

# Real-Time Water Quality Deployment Report

## Paddy's Pond

August 24, 2018 to October 2, 2018



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



## General

- Department of Municipal Affairs and Environment staff monitors the real-time web pages consistently.
- Water quality parameters are within expected ranges for this time of year.

## 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.

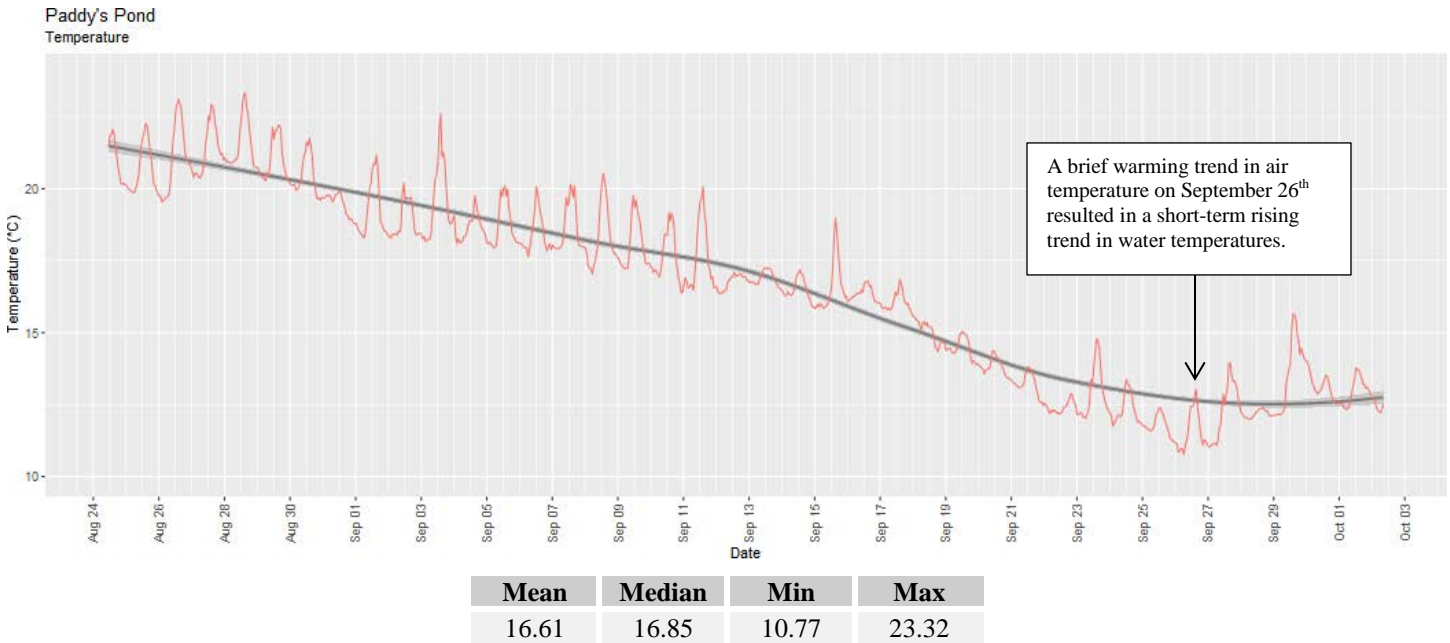
**Table 1: Qualitative QAQC Ranking**

Date	Action	Comparison Ranking				
		Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
2018-08-24	Deployment	Fair	Excellent	Fair	Excellent	Good
2018-10-02	Removal	Good	Fair	Good	Excellent	Excellent

