Newfoundland Labrador

Real Time Water Quality Monthly Report
Leary's Brook
February -March 2008

General

- The Water Resources Management Division staff monitors the real-time web page on a daily basis.
- Newfoundland and Labrador Refining Company will be informed of any significant water quality events in the form of a monthly report.

Maintenance and Calibration of Instrumentation

- The datasonde was deployed on February 27, 2008. A second set of data readings was collected at the time of installation, using a similar, freshly calibrated instrument. Data readings from both instruments were compared and their variability was ranked, as part of QA/QC protocol.
- The QA/QC rankings from comparing water quality data from both instruments at the time of installation are indicated in **Table 1**, below. All parameters ranked as "excellent" indicating a high degree of confidence in the accuracy of data collected during this deployment period.

Table 1: QA/QC Data Comparison Rankings upon reinstallation on February 27, 2008

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Leary's Brook	February 27	Installation	Excellent	Excellent	Excellent	Excellent

- The Leary's Brook instrument was deployed until March 25th, 2008 at which point it was removed for routine maintenance and calibration. A second set of data readings was collected at the time of removal using a similar, freshly calibrated instrument. Data readings from both instruments were compared and their variability was ranked, as part of QA/QC protocol.

Table 2: QA/QC Data Comparison Rankings upon removal on March 25, 2008

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Leary's Brook	March 25	Removal	Excellent	Good	Excellent	Excellent

- Rankings of "excellent" and "good" were achieved when comparing all parameter readings from the instrument that had been deployed for 25 days, with a clean freshly calibrated instrument. This indicates very little fouling or drift occurred with any sensors during the deployment period, and confirms a high degree of confidence in the accuracy of data recorded by all sensors for the deployment period.

Data Interpretation

- This monthly report interprets the data from the Leary's Brook RTWQ station for the period of February 27 – March 25, 2008.

- Water temperature data for this deployment period was very stable, showing diurnal fluctuations, and ranging between -0.38 and 3.64°C (see **Figure 1**, below).

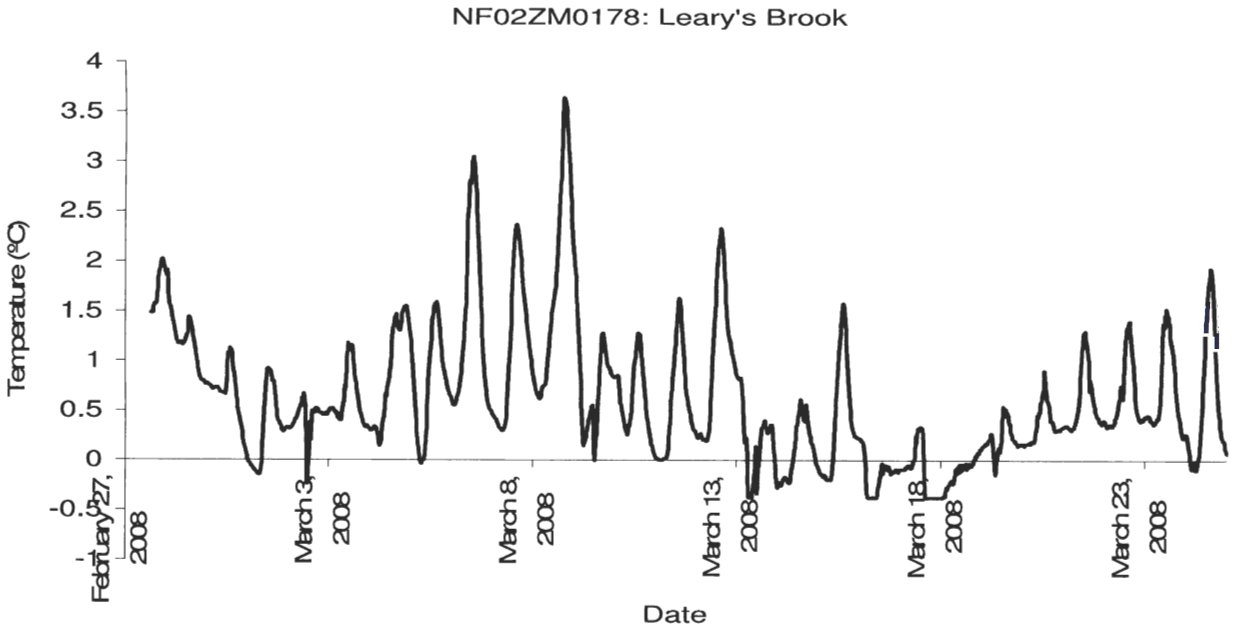


Figure 1

- DO values (**Figure 2** below) ranged from 12.86 to 14.7 mg/L and all values were above the minimum DO concentrations recommended by the Canadian Council of Ministers of the Environment (CCME) Protection of Freshwater Aquatic Life Guidelines (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 – above 9.5 mg/L).

