Environment Canada Environnement Canada

Canada

Canadian Freshwater Quality Monitoring and Surveillance Automated Monitoring Network

Real Time Water Quality Monitoring Workshop
St. John's, NL
November 7–8, 2018

Presentation Overview

1. Departmental Water Priorities
2. Freshwater Quality Monitoring and Surveillance
3. ECCCs Automated Monitoring Team
4. The Network
5. Data Management

Environment and Climate Change Canada
Water Priorities

Priority initiative	Commitment
• **FWQM** – **Long term network** – **Automated** – **CABIN** – **Interjurisdictional** – **Priority Watersheds** – **Fed-Prov agreements**	• Collect water quality data, and monitor the physical, chemical and biological characteristics of Canada's watersheds as part of the "**GoC's strong, comprehensive approach to ensure clean water** for all Canadians, including monitoring water quality". • Collecting water quality data to meet federal commitments related to **trans-boundary watersheds** (Osoyoos, Saint Lawrence, Great Lakes, Saint John, Mecatina) • Monitoring under agreements with **provincial partners** to facilitate Minister's obligations under **Canada Water Act**.
• **CESI**	• Monitor water quality at select sites representative of populated regions in Canada to support CESI reporting to Canadians on the state of the environment and progress on sustainability under the **Federal Sustainable Development Act**.
• **CMP**	• Monitor set of specified substances for the Chemicals Management Plan under the **Canadian Environmental Protection Act**

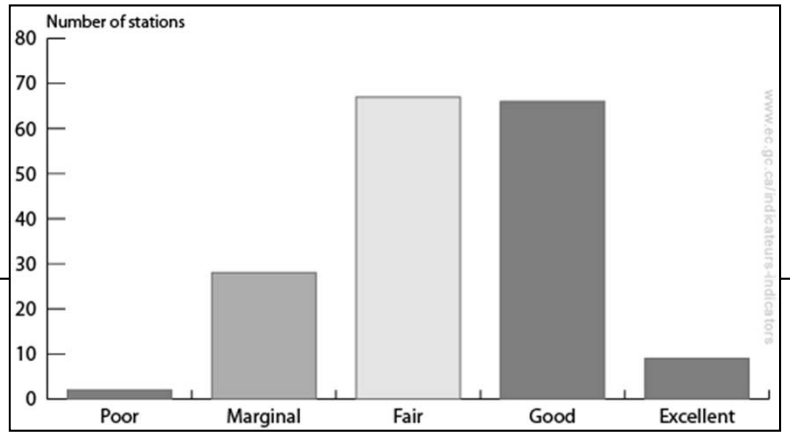
Other directorate priorities include Great Lakes Action Plan, St. Lawrence Action Plan, Joint Oil Sands Monitoring, others

