Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

July 14th, 2010 to August 11th, 2010

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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General

- Department of Environment and Conservation staff monitors the real-time web pages consistently.
- A planned power outage at the Confederation Building in addition to a datalogger problem erased three days of data from August 7th until August 11th. This gap was filled with data received from Water Survey of Canada staff.
- A consistent problem with fouling on the turbidity sensor has resulted in a record full of erroneous turbidity data lacking useful data. For this reason, a discussion regarding turbidity is omitted.

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 along side the Field Sonde. Values for temperature and dissolved oxygen are compared between the two instruments. A grab sample is taken to compare with the Field Sonde for specific conductivity, pH and turbidity parameters. Based on the degree of difference between parameters recorded by the Field Sonde, QAQC Sonde and grab sample a qualitative statement is made on the data quality in Table 1 upon Deployment.
  - At the end of a deployment period, readings are taken in the water body from the Field Sonde before and after a thorough cleaning in order to assess the degree of biofouling. During calibration in the laboratory, an assessment of calibration drift is made and the two error values are combined to give Total Error (T_e). If T_e exceeds a predetermined data correction criterion, a correction based on T_e is applied to the dataset using linear interpolation. Based on the value for T_e, a qualitative statement is also made on the data quality in Table 1 upon Removal.

Station	Date	Action	Comparison Ranking				
			Temperature	pH	Conductivity	Dissolved Oxygen	Turbidity
Leary's Brook at Prince Philip Drive	July 14th, 2010	Deployment	Excellent	Good	Marginal	Excellent	Excellent
	August 11th, 2010	Removal	Excellent	Good	Excellent	Good	NA

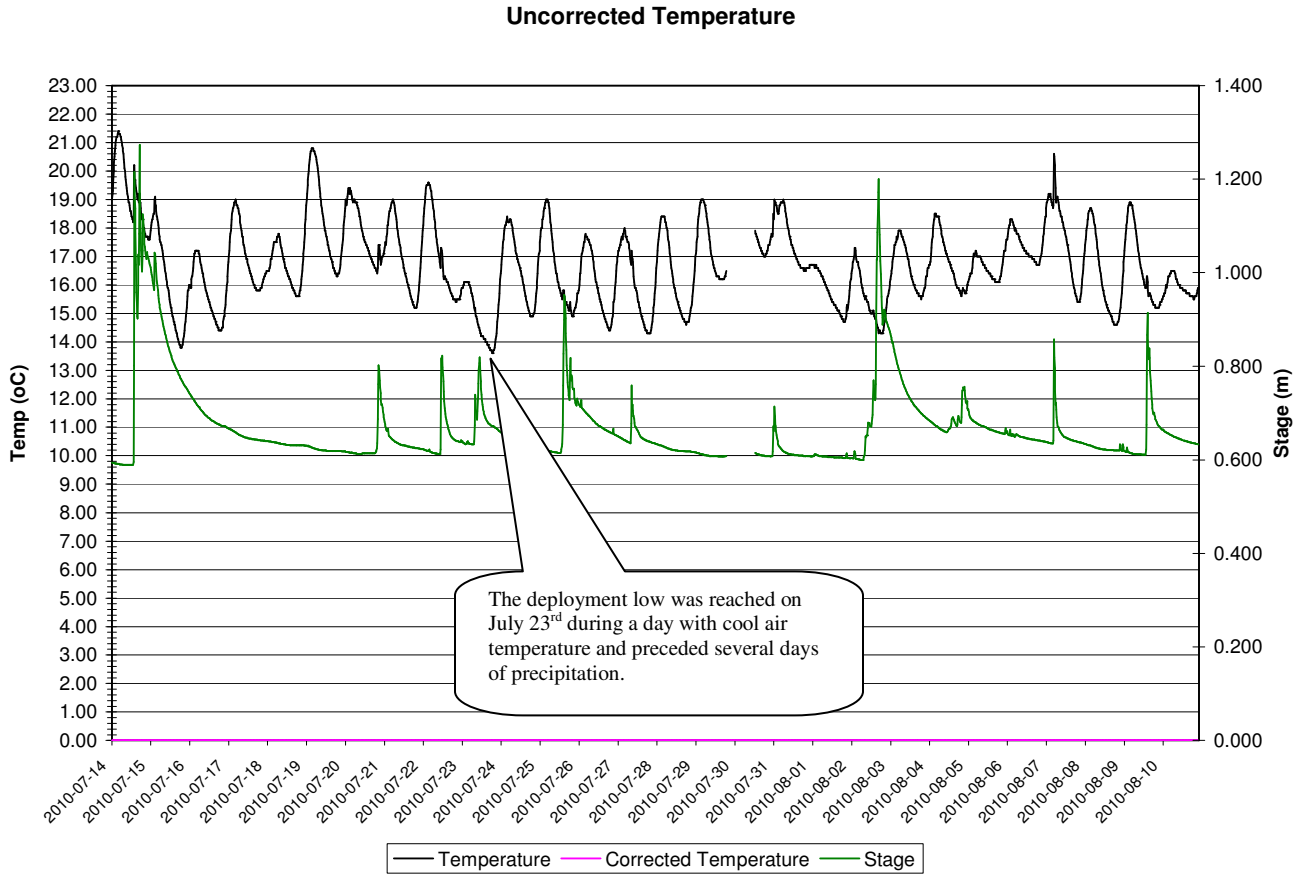
- Note: A rating of "Marginal" upon deployment for Specific Conductivity may be related to a discrepancy between grab sample and Hydrolab. An assessment of data quality at removal indicates that the reliability is "Excellent" in terms of total error.