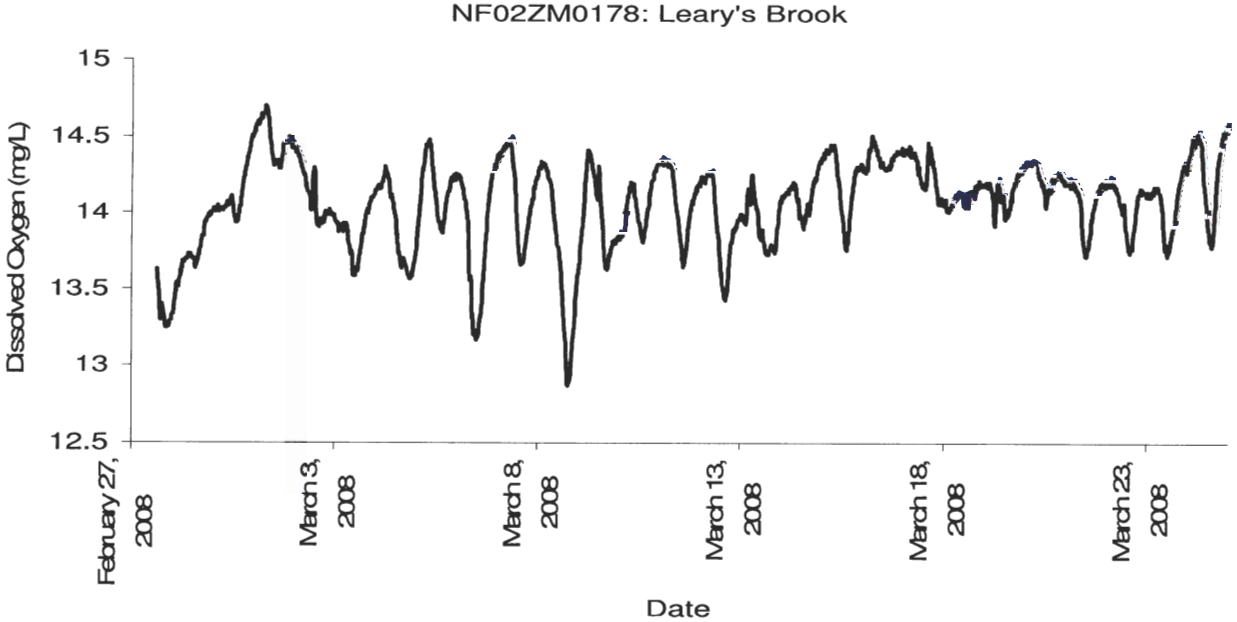
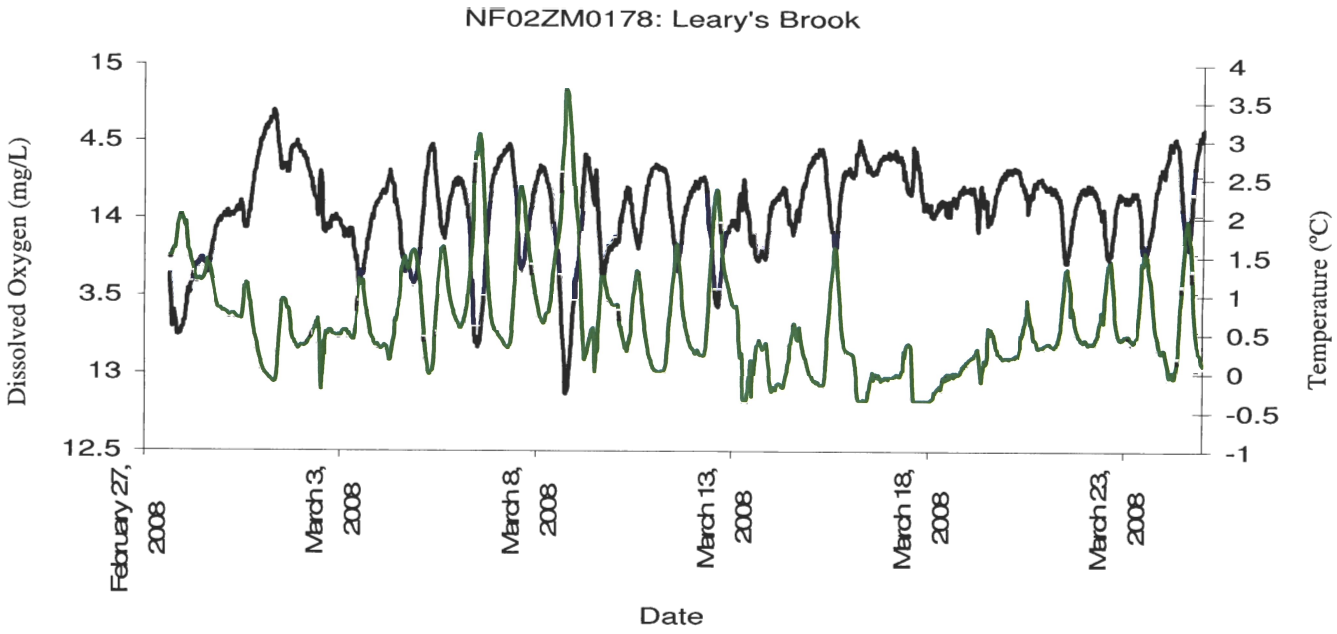