Freshwater Quality Monitoring and Surveillance
Key program components

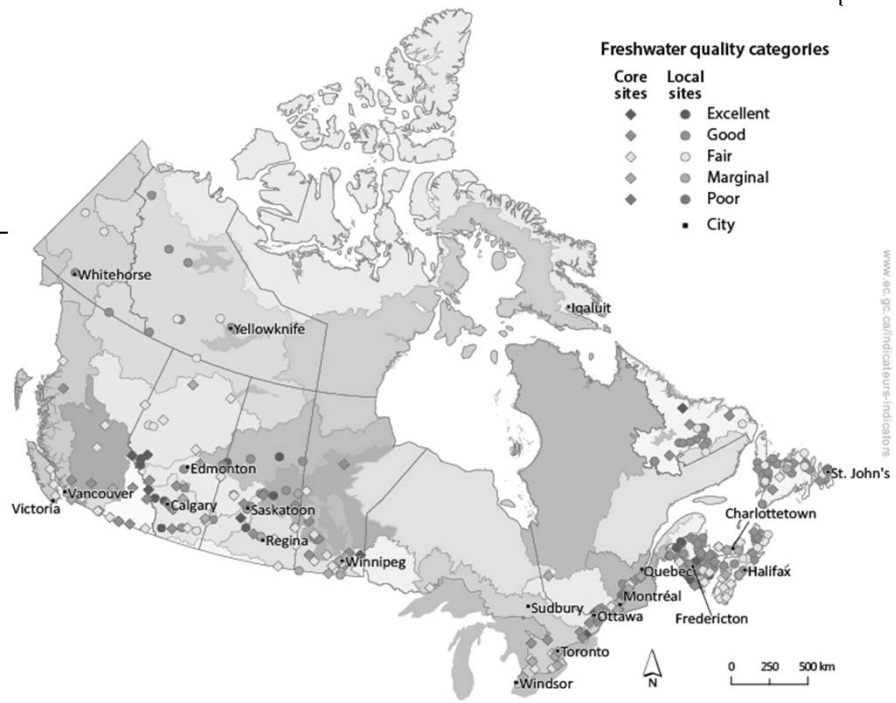
Status and Trends Monitoring

Measure the natural changes and conditions of water quality

Includes physical/chemical/biological monitoring



Site	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015
Sackville River	FAIR	MARGINAL	MARGINAL	MARGINAL	MARGINAL	FAIR	FAIR
Little Sackville River	MARGINAL	MARGINAL	MARGINAL	MARGINAL	MARGINAL	MARGINAL	MARGINAL



Key Program Components

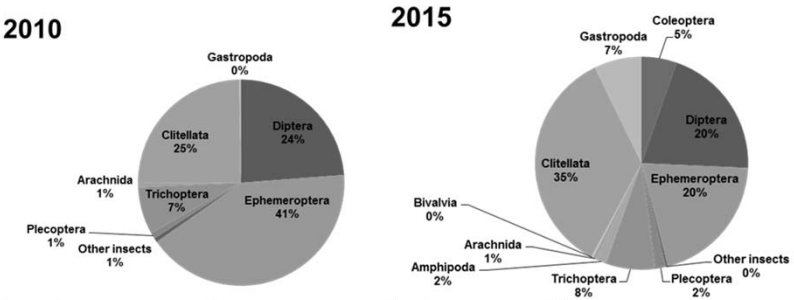
Issue- or threat- based Surveillance

Focused, short-term studies targeted on specific threats (e.g. Chemical Management Plan)

Identification of emerging issues

Reporting Biological Condition

CABIN (numerous partnerships)



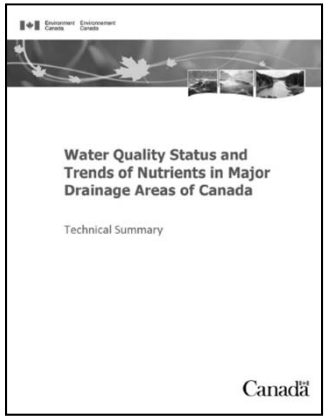
Automated / Real Time Monitoring

Supports all FWQMS priorities

Time series WQ data to better characterize environmental condition

Reporting and Open Data

National, watershed and issue based reporting (FWQ Indicator, website, journals, reports)



Automated FWQ Monitoring

What is Automated Water Quality Monitoring

- Collection of continuous WQ data using specialized instruments and sensors
- Monitoring tool that provides high frequency water quality data that can show changes in WQ related to time of day, season, climate and parameters of greater concern
- May be in real time or not
- Usually supplements laboratory sample analyses

Supports all of our priority activities

- Characterize trends in water quality
- Support international agreements such as the IJC
- Validate long term water quality monitoring sample results
- Surveillance tool to identify emerging issues and threats

