

# Real-Time Water Quality Deployment Report

## Rattling Brook Network

April 21, 2021 to May 17, 2021



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

## General

- Department of Environment and Climate Change staff monitor the real-time web pages consistently.
- Hydrometric data included in this report is provisional and used only for illustrative purposes. Corrected and finalized data may be retrieved from the Water Survey of Canada website ([https://wateroffice.ec.gc.ca/index\\_e.html](https://wateroffice.ec.gc.ca/index_e.html))\*.

## 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

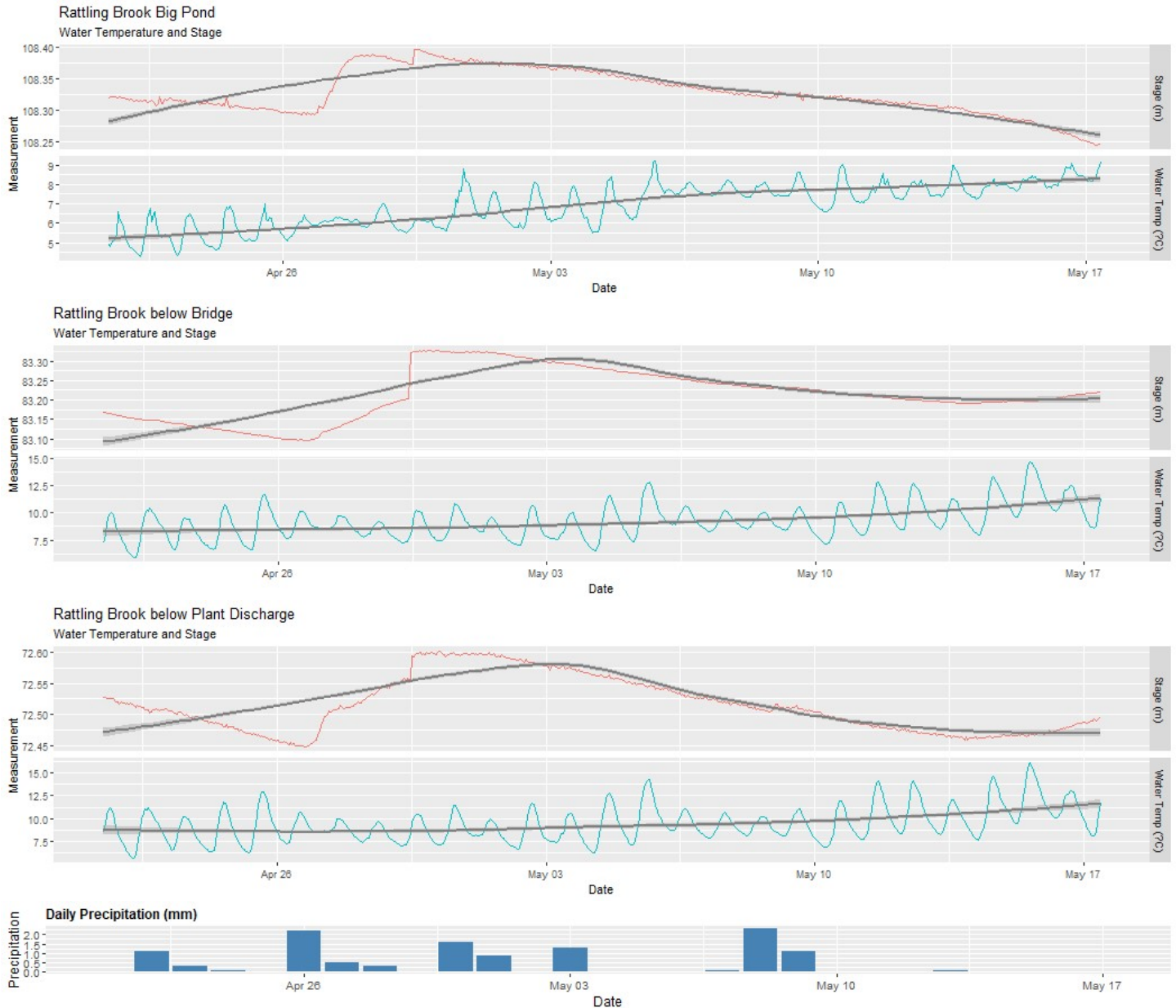
Station	Date	Action	Comparison Ranking				
			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
Rattling Brook Big Pond	April 21	Deployment	Marginal	Excellent	Excellent	Excellent	Excellent
	May 17	Removal	<b>Poor</b>	Marginal	Good	Excellent	Excellent
Rattling Brook below Bridge	April 21	Deployment	Excellent	Excellent	Good	Excellent	Excellent
	May 17	Removal	Good	Fair	Good	Fair	Excellent
Rattling Brook below Plant Discharge	April 21	Deployment	Excellent	Excellent	Excellent	Excellent	Excellent
	May 17	Removal	Good	Excellent	Good	<b>Cannot Rank</b>	Good

