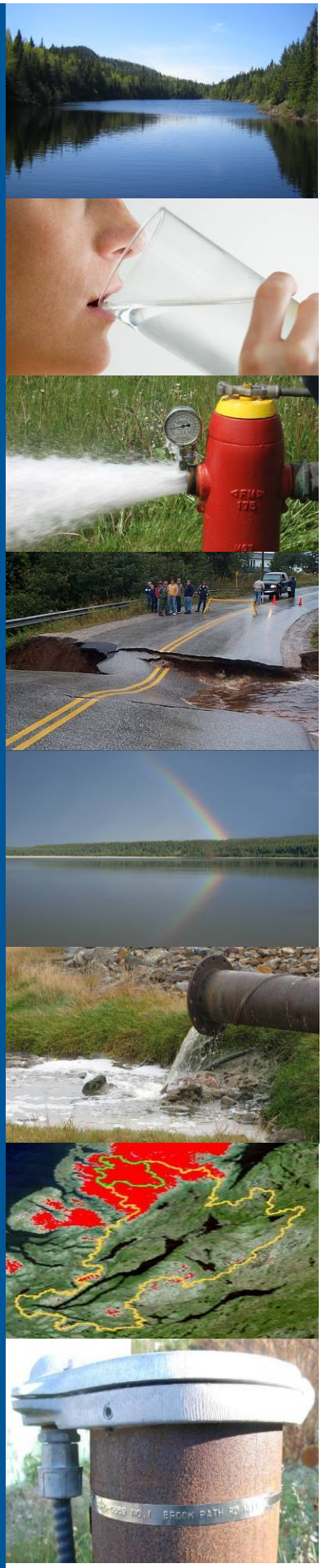


Waterford River @ Kilbride

NF02ZM0009

November 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
November 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 does not include a turbidity sensor, thus turbidity will not be recorded at this station until further notice.

Table 1: Table of Water Quality Probe Installation and Removal

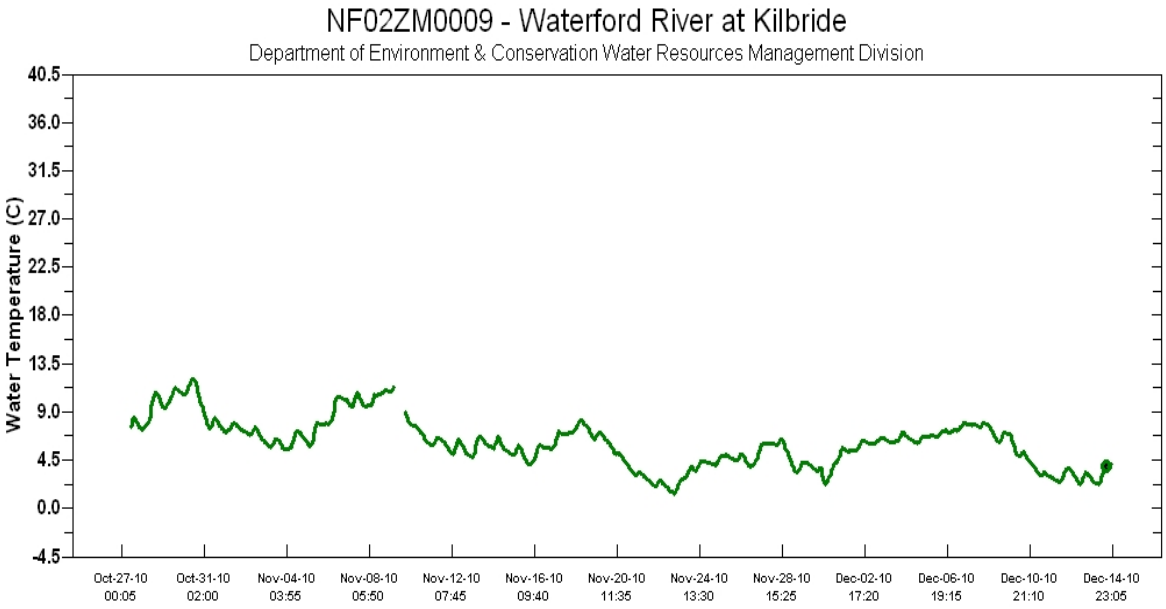
Date Installed	**Date Removed**
October 27, 2010	December 14, 2010

