



Real Time Water Quality Monthly Report Leary's Brook March 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 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 March.

Date Installed	Date Removed
March 7, 2005	March 16, 2005
March 17, 2005	March 24, 2005
March 28, 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 on March 29, 2005 for laboratory analysis as part of QA/QC procedures.

Data Interpretation

- In general, water quality parameters were stable during the month of March 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**. The response to heavy precipitation where 42.2 mm of precipitation fell on March 30th and 17.4 mm of precipitation fell on March 31 can be observed 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 March 8th to the 10th in response to an increase in daily mean temperatures. From March 8th to the 10th a decrease is seen in water temperature in response to the decrease in daily maximum air temperatures. Another increase in water temperature is observed from March 17th to the 20th 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 March 2005											
D	Max Temp	Min Temp	Mean	Heat Deg	Cool Deg	Total Rain	Total	Total Precip	Snow on	Dir of	Spd of Max
01†	-1.7	-11.9	-6.8	24.8	0.0	0.0	T	T	16	12	52
02†	2.9	-2.0	0.5	17.5	0.0	31.1	0.0	31.1	15	13	56
03†	4.8	-1.9	1.5	16.5	0.0	1.4	0.0	1.4	10	25	32
04†	-0.5	-8.6	-4.6	22.6	0.0	0.0	50.0	50.0	18	31	70
05†	-5.2	-10.8	-8.0	26.0	0.0	0.0	1.2	1.2	60	22	43
06†	-3.8	-13.6	-8.7	26.7	0.0	0.0	0.2	0.2	61		<31
07†	-0.6	-13.3	-7.0	25.0	0.0	0.0	0.0	0.0	61		<31
08†	2.2	-4.2	-1.0	19.0	0.0	0.0	0.0	0.0	61	15	35
09†	2.2	-2.4	-0.1	18.1	0.0	6.2	0.0	6.2	58	14	39
10†	2.3	-8.8	-3.3	21.3	0.0	4.4	2.0	6.4	53	28	37
11†	-3.5	-8.0	-5.8	23.8	0.0	0.0	8.4	7.8	49	32	63
12†	-2.4	-6.5	-4.5	22.5	0.0	0.6	T	0.6	56	31	63
13†	0.9	-4.9	-2.0	20.0	0.0	8.4	1.4	9.8	55		<31
14†	1.7	-1.5	0.1	17.9	0.0	5.8	T	5.8	48	2	52
15†	-1.0	-2.4	-1.7	19.7	0.0	0.0	T	T	45	34	54
16†	0.1	-2.7	-1.3	19.3	0.0	0.0	1.2	1.2	45		<31
17†	1.0	-2.8	-0.9	18.9	0.0	0.0	6.2	6.2	44	3	54
18†	0.6	-2.9	-1.2	19.2	0.0	0.0	T	T	48	34	32
19†	-0.4	-3.7	-2.1	20.1	0.0	0.0	0.6	0.6	46		<31
20†	0.4	-3.6	-1.6	19.6	0.0	0.0	1.2	1.2	46	31	43
21†	-1.0	-3.3	-2.2	20.2	0.0	0.0	7.2	7.2	52	32	56
22†	-2.1	-4.0	-3.1	21.1	0.0	0.0	1.2	1.0	54	36	39
23†	-2.7	-8.7	-5.7	23.7	0.0	0.0	T	T	54		<31
24†	-2.0	-9.2	-5.6	23.6	0.0	0.0	0.0	0.0	53		<31
25†	-1.5	-8.2	-4.9	22.9	0.0	0.0	0.0	0.0	51		<31
26†	1.8	-4.2	-1.2	19.2	0.0	0.0	T	T	50	36	33
27†	-3.3	-11.0	-7.2	25.2	0.0	0.0	T	T	45		<31
28†	4.8	-9.6	-2.4	20.4	0.0	0.0	0.0	0.0	43		<31
29†	4.3	-4.8	-0.3	18.3	0.0	0.0	0.0	0.0	37		<31
30†	0.9	-0.1	0.4	17.6	0.0	42.4	17.8	60.2	37	12	56
31†	1.0	-2.1	-0.6	18.6	0.0	17.4	0.2	17.6	40	6	59

