Waterford River @ Kilbride

NF02ZM0009

August 2010

Newfoundland Labrador

Government of Newfoundland & Labrador
Department of Environment and Conservation
Water Resources Management Division
St. John's, NL, A1B 4J6 Canada

Real Time Water Quality Monthly Report
Waterford River - St. John's NL
August 2010

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.
- The instrument at Waterford River has been replaced with a sonde that has a luminescent dissolved oxygen sensor, which should be fully functional and produce reliable DO values for a 30-day deployment period. The recording of dissolved oxygen data will resume at this station. The replacement sonde does not include a turbidity sensor, thus turbidity will no longer be recorded at this station.
- There is a data gap from August 3rd at 12:00PM until August 6th at 10:05AM when the data logger was not receiving data from the sonde. This data gap will be visible in the graphs below.

Table 1: Table of Water Quality Probe Installation and Removal

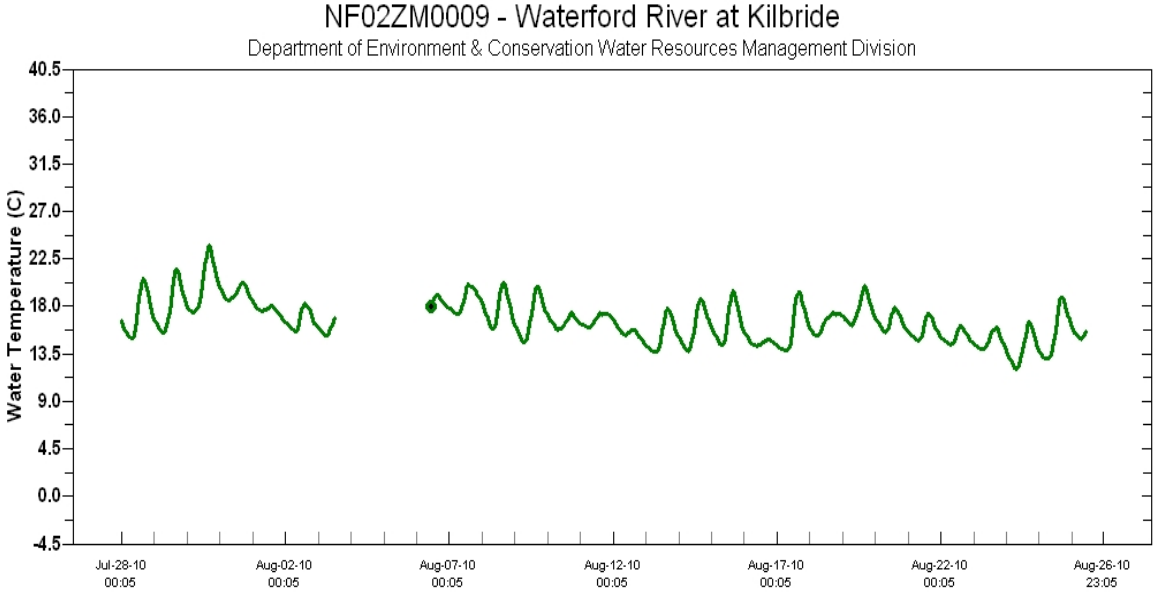
Date Installed	Date Removed
July 28, 2010	August 26, 2010