Figure 2



- pH values displayed a slight increasing trend over the duration of this deployment. This may be attributed to increasing daylight hours and the resultant increase in photosynthetic activity. Most pH values (see **Figure 3** below) for Leary's Brook were within the range recommended by the CCME Guidelines for the Protection of Freshwater Aquatic Life (6.5 to 9). pH levels ranged between 5.98 and 7.1 during this deployment period.

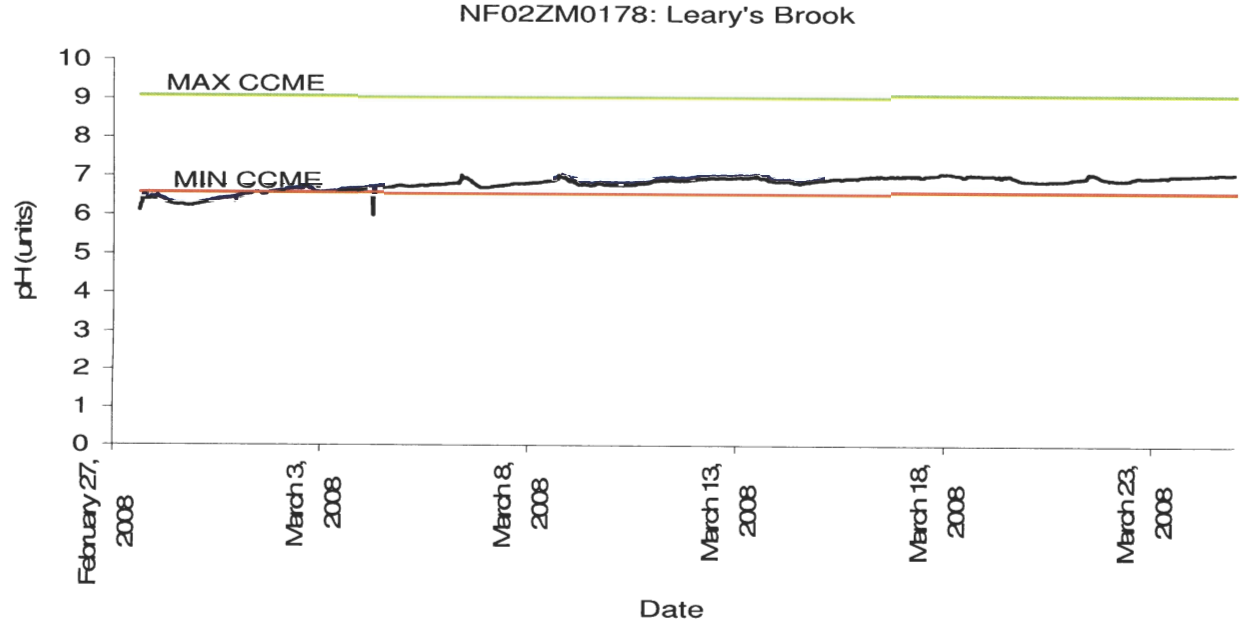


Figure 3

- Specific conductivity values (**Figure 4, below**), exhibited several spikes and ranged from 472 to 4748 µS/cm throughout the deployment period. Maximum air temperatures of 9.4 and 8.6 °C occurring on February 27 and 28 (see **Climate Data, Appendix A**) may have caused sudden snow melt and resulting surface drainage to enter Leary's Brook. Conductivity spikes that occurred near March 6-8

