Real-Time Water Quality Deployment Report

Paddy's Pond

October 2, 2015 to November 20, 2015

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

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2015-10-02 to 2015-11-20

General

- Department of Environment and Conservation staff monitors the real-time web pages consistently.
- A station battery failure resulted in a data loss from November 3rd to 20th.

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.

Table 1: Qualitative QAQC Ranking

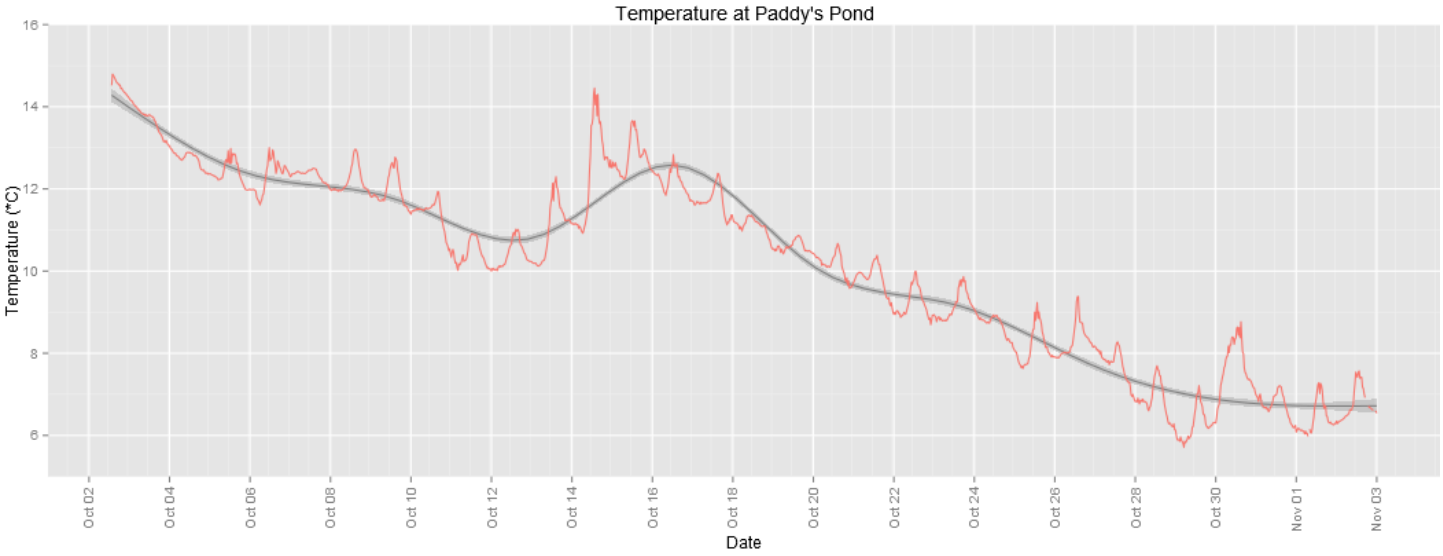
Station	Date	Action	Comparison Ranking				
			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
Paddy's Pond	October 2, 2015	Deployment	Fair	Excellent	Poor	Excellent	Excellent
	November 20, 2015	Removal	NA	NA	NA	NA	NA

- Note: A cable fault meant the QAQC instrument could only be connected via Bluetooth, reducing the depth at which measurements could be made. QAQC readings at Deployment were made at a relatively shallow depth, resulting in a data mismatch. A battery failure resulted in an inability to connect to the field sonde.

Data Interpretation

Temperature

Water Temperature is a major factor used to describe water quality. Temperature has major implications on both the ecology and chemistry of a water body, governing processes such as the metabolic rate of aquatic plants and animals and the degree of dissolved oxygen saturation.

