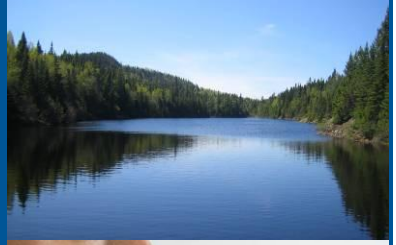








Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

February 27, 2013 to March 21, 2013

Newfoundland Labrador

Government of Newfoundland & Labrador

Department of Environment and Conservation

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.
- The existing field sonde was replaced by the QA/QC sonde at the time of deployment since the DO sensor for the field sonde was showing questionable values. When the sonde was returned for calibration it was identified that the cap for DO sensor needed to be replaced. At the same time the calibration for pH4 failed. As QA/QC was the only available sonde at that time, it was used to replace 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 was also taken for additional confirmation of conditions at deployment and to allow for future modelling studies.

Table 1: Qualitative QAQC Ranking

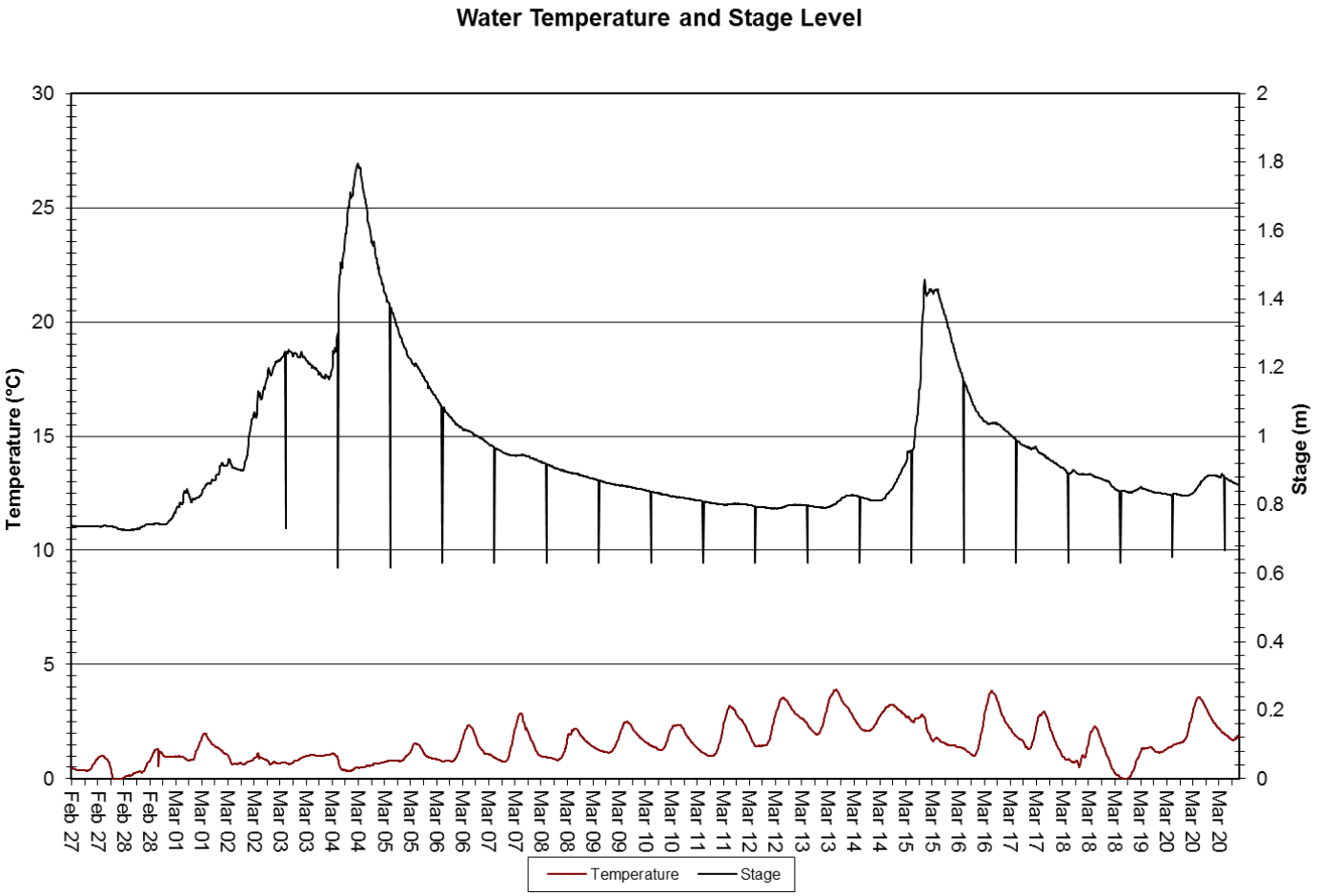
Station	Date	Action	Comparison Ranking				
			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
Leary's Brook at Prince Philip Drive	Feb 27,2013	Deployment	N/A	N/A	N/A	NA	N/A
	March 21, 2013	Removal	Excellent	Excellent	Excellent	Excellent	Excellent