- 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

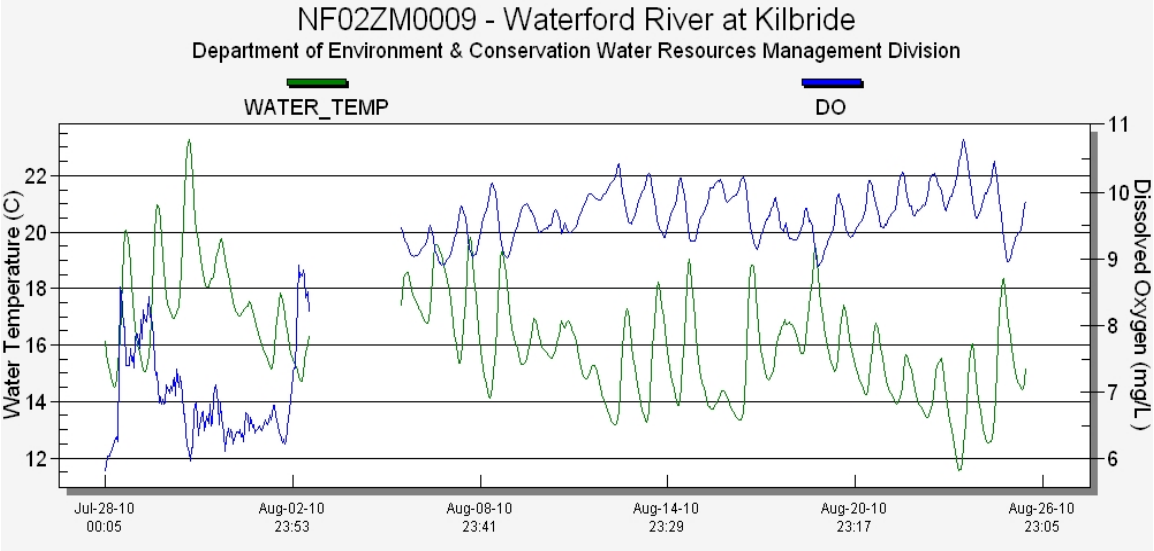
- **Water temperatures** were fairly constant during this deployment, ranging between 11.56 and 23.27°C, which is within the expected temperature range for this time of year. Water temperature data is shown in **Figure 1** below. The break in the graph represents the data gap from August 3rd at 12:00PM until August 6th at 10:05AM (noted above) when the data logger was not receiving data from the sonde.

- **Figure 1: Water Temperature**



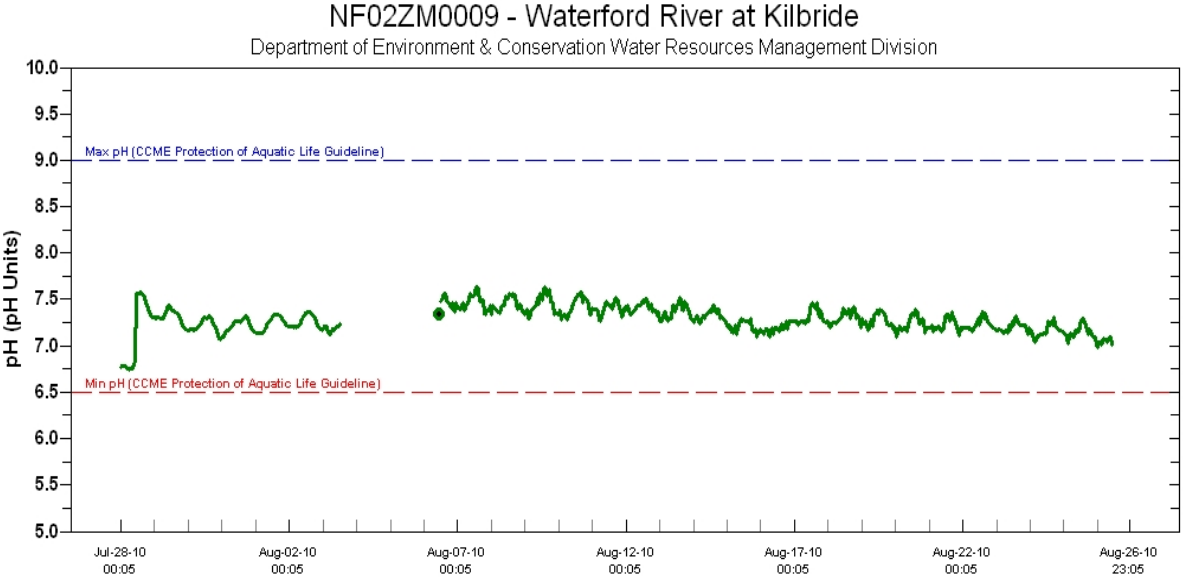
- **Dissolved oxygen (DO)** levels displayed diurnal fluctuations in response to changes in water temperatures from daytime highs to night time lows. Colder water typically holds more dissolved oxygen than warmer water, so as water temperatures decrease, dissolved oxygen levels typically increase. Conversely, as water temperatures increase, dissolved oxygen levels decrease. Dissolved oxygen levels ranged between 5.91 and 10.70mg/L during this deployment, dipping below the CCME dissolved oxygen minimum guideline for the Protection of Aquatic Life of 6.5mg/L. The lowest oxygen values corresponded with the highest water temperatures for the deployment period. Dissolved oxygen is shown in blue and water temperature is displayed in green in **Figure 2**, below. The break in the graph represents a data gap from August 3rd at 12:00PM until August 6th at 10:05AM when the data logger was not receiving data from the sonde.

