

Assessment of Water Monitoring Networks for Climate Change Scott MacRitchie, MOE February 9, 2011

Climate Change Initiatives at GW-SW Unit, EMRB, MOE

•The Canada-Ontario Agreement (COA) Project:

Assessment of the Groundwater and Stream Water Quality Monitoring Networks for Climate Change Detection and Adaptation. In partnership with Conservation Ontario.

•CCME Water Agenda Development Committee:

Working with MOE Strategic Policy Branch on the Water Monitoring and Climate Change Adaptation Subgroup; Setting Strategic Directions for Water (Three Year Water Action Plan)

·Lake Simcoe Climate Change Adaptation Strategy:

Working with the Sport Fish and Biomonitoring Unit to develop the water vulnerability assessment for Lake Simcoe and 18 subwatersheds.

Ontario Low Water Response:

Working with MNR Surface Water Monitoring Centre to develop a groundwater indicator.



COA Project

Assess the PGMN and PWQMN for their effectiveness to provide relevant data for climate change detection and adaptation.

A partnership project with Conservation Ontario. Technical Working Team: MOE, CO, OMAFRA, MNR

A multi-phase, multi-year project.
Phase 1 and 2 completed
Phase 3 in progress

Reports available at http://www.conservation-ontario.on.ca



Phase 1: Monitoring CC Impacts on Water

- Set up Advisory Committee
- Review of the literature on effects of climate change on quantity and quality of groundwater and surface water;
- Identification of monitoring parameters and indicators.



Phase 2: Assessment of PGMN and PWQMN

BASIC APPROACH

DETECTION AND ADAPTATION

PRIORITIZATION: IDENTIFY "CRITICAL" OR "SENSITIVE" OR "REPRESENTATIVE" OR "APPROPRIATE" WATERSHEDS.

NETWORK EVALUATION: IDENTIFY MONITORING NEEDS AND ENHANCEMENTS



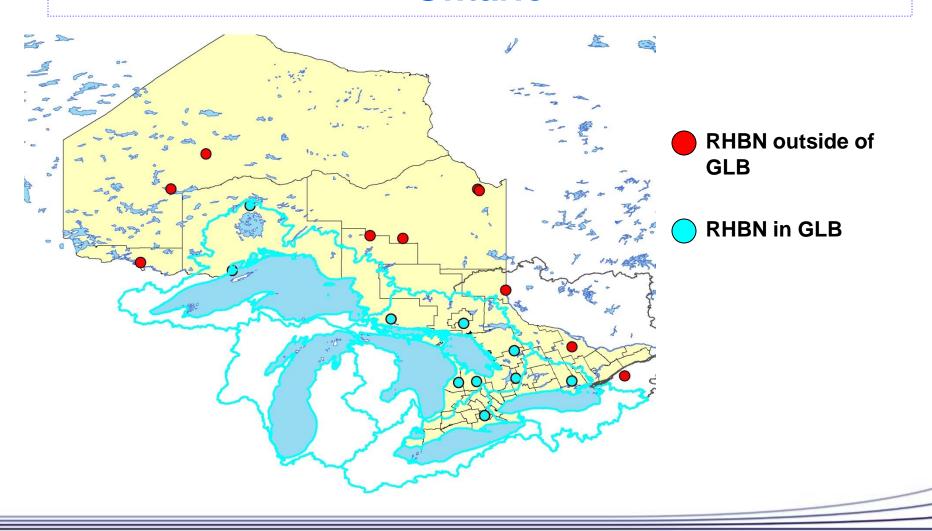
Detection and Water Monitoring

CCME Report, April, 2008: Assessment of Water Monitoring Networks For Detection of Climate Change in Canada – Summary Report on Scoping Study

"...a monitoring strategy (for climate change detection) should focus on maintaining <u>long-term</u> stations in pristine areas not affected by land use changes and water use and establishing new stations in pristine areas not currently represented."



Reference Hydrometric Basin Network in Ontario





Adaptation and Water Monitoring





Report of the Expert Panel on Climate Change Adaptation

November 2009

Adaptation = Vulnerability Assessment

Review of adaptation guides:

Vulnerability assessment is a <u>fundamental</u> part of adaptation planning.

