Government of Newfoundland and Labrador
Department of Environment and Conservation
Water Resources Management Division

Real Time Water Quality Monthly Report
Waterford River - St. John's NL
October 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.
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Table 1: Table of Water Quality Probe Installation and Removal

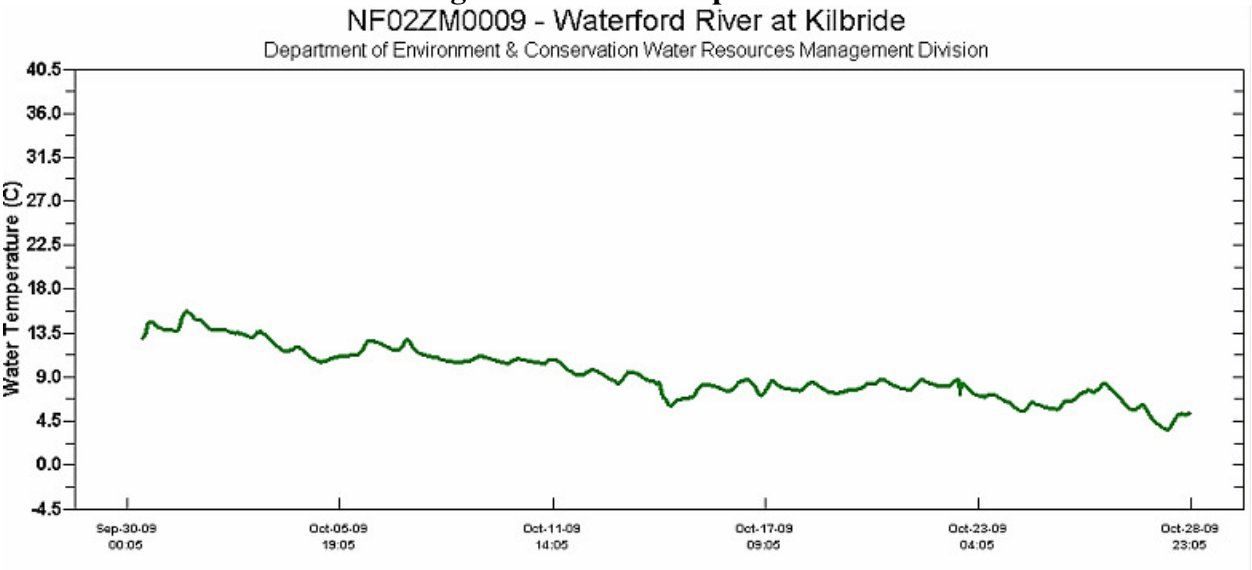
Date Installed	Date Removed
September 30, 2009	October 22, 2009

- 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 **Figure 1** below. Water temperatures demonstrated diurnal fluctuations and a seasonal decreasing trend during this deployment. This is further 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 3.11 and 15.2^{o}C, which is within the expected range for this station at this time if year.

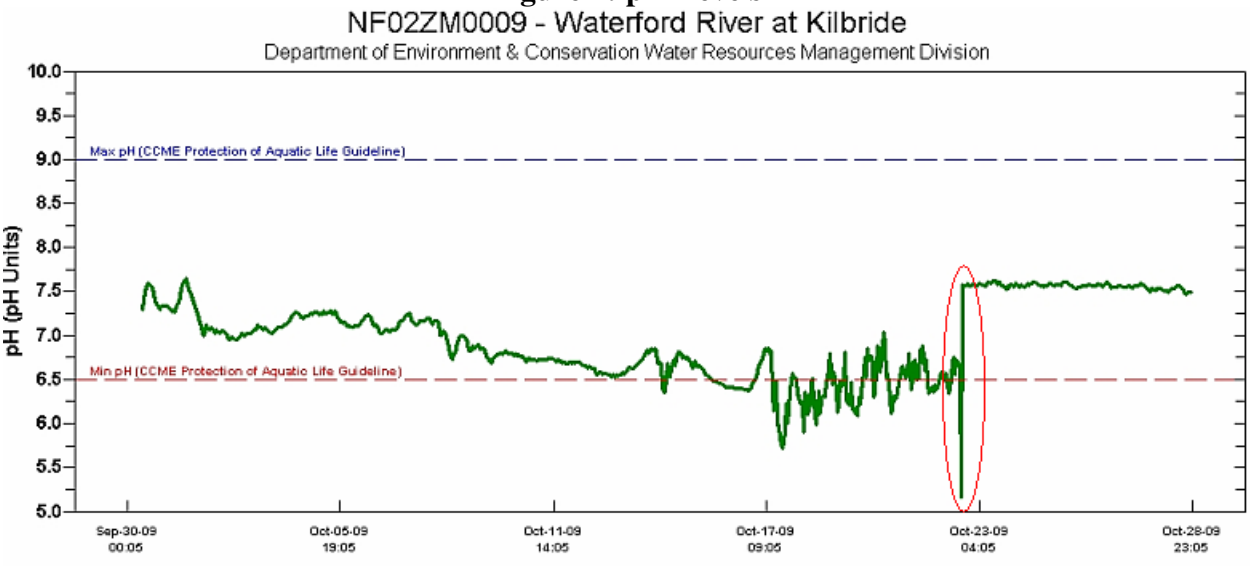
Figure 1: Water Temperature



- The **dissolved oxygen** (DO) sensor was malfunctioning during this deployment and the DO data is unreliable.

