WATER RESOURCES INFORMATION

Ontario

Climate Change Issues Related to Water Use & Supply

Issues and Strategies to Increase our Resilience

Alliance for Resilient Cities
Webinar

2008-10-21

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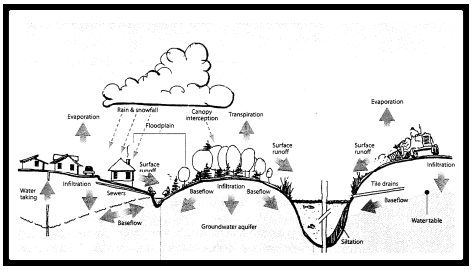
Outline:

- **Perspective**
- **Defining Use and Supply**
- **Monitoring and Reporting**
- **Approaches for Municipalities**
- **Wider Directions**



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Perspective

WRIP:
Water Resources Information Program

- **Provincial program—linkages up and down**
- **Works with business units**
  - **Information Improvement**
  - **Design**
  - **Quality**
  - **Discoverability**

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Water Information

- **Across many disciplines**
- **Across many sectors**
- **Across all levels of government**
- **Information Overlap**
- **Information Gaps**

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Interest crosses many professional areas

- **Health & Safety**
  - **•Drinking water - Source Water Protection**
  - **•Emergency Management**
- **Environment**
  - **•Biological sustainability**
  - **•Biological diversity**
  - **•Climate & Climate Change**
- **Economy**
  - **•Industry**
  - **•Agriculture**
  - **•Tourism & Recreation**
  - **•Water Power**

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Supply

Water that is potentially available for use by humans

- **•tends to ignore peaks, but considers low flows**
- **•focus on surface water**
- **•ground water issues regionalized**

is a function of:

- **•Rainfall**
- **•Evaporation**
- **•Storage (non-storage)**
- **•Use**

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Withdrawals & Loss

Water withdrawals
refer to the amount of water removed from a source to perform a specific duty, i.e. through a well for domestic purposes, or for the irrigation of a crop.

Water consumption
is the portion of water incorporated into a product such as canning of fruit, or lost through natural processes such as evaporation.

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Use

Difference between withdrawals & loss

- **Hydro power**
- **Thermal power**
- **Agricultural**
- **Drinking Water**
- **Industrial**

Note sliding scale between

Monitoring is not always clear on determining which

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Supply & Use

Difference between sources

- **Surface water (rivers, lakes)**
- **Groundwater**
- **Great Lakes**

Linkage between quantity and quality increases as supply drops

Use has not historically been an issue when considering supply.

Potential for continued low flow requires a change in thinking

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Supply & Use Modelling

- **Complex**
- **Discipline/sector driven or centric**
- **Information Gaps**
- **Process Gaps**
- **We are improving**

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Use Statistics

Region	Thermal Power	Manufacturing	Mining	Agriculture*	Municipal*	Rural*	Total
Atlantic	x	537.7	x	20.6	286.9	190.7	**1 035.9**
Quebec	x	1 833.1	24.2	113.2	1 555.0	250.3	**3 775.9**
Ontario	26 647.9	3 486.8	42.7	174.1	1 536.4	176.3	**32 064.2**
Prairies	x	675.2	x	3 592.4	650.0	123.5	**5 041.1**
British Columbia and North	x	1 246.1	62.1	886.2	753.6	125.5	**3 073.5**
National Total**	**32 137.5**	**7 778.9**	**458.9**	**4 786.6**	**4 784.5**	**866.3**	**50 812.7**
Percent of Total (rounded)	63.25	15.31	0.90	9.42	9.42	1.70	100
Percent of Total (rounded)	63	15	1	9	9	2	99

Canada-wide use 2005 (millions of cubic metres per year)

Source: Environment Canada Municipal Water and Wastewater Survey, 2004
Statistics Canada Estimation of Water Use in Canadian Agriculture in 2001
Statistics Canada Industrial Water Survey, 2005.

