

Real Time Water Quality Monthly Report Come by Chance River September—October 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 September 5, 2007.
- At the time of installing the freshly calibrated datasonde, a second set of data readings was collected 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 ranking for temperature at the time of installation was listed as ‘marginal’ (**Table 1**), which may be an indication of trouble occurring with the temperature sensor from either of the two instruments. This issue will be further investigated, and the temperature data will be viewed as “suspect” for this deployment period.
- The QA/QC rankings for pH, specific conductivity and dissolved oxygen were “good” and “excellent”, which meets this Department’s specifications for QA/QC protocol, when comparing specific parameter readings between two similar instruments.

Table 1: QA/QC Data Comparison Rankings upon reinstallation on September 5th, 2007

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Come by Chance River	September 5th	Installation	Marginal	Good	Excellent	Excellent

- The Come by Chance instrument was deployed until October 11, 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 October 11th, 2007

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Come by Chance River	October 11 th	Removal	Good	Excellent	Good	Excellent

- Rankings of “good” and “excellent” were achieved when comparing specific parameter readings from an instrument that had been deployed for 36 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 September 5th, 2007 –October 11th, 2007.
- There were several data interruptions during this deployment period and 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 water temperature (**Figure 1**) data for Come by Chance River showed a decreasing trend in response to seasonally decreasing air temperatures. The water temperature ranged from 18.64°C down to 8.08°C. Diurnal fluctuations in water temperature are clearly visible in the graph, as water temperature is typically higher during the day and lower at night.

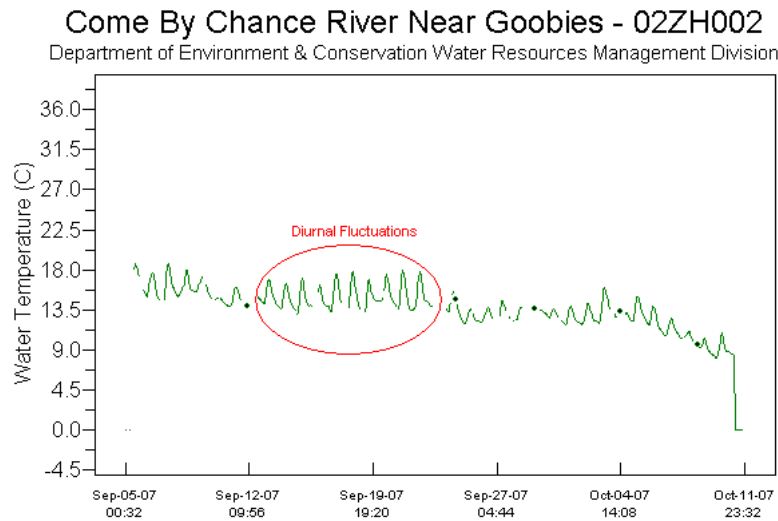
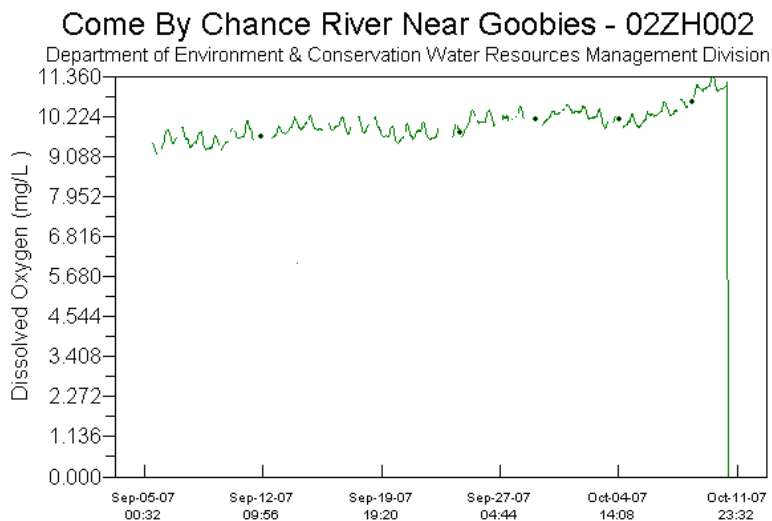
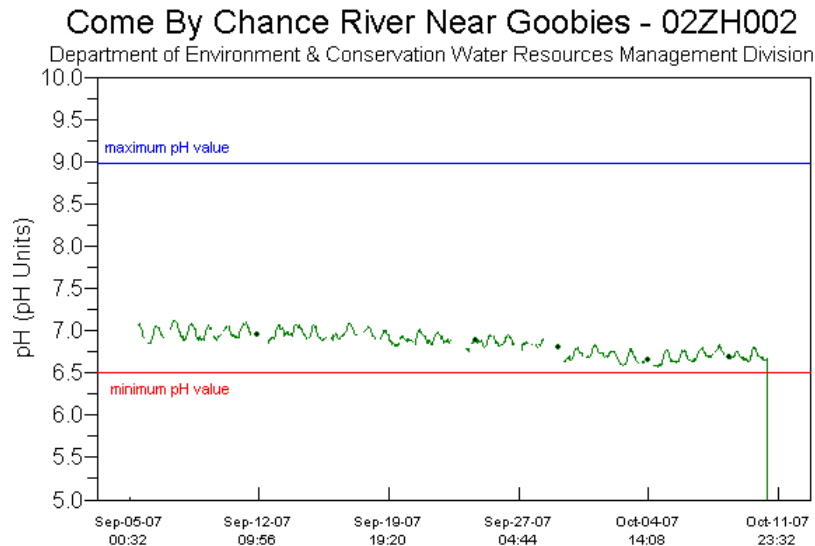


