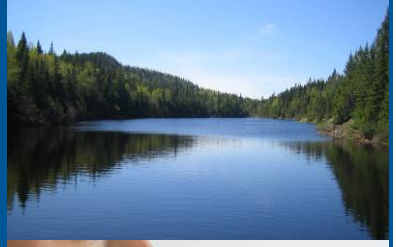
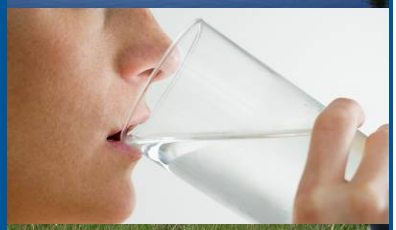






Real-Time Water Quality Deployment Report

Leary's Brook at Prince Philip Drive

June 16th, 2010 to July 14th, 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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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 following report presents an interpretation of the water quality data recorded at Leary's Brook at Prince Philip Drive station for the deployment period lasting from June 16th, 2010 to July 14th, 2010; a period of 28 days.
- A series of technical issues compounded to prevent the calculation of Data Quality Rankings. While the process outlined below in the Maintenance and Calibration of Instrument Section is typically followed, it was not possible in this case, though the description of the method is kept for the reader's interest.

Maintenance and Calibration of Instrument

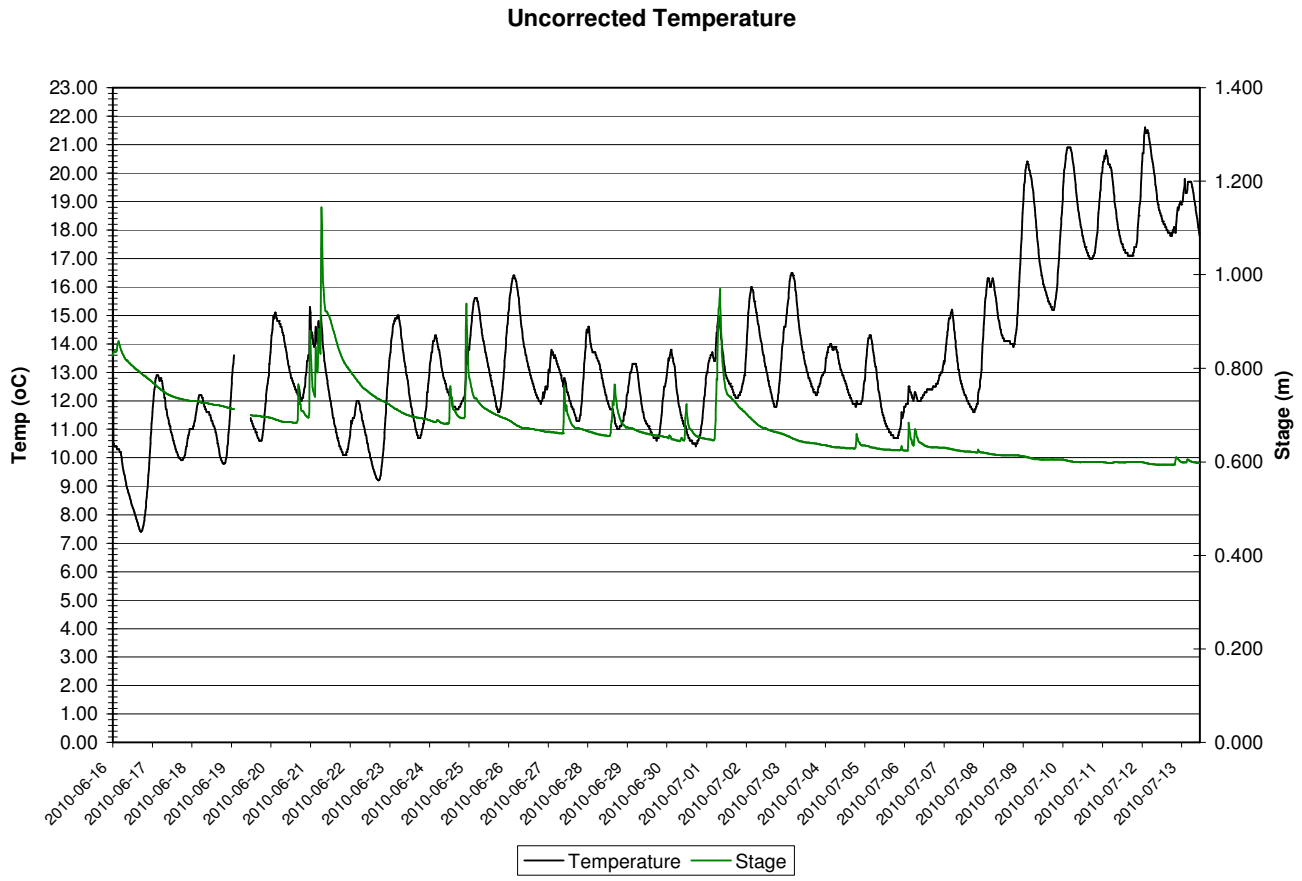
- As part of the Quality Assurance and Quality Control protocol (QAQC), an assessment of the reliability of data recorded by an instrument is made at the beginning and end of the deployment period. The procedure is based on the approach used by the United States Geological Survey.
  - Upon deployment, 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	June 16th, 2010	Deployment	NA	NA	NA	NA	NA
	July 14th, 2010	Removal	NA	NA	NA	NA	NA

