Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

August 11, 2010 to September 8, 2010

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

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NF02ZM0178, Leary's Brook at Prince Philip Drive
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General

- Department of Environment and Conservation staff monitors the real-time web pages consistently.
- The temporary substitute instrument was replaced this deployment with the original Hydrolab (s/n 44975) designated for this station.
- S/n 44975 was used as the QAQC instrument for the removal of s/n 46319 at the end of the previous deployment period and was then deployed for this month, leaving no QAQC sonde available at this time.

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	August 11, 2010	Deployment	NA	Fair	Good	NA	Excellent
	September 8, 2010	Removal	Excellent	Excellent	Good	Excellent	Excellent

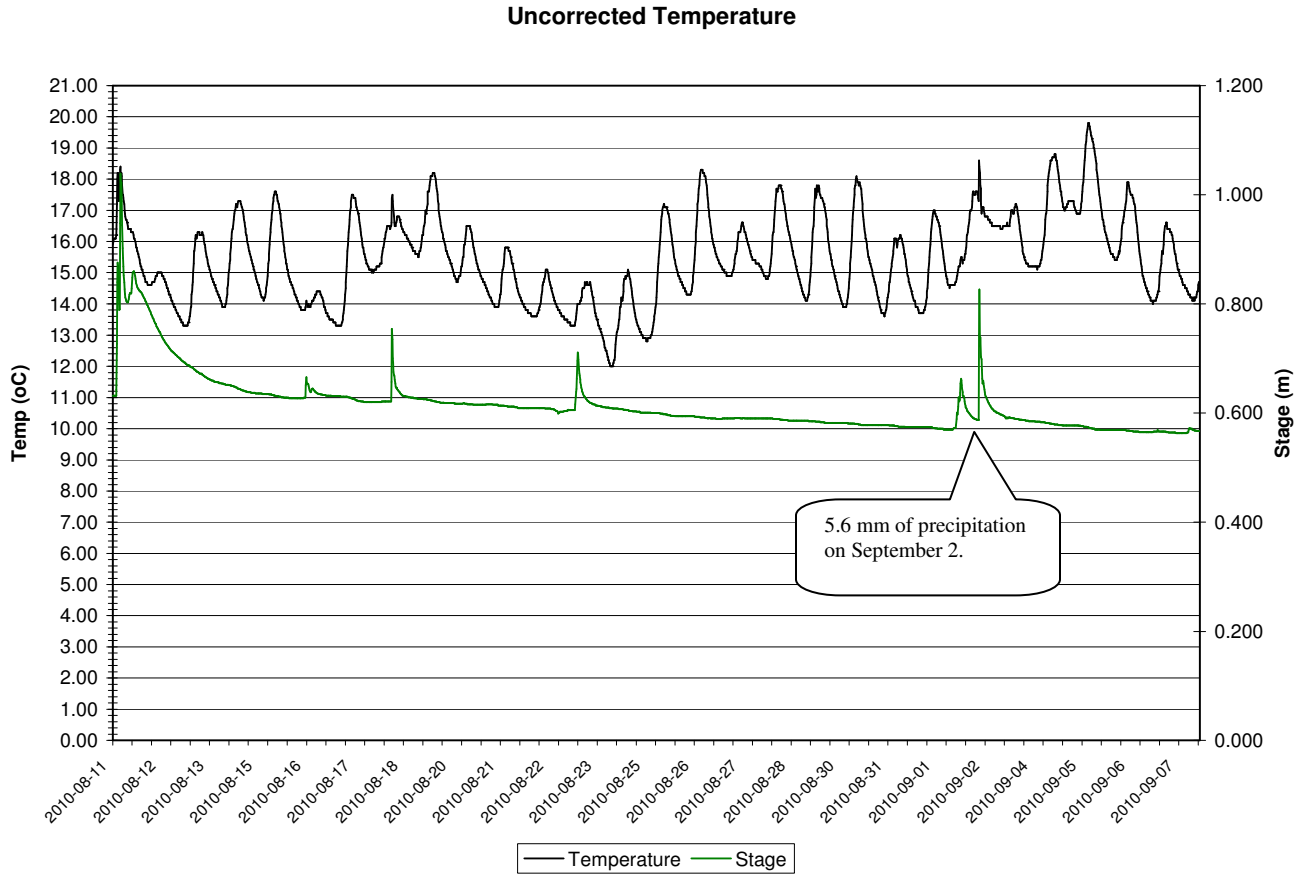
- Note: Since no QAQC sonde was available on deployment, there are no rankings for temperature and dissolved oxygen.