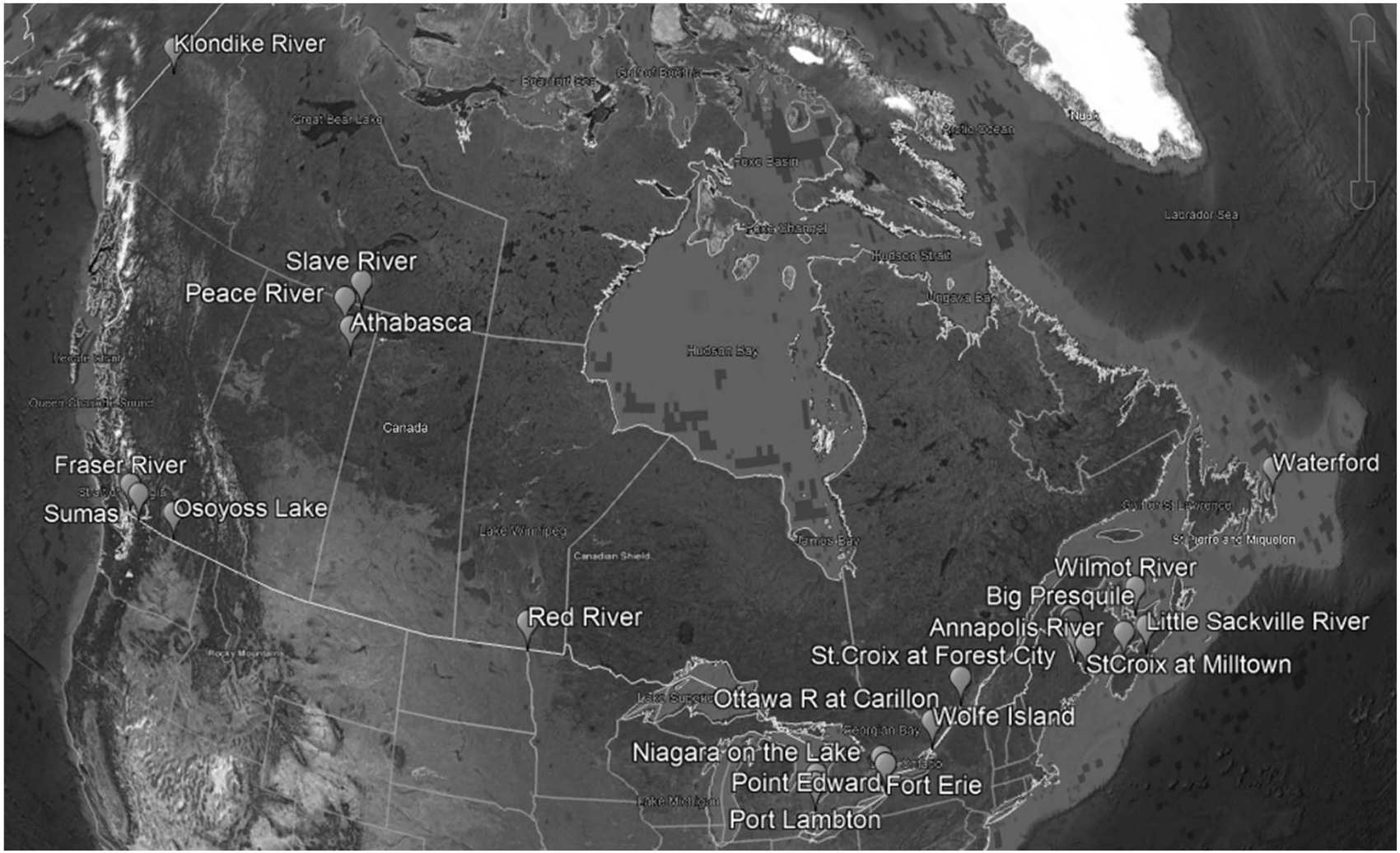
National Automated Monitoring Task Group

