Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

October 2 to October 30, 2013

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.

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.
- 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.

Table 1: Qualitative QAQC Ranking

Station	Date	Action	Comparison Ranking				
			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
Leary's Brook at Prince Philip Drive	October 2, 2013	Deployment	Excellent	Good	Excellent	Excellent	Excellent
	October 30, 2013	Removal	Fair	Good	Excellent	Good	Poor

- pH ranked "Good" throughout the deployment period.
- The turbidity for field sonde is questionable at the time of removal likely due to bio-fouling of sensor at the end of deployment period.
- The maximum, minimum, median and mean for Temperature, pH, Specific Conductivity, Dissolved Oxygen and Turbidity is shown below in table 2.

Table 2: Parameter Statistics during deployment period

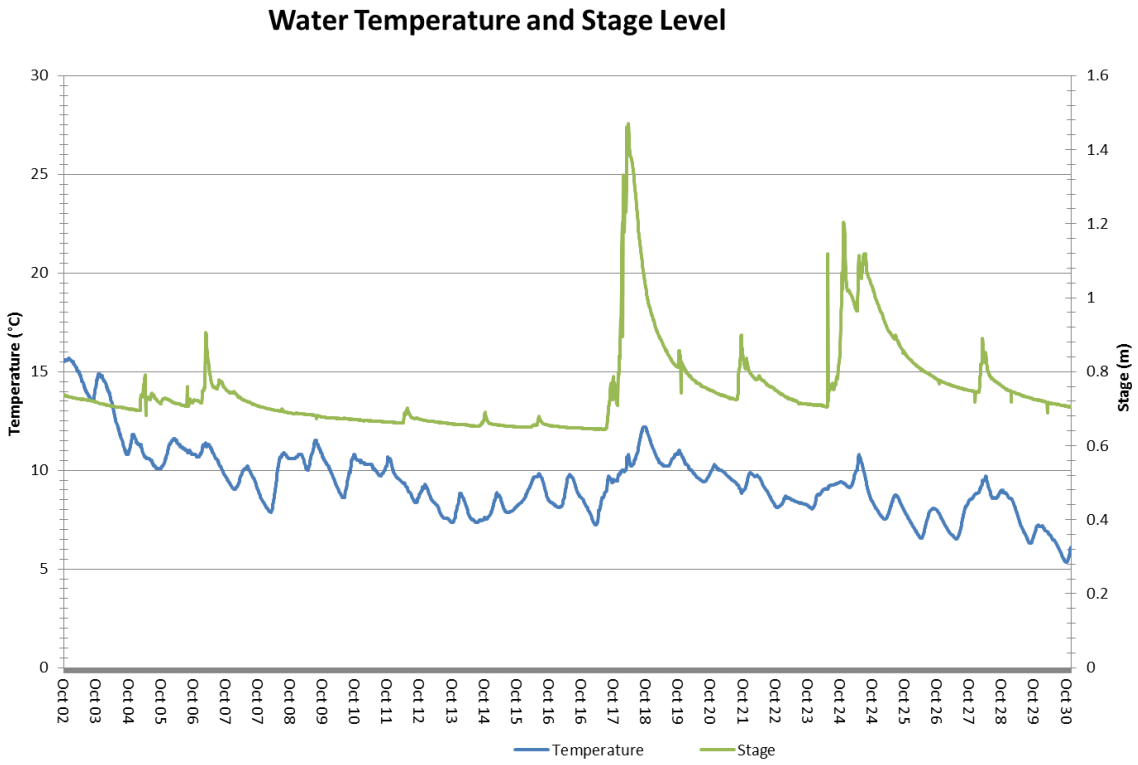
Parameter	Max	Min	Median	Mean
Temperature('C)	15.70	5.33	9.27	9.42
pH	7.08	6.41	6.72	6.73
Specific Conductivity (µS/cm)	460.0	80.8	328.0	330.9
TDS (g/ml)	0.2950	0.0517	0.2100	0.2117
Dissolved Oxygen (%-Sat)	99.1	85.6	96.2	96.0
Dissolved Oxygen (mg/l)	12.36	9.43	10.98	10.99
Turbidity (NTU)	73.6	0.0	0.0	3.7

- A grab sample was also taken for additional confirmation of conditions at deployment and to allow for future modelling studies. The results of the grab sample ranking compared to field sonde data is shown in table 3.