Data Interpretation

- Raw water temperature is provided in the Figure below. No correction was deemed necessary.
- Water temperature increased slightly over the deployment period. A low of 12.00°C was recorded and increased to a maximum of 19.80°C.

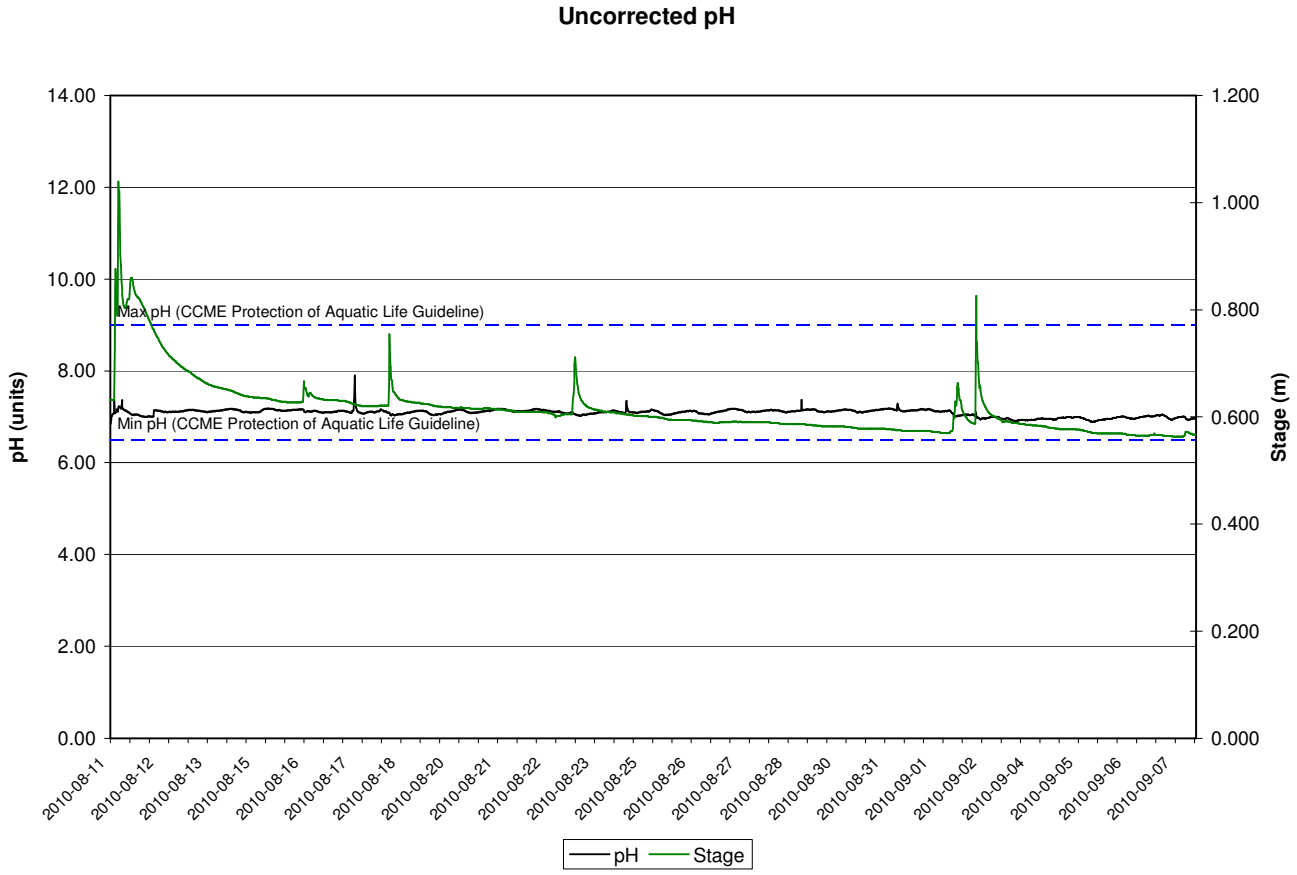
- During rainfall on September 2, the temperature of Leary's Brook did not show the typical nocturnal decline but instead remained elevated throughout the night due to inflow from storm sewers. Within a day or so, this returned to normal.

