Government of Newfoundland and Labrador
**Department of Environment and Conservation**
**Water Resources Management Division**

# Real Time Water Quality Monthly Report
# Leary Brook- St. John's NL
# May 31-July 13, 2007

## General

- Data from the Leary Brook monitoring station is monitored by the Water Resources Management Division staff on a monthly basis.

## Maintenance and Calibration of Instrumentation

- The following table displays the dates when the Datasonde was removed for routine cleaning, maintenance and calibration and when it was redeployed.

**Table 1**: Table of Datasonde removal and installation dates

| Date Installed | Date Removed |
|---|---|
| May 31, 2007 | July 13,2007 |

- Water quality readings were taken with a Minisonde at the time of removal for comparison purposes. The Minisonde was calibrated prior to use.

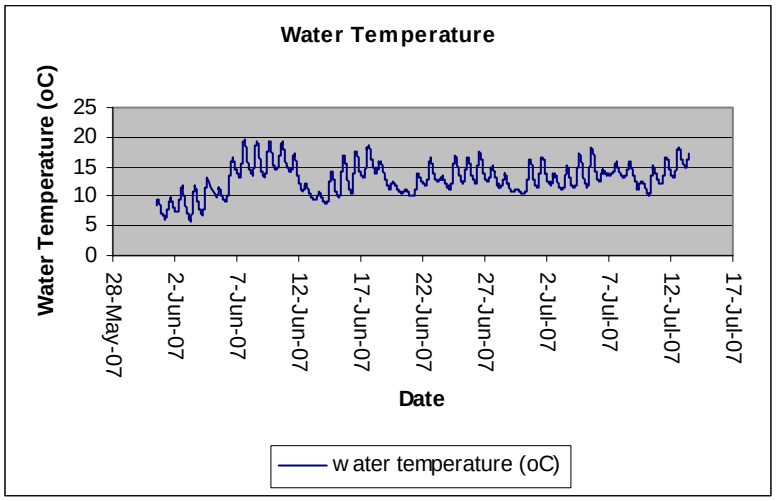
## Data Interpretation

- Leary Brook is an urban water system and is greatly impacted by significant precipitation events, due to storm drainage inputs and surface run-off. This relationship is outlined by comparing the water quality graphs below to precipitation data (Appendix 1) collected for the same time period.
- Diurnal and seasonal changes are depicted in the water quality graphs below.
- An unexplained data gap occurred between June 4 at 1500hrs and June 5 at 1000hrs. This gap may be the result of a temporary transmission failure.

**Water Temperature:**

- Diurnal fluctuations are evident throughout the deployment period as daytime maximum and nighttime minimum water temperatures **(Table 1)** correspond to daytime maximum and nighttime minimum air temperatures**(Appendix 1)**. An overall increase is seen in water temperature, which is consistent with the gradual seasonal increase in air temperature during this period.

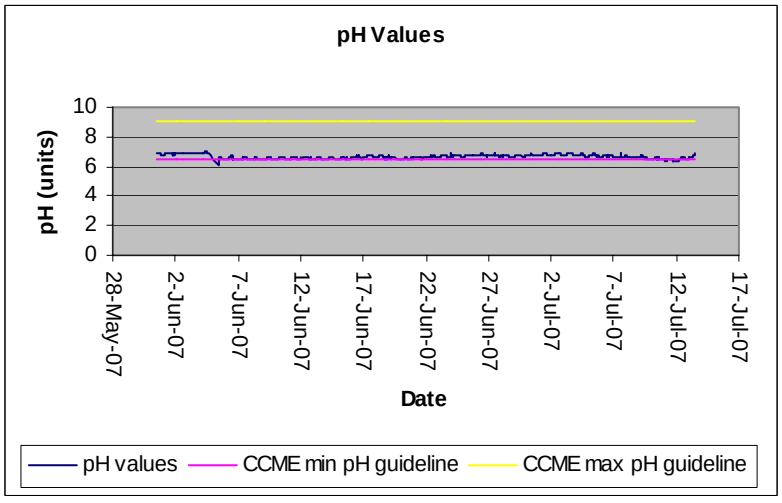
**Figure 1: Water Temperature**




**pH:**

- The pH remained relatively constant throughout the deployment **(Figure 2)**, with the largest variation occurring between June 4 and 5, when levels dropped quickly from 6.9 to 6.1. This decrease corresponds with the data gap experienced between June 4 and 5, and may be a result of a transmission failure, rather than a water quality event. Most pH values were within the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9; however some values fell below 6.5. These lower values may reflect the naturally acidic pH conditions typically found in surface waters throughout the province.

