

Real Time Water Quality Monthly Report Waterford River - St. John's NL November 2008

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:

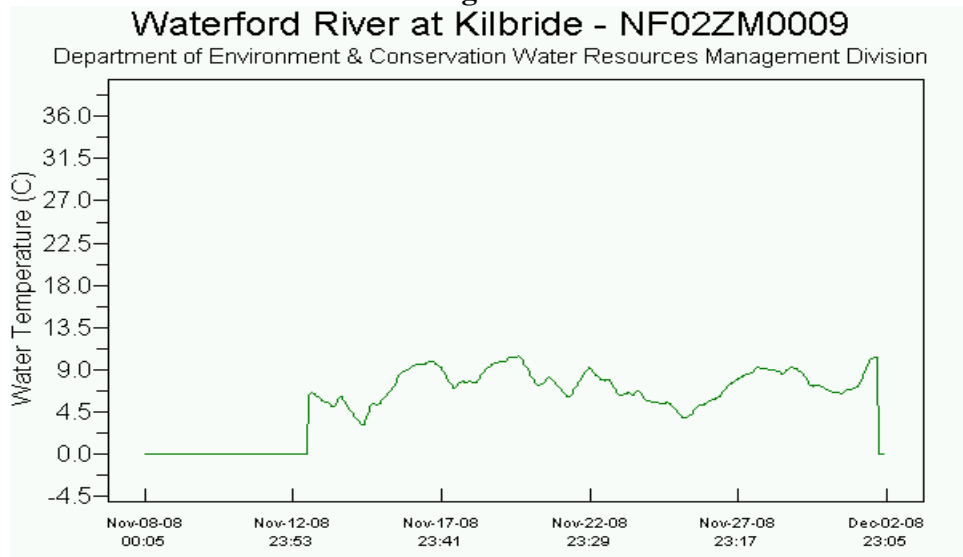
Date Installed	Date Removed
November 3, 2008	December 2, 2008

- 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.

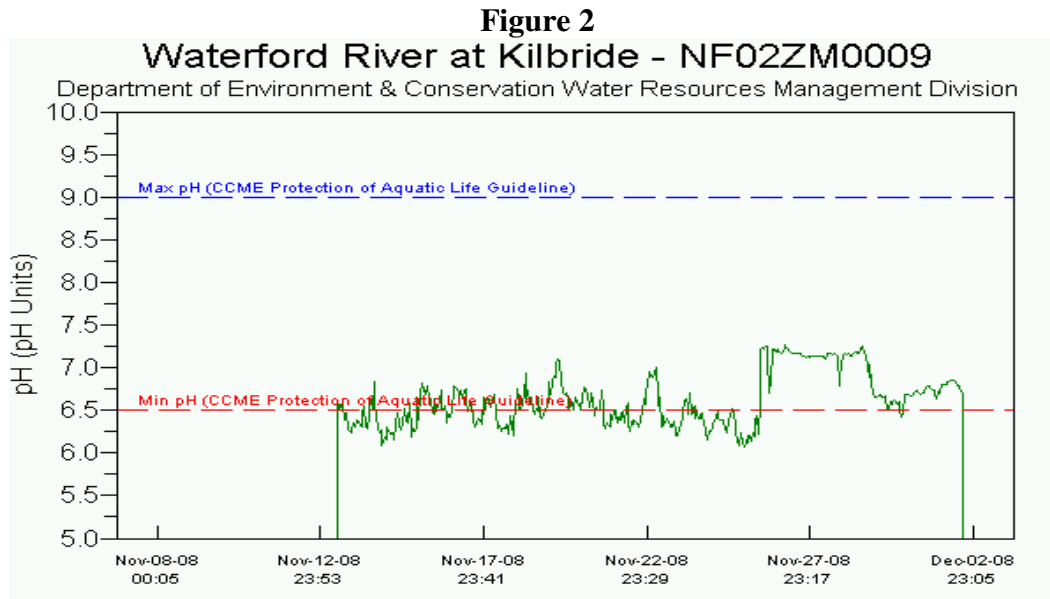
Data Interpretation

- Technical transmission difficulties were experienced at the beginning of this deployment resulting in no data being recorded from November 3 to November 13. This report will be based on the interpretation of data recorded from November 13 to December 2.
- In general, water quality parameters were stable during the deployment period with expected daily/nightly (diurnal) and seasonal changes occurring.
- Water temperatures** fluctuated in response to daily maximum and minimum air temperatures. This is demonstrated by comparing the graph in **Figure 1** below, to the air temperature data in **Appendix 1**, found at the end of this report.