- Upon removal at Big Pond, water temperature rated ‘poor’ due to the QA/QC instrument’s placement near the shoreline in shallower water.
- Upon removal at Below Plant Discharge, dissolved oxygen could not be ranked as the field sonde sensor started failing on May 9<sup>th</sup>.

- 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.*



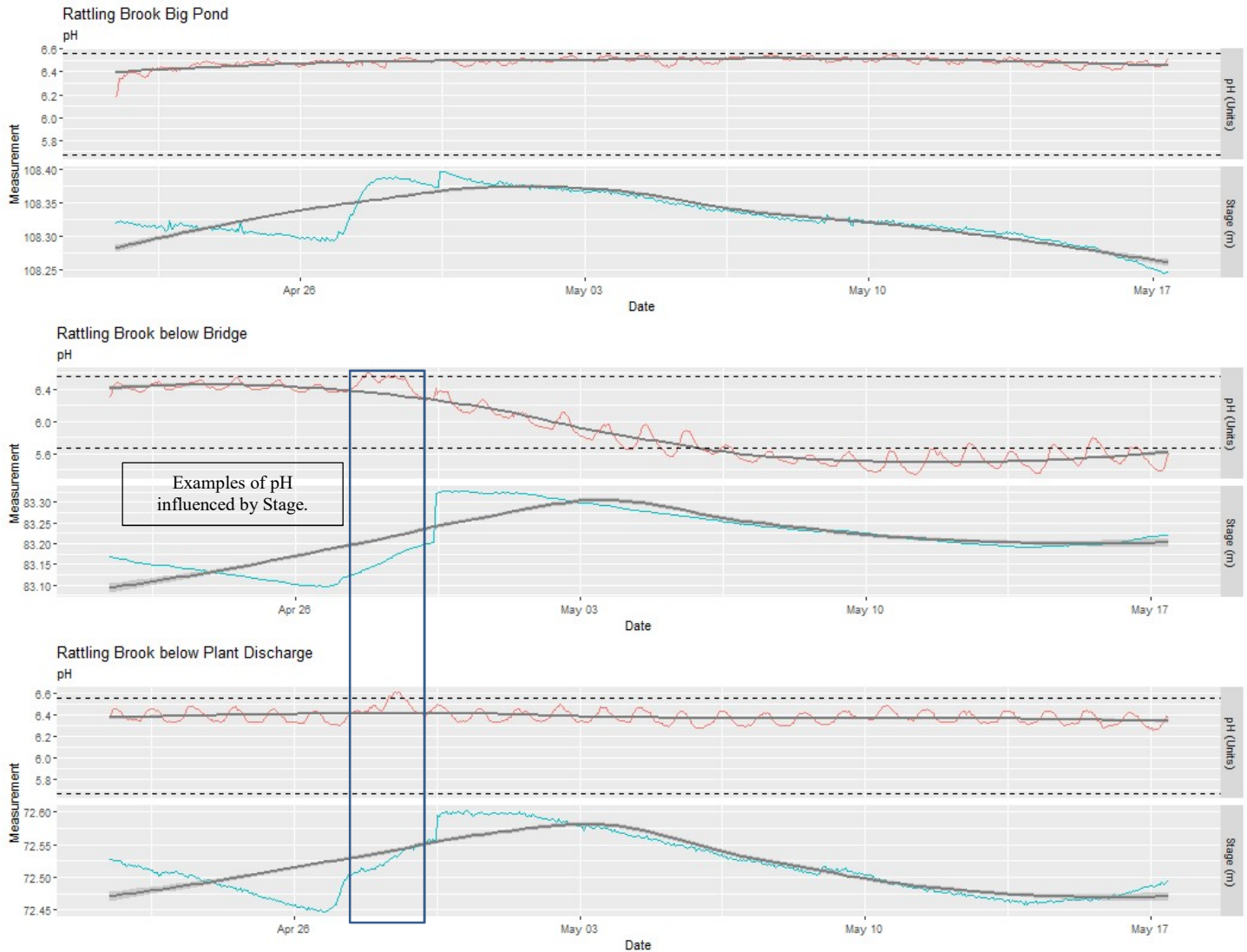
Station	Max	Min	Median	Mean
Big Pond	9.20	4.27	6.89	6.84
Below Bridge	14.63	5.91	8.98	9.17
Below Plant Discharge	16.10	5.64	9.06	9.33