- 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

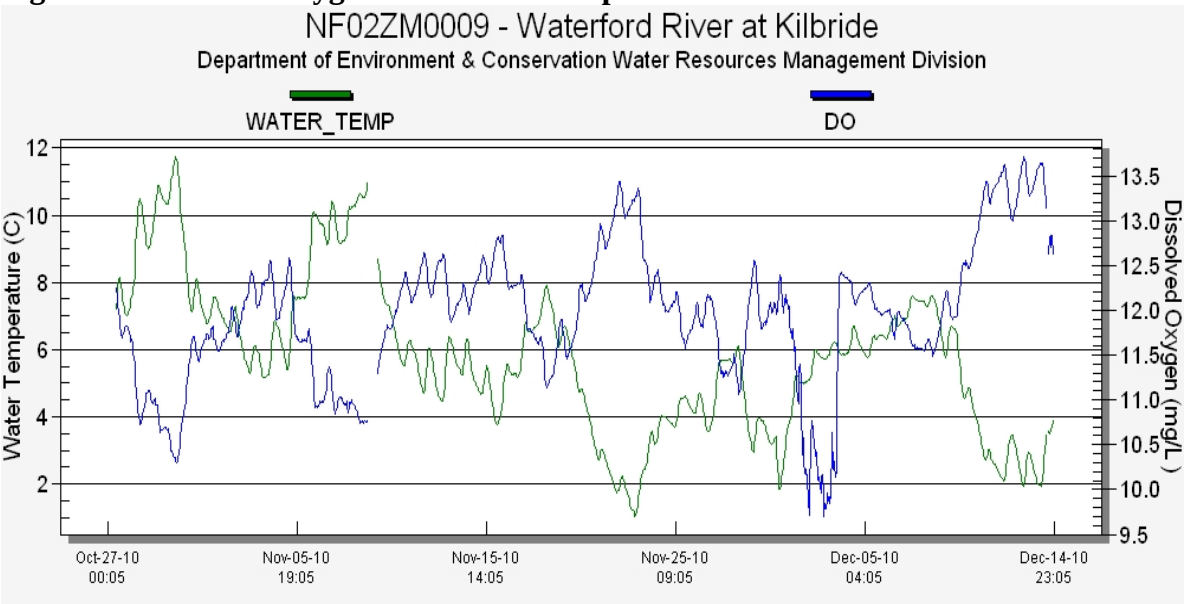
- **Water temperatures** were fairly constant during this deployment, ranging between 0.88 and 11.58^{o}C, which is within the expected temperature range for this time of year. Water temperatures displayed an overall decreasing trend, in response to seasonally decreasing air temperatures. Water temperature data is shown in **Figure 1** below.

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 9.68 and 13.69 mg/L during this deployment. Dissolved oxygen is shown in blue and water temperature is shown in green in **Figure 2**, below.

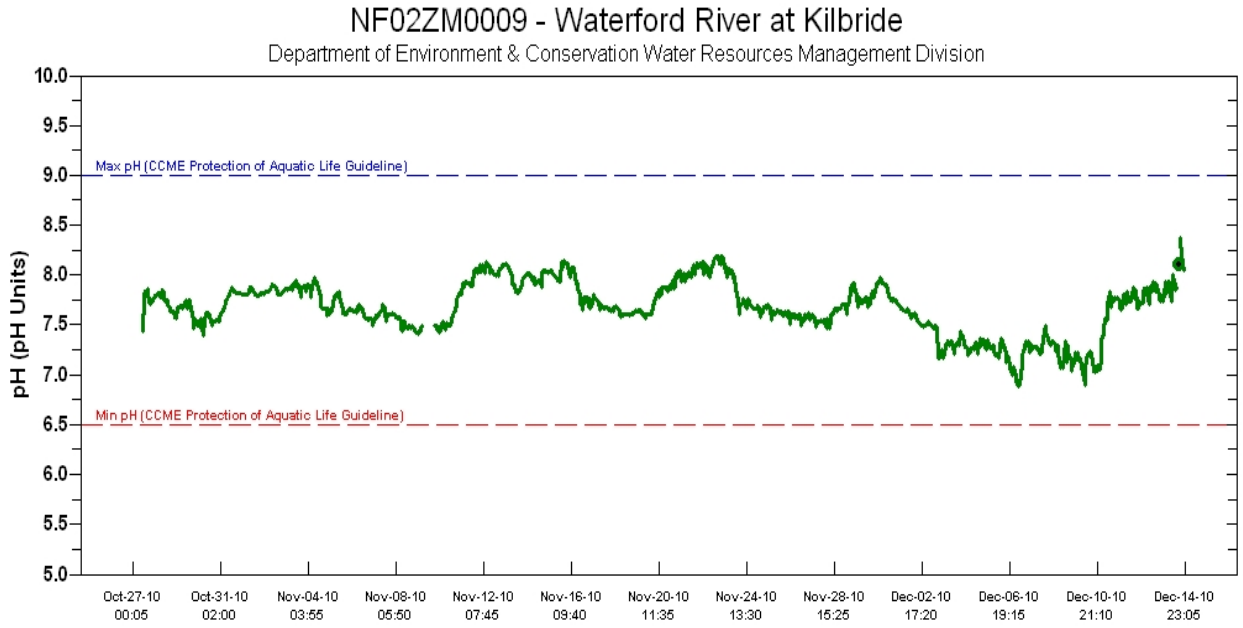
Figure 2: Dissolved Oxygen and Water Temperature