Figure 1

- The dissolved oxygen values (**Figure 2**) showed an increasing trend during this deployment period, in response to decreasing water temperatures. Colder water can hold more dissolved oxygen than warmer water. Dissolved oxygen (DO) values ranged from 9.10 to 11.36mg/L and fall above the minimum DO concentrations recommended by the Canadian Council of Ministers of the Environment (CCME) Protection of 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). Only the most conservative CCME guideline (above 9.5 mg/L for cold water/early life stages) was not met. This is typical for surface water in this province at this time of year.



- The pH values (**Figure 3**) for Come by Chance River remained relatively stable throughout the deployment period. The pH values ranged from 6.57 – 7.12 pH units and all values fell within the optimum range recommended by the CCME Protection of Aquatic Life guidelines of 6.5 – 9.0. 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. During the non-daylight hours pH is expected to decrease.



- The specific conductivity values (**Figure 4**) increased fairly constantly throughout the reported period, ranging from 65.7-103.9 μ S/cm. A sharp increase in specific conductivity values is seen on September 29th. The conductivity was most likely impacted by land run-off from the 15mm of rain that was recorded in the area that day, as indicated in the Daily Climate Data Report in **Appendix A**, found at the end of this report.

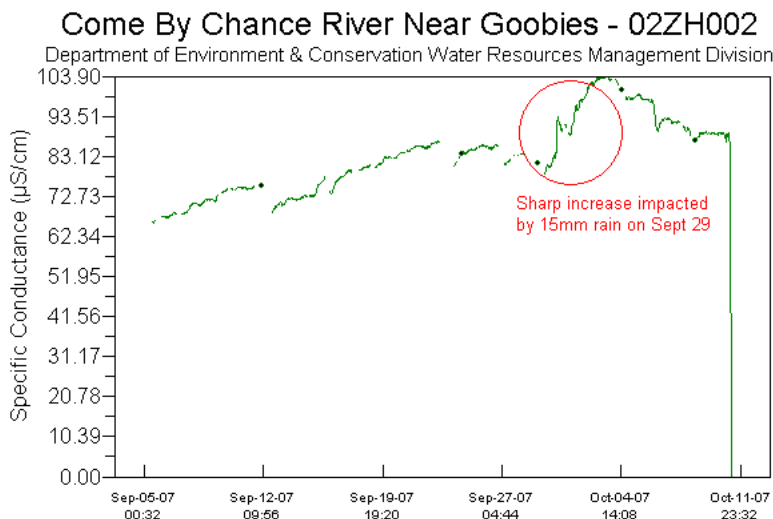


Figure 4

- The turbidity sensor didn't appear to be functioning as readings of 0 NTU were recorded throughout the entire deployment period. The turbidity sensor calibrated successfully and performed as expected during routine maintenance conducted from October 12-17. This sensor will be monitored closely during the next deployment period and will be sent for repairs if sensor malfunction is expected.

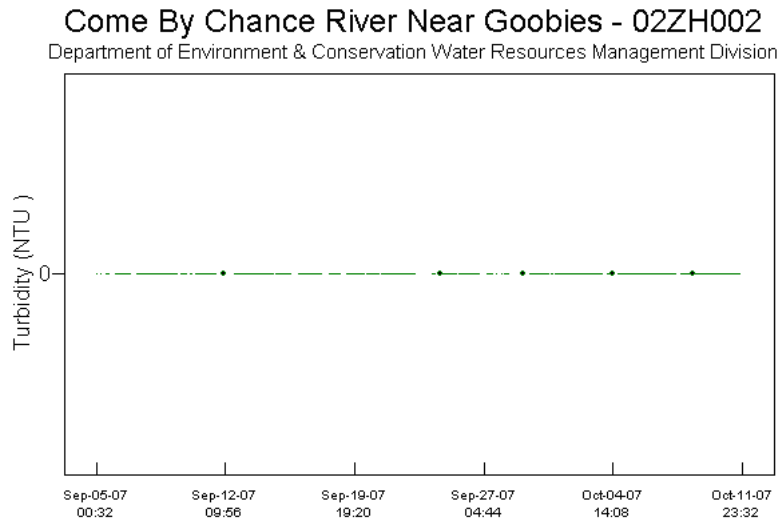


Figure 5

- The stage fluctuated during the deployment period. Increases in stage height appear to coincide with rainfall events in the area, as shown in the Daily Climate Data Report in **Appendix A**, found at the end of this report. A small amount of rainfall, such as the 0.6mm recorded on September 12, seemed to have a significant affect on stage height. A more pronounced increase in stage height is seen on September 29th when 15mm of rain fell in the area.

