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
# April to May 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.

**Table 1**: Table of Water Quality Probe installation and removal:

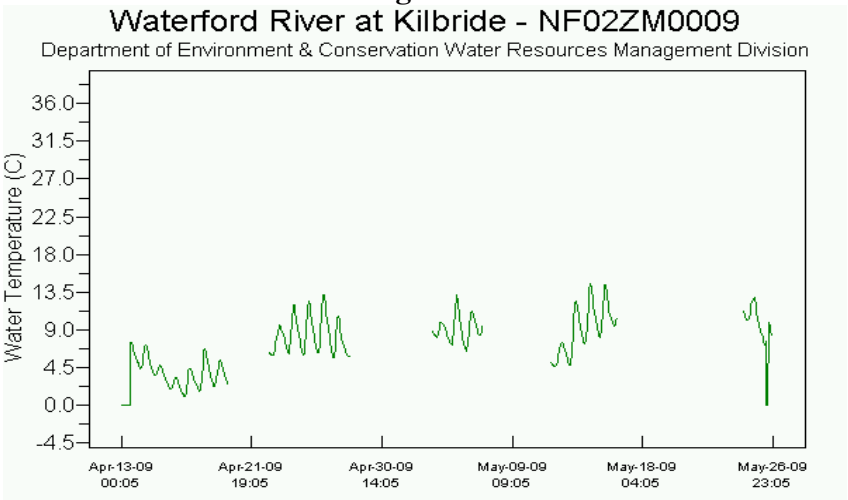
| Date Installed | Date Removed |
|---|---|
| April 13, 2009 | May 26, 2009 |

- 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

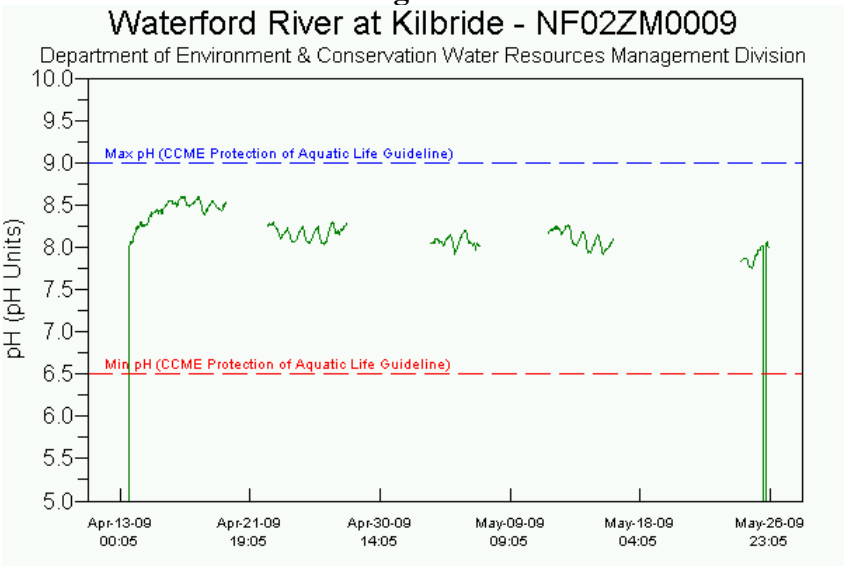
- Technical transmission difficulties were experienced resulting in several data gaps during this deployment period.
- In general, water quality parameters were stable during the deployment period with expected diurnal and seasonal variations occurring.
- **Water temperatures** fluctuated in response 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** at the end of this report. Water temperatures ranged from 1.04 to 14.54 $^{o}$C and displayed an overall increasing trend in response to seasonally increasing temperatures.

**Figure 1**



- **pH** ranged from 7.75 to 8.60 units, as seen in **Figure 2**. All pH measurements were within the range recommended by the Canadian Water Quality Guidelines for the Protection of Aquatic Life of 6.5 to 9 **(Figure 2).**

**Figure 2**




- **Specific conductivity** levels ranged from 332 to708µS/cm, as seen in **Figure 3.** Data gaps make interpretation difficult during this deployment period. Specific conductivity values appear to share an inverse relationship with **water level** (see Figure 4). As water levels decrease, conductivity becomes more concentrated and its values increase. Conversely, as water levels increase, conductivity values decrease.