Data Interpretation

- No correction was required for the water temperature record for this deployment period.

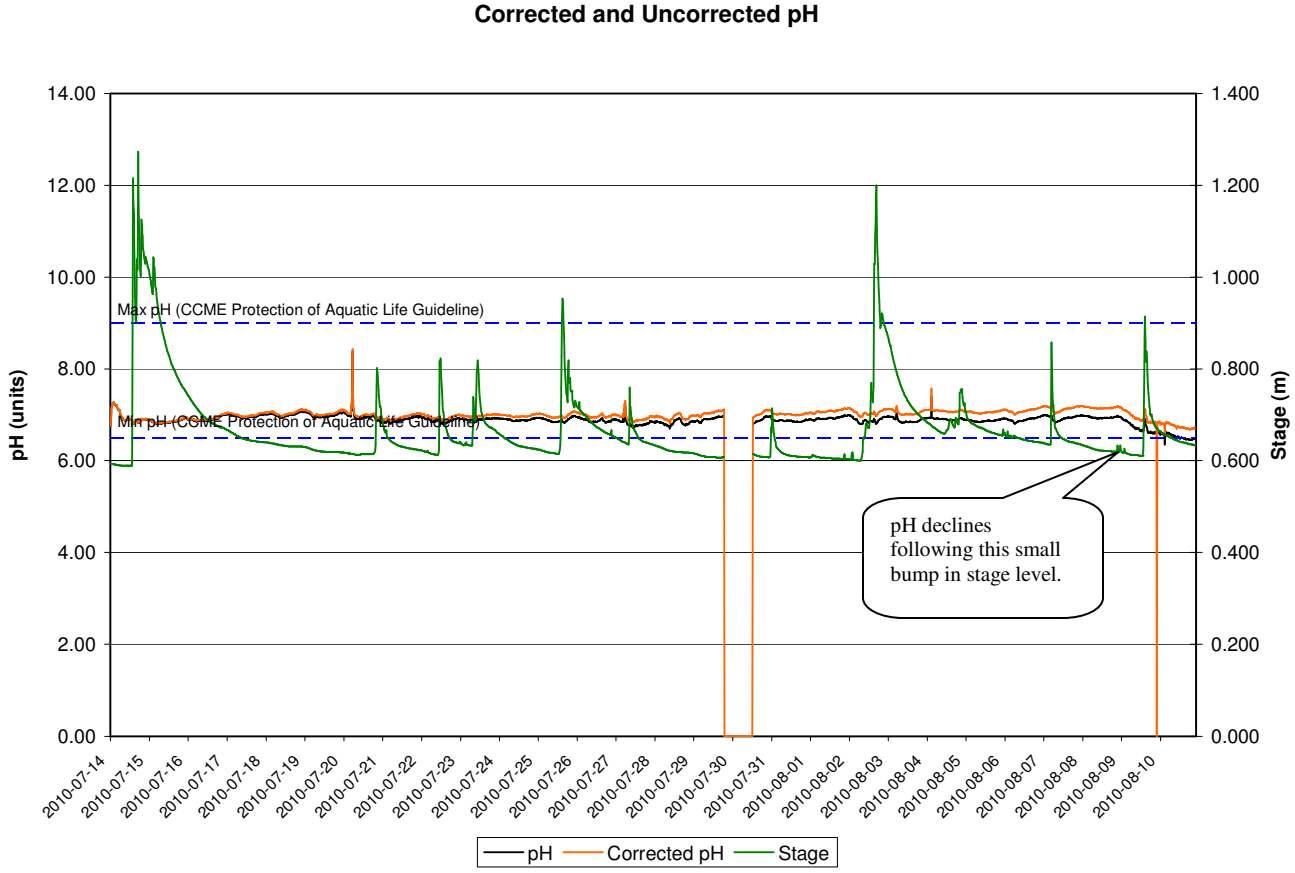
- An overall downward trend is recorded for this deployment period with temperature ranging from a high of 21.40°C to a low of 13.60°C. No significant variations are observed throughout the deployment period; save those related to cool days and precipitation.