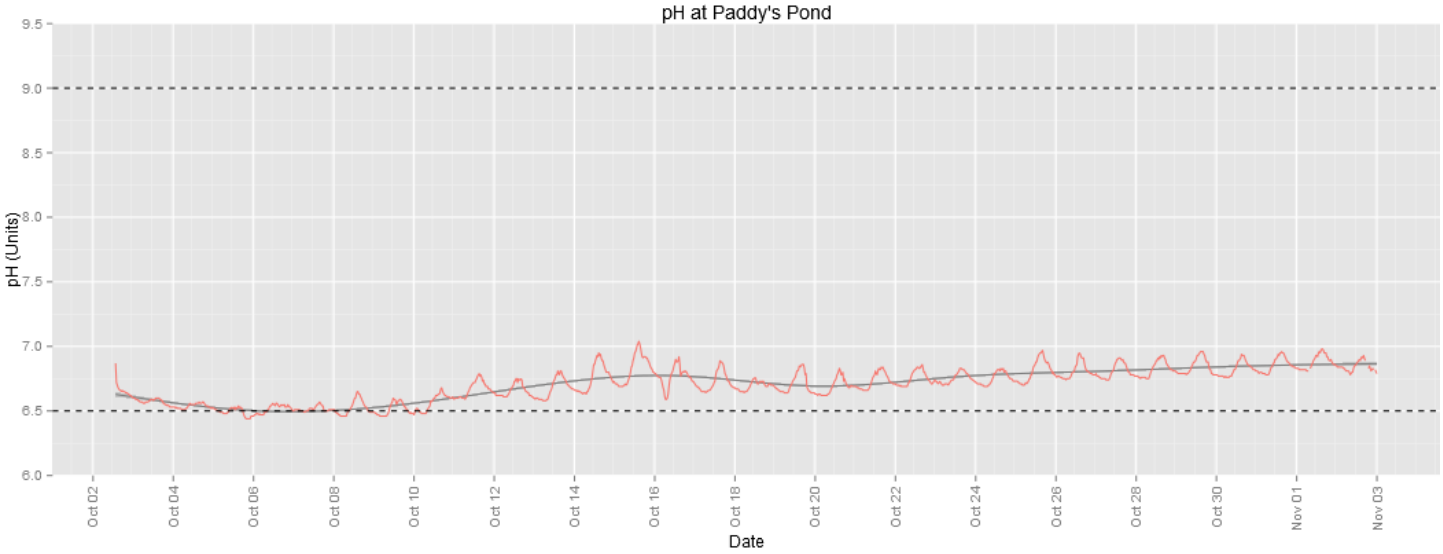


Mean	Median	Min	Max
10.183	10.482	5.712	14.796

- Water temperature declined throughout the deployment with a warming period observed from October 13th to October 15th.

pH

pH is used to give an indication of the acidity or basicity of a solution. A pH of 7 denotes a neutral solution while lower values are acidic and higher values are basic. Technically, the pH of a solution indicates the availability of protons to react with molecules dissolved in water. Such reactions can affect how molecules function chemically and metabolically.

