Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

February 15, 2012 to August 7, 2012

Newfoundland Labrador

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

Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

2012-02-15 to 2012-08-07

General

- Department of Environment and Conservation staff monitors the real-time web pages consistently.
- A communication cable breakage prevented data transmission between February 28th and March 28th. As such, all graphs presented below have a gap during this time. Data could not be retrieved from the internal Datasonde backup due to battery failure.
- A series of repetitive "Fair" QAQC rankings for temperature indicates a potentially imminent 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

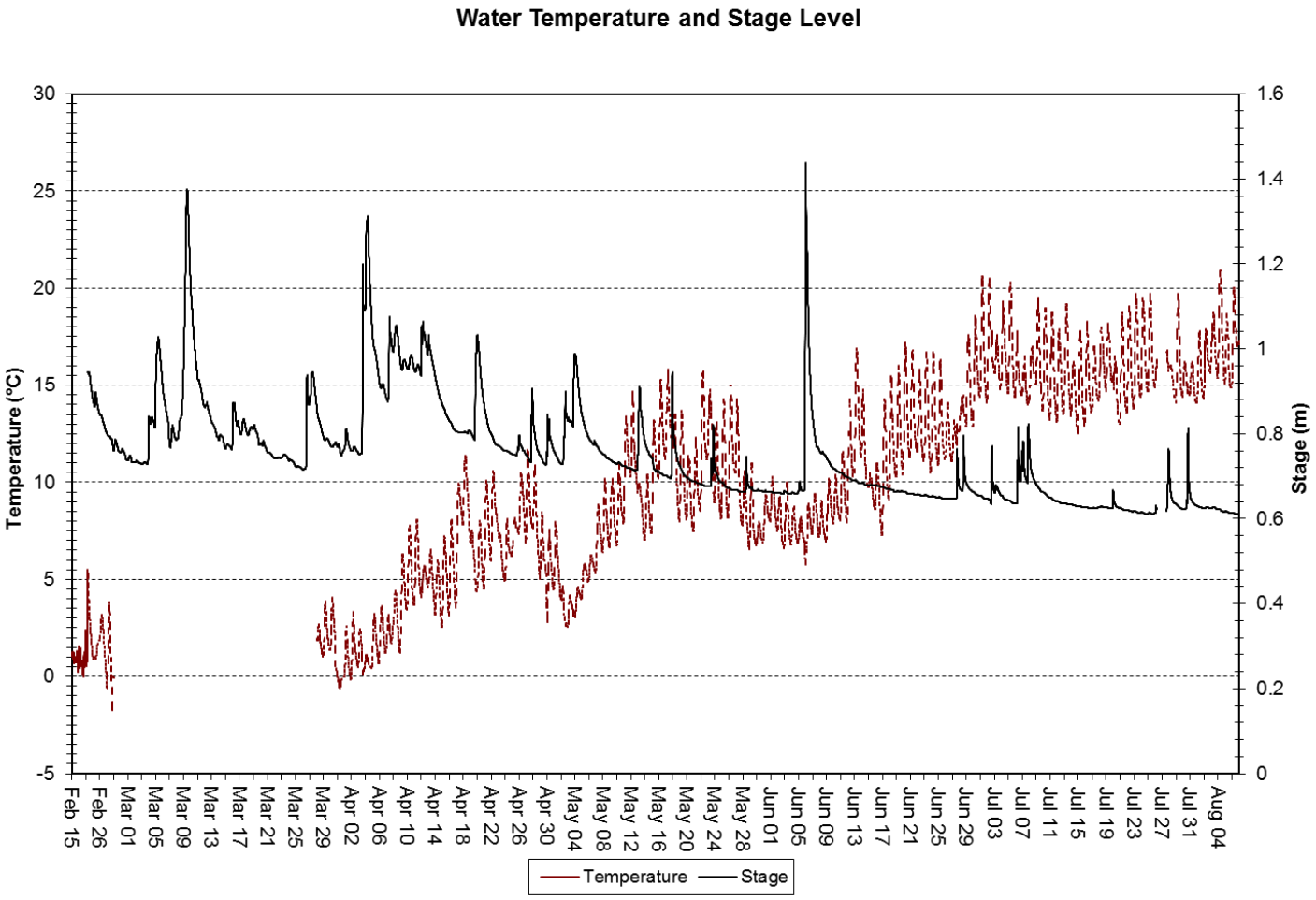
Date	Action	Comparison Ranking				
		Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
February 15, 2012	Deployment	Excellent	Excellent	Excellent	Excellent	Excellent
February 28, 2012	Removal	NA				
February 28, 2012	Deployment	Marginal	Excellent	Marginal	Good	Good
April 25, 2012	Removal	Fair	Excellent	Marginal	NA	Good
April 25, 2012	Deployment	Fair	Excellent	Poor	NA	Excellent
June 12, 2012	Removal	Fair	Excellent	Excellent	Excellent	Poor
June 12, 2012	Deployment	Fair	Excellent	Excellent	Excellent	Good
August 7, 2012	Removal	Fair	Excellent	Excellent	Excellent	Excellent

