

## Real Time Water Quality Monthly Report Leary's Brook- St. John's NL April 2009

### General

- Data from Leary's Brook monitoring station is monitored by the Water Resources Management Division staff.

### Maintenance and Calibration of Instrumentation

- The following table displays the dates when the water quality probe was installed and later removed at the end of the deployment period for routine cleaning, maintenance and calibration:

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

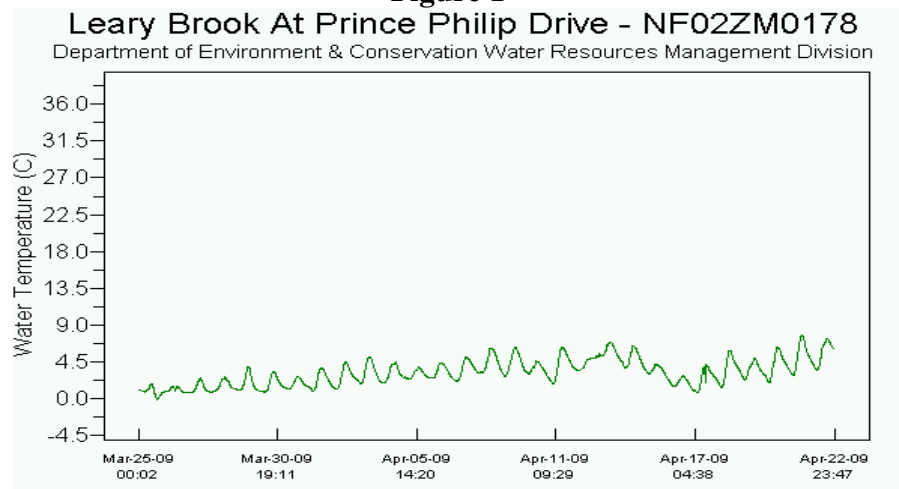
Date Installed	Date Removed
March 25, 2009	April 22, 2009

- Water quality readings were taken with a second, freshly calibrated water quality probe at the time of installation and removal for QAQC comparison.
- The probe was removed from its protective cage on April 17<sup>th</sup> to wipe away a build-up of silt and slime that had accumulated on the sensors, and it was immediately returned to its position in the cage. The impact of removing this build-up is evident, particularly in the pH and turbidity data, as is shown in this report.

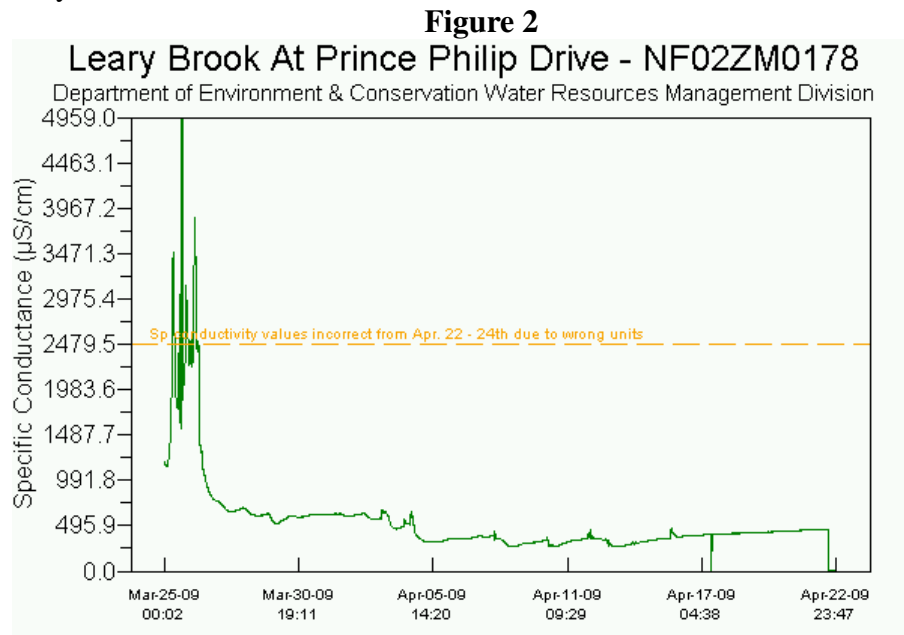
### Data Interpretation

- Water quality parameter levels fluctuated within expected ranges during the deployment period with daily/nightly (diurnal) variations.
- Water temperatures** ranged between -0.19 and 7.7 °C during this deployment as seen in **Figure 1** below. There was an overall increasing trend in water temperature in response to seasonally increasing air temperatures.