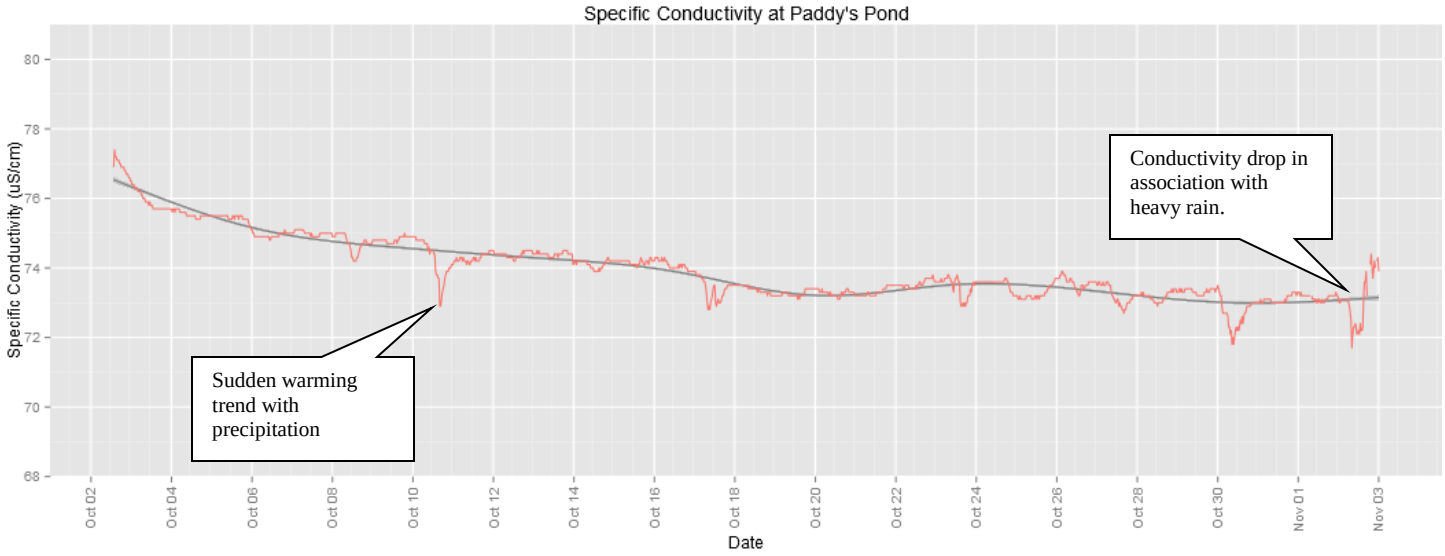


Mean	Median	Min	Max
6.71	6.71	6.44	7.04

- A slight upward trend is observed over the deployment period. Most values fell within the CCME Guidelines for the protection of cold water organisms (dashed lines).

Specific Conductivity

Conductivity relates to the ease of passing an electric charge – or resistance – through a solution. Conductivity is highly influenced by the concentration of dissolved ions in solution: distilled water has zero conductivity (infinite resistance) while salty solutions have high conductivity (low resistance). Specific Conductivity is corrected to 25°C to allow comparison across variable temperatures.

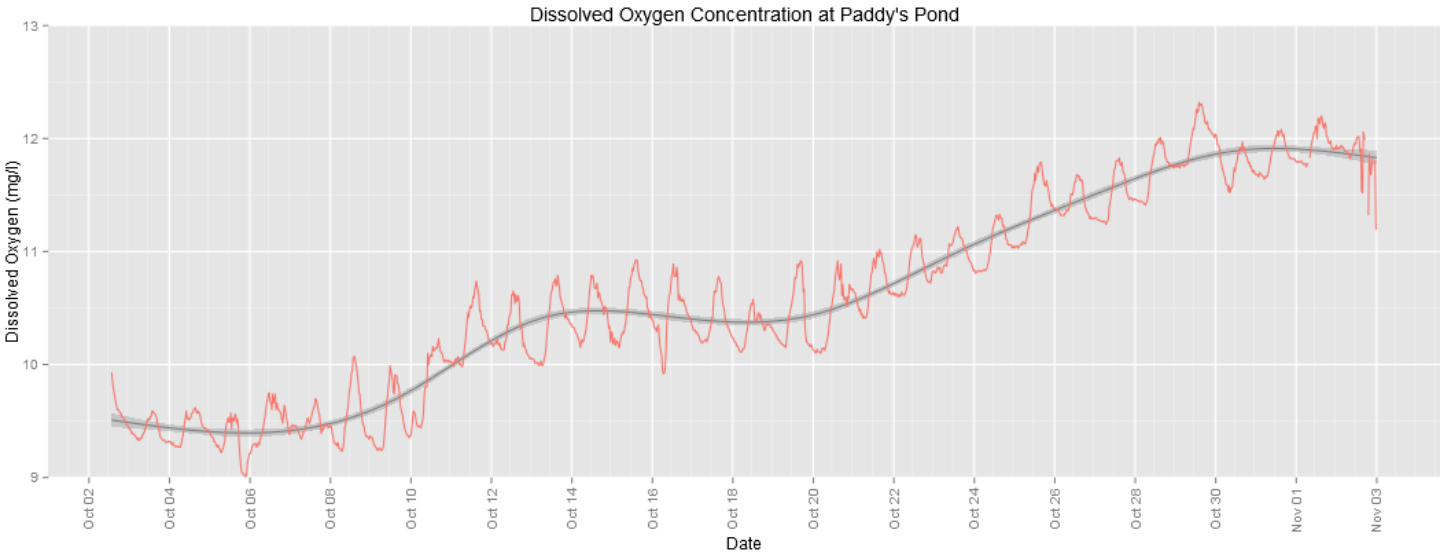


Mean	Median	Min	Max
74.0	73.6	71.7	77.4

- Specific conductivity fell throughout the deployment period. Occasional perturbations were observed in conjunction with weather events.