- Gradual water temperature increases are observed at each station during this deployment period.

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## 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.*



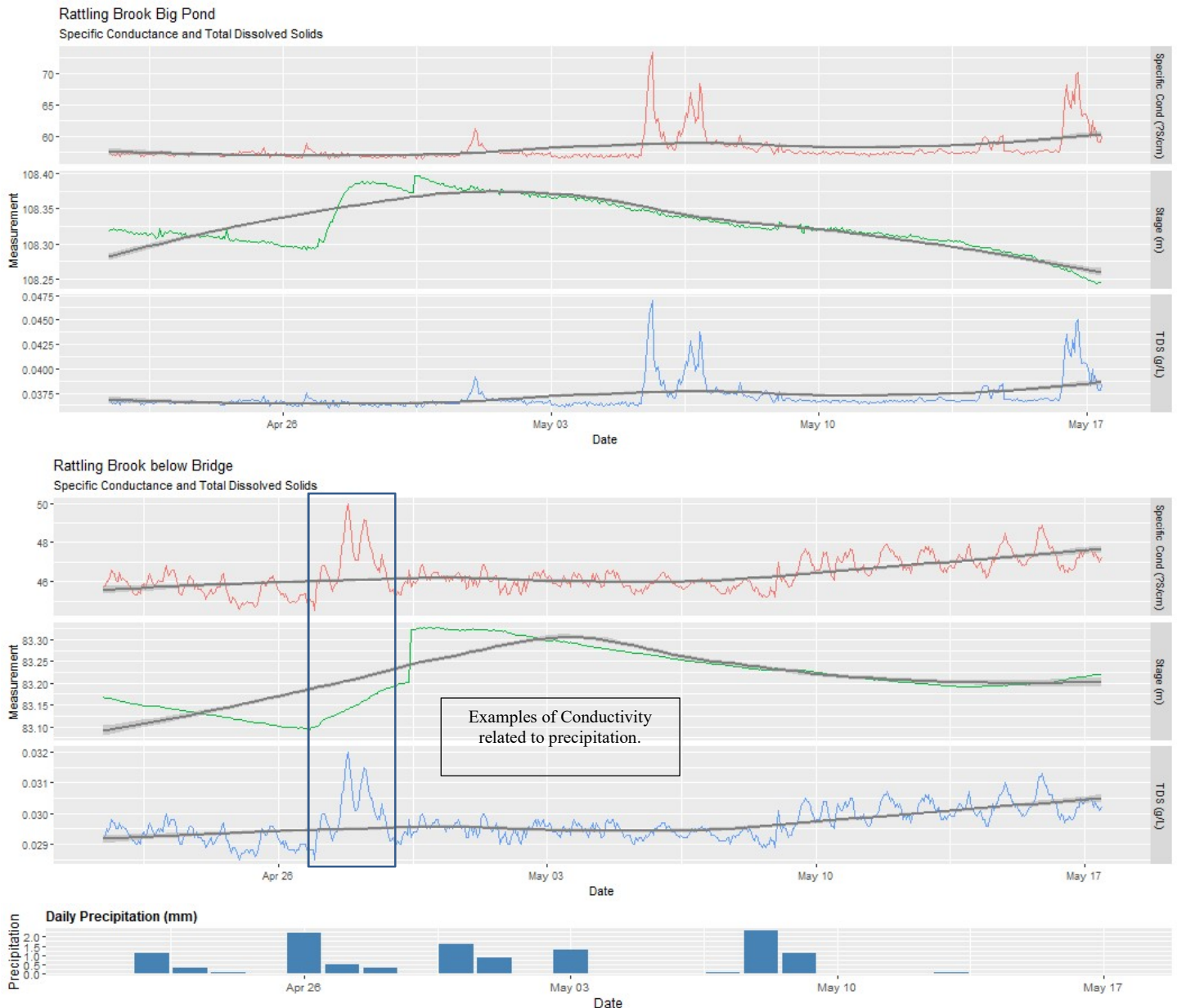
Station	Max	Min	Median	Mean
Big Pond	6.55	6.19	6.49	6.49
Below Bridge	6.60	5.34	5.87	5.94
Below Plant Discharge	6.61	6.26	6.38	6.39