Table 3: Comparison Grab Sample Ranking with Field Sonde Data at Deployment

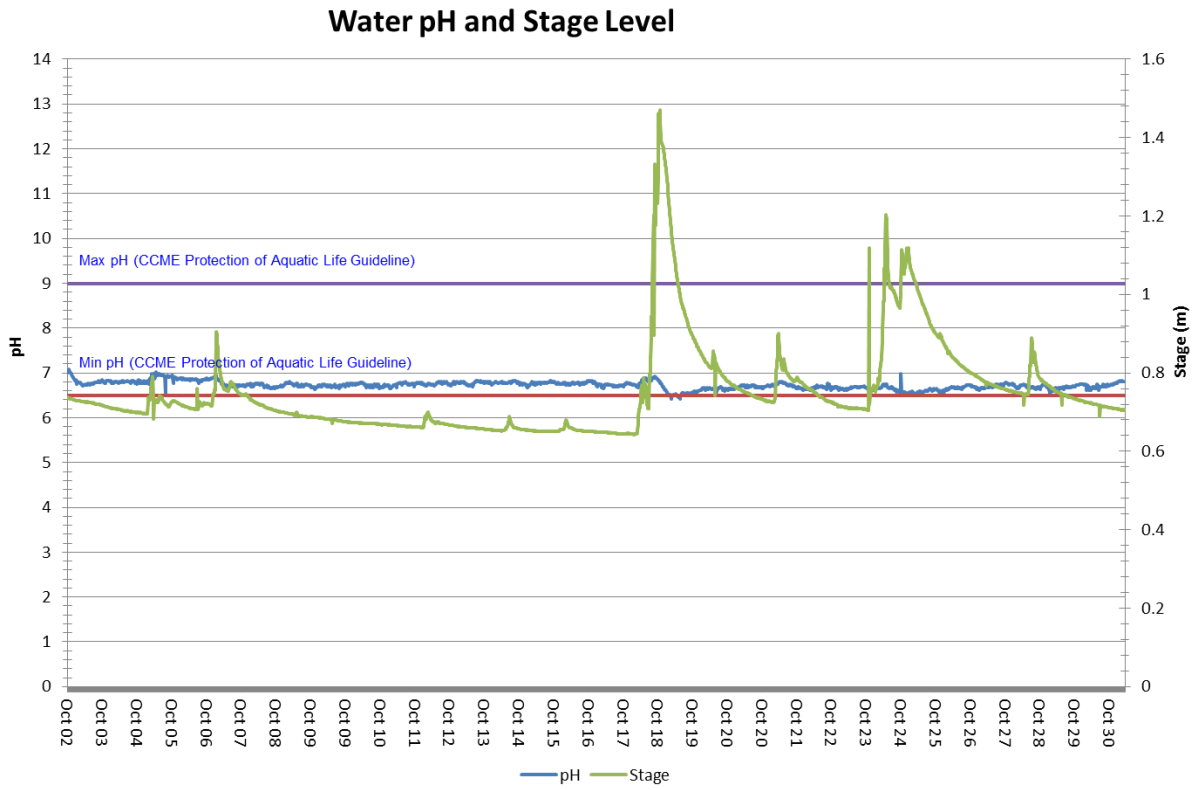
Grab Sample Date	pH	Conductivity	Turbidity
Field	6.98	349.9	0.7
Grab	6.54	358	1.4
Ranking	Good	Excellent	Excellent

