

Real Time Water Quality Monthly Report Leary's Brook February 2005

General

- The Water Resources Management Division staff monitor the data from the Leary's Brook monitoring station on a monthly basis.

Maintenance and Calibration of Instrumentation

- The Datasonde was installed in Leary's Brook on February 4, 2004 utilizing a new casing set-up for deployment.
- The following table displays the dates when the Datasonde was removed for routine cleaning, maintenance and calibration and when it was redeployed during the month of February.

Date Installed	Date Removed
February 4, 2004	February 15, 2005
February 16, 2005	February 16, 2005-05-10
February 23, 2005	

- Water quality readings were taken with a Minisonde at the time of removal for comparison purposes. The Minisonde was calibrated prior to use.
- Water samples were taken February 22, 2005 for laboratory analysis as part of QA/QC procedures.

Data Interpretation

- In general, water quality parameters were stable during the month of February with expected daily/nightly (diurnal) and seasonal changes occurring.
- **Stage height** (water level) rose and fell in response to daily precipitation as well as melting and freezing temperatures, as seen in **Figure 1**.
- **Water temperature** fluctuated in response to daily maximum and minimum air temperature. This is demonstrated by comparing the graph in **Figure 2** to the air temperature data in **Table 1**. An increase in water temperature is observed from February 8th to the 10th in response to an increase in daily mean temperatures. From February 13th to the 15th, a sharp decrease is seen in water temperature in response to the steep decrease in daily maximum air temperatures. Another increase in water temperature is observed from February 16th to the 18th in response to an increase in daily mean temperatures.

Table 1: Weather information for St. John's, NL provided by Environment Canada

Daily Data Report for February 2005											
D a y	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†	-4.0	-12.2	-8.1	26.1	0.0	0.0	T	T	25		<31
02†	-3.7	-12.7	-8.2	26.2	0.0	0.0	0.0	0.0	23		<31
03†	-3.2	-14.2	-8.7	26.7	0.0	0.0	0.0	0.0	23		<31
04†	1.1	-4.7	-1.8	19.8	0.0	17.4	0.0	17.4	23		<31
05†	2.4	-2.9	-0.3	18.3	0.0	18.4	0.0	18.4	10	36	59
06†	-2.9	-4.7	-3.8	21.8	0.0	0.0	0.0	0.0	7	2	50
07†	1.4	-4.0	-1.3	19.3	0.0	0.0	0.0	0.0	6		<31
08†	3.4	-3.5	-0.1	18.1	0.0	0.2	0.0	0.2	5		<31
09†	1.1	-1.7	-0.3	18.3	0.0	3.2	0.0	3.2	5		<31
10†	1.5	-2.7	-0.6	18.6	0.0	T	0.0	T	5		<31
11†	6.5	-2.5	2.0	16.0	0.0	7.8	0.0	7.8	5	17E	59E
12†	6.5	-1.4	2.6	15.4	0.0	4.0	0.0	4.0	5	17	69
13†	-0.6	-6.8	-3.7	21.7	0.0	15.6	9.8	25.4	5	27E	74E
14†	-3.2	-12.7	-8.0	26.0	0.0	0.0	T	T	12	32E	37E
15†	-5.8	-12.7	-9.3	27.3	0.0	0.0	T	T	12		<31
16†	1.0	-6.0	-2.5	20.5	0.0	0.0	0.0	0.0	12		<31
17†	4.5	-2.1	1.2	16.8	0.0	5.4	0.0	5.4	12		<31
18†	7.1	-2.6	2.3	15.7	0.0	8.0	0.0	8.0	11	17	83
19†	-2.4	-5.8	-4.1	22.1	0.0	0.0	T	T	10	28	41
20†	-5.4	-9.5	-7.5	25.5	0.0	0.0	4.0	4.0	10	36	41
21†	-9.0	-12.5	-10.8	28.8	0.0	0.0	1.8	1.8	14	31	35
22†	-5.3	-12.6	-9.0	27.0	0.0	0.0	0.6	0.6	14	32	39
23†	-2.1	-14.5	-8.3	26.3	0.0	0.0	0.0	0.0		7	43
24†	-0.7	-2.6	-1.7	19.7	0.0	0.0	3.0	3.0	14	6	65
25†	-0.1	-2.4	-1.3	19.3	0.0	2.0	T	2.0	17	1	41
26†	1.3	-4.3	-1.5	19.5	0.0	14.0	5.8	19.8	15	23E	98E
27†	-0.8	-4.7	-2.8	20.8	0.0	0.0	1.6	1.2	16	21	54
28†	-3.7	-10.2	-7.0	25.0	0.0	0.0	T	T	16	29	37

