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
June-August 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 freshly calibrated Datasonde was installed and when it was removed at the end of the deployment period for routine cleaning, maintenance and calibration.

Table 1: Table of Datasonde installation and removal:

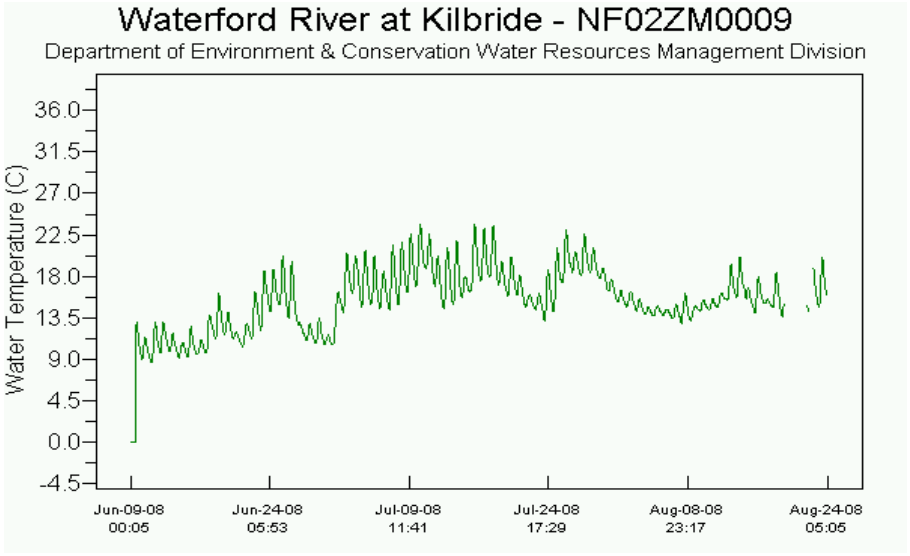
Date Installed	Date Removed
June 9, 2008	August 27, 2008

- Water quality readings were taken with a second, freshly calibrated hydrolab instrument at the time of installation and removal for QAQC comparison.

Data Interpretation

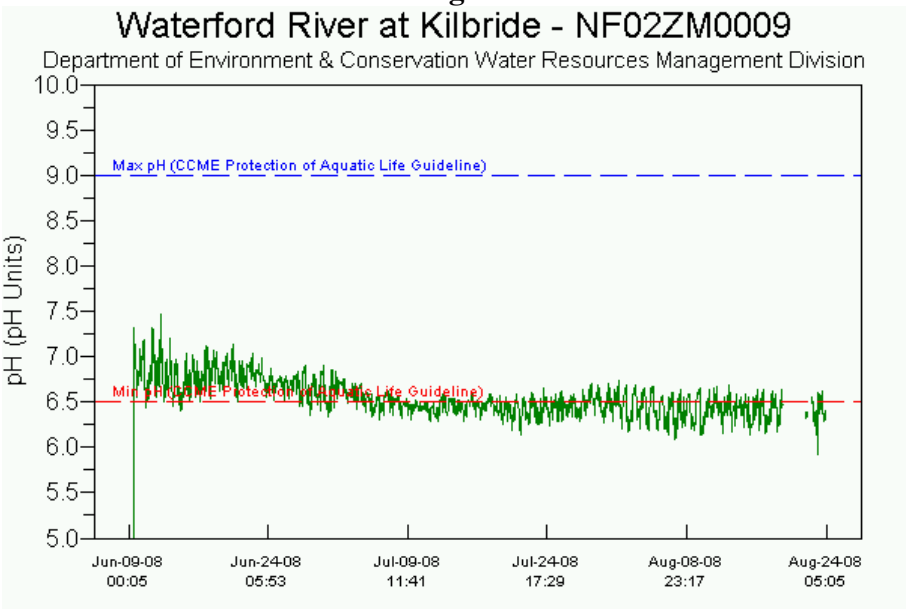
- In general, water quality parameters were stable during the deployment period with expected daily/nightly (diurnal) and seasonal changes occurring.
- Water temperatures fluctuated between 8.65-23.69^{o}C during the deployment period, in response to daily minimum and maximum air temperatures. Water temperatures are shown in **Figure1** below, and daily air temperatures for the deployment period are found in the three Daily Climate Data charts found in **Appendix 1** at the end of this report. The highest water temperatures occurred from July 2nd -29th, which corresponds with higher air temperatures experienced during the same period.