Data Interpretation

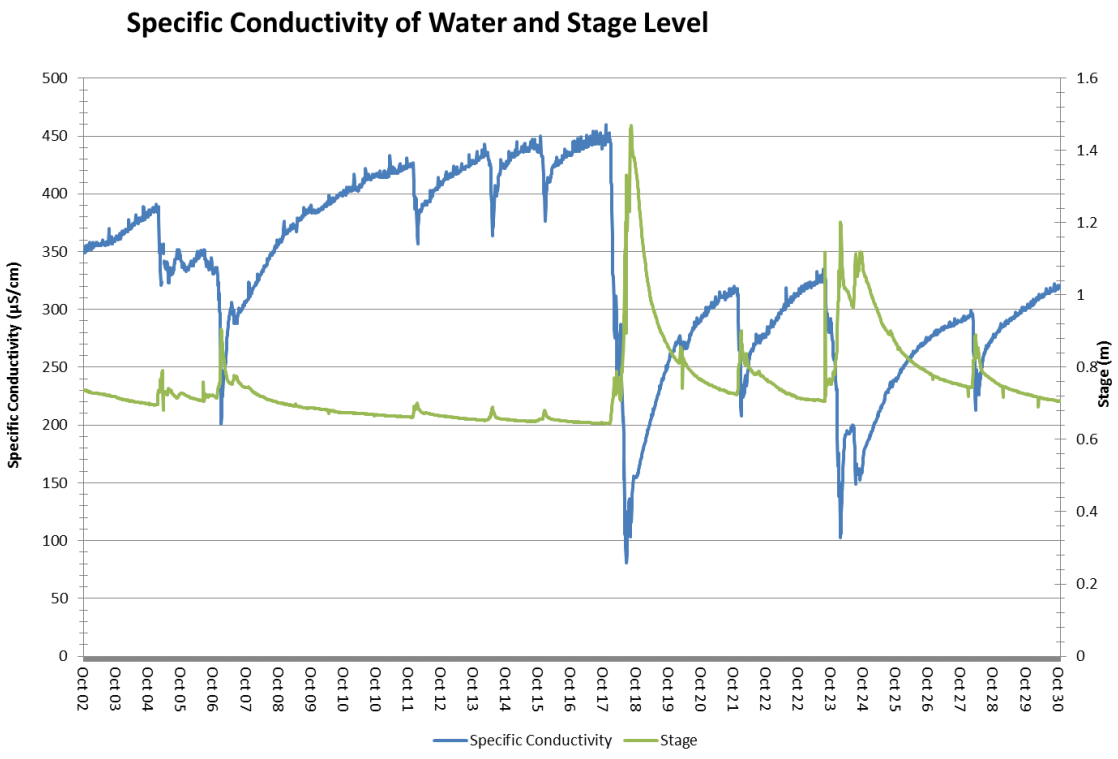


- Overall, the temperature decreased noticeably at Leary's Brook from the beginning of October to the end of October.

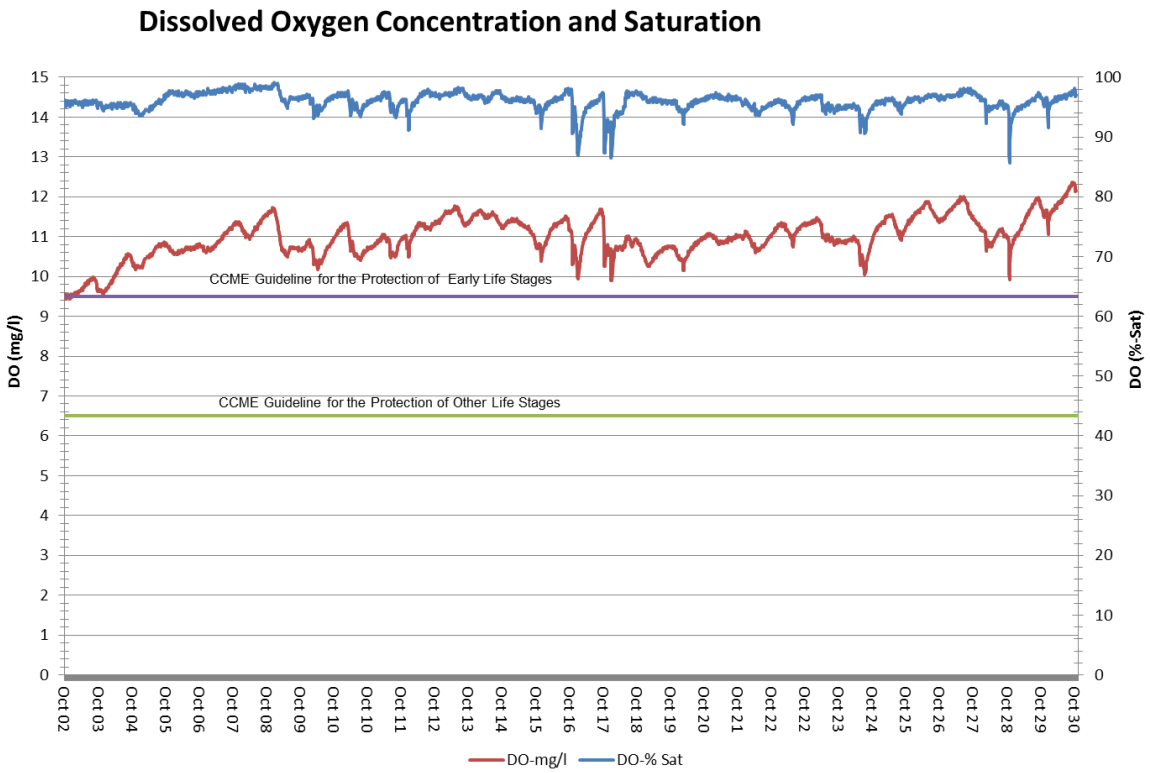
- Water temperature cycles diurnally and ranges from a low of 5.33^{o}C to a high of 15.7^{o}C (median value: 9.27^{o}C).



