Real Time Really Works

Success Stories from Real Time Water Quality Monitoring, Newfoundland and Labrador

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Water Resources Management Division
Presentation Outline

- How we monitor
- Monitoring alerts
- Defining Success
- Examples
  - Leary's Brook
  - Voisey’s Bay
  - Duck Pond
How we monitor: RTWQ Website


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<th>Provincial Network</th>
<th>NL WRMD</th>
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<td><strong>RTWQ Website</strong></td>
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<td>1. NF02ZM0178 - Leary Brook at Prince Philip Drive (St. John’s, Newfoundland)</td>
<td>November 2001</td>
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<td>2. NF02YL0012 - Humber River at Humber Village Bridge (Western Newfoundland)</td>
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<td>3. NF02ZM0009 - Waterford River at Kilbride (St. John’s, Newfoundland)</td>
<td>July 2005</td>
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**Graphs:**

1. **Leary Brook At Prince Philip Drive - NF02ZM0178**
   - Department of Environment & Conservation Water Resources Management Division
   - Graph showing dissolved oxygen (mg/L) from May 10 to June 6, 2017.

2. **Humber River At Humber Village Bridge - NF02YL0012**
   - Department of Environment & Conservation Water Resources Management Division
   - Graph showing pH (pH Units) from May 10 to June 6, 2002.
Web-Cam

- Real Time photos of stations

- Leary’s Brook
- Badger

Leary Brook WebCam

Leary Brook At Prince Philip Drive - NF02ZM0178
Date: 2009-May-21 14:05:53 NST

A new image is available every 20 seconds. Click the Refresh button on your browser.
Weather Station

Badger Weather Station

Pippy Park Weather Station

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Real Time Weather Data

- Compliments hydrometric and water quality data

Exploits River at Badger East of Stadium - NLENCL0002
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Wind Direction (Degrees)

May-10-09 07:00  May-15-09 07:00  May-20-09 07:00  May-25-09 07:00  May-30-09 07:00  Jun-04-09 07:00  Jun-09-09 06:00
Alerts – Email Notification

Data Logger → Data Base

Mail To: Khan, Ali <Ali.Khan@gov.nl.ca>

Subject: Flow at Debt River at Big Chute

At 10:59 PM, station C303001 - Debt River at Big Chute reported a measurement of FLOW = 67.5000, which is < than the alert value of 10.

THIS IS AN AUTOMATED EMAIL PLEASE DO NOT REPLY TO THIS MESSAGE.
Alerts – Auto Sampler

- Continue to test/implement automated sampler triggered by real-time instruments

Data Logger

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What is Success?

- Objectives of RTWQ:
  - (1) provide near real time water quality information for selected water bodies throughout the province
  - (2) act as an early warning system and catch emerging water quality issues before irreversible effects occur
Leary’s Brook RTWQ

- Original RTWQ Site, since 2001
- Urban Steam with urban interference
- Current test site for multiple probes (Hydrolab, S::can, YSI), web cam
- Fish Kill 2004
- Flood in 2008
Leary’s Brook – July 24, 2004
Conductivity, Turbidity, and pH
Leary’s Brook – July 24, 2004
Temperature and Dissolved Oxygen

Leary’s Brook Water Quality - July 24, 2004

- **Temperature (°C)**
- **Dissolved Oxygen (mg/L)**

![Graph showing temperature and dissolved oxygen levels over time]
Leary’s Brook Flood
November 29-30, 2008

Leary Brook At Prince Philip Drive - 02ZM020

Stage resulting in hut flooding

Red line indicates high water mark of flood event

Debris staining wall of hut and equipment on floor

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Voisey’s Bay – Vale Inco, RTWQ

- RTWQ since 2003
  - Able to identify and address water quality issues much more quickly, minimizing the damage to the aquatic ecosystem.
- 5 stations, Hydrolabs and Quanta G
Lower Reid Brook, Voisey’s Bay
September 2004

- Increased turbidity (September 2004)
- Surface runoff from construction,
- Instituted mitigation measures

Turbidity at Lower Reid Brook (Voisey’s Bay) - September 1-23, 2004

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Camp Pond Brook, Voisey’s Bay
September – November 2003

- Increased turbidity (Sept. to Nov. 2003)
- Failure of settling pond pump during mine construction activities
- Instituted mitigation measures

Turbidity at Camp Pond Brook (Voisey’s Bay) - September to November 2003

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Duck Pond Operations-Teck

- RTWQ since 2006
- 2 surface water stations, (Hydrolab)
- 1 ground water Station, (Quanta G)
Tributary to Gills Pond Brook, Duck Pond

Investigated thoroughly on October 16, 2008.

Turbidity higher in middle of deep pool where Datasonde was deployed.

Air entrainment, not a water quality event
Tributary to Gills Pond Brook, Duck Pond

False Positive Turbidity

Turbidity values may be exaggerated due to air entrainment (turbulent flow)

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Tributary to Gills Pond Brook, Duck Pond

pH Increase

- Any abnormalities in data values can be seen in real time by Duck Pond staff.
- Used as a decision making tool to ensure discharge is environmentally compliant.
- Will adjust discharge amounts if necessary
Conclusions

- RTWQ has proven to work as an early warning system
- RTWQ can provide important insight into water quality events as they occur through time and space
- Automated alerts to provide efficient response times to problems before irreversible damage occurs
- Continue to get industry partners involved so they too can benefit and become efficient in their mitigation efforts