## Data Interpretation

### Temperature

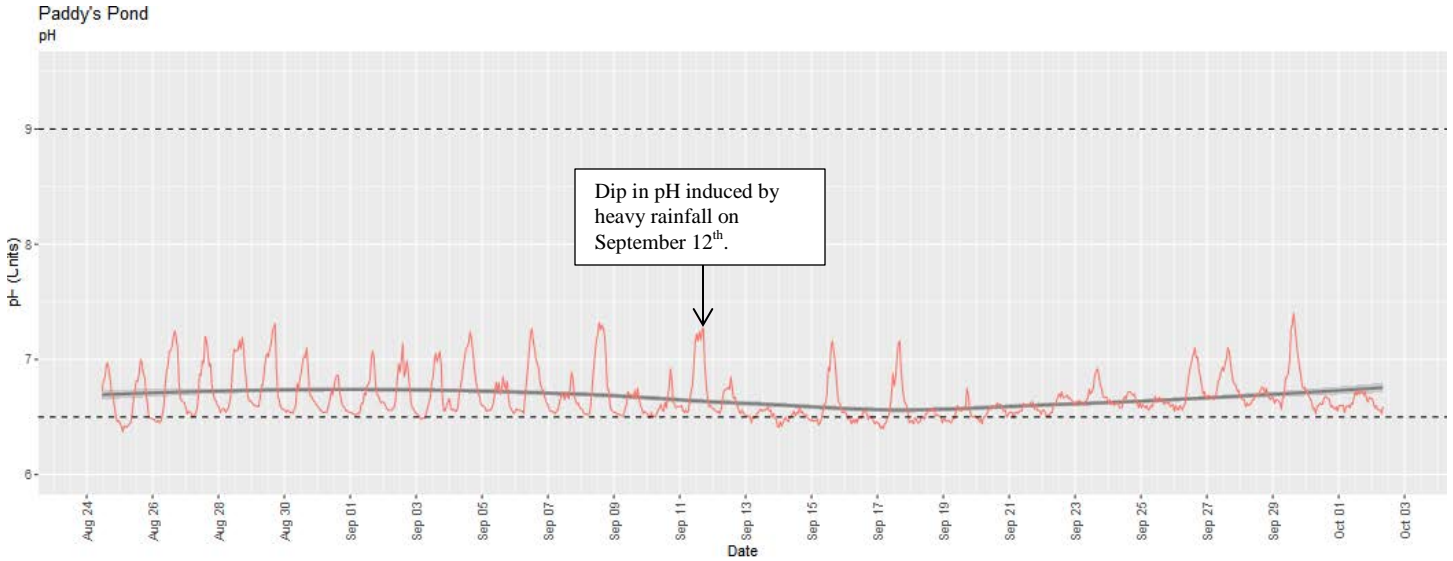
*Water Temperature is a major factor used to describe water quality. Temperature has major implications on both the ecology and chemistry of a water body, governing processes such as the metabolic rate of aquatic plants and animals and the degree of dissolved oxygen saturation.*



- Water temperatures declined from late summer into early fall with a slight rebound in late September due to a brief warming trend.