and March 20-23 correspond to precipitation events that occurred on those dates (see **Appendix A** at end of report). Surface drainage this time of year usually contains significant amounts of road salt, resulting in increased conductivity.

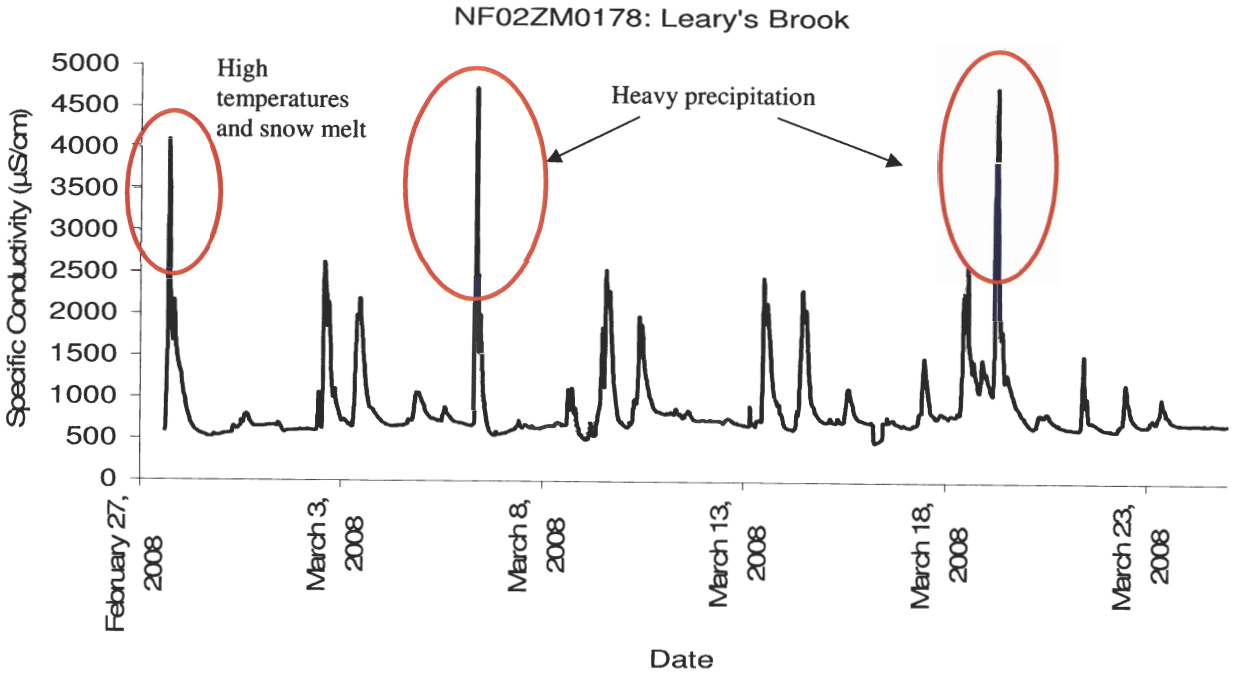


Figure 4

- Turbidity values ranged from 0 NTU to 3000 NTU which was held for several days near the beginning of the deployment period. This is a saturated sensor reading likely due to interference, possibly a leaf or other suspended debris stuck on the sensor. Heavy snowfall and wind gusts up to 96 kph that occurred on March 17 may account for the turbidity spike seen on that day.