- A series of problems with this month's deployment resulted with limited QAQC interpretation. A problem with the turbidity probe that was found during calibration meant the sonde intended to be used as the QAQC sonde was deployed as the field sonde leaving none available for QAQC purposes. Also, a problem with the grab sample shipment meant that no results were available for comparison. At the end of deployment, a connection could not be made with the field sonde and no biofouling data could be recorded.
- A problem with the turbidity sensor in the replacement field sonde also failed to work and returned values of 3000 NTU for the entire month. As a result, turbidity data is not presented in this report.
  - Due to the problems outlined above, no corrections were applied to the data for this month.

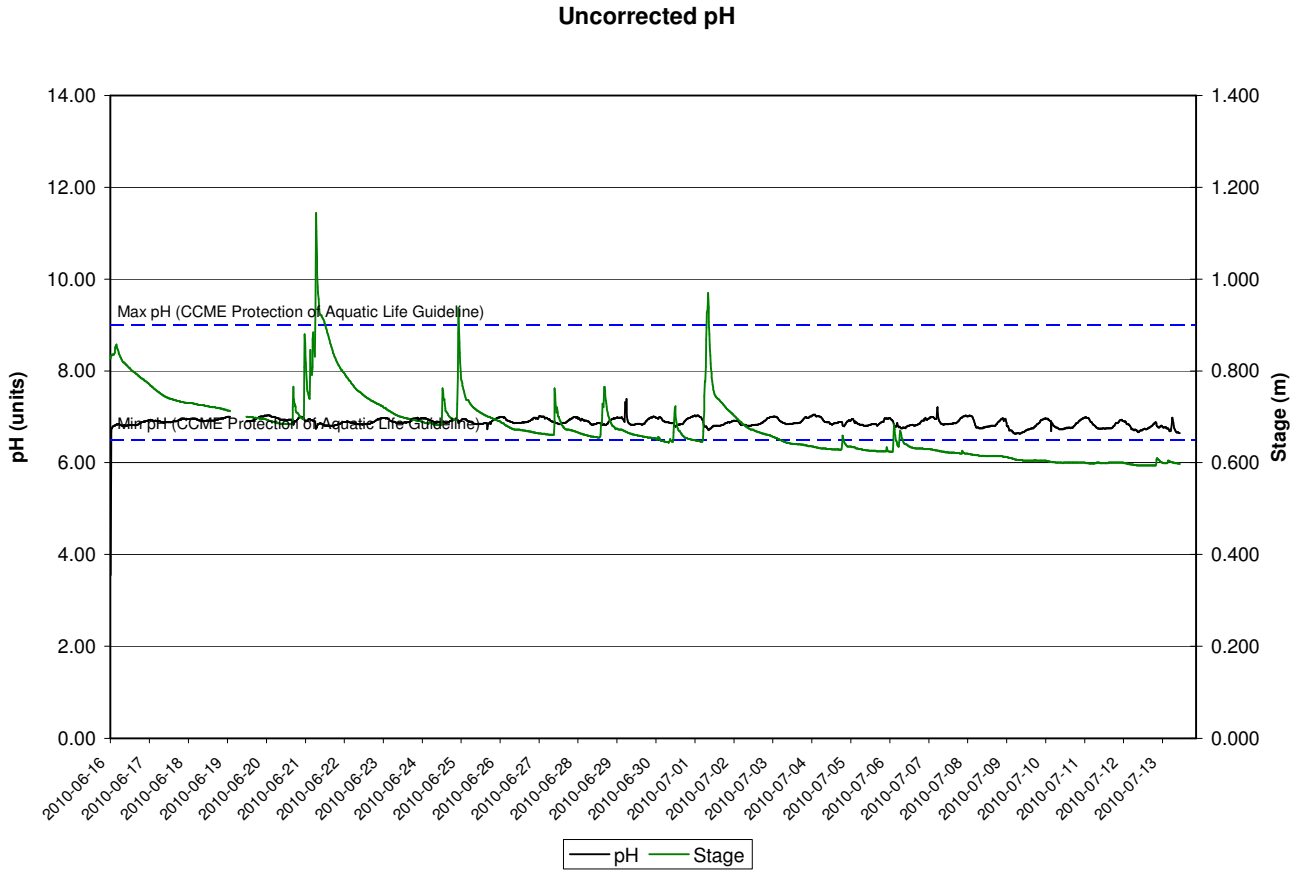
Data Interpretation

Figure 1: Water Temperature at Leary's Brook from June 16th to July 14th, 2010



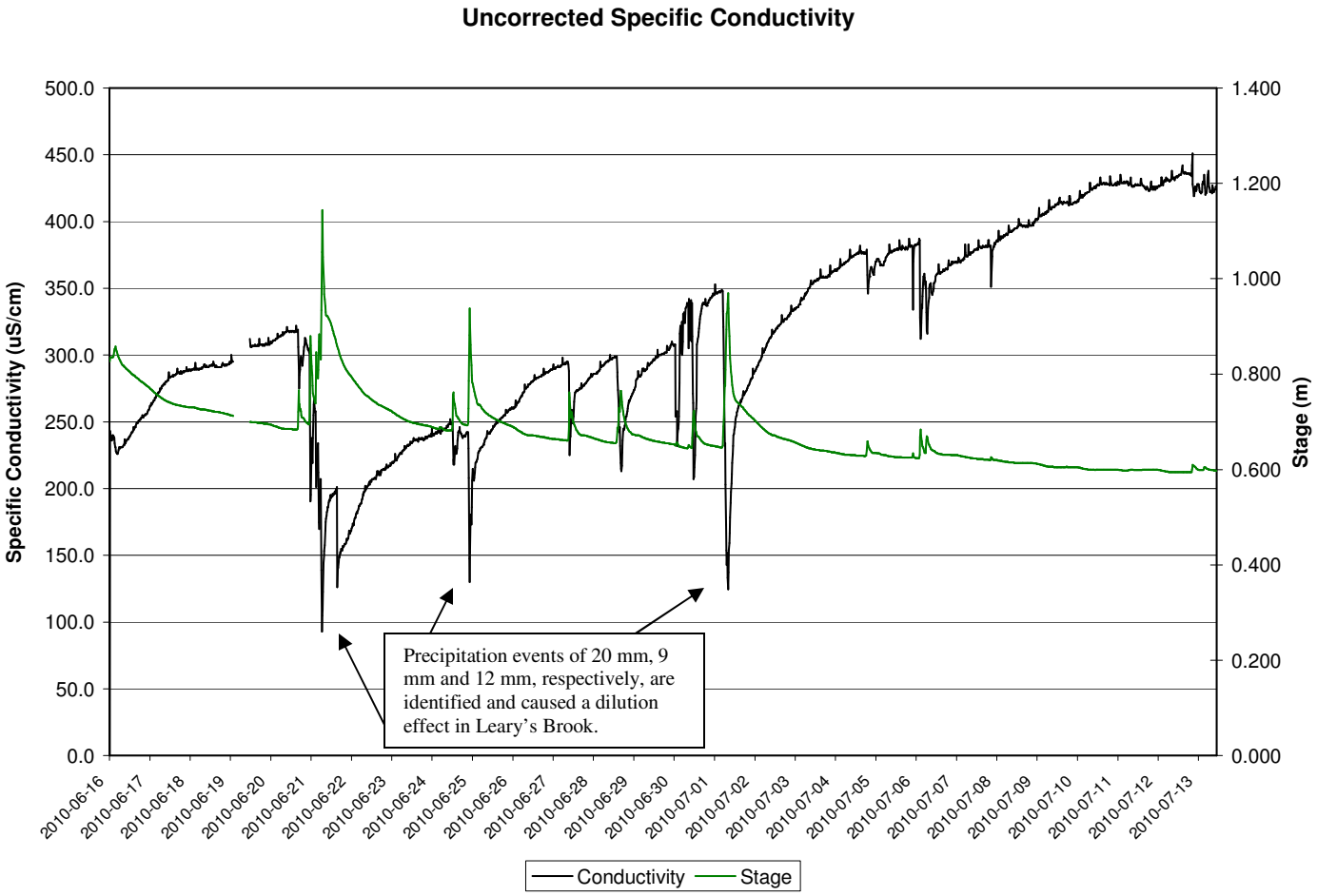
- For this deployment period, water temperature at Leary's Brook in June presented a marginally positive increase from a low of 7.40^{o}C but began to rise sharply from July 6, onward, to a maximum of 21.60^{o}C.
- This trend reflects the mean daily temperatures depicted in the Appendix where mean June temperatures hovered near 15^{o}C whereas mean July temperatures were above 20^{o}C.