- The field sonde was replaced by QA/QC sonde during deployment since there was no available QA/QC sonde. Thus no ranking was recorded for the deployment period.
- Ranking for all parameters were "Excellent" during field sonde removal.
- 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

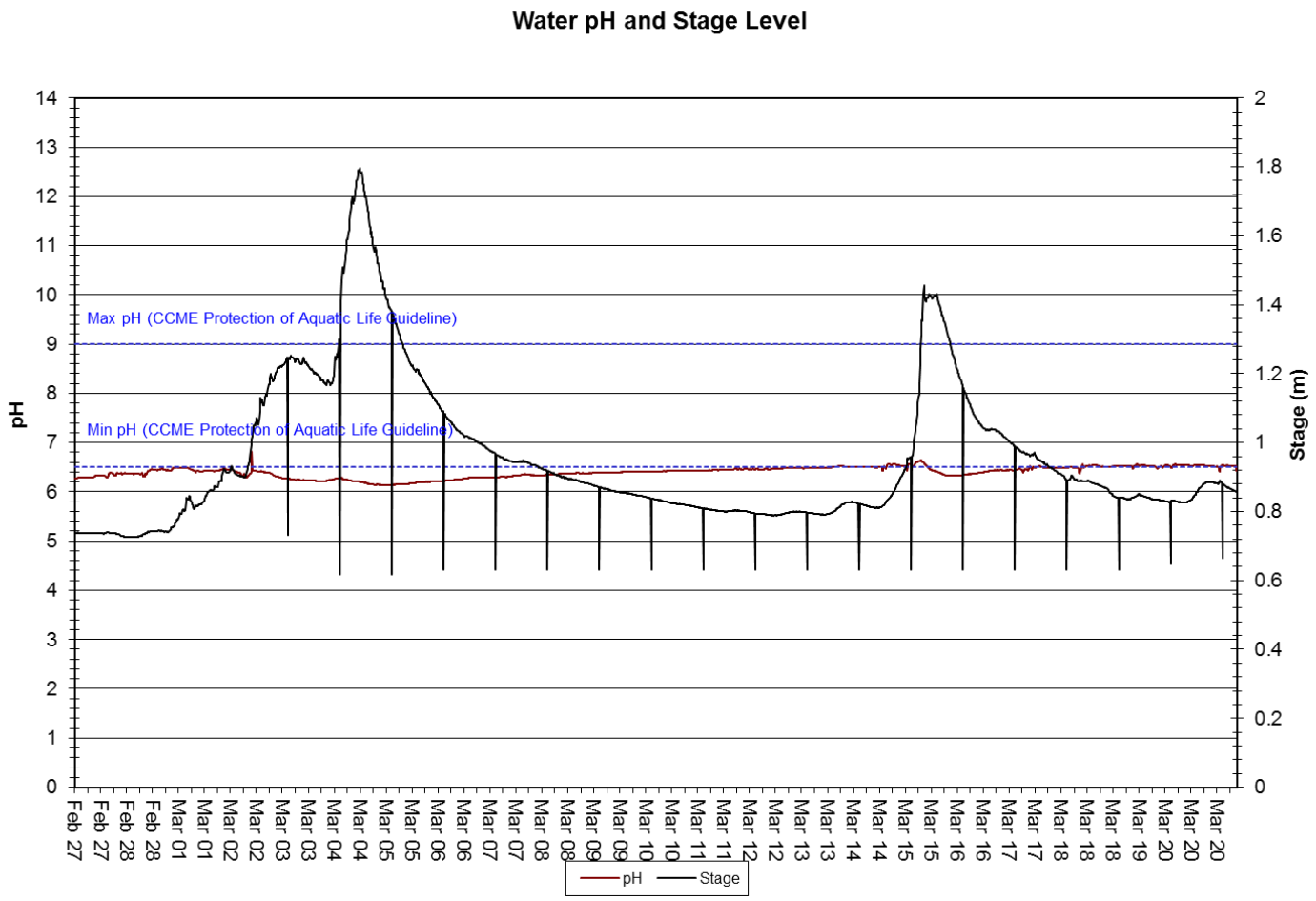
Parameter	Max	Min	Median	Mean
Temperature('C)	3.90	-0.06	1.36	1.54
pH	6.82	6.13	6.42	6.40
Specific Conductivity (µS/cm)	6730.9	347.0	682.0	977.7
TDS (g/ml)	4.3100	0.0003	0.4360	0.6254
Dissolved Oxygen (%-Sat)	98.9	93.0	96.7	96.8
Dissolved Oxygen (mg/l)	14.06	12.57	13.51	13.51
Turbidity (NTU)	244.0	0.0	0.0	12.1
Stage (m)	1.80	0.62	0.88	0.95
Flow (m)	12.70	0.21	1.16	1.86