ECCCs Automated Monitoring Task Group

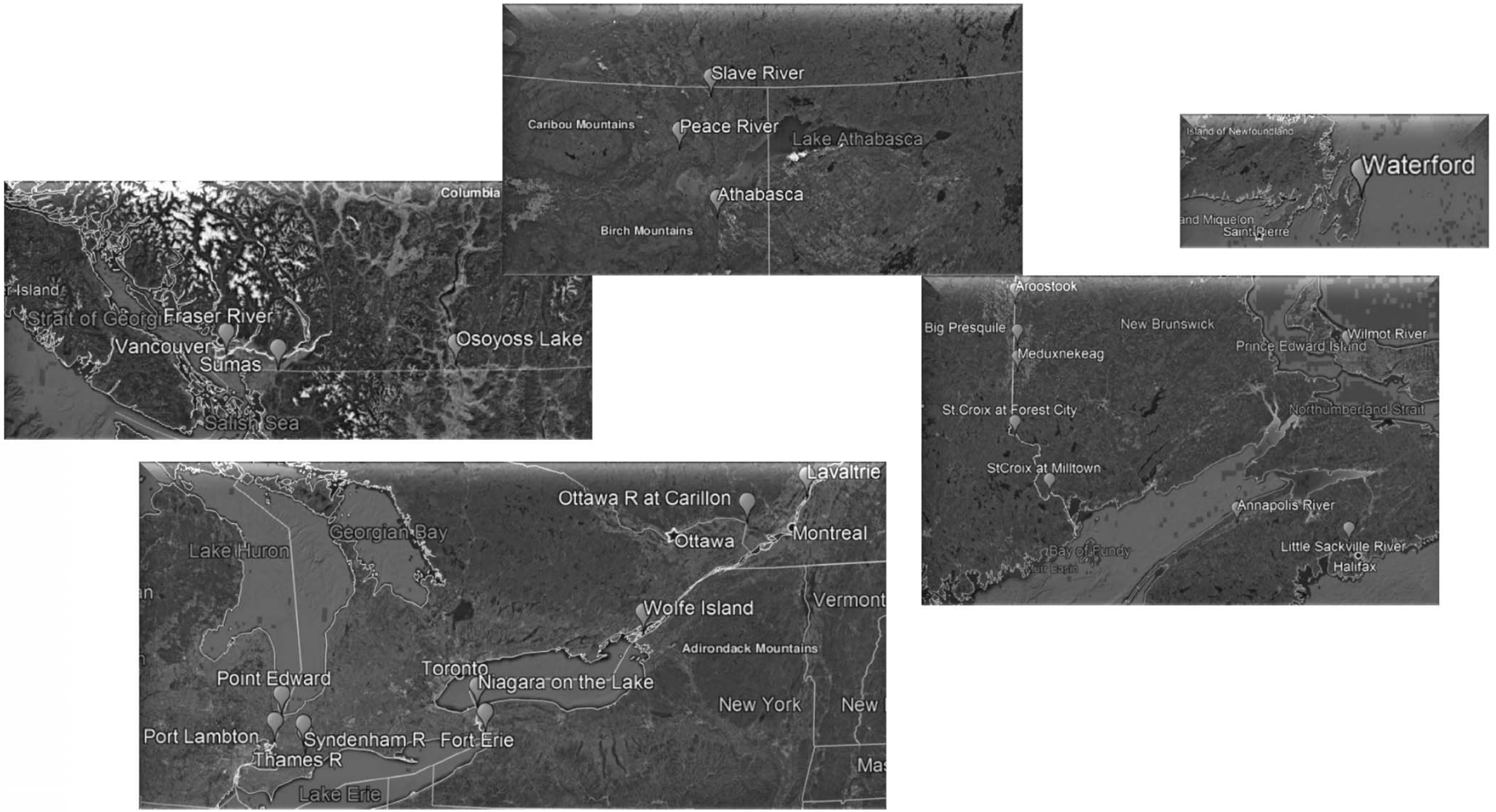
- Automated monitoring is currently conducted in all watersheds
- National team provides a forum for open discussion and sharing of our programs and procedures related to automated monitoring, and to bring more national consistency to our activities
- Goal to improve national reporting
- Enhance collaboration between our watersheds for better overall collaboration