- A problem with the communication cable prevented the collection of data from the Field Sonde for much of the February 15th – 28th deployment. No QAQC rankings could be collected for removal.
- A lack of sufficient power in the QAQC sonde prevented dissolved oxygen QAQC values from being recorded. No rankings could be generated for DO on April 25th.
- Conductivity recorded by the QAQC sonde (48.2 µS/cm) was significantly higher than the Field sonde (79.8 µS/cm). This may be due to a temporary water quality issue near the QAQC sonde (disturbed sediment) since the ranking was determined to be "Excellent" at removal time on June 12th.

Data Interpretation

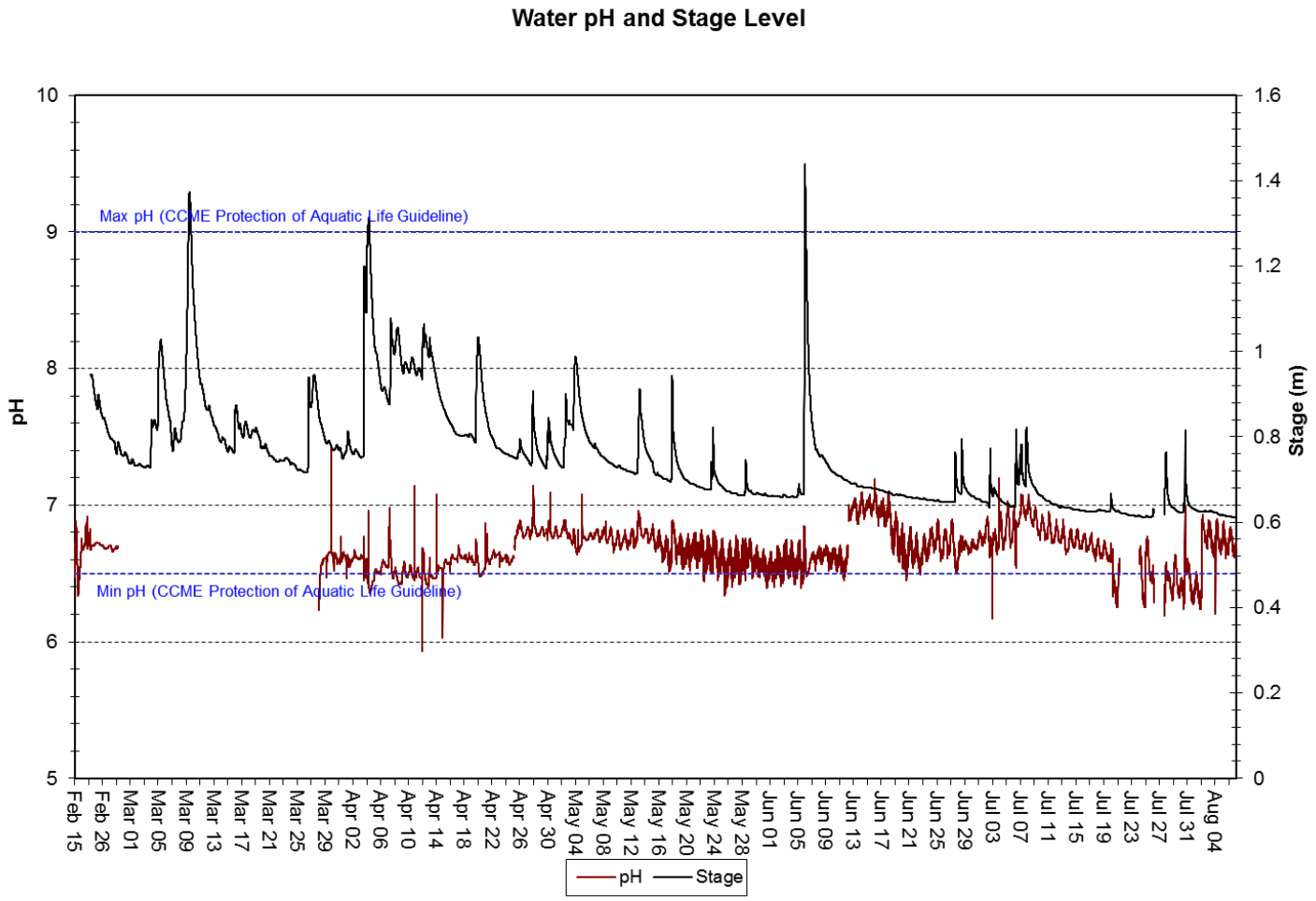
Leary's Brook

Figure 1: Water temperature at Leary's Brook from February 15th to August 7th.



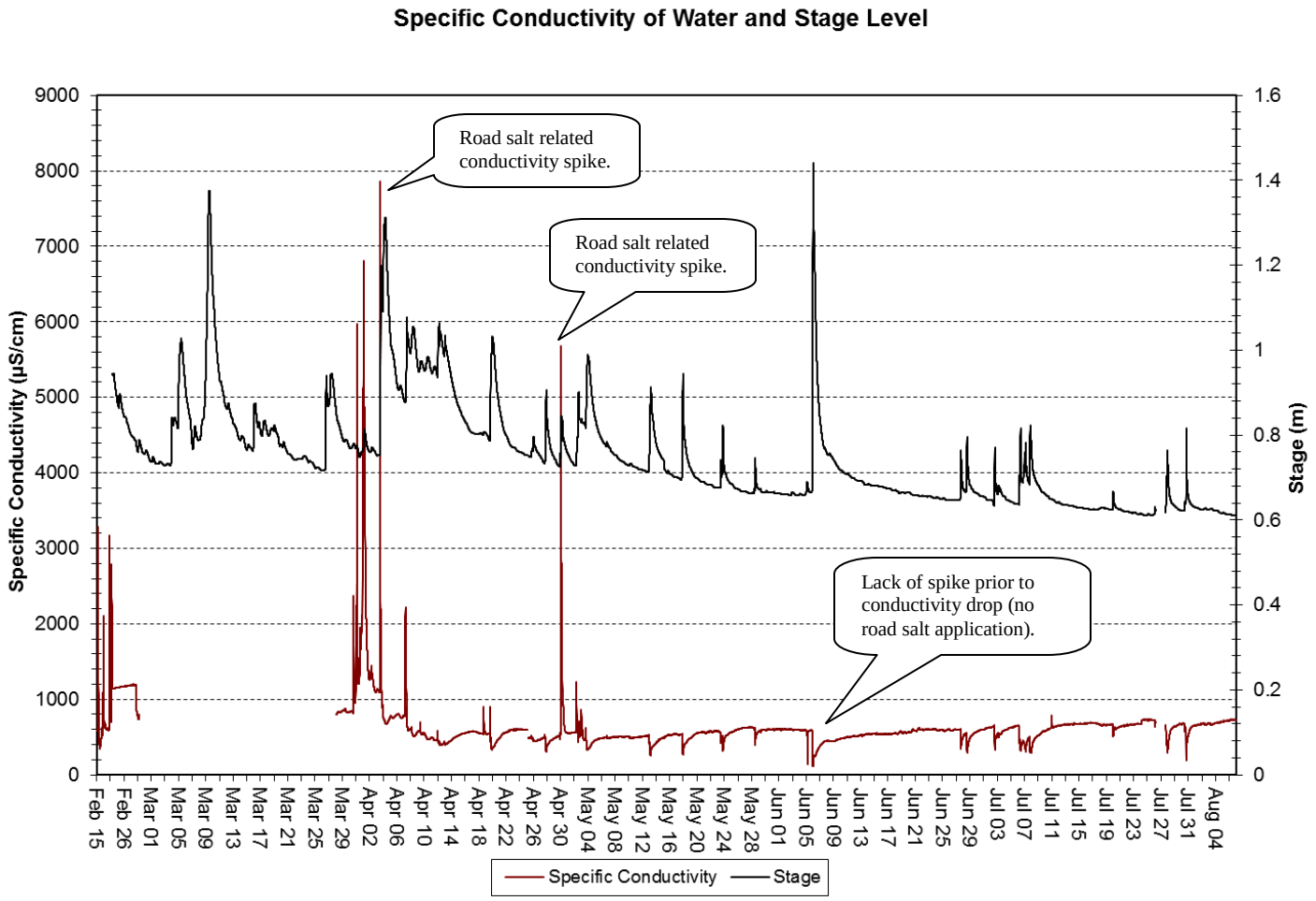
- This deployment report follows temperatures from their annual low to near annual high temperatures seen in mid-August. Water temperatures fell between -1.72°C and 21.10°C.