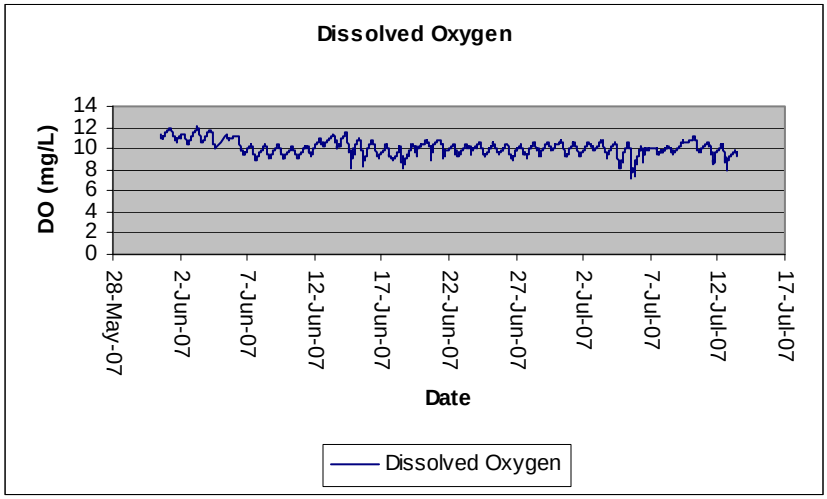
**Figure 2: pH**




**Dissolved Oxygen:**

- Dissolved oxygen (DO) values typically fluctuated in the 9-10mg/L range for the deployment period **(Figure 3)**. Periods when the DO values fell below 9mg/L or rose above 10mg/L correspond with increases and decreases in water temperature **(Figure 1)**. All DO values were above the Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life recommended minimum DO levels: (cold water/other life stages – above 6.5; warm water/other life stages – above 5.5; warm water/early life stages – above 6; cold water/early life stages – 9.5 mg/L).

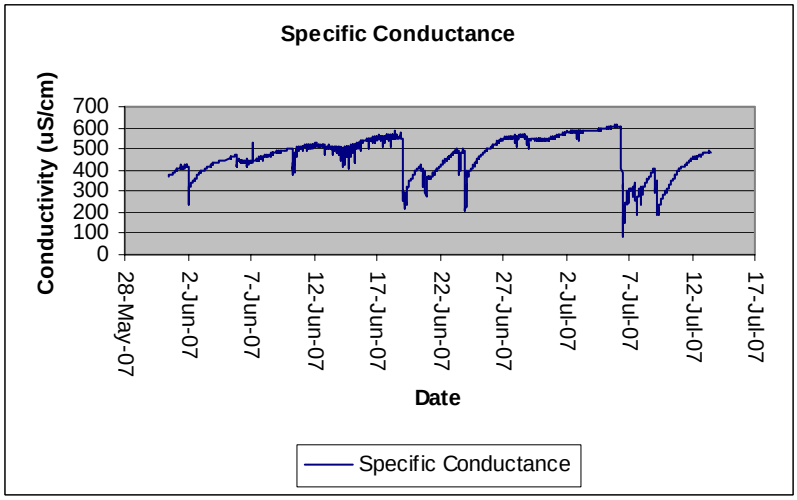
**Figure 3: Dissolved Oxygen**




**Specific Conductivity:**

- Conductivity values plummeted rapidly on 5 separate occasions during the deployment period, occurring on June 2, 19, 24 and Jul 6 and 9 **(Figure 4)**. These variations correspond directly with significant rainfall events that occurred on the same dates **(Appendix 1)**. The rainfall appears to have a dilution effect on conductivity levels.

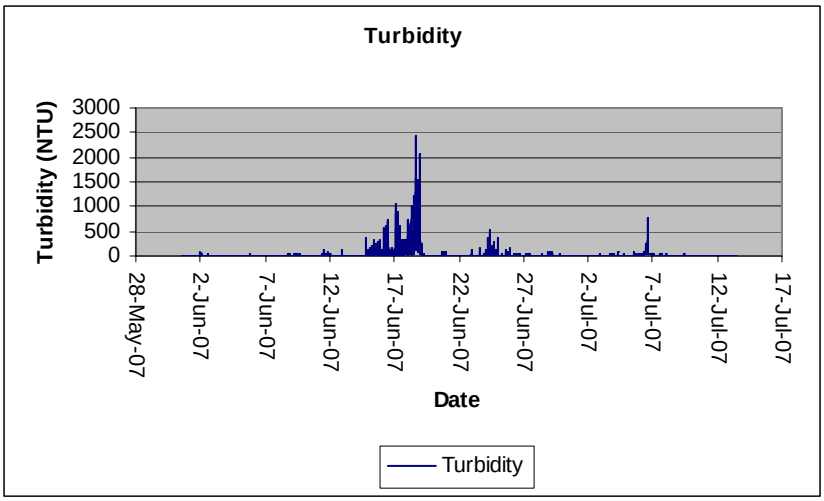
**Figure 4: Conductivity**




**Turbidity:**

- Turbidity values were fairly stable and remained near zero for most of the deployment period, with the exception of three separate periods of instability that occurred between June 15-20, June 23-25 and July 6 **(Figure 5)**. Each of these variable periods corresponds with precipitation events that occurred on the same dates **(Appendix 1)**, and are also consistent with increases in stage height **(Figure 6)** that occurred during those periods. Rainfall, surface drainage and storm sewer inputs appear to have a substantial and near instantaneous impact on turbidity levels in Leary Brook.