Vulnerability assessment (VA) = exposure (E), sensitivity (S) and adaptive capacity (A).

$$VA = E * S$$

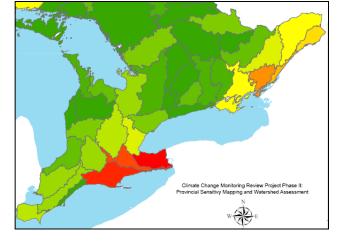
$$A$$



Prioritization: Current Sensitivity Assessment of Southern Ontario

Using GIS, produce the following current sensitivity map overlays based on current data:

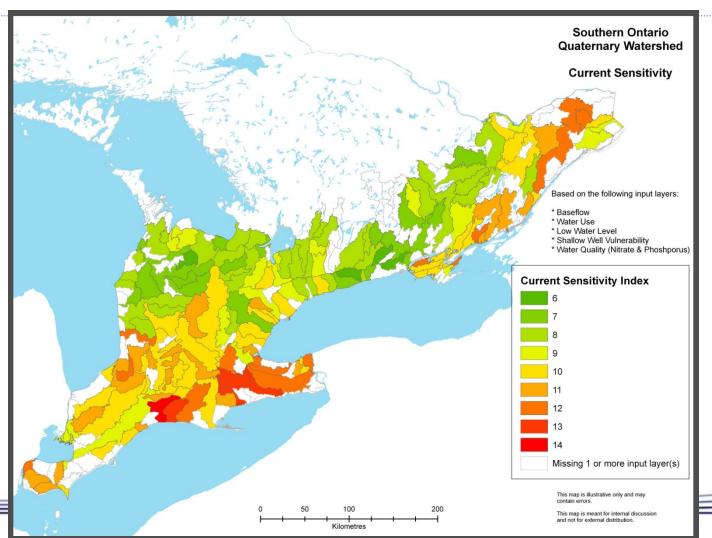
- Water Use / Demand
- Low Water Level
- Baseflow Index
- Stream Water Quality
- Shallow Well Vulnerability



Assign simple high-medium-low sensitivity ranges for the sensitivity factors and produce GIS map overlays.



Current Sensitivity Assessment of Southern Ontario



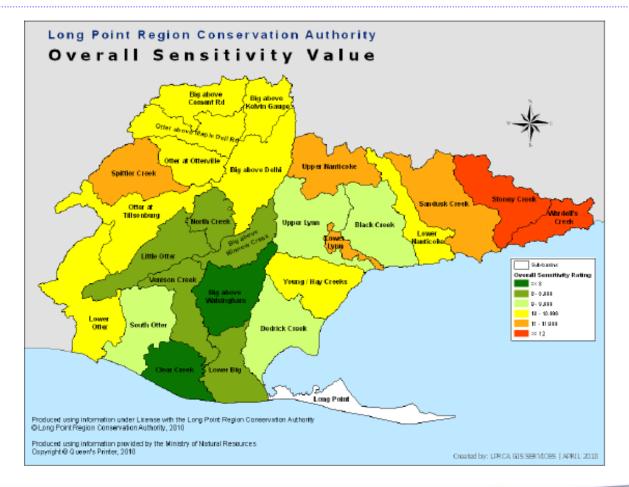


Evaluate networks in sensitive watersheds

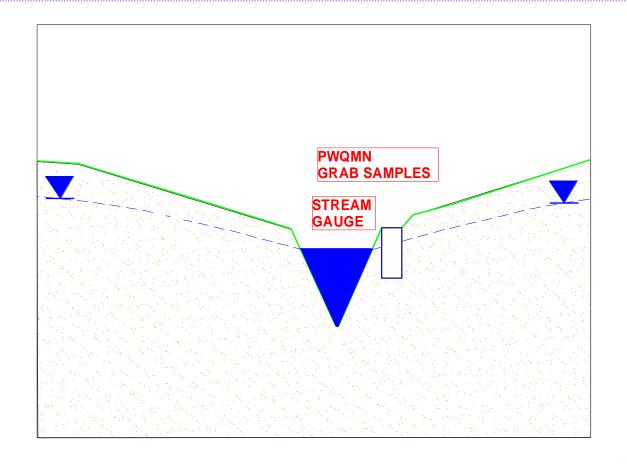
Conservation Authority	Number of Quaternary Watersheds
Ausable Bayfield	2
Catfish	1
Essex	1
Grand River	3
Hamilton	1
Kettle	1
Long Point	2
Niagara	3
Quinte	2
Cataraqui	1
South Nation	2