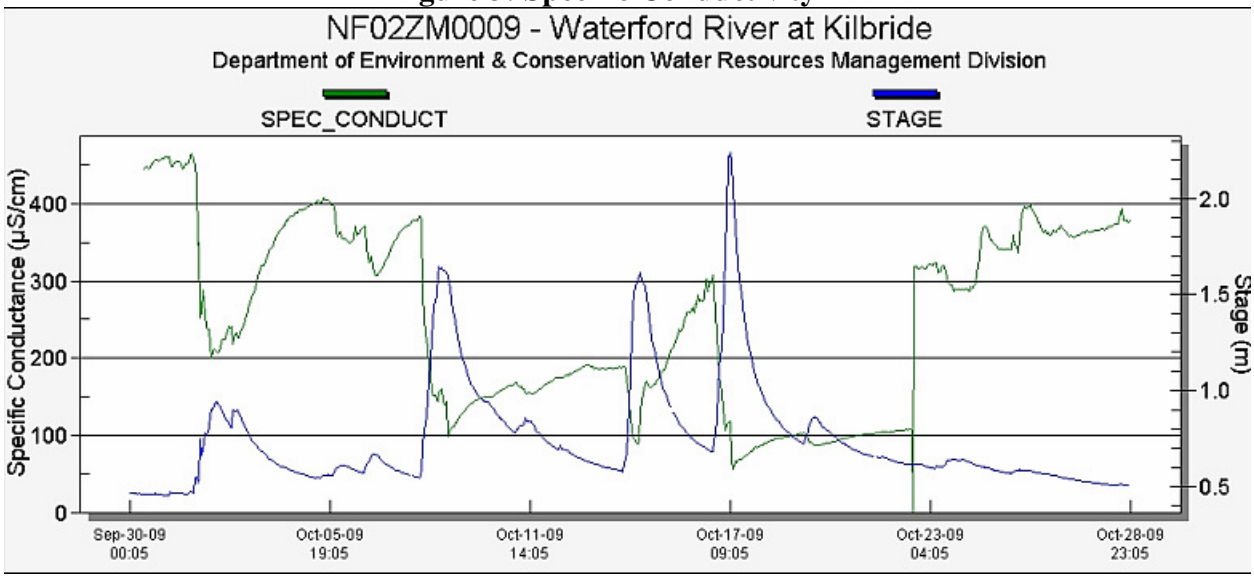
- **pH** levels ranged from 5.72 to 7.65 units, as seen in **Figure 2** below. Some pH values dropped below the range recommended by the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9 pH units **(Figure 2).** It isn't unusual for the pH of surface water in this province to fall below the recommended minimum, as NL waters are influenced by the natural acidity of surrounding bogs and surficial and bedrock geology. The monitoring instrument was removed on October 22 for cleaning and maintenance, and immediately replaced with a freshly calibrated probe. This removal/replacement activity can be seen in the graph below when pH levels appear to drop to 0 units. It's interesting to note that pH levels immediately returned to about 7.5 as soon as the freshly calibrated probe was deployed. This was approximately the same pH level that was reported at the beginning of the deployment period on September 30, which may be an indication that the gradual but consistent decrease in pH that progressed during the deployment was a result of sensor fouling.

Figure 2: pH Levels



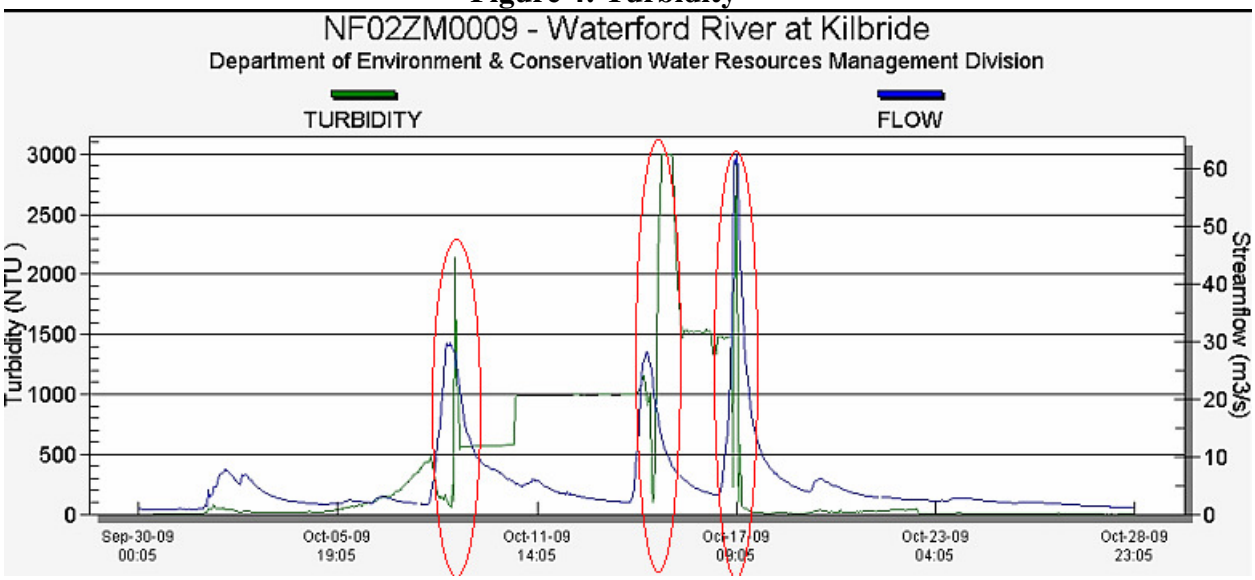
- **Specific conductivity levels** are shown in green in **Figure 3** below. Specific conductivity levels ranged between 56 and 465µS/cm during this deployment. Sudden drops in conductivity levels generally correspond with rainfall events, with the rainfall having a dilution effect on conductivity, lowering 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 shown in **Figure 3** 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.