Data Interpretation

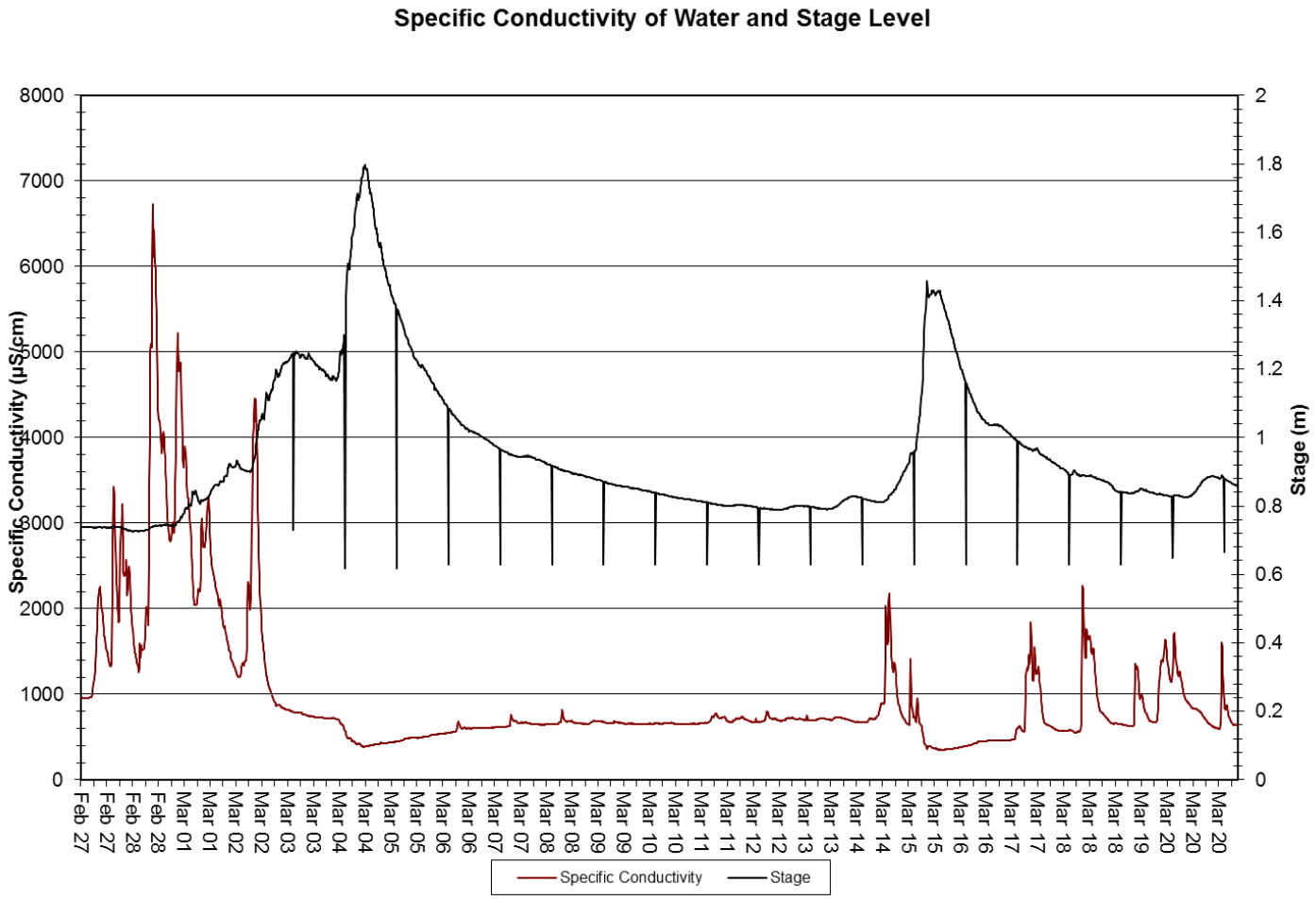


- Overall, an expected increase in water temperature was observed at Leary's Brook from