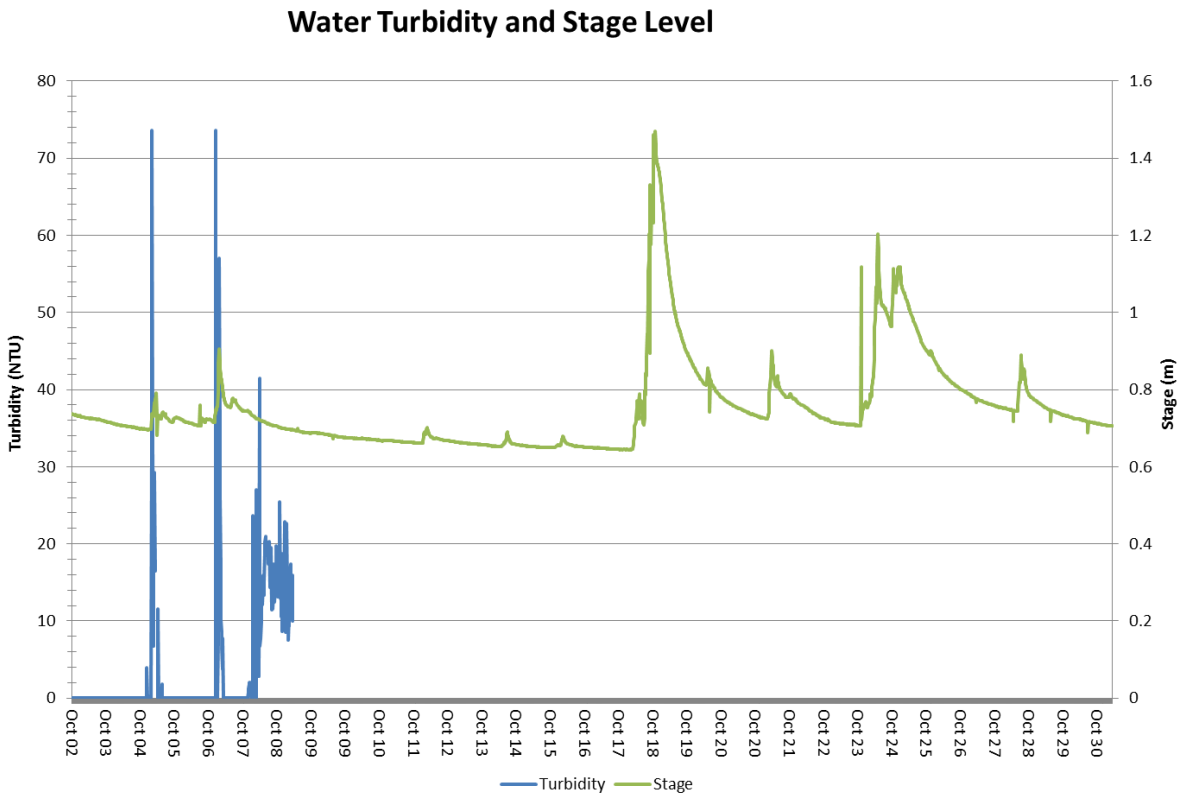
- Generally speaking, NL waters are slightly acidic which is reflected in the pH values lying closer to the lower CCME Protection of Aquatic Life guideline value of 6.5
- The pH readings are just above the lower CCME guideline for most part of the deployment. There was a brief drop in pH values on October 18-19, marked by a corresponding increase in stage level.
- pH ranged from 6.41 to 7.08 (Median: 6.72).