Figure 1

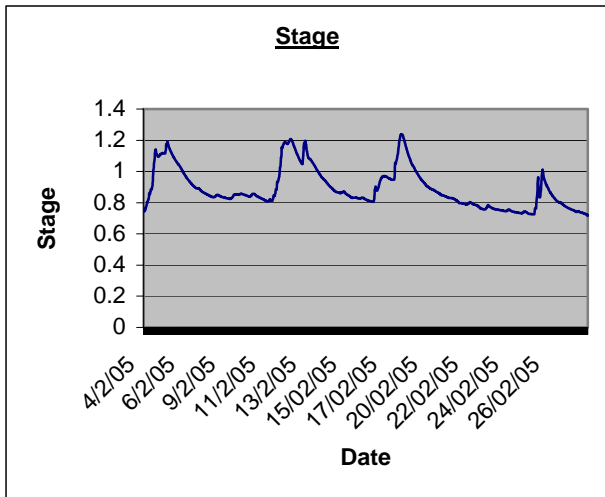
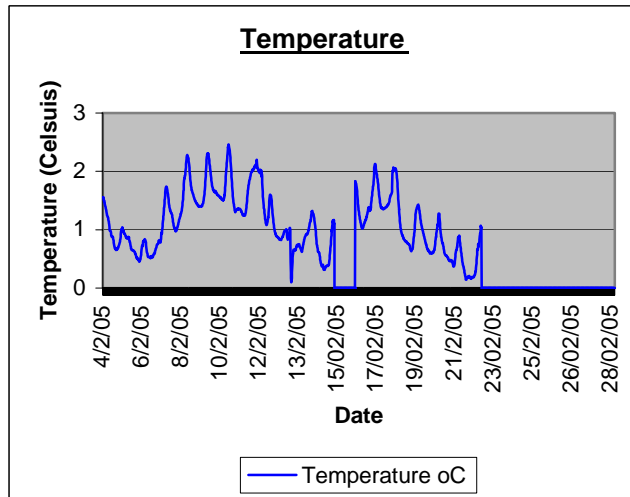


Figure 2



- **Conductivity** levels spiked on February 4th (**Figure 3**). This is related to the 17mm of precipitation that occurred on February 4th and above zero temperatures (**Table 1**). Another conductivity spike occurred on February 17th. This spike is also related to precipitation on that day and above zero temperatures. Conductivity readings were stable for the rest of the month with small spikes related to precipitation and above zero temperatures.
- **Total dissolved solids** levels reflected the changes in conductivity, as seen in **Figure 4**. Conductivity measurements are a good indication of total dissolved solids and total dissolved ion concentrations, although this is not an exact linear relationship.

Figure 3

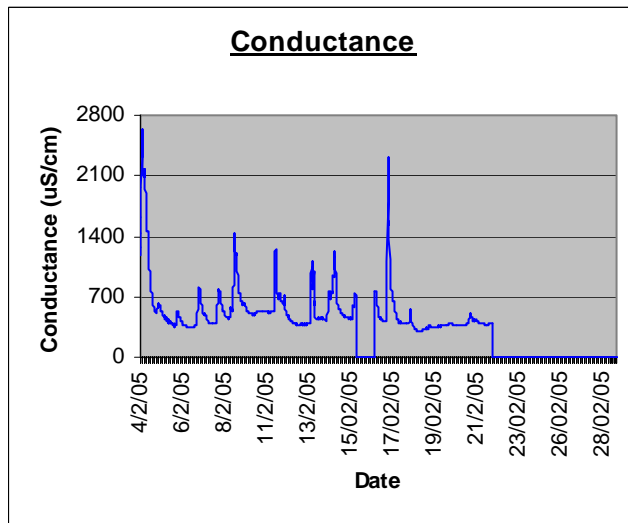
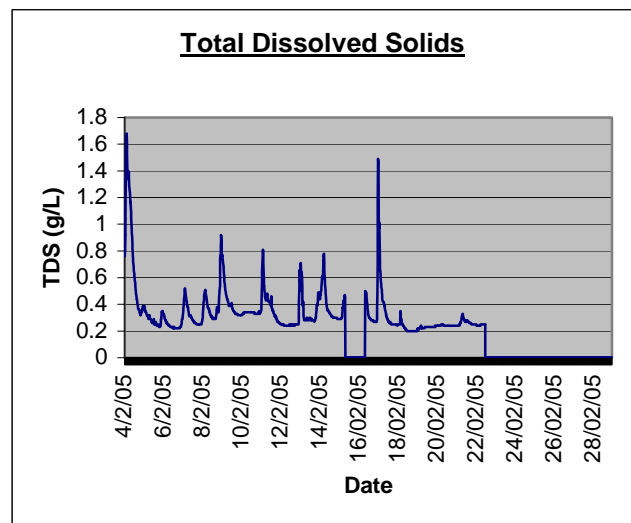


Figure 4



- **pH** levels ranged between 5.98 to 6.69. There were some exceedances above the CCME recommended Guideline for Freshwater Aquatic Life of 6.5 (see **Figure 5**). The average pH levels for the two deployments of the datasonde instrument during the month of February were 6.28 and 6.27. (see **Table 2 and 3**).
- **Dissolved oxygen (DO)** levels ranged between 12.71 mg/L to 14.91 mg/L during the periods of measurement (see **Figure 6**). All dissolved oxygen measurements were above the CCME recommended maximum guideline of 9.5. The average DO levels for the periods of measure were 14.47 mg/L and 12.26 mg/L.