Figure 1: Water Temperature at Leary's Brook from August 11 to September 8



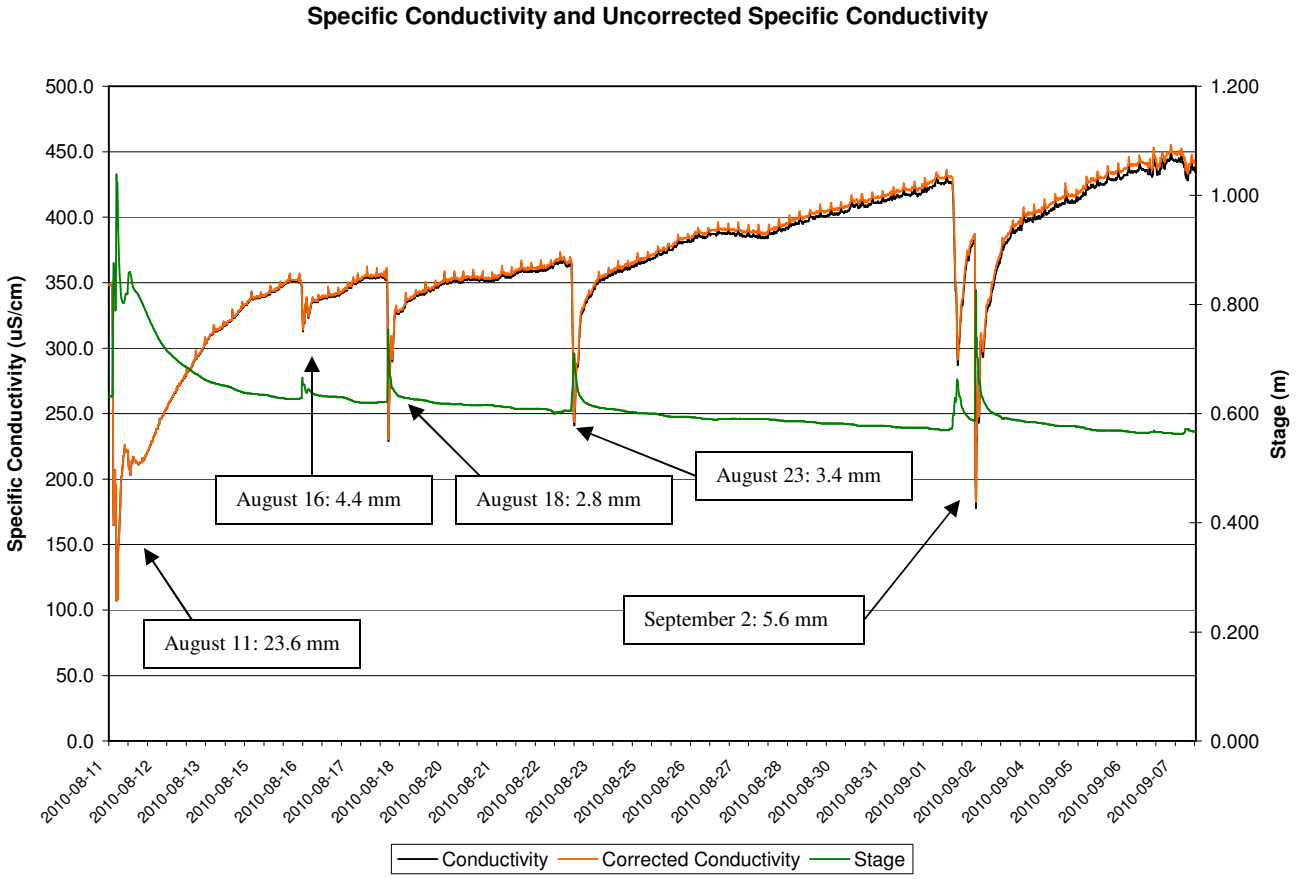
- No correction was needed for pH data during this deployment period.
- The range in pH measurements over this time period was from 6.84 to 7.90; all between the CCME Guideline of 6.5 to 9.0 for the Protection of Aquatic Life.
- No major fluctuations in pH were recorded during this deployment that gives cause for concern.