Figure 1: Water Temperature at Leary's Brook from July 14th to August 11th, 2010



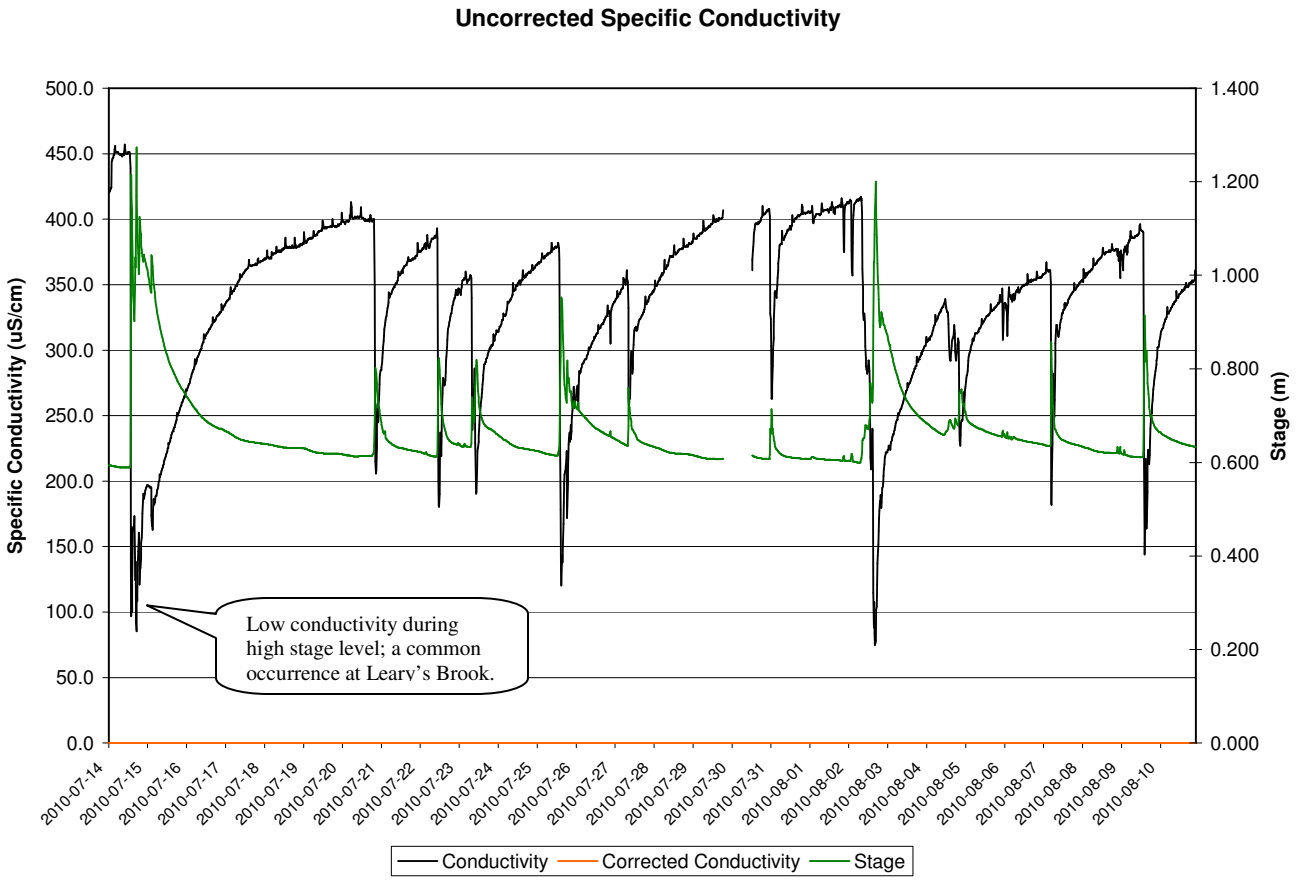
- A small correction was applied to pH during this deployment period due mostly to biofouling error. Interestingly, following a brief spike in stage level, a noticeable decline in pH to below CCME guideline levels is recorded. It is possible that during this precipitation event, the pH sensor was fouled by material washed into the stream channel.
- Corrected pH values range from 8.43 to a low of 6.57, all above CCME guidelines levels of 6.5 to 9.0.