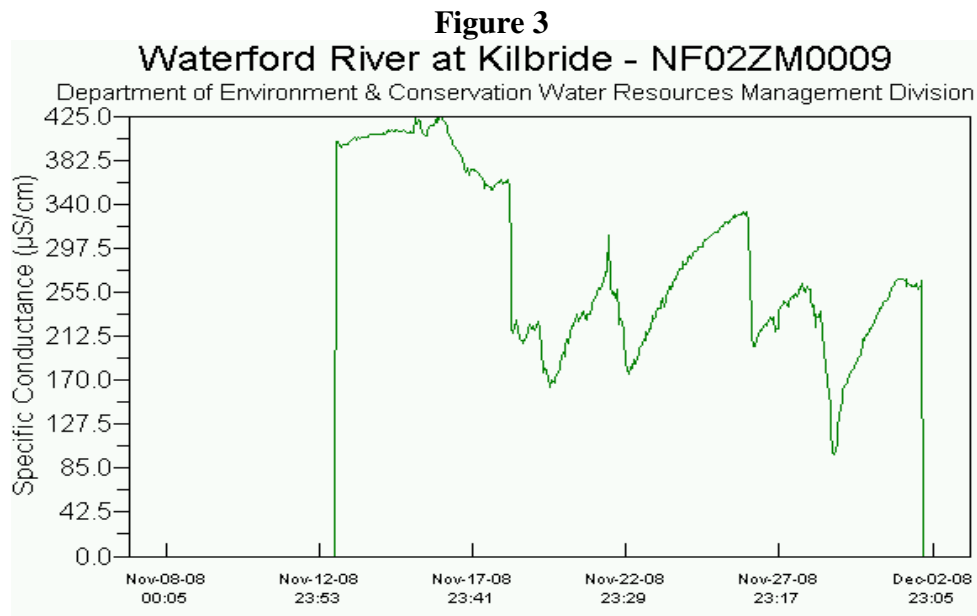
Figure 1



- pH levels** ranged from 6.07 to 7.26 pH units, as seen in **Figure 2**. Some pH measurements were below the range recommended by the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9 (**Figure 2**). It is typical for surface water in NL to have pH levels below the recommended guideline, due to the acidic nature of the terrain.



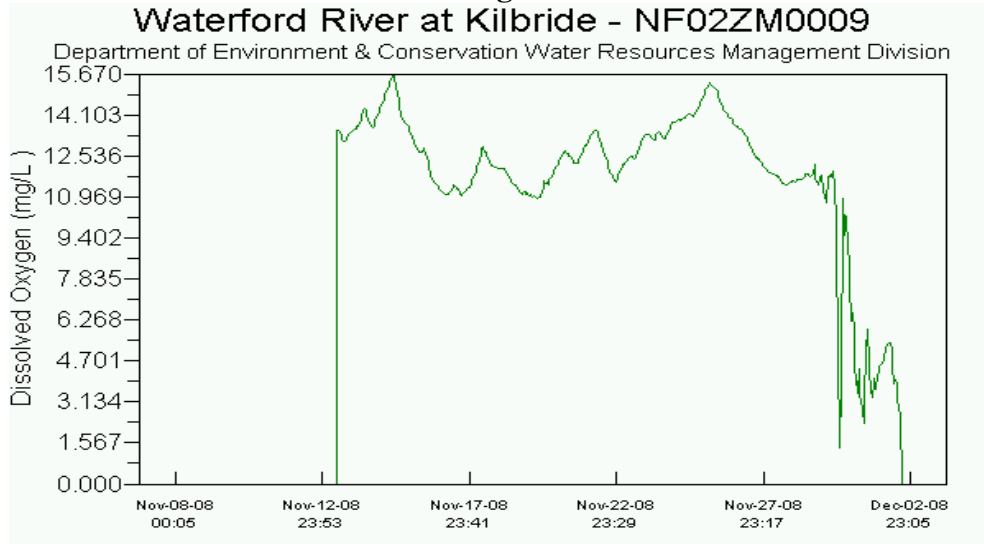
- Specific conductivity levels** displayed sharp fluctuations within the range of 97.6 to 425 $\mu\text{S}/\text{cm}$ during this deployment, as seen in **Figure 3**. Sharp decreases in conductivity levels appear to be associated with significant rainfall events on coinciding dates (see **Appendix 1**), demonstrating the dilution affect that rainfall naturally has on conductivity.