Figure 2: Dissolved Oxygen and Water Temperature



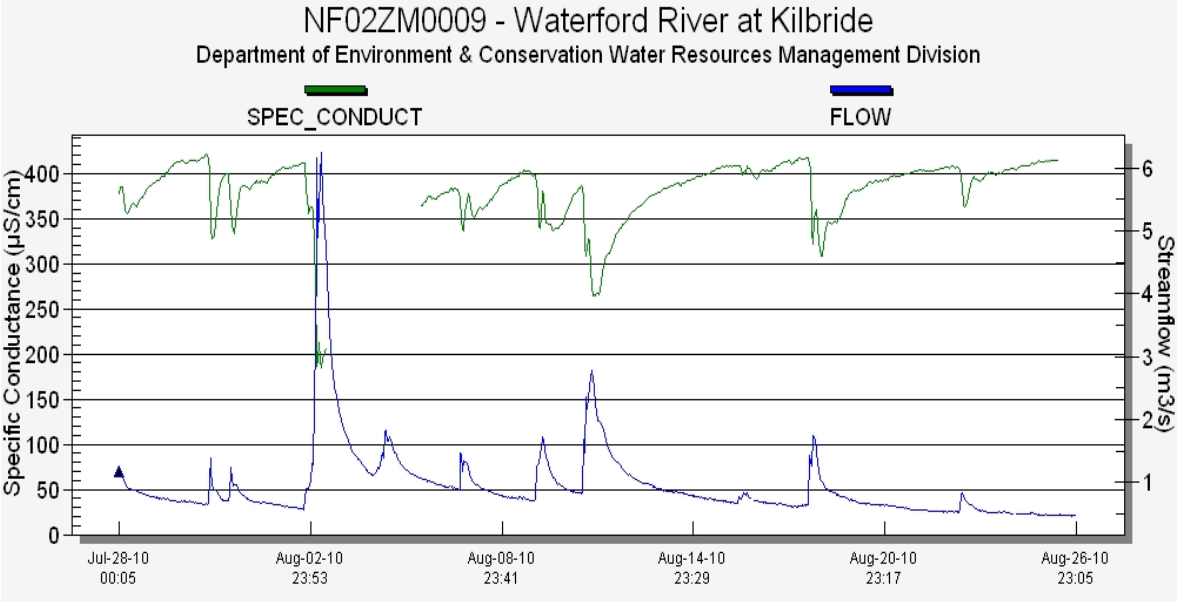
- **pH** levels were fairly constant and within the expected range for this station throughout the deployment, ranging from 6.74 to 7.64 units, as seen in **Figure 3** below. All pH values were within the range recommended by the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9.0 pH units. The break in the graph represents a data gap from August 3rd at 12:00PM until August 6th at 10:05AM when the data logger was not receiving data from the sonde.