late February to late March.

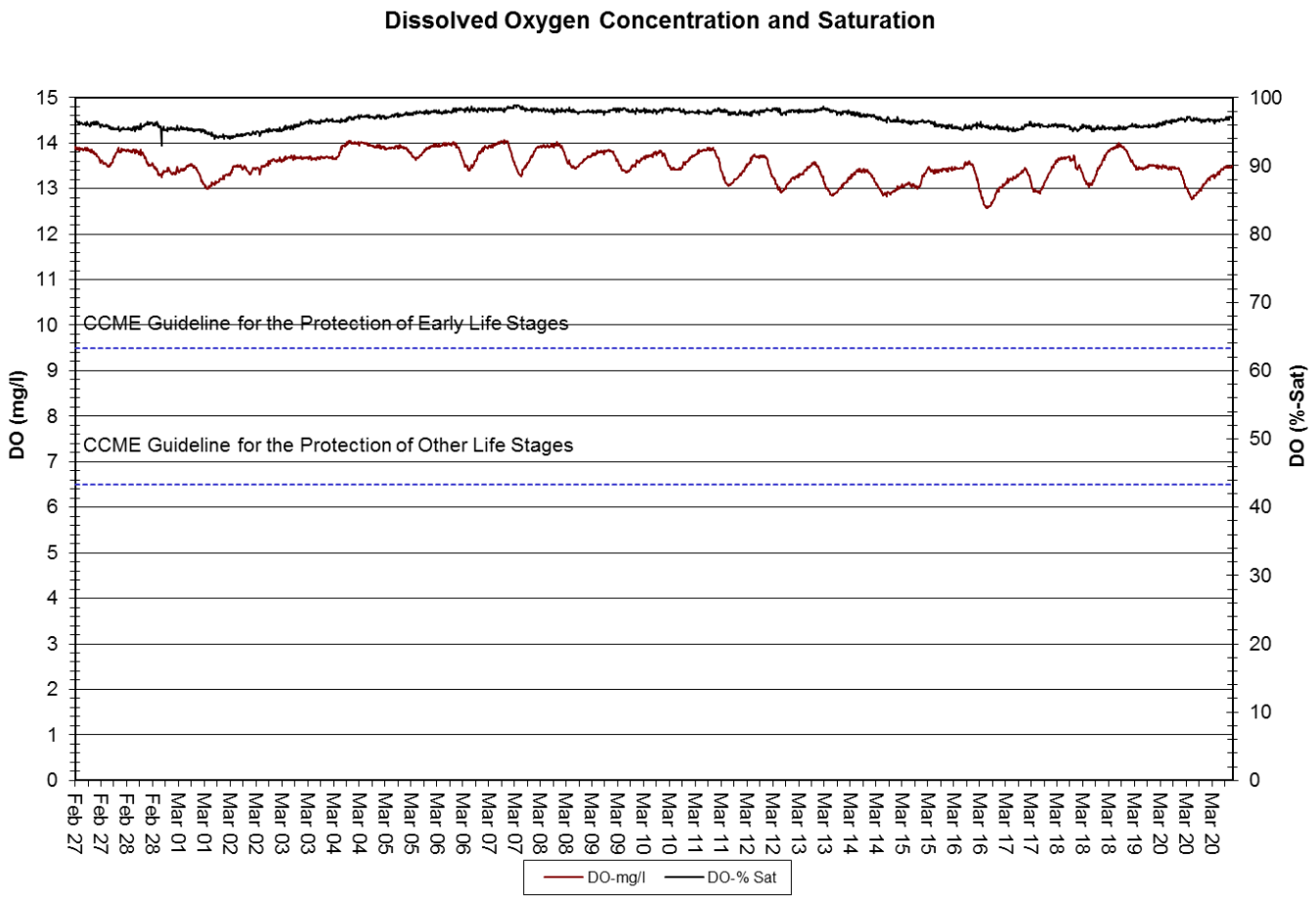
- Water temperature ranged from -0.06^{o}C to 3.9^{o}C (median value: 1.36^{o}C).