Figure 2: pH at Leary's Brook from February 15th to August 7th.



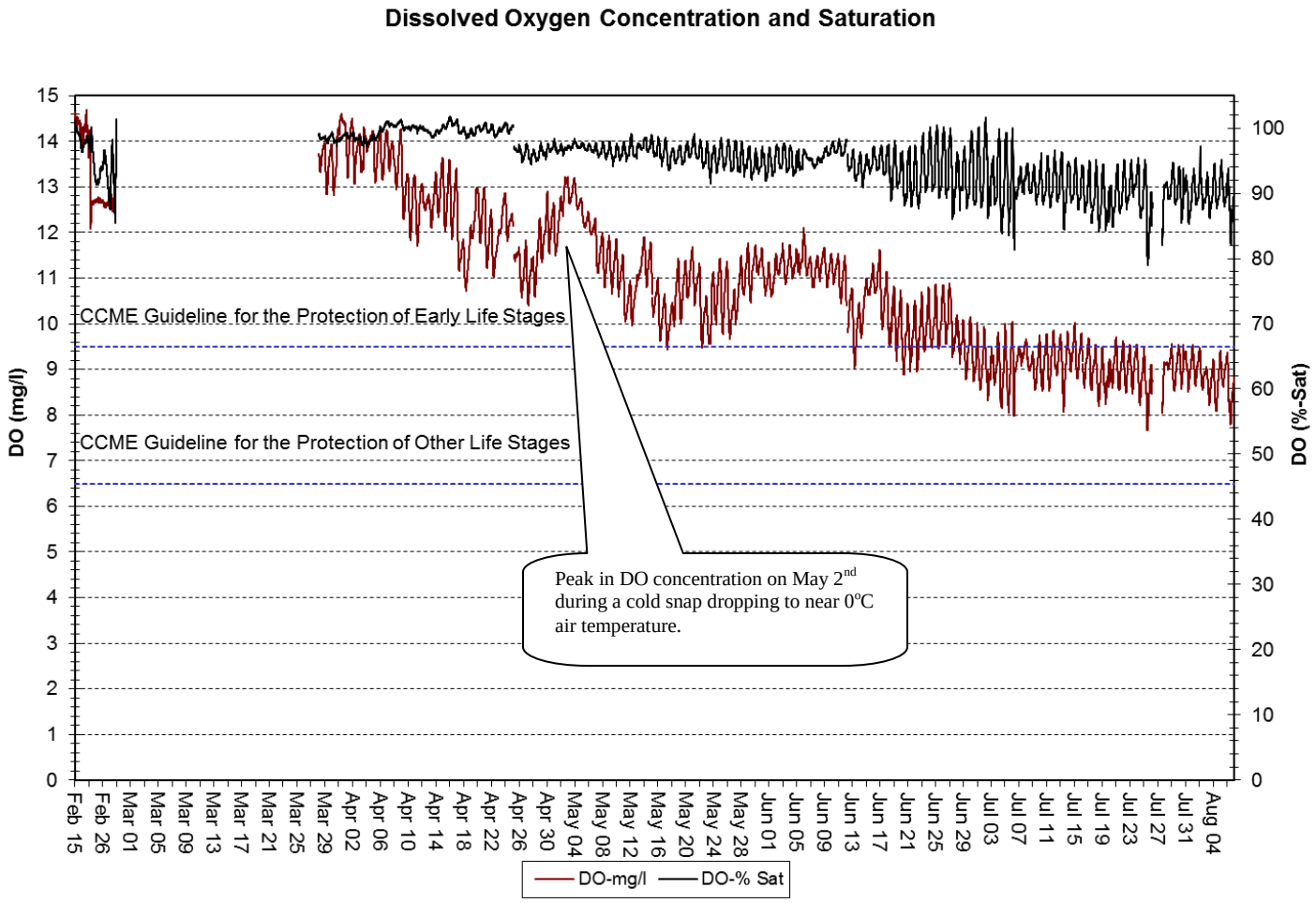
- pH levels fluctuated around a median value of 6.67 during the reporting period. Max values were found as high as 7.42 while a minimum of 5.93 was recorded. Most pH values fell between the CCME Guidelines of 6.5 to 9 units for the Protection of Aquatic Life, albeit on the lower end of the scale.

Figure 3: Specific Conductivity at Leary's Brook from February 15th to August 7th.