- At all stations, pH values were generally consistent over the deployment period. The majority of values were within the site-specific guidelines (5.67-6.56 pH Units).

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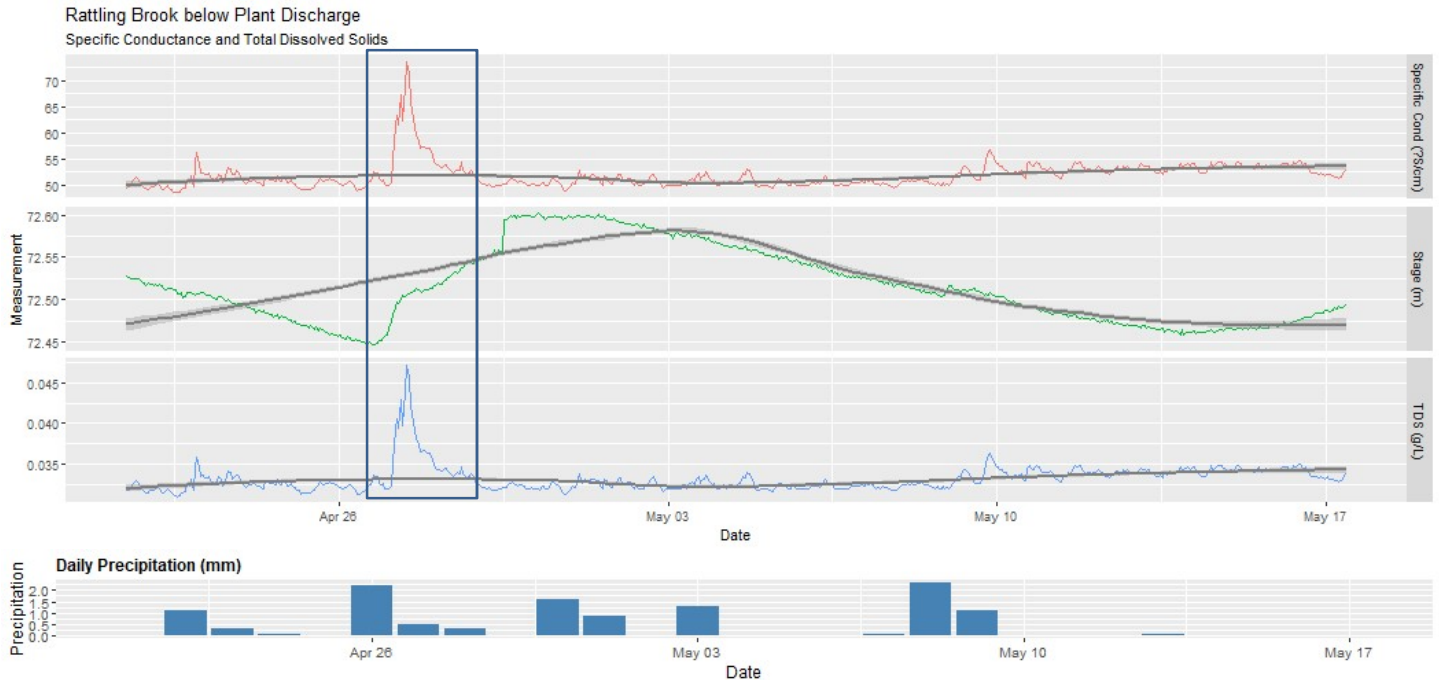
## Specific Conductivity

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.