Figure 1



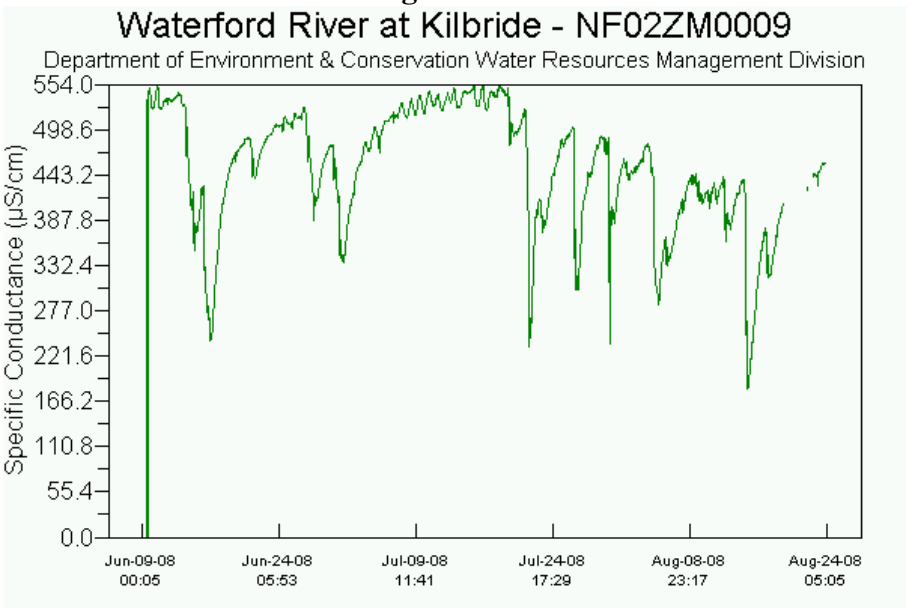
- pH levels during the deployment period ranged from 5.93 to 7.47 pH units, as seen in **Figure 2**. pH levels displayed an overall decreasing trend which may be the result of seasonally decreasing daylight hours. When photosynthesis occurs during the daylight hours**,** we can expect pH to increase**.** During the non-daylight hours, pH typically decreases. There were some instances where pH was below the range recommended by the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9.0. It is typical for surface water in NL to have pH levels below the range recommended by the guidelines.

Figure 2



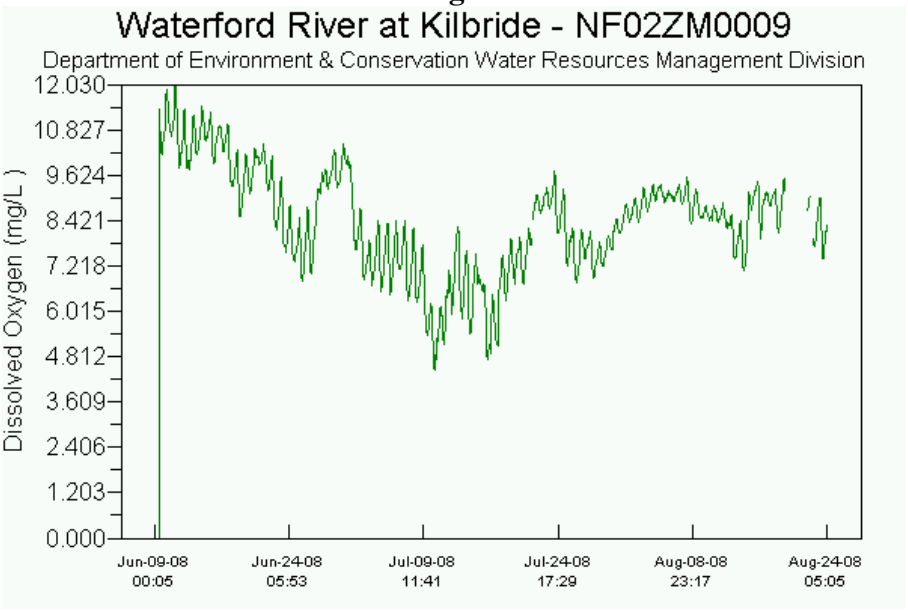
Specific conductance levels displayed sharp decreases on June 16th and 27th, July 21st, 26th and 30th, and August 4th and 15th, as seen in **Figure 3,** below. These declines corresponded with significant rainfall that occurred on the same dates, as shown in **Appendix 1**. Rainfall can have a dilution effect on conductance. Average conductivity was 452µS/cm during the deployment period, which is within the expected range for this station.