- Dissolved oxygen** levels displayed diurnal fluctuations (see **Figure 4**) in response to changes in water temperatures from daytime highs to night time lows (see **Figure 1**). Colder water typically holds more dissolved oxygen than warmer water, so as water temperatures decrease, dissolved oxygen levels typically increase. Heavy rainfall on November 29th caused sediment to build up in the bottom of the protective pipe that

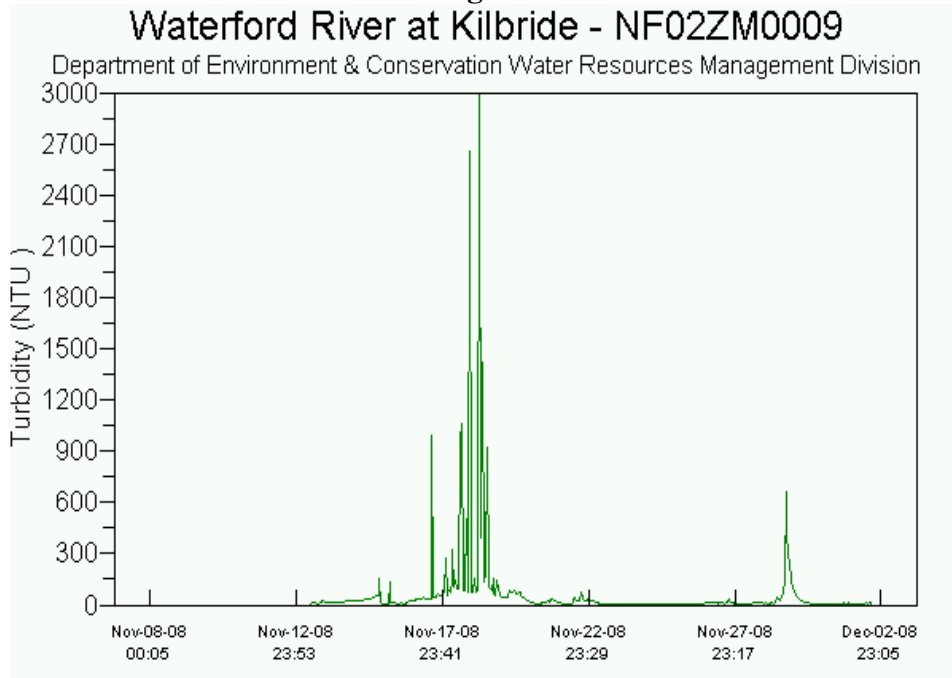
houses the water quality probe. The DO sensor was covered with sediment, which explains the low DO readings that were recorded from November 29 to the end of the deployment period.

Figure 4



- **Turbidity** levels were consistent for most of the deployment period, with significant spikes occurring from November 19 -20, and on November 29, as seen in **Figure 5**. These spikes coincide with rainfall events that occurred on those dates (**Appendix 1**).