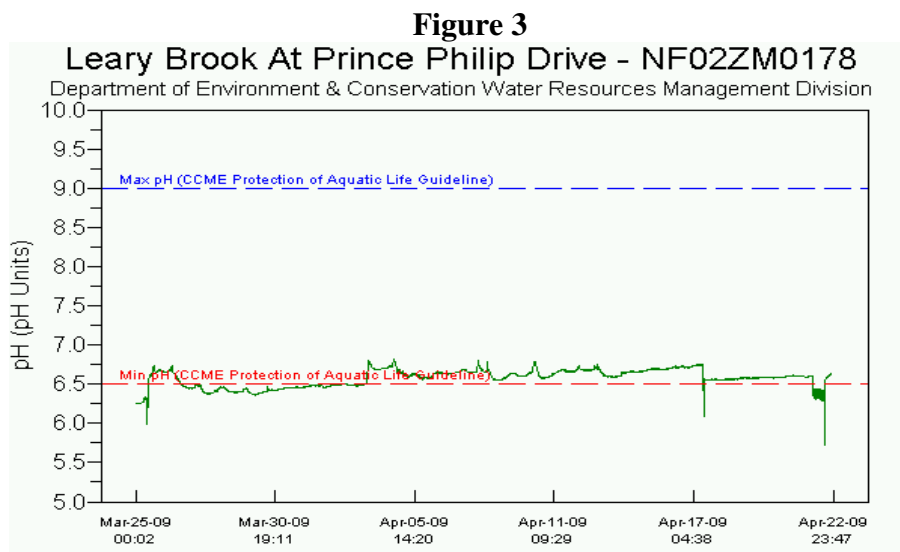
**Figure 1**



- Conductivity** levels were unstable on March 25<sup>th</sup> and 26<sup>th</sup> but settled down to background levels on the 27<sup>th</sup> and remained fairly constant for the rest of the deployment period, as seen in **Figure 2** below. According to Environment Canada's Daily Climate Data report in **Appendix 1**, 20mm of mixed precipitation (rain and snow) fell on March 25<sup>th</sup> and the air temperature was below zero. These weather conditions would have prompted road salting operations, resulting in conductivity spikes in Leary's Brook. Daily air temperatures remained consistently above zero after March 26<sup>th</sup> which probably brought a halt to road salting operations, allowing Leary's Brook to return to background conductivity levels.

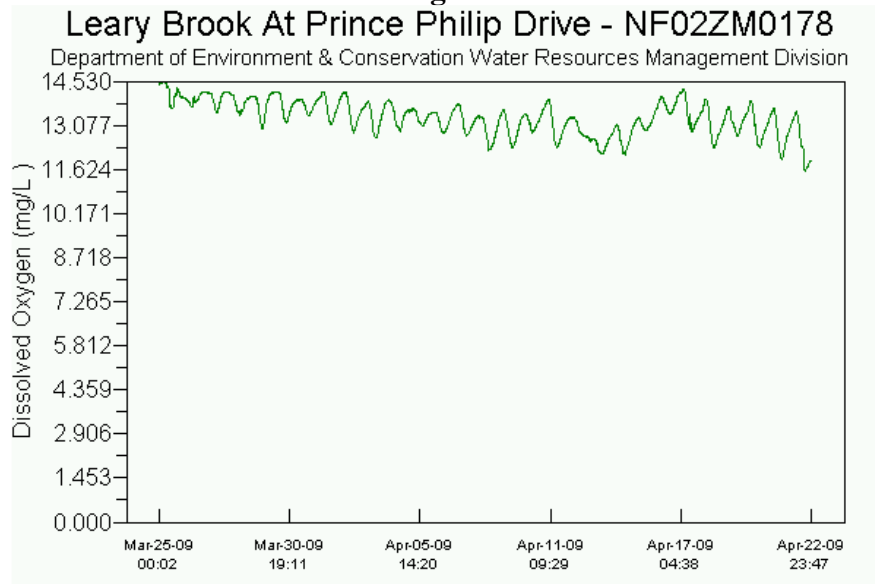


- pH** values ranged from 6.08 to 6.82 pH units during the deployment period, as shown in **Figure 3** below. Some values fell below the range recommended by the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9 pH units, and this is typical of surface water in NL. The quick drop in pH on April 17<sup>th</sup> is a result of removing the build-up of silt and slime on the sensor.