Figure 3



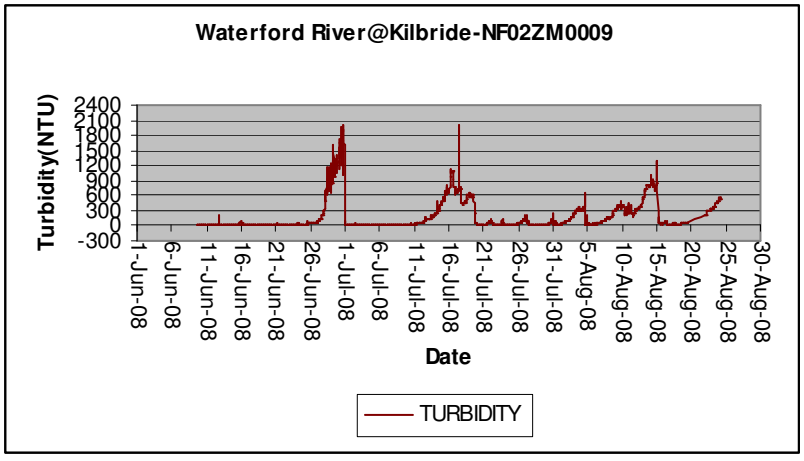
- Dissolved oxygen levels displayed diurnal fluctuations (**see Figure 4**) in response to changes in water temperatures from daytime highs to night time lows (**see Figure 1**). Colder water typically holds more dissolved oxygen than warmer water, so as water temperatures decrease, dissolved oxygen levels typically increase. Dissolved oxygen levels were lowest from July 8th-18th, often dipping below the CCME Guideline for the Protection of Aquatic Life for a minimum of 6.5-9.5mg/L dissolved oxygen.

Figure 4



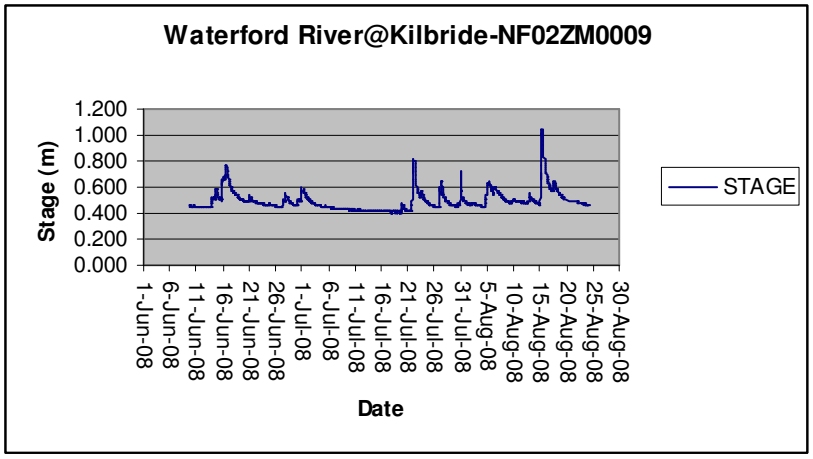
- Turbidity levels displayed significant spikes from June 27th -July 1st, July 11th-19th, August 5th and August 15th, as seen in **Figure 5.** The spikes that occurred on June 27th - July 1st, August 5th and August 15th correspond with rainfall that occurred during those periods. There was no rainfall recorded near July 11th-19th, and this turbidity disturbance may have been the result of a land-based event that impaired water quality. Several turbidity spikes exceeded the CCME recommended maximum of 8 NTU above background levels. It isn't unusual for turbidity levels at this station to display significant spikes because Waterford River passes through urban development for most of its water course and is influenced by urban run-off.

Figure 5



- Stage height displayed several spikes during the deployment period (see **Figure 6**) in response to rainfall that occurred on those days (see **Appendix 1**).