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Great Lakes Use

766 billion litres per day

- **94% Hydroelectric usage**
- **5% Nuclear plant usage (cooling)**
- **1% all other categories**

See: http://www.glc.org/wateruse/database/

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Looking Ahead

- **More variability**
- **Floods**
- **Seasonal lows**
- **Droughts (extended lows)**
- **Increased use**

- **How well do climate change prediction models deal with localised realities?**

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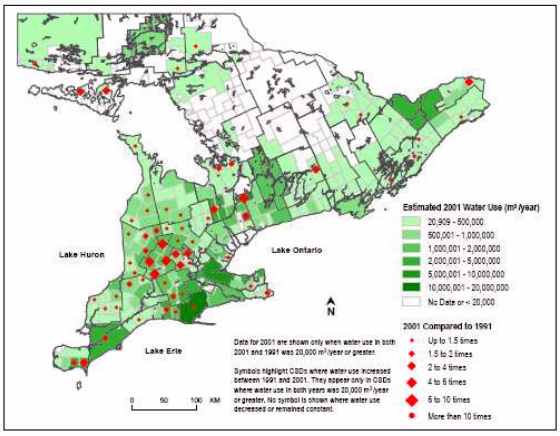
Use is expected to increase across sectors



As an example:

Estimated 2001 Total Agricultural Water Use in Southern Ontario
Source: R. De Loë, University of Guelph, 2004

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Competition for water

How do we decide on priorities?

- **Power**
- **Industry**
- **Agriculture**
- **Drinking Water**

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Problems

- **Cultural views to water**
- **Divergent understanding/positions**
- **Monitoring**
- **Reporting**
- **Coordination of assessment initiatives**

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Monitoring & Reporting Examples

- **Conservation Authorities**
- **Oak Ridges Moraine**
- **Upper Great Lakes**
- **SWMC-MNR**
- **Great Lakes**
- **Water Use and Supply Project**

For more information on monitoring networks see
Inventory of Climate Observation Networks in Ontario (ICONO)
http://www.icono.ca

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Surface Water Monitoring Centre--MNR

- **Climate and surface flow monitoring network**
- **Network made up of components from different networks**
- **Centralized management**
- **Flood forecasting focus**
- **Other benefits (mapping, summary statisitics)**

- **Limited data access**

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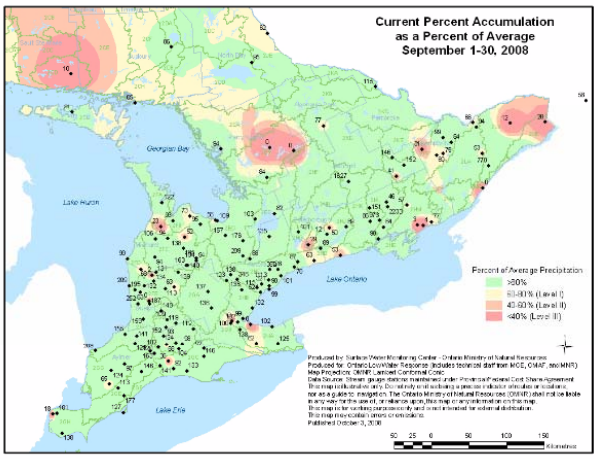

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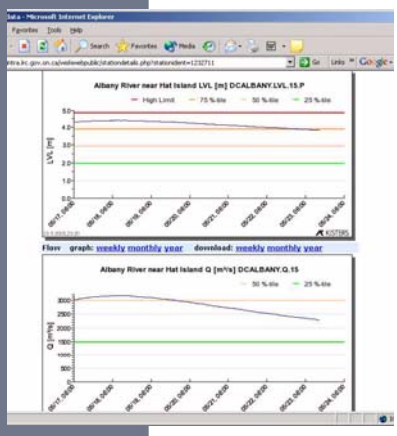