Figure 2: pH at Leary's Brook from July 14th to August 11th, 2010



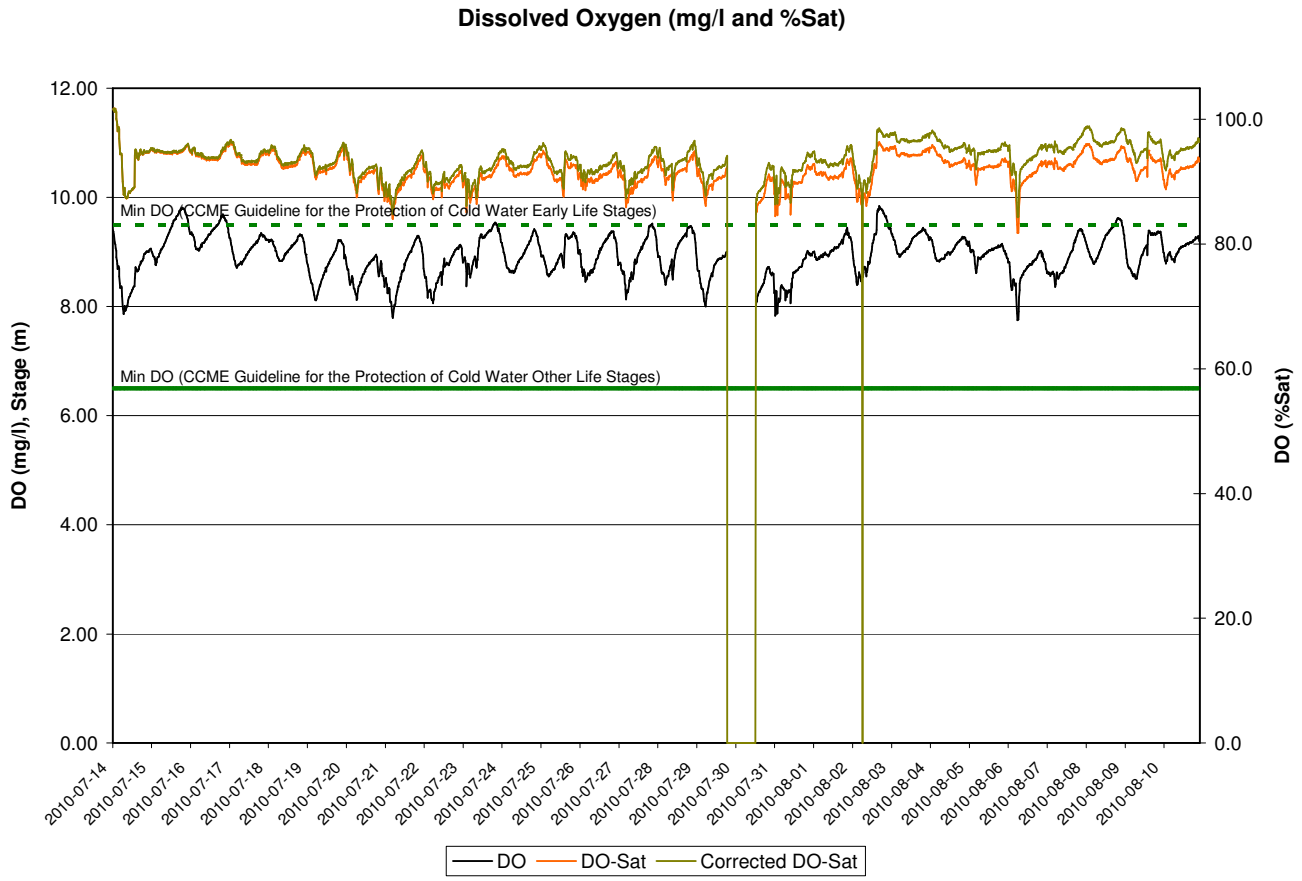
- No correction was applied to the record for Specific Conductivity and the data presented below is raw.
- A series of precipitation events causing spikes in stage level are highly correlated with drops in specific conductivity, likely due to a dilution effect of the stream channel by stormwater flow. A Pearson's r value of -0.904 indicates a highly negative correlation effect between stage level and conductivity.

Figure 3: Specific Conductivity at Leary's Brook from July 14th to August 11th, 2010



- A correction of 3.1% was applied to the %-Saturation record for dissolved oxygen during this deployment period.
- Saturation ranged from 101.8 to 84.4% indicating that during the saturation low point (August 6th at 6:00 pm to 6:30 pm), a combination of chemical reactions and/or respiration decreased the saturation of oxygen in Leary's Brook by 15.6%.
- The mean air temperature was found to be ~20^{o}C on August 6th with rain showers. Warm temperatures tend to increase respiration rates while stormwater flow, possibly carrying chemicals undergoing oxidation, decreases the availability of oxygen in the water column.
- The concentration of dissolved oxygen was typically found to be above the CCME guideline for the protection of "Other Life Stage" cold water biota but below the guideline for the protection of "Early Life Stage" cold water biota.
- No adverse effects on aquatic life have been identified by WRMD staff or area residents, indicating that no concern is warranted regarding the concentration of dissolved oxygen.