## 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.*

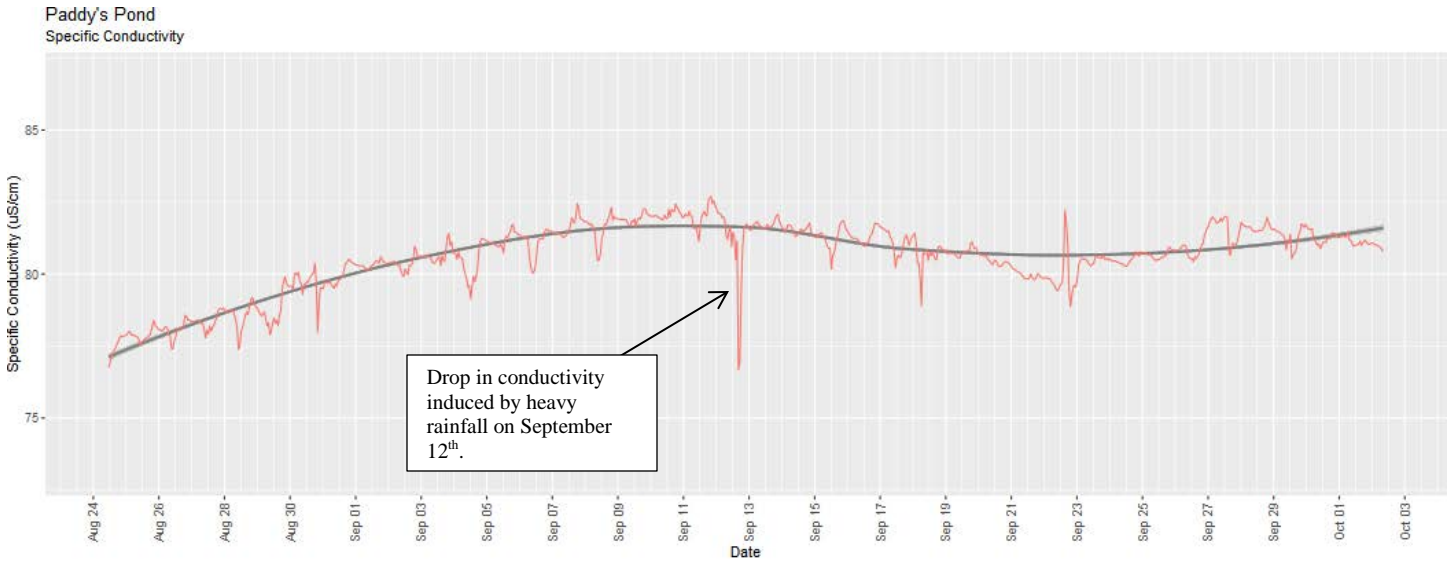


Mean	Median	Min	Max
6.67	6.61	6.37	7.40

- pH levels were mostly level during this deployment period. A dip in pH values after September 12<sup>th</sup> resulted from precipitation. Subsequent to the dip, pH values recovered within a few days.
- Most pH values were within the CCME guidelines for the protection of aquatic life.