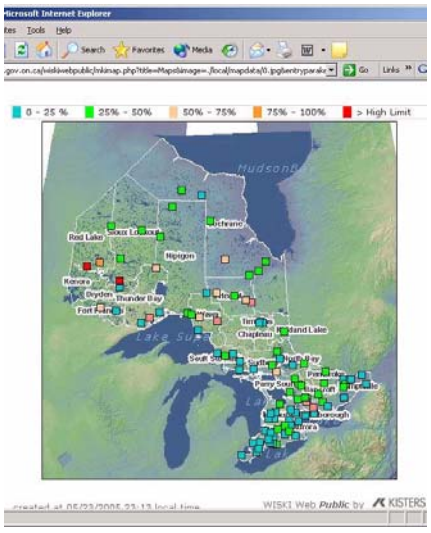

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Water Use and Supply Project

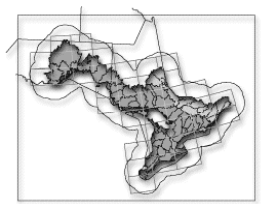
Collaborative:
Environment Canada & OMNR co-leads

Ministry of the Environment

Conservation Ontario

Others

Ontario Great Lakes focus



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Water Use and Supply Project

Initial Goals:

•To gain baseline information on water supply (surface and groundwater source and abundance), water use and demand at a sub-basin level

•To make projections for the future and to consider the impacts of climate change

•To improve our understanding of the diversity of water resource conditions in the Great Lakes Basin and the sensitivities of the system to future demands and climate change

See: http://www.on.ec.gc.ca/water/water-use/intro-e.html

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Water Use and Supply Project

New Terms of Reference:

- **To evaluate the state of understanding of water use and supply modelling and monitoring**
- **To facilitate cooperation of activities in this area**
- **To report on how well we are doing collectively on reporting water use and supply information at the Great Lakes level in Canada**

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Monitoring Gaps/Weaknesses

- **Precipitation**
- **Evaporation**
- **Evaluative processes**
- **Supply-Use Models**
- **Use-Loss Modelling**

- **Division between processes that affect all and specific monitoring at local level**

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Approaches for municipalities

- Understand local specifics
- Awareness and management of supply
- Awareness and management of water use
- Infrastructure development
- Control of users
- Cultural-Political issues
- Work with local resources for specifics
- Work with others for general processes

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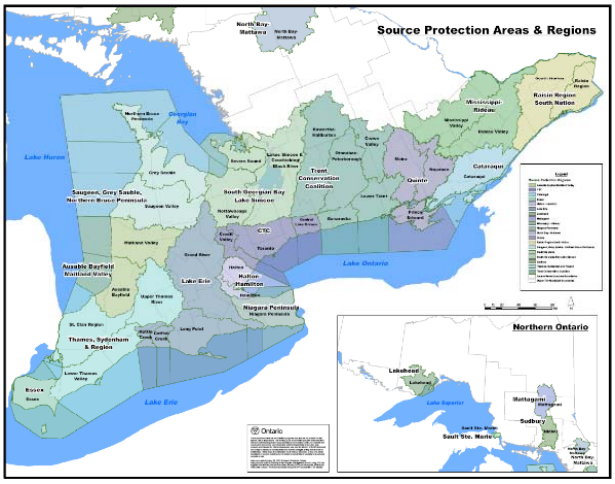
Wider Initiatives



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Wider Initiatives

- Great Lakes Annex
- Canada-Ontario Agreement
- Source Water Protection
- Climate Change Research
- Overall Data Improvements

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General Directions

- Understand the importance of the local
  - Watershed Characteristics
  - Information Resources
  - Process or Modeling Resources
- Understand the connections within local water model
- Figure out ways to control connections
- Cultural Adaptation

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Summary

- **Water management is complex (naturally)**
- **Water management is complex (structurally)**
- **Climate change will bring uncertainty**
- **Low flows are of concern for supply issues**
- **Supply & use are connected in low flow conditions**
- **Use will increase**
- **We only have part of the picture (but are getting more)**
- **Municipalities should first examine their unique context to understand issues related to supply and use—connect with local resources first**

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