Real-Time Water Quality Deployment Report

Paddy's Pond

June 6, 2014 to July 24, 2014

Newfoundland Labrador

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

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2014-06-06 to 2014-07-24

General

- Department of Environment and Conservation staff monitors the real-time web pages consistently.
- Paddy's Pond Real-Time station is used as a test site for new equipment and deployment methods. There may be occasions where common parameters are not available or are absent for portions of deployment periods.
- Paddy's Pond is a Research and Development test site used to trial atypical instrumentation and deployment techniques. During this period, the field sonde deployed was a YSI 6600 multi-parameter sonde.
- Dissolved oxygen and turbidity probes were non-functional during this deployment period due to failure.

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

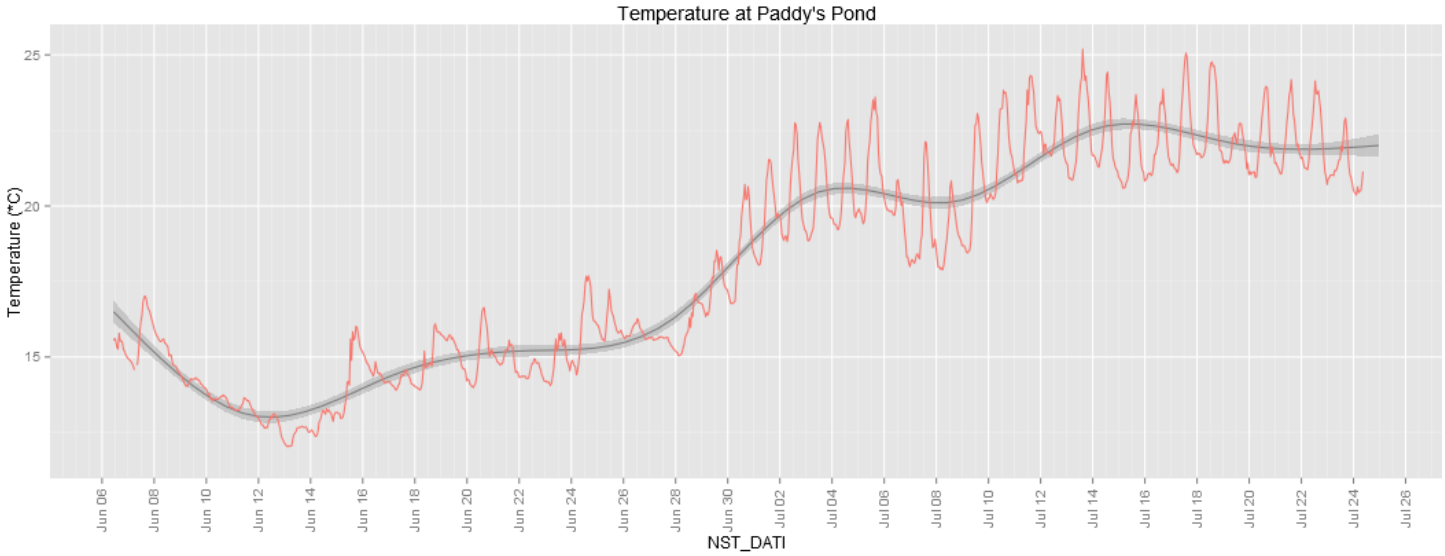
Station	Date	Action	Comparison Ranking				
			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
Paddy's Pond	June 6, 2014	Deployment	Excellent	Fair	Excellent	NA	NA
	July 24, 2014	Removal	Fair	Excellent	Excellent	NA	NA

- Dissolved Oxygen and Turbidity sensor data was not available from the Field Sonde during this interval.

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.

