Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

April 24 to May 30, 2013

Newfoundland Labrador

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	April 24,2013	Deployment	Excellent	Excellent	Excellent	Excellent	Excellent
	May 30, 2013	Removal	Excellent	Good	Poor	Fair	Poor

- All parameters ranked "Excellent" during deployment.
- 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 Conductivity ranked poor at the time of removal likely due to calibration / bio-fouling of the 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

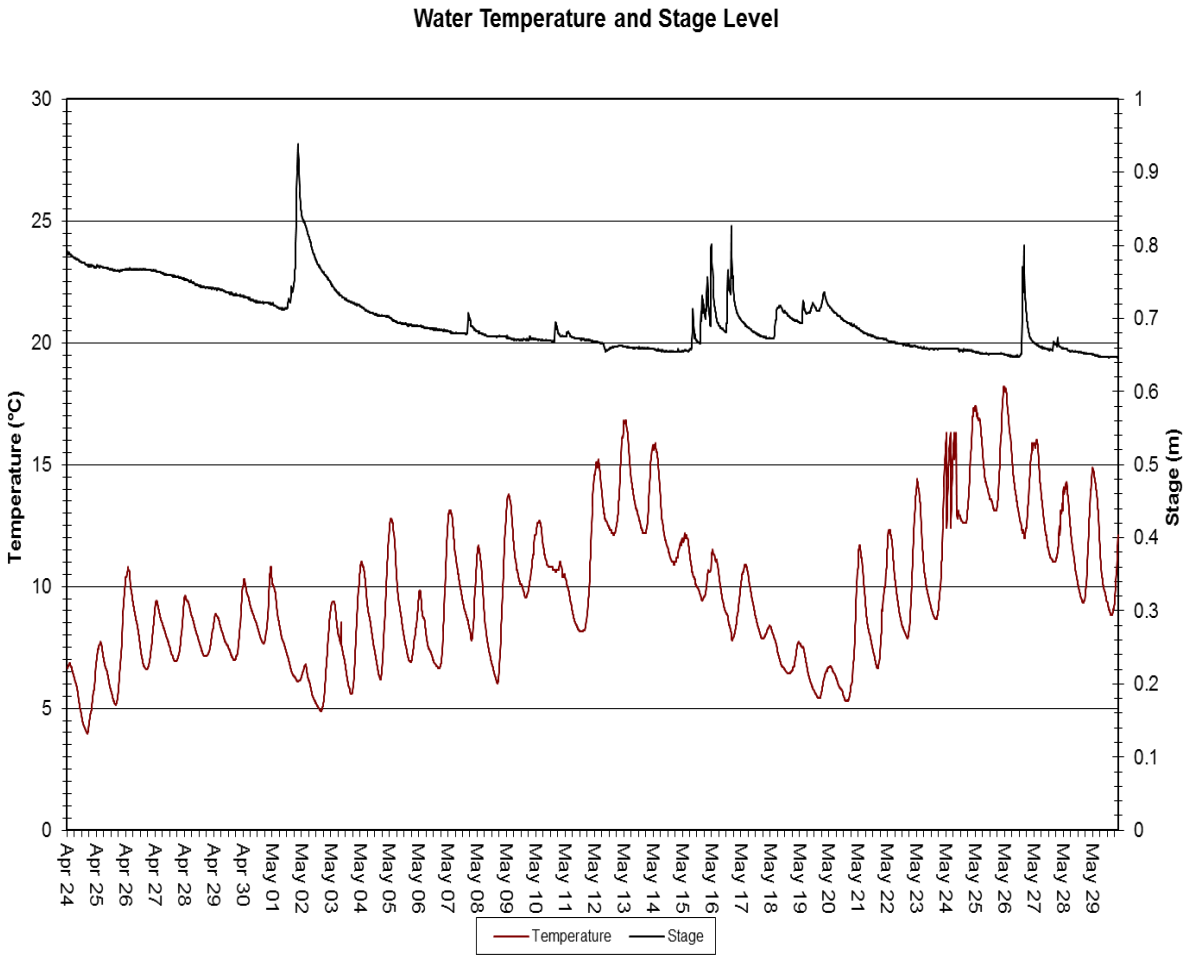
Parameter	Max	Min	Median	Mean
Temperature('C)	18.20	3.97	9.29	9.72
pH	7.10	5.55	6.85	6.86
Spec. Conductivity (µS/cm)	595.0	294.0	438.0	438.3
TDS (g/ml)	0.3810	0.1880	0.2810	0.2805
Dissolved Oxygen (%-Sat)	95.9	81.0	92.0	91.8
Dissolved Oxygen (mg/l)	12.37	8.19	10.53	10.45
Turbidity (NTU)	2052.9	0.0	68.1	194.4
Stage (m)	0.94	0.65	0.68	0.70
Flow (m)	1.50	0.27	0.37	0.42