Figure 2: pH at Leary's Brook from August 11 to September 8



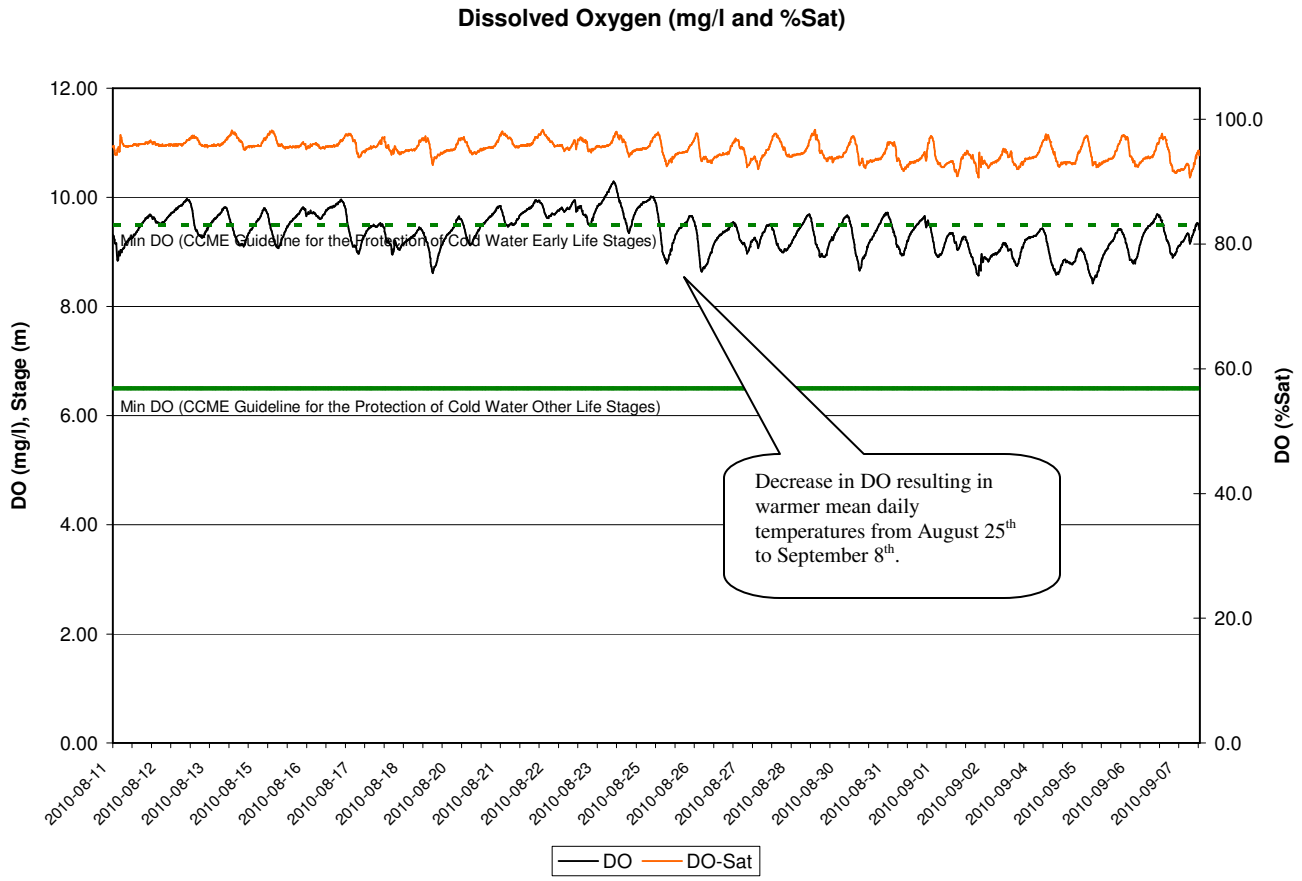
- A slight correction of 5.60 µS/cm was applied to the record for specific conductivity for this deployment.
- Corrected specific conductivity ranged from 107.0 to 455.5 µS/cm with a median of 365.7 µS/cm.
- All changes in specific conductivity occur in conjunction with precipitation and stage-level increases, as indicated in the figure below. Following the decline in precipitation, there is a steady rise in conductivity until the next occurrence of precipitation.