Christine Garron – Atlantic (National Team Lead)
Loubna Benyahya – Saint Lawrence River
Lisa Bradley – Great Lakes
Diana Fred / Dorothy Lindeman – Hudson Bay
Kerry Pippy – Arctic / Athabasca
Jennifer MacDonald – Pacific
David Halliwell – FWQMS National Coordination

Canadian Automated Network



Canadian Automated Network



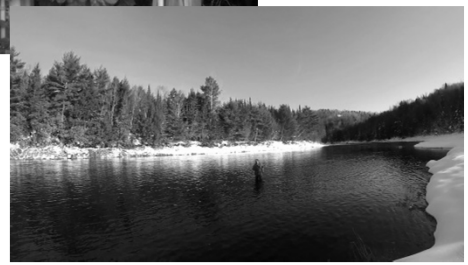
Freshwater Quality Automated Network

Stations

- Some co-located with Water Survey of Canada stations – complete enclosures (walk-in) or pole-mounted boxes (look-in)
- Many have shared telemetry, power, data loggers
- Some capacity for collaboration in sample collection and station maintenance

Freshwater Quality Automated Network

- Some shared location, with separate data collection



- Additional equipment (e.g Temp Loggers, buoys, MEMPs) that are currently stand alone

Data Collection

Databases and Data Collection

- Real Time Database (RTDB) was developed >10yrs ago
- Program staff have used Aquarius Workstation for QA and analysis
- Need to transition to a newer, integrated solution
- Letter of Understanding with WSC signed last year
- Some Atlantic sites, Klondike are fully integrated with WSC (Aquarius)
- Others are being integrated one-by-one (Great Lakes, Red River, Atl, SLR)
- Fraser River, Saint John River and Osoyoos Lake buoys, Forest City (St. Croix R) – telemetry, various types and database destinations
- Arctic / Athabasca data is collected manually but will be stored in Aquarius

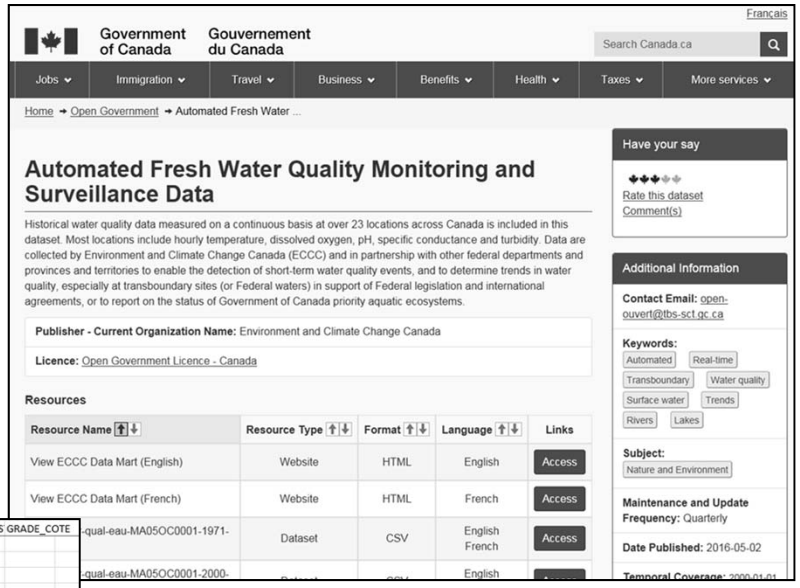
Data Quality Control

- QA/QC processes becoming more standardized – SOPs on station set-up and maintenance, data validation, data correction (Aquarius), and others underway

Applications for data Access

Applications and Data Access

- GOC commitment to Open Data
- Contains corrected data only
- Not all stations have data in this portal yet
- Newer data contains grades which provide a sense of the reliability of the numbers (based on our drift correction procedures)