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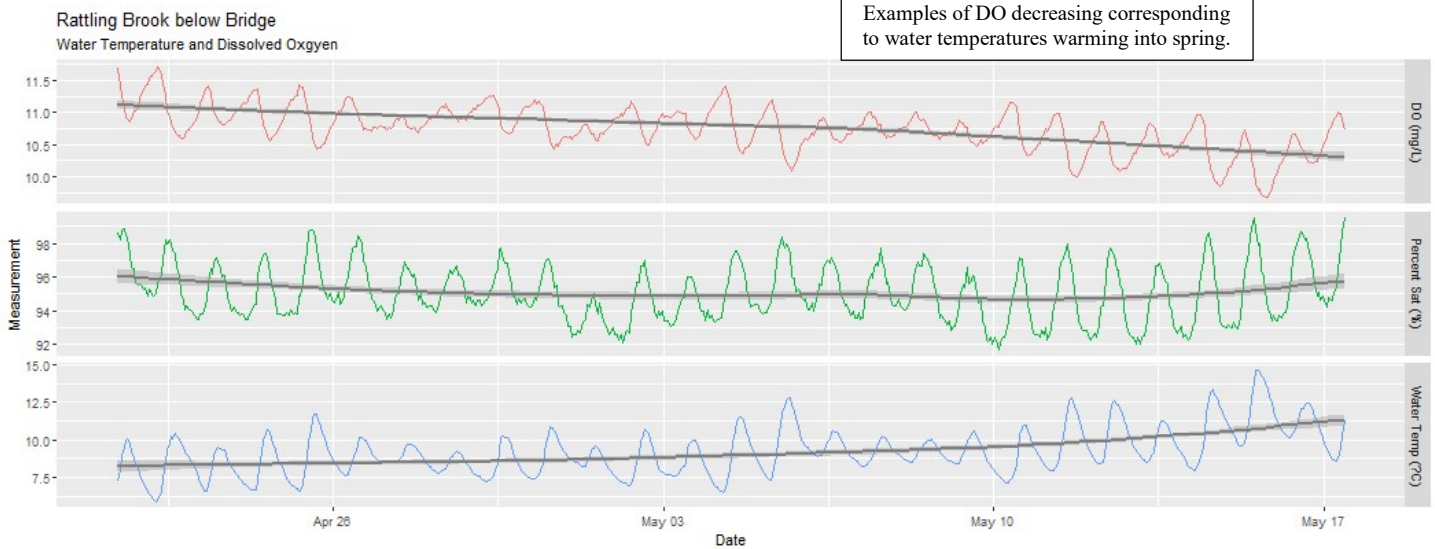
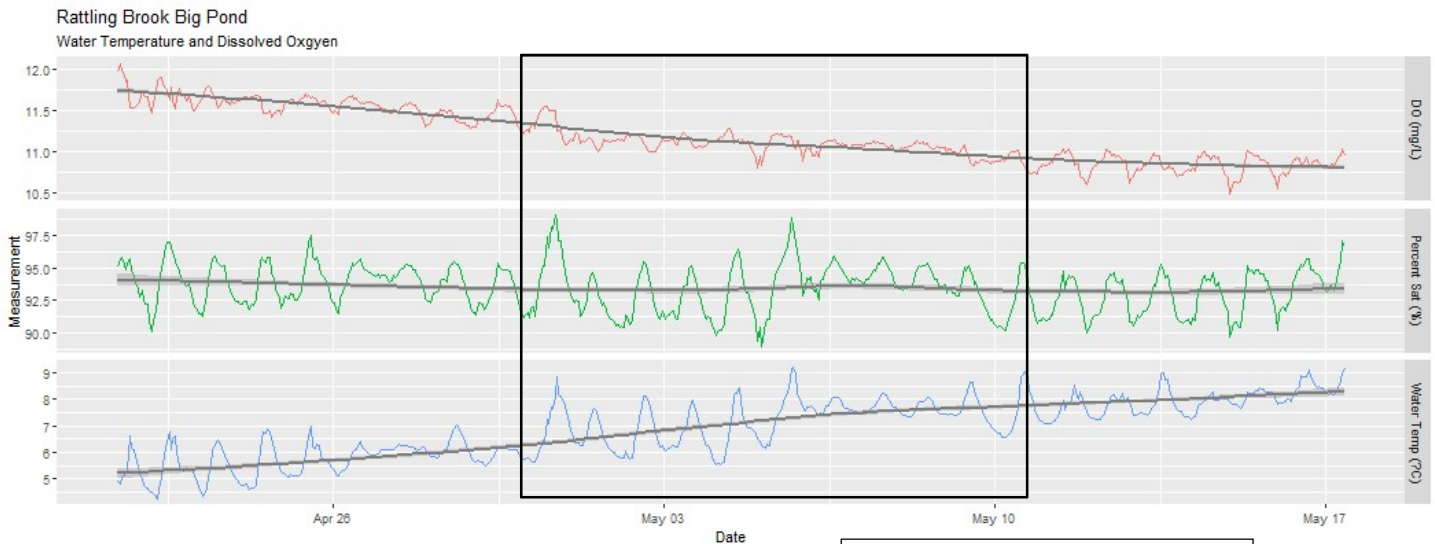
Station	Max	Min	Median	Mean
Big Pond	73.5	56.3	57.2	57.8
Below Bridge	50.0	44.5	46.2	46.3
Below Plant Discharge	73.7	48.5	51.0	51.7

