

Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

October 12, 2012 to November 23, 2012



Government of Newfoundland & Labrador Department of Environment and Conservation Water Resources Management Division St. John's, NL, A1B 4J6 Canada



General

- Department of Environment and Conservation staff monitors the real-time web pages consistently.
- Two periods of station outage resulted in some data loss for stage level at Leary's Brook. Gaps in water quality data were filled with internally logged data recorded on an hourly interval instead of the regular fifteen minute interval.

Maintenance and Calibration of Instrument

- As part of the Quality Assurance and Quality Control protocol (QAQC), an assessment of the reliability of data recorded by an instrument is made at the beginning and end of the deployment period. The procedure is based on the approach used by the United States Geological Survey.
 - Upon deployment, a QA/QC Sonde is temporarily deployed *in situ*, adjacent to the Field Sonde.
 Depending on the degree of difference between each parameter from the Field and QAQC sondes a qualitative rank is assigned (See Table 1). The possible ranks, from most to least desirable, are: Excellent, Good, Fair, Marginal, and Poor. A grab sample is also taken for additional confirmation of conditions at deployment and to allow for future modelling studies.
 - At the end of a deployment period, a freshly cleaned and calibrated QAQC Sonde is placed *in situ*, adjacent to the Field Sonde. Values are compared between all parameters and differences are ranked for placement in Table 1.

Date	Action	Comparison Ranking				
		Temperature	рН	Conductivity	Dissolved Oxygen	Turbidity
October 12, 2012	Deployment	Excellent	NA	Excellent	Good	NA
November 23, 2012	Removal	Fair	NA	Excellent	Good	Poor

Table 1: Qualitative QAQC Ranking

• A Turbidity sensor problem at deployment and a pH sensor problem at deployment and removal limited the use of data from the QAQC instrument. Rankings were not used in those cases. At removal, turbidity was ranked as "Poor" during removal. It should be noted that both the field sonde and QAQC sonde were reading high values of 121.5 NTU and 96.8 NTU, respectively.

Data Interpretation

Figure 1: Water Temperature at Leary's Brook from October 12, 2012 to November 23, 2012



Water Temperature and Stage Level

Water temperature declined throughout this deployment period as expected and was consistently tied to air temperatures. For instance, notable lows include 4.71°C on November 12th and 3.26°C on November 19th when mean air temperatures were 2°C and 0°C, respectively.

Figure 2: pH at Leary's Brook from October 12, 2012 to November 23, 2012



Water pH and Stage Level

• pH levels decreased marginally over the course of this deployment period but remained within the CCME Guidelines for much of the time. Notable drops in pH were associated with rises in stage level.





Specific Conductivity of Water and Stage Level

In the figure above, it is clear that high stage levels tend to correspond with low specific conductivity as a result of the dilution effect of precipitation and runoff. Over the course of the deployment, conductivity fell, however, this does not appear to be a long-term trend given the slow rise seen from November 17th onwards.





Dissolved Oxygen Concentration and Saturation

Dissolved oxygen increased over time from October 12th to November 23rd as expected with declining air temperatures. All dissolved oxygen values were found to be greater than the upper and lower CCME Guidelines.

Figure 5: Turbidity at Leary's Brook from October 12, 2012 to November 23, 2012



Water Turbidity and Stage Level

• Highly variable turbidity was prevalent during this deployment period. A few instances of precipitationinduced turbidity events are identified in the figure above. However it is not uncommon for Leary's Brook to suddenly turn opaque due to upstream work or other activity –despite a lack of rain.

Conclusions

• Two station outages from October 19th to November 1st and November 5th to November 12th left large gaps in the stage level data. Gaps in water quality data were filled with the internal log file recorded independently of the station's datalogger.

Appendix



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