- There were mid ranged spikes in specific conductance. The increases in conductivity were related to decreased stage level and vice versa.
- The increase in specific conductivity could be attributed to an increase in the concentration of dissolved solids in the water, resulting from a decrease in stage that occurred over that time period.
- The spikes ranged from 80.8 - 460 µs/cm throughout the deployment period (the median is 328 µs/cm).



- DO values were above the CCME Guideline for the Protection of Early Life Stages (9.5 mg/L) for most part of the deployment period. The solubility of oxygen is greater in colder water than in warmer water, thus as water temperatures increase DO levels decrease, and vice versa. This can be noted by a decreased temperature during the same period.
- Concentrations ranged from 9.43 mg/l to 12.36 mg/l (median value: 10.98 mg/l) for DO while 85.6% to 99.1% (median value 96.2%) for percent saturation.



- The turbidity spikes are related to a combination of increased stage level and precipitation.
- A series of increased turbidity due to calibration / bio-fouling drift can be observed from October 8th to the end of the deployment period *resulting in questionable turbidity values*. This can occur due to accumulation of debris along with aquatic growth surrounding the sensor areas.
- Turbidity ranged between 0.0 NTU and 73.6 NTU (median value: 0 NTU) during this deployment period.

Conclusions

- The pH values remained mostly above the lower pH CCME aquatic guideline throughout the deployment period.

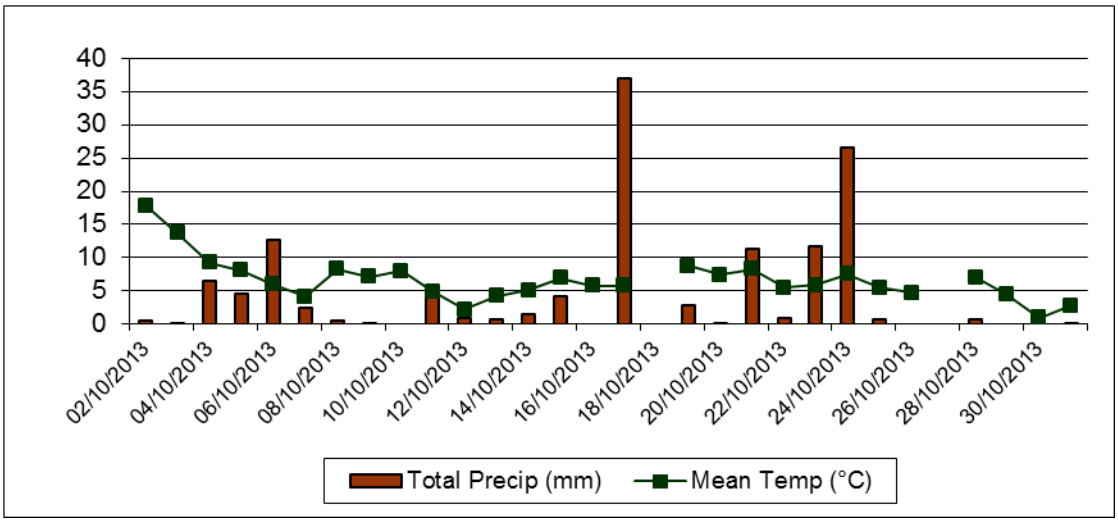
- The specific conductance was consistent in the mid-range throughout the deployment period.

- DO values were above the CCME Guideline for the Protection of Early Life Stages (9.5 mg/L) for most part of the deployment period marked by a corresponding drop in temperature.

- The turbidity values were questionable from October 8th to the end of the deployment period due to increased calibration drifts and bio-fouling due to aquatic growth surrounding the turbidity sensor.

Appendix

The graph below shows the mean daily temperature and total precipitation taken from Environment Canada for St. John's (Airport Station).



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