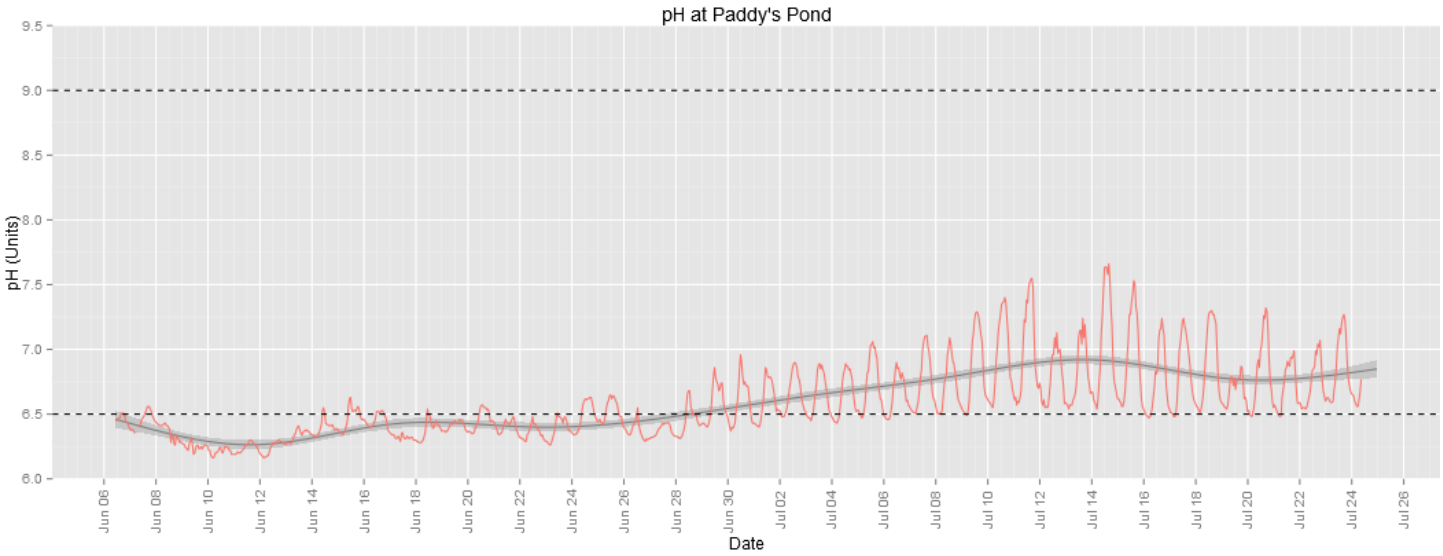


Mean	Median	Min	Max
18.11	18.11	12.03	25.19

- Water temperature displays typical seasonal variation for early June into July. Temperatures running into late July may be annual extremes as a slight downward trend seems apparent.

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.

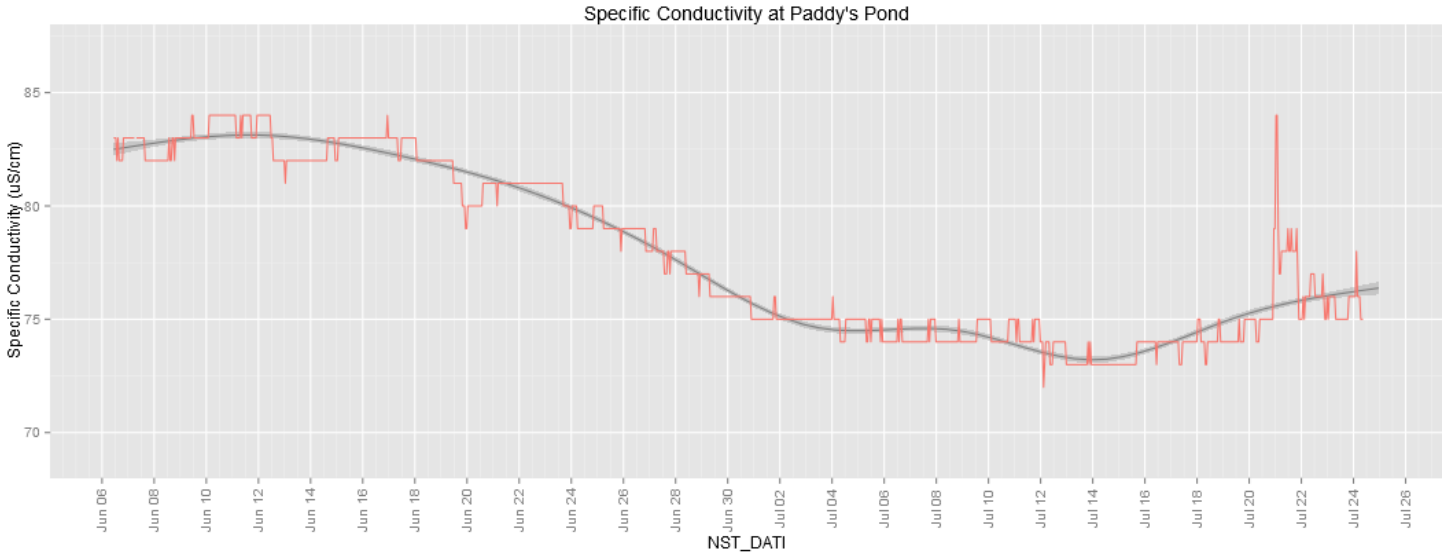


Mean	Median	Min	Max
6.59	6.52	6.16	7.66

- CCME Guidelines for the protection of aquatic life are indicated by dashed lines at 6.5 and 9.0 pH units. Most values fall within those guidelines; however waters in Newfoundland and Labrador tend to be more acidic than the nationally-derived guidelines.
- A trend towards alkaline conditions is apparent throughout the deployment period including large diurnal cycling in pH values. Such cycling may be the result of cellular respiration where, during the day, carbon dioxide consumption by aquatic vegetation outweighs carbon dioxide production reducing carbonic acid formation and raising pH. The opposite would occur during the evening.