Figure 5



APPENDIX 1: Weather information for St. John’s, NL provided by Environment Canada for November 2008:

Daily Data Report for November 2008

D	<u>Max</u>	<u>Min</u>	<u>Mean</u>	<u>Heat</u>	<u>Cool</u>	<u>Total</u>	<u>Total</u>	<u>Total</u>	<u>Snow</u>	<u>Dir of</u>	<u>Spd of</u>
a	<u>Temp</u>	<u>Temp</u>	<u>Temp</u>	<u>Deg</u>	<u>Deg</u>	<u>Rain</u>	<u>Snow</u>	<u>Precip</u>	<u>on</u>	<u>Max</u>	<u>Max</u>

y	°C	°C	°C	Days °C	Days °C	mm	cm	mm	Grnd cm	Gust 10's Deg	Gust km/h
01	9.3	2.1	5.7	12.3	0.0	1.2	0.0	1.2	0	26E	61E
02	5.2	-0.1	2.6	15.4	0.0	0.6	2.0	2.6	0	34E	37E
03	4.4	-2.1	1.2	16.8	0.0	0.0	0.0	0.0	1	M	M
04	7.3	-0.5	3.4	14.6	0.0	0.0	0.0	0.0	0	26E	54E
05	10.9	0.4	5.7	12.3	0.0	0.0	0.0	0.0	0	25E	59E
06	15.7	8.6	12.2	5.8	0.0	0.0	0.0	0.0	0	26E	46E
07	10.4	3.4	6.9	11.1	0.0	1.0	0.0	1.0	0		<31
08	15.1	5.2	10.2	7.8	0.0	13.6	0.0	13.6	0	23E	37E
09	13.5	6.1	9.8	8.2	0.0	1.2	0.0	1.2	0	19E	39E
10	17.6	4.8	11.2	6.8	0.0	0.0	0.0	0.0	0	26E	48E
11	9.6	4.1	6.9	11.1	0.0	1.0	0.0	1.0	0	26E	63E
12	7.3	-0.6	3.4	14.6	0.0	3.4	T	3.4	0	25E	35E
13	3.1	-2.2	0.5	17.5	0.0	0.0	T	T	T	33E	32E
14	4.1	-4.4	-0.2	18.2	0.0	0.0	0.0	0.0	0		<31
15	6.9	-2.4	2.3	15.7	0.0	0.4	0.0	0.4	0	18E	57E
16	12.7	6.8	9.8	8.2	0.0	1.4	0.0	1.4	0	18E	63E
17	11.6	2.2	6.9	11.1	0.0	3.2	0.0	3.2	0	18E	80E
18	6.8	1.4	4.1	13.9	0.0	2.6	0.0	2.6	0		<31
19	12.8	5.6	9.2	8.8	0.0	19.6	0.0	19.6	0	16E	69E
20	12.1	2.5	7.3	10.7	0.0	27.2	0.0	27.2	0	16E	70E
21	7.9	1.2	4.6	13.4	0.0	6.4	0.0	6.4	0	18E	48E
22	12.1	1.3	6.7	11.3	0.0	26.0	0.0	26.0	0	17E	72E
23	5.5	-0.6	2.5	15.5	0.0	1.2	0.0	1.2	0	26E	41E
24	5.2	-0.8	2.2	15.8	0.0	0.6	T	0.6	0	19E	39E
25	1.6	-3.6	-1.0	19.0	0.0	0.0	T	T	0		<31
26	5.9	-1.2	2.4	15.6	0.0	20.4	0.0	20.4	0	11E	48E
27	10.9	5.5	8.2	9.8	0.0	5.0	0.0	5.0	0	14E	57E
28	10.9	9.0	10.0	8.0	0.0	6.2	0.0	6.2	0	16E	41E
29	10.3	5.5	7.9	10.1	0.0	97.2	0.0	97.2	0	28E	59E
30	6.3	2.6	4.5	13.5	0.0	0.0	0.0	0.0	0	28E	57E
Sum				372.9	0.0	239.4	2.0	241.4			
Avg	9.1	2.0	5.6								
Xtrm	17.6	-4.4								18*	80*

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