Figure 3: Specific Conductivity at Leary's Brook from August 11 to September 8



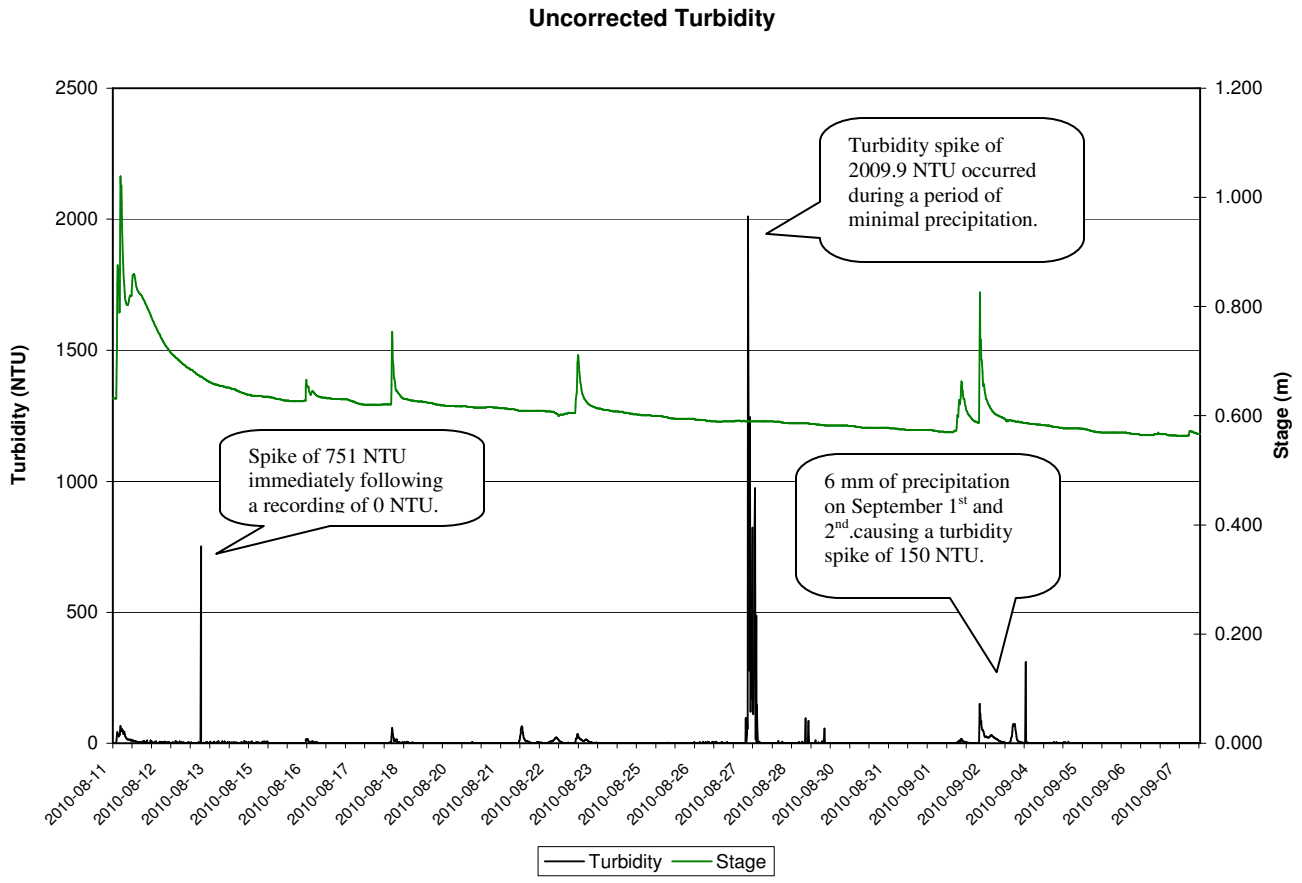
- A correction was not applied to Dissolved Oxygen for this deployment period.
- Dissolved oxygen saturation at Leary's Brook station ranged from 90.7% to 98.3% indicating that oxygen was near its saturation point for the whole deployment period.
- The concentration of DO ranged from 8.42 to 10.29 mg/l with a median of 9.37 mg/l, placing more than 50% of the data below the CCME guideline of 9.5 mg/l for the Protection of Early Life Stage Aquatic Biota. Given how late the deployment period is in the summer season, however, it's probable that most biota has surpassed its sensitive early life stages.

Figure 4: Dissolved Oxygen at Leary's Brook from August 11 to September 8



- Turbidity was not corrected for this deployment period.
- For most of this deployment, turbidity was found to be low-level with a median turbidity level of 0.0 NTU. While Leary's Brook was found to be clear for most of the month, a few spikes are evident – with one reaching 2009.9 NTU.