Figure 2: pH at Leary's Brook from June 16th to July 14th, 2010



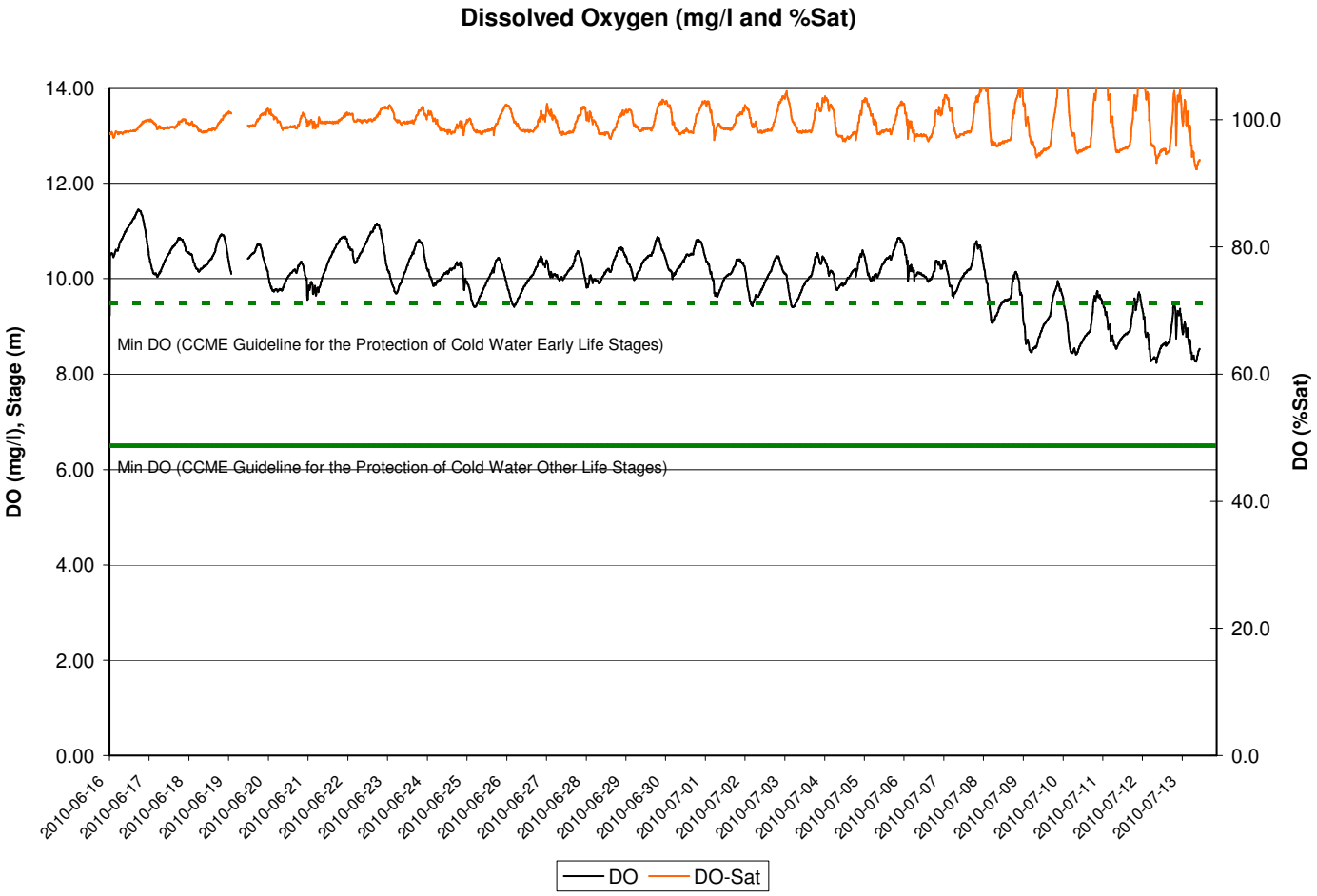
- pH at Leary's Brook ranged from 6.63 to 7.39 with a median of 6.88 and was found to reside within the CCME Guidelines for the Protection of Aquatic Life (6.5 to 9.0). No significant events were recorded during this deployment period.

Figure 3: Specific Conductivity at Leary's Brook from June 16th to July 14th, 2010



