

## Real Time Water Quality Monthly Report Come by Chance River October-November 2007

### 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 October 18th, 2007. The SDI-address on the data logger was incompatible with the SDI-address on the sonde at the time of installation, resulting in data loss from October 18th -29th.
- Data was recorded from a second, freshly calibrated probe at the time of deployment on October 18<sup>th</sup>, for QA/QC purposes. Data readings from the QA/QC instrument can only be compared with the first available data recorded by the data logger on October 29, which is not typical QA/QC procedure, and is expected to rank poorly given the temporal lapse between data sets being compared.
- The QA/QC ranking when comparing the temperature data from both instruments at the time of installation was “poor”(Table 1), which is not surprising considering that the QA/QC probe’s temperature was recorded on October 18<sup>th</sup>, and the Come by Chance River probe’s temperature reading was recorded on October 29<sup>th</sup>. The QA/QC ranking when comparing conductivity data from both instruments also ranked as “poor”, which again can be attributed to the temporal difference between comparison data sets.
- The QA/QC rankings for pH and dissolved oxygen were “excellent” and “good” indicating that these 2 water quality parameters didn’t change significantly between October 18<sup>th</sup> and October 29th when the comparison data sets were collected.

**Table 1: QA/QC Data Comparison Rankings upon reinstallation on October 18<sup>th</sup>-29<sup>th</sup>, 2007**

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Come by Chance River	October 18	Installation	Poor	Excellent	Poor	Good

- The Come by Chance instrument was deployed until November 13th, 2007 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 November 13<sup>th</sup>, 2007**

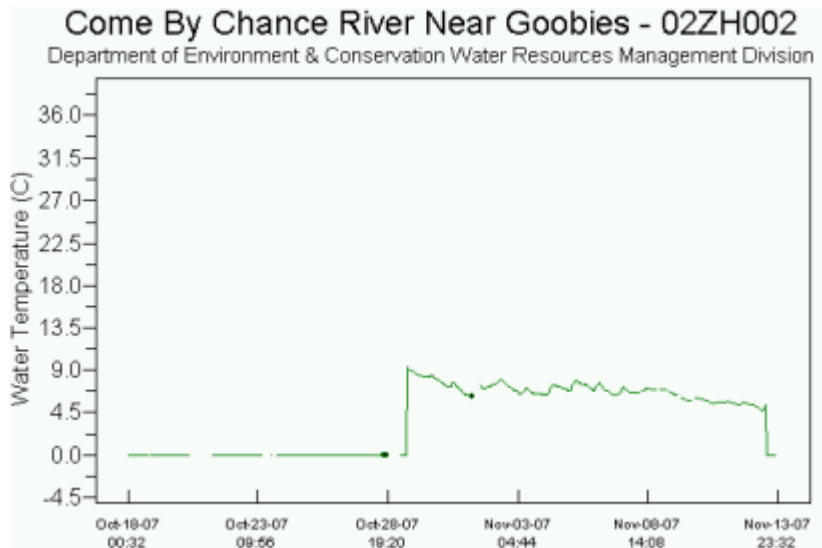
Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Come by Chance River	November 13th	Removal	Excellent	Excellent	Good	Good

- Rankings of “excellent” and “good” were achieved when comparing specific parameter readings from

an instrument that had been deployed for 26 days with a clean freshly calibrated instrument. This increases confidence in the accuracy of the data collected from the deployed instrument throughout the deployment period.