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NB01AJ0008	07/03/2016 6:00		172	4729	US/CM	SPECIFIC CONDUCTANCE	CONDUCTANCE SPÉCIFIQUE	V	
NB01AJ0008	07/03/2016 7:00		0	4730	DEG C	TEMPERATURE WATER	TEMPÉRATURE EAU	V	
NB01AJ0008	07/03/2016 7:00		4.2	4731	NTU	TURBIDITY	TURBIDITÉ	V	
NB01AJ0008	07/03/2016 7:00		8.05	4728	PH	PH	PH	V	
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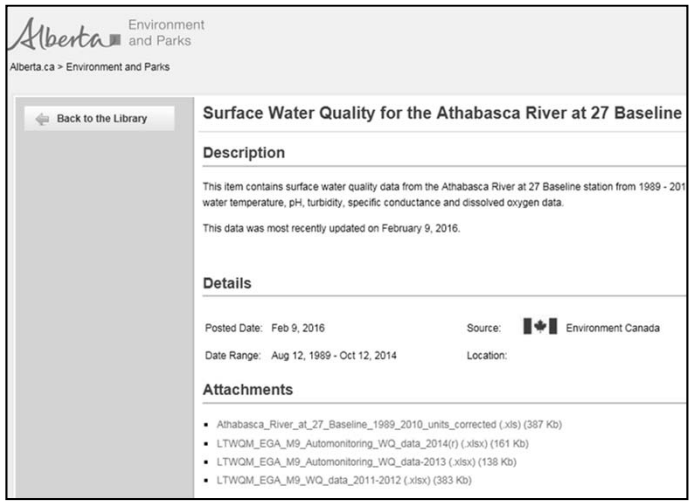
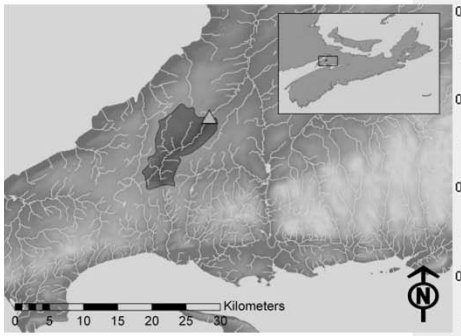


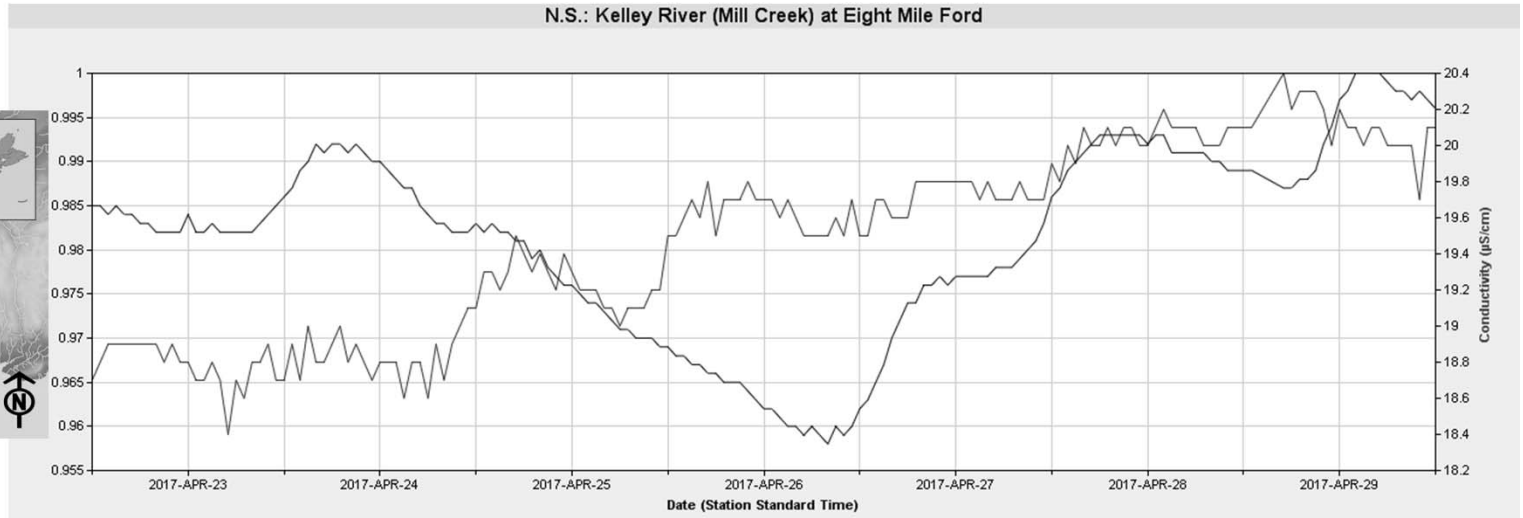
- Athabasca River Data on Oil Sands Portal
- Fraser and Osoyoos buoy data on line