Figure 5

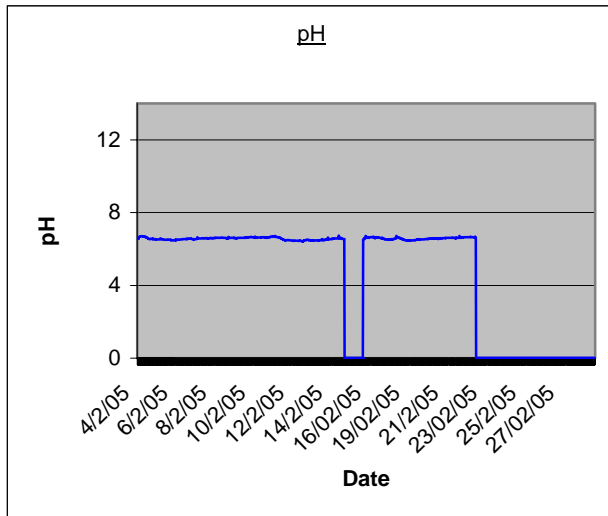
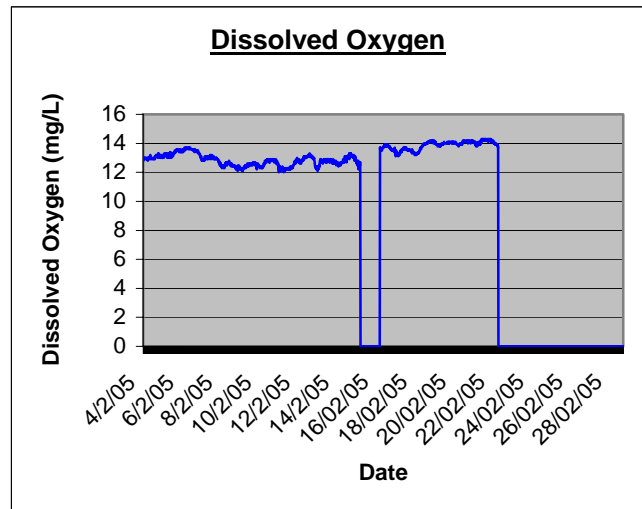
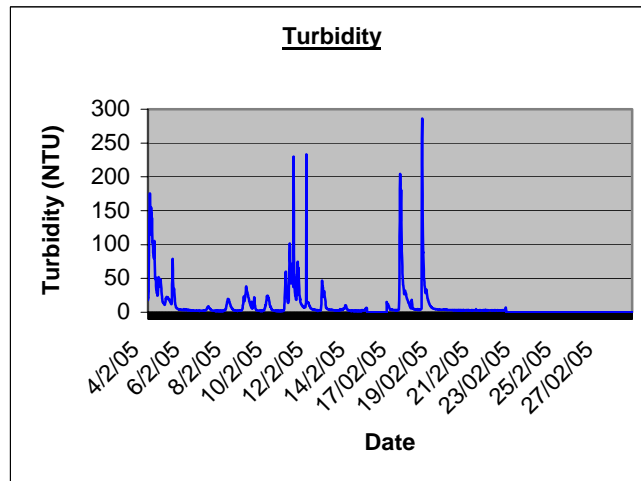


Figure 6



- **Turbidity** levels fluctuated and had several spikes noted throughout the month. The turbidity spikes (see **Figure 7**) are probably in response to precipitation and warming events. Many turbidity spikes exceeded the CCME recommended maximum of 8 NTU above background levels.

Figure 7



Additional Information

- Table 2 and Table 3 provide summary statistics on water quality parameters for Leary’s Brook during the deployment periods indicated.

Table 2: Summary statistics for the period February 4th to 15th, 2005.

	Temp-Water	pH	Conductance	Diss-Solids	Percent-Satur	Diss-Oxy	Turbidity
Max	2.41	6.69	2627.81	1.6798	101.02	14.63	233.10
Min	0.03	5.95	341.00	0.2156	90.49	12.71	1.70
Average	1.14	6.28	585.16	0.3729	95.75	13.53	14.47
Standard Deviation	0.52	0.19	323.00	0.2071	2.19	0.42	25.36

Table 3: Summary statistics for the period February 16^h to 22nd, 2005.

	Temp-Water	pH	Conductance	Diss-Solids	Percent-Satur	Diss-Oxy	Turbidity
Max	2.11	6.69	2321.79	1.4893	102.48	14.91	286.40
Min	0.02	5.98	304.25	0.1973	94.79	13.19	2.60
Average	0.92	6.27	433.47	0.2762	99.84	14.20	12.26
Standard Deviation	0.54	0.17	216.95	0.1394	1.79	0.44	30.81

Report prepared by:

Kent Slaney
 Watershed Management Specialist
 Water Resources Management Division
 Department of Environment and Conservation
 Confederation Building West Block 4th Floor
 PO Box 8700
 St. John's NL A1B 4J6

Ph. (709) 729-1157
 Fax (709) 729-0320