Figure 3: Specific Conductivity



Turbidity levels are displayed in green ink in **Figure 4**, below. Turbidity remained near background levels for most of this deployment, with the exception of 3 peaks which are circled in red in the graph below. Each of these peaks appears to be the result of increased **flow**, shown in blue ink in **Figure 4.** Climate data for St. John's, found in **Appendix 1** below, indicates that significant rainfall events occurred on October 8-9, 14 and 16-17 which correspond to the spikes in turbidity and flow.

Figure 4: Turbidity



APPENDIX 1: Weather information for St. John's, NL provided by Environment Canada for October 2009:

Daily Data Report for October 2009

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	20.7	12.4	16.6	1.4	0.0	15.2	0.0	15.2	0		<31
02	13.9	12.0	13.0	5.0	0.0	34.8	0.0	34.8	0	26E	46E
03	13.2	7.1	10.2	7.8	0.0	1.8	0.0	1.8	0	31E	56E
04	8.6	5.8	7.2	10.8	0.0	1.0	0.0	1.0	0	32E	50E
05	10.3	5.8	8.1	9.9	0.0	9.6	0.0	9.6	0	16E	54E
06	15.0	9.8	12.4	5.6	0.0	7.6	0.0	7.6	0	24E	41E
07	12.1	7.2	9.7	8.3	0.0	T	0.0	T	0	28E	57E
08	8.4	6.9	7.7	10.3	0.0	44.4	0.0	44.4	0	3E	61E
09	8.9	6.7	7.8	10.2	0.0	8.2	0.0	8.2	0	1E	57E
10	8.2	5.8	7.0	11.0	0.0	1.8	0.0	1.8	0	36E	37E
11	8.8	4.9	6.9	11.1	0.0	7.0	0.0	7.0	0	30E	63E
12	7.5	4.1	5.8	12.2	0.0	2.2	0.0	2.2	0	29E	61E
13	10.1	3.3	6.7	11.3	0.0	0.0	0.0	0.0	0	M	M
14	5.2	0.7	3.0	15.0	0.0	41.2	5.2	46.4	0	M	M
15	8.4	1.1	4.8	13.2	0.0	0.0	0.0	0.0	0	30E	65E
16	8.4	-0.5	4.0	14.0	0.0	23.0	0.0	23.0	0	11E	67E
17	10.7	3.0	6.9	11.1	0.0	30.6	0.0	30.6	0	12E	83E
18	4.6	0.1	2.4	15.6	0.0	0.4	0.0	0.4	0		<31
19	8.6	1.1	4.9	13.1	0.0	14.0	0.0	14.0	0	13E	54E
20	7.4	2.4	4.9	13.1	0.0	2.0	0.0	2.0	0	3E	41E
21	5.5	2.9	4.2	13.8	0.0	3.0	0.0	3.0	0		<31
22	5.1	0.5	2.8	15.2	0.0	1.0	0.0	1.0	0		<31
23	2.8	0.8	1.8	16.2	0.0	5.0	0.8	5.8	0	35E	59E
24	2.6	-0.3	1.2	16.8	0.0	0.0	0.2	0.2	T	35E	59E
25	10.7	0.1	5.4	12.6	0.0	3.6	0.0	3.6	0	19E	59E
26	8.4	0.1	4.3	13.7	0.0	1.0	T	1.0	0	29E	67E
27	2.2	-2.0	0.1	17.9	0.0	0.0	0.0	0.0	0	32E	65E
28	3.2	-1.7	0.8	17.2	0.0	0.6	0.6	1.2	0	32E	74E
29	3.3	-0.2	1.6	16.4	0.0	2.8	T	2.8	0	35E	54E
30	4.7	-1.4	1.7	16.3	0.0	0.0	0.0	0.0	0		<31
31	12.8	-0.5	6.2	11.8	0.0	T	0.0	T	0	24E	78E
Sum				**377.9**	**0.0**	**261.8**	**6.8**	**268.6**			
Avg	**8.4**	**3.2**	**5.8**								
Xtrm	**20.7**	**-2.0**								**12***	**83***

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