Dissolved Oxygen

Dissolved oxygen is a metabolic requirement of aquatic plants and animals. The concentration of oxygen in water depends on many factors, especially temperature – the saturation of oxygen in water is inversely proportional to water temperature. Oxygen concentrations also tend to be higher in flowing water compared to still, lake environments. Low oxygen concentrations can give an indication of excessive decomposition of organic matter or the presence of oxidizing materials.

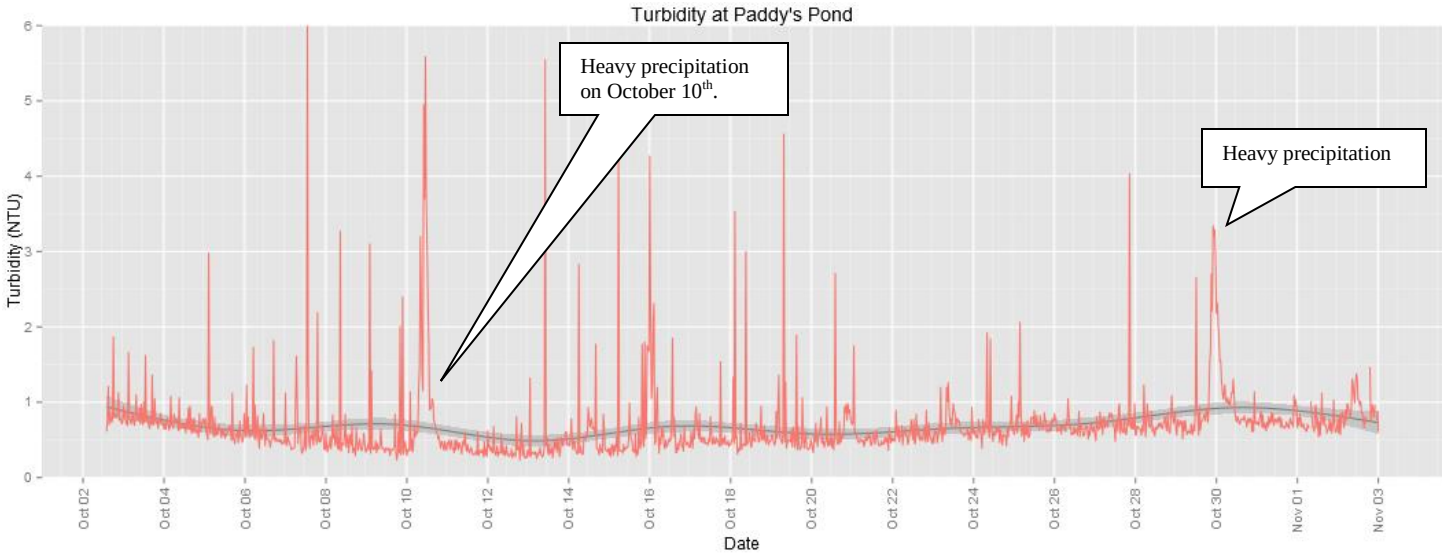


Mean	Median	Min	Max
10.60	10.54	9.01	12.32

- As water temperature fell, dissolved oxygen levels increased. Dissolved oxygen concentrations were above the CCME guidelines of 9.5 mg/l for the majority of the deployment period.