- 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 in compared to field sonde data is shown in table 3.

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

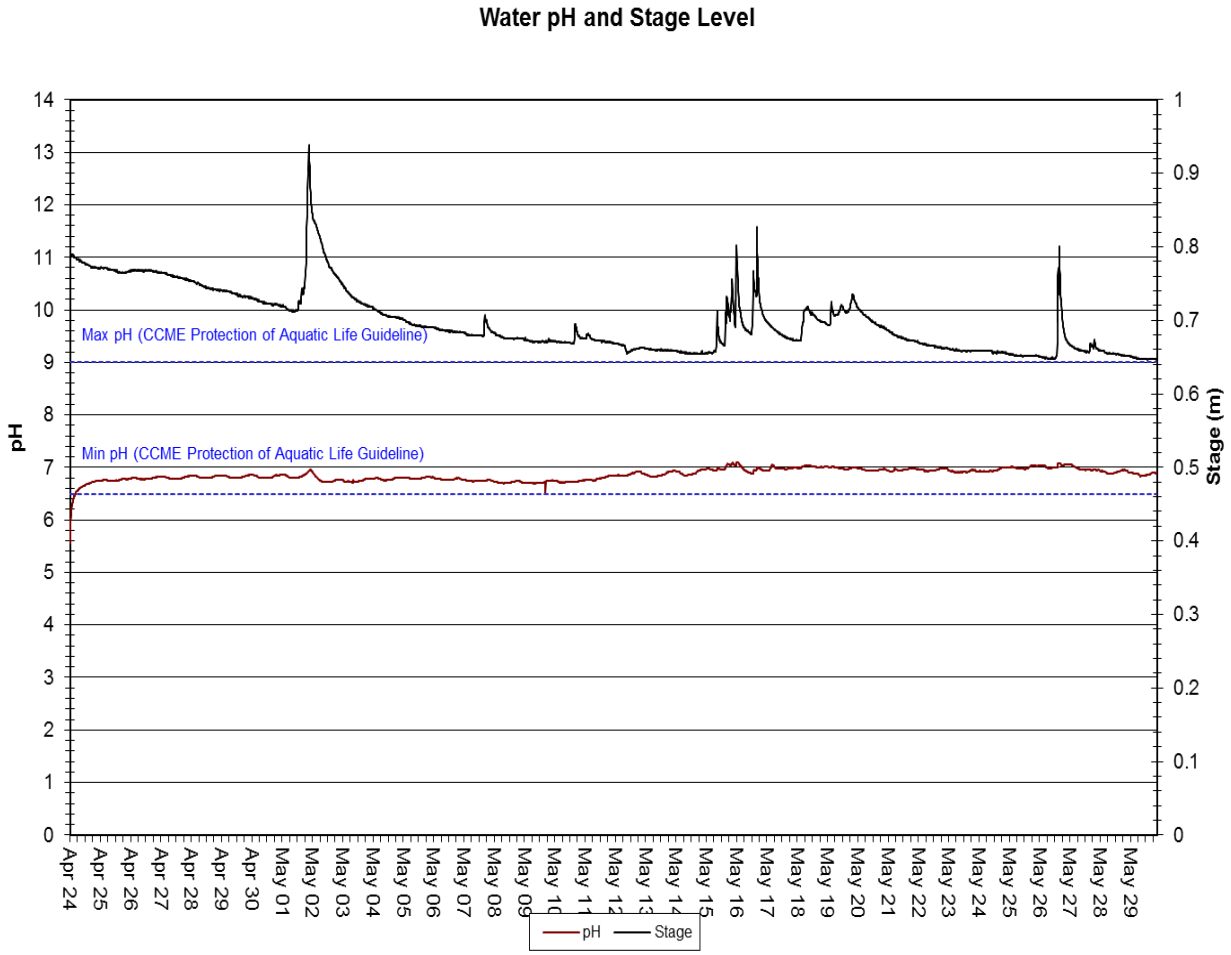
Sonde	pH	Conductivity	Turbidity
Field	5.36	327.4	1.5
Grab	6.18	428	0.8
Ranking	Marginal	Poor	Excellent

