Ontario’s Hydrometric Network

and

The Canada-Ontario Agreement on Hydrometric Monitoring

Ontario Flood Risk Management Workshop
Dave Burritt, MNRF
September, 2018
Outline

• Explore what it is
• Explain how it’s managed and operated
• Provide examples of ways you can use the information
• Imagine what the future might hold
Surface Water Monitoring Centre (SWMC)

Communications
Flood Forecasting
Emergency Management
Project Management
Weather
Water
Ontario’s Hydrometric Network

- Produces near-real time water level and flow data and contains historic (archived) data
- 600+ stations across the province
- Operated to high accuracy standards (ISO 9001 certification)
- Supports other types of monitoring equipment: Rain, air and water temperature, cameras
- All data is publicly available
Ontario’s Hydrometric Network – All Stations

Stations by Cost-Share Status

- Federal
- Federal-Provincial
- Provincial
- Other (e.g. OPG, Commercial)
- Lakes
- Rivers
- Primary Watershed Boundaries
- Tertiary Watershed Boundaries
- Ontario
What is included in the network?

- Technicians
- Remote Equipment
- Measuring Equipment
- Survey Equipment
- Helicopters
- Quality Data
- Planes
- Sensors and Data Loggers
What is Data used for?

- Emergency Planning
- Infrastructure Design & Operations
- Science & Research
- Public Policy
How it Works

- Historical Summary
- Governance
- Operations
Canada-Ontario Agreement for Water Quantity Surveys: ECCC-MNRF-MOE Committees Formed
1975

Walkerton E.coli outbreak
2000

Phase 1 Network Expansion - Bringing operational stations back online
2001

Gauge rationalization
1993-1997

MNRF funding allocation determined
2003

2002-2004
Phase 2 Network Expansion - Reactivating mothballed stations and adding new stations

MNRF designated as provincial lead of Canada-Ontario Agreement for Water Quantity Surveys
2002

2005-2006
Phase 3 Network Expansion - Northern Ontario

2008
Canada-Ontario Agreement on hydrometric monitoring - MNRF-ECCC

2009-2011
Ring of Fire/Far North Network Expansion

2014
Third Party Operator Assist Agreement: CA-MNR

2015
2018
Network Evolution

- Number of stations in a watershed by year
- Notice where they’re located and when
- Notice when the network expands and contracts
Governance Structure

National Administrators Table

- NAT
- Provides direction on program activities in Canada
- Comprised of the administrators from each province

National Hydrometric Program Coordinating Committee

- NHPCC
- Discusses hydrometric monitoring issues and administration across the country
- Representatives from across the country

Ontario Hydrometric Program Coordinating Committee

- OHPCC
- Fulfills national mandate for standardized water quantity data at a provincial scale
- Co-chaired by the MNRF and WSC
- Third Party Operator Assist Agreements MNRF-CA’s
Ministry of Natural Resources and Forestry

OHPCC
Hydrometric Network

NHS
Federal Water Mandate

MNRF
Provincial Monitoring Mandate

CA’s
Water Management And Public Safety

Indigenous Community: Emergency Response
Municipality: Emergency Response
Citizen: Personal Response
Ontario Hydrometric Program Coordinating Committee (OHPCC)

- Committee members = CA’s, MNRF-SWMC & WSC
- Comply with standards
- Prepare annual plans and cost estimates
- Evaluate issues affecting the network
- Outreach and knowledge transfer
Station Funding

• Stations are funded by:
  1. who has interest in the station
  2. where it is and
  3. the monitoring standard

• Funding is negotiated each year

• In 2017, Provincial share was more than $4M (Operations and Capital)

• New station requests only if there’s an offsetting cost savings somewhere else in the network
WSC Process Data Production

Real time data is transmitted to WSC

Sensors and Data Logger housed within gauge hut.

Gauge Station hut

Technicians take measurements at the gauge station and input into database

Technicians create rating curves from measurements

Approved Data is published to the Web
How Can You Use It?

Real-Time Hydrometric Data for OTTAWA RIVER AT BRITANNIA (02KF005) [ON]

This table provides real-time data in tabular format.

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<th>Primary water level (m)</th>
<th>Discharge (m³/s)</th>
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Annual Maximum and Minimum Daily Discharge Graph for OTTAWA RIVER AT BRITANNIA (02KF005) [ON]

This graph shows the annual maximum and minimum daily discharge from 2010 to 2017.
Federal Web Presence

https://wateroffice.ec.gc.ca/

Notice
The sixteenth release of the HYDAT mdb and the eleventh release of Hydat sqlite3 dated on July 16, 2018 are now available and can be used as standalone products (http://collaboration.cmc.ec.gc.ca/cmc/hydrometrics/www/).

Water Level and Flow

Real-time hydrometric data
Explore real-time water level and flow (discharge) data collected at over 1900 hydrometric stations across Canada.

Hydrometric Station and Network Data
Access station and network metadata (such as station name, location, drainage area, data type, gauge type, stream order).

Historical hydrometric data
Explore historical water level and flow (discharge) data collected at over 7700 hydrometric stations across Canada.

Tools and Downloads
Download freely-available hydrometric data products and hydrological modelling tools.