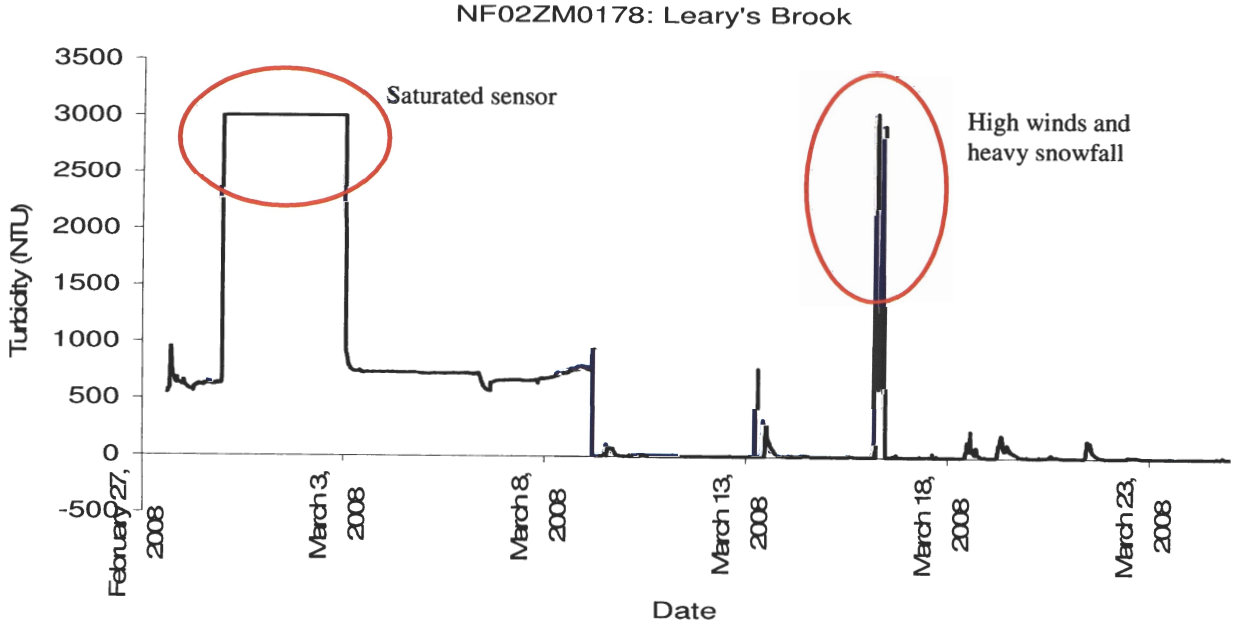


Figure 5

- Ammonium values ranged from 0.01 to 1.68 mg/L for the deployment period (see **Figure 6** below). The spike at the beginning of the deployment period may be reflective of a substance coming into contact with the ammonium sensor membrane at the time of installation, rather than a water quality event. Once the sensor stabilized, it collected very consistent data, in the anticipated range for ammonium at this time of year.