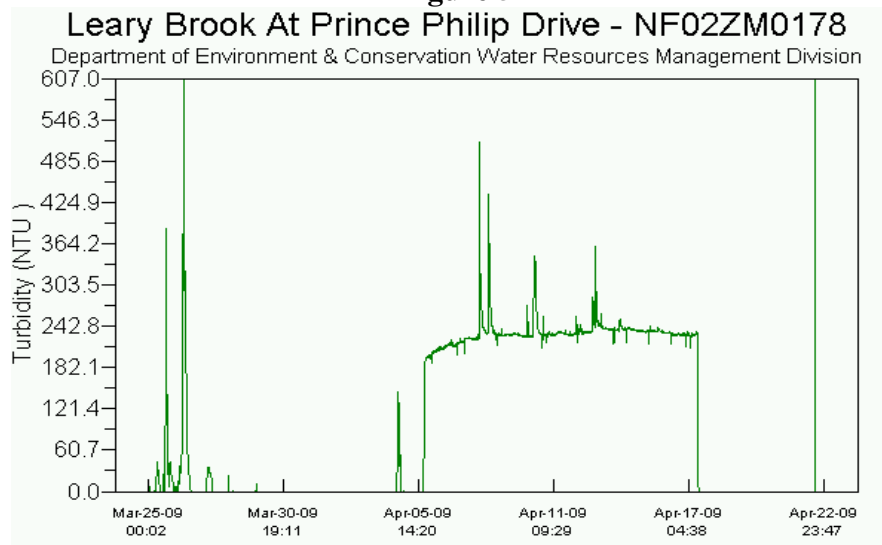
- Dissolved oxygen** measurements displayed typical diurnal variations during the deployment period, ranging from 11.96 to 14.30mg/L, as shown in **Figure 4** below. Dissolved oxygen levels displayed an overall decreasing trend in response to seasonally increasing water temperatures. Colder water tends to hold more dissolved oxygen than warmer water.

**Figure 4**



- Turbidity** levels were unsettled in Learys Brook on March 25<sup>th</sup> and 26<sup>th</sup> as seen in **Figure 5** below. Mixed snow and rain combined with surface run-off containing road salt contributed to increased turbidity in the brook on these days. Turbidity returned to background levels from March 27<sup>th</sup> to April 3<sup>rd</sup>, when turbidity was once again unsettled until April 17<sup>th</sup>. There was no significant precipitation and wind speeds were average from April 3<sup>rd</sup>-17<sup>th</sup>, so land based activities upstream from this station were probably impacting turbidity levels during this period. The probe was quickly removed from its protective cage on April 17<sup>th</sup> to wipe away a build up of silt and slime that had accumulated on the sensors. The impact of cleaning the turbidity sensor was very obvious in the data, as the clean sensor began reading turbidity levels at 0.0 NTU, which matched the QA/QC turbidity reading of 0.0 NTU on April 22<sup>nd</sup>.

