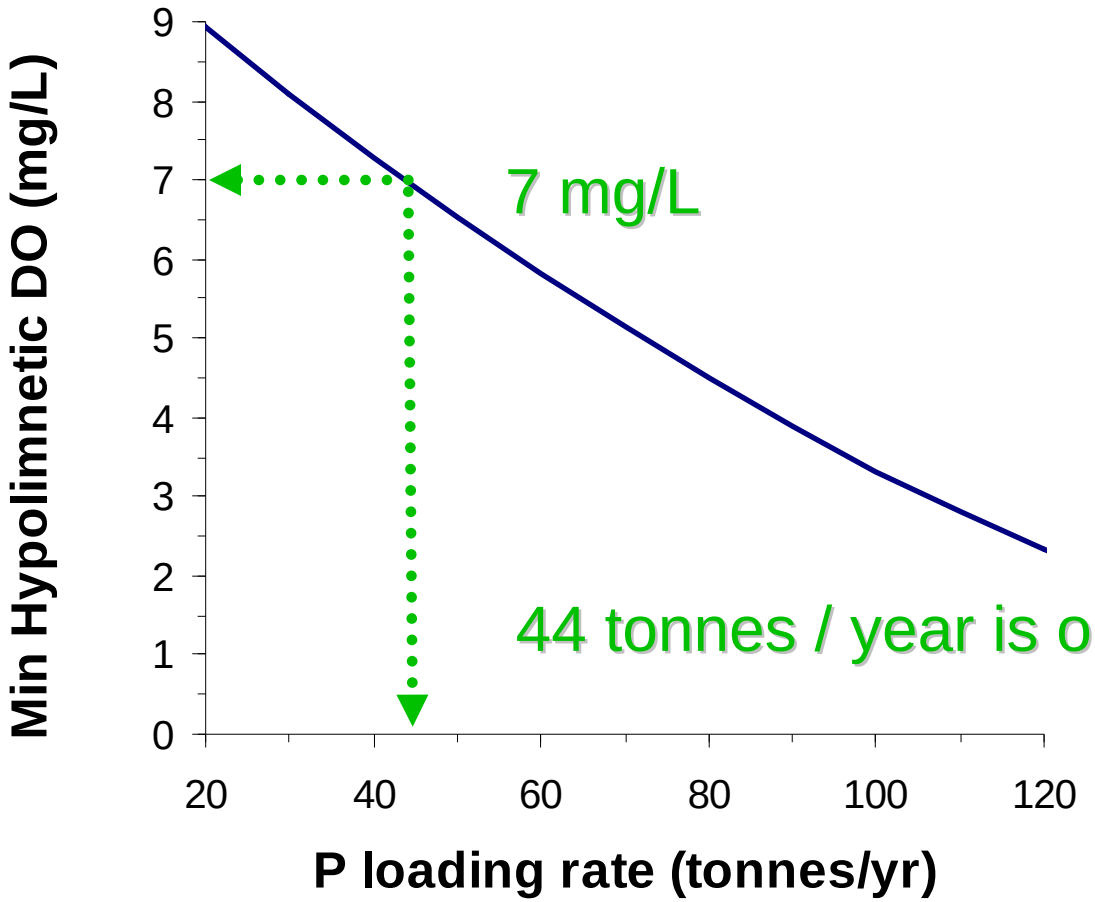
Phosphorus Loading Target

DO in the hypolimnion should not go below **7 mg/L** on any day between June 15 and September 15



P loading rate → **Dissolved Oxygen**

44 tonnes / year is our current estimate

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Phosphorus Reduction Strategy (PRS) lays out the steps needed to reduce "P" load to Lake Simcoe

Agriculture: BMPs and stewardship. Over 2000 farms

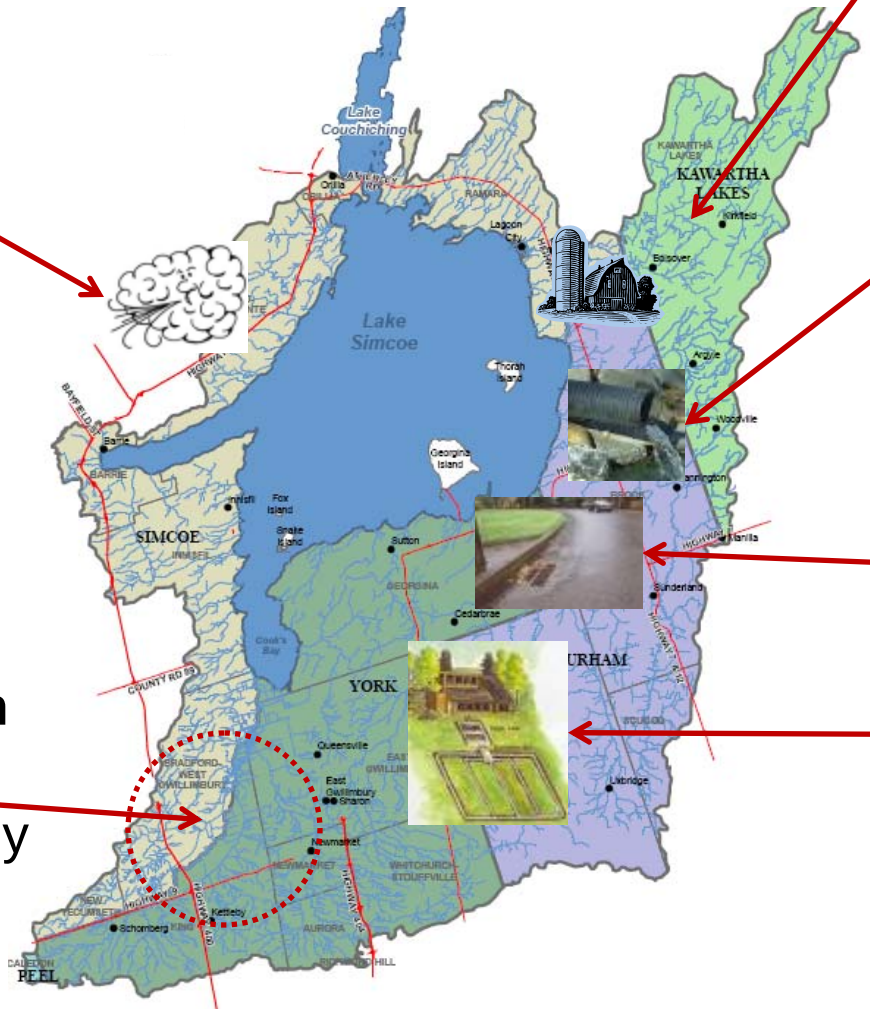
Atmospheric deposition: BMPs

STPs: Limits, upgrades and technology

Urban stormwater: LID, green development

Holland Marsh and Polders: BMPs and study

Septics: Reinspections and technology



Conclusions and Future Work

- Some improvements to Lake Simcoe have occurred since the 1980s
- Continued efforts towards the lake's restoration are required
- e.g. Minimum deep-water dissolved oxygen target of 7 mg/L; need to reduce total phosphorus loads
- Ongoing monitoring to assess change and commitment to adjust management actions - Minister's 5-year report on monitoring (targeted 2014)
- Ongoing research to inform actions (e.g., phosphorus from atmospheric and septic sources; climate change effects on loading and the lake; road salts)
- Guidance from Science and Coordinating Committees

www.ene.gov.on.ca/en/water/lakesimcoe/

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Thank you!

MOE's Lake Simcoe team

Lake Simcoe Region Conservation Authority

MNR's Lake Simcoe Fisheries Assessment Unit

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