## 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.*

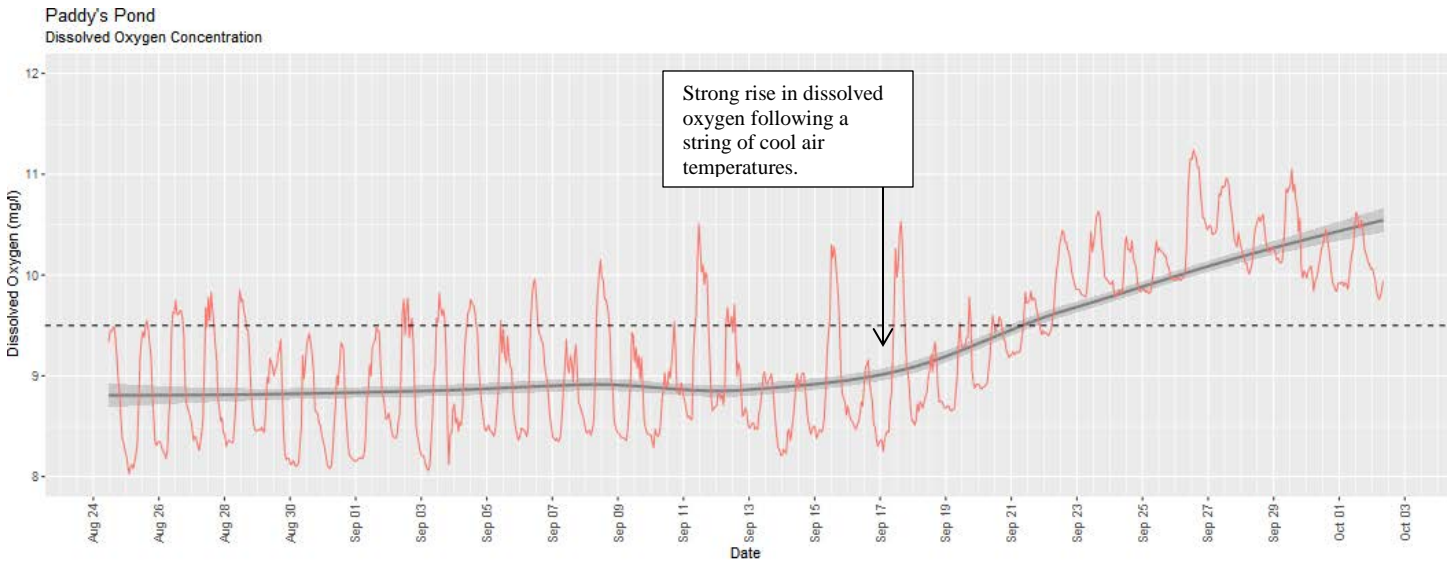


Mean	Median	Min	Max
80.58	80.79	76.69	82.69

- Specific conductivity increased overall from late August to early October. On September 12<sup>th</sup>, almost 60 mm of precipitation fell, creating a short term drop of approximately 5 uS/cm before rebounding and slowly declining for the next ten days.

## 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.*

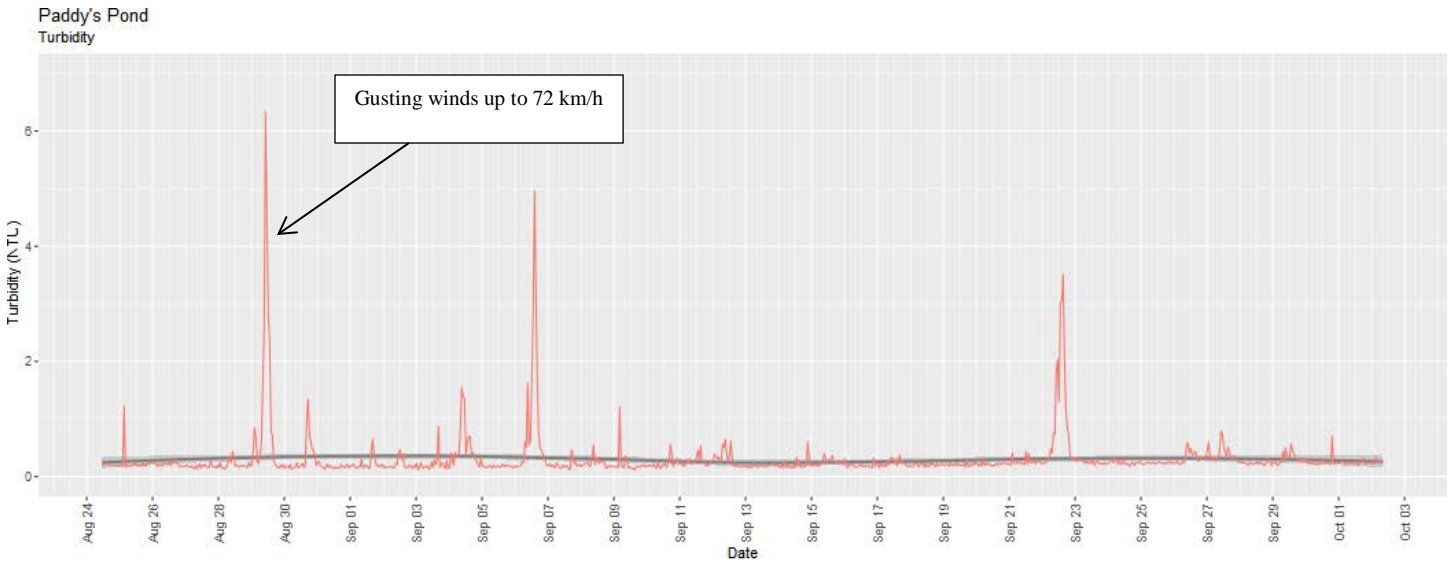


Mean	Median	Min	Max
9.26	9.18	8.03	11.24

- Dissolved oxygen concentration was stable for the first two thirds of the deployment period. In the final third of deployment an increase was observed around September 17<sup>th</sup> when mean air temperatures fell to less than 10 °C for more than a week.

## 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
0.31	0.22	0.11	6.34

- Turbidity levels were low during this deployment period and indicate occasional turbidity peaks. Often such peaks correspond to heavy rainfall, but in comparing the turbidity figure above to the temperature and precipitation graph in the Appendix, a link is not evident. Instead, turbidity events appear to be linked with gusty wind conditions which can result in heavy wave conditions.



Appendix