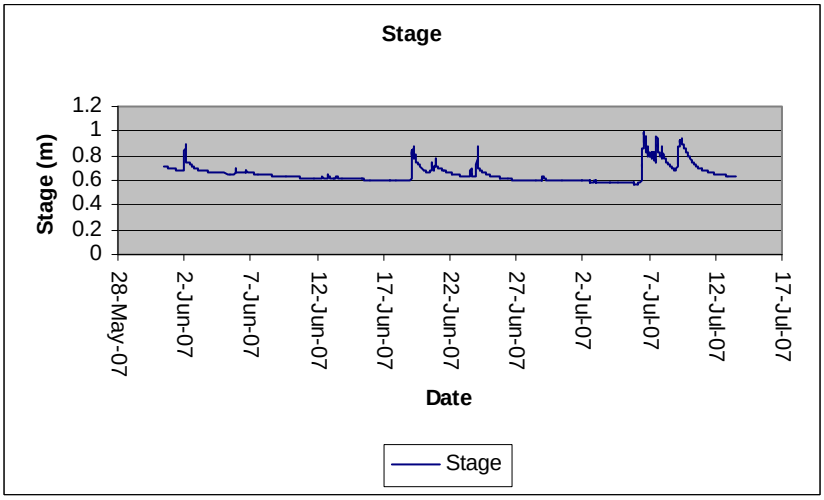
**Figure 5: Turbidity**




**Stage Height:**

- Changes in stage height (Figure 6) directly reflect precipitation events (Appendix 1) that occurred during this deployment period, with the most significant variations occurring June 1, June 18-23, and July 6-9.

**Figure 6: Stage Height**




## Data Summary Statistics:

- Data collected for each parameter from May 31-July 13/07 is summarized in the table below:

| **Summary Statistics** | Water Temp ($^{o}$C) | pH (units) | Dissolved Oxygen (mg/L) | Conductivity (uS/cm) | Turbidity (NTU) | Stage (m) |
|---|---|---|---|---|---|---|
| Minimum | 5.86 | 6.1 | 7.14 | 80.5 | 0 | 0.575 |
| Maximum | 19.50 | 6.98 | 12.05 | 613.00 | 2429.90 | 0.99 |
| Average | 12.97 | 6.65 | 10.09 | 469.28 | 21.30 | 0.65 |

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**Appendix 1: Daily Climate Data for St. John's, as recorded on Environment Canada web page:**