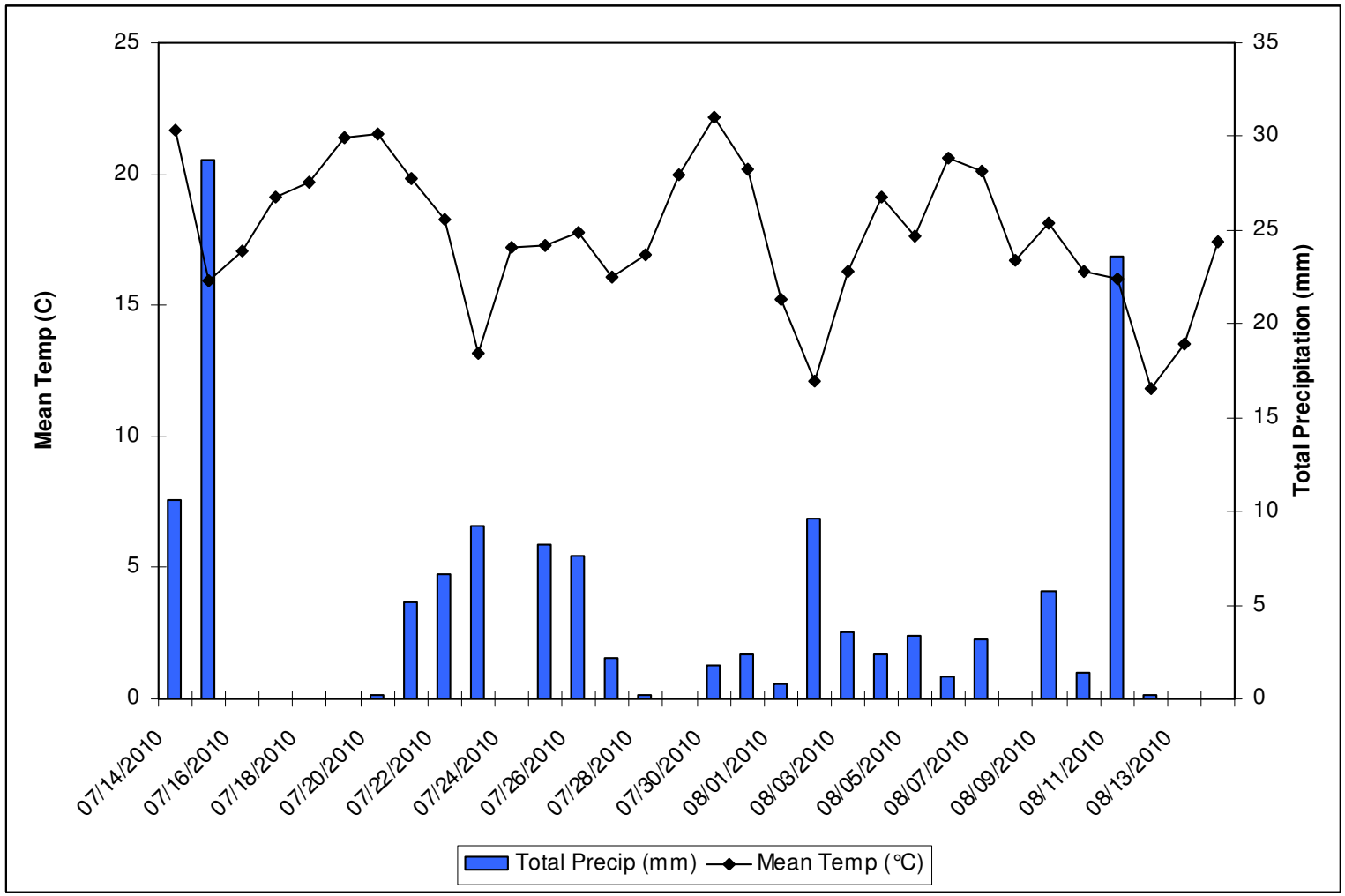
Figure 4: Dissolved Oxygen at Leary's Brook from July 14th to August 11th, 2010



Conclusions

- No significant impacts on water quality unusual for Leary's Brook have been identified during this deployment period.
- During site visits, visual inspection of the river suggested that the river's health is normal.
- Efforts will be made to ensure that future turbidity data gathered at Leary's Brook will be reliable.

Appendix



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