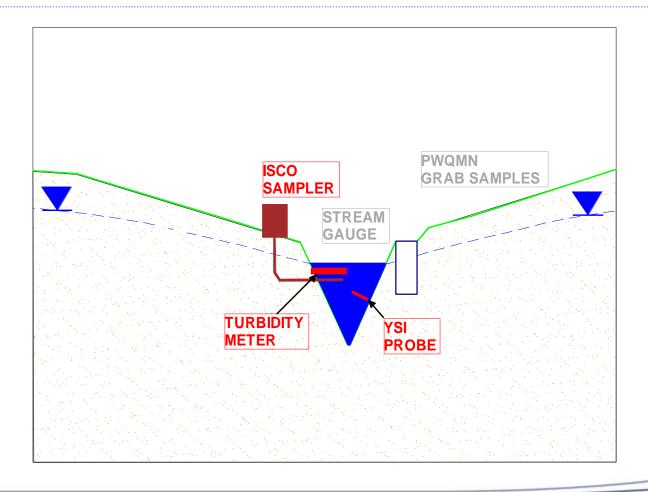
CA Evaluation Example: Long Point



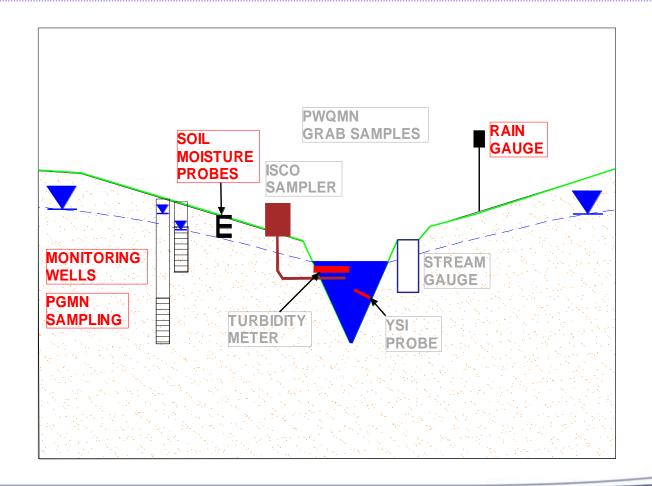




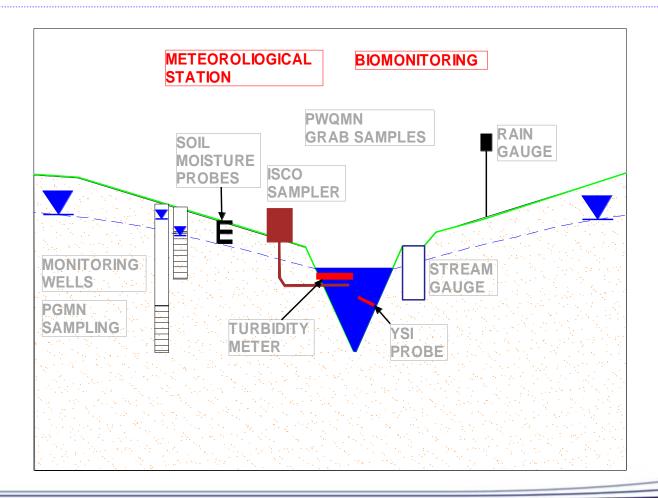














Conservation Authorities: Potential Integrated Monitoring Sites

ABCA GRCA NPCA QUINTE

NICKEL DISTRICT LAKEHEAD



CCME Water Action Plan

Goal 4. Climate change impacts are reduced through adaptive strategies

- Guidance for the Evaluation of Water Monitoring Networks for Climate Change Adaptation, July 2011
- Tools for Watershed Based Vulnerability Assessment, October 2012
- Measures (Actions/Options) for Watershed Climate Change Adaptation, October 2013



Ontario Low Water Response: Groundwater Indicator

- •Guidance document for well selection to be submitted by UTRCA.
- ·Finalize groundwater indicator method.
- Selection of PGMN wells (others?) for OLWR.
- Address data accessibility issue(s).
- Incorporation of groundwater indicator to OLWR



SUMMARY

- Water monitoring for climate change detection and adaptation.
- Integrated monitoring for water quantity and quality.
- •Current work to provide guidance on water monitoring for climate change and climate change adaptation.