Data Interpretation

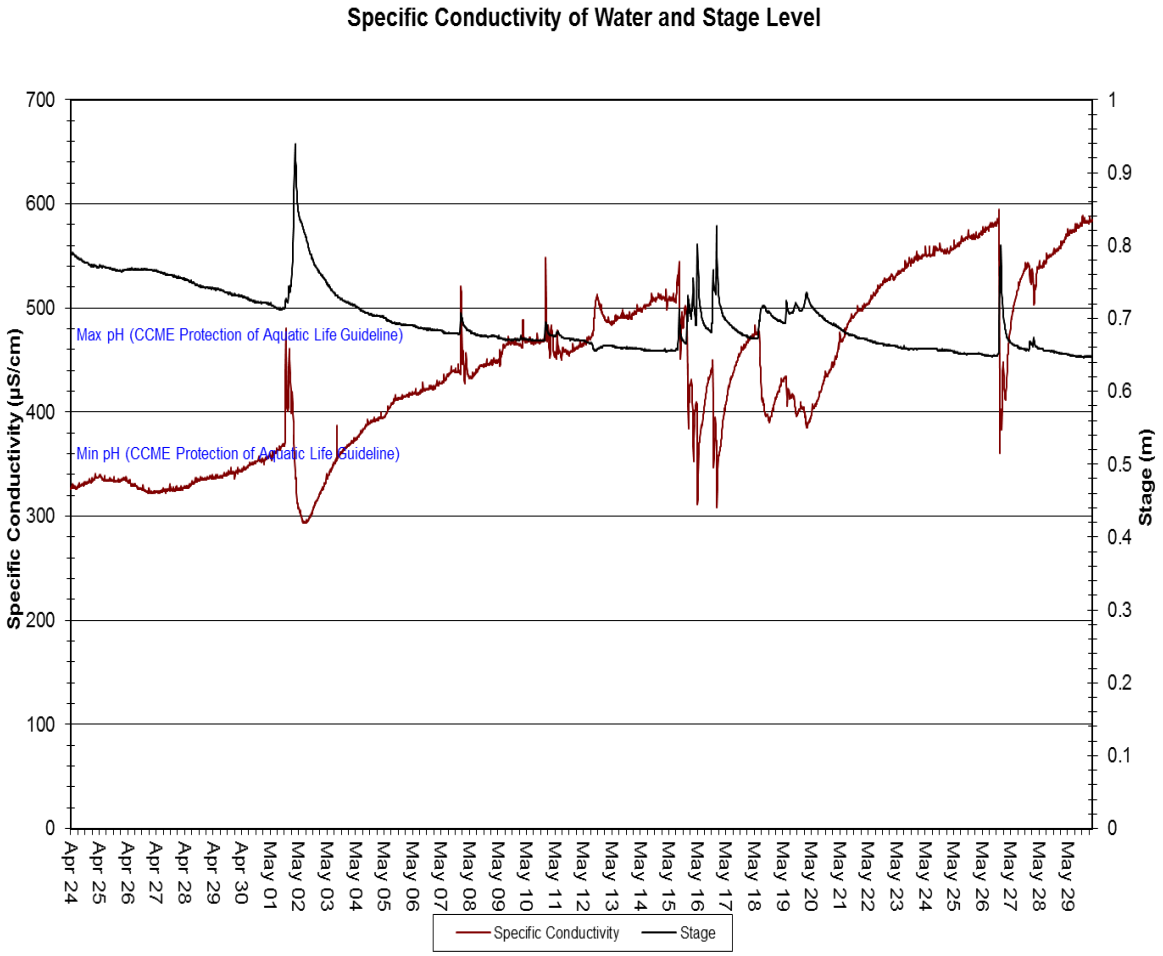


- Overall, an expected increase in water temperature was observed at Leary's Brook from late April to end of May.