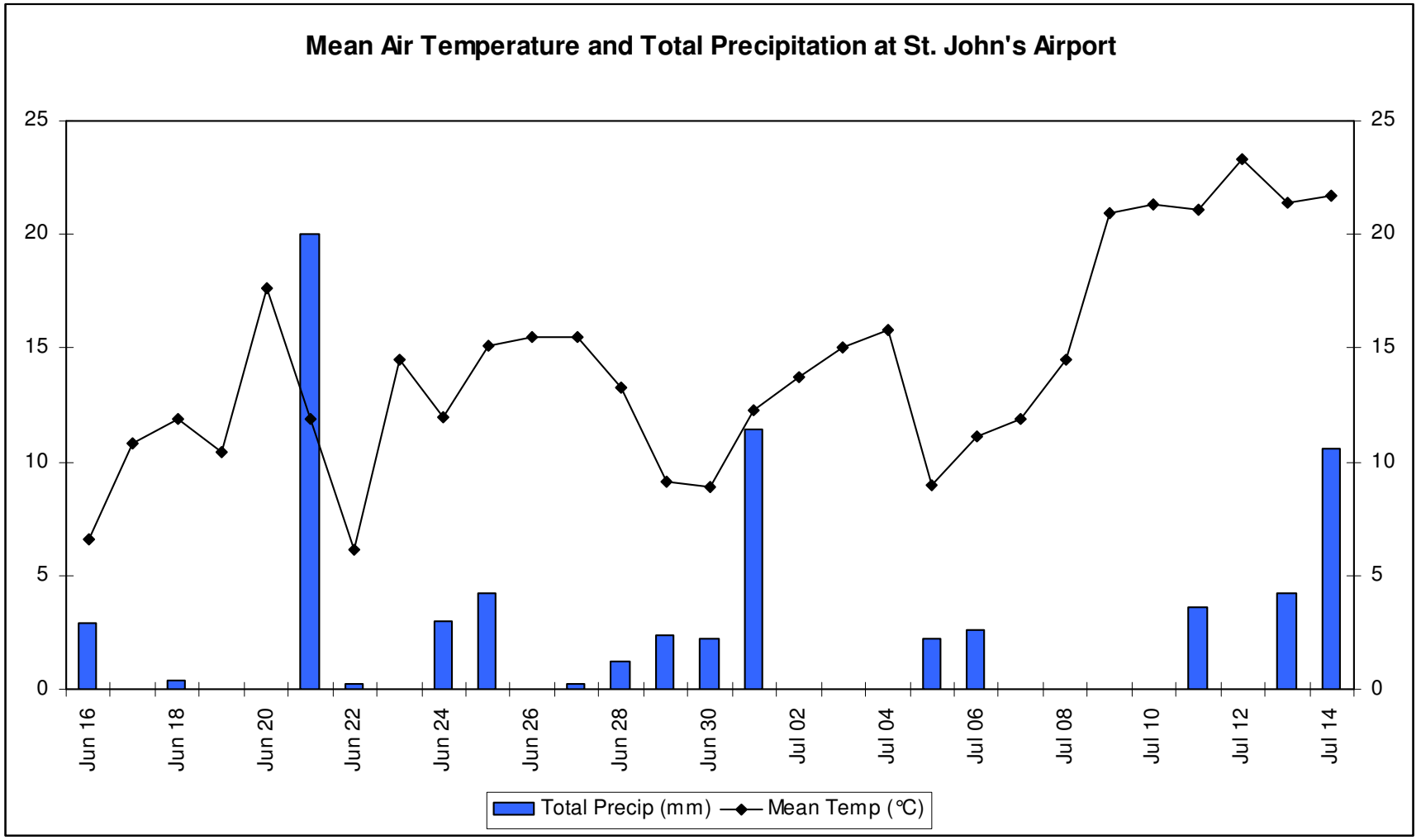
- Over the course of this deployment, Specific Conductivity followed a steady upward trend from a low of 92.9 to 451.0 µS/cm.
- Precipitous drops in conductivity were noted during periods of heavy rainfall as indicated on the figure above. Shortly after the rainfall and the associated peak in stage, specific conductivity begins to recover.
- The pattern of increasing specific conductivity is consistent with the decreasing stage level indicated by the green trace above. During the hot summer weather, precipitation is minimal and groundwater intrusion recedes to baseflow. Consequently, the dissolved ions and chemicals in the river become more concentrated, increasing conductivity.

Figure 4: Dissolved Oxygen at Leary's Brook from June 16th to July 14th, 2010



- The concentration of Dissolved Oxygen ranges from 92.2 to 109.2% from June 16th to July 14th. During periods of high flow, such as during a rainstorm, water becomes supersaturated with air as water pours from culverts and flows vigorously over riffles and rapids. During warm weather, dissolved oxygen is consumed by aquatic organisms and chemicals as they become oxidized. Additionally, at night, plants have a net consumption of oxygen due to a reduction of photosynthesis. Consequently, DO saturation is found to be lowest during the night and highest in the afternoon.
- Meanwhile, the concentration of DO in water is affected highly by water temperature. High temperatures reduce the amount of oxygen that can be dissolved in water. Therefore, although the percentage oxygen saturation is highest in the day, DO concentration is usually at its lowest due to water heated by incoming solar radiation. For this month, the concentration of DO was found to range from 11.45 to 8.24 mg/l – levels below the CCME Guideline for the Protection of Aquatic Life (9.5 mg/l for Cold Water, Early Life Stage Biota).
- This situation will be monitored closely.

Appendix



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