Turbidity

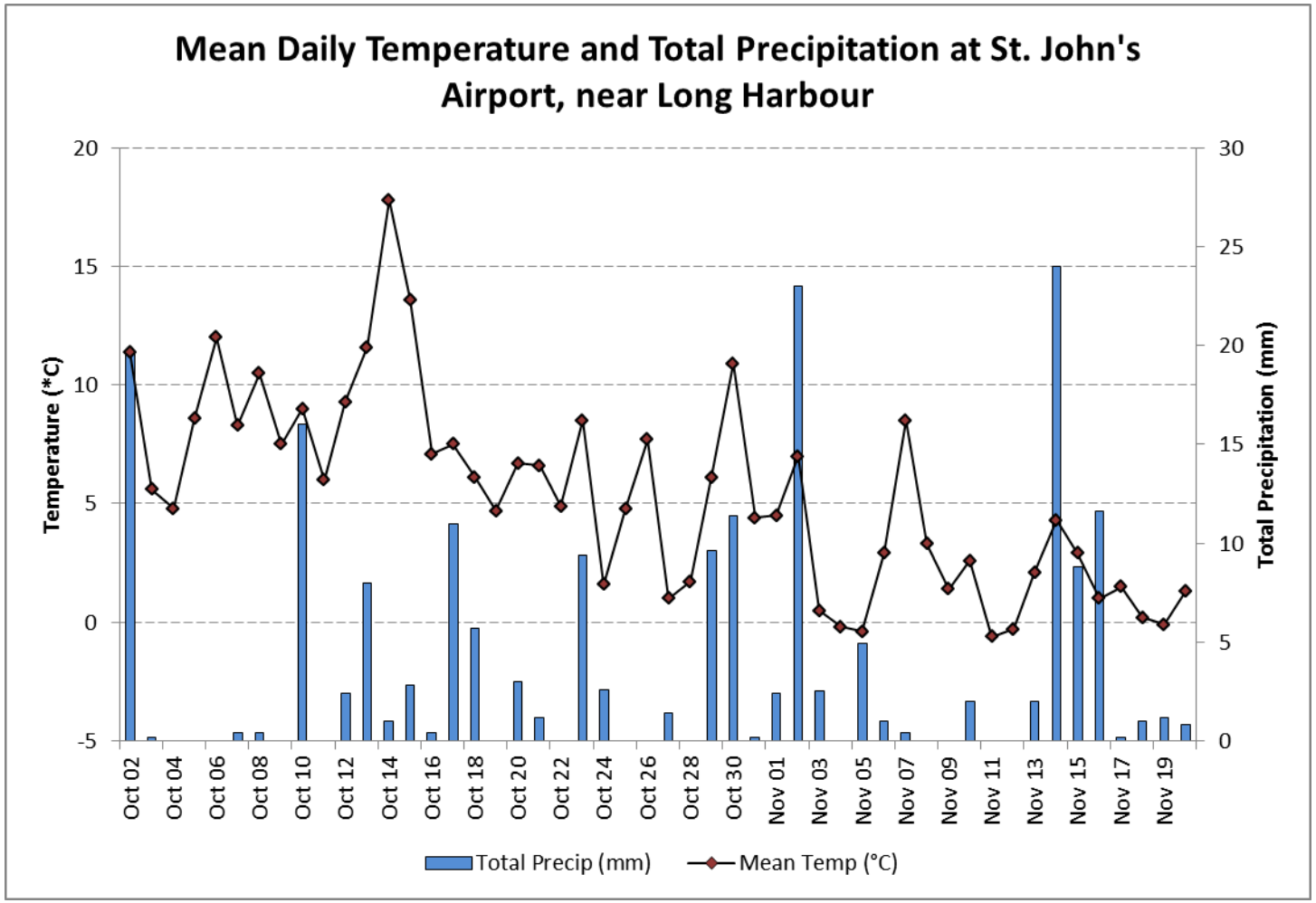
Turbidity is typically caused by fine suspended solids such as silt, clay, or organic material. Consistently high levels of turbidity tend to block sunlight penetration into a waterbody, discouraging plant growth. High turbidity can also damage the delicate respiratory organs of aquatic animals and cover spawning areas.



Mean	Median	Min	Max
0.69	0.60	0.23	6.03

- Turbidity levels were low throughout the deployment period. Occasional peaks were observed and were likely related to wave action and/or stormy weather.

Appendix



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