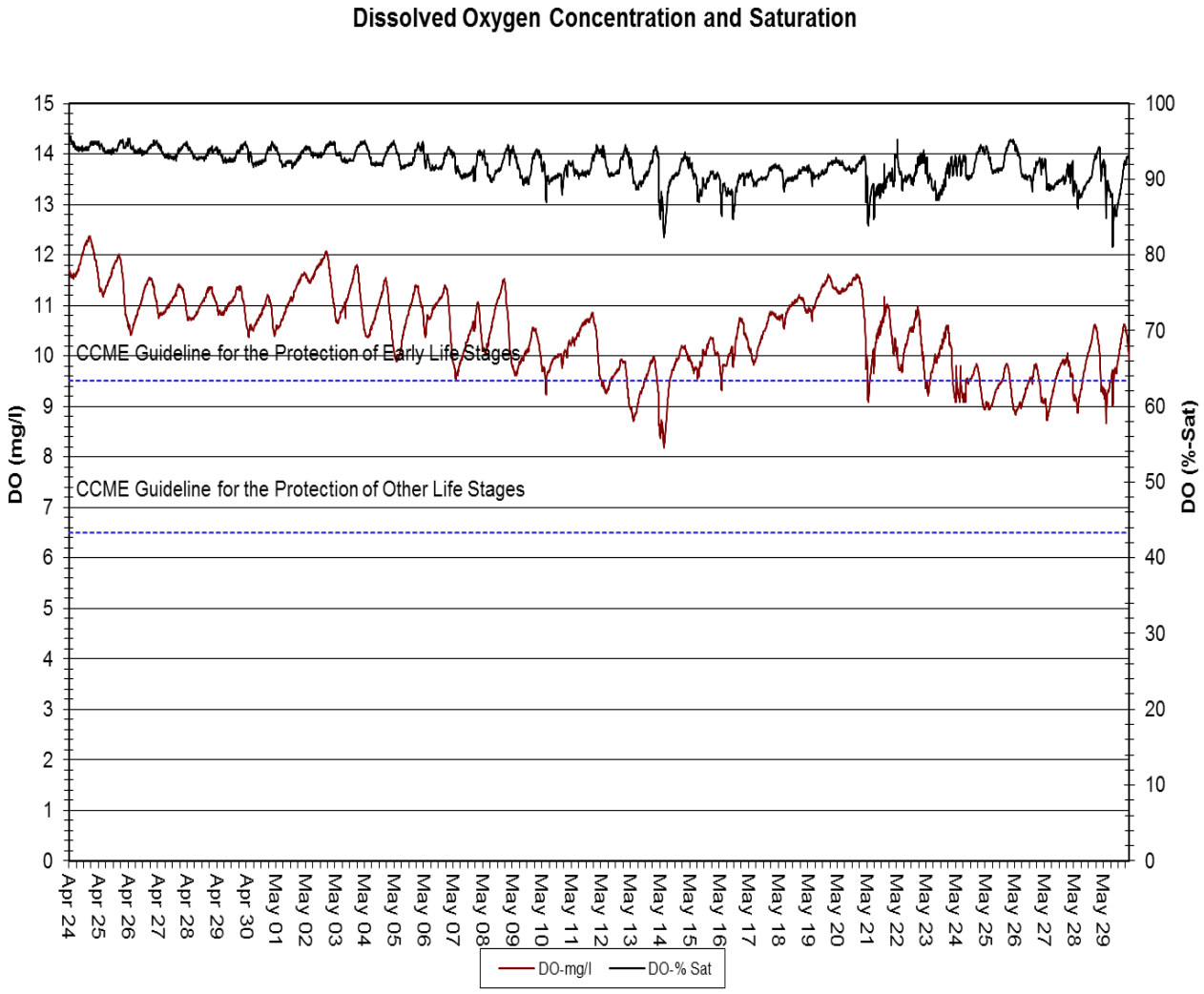
- Water temperature cycles diurnally and range from a low of 3.97 ^{o}C to 18.2 ^{o}C (median value: 9.29 ^{o}C).