Resources
Learn about the Water Survey of Canada, and access other websites related to water data or water resource management.

Partners
- Alberta
- British Columbia
- Manitoba
- New Brunswick
- Newfoundland and Labrador
- Northwest Territories
- Nova Scotia
- Nunavut
- Ontario
- Prince Edward Island
- Quebec
- Saskatchewan
- Yukon

Real-time Data
- Real-time Station Search
- Real-time Map Search
- My Station List

Historical Data
- Historical Station Search
- Historical Map Search
- Additional Statistics

Resources
- Disclaimer for Hydrometric Information
- Frequently Asked Questions
- Hydrometric Data and Information Service Standards
Overview of how stream flows rank today versus average
Build your own “dashboard”

My Station List for Real-Time Hydrometric Data

Quick Graph List:

- Select List: toronto for the past 7 days

CREDIT RIVER AT STREETSVILLE (02HB029)
Water level provisional

- ALBANY RIVER ABOVE FISHING CREEK ISLAND (04HA002)
  - Last Month: 5.571M
  - Last Week: 5.571M
  - Last Day: 5.571M

- ALBANY RIVER ABOVE NOTTIK ISLAND (04GD001)
  - Last Month: 23.22M
  - Last Week: 23.22M
  - Last Day: 23.22M

- ALBANY RIVER BELOW ACHAPI LAKE (04GC002)
  - Last Month: 26.376M
  - Last Week: 26.376M
  - Last Day: 26.376M

- ALBANY RIVER NEAR HAT ISLAND (04HA001)
  - Last Month: 1.693M
  - Last Week: 1.693M
  - Last Day: 1.693M
Province: Gauge Statistics - OFAT

Flow Statistics

Select Hydat ID

Select a gauge by using the above pick list or by selecting from the map using the above tool.

Station Name

Status

Regulation Type

Extreme Flow Frequency Statistics
Note that all flow statistic values in OFAT are estimates based on historic data. A practicing water professional should be consulted before using the estimated flow values for any decision making purpose.

http://www.gisapplication.lrc.gov.on.ca/OFAT/Index.html?site=OFAT&viewer=OFAT&loc
Muskoka River
Water Management Plan

Checking Water Levels on Your Lake

The MNRF participates in a cost sharing program with Environment Canada to maintain automatic water level monitoring stations on many of the larger lakes in the district. These stations are part of the Real-Time Water Level Network. This information can be accessed for the lakes listed below at http://www.wateroffice.ec.gc.ca/index_e.html.

- Fairy Lake at Huntsville [02EB016] (Huntsville Lakes)
- Go Home Lake near Potters Landing [02EB023]
- Kawagama Lake at Russell Landing [02EB017]
- Lake Muskoka at Beaumaris [02EB018]
- Lake of Bays at Baysville [02EB019]
- Lake Rosseau at Port Carling [02EB020] (Lakes Rosseau and Joseph)
- Mary Lake at Port Sydney [02EB021]

Click on the link above and obtain the current water level value for the lake you are interested in. You must then add a unique conversion factor to the water level value obtained in order to determine the ACTUAL water level reading (elevation above sea level, in meters) for each lake. Actual water level values can then be compared to the annual lake operating plan chart of interest.

http://www.muskokawaterweb.ca/water-101/water-quantity/mrwmp

Topics

- Muskoka River Water Management Plan
  Learn about water management planning and view the MRWMP report.
- Muskoka River Watershed
  View maps and schematics of water control structures in the Muskoka River Watershed.
- Water Levels Throughout the Year
  How are water levels managed during different seasons?
- Operating Regime & Daily Procedures
  View a typical Annual Lake Operating Plan and download the Annual Operating Plan for your lake.

Resources
Imagery on Twitter

Surface Water @newswmc1
- Joined December 2016
- 5,278 Photos and videos

New to Twitter?
Sign up now to get your own personalized timeline!

https://twitter.com/newswmc1?lang=en
Data Distribution – KiWIS Module

- WISKI database software that lets you build a time-series script and send it to anyone as a hyperlink.
- Can also use it to scrape data from other databases.
- Easier to share information.
- User can customize
Dashboards
Public Safety & Emergency Plans

Water Level and Flow information can inform each pillar
Provincial Extranet Site
What might the future look like?

• Wireless Sensors?
• Internet of Things & Telecommunications?
• Models based on Artificial Intelligence
• Open Data vs Cyber-Security?
• “Virtual Gauges” and Remote Sensing?
• Common tool development through WISKI database and Hubs – community of users?
• Social Media & Mobile applications?
• Indigenous Partnerships?
Closing

- Explored what it is
- Explained how it’s managed and operated
- Provided examples of ways you can use the information
- Imagined what the future might hold
Parting Questions…

• What parts of your business are dependent on this information?
• How do you think future trends may affect how we collect water information?
• Do you think modelling can replace the need for monitoring?
• Do you think some needs are higher priority than others: e.g. public safety vs infrastructure design
• Do we need high measurement standards everywhere?
• What would you do if there’s increased value for monitoring data but decreasing appetite to pay for it?
Thanks for your attention!

Ministry of Natural Resources and Forestry
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