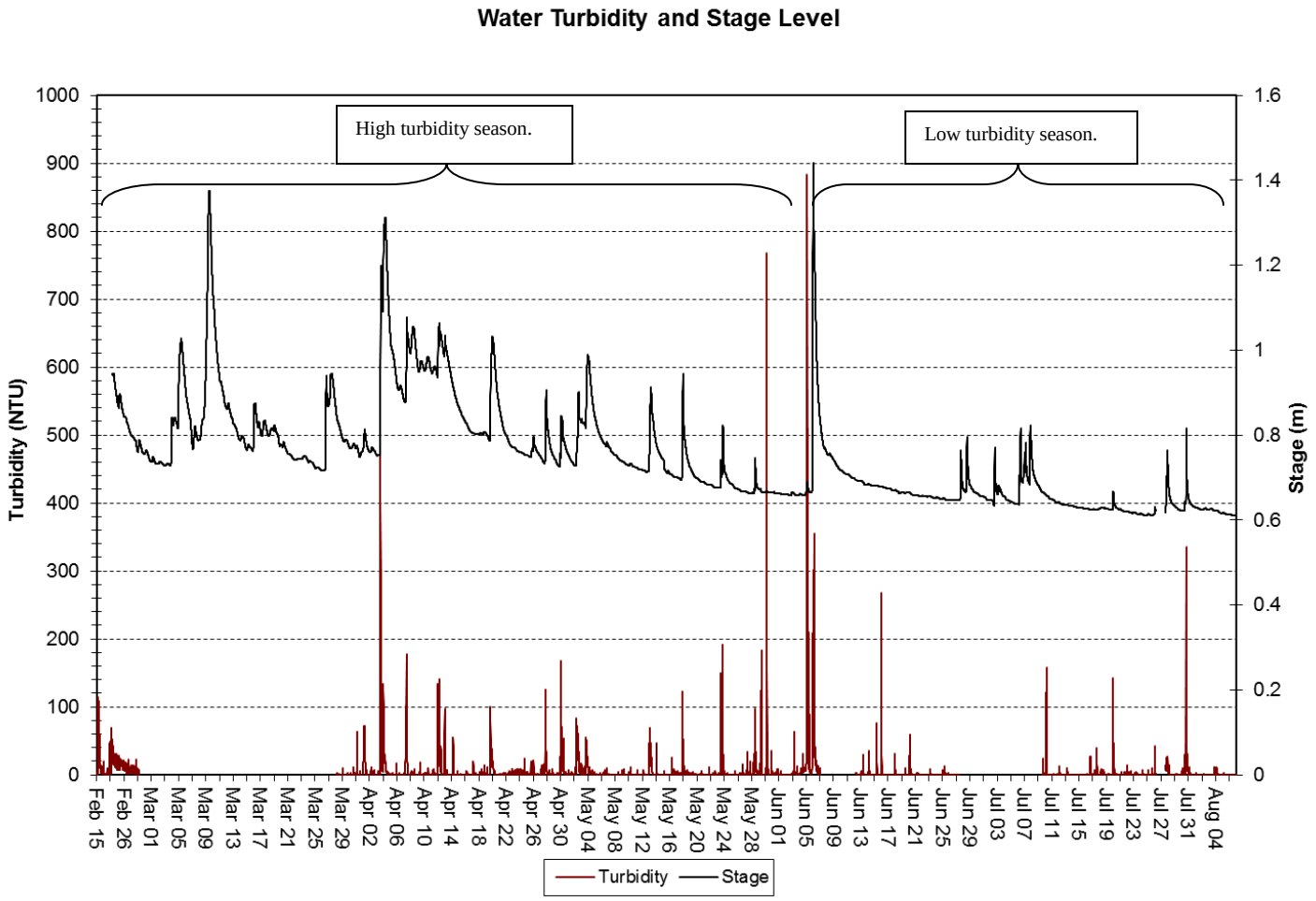
- A defining characteristic between summer and winter conductivity events in Leary's Brook is the presence or absence of a large spike in conductivity immediately before a decline. Interestingly, this large spike is present from December to the end of April and absent throughout the spring, summer, and fall months. It can be inferred that the spike is the result of road salt residue washing into the Leary's Brook system.
- During this report period, conductivity ranged from 118.3 µS/cm to 7859.9 µS/cm with a median value of 581.0 µS/cm.

Figure 4: Dissolved Oxygen at Leary's Brook from February 15th to August 7th.



- Dissolved oxygen concentration fell consistently from the winter high of 14.69 mg/l to the summer low value of 7.66 mg/l. Oxygen concentrations began to consistently fall below CCME Guidelines for the Protection of Early Life stage cold water biota in late June.

Figure 5: Turbidity at Leary's Brook from February 15th to August 7th.