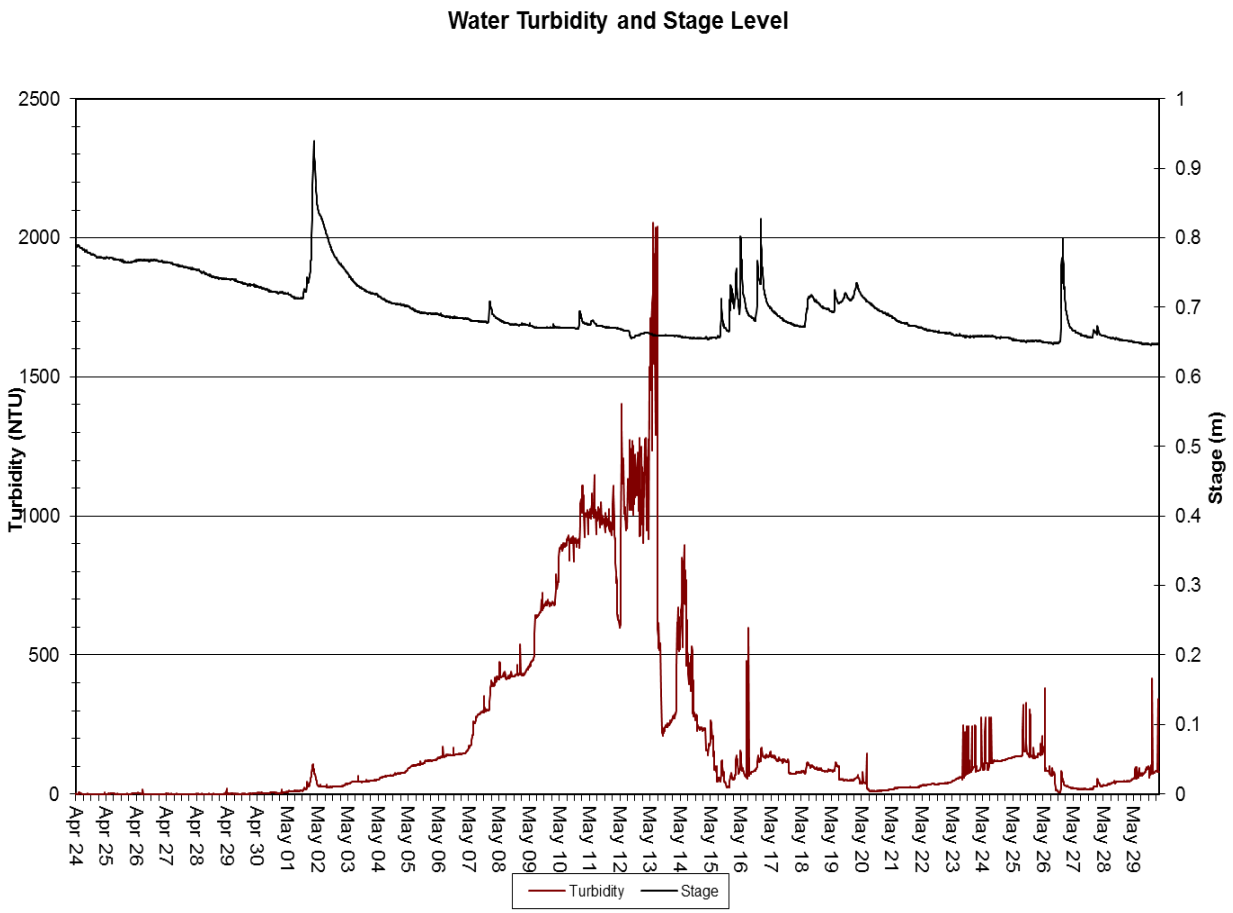
- Generally speaking, NL waters are slightly acidic which is reflected in the pH values lying closer to the lower CCME Protection of Aquatic Life guideline value of 6.5
- After an initial adjustment of pH in the sonde reading, the pH reading was rising slowly in the first half of the deployment period and then remained constant in the remainder of the period. The corresponding stage level decreased until the deployment period.
- pH ranged from 5.55 to 7.1 (Median: 6.85).