http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html

Daily Data Report for June 2007

| Day | Max Temp °C | Min Temp °C | Mean Temp °C | Heat Deg Days °C | Cool Deg Days °C | Total Rain mm | Total Snow cm | Total Precip mm | Snow on Grnd cm | Dir of Max Gust 10's Deg | Spd of Max Gust km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 11.7 | 0.5 | 6.1 | 11.9 | 0.0 | 9.2 | 0.0 | 9.2 | 0 | 22E | 59E |
| 02 | 9.9 | 0.0 | 5.0 | 13.0 | 0.0 | 0.6 | 0.0 | 0.6 | 0 | 31E | 74E |
| 03 | 9.6 | -0.7 | 4.5 | 13.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | | <31 |
| 04 | 14.9 | 0.1 | 7.5 | 10.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | | <31 |
| 05 | 11.9 | 3.0 | 7.5 | 10.5 | 0.0 | 2.0 | 0.0 | 2.0 | 0 | 18E | 46E |
| 06 | 25.2 | 11.9 | 18.6 | 0.0 | 0.6 | 1.2 | 0.0 | 1.2 | 0 | 26E | 35E |
| 07 | 25.9 | 11.3 | 18.6 | 0.0 | 0.6 | T | 0.0 | T | 0 | 18E | 46E |
| 08 | 24.3 | 9.5 | 16.9 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 18E | 48E |
| 09 | 24.9 | 9.0 | 17.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 20E | 33E |
| 10 | 25.2 | 14.1 | 19.7 | 0.0 | 1.7 | T | 0.0 | T | 0 | 28E | 37E |
| 11 | 15.7 | 5.0 | 10.4 | 7.6 | 0.0 | 0.4 | 0.0 | 0.4 | 0 | | <31 |
| 12 | 7.2 | 4.8 | 6.0 | 12.0 | 0.0 | 1.0 | 0.0 | 1.0 | 0 | 4E | 37E |
| 13 | 6.5 | 3.7 | 5.1 | 12.9 | 0.0 | 1.0 | 0.0 | 1.0 | 0 | | <31 |
| 14 | 11.4 | 3.3 | 7.4 | 10.6 | 0.0 | T | 0.0 | T | 0 | 26E | 39E |
| 15 | 22.8 | 5.7 | 14.3 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 26E | 57E |
| 16 | 25.7 | 6.9 | 16.3 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 27E | 44E |
| 17 | 25.1 | 13.0 | 19.1 | 0.0 | 1.1 | T | 0.0 | T | 0 | 27E | 43E |
| 18 | 19.3 | 7.6 | 13.5 | 4.5 | 0.0 | 6.4 | 0.0 | 6.4 | 0 | 6E | 37E |
| 19 | 9.5 | 5.4 | 7.5 | 10.5 | 0.0 | 13.6 | 0.0 | 13.6 | 0 | 6E | 44E |
| 20 | 8.6 | 5.4 | 7.0 | 11.0 | 0.0 | 7.2 | 0.0 | 7.2 | 0 | 2E | 33E |
| 21 | 13.1 | 6.7 | 9.9 | 8.1 | 0.0 | 1.0 | 0.0 | 1.0 | 0 | | <31 |
| 22 | 16.7 | 8.9 | 12.8 | 5.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | | <31 |
| 23 | 15.4 | 8.8 | 12.1 | 5.9 | 0.0 | 12.2 | 0.0 | 12.2 | 0 | 15E | 41E |
| 24 | 19.2 | 8.5 | 13.9 | 4.1 | 0.0 | 0.6 | 0.0 | 0.6 | 0 | 23E | 46E |
| 25 | 21.7 | 9.7 | 15.7 | 2.3 | 0.0 | T | 0.0 | T | 0 | 21E | 46E |
| 26 | 23.1 | 9.9 | 16.5 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 26E | 46E |
| 27 | 17.3 | 9.9 | 13.6 | 4.4 | 0.0 | 0.2 | 0.0 | 0.2 | 0 | 26E | 56E |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | 12.5 | 7.3 | 9.9 | 8.1 | 0.0 | 1.8 | 0.0 | 1.8 | 0 | 33E | 35E |
| 29 | 8.8 | 6.6 | 7.7 | 10.3 | 0.0 | 3.0 | 0.0 | 3.0 | 0 | | <31 |
| 30 | 19.5 | 8.6 | 14.1 | 3.9 | 0.0 | T | 0.0 | T | 0 | 26E | 37E |

**Daily Data Report for July 2007**

| Day | Max Temp °C | Min Temp °C | Mean Temp °C | Heat Deg Days °C | Cool Deg Days °C | Total Rain mm | Total Snow cm | Total Precip mm | Snow on Grnd cm | Dir of Max Gust 10's Deg | Spd of Max Gust km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01† | 16.7 | 8.5 | 12.6 | 5.4 | 0.0 | 0.0 | 0.0 | 0.0 | | 26 | 33 |
| 02† | 14.2 | 7.8 | 11.0 | 7.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 03† | 13.7 | 7.7 | 10.7 | 7.3 | 0.0 | T | 0.0 | T | | | <31 |
| 04† | 21.5 | 7.8 | 14.7 | 3.3 | 0.0 | 0.0 | 0.0 | 0.0 | | 26 | 37 |
| 05† | 22.0 | 9.3 | 15.7 | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | | 26 | 41 |
| 06† | 16.7 | 12.0 | 14.4 | 3.6 | 0.0 | 30.0 | 0.0 | 30.0 | | 18 | 50 |
| 07† | 17.8 | 12.4 | 15.1 | 2.9 | 0.0 | 10.6 | 0.0 | 10.6 | | 23 | 56 |
| 08† | 19.6 | 7.8 | 13.7 | 4.3 | 0.0 | 2.2 | 0.0 | 2.2 | | 26 | 46 |
| 09† | 19.6 | 6.9 | 13.3 | 4.7 | 0.0 | 14.4 | 0.0 | 14.4 | | 34 | 33 |
| 10† | 19.1 | 5.7 | 12.4 | 5.6 | 0.0 | T | 0.0 | T | | 28 | 46 |
| 11† | 20.7 | 10.3 | 15.5 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 12† | 24.2 | 11.2 | 17.7 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 13† | 25.7 | 15.2 | 20.5 | 0.0 | 2.5 | T | 0.0 | T | | 26 | 37 |