Figure 6



APPENDIX 1: Weather information for St. John's, NL provided by Environment Canada for June, July and August 2008:

Daily Data Report for June 2008					
Day	Max Temp °C	Min Temp °C	Mean Temp °C	Total Precip mm	Spd of Max Gust km/h
09†	10.3	3.5	6.9	0.0	<31
10†	8.4	4.3	6.4	0.4	65
11†	11.7	4.7	8.2	0.6	39
12†	16.3	5.6	11.0	T	<31
13†	10.3	5.6	8.0	9.0	35
14†	8.9	5.6	7.3	13.8	<31
15†	10.7	5.5	8.1	7.2	39
16†	10.3	6.2	8.3	19.0	<31
17†	14.7	6.5	10.6	0.8	<31
18†	14.7	7.2	11.0	1.2	<31
19†	14.0	7.3	10.7	0.2	<31
20†	10.2	7.2	8.7	4.6	37
21†	12.5	7.9	10.2	2.4	<31
22†	21.6	9.0	15.3	0.0	33
23†	24.2	9.3	16.8	0.0	39
24†	24.2	13.5	18.9	T	46
25†	22.6	12.4	17.5	0.0	52
26†	21.2	8.0	14.6	0.8	48

27†	10.2	8.1	9.2	13.0	<31
28†	10.5	7.6	9.1	0.8	<31
29†	11.7	7.0	9.4	T	<31
30†	12.4	7.4	9.9	9.4	57

Daily Data Report for July 2008

Day	Max Temp °C	Min Temp °C	Mean Temp °C	Total Precip mm	Spd of Max Gust km/h
01†	21.4	12.4	16.9	2.6	56
02†	26.2	13.0	19.6	0.0	37
03†	23.9	12.4	18.2	T	54
04†	21.9	12.5	17.2	0.0	61
05†	24.4	11.8	18.1	0.0	35
06†	21.9	11.8	16.9	0.0	44
07†	26.5	11.9	19.2	0.0	35
08†	27.4	14.3	20.9	0.0	44
09†	29.5	13.7	21.6	0.0	32
10†	26.2	15.7	21.0	0.0	59
11†	26.7	14.3	20.5	1.8	41
12†	19.6	9.4	14.5	0.0	<31
13†	21.6	8.8	15.2	T	<31
14†	24.4	11.4	17.9	0.0	35
15†	21.0	15.2	18.1	0.6	48
16†	27.9	16.9	22.4	0.0	35
17†	25.8	16.4	21.1	0.0	37
18†	25.5	15.3	20.4	0.0	<31
19†	24.0	14.4	19.2	10.8	<31
20†	21.2	11.2	16.2	0.0	<31
21†	20.9	10.7	15.8	36.3	35
22†	18.4	12.4	15.4	12.8	<31
23†	14.3	7.3	10.8	2.8	32
24†	22.1	6.4	14.3	0.0	<31
25†	25.8	12.9	19.4	0.0	<31
26†	26.1	18.8	22.5	7.2	52
27†	24.9	18.5	21.7	6.6	46
28†	25.9	18.0	22.0	0.4	37
29†	25.4	17.8	21.6	T	<31
30†	18.4	14.6	16.5	22.4	<31
31†	19.5	12.8	16.2	2.8	<31

Daily Data Report for August 2008

Day	Max Temp °C	Min Temp °C	Mean Temp °C	Total Precip mm	Spd of Max Gust km/h

01†	15.0	12.7	13.9	6.2	<31
02†	15.4	12.4	13.9	1.4	32
03†	14.5	10.0	12.3	0.6	<31
04†	13.7	11.0	12.4	16.4	<31
05†	14.2	12.0	13.1	7.6	<31
06†	14.0	12.0	13.0	3.9	33
07†	14.9	8.2	11.6	0.4	<31
08†	20.5	7.4	14.0	0.0	<31
09†	15.4	11.3	13.4	5.4	<31
10†	15.3	13.6	14.5	3.0	<31
11†	15.9	13.8	14.9	2.8	<31
12†	19.0	14.9	17.0	5.2	33
13†	25.6	15.1	20.4	T	46
14†	22.9	15.0	19.0	6.0	41E
15†	21.3	12.0	16.7	37.8	85
16†	22.9	11.1	17.0	0.0	35
17†	17.2	12.6	14.9	8.8	89
18†	22.6	12.4	17.5	1.2	44
19†	23.8	10.4	17.1	0.0	50
20†	22.9	12.4	17.7	4.0	39
21†	18.9	12.3	15.6	T	48
22†	23.9	11.3	17.6	0.0	41
23†	24.2	14.2	19.2	0.0	54
24†	25.3	14.3	19.8	0.0	56
25†	25.2	14.8	20.0	0.8	50
26†	22.2	15.6	18.9	T	54
27†	23.7	13.3	18.5	1.6	39
28†	15.3	11.3	13.3	0.0	44
29†	16.6	11.0	13.8	9.8	37
30†	20.7	14.4	17.6	T	<31
31†	22.3	13.4	17.9	T	35

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