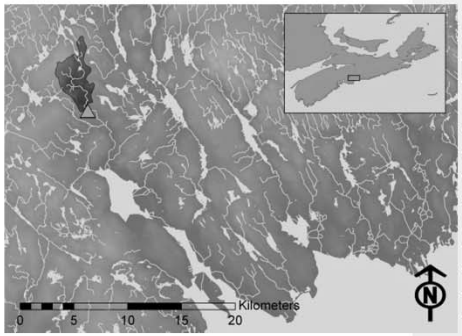
Conductivity with rainfalls

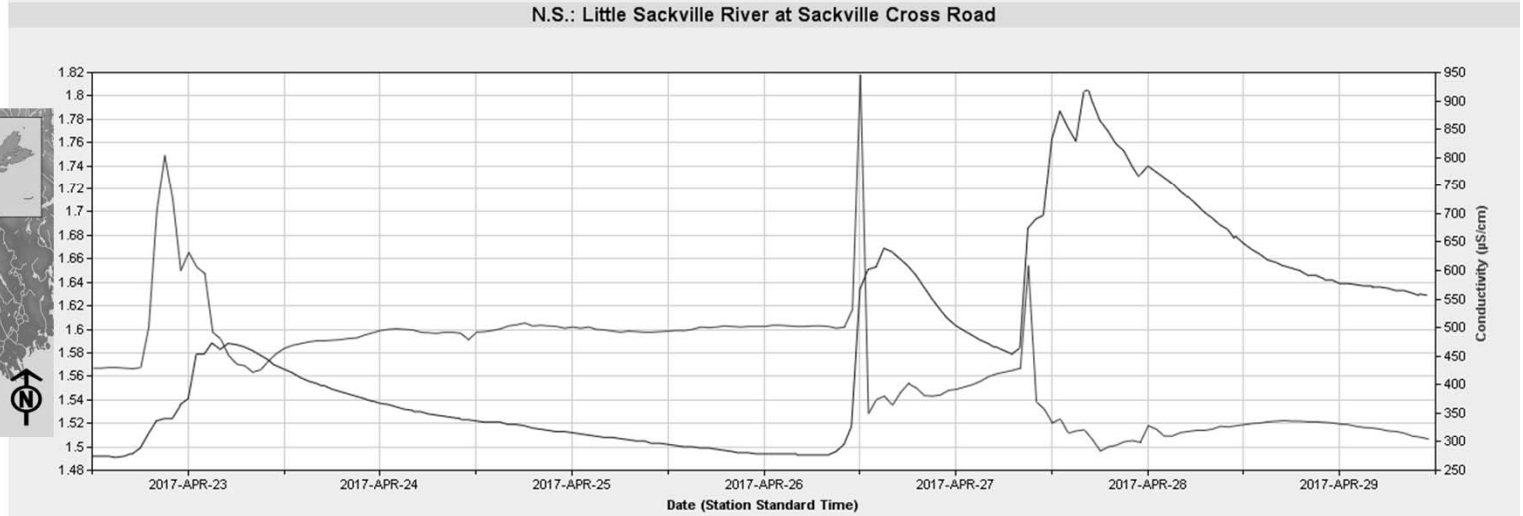
Urban versus Reference Site

Realtime Graphing







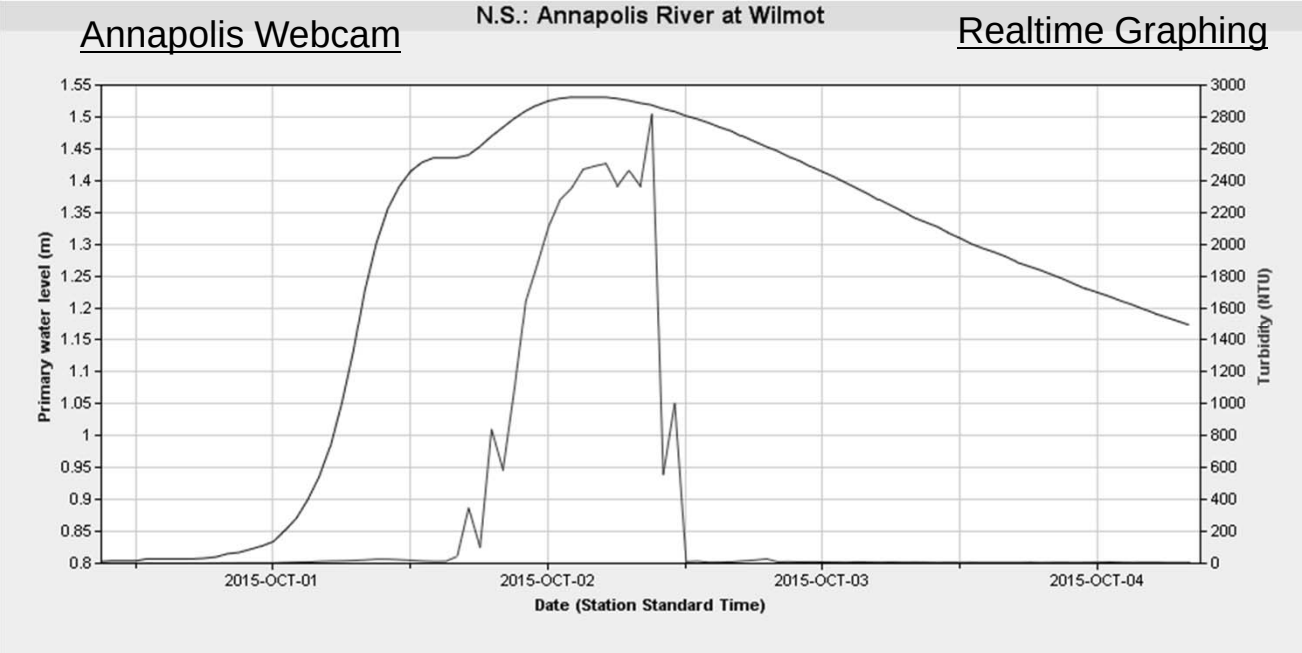


Turbidity with Rainfalls

Annapolis River Site – Agriculture influences

Annapolis Webcam

Realtime Graphing



More Information

Open Data Portal (Automated WQMS Data)
https://open.canada.ca/data/en/dataset/f258b0c8-7871-4572-b567-1ba2bd55f1b6

Athabasca River Data
http://osip.alberta.ca/library/Dataset/Details/695

Fraser River Buoy and Osoyoos Buoy Data
http://aquatic.pyr.ec.gc.ca/realtimebuoys/default.aspx
http://aquatic.pyr.ec.gc.ca/realtimebuoys/Osoyoos.aspx

ECCC Freshwater Quality Monitoring
https://www.canada.ca/en/environment-climate-change/services/freshwater-quality-monitoring.html

CESI Water Quality Index
https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/water-quality-canadian-rivers.html