Figure 3: pH Levels



- **Specific conductivity** levels typically share an inverse relationship with water flow, showing decreasing levels as flow increases due to precipitation. This is caused by the dilution effect precipitation has on conductivity during the warmer months, when road salting operations are not in effect. Conversely, specific conductivity levels typically increase as flow decreases. The significant drop in conductivity and corresponding increase in flow on August 2 can be attributed to 5 consecutive days of rainfall that began on August 2nd. Climate data from Environment Canada is shown in Appendix 1 at the end of this report. Smaller peaks in flow and corresponding drops in conductivity can also be attributed to rainfall, given in Appendix 1. Specific conductivity values are shown in green and flow is shown in blue in **Figure 4** below. Specific conductivity values ranged between 185-422 µS/cm during this deployment. The break in the graph represents a data gap from August 3rd at 12:00PM until August 6th at 10:05AM when the data logger was not receiving data from the sonde.

Figure 4: Specific Conductance and Flow



APPENDIX 1: Weather information for St. John's, NL provided by Environment Canada for August 2010:

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	18.5	11.9	15.2	2.8	0.0	0.8	0.0	0.8	0		<31
02	13.4	10.8	12.1	5.9	0.0	9.6	0.0	9.6	0		<31
03	20.2	12.4	16.3	1.7	0.0	3.6	0.0	3.6	0	28E	48E
04	23.3	14.9	19.1	0.0	1.1	2.4	0.0	2.4	0	26E	39E
05	20.3	14.8	17.6	0.4	0.0	3.4	0.0	3.4	0	19E	35E
06	24.0	17.1	20.6	0.0	2.6	1.2	0.0	1.2	0	19E	39E
07	26.2	13.9	20.1	0.0	2.1	3.2	0.0	3.2	0	26E	39E
08	21.0	12.4	16.7	1.3	0.0	0.0	0.0	0.0	0	28E	39E
09	23.0	13.1	18.1	0.0	0.1	5.8	0.0	5.8	0	25E	44E
10	19.2	13.4	16.3	1.7	0.0	1.4	0.0	1.4	0		<31
11	19.8	12.1	16.0	2.0	0.0	23.6	0.0	23.6	0		<31
12	13.2	10.4	11.8	6.2	0.0	0.2	0.0	0.2	0	1E	33E
13	16.6	10.4	13.5	4.5	0.0	0.0	0.0	0.0	0		<31

14	21.8	13.0	17.4	0.6	0.0	0.0	0.0	0.0	0		<31
15	18.4	12.1	15.3	2.7	0.0	0.0	0.0	0.0	0		<31
16	14.2	12.2	13.2	4.8	0.0	4.4	0.0	4.4	0	5E	37E
17	19.4	11.5	15.5	2.5	0.0	0.0	0.0	0.0	0		<31
18	22.3	16.1	19.2	0.0	1.2	2.8	0.0	2.8	0	23E	39E
19	20.5	11.9	16.2	1.8	0.0	0.0	0.0	0.0	0		<31
20	15.3	11.3	13.3	4.7	0.0	1.4	0.0	1.4	0	10E	32E
21	15.2	12.4	13.8	4.2	0.0	0.0	0.0	0.0	0	7E	41E
22	14.5	11.0	12.8	5.2	0.0	0.4	0.0	0.4	0		<31
23	14.7	7.2	11.0	7.0	0.0	3.4	0.0	3.4	0		<31
24	16.7	6.9	11.8	6.2	0.0	0.0	0.0	0.0	0		<31
25	23.6	12.2	17.9	0.1	0.0	0.0	0.0	0.0	0	27E	32E
26	20.3	13.5	16.9	1.1	0.0	0.2	0.0	0.2	0	17E	37E
27	17.8	13.8	15.8	2.2	0.0	0.8	0.0	0.8	0	16E	59E
28	21.9	13.4	17.7	0.3	0.0	0.0	0.0	0.0	0		<31
29	20.4	12.7	16.6	1.4	0.0	0.0	0.0	0.0	0		<31
30	22.7	10.5	16.6	1.4	0.0	0.0	0.0	0.0	0	29E	33E
31	19.4	10.8	15.1	2.9	0.0	0.0	0.0	0.0	0	27E	50E
Sum				**75.6**	**7.1**	**68.6**	**0.0**	**68.6**			
Avg	**19.3**	**12.3**	**15.8**								
Xtrm	**26.2**	**6.9**								**16E**	**59E**

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