- **pH** levels were fairly constant and within the expected range for this station throughout the deployment, ranging from 6.88 to 8.19 pH units, as seen in **Figure**

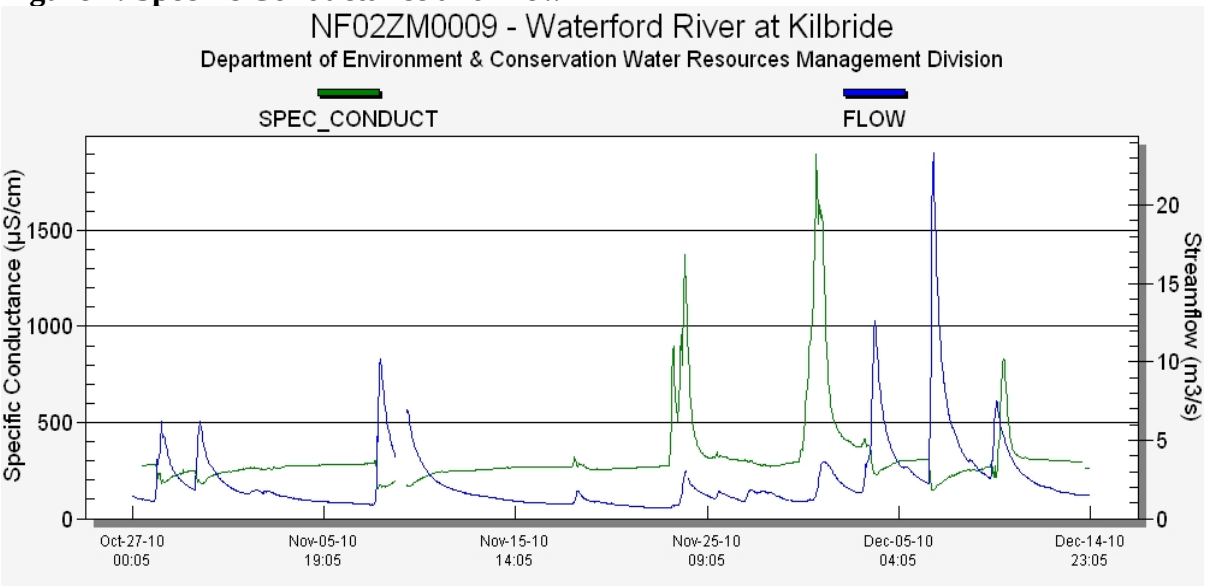
3 below. All pH values were within the range recommended by the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9.0 pH units.

Figure 3: pH Levels



- **Specific conductivity** levels typically share an inverse relationship with water flow, showing decreasing levels as flow increases due to precipitation. However, when air temperatures approach 0^{o}C and road salting is employed as a safety measure, rainfall and resulting land run-off cause an increase in specific conductivity in receiving waters. This phenomenon can be observed in **Figure 4** below, which shows specific conductivity levels in green and water flow in blue. Specific conductivity covered a wide range of values during this deployment, ranging between 146-1898 µS/cm. Canadian Climate Data for November 2010 and part of December 2010 is found in Appendix 1 at the end of this report. Spikes in conductivity in November and December directly correspond with dates that significant precipitation was recorded in the Environment Canada charts.