**Figure 5**



**Appendix 1:** Weather information for St. John's, NL provided by Environment Canada for March and April 2009:

Daily Data Report for March 2009

<u>D</u> <u>a</u> <u>y</u>	<u>Max</u> <u>Temp</u> °C	<u>Min</u> <u>Temp</u> °C	<u>Mean</u> <u>Temp</u> °C	<u>Heat</u> <u>Deg</u> <u>Days</u> °C	<u>Cool</u> <u>Deg</u> <u>Days</u> °C	<u>Total</u> <u>Rain</u> mm	<u>Total</u> <u>Snow</u> cm	<u>Total</u> <u>Precip</u> mm	<u>Snow</u> <u>on</u> <u>Grnd</u> cm	<u>Dir of</u> <u>Max</u> <u>Gust</u> 10's Deg	<u>Spd of</u> <u>Max</u> <u>Gust</u> km/h
<u>01</u>	8.3	-4.8	1.8	16.2	0.0	18.0	T	18.0	10	25E	48E
<u>02</u>	11.8	-2.1	4.9	13.1	0.0	17.2	0.0	17.2	6	M	M
<u>03</u>	13.5	8.8	11.2	6.8	0.0	3.6	0.0	3.6	6	21E	76E
<u>04</u>	9.6	-4.8	2.4	15.6	0.0	10.6	1.0	11.4	2	26E	48E
<u>05</u>	-4.6	-10.1	-7.4	25.4	0.0	0.0	3.8	2.6	3	27E	61E
<u>06</u>	-1.9	-13.7	-7.8	25.8	0.0	0.0	T	T	5	29E	52E
<u>07</u>	3.8	-7.2	-1.7	19.7	0.0	2.8	4.2	7.0	5	18E	70E
<u>08</u>	1.3	-3.4	-1.1	19.1	0.0	0.0	0.0	0.0	6	28E	74E
<u>09</u>	-0.2	-6.3	-3.3	21.3	0.0	0.0	1.0	0.6	6	33E	61E
<u>10</u>	-0.3	-3.6	-2.0	20.0	0.0	0.0	0.0	0.0	6	33E	46E
<u>11</u>	2.9	-5.1	-1.1	19.1	0.0	0.0	0.0	0.0	6		<31
<u>12</u>	4.8	-9.8	-2.5	20.5	0.0	2.2	T	2.2	2	27E	82E
<u>13</u>	-6.5	-11.6	-9.1	27.1	0.0	0.0	T	T	1	28E	72E
<u>14</u>	-2.8	-11.1	-7.0	25.0	0.0	0.0	T	T	1	29E	63E
<u>15</u>	3.7	-9.6	-3.0	21.0	0.0	0.0	T	T	1	27E	63E
<u>16</u>	-5.9	-10.7	-8.3	26.3	0.0	0.0	T	T	1	29E	39E
<u>17</u>	-2.8	-9.8	-6.3	24.3	0.0	0.0	2.0	2.0	3	32E	37E
<u>18</u>	-0.3	-10.7	-5.5	23.5	0.0	0.0	T	T	2		<31
<u>19</u>	4.0	-3.9	0.1	17.9	0.0	0.2	0.0	0.2	T	24E	54E
<u>20</u>	3.9	-2.8	0.6	17.4	0.0	0.6	T	0.6	T		<31
<u>21</u>	-0.1	-5.5	-2.8	20.8	0.0	9.2	27.8	36.4	7	5E	52E
<u>22</u>	-0.1	-6.7	-3.4	21.4	0.0	3.8	T	3.8	24	M	M
<u>23</u>	-1.6	-7.4	-4.5	22.5	0.0	0.0	8.0	6.4	24	M	M
<u>24</u>	-0.1	-1.7	-0.9	18.9	0.0	T	3.2	2.4	32	2E	76E
<u>25</u>	-0.1	-1.6	-0.9	18.9	0.0	8.0	12.2	20.0	30	4E	54E
<u>26</u>	1.1	-1.3	-0.1	18.1	0.0	11.6	0.0	11.6	31	M	M
<u>27</u>	5.3	0.0	2.7	15.3	0.0	0.6	0.0	0.6	20	M	M
<u>28</u>	7.2	0.9	4.1	13.9	0.0	T	0.0	T	15	33E	33E
<u>29</u>	7.1	-1.2	3.0	15.0	0.0	0.0	T	T	12	32E	50E
<u>30</u>	2.1	-1.7	0.2	17.8	0.0	0.0	T	T	12	35E	50E
<u>31</u>	0.9	-1.9	-0.5	18.5	0.0	0.0	0.0	0.0	8	2E	54E
Sum				<b>606.2</b>	<b>0.0</b>	<b>88.4</b>	<b>63.2</b>	<b>146.6</b>			
Avg	<b>2.1</b>	<b>-5.2</b>	<b>-1.6</b>								
Xtrm	<b>13.5</b>	<b>-13.7</b>								<b>27*</b>	<b>82*</b>