- Specific conductivity was relatively stable at all stations during this deployment period with few fluctuations due to variations in Stage caused by precipitation. There are increases at Big Pond not related to precipitation. During low or no stage increases, diluted salts and inorganic material will accumulate in the pond, increasing the conductivity data.

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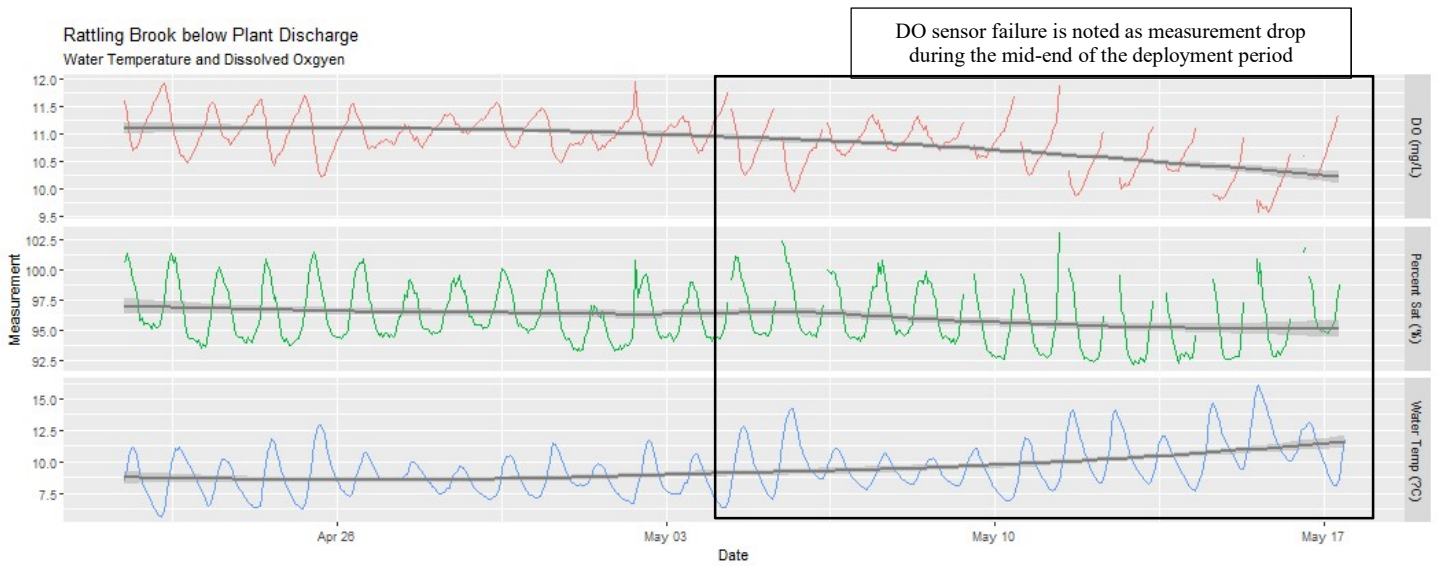
## Dissolved Oxygen

*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 oxidation reactions.*



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Station	Max	Min	Median	Mean
Big Pond	12.07	10.47	11.13	11.20
Below Bridge	11.72	9.67	10.78	10.76
Below Plant Discharge	11.95	9.80	10.93	10.92