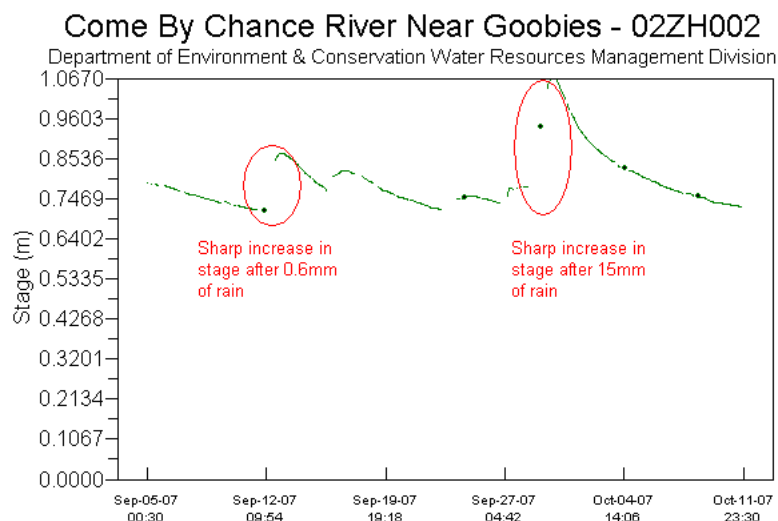


Figure 6

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Appendix A:

Climate Data for Argientia, NL (September-October 2007)

Daily Data Report for September 2007					
D a y	Max Temp °C	Min Temp °C	Mean Temp °C	Total Precip mm	Spd of Max Gust km/h
<u>01</u> †	20.8	13.5	17.2	9.9	78
<u>02</u> †	17.8	10.7	14.3	0.0	56
<u>03</u> †	16.6	9.8	13.2	0.0	46
<u>04</u> †	16.1	13.4	14.8	3.5	48
<u>05</u> †	16.6	10.0	13.3	0.0	46
<u>06</u> †	14.4	6.9	10.7	0.0	41
<u>07</u> †	16.4	7.2	11.8	0.0	<31
<u>08</u> †	17.5	11.3	14.4	0.0	<31
<u>09</u> †	16.5	10.8	13.7	0.0	46
<u>10</u> †	12.3	10.6	11.5	0.6	41
<u>11</u> †	15.2	10.9	13.1	0.0	46
<u>12</u> †	19.4	11.6	15.5	0.6	80
<u>13</u> †	15.9	10.4	13.2	0.0	57

<u>14</u> †	14.4	9.2	11.8	0.0	46
<u>15</u> †	15.6	8.3	12.0	0.0	56
<u>16</u> †	18.1	10.7	14.4	4.2	85
<u>17</u> †	14.7	8.1	11.4	0.0	<31
<u>18</u> †	15.7	6.9	11.3	0.0	<31
<u>19</u> †	15.4	8.2	11.8	0.0	33
<u>20</u> †	15.6	13.2	14.4	0.0	48
<u>21</u> †	18.0	8.7	13.4	0.0	37
<u>22</u> †	16.3	9.3	12.8	0.0	39
<u>23</u> †	18.4	12.2	15.3	8.1	57
<u>24</u> †	12.9	9.1	11.0	0.0	59
<u>25</u> †	12.2	9.1	10.7	0.0	41
<u>26</u> †	13.3	9.6	11.5	8.1	41
<u>27</u> †	15.8	8.1	12.0	0.0	46
<u>28</u> †	18.5	7.9	13.2	6.8	74
<u>29</u> †	15.6	9.7	12.7	15.4	52
<u>30</u> †	12.2	6.5	9.4	0.0	41

Daily Data Report for October 2007

<u>D</u> <u>a</u> <u>y</u>	<u>Max</u> <u>Temp</u> °C 	<u>Min</u> <u>Temp</u> °C 	<u>Total</u> <u>Precip</u> mm 	<u>Spd of Max</u> <u>Gust</u> km/h 
<u>01</u> †	12.9	6.6	0.0	48
<u>02</u> †	14.2	10.6	0.0	48
<u>03</u> †	15.1	10.3	0.0	<31
<u>04</u> †	15.2	10.5	2.9	48
<u>05</u> †	14.3	11.1	0.0	59
<u>06</u> †	13.5	8.7	0.0	57
<u>07</u> †	10.2	6.8	0.7	52
<u>08</u> †	11.0	6.7	4.4	61
<u>09</u> †	9.0	5.2	0.0	56
<u>10</u> †	11.1	4.2	0.0	33
<u>11</u> †	11.2	4.2	0.0	37
<u>12</u> †	12.1	3.6	0.0	39
<u>13</u> †	11.9	6.1	9.0	63
<u>14</u> †	9.7	7.3	0.0	<31
<u>15</u> †	12.0	6.6	7.8	<31
<u>16</u> †	7.7	3.7	3.0	43
<u>17</u> †	8.0	4.4	0.0	57
<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