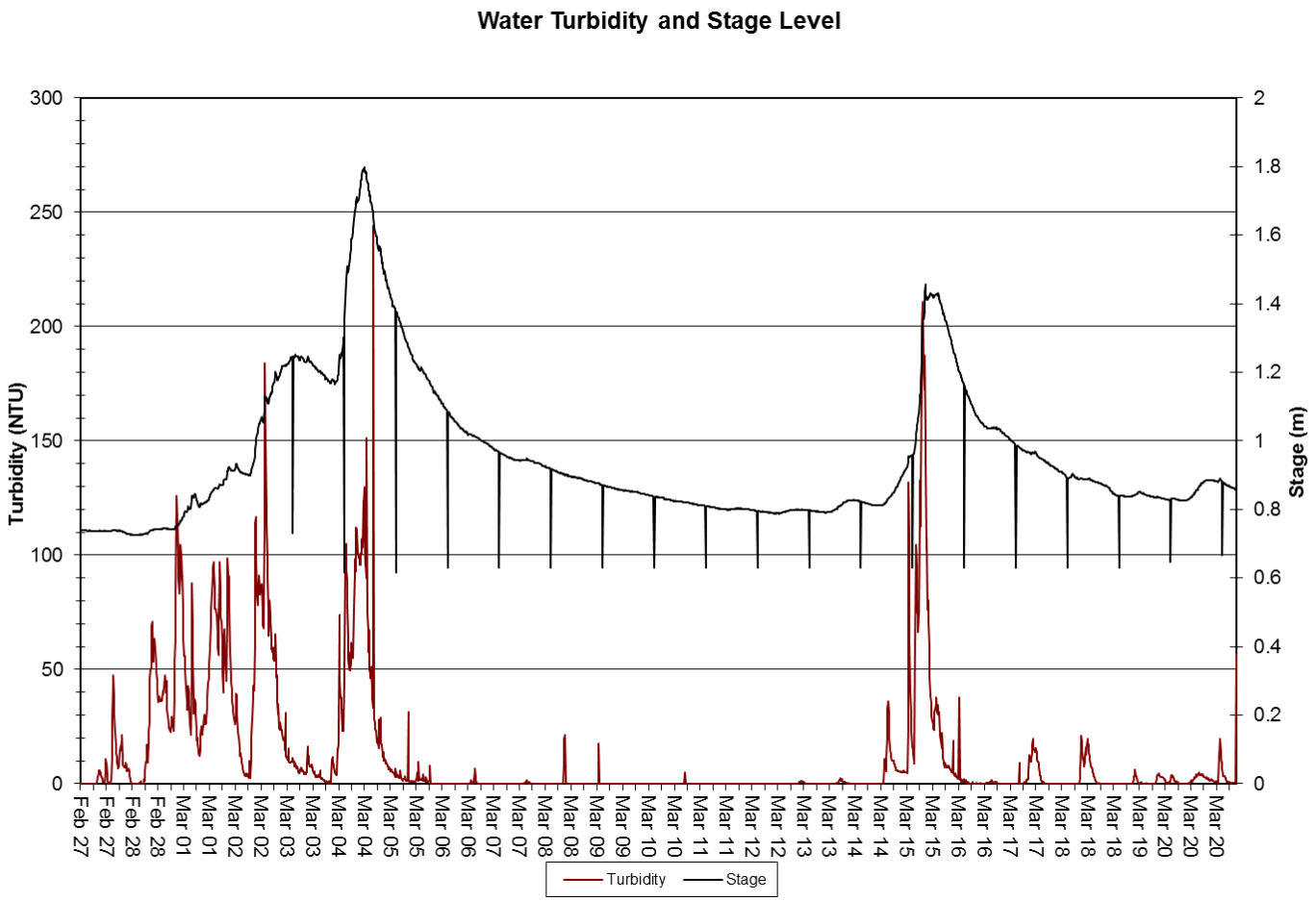
- Generally speaking, NL waters are slightly acidic which is reflected in the pH values lying closer to the lower CCME Protection of Aquatic Life guideline value of 6.5.
- During the period of March 2-7 and again on March 15-18, there was an increase in stage level with corresponding noticeable decrease in pH values.
- pH ranged from 6.13 to 6.82 (Median: 6.42)