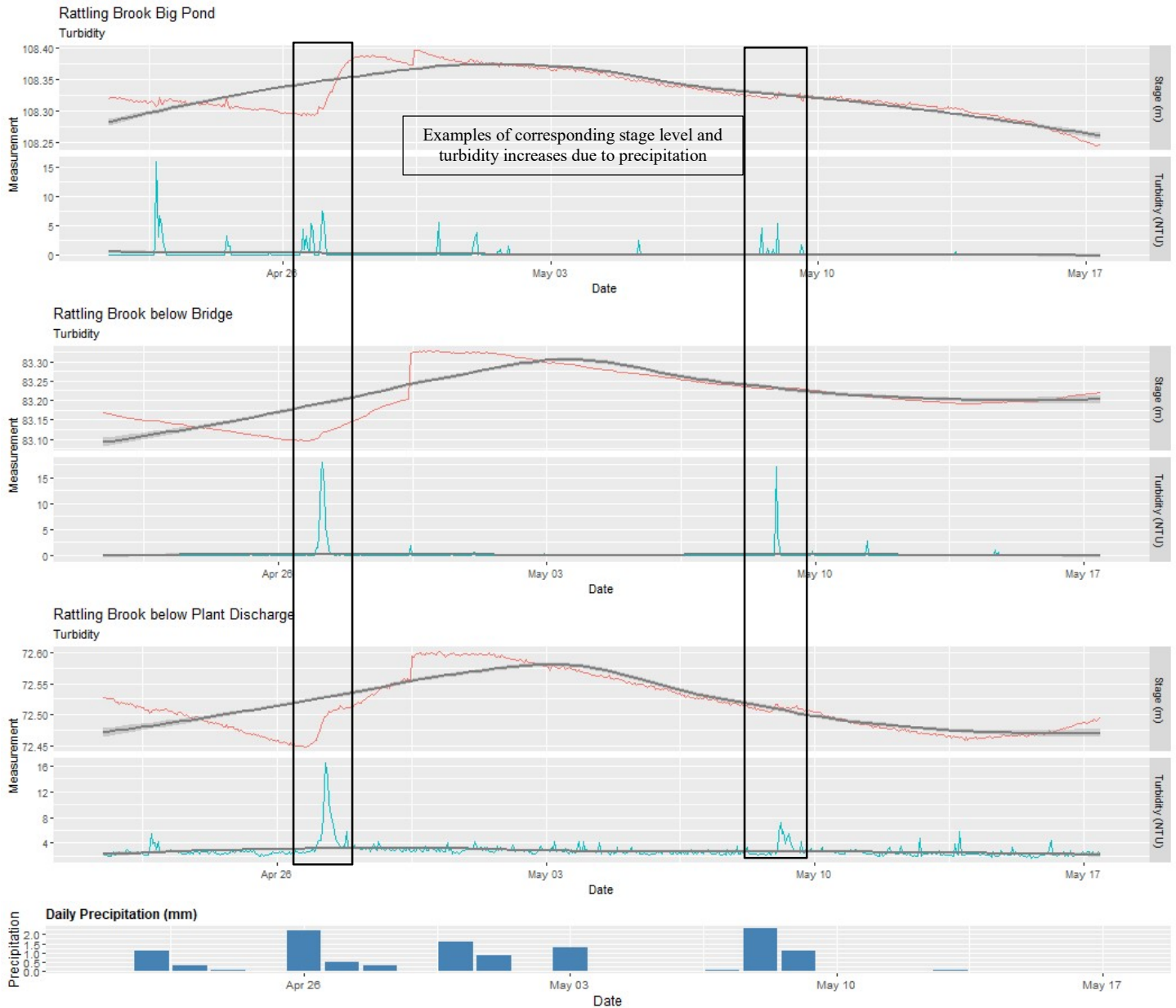
- As expected, trend lines show the start of spring as water temperatures warm, causing gradual decreases of dissolved oxygen concentrations at the end of this deployment.
- During this deployment period, all values remained above the minimum CCME Aquatic Guideline for other life stages (6.5 mg/l) and for cold water biota (9.5 mg/l).

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## 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.*



Station	Max	Min	Median	Mean
Big Pond	16.0	0.0	0.0	0.2
Below Bridge	17.9	0.0	0.0	0.1
Below Plant Discharge	16.5	1.6	2.6	2.8

- Most turbidity peaks are associated with precipitation events and are of short duration.

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### Appendix