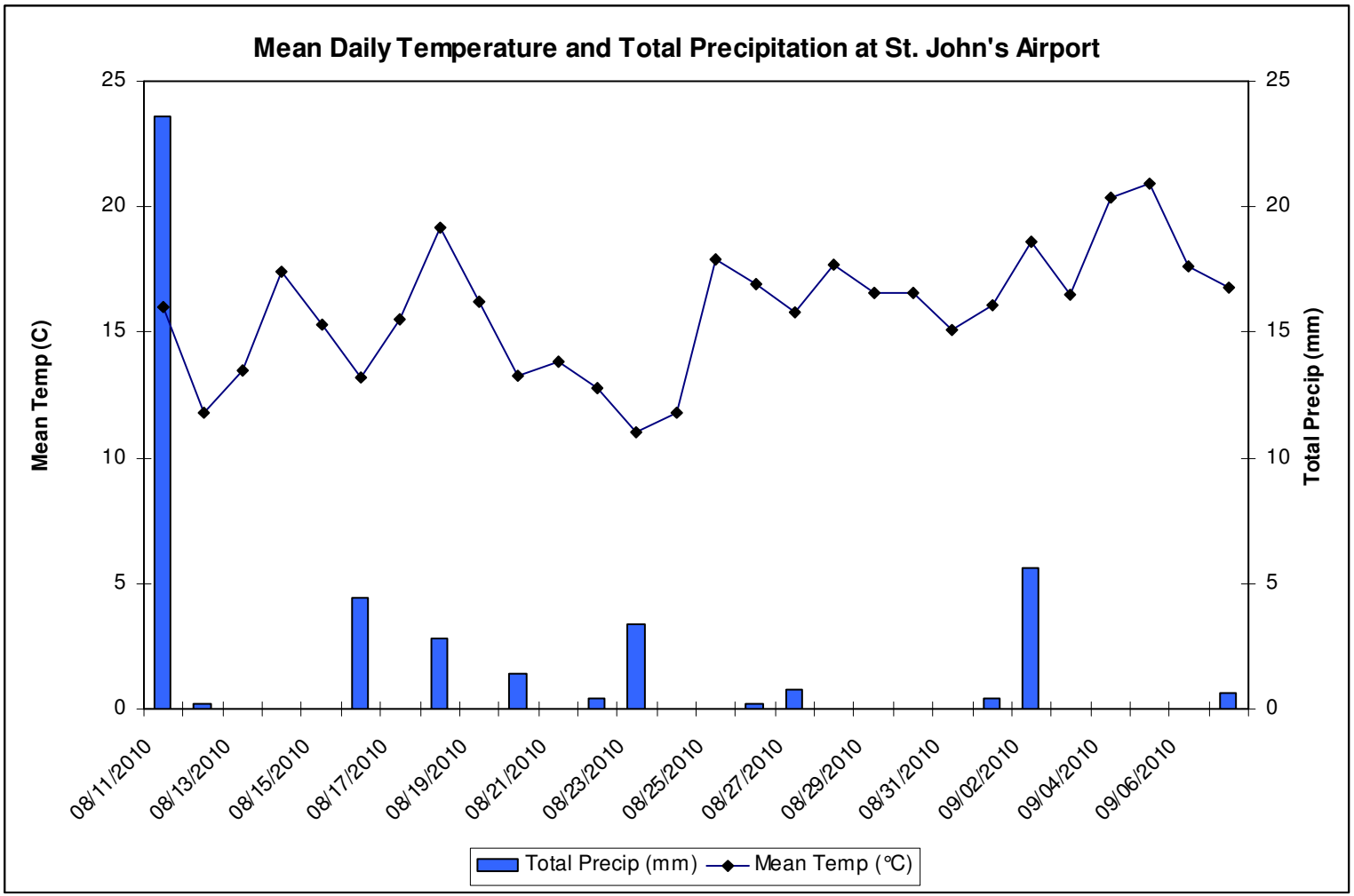
Figure 5: Turbidity at Leary's Brook from August 11 to September 8



Conclusions

- Dissolved oxygen and turbidity showed some instances indicating potential impact on water quality (in terms of DO concentration falling below CCME Guidelines for the Protection of Early Life Stage Cold Water Biota and turbidity records as high as 2009.9 NTU). No cases of disturbance to wildlife have been reported suggesting these fluctuations may be within the normal parameters of Leary's Brook.
- The original Hydrolab designated for this water quality station has been redeployed following a repair and performance testing period.

Appendix



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