Figure 1

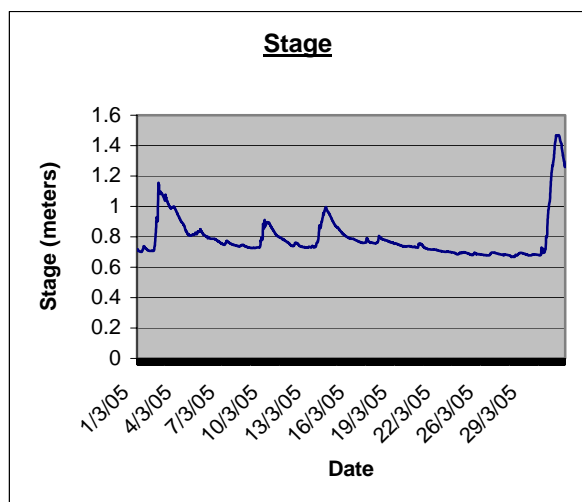
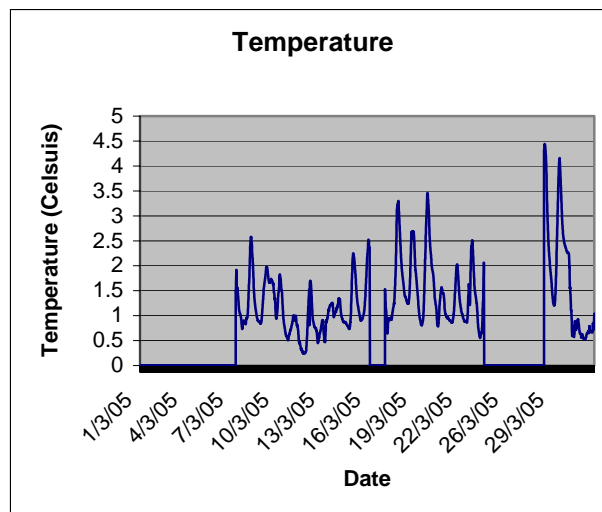


Figure 2



- **Conductivity** levels spiked on March 13th (**Figure 3**). This is related to the 8.4 mm of precipitation that occurred on March 13th and above zero temperatures (**Table 1**). Other conductivity spikes occurred on March 14th, 15th, 20th, 30th and 31st. These spikes are related to precipitation on those dates 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 (Figure 4)** levels reflected the changes in conductivity. 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

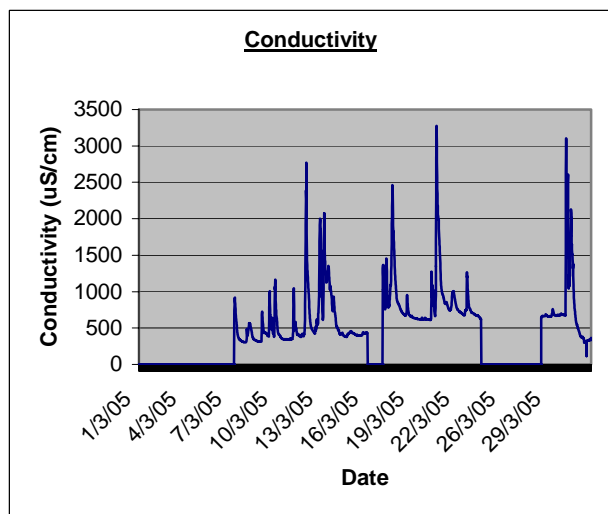
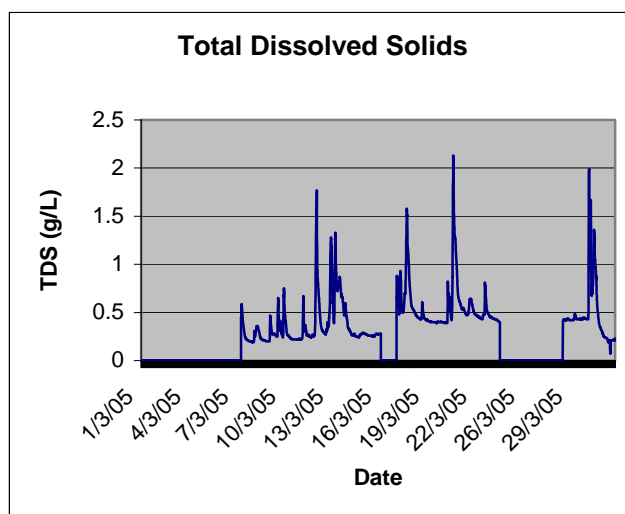


Figure 4



- **pH** levels ranged between 6.26 to 7.77. 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 three deployments of the datasonde instrument during the month of March were 6.33, 6.38 and 6.71 . (see **Table 2, 3 and 4**).
- **Dissolved oxygen (DO)** levels ranged between 9.9 mg/L to 14.8 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 13.30 mg/L, 13.97 mg/L and 11.97 mg/L.