- There were mid ranged spikes in specific conductance most of which are related to decreased stage level while others related to increased precipitation at the same time period.
- 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 294 - 595 µs/cm throughout the deployment period (the median is 438 µs/cm).



- DO values dropped below the CCME Guideline for the Protection of Early Life Stage (9.5 mg/L) during the period of May 12-14 and May 24-29. 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 an increased temperature during the same period.
- Concentrations ranged from 8.19 mg/l to 12.37 mg/l (median value: 10.53 mg/L) for DO while 81% to 95.9% (median value 92%) for percent saturation.



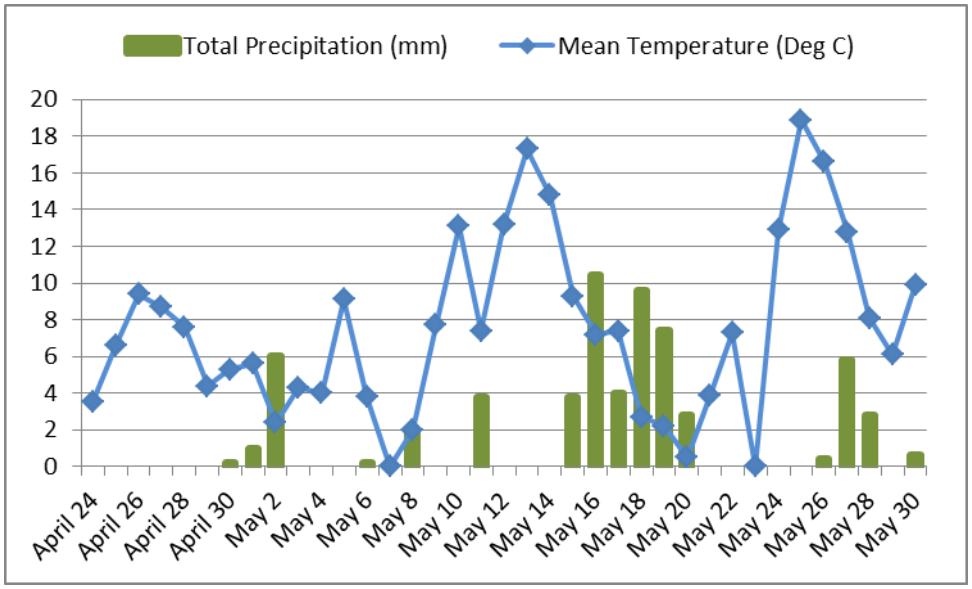
- The turbidity spikes are related to a combination of increased stage level and accumulation of debris along with aquatic growth surrounding the sensor areas.
- An increase in turbidity due to calibration / bio-fouling drift can be observed from May 3 - 13.
- Turbidity ranged between 0.0 NTU and 2052 NTU (median value: 68.1 NTU) during this deployment period.

Conclusions

- The pH values increased slightly throughout the deployment period and was above the lower guideline of 6.5
- The specific conductance was in the mid range throughout the deployment period.
- The DO values dropped below the CCME Guideline for the Protection of Early Life Stage during the period of May 12-14 and May 24-29 due to rise in temperature.
- The turbidity values were questionable during May 3 - 13 deployment period due to increased calibration / bio-fouling drift in turbidity sensor.

Appendix

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



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