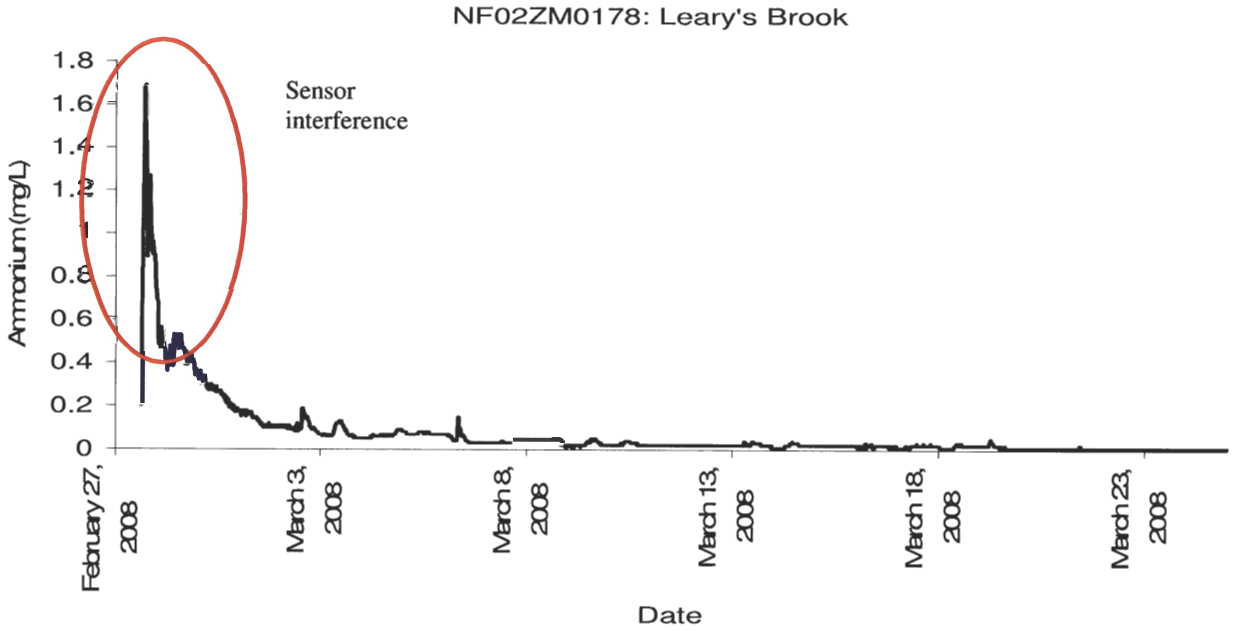


Figure 6

- Nitrate values remained quite stable ranging from 1.09 to 1.23 mg/L during the deployment period (see **Figure 7** below).

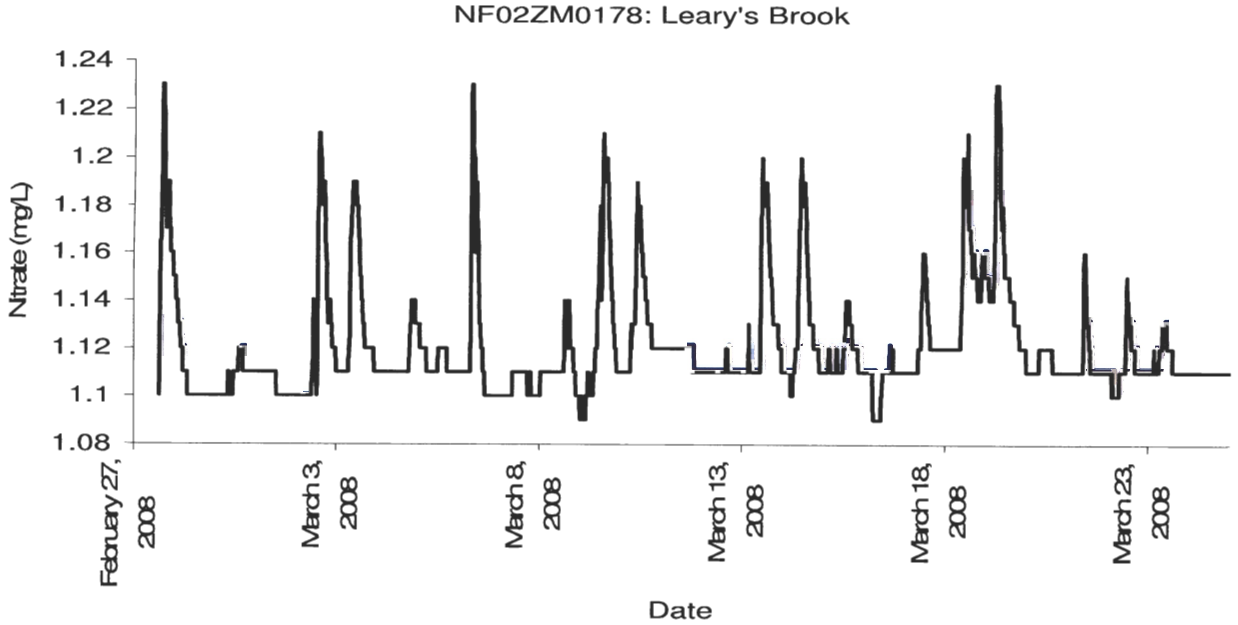


Figure 7

- Stage height fluctuated during the deployment period, ranging between 0.67 and 1.08 meters, as shown in **Figure 8** below. Sudden increases in stage height coincide with the dates of significant precipitation events and warmer air temperatures (see **Appendix A**, below).