Figure 5

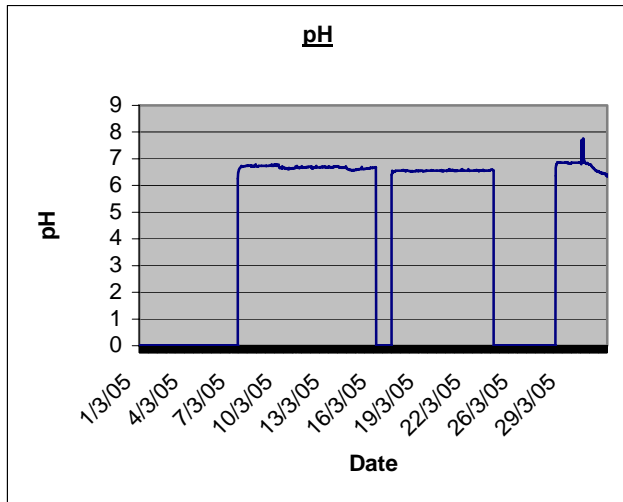
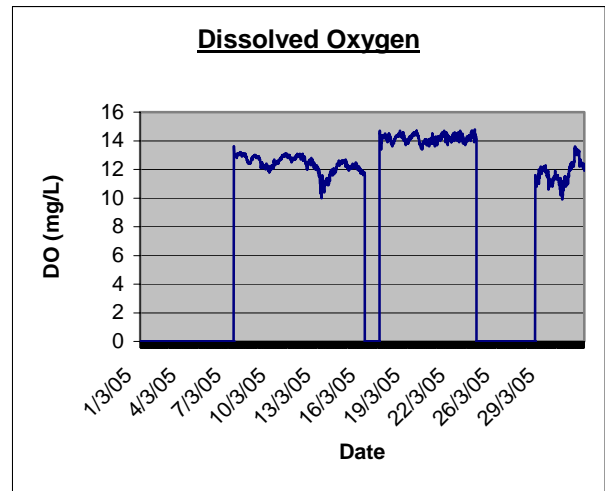
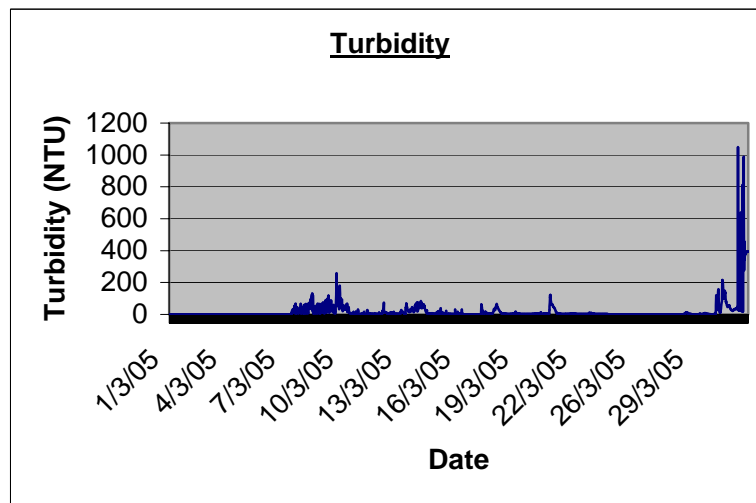


Figure 6



- 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. A large turbidity spike occurred on March 30-31. This is in response to heavy precipitation where 42.2 mm of precipitation fell on March 30th and 17.4 mm of precipitation fell on March 31. Many turbidity spikes exceeded the CCME recommended maximum of 8 NTU above background levels.

Figure 7



Additional Information

- Table 2, Table 3 and Table 4 provide summary statistics on water quality parameters for Leary’s Brook during the deployment periods indicated.

Table 2: Summary statistics for the period March 7th to 16th, 2005.

	Temp-Water	pH	Conductance	Diss-Solids	Percent-Satur	Diss-Oxy	Turbidity
Max	2.57	6.72	2814.40	1.8165	100.56	14.24	258.00
Min	0.19	5.98	308.81	0.1966	79.67	11.22	1.20
Average	1.09	6.33	606.21	0.4050	94.38	13.30	22.44
Standard Deviation	0.50	0.23	353.82	0.2289	3.40	0.51	28.29

Table 3: Summary statistics for the period March 17th to 24th, 2005.

	Temp-Water	pH	Conductance	Diss-Solids	Percent-Satur	Diss-Oxy	Turbidity
Max	3.46	6.56	3267.43	2.1212	104.89	14.70	123.20
Min	0.56	6.22	600.10	0.3821	93.87	13.21	2.20
Average	1.52	6.38	870.80	0.5552	100.11	13.97	8.82
Standard Deviation	0.68	0.09	386.03	0.2474	1.87	0.28	15.73

Table 3: Summary statistics for the period March 28th to 31st, 2005.

	Temp-Water	pH	Conductance	Diss-Solids	Percent-Satur	Diss-Oxy	Turbidity
Max	4.44	7.71	3103.14	1.9888	96.65	13.96	1049.00
Min	0.50	6.22	112.45	0.0678	71.92	10.14	0.20
Average	1.69	6.71	747.46	0.4786	85.96	11.97	66.05
Standard Deviation	1.16	0.23	477.87	0.3059	4.44	0.80	146.25

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