Daily Data Report for April 2009

<u>D</u> <u>a</u> <u>y</u>	<u>Max</u> <u>Temp</u> °C	<u>Min</u> <u>Temp</u> °C	<u>Mean</u> <u>Temp</u> °C	<u>Heat</u> <u>Deg</u> <u>Days</u>	<u>Cool</u> <u>Deg</u> <u>Days</u>	<u>Total</u> <u>Rain</u> mm	<u>Total</u> <u>Snow</u> cm	<u>Total</u> <u>Precip</u> mm	<u>Snow</u> <u>on</u> <u>Grnd</u>	<u>Dir of</u> <u>Max</u> <u>Gust</u>	<u>Spd of</u> <u>Max</u> <u>Gust</u>
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				°C	°C				cm	10's Deg	km/h
<a href="#">01</a>	2.0	-2.8	-0.4	18.4	0.0	0.0	0.0	0.0	8	35E	37E
<a href="#">02</a>	5.8	-3.2	1.3	16.7	0.0	0.0	T	T	7	25E	44E
<a href="#">03</a>	9.4	1.1	5.3	12.7	0.0	0.0	0.0	0.0	1	27E	44E
<a href="#">04</a>	10.9	1.2	6.1	11.9	0.0	14.4	0.0	14.4	1	18E	48E
<a href="#">05</a>	12.8	6.2	9.5	8.5	0.0	2.6	0.0	2.6	T	18E	48E
<a href="#">06</a>	8.9	0.2	4.6	13.4	0.0	2.8	0.0	2.8	T	29E	44E
<a href="#">07</a>	6.0	-0.3	2.9	15.1	0.0	0.4	0.0	0.4	T	29E	37E
<a href="#">08</a>	15.0	1.3	8.2	9.8	0.0	8.2	T	8.2	0	21E	67E
<a href="#">09</a>	12.5	-0.1	6.2	11.8	0.0	0.0	0.0	0.0	0	26E	50E
<a href="#">10</a>	6.7	0.2	3.5	14.5	0.0	11.2	0.0	11.2	0		<31
<a href="#">11</a>	9.2	0.4	4.8	13.2	0.0	0.0	0.0	0.0	0	26E	46E
<a href="#">12</a>	8.1	0.6	4.4	13.6	0.0	7.0	0.0	7.0	0	18E	63E
<a href="#">13</a>	9.3	2.2	5.8	12.2	0.0	4.2	0.0	4.2	0	19E	63E
<a href="#">14</a>	7.3	-0.5	3.4	14.6	0.0	0.4	3.4	3.0	1	26E	46E
<a href="#">15</a>	2.7	-3.3	-0.3	18.3	0.0	0.0	1.2	0.6	T	33E	44E
<a href="#">16</a>	-2.0	-5.8	-3.9	21.9	0.0	0.0	T	T	T	31E	48E
<a href="#">17</a>	0.4	-6.5	-3.1	21.1	0.0	0.0	0.2	T	0	29E	44E
<a href="#">18</a>	2.9	-7.1	-2.1	20.1	0.0	0.0	0.0	0.0	0		<31
<a href="#">19</a>	3.8	-4.0	-0.1	18.1	0.0	0.0	0.0	0.0	0	26E	33E
<a href="#">20</a>	3.6	-4.9	-0.7	18.7	0.0	0.0	0.0	0.0	0		<31
<a href="#">21</a>	9.8	-1.8	4.0	14.0	0.0	0.0	0.0	0.0	0	28E	33E
<a href="#">22</a>	12.3	-0.6	5.9	12.1	0.0	0.0	0.0	0.0	0	21E	41E
<a href="#">23</a>	13.1	6.4	9.8	8.2	0.0	2.8	0.0	2.8	0	19E	65E
<a href="#">24</a>	16.3	2.5	9.4	8.6	0.0	0.0	0.0	0.0	0	22E	50E
<a href="#">25</a>	12.9	0.8	6.9	11.1	0.0	0.0	0.0	0.0	0	14E	39E
<a href="#">26</a>	17.9	-0.2	8.9	9.1	0.0	T	T	T	0	25E	48E
<a href="#">27</a>	6.6	-2.0	2.3	15.7	0.0	0.0	0.0	0.0	0	1E	33E
<a href="#">28</a>	7.2	1.1	4.2	13.8	0.0	1.8	T	1.8	0	25E	59E
<a href="#">29</a>	7.5	-2.2	2.7	15.3	0.0	6.0	0.6	6.0	0	33E	67E
<a href="#">30</a>	8.1	-2.6	2.8	15.2	0.0	0.0	0.0	0.0	T	29E	48E
Sum				<b>427.7</b>	<b>0.0</b>	<b>61.8</b>	<b>5.4</b>	<b>65.0</b>			
Avg	<b>8.2</b>	<b>-0.8</b>	<b>3.7</b>								
Xtrm	<b>17.9</b>	<b>-7.1</b>								<b>21B</b>	<b>67B</b>

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