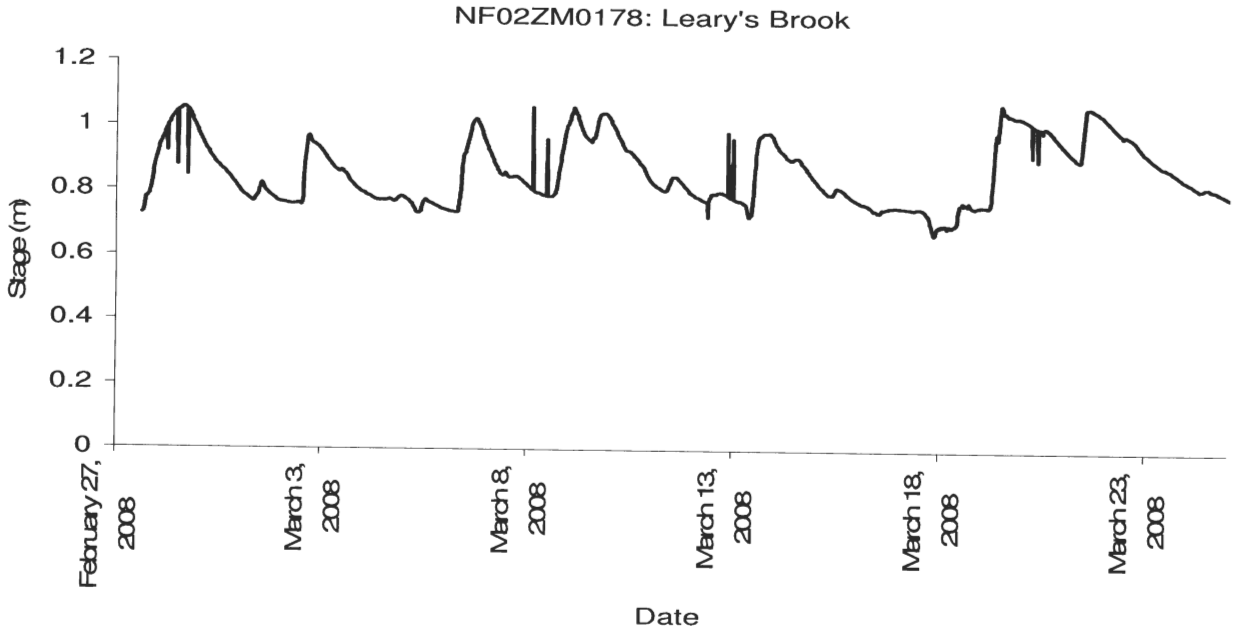


Figure 8

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Appendix A: Climate Data for St. John's, NL

Daily Data Report for February 2008

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†	-3.4	-7.1	-5.3	23.3	0.0	0.0	0.0	0.0	16	29	50
02†	1.6	-8.0	-3.2	21.2	0.0	8.4	2.0	10.4	15	15	72
03†	-0.1	-6.1	-3.1	21.1	0.0	0.0	0.2	T	13	28	70
04†	-5.0	-7.2	-6.1	24.1	0.0	0.0	T	T	13	33	46
05†	-6.1	-12.7	-9.4	27.4	0.0	0.0	T	T	10	33	41
06†	-2.2	-12.6	-7.4	25.4	0.0	0.0	3.2	1.8	10	14	33
07†	-2.3	-4.9	-3.6	21.6	0.0	0.0	3.2	2.2	13	35	44
08†	-2.5	-4.9	-3.7	21.7	0.0	0.0	0.2	T	13	3	35
09†	-0.8	-7.5	-4.2	22.2	0.0	0.0	5.8	5.6	18	33	41
10†	-1.9	-7.3	-4.6	22.6	0.0	0.0	6.0	4.6	18	11	54
11†	1.9	-5.5	-1.8	19.8	0.0	0.2	12.8	10.8	22	23	70
12†	-1.7	-7.6	-4.7	22.7	0.0	0.0	1.4	0.8	26	29	83
13†	-2.6	-8.4	-5.5	23.5	0.0	0.0	T	T	24	29	46
14†	8.5	-4.0	2.3	15.7	0.0	35.6	T	35.6	23	19	106
15†	4.6	-3.8	0.4	17.6	0.0	0.4	T	0.4	11	25	33
16†	1.8	-12.6	-5.4	23.4	0.0	0.0	T	T	11	29	52
17†	-9.1	-14.1	-11.6	29.6	0.0	0.0	0.0	0.0	10	29	54
18†	6.2	-12.2	-3.0	21.0	0.0	3.2	2.0	4.6	10	22	72
19†	10.9	0.9	5.9	12.1	0.0	20.2	0.0	20.2	8	22	85
20†	2.9	-4.2	-0.7	18.7	0.0	0.0	T	T	6	25	85
21†	-2.0	-10.3	-6.2	24.2	0.0	0.0	0.2	T	6	27	54
22†	-5.9	-11.0	-8.5	26.5	0.0	0.0	T	T	6	28	57
23†	-4.3	-9.6	-7.0	25.0	0.0	0.0	17.5	17.5	6	7	54
24†	-4.8	-12.1	-8.5	26.5	0.0	0.0	T	T	21	29	50
25†	0.1	-7.2	-3.6	21.6	0.0	0.0	0.0	0.0	20	25	35
26†	1.5	-3.6	-1.1	19.1	0.0	0.0	0.0	0.0	20		<31
27†	9.4	-5.8	1.8	16.2	0.0	2.2	0.0	2.2	17	18	70
28†	8.6	-2.2	3.2	14.8	0.0	0.6	0.0	0.6	12	25	61
29†	-2.2	-13.6	-7.9	25.9	0.0	0.0	2.6	1.6	11	35	37
Sum				**634.5**	**0.0**	**70.8**	**57.1**	**118.9**			
Avg	**0**	**-7.8**	**-3.86**								
Xtrm	**10.9**	**-14.1**								**19**	**106**

