

#### Real Time Water Quality Monthly Report Waterford River - St. John's NL September 2009

### General

 Data from the Waterford River monitoring station is monitored by the Water Resources Management Division staff.

# Maintenance and Calibration of Instrumentation

- The following table displays the dates when the Waterford River water quality probe was installed and removed during this deployment period for routine cleaning, maintenance and calibration.
- •

**Table 1**: Table of Water Quality Probe Installation and Removal

Date Installed	Date Removed							
August 25, 2009	September 28, 2009							

 Water quality readings were taken with a second water quality instrument at the time of installation and removal for QAQC comparison. The QAQC instrument was calibrated prior to each use.

## **Data Interpretation**

- Water temperature is shown in blue in Figure 1 below. Water temperatures fluctuated in response to daily maximum and minimum air temperatures during this deployment. This is illustrated by comparing the graph in Figure 1 below, to the air temperature data in Appendix 1 at the end of this report. Water temperatures ranged between 7.62 and 18.79°C, which is within the expected range for this station at this time if year.
- The inverse relationship between dissolved oxygen(DO) levels and water temperature is demonstrated in **Figure 1** below (DO levels shown in green). Colder water has a greater capacity to hold DO than warmer water, which is clearly seen in **Figure 1**; when water temperatures (blue) decrease DO(green) increases proportionally. Three areas of the graph are highlighted in red to identify occurrences where DO levels dropped below the minimum guideline value of 6.5, as recommended in the Canadian Water Quality Guidelines for the Protection of Aquatic Life. These low oxygen values can be an indication of an adverse water quality event or debris lodged near the sensor. Both DO and water temperatures appear to bottom out at the end of the graph, but this is representative of the instrument being disconnected at the end of the deployment period.



pH levels ranged from 6.65 to 7.62 units, as seen in Figure 2 below. All pH measurements during this deployment period were within the range recommended by the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9 pH units (Figure 2).



Specific conductivity levels were variable during this deployment, ranging from 176.4 to 600µS/cm, as seen in Figure 3. Sudden drops in conductivity levels generally correspond with rainfall events, with the rainfall having a dilution effect on conductivity, lowering its values. This relationship is clearly seen in Figure 3, as specific conductivity levels (green) change in response to changes in water levels (stage-blue). Stage levels increase as a result of precipitation events, which are shown in Appendix 1 at the end of this report. Specific conductivity values were in the expected range for this station at this time of year.



Turbidity values, shown in Figure 4 below, steadily increased from late August until mid-September, as seasonally low water levels and warm water temperatures provided optimum conditions for algal and macrophyte populations to flourish. A significant rainfall of 53mm on September 14 had a settling effect on suspended particles as turbidity values plunged to background levels. Increased flows that followed the heavy rainfall resulted in turbidity levels rising, until another rainfall of 31mm on September 18 triggered a sudden drop in turbidity. Turbidity values fluctuated between 0.7 and 1357 NTU during this deployment period.



#### **APPENDIX 1**:

Weather information for St. John's, NL provided by Environment Canada for September 2009:

Daily Data Report for September 2009

D a	<u>Max</u> <u>Temp</u> °C	<u>Min</u> <u>Temp</u> °C	<u>Mean</u> <u>Temp</u> °C	<u>Heat</u> Deg Days	Cool Deg Days	<u>Total</u> <u>Rain</u> mm	<u>Total</u> <u>Snow</u> cm	<u>Total</u> <u>Precip</u> mm	Snow on Grnd	Dir of Max Gust	Spd of Max Gust
y	2	~	2	~	~	2	2	~	2	Deg	KIII/ II M
<u>01</u>	19.5	9.6	14.6	3.4	0.0	Т	0.0	Т	0	25E	44E
<u>02</u>	15.3	9.1	12.2	5.8	0.0	0.0	0.0	0.0	0	25E	37E
<u>03</u>	21.6	11.3	16.5	1.5	0.0	0.0	0.0	0.0	0	26E	67E
<u>04</u>	23.3	12.3	17.8	0.2	0.0	0.0	0.0	0.0	0	25E	46E
<u>05</u>	13.9	5.3	9.6	8.4	0.0	0.0	0.0	0.0	0		<31
<u>06</u>	14.1	4.8	9.5	8.5	0.0	0.0	0.0	0.0	0		<31
<u>07</u>	19.7	7.4	13.6	4.4	0.0	0.0	0.0	0.0	0	26E	70E
<u>08</u>	17.9	12.5	15.2	2.8	0.0	0.8	0.0	0.8	0	М	М
<u>09</u>	13.2	5.3	9.3	8.7	0.0	Т	0.0	Т	0	М	М
<u>10</u>	11.4	4.5	8.0	10.0	0.0	0.2	0.0	0.2	0	33E	44E
<u>11</u>	20.5	7.2	13.9	4.1	0.0	0.0	0.0	0.0	0	28E	50E
<u>12</u>	16.3	6.1	11.2	6.8	0.0	0.0	0.0	0.0	0	35E	33E
<u>13</u>	13.8	6.6	10.2	7.8	0.0	4.0	0.0	4.0	0	18E	33E
<u>14</u>	17.9	12.2	15.1	2.9	0.0	<mark>53.2</mark>	0.0	<mark>53.2</mark>	0	16E	69E
<u>15</u>	18.2	9.7	14.0	4.0	0.0	Т	0.0	Т	0	26E	61E
<u>16</u>	9.7	5.7	7.7	10.3	0.0	1.2	0.0	1.2	0	3E	33E
<u>17</u>	17.4	5.4	11.4	6.6	0.0	0.0	0.0	0.0	0	27E	37E
<u>18</u>	14.4	6.2	10.3	7.7	0.0	<mark>31.0</mark>	0.0	<mark>31.0</mark>	0	31E	65E
<u>19</u>	16.7	7.9	12.3	5.7	0.0	<mark>3.2</mark>	0.0	<mark>3.2</mark>	0	23E	37E
<u>20</u>	9.6	7.2	8.4	9.6	0.0	<mark>2.0</mark>	0.0	<mark>2.0</mark>	0	32E	41E
<u>21</u>	13.9	8.3	11.1	6.9	0.0	0.4	0.0	0.4	0	26E	41E
<u>22</u>	19.8	10.0	14.9	3.1	0.0	0.0	0.0	0.0	0	26E	54E
<u>23</u>	17.8	11.2	14.5	3.5	0.0	0.0	0.0	0.0	0	25E	67E
<u>24</u>	17.5	7.1	12.3	5.7	0.0	<mark>14.6</mark>	0.0	<mark>14.6</mark>	0	25E	70E
<u>25</u>	7.8	5.5	6.7	11.3	0.0	0.2	0.0	0.2	0	4E	59E
<u>26</u>	7.7	1.6	4.7	13.3	0.0	0.0	0.0	0.0	0	3E	54E
<u>27</u>	15.9	2.8	9.4	8.6	0.0	0.0	0.0	0.0	0		<31
<u>28</u>	15.7	6.7	11.2	6.8	0.0	0.4	0.0	0.4	0		<31
<u>29</u>	11.4	9.5	10.5	7.5	0.0	<mark>6.0</mark>	0.0	<mark>6.0</mark>	0	16E	41E
<u>30</u>	16.8	10.4	13.6	4.4	0.0	T	0.0	T	0	18E	37E
Sum			_	190.3	0.0	117.2	0.0	117.2			
Ava	15.6	7.6	11.7								

Avg **15.6 7.6** Xtrm **23.3 1.6** 

Report prepared by:

26\* 70

Joanne Sweeney Environmental Scientist Water Resources Management Division Department of Environment and Conservation Confederation Building West Block 4<sup>th</sup> Floor PO Box 8700 St. John's NL A1B 4J6

Ph. (709) 729-0351 Fax (709) 729-0320