Specific Conductivity

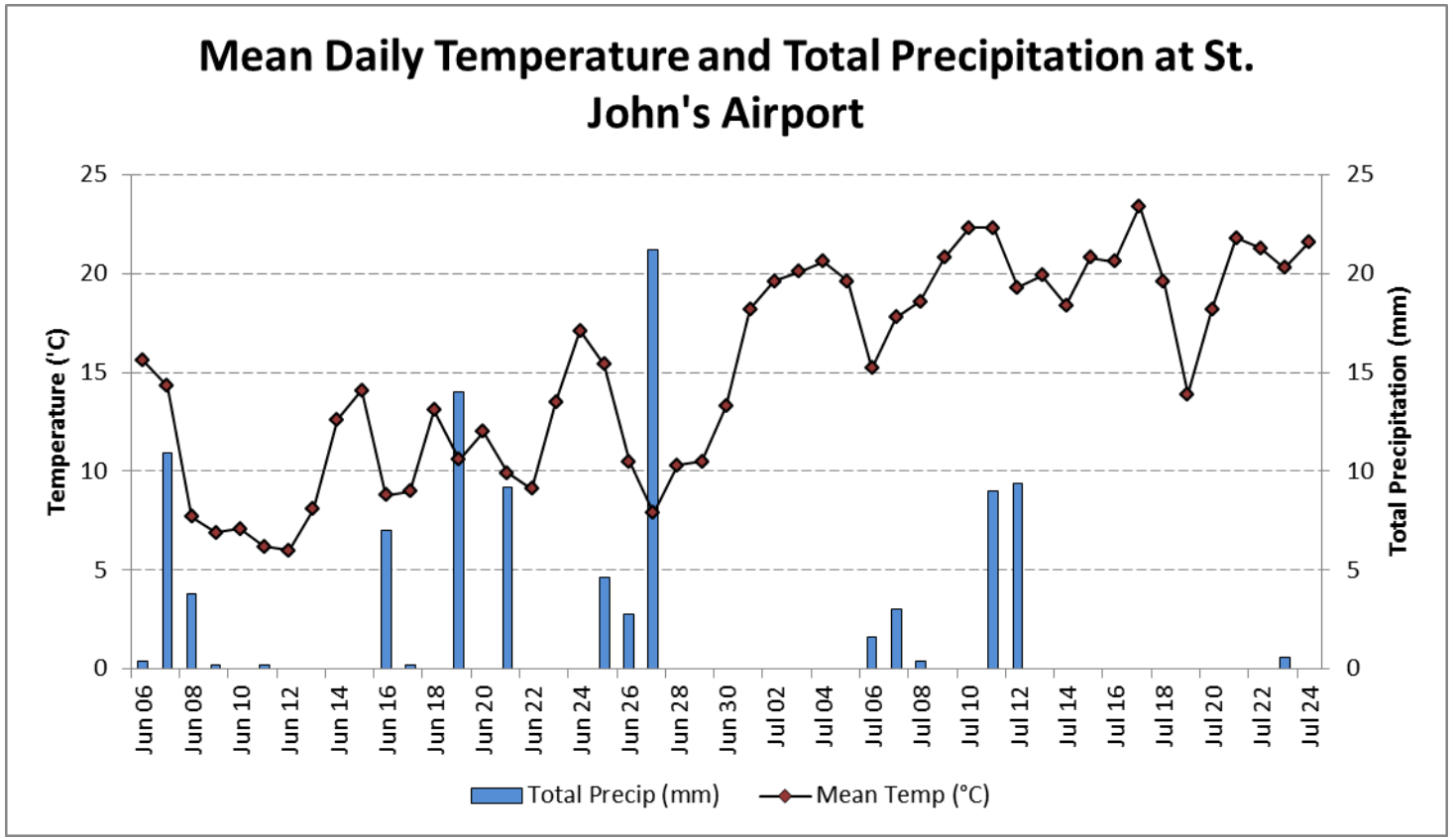
Conductivity relates to the ease of passing an electric charge – or resistance – through a solution. Conductivity is highly influenced by the concentration of dissolved ions in solution: distilled water has zero conductivity (infinite resistance) while salty solutions have high conductivity (low resistance).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



Mean	Median	Min	Max
78	76	72	84

- Specific conductivity declined throughout the deployment period, potentially the result of a dilution effect from rainfall. A peak near the end of the deployment period doesn't appear to be related to precipitation, however, wind and wave action could be responsible if sediment was stirred up from the bottom of Paddy's Pond. Unfortunately, this weather factor wasn't taken into account.

Appendix



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