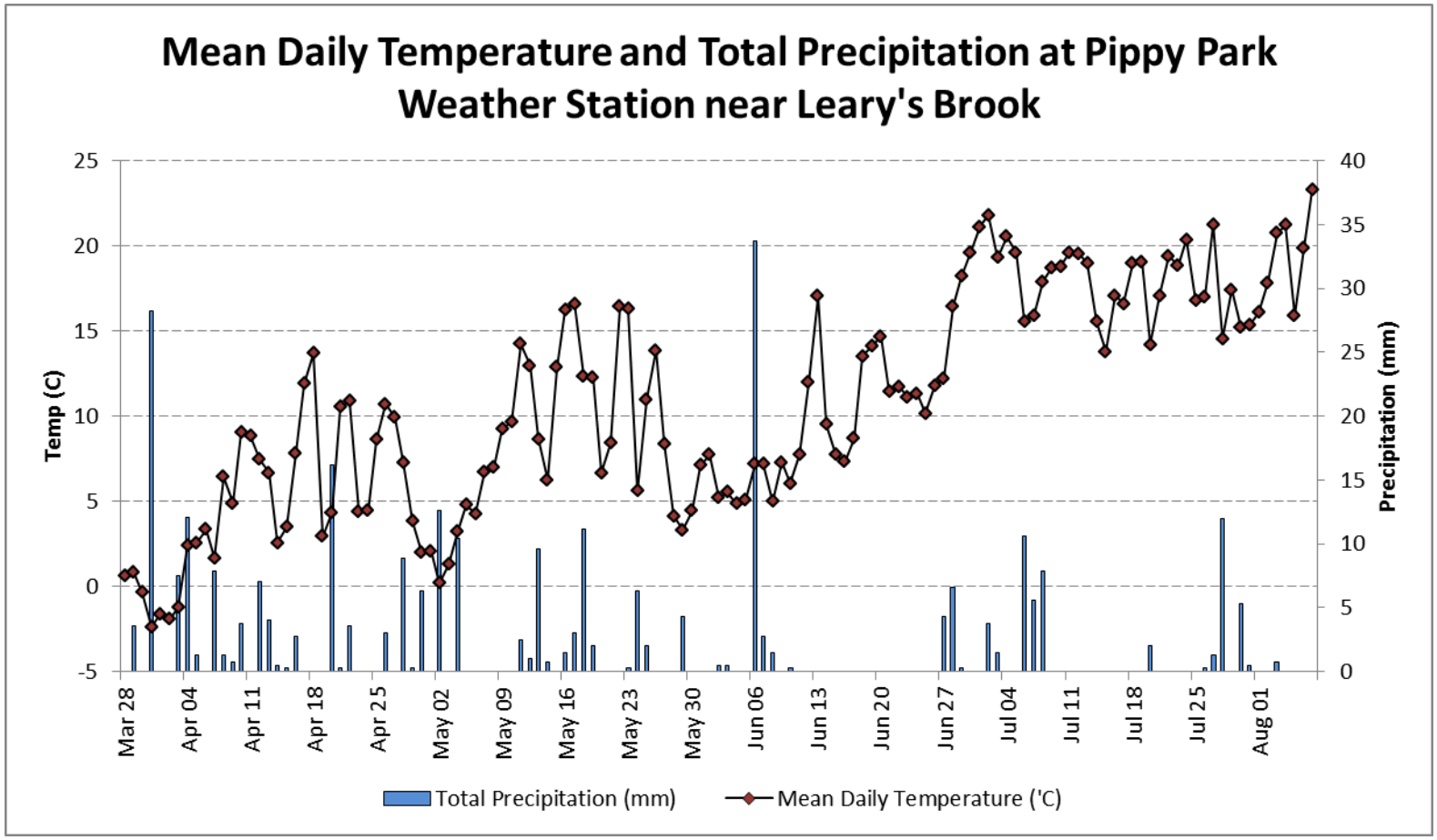


- A gap in data acquisition obscures the highly variable turbidity prevalent during winter and spring months. In the early part of the year, heavy snows and salt-laden melt water tend to cloud Leary's Brook on regular intervals. After spring freshet, however, clarity tends to stabilize with lower water levels.
- Over the course of the report period, turbidity ranged between 0.0 NTU and 883 NTU (median value: 0.00 NTU).

Conclusions

- A recurring problem with the communication cable at Leary's Brook resulted in data loss from February 28th to March 28th. This situation has now been resolved.
- No major water quality events were identified over the course of this report period.

Appendix



Prepared by:
Ryan Pugh
Department of Environment and Conservation
Water Resources Management Division
Phone: 709.729.1681
Fax: 709.729.3020