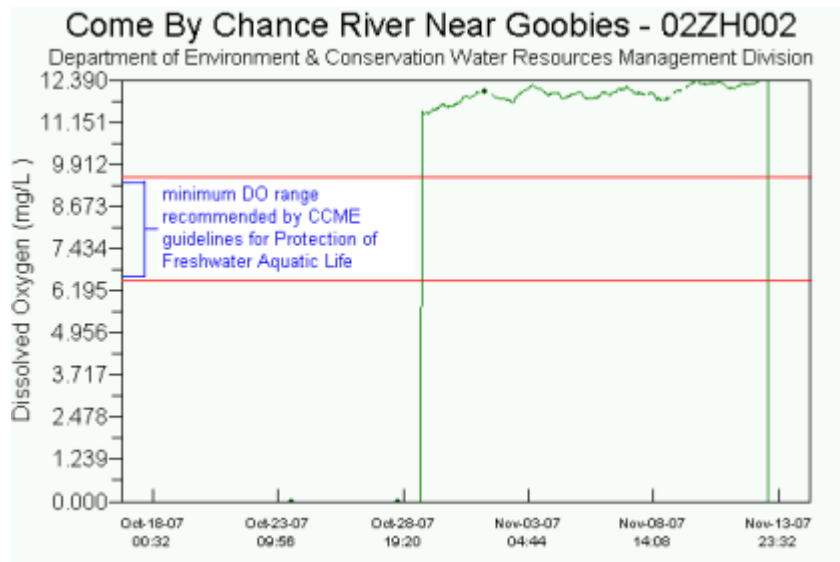
## Data Interpretation

- This monthly report interprets the data from the Come by Chance River RTWQ station for the period of October 18th, 2007 –November 13th, 2007.
- Data interruptions occurred during this deployment period, but less frequently than during the previous deployment period. It's currently not known what's causing these data transmission gaps. This issue is under review by the provincial Department of Environment and Conservation and Environment Canada.
- The data gap for water temperature that occurred from October 18<sup>th</sup>-29<sup>th</sup> is represented in **Figure 1**, below, by a flat line at 0.0°C. This flat line doesn't represent true data values. The water temperature data for this deployment period showed a decreasing trend, as expected, in response to seasonally decreasing air temperatures. Water temperatures ranged from 9.25°C down to 4.58°C. Diurnal fluctuations in water temperature are visible in the graph, as water temperature is typically higher during the day and lower at night.



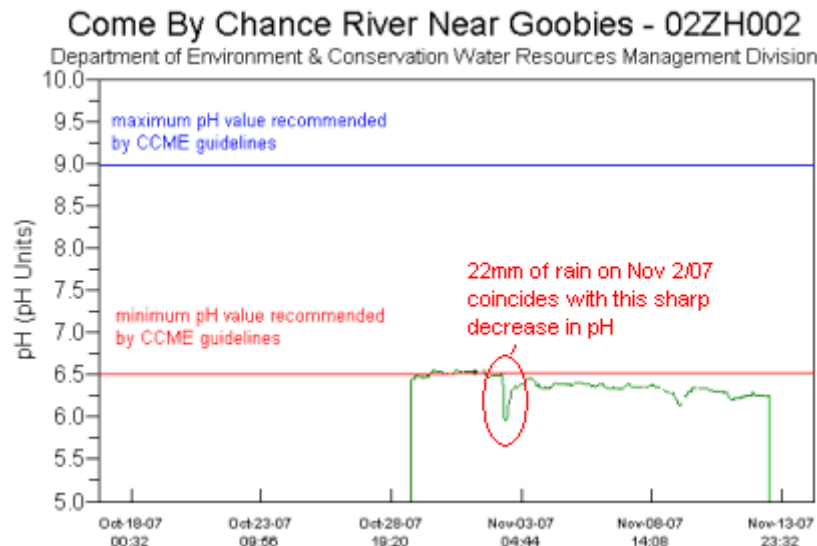
**Figure 1**

- The dissolved oxygen values (**Figure 2**) showed an increasing trend during this deployment period, in response to seasonally decreasing water temperatures. Colder water can hold more dissolved oxygen than warmer water. Dissolved oxygen (DO) values ranged from 11.39 to 12.48mg/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**

- The pH values (**Figure 3**) for Come by Chance River remained relatively stable throughout the deployment period. The pH values ranged from 5.96 – 6.56 pH units with most values falling below the optimum pH range recommended by the CCME Protection of Freshwater Aquatic Life guidelines of 6.5 – 9.0. Fresh, surface water bodies in NL frequently have pH values below the CCME recommended range, which may result from the typically acidic nature of surrounding granite and bog. Overall, the pH values showed a decreasing trend in response to the seasonally decreasing amount of daylight. When photosynthesis occurs during the daylight hours, pH tends to increase as a result of the increased production of carbon dioxide. During the non-daylight hours pH is expected to decrease. pH values indicated



**Figure 3**

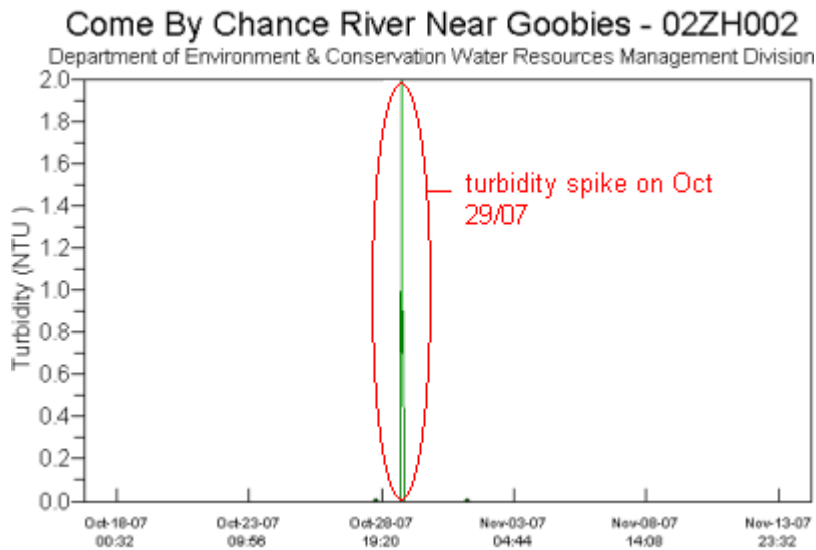
- Specific conductivity values (**Figure 4**), ranged from 57.6 to 82.0 $\mu$ S/cm throughout the reported period. Fluctuations in conductivity values are often the result of precipitation events, which can either have a dilution effect causing a decrease in conductivity, or can increase conductivity depending on the characteristics of the land run-off. Precipitation was recorded in the area of Come by Chance River on