- The first part of the deployment period showed increased fluctuation in conductivity which is related to increased precipitation and snowmelt. As a result of increased precipitation and snowmelt, the road salts applied during the winter months eventually washes into the water body which increases the amount of sodium and chloride ions in the water. The increased ionic concentration causes a rise in conductivity in the water.
- The second part of the deployment period showed a stable conductivity which again can be associated with a period of very little precipitation.
- The last part of the deployment period showed increased fluctuation once again as a result of increased precipitation and snowmelt.
- Conductivity ranged 347 µs/cm to 6730.9 µs/cm (the median is 682 µs/cm).



- DO values remained stable and did not drop below the Guideline for the Protection of Other Life Stage biota or Protection of Early Life Stages.
- Concentrations ranged from 12.57 mg/l to 14.06 mg/l (median value: 13.51 mg/l) for DO while 93% to 98.9% (median value 96.7%) for percent saturation.



- The turbidity spikes are related to increased precipitation due to snow and rainfall and the snowmelt that followed.
- Turbidity spikes tend to be clustered with stage level increases. As stage increases in the river, flow rate and velocity tends to increase as well, resulting in a lofting of stream bed sediments. Additionally, road debris and soil particles tend to be washed into the river channel increasing the suspended matter load.
- Turbidity ranged between 0.0 NTU and 244 NTU (median value: 0.0 NTU) during this deployment period.

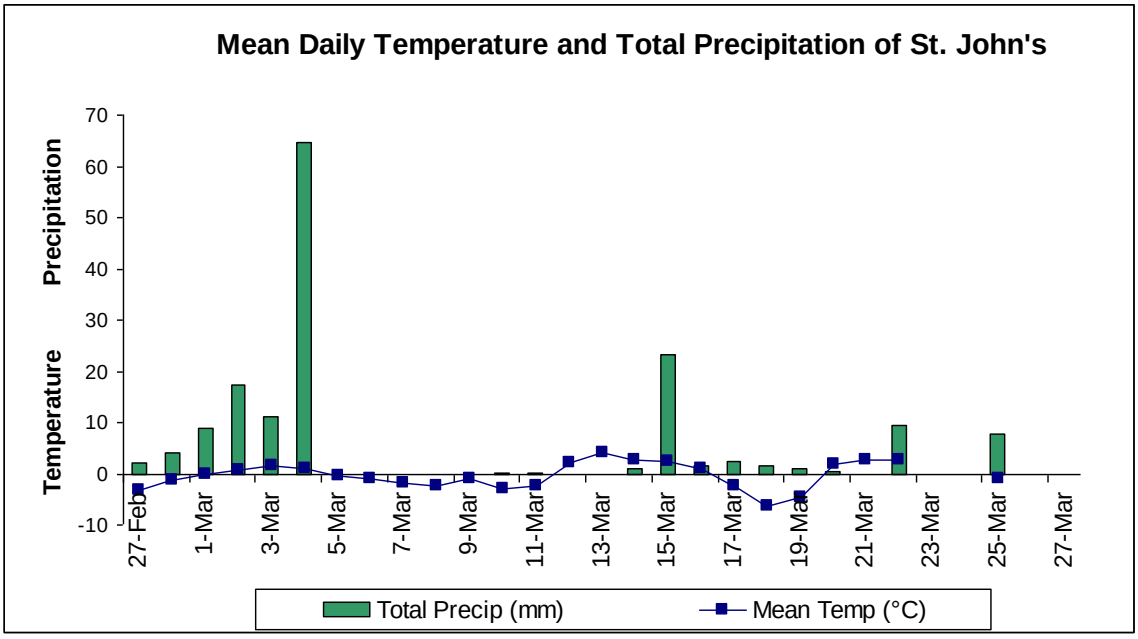
Conclusions

- The existing field sonde was replaced by the QA/QC sonde at the time of deployment since the DO sensor for the field sonde was experiencing technical issues.

- There was an increase in stage level with corresponding noticeable decrease in pH values during the period of March 2-7 and again on March 15-18.

Appendix

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



Prepared by:

Shibly Rahman

Department of Environment and Conservation

Water Resources Management Division

Phone: 709.729.4540

Fax: 709.729.3020