Figure 4: Specific Conductance and Flow



APPENDIX 1: Weather information for St. John's, NL provided by Environment Canada for November 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	5.7	2.1	3.9	14.1	0.0	2.4	T	2.4	0	5E	41E
02	4.4	0.0	2.2	15.8	0.0	3.0	0.8	3.2	0	1E	41E
03	2.5	-1.1	0.7	17.3	0.0	0.0	T	T	T		<31
04	6.4	1.1	3.8	14.2	0.0	T	0.0	T	0		<31
05	10.6	1.4	6.0	12.0	0.0	0.0	0.0	0.0	0	18E	57E
06	16.7	7.8	12.3	5.7	0.0	0.0	0.0	0.0	0	22E	54E
07	15.9	8.5	12.2	5.8	0.0	T	0.0	T	0	20E	41E
08	15.0	8.6	11.8	6.2	0.0	38.2	0.0	38.2	0	18E	35E
09	16.4	2.7	9.6	8.4	0.0	8.2	0.0	8.2	0	2E	46E
10	3.2	1.6	2.4	15.6	0.0	0.0	T	T	0	4E	63E
11	4.6	-1.8	1.4	16.6	0.0	0.0	T	T	0	2E	56E
12	7.4	-2.1	2.7	15.3	0.0	0.0	0.0	0.0	0		<31
13	10.7	1.1	5.9	12.1	0.0	0.0	0.0	0.0	0	26E	41E
14	5.8	0.5	3.2	14.8	0.0	0.0	0.0	0.0	0	1E	33E
15	3.7	-2.6	0.6	17.4	0.0	0.0	0.0	0.0	0		<31
16	5.2	-0.3	2.5	15.5	0.0	0.0	0.0	0.0	0		<31
17	8.9	3.4	6.2	11.8	0.0	0.0	0.0	0.0	0	16E	33E
18	9.1	5.0	7.1	10.9	0.0	4.2	0.0	4.2	0	18E	65E
19	6.5	1.6	4.1	13.9	0.0	T	0.0	T	0		<31
20	1.7	-3.0	-0.7	18.7	0.0	0.0	T	T	0	30E	48E
21	-1.7	-3.7	-2.7	20.7	0.0	0.0	T	T	0	32E	57E
22	-1.2	-4.7	-3.0	21.0	0.0	0.0	T	T	T	29E	67E
23	3.5	-4.8	-0.7	18.7	0.0	4.4	3.4	6.4	1	29E	70E
24	4.1	1.4	2.8	15.2	0.0	1.6	T	1.6	0	35E	46E
25	3.3	1.4	2.4	15.6	0.0	1.6	0.0	1.6	0	33E	56E
26	5.8	-0.3	2.8	15.2	0.0	0.2	0.0	0.2	0	28E	48E

27	7.8	1.2	4.5	13.5	0.0	5.0	0.0	5.0	0	16E	69E
28	7.8	-1.6	3.1	14.9	0.0	1.8	T	1.8	0	26E	56E
29	2.9	-2.4	0.3	17.7	0.0	0.0	2.4	0.8	0	35E	35E
30	5.8	-0.6	2.6	15.4	0.0	7.6	4.4	11.6	2	35E	78E
Sum				**430.0**	**0.0**	**78.2**	**11.0**	**85.2**			
Avg	**6.6**	**0.7**	**3.7**								
Xtrm	**16.7**	**-4.8**								**35E**	**78E**

APPENDIX 1: Weather information for St. John's, NL provided by Environment Canada for December 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	6.8	3.7	5.3	12.7	0.0	T	0.0	T	T	7E	59E
02	6.2	4.4	5.3	12.7	0.0	T	0.0	T	0	7E	48E
03	5.8	4.4	5.1	12.9	0.0	18.6	0.0	18.6	0	9E	41E
04	5.8	3.2	4.5	13.5	0.0	T	0.0	T	0	12E	41E
05	5.9	3.0	4.5	13.5	0.0	3.4	0.0	3.4	0	13	46
06	7.7	5.0	6.4	11.6	0.0	35.0	0.0	35.0	0	16E	69E
07	11.4	6.2	8.8	9.2	0.0	0.8	0.0	0.8	0	16E	32E
08	9.5	4.2	6.9	11.1	0.0	1.2	0.0	1.2	0	23E	37E
09	7.1	0.2	3.7	14.3	0.0	10.2	2.0	12.2	0	23E	37E
10	1.0	-5.1	-2.1	20.1	0.0	0.0	4.0	4.0	2	31E	35E
11	-4.2	-7.0	-5.6	23.6	0.0	0.0	0.2	T	1		<31
12	1.3	-5.4	-2.1	20.1	0.0	0.0	0.0	0.0	1		<31
13	2.5	-6.7	-2.1	20.1	0.0	0.0	0.0	0.0	1		<31
14	4.2	-1.0	1.6	16.4	0.0	0.4	0.0	0.4	T	13E	39E

Report prepared by: Joanne Sweeney
Environmental Scientist
Water Resources Management Division
Department of Environment and Conservation
Confederation Building West Block 4th Floor
St. John's NL A1B 4J6
Ph. (709) 729-0351