

Real-Time Water Quality Deployment Report NF02ZM0178 – Leary's Brook November 20th, 2009 to January 8th, 2010

General

- Data from Leary's Brook monitoring station is monitored by the Water Resources Management Division staff consistently.
- This monthly deployment report interprets the data from the Leary Brook real-time water quality station for the period of November 20, 2009 to January 8, 2010 a period of 47 days.
- Leary Brook station operational status was nominal over the deployment period; no communications dropouts or malfunctions were detected. Two major communication issues arose during the deployment period: one from December 24th to December 28th, and another from December 31st to January 2nd.
- Hydrolab Datasonde 5X s/n 44975 was in place for this time period.

Maintenance and Calibration of Instrument

• As part of the removal and deployment QAQC process, a reading is taken from the field sonde and a newly calibrated QAQC sonde upon arrival at the site. The field sonde is taken from the river and cleaned to remove biofouling debris. After cleaning, the sonde is placed in the original position and another reading taken The difference between the before and after cleaning readings allows for the computation of biofouling drift. Similarly, calibration drift is computed in the lab by examining the readings from known standards prior to calibration of the instrument. The sum of these errors is ranked and given below.

Station	Date	Action	Instrument Comparison Ranking				
Leary's Brook at Prince Philip Drive			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
	January 8 th , 2010	Removal	Excellent	Fair	Poor	Excellent	Good

Data Interpretation

• Flow at Leary's Brook during the deployment interval ranged from a low of 0.305 m³/s to a high of 11.7 m³/s. These fluctuations are primarily the result of precipitation (in the form of rain and snow) and fluctuations in temperature causing snowmelt and runoff. On Janurary 4th and 5th, rainfall and warm temperatures caused a major snowmelt increasing flow at Leary's Brook by 14.6 times in about 15 hours.





Temperature fluctuated from 9.08°C to -0.35°C (heavy, turbulent flow will allow fresh water to become super-cooled) during the deployment interval as highly variable weather conditions passed through the area. During periods of warm weather and rain, water temperatures would rise while dropping rapidly during cold weather and snow fall (such as on December 7th).

Figure 2: Temperature at Leary's Brook from November 20th, 2009 to January 8th, 2010.



Corrected Vs Uncorected Temperature

Because of a combination of biofouling and sensor drift, pH underwent a correction during the deployment interval as indicated by the pink line in Figure 3. The corrected pH ranged from 7.36 to 6.11, staying within the CCME guideline for the Protection of Aquatic Life until dropping below 6.5 after December 23rd.

Figure 3: pH at Leary's Brook from November 20th, 2009 to January 8th, 2010.



Corrected vs. Uncorrected pH

Specific conductivity at Leary's Brook is highly variable in the winter due to the application of road salt for ice control in the watershed. During ice control, conductivity rises sharply as seen in Figure 4 on December 13th, for example, where conductivity rises from 770 µS/cm to 5020 µS/cm.





Conductivity Vs. Uncorrected Conductivity

 Dissolved Oxygen remained well above the CCME Guideline for the protection of Cold Water Species for the deployment period, ranging from 10.73 mg/l to 13.85 mg/l. Percent saturation ranged from 92.6 to 99.7% indicating that no concern regarding DO is warranted.





Dissolved Oxygen (mg/l and %Sat)

Turbidity at Leary's Brook ranged from 0.0 to 648.8 NTU. Large spikes in turbidity are generally related to
warm air temperatures and precipitation in the winter. Often, high total precipitation falling as snow in cold
temperatures does not impact stream turbidity as little runoff is seen. During periods of rain, however,
runoff and snow melt combines to increase streamflow significantly, stirring up sediment and increasing
turbidity.

Figure 6: Turbidity at Leary's Brook from November 20th, 2009 to January 8th, 2010.



Turbidity Vs. Uncorrected Turbidity

Ryan Pugh Regional Water Quality Officer Department of Environment and Conservation Water Resources Management Division Phone: 709.729.1681 Fax: 709.729.3020

Appendix



Figure 7: Total Precipitation and Mean Daily Temperature as measured by the St John's Airport Weather Station