Daily Data Report for March 2008											
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†	-3.8	-15.6	-9.7	27.7	0.0	0.0	T	T	13	16	56
02†	2.1	-4.0	-1.0	19.0	0.0	11.4	7.0	18.4	9	16	70
03†	-0.4	-4.5	-2.5	20.5	0.0	0.2	2.0	2.0	11	22	48
04†	3.5	-6.1	-1.3	19.3	0.0	0.0	T	T	11	29	63
05†	-2.0	-7.0	-4.5	22.5	0.0	T	0.0	T	10	17	72
06†	9.5	-3.4	3.1	14.9	0.0	5.2	0.0	5.2	7	17	72
07†	0.9	-5.3	-2.2	20.2	0.0	0.0	0.0	0.0	5		<31
08†	13.8	-3.6	5.1	12.9	0.0	4.6	0.0	4.6	5	26	78
09†	5.3	-5.6	-0.2	18.2	0.0	9.8	1.2	12.8	2	26	76
10†	0.1	-12.8	-6.4	24.4	0.0	0.0	6.0	3.0	6	17	48
11†	-2.3	-12.7	-7.5	25.5	0.0	0.0	0.0	0.0	5		<31
12†	2.4	-6.4	-2.0	20.0	0.0	0.0	T	T	5	16	46
13†	1.4	-7.4	-3.0	21.0	0.0	12.2	14.8	26.6	7	30	76
14†	-3.7	-10.5	-7.1	25.1	0.0	0.0	0.5	0.5	7	29	80
15†	-2.8	-11.8	-7.3	25.3	0.0	0.0	T	T	7	25	33
16†	-5.4	-8.4	-6.9	24.9	0.0	0.0	20.4	17.8	18	3	63
17†	-1.4	-8.7	-5.1	23.1	0.0	0.0	37.4	30.3	25	4	96
18†	-0.2	-1.6	-0.9	18.9	0.0	16.0	1.2	18.8	53	3E	65E
19†	0.6	-1.7	-0.6	18.6	0.0	32.6	0.0	32.6	40		<31
20†	1.1	-1.7	-0.3	18.3	0.0	T	0.0	T	33		<31
21†	3.0	-2.9	0.1	17.9	0.0	11.2	T	11.2	33	16	63
22†	2.0	-4.2	-1.1	19.1	0.0	1.4	0.4	1.8	28	23	35
23†	-0.1	-5.8	-3.0	21.0	0.0	0.8	0.2	1.0	27	26	63
24†	-1.4	-7.6	-4.5	22.5	0.0	0.0	T	T	27	27	69
25†	-6.3	-9.6	-8.0	26.0	0.0	0.0	6.4	4.2	26	2	35
26†	-5.6	-10.7	-8.2	26.2	0.0	0.0	0.4	0.4	32	34	32
27†	1.6	-7.6	-3.0	21.0	0.0	0.0	2.4	2.4	31	17	70
28†	2.3	-5.9	-1.8	19.8	0.0	0.0	0.0	0.0		28	54
29†	-1.8	-5.8	-3.8	21.8	0.0	0.0	10.2	8.8	32	2	44
30†	-1.8	-7.6	-4.7	22.7	0.0	0.0	7.0	5.2	42	1	57
31†	-6.6	-13.4	-10.0	28.0	0.0	0.0	T	T	38	34E	39E
Sum				666.3	0.0	105.4	117.5	207.6			
Avg	0.1	-7.1	-3.48								
Xtrm	13.8	-15.6								4	96