October 20<sup>th</sup>, 21<sup>st</sup>, 28<sup>th</sup>, and 29<sup>th</sup>, and on November 2<sup>nd</sup>, 4<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 11<sup>th</sup> and 13<sup>th</sup>, as seen in **Appendix A**, found at the end of this report.



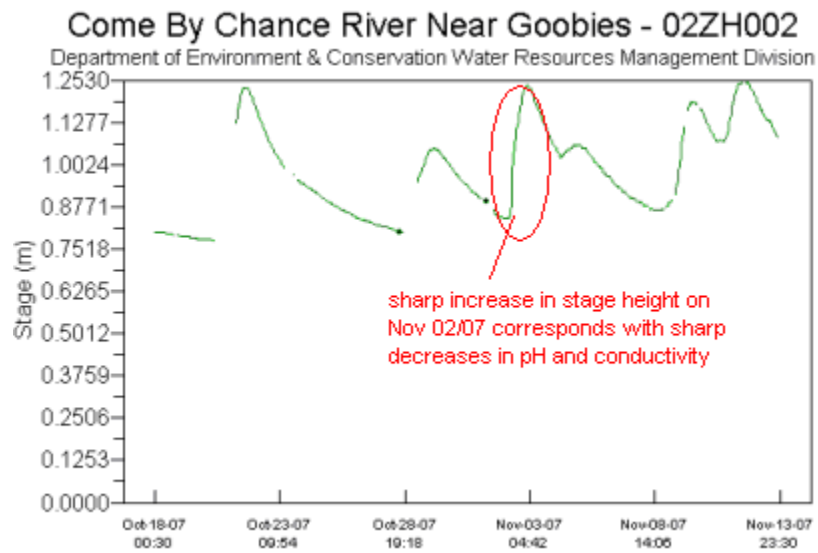
**Figure 4**

- Turbidity values spiked from 0 to 2 NTU on October 29<sup>th</sup>, and then returned to 0 NTU for the remainder of the deployment period, as shown below in **Figure 5**. Wind gusts of up to 72km/hr and 17.9 mm of rain recorded on October 28<sup>th</sup>, as indicated in Appendix A (below), may have influenced the turbidity values on October 29<sup>th</sup>. Turbidity values tend to migrate near 0 NTU at this site.



**Figure 5**

- The stage fluctuated during the deployment period. Increases in stage height appear to coincide with rainfall events, as highlighted in the Daily Climate Data Report in **Appendix A**, below.











**Figure 6**

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**Appendix A:**

Climate Data for Argentia, NL (October-November 2007)

Daily Data Report for October 2007				
D a y	Max Temp °C 	Min Temp °C 	Total Precip mm 	Spd of Max Gust km/h 
<u>18</u> †	8.0	4.1	0.7	54
<u>19</u> †	8.7	2.6	0.0	35
<u>20</u> †	15.3	4.3	25.6	74
<u>21</u> †	14.0	8.7	23.0	65
<u>22</u> †	10.3	4.3	0.0	54
<u>23</u> †	14.6	5.3	0.0	69
<u>24</u> †	11.9	5.9	0.0	59
<u>25</u> †	7.2	4.5	0.0	32
<u>26</u> †	8.8	4.4	0.0	54
<u>27</u> †	10.7	7.7	0.0	44
<u>28</u> †	15.6	9.3	17.9	72
<u>29</u> †	10.6	2.5	9.7	54
<u>30</u> †	6.2	1.9	0.6	<31
<u>31</u> †	4.9	2.1	0.6	43

Daily Data Report for November 2007				
D a y	Max Temp °C 	Min Temp °C 	Total Precip mm 	Spd of Max Gust km/h 
<u>01</u> †	13.7	3.6	0.0	76
<u>02</u> †	16.5	4.9	22.2	93
<u>03</u> †	7.6	1.5	0.0	50
<u>04</u> †	15.4	6.6	2.6	98
<u>05</u> †	11.3	5.0	0.0	32
<u>06</u> †	9.6	2.4	0.0	37
<u>07</u> †	9.0	1.6	0.0	39
<u>08</u> †	11.0	6.1	10.2	70
<u>09</u> †	8.8	2.8	24.9	54
<u>10</u> †	4.1	1.8	0.0	57
<u>11</u> †	12.9	2.4	20.5	76
<u>12</u> †	7.6	3.4	0.6	65
<u>13</u> T†	4.6	2.0	1.4	48