**Figure 3**

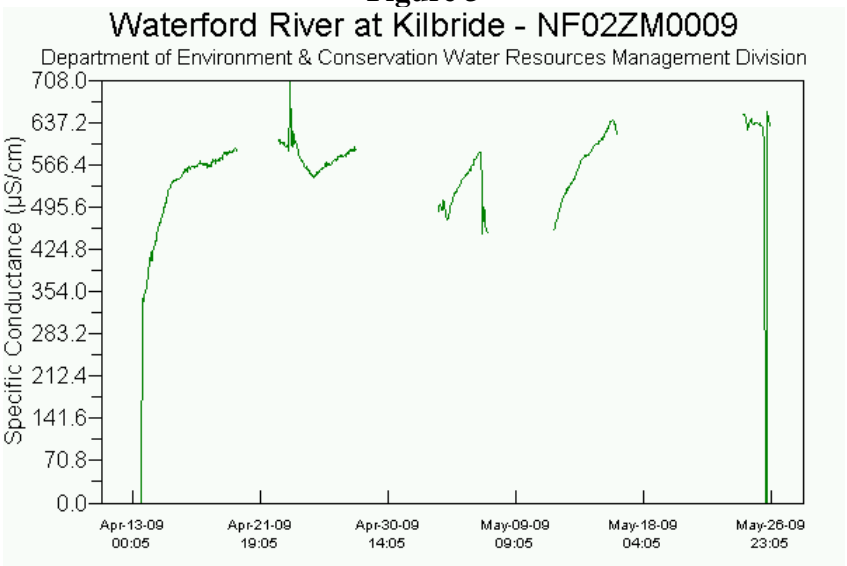
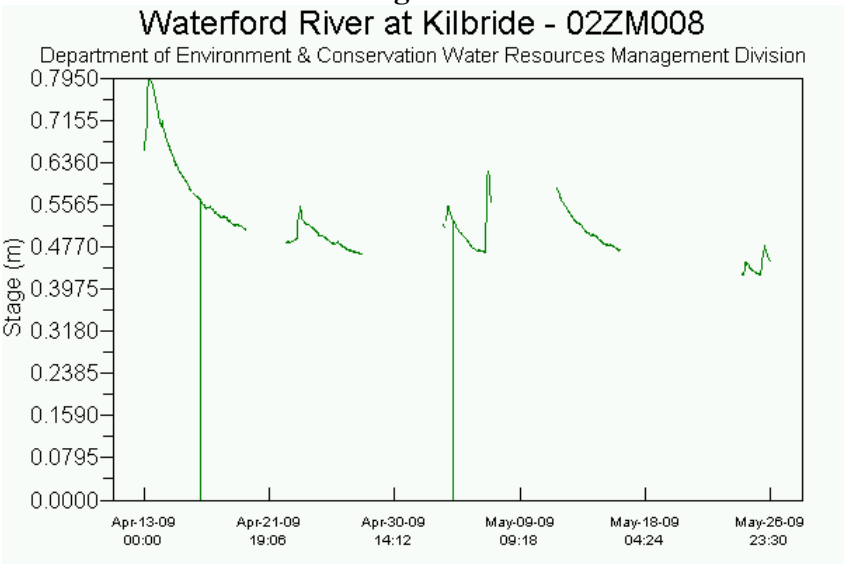
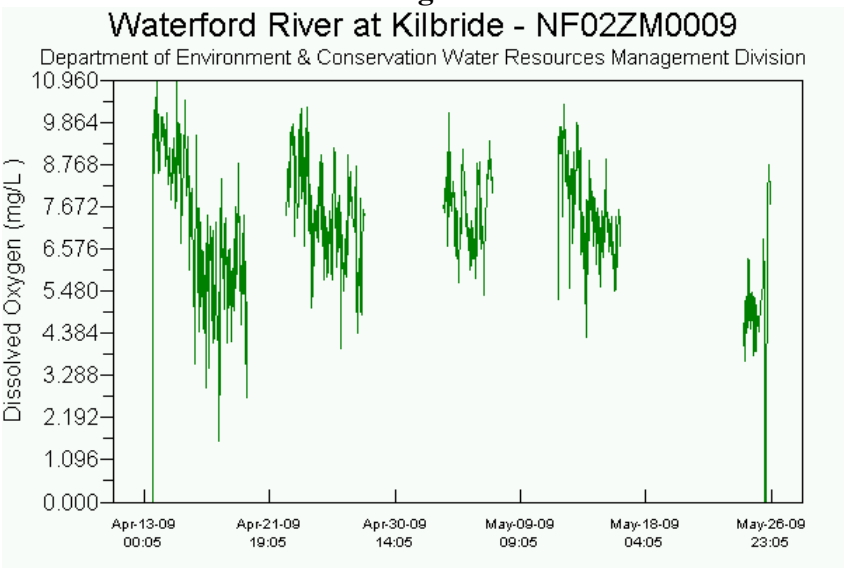


**Figure 4**



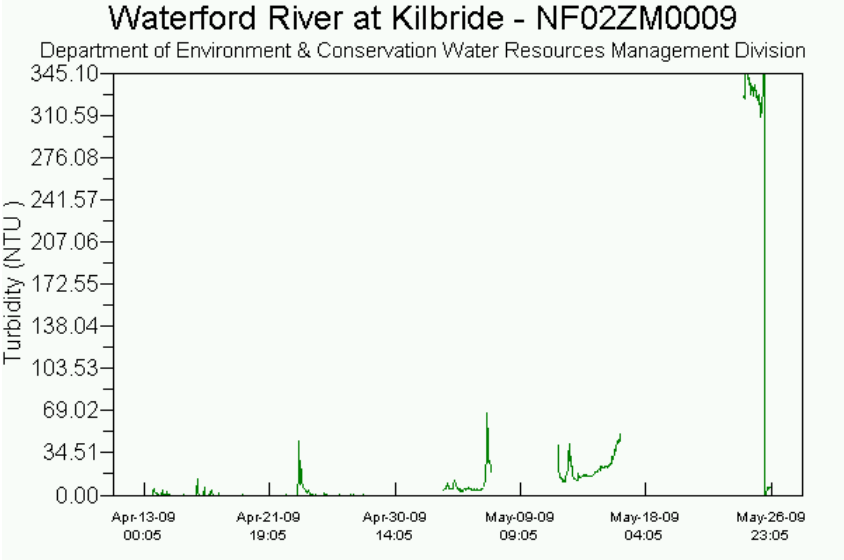

- The **dissolved oxygen (DO)** sensor malfunctioned for the duration of this deployment despite a second attempt to calibrate it in the field on April 23. Recorded DO values are not valid.

**Figure 5**




- **Turbidity** values ranged between 0 and 384 NTU during this deployment period. Transmission gaps make interpretation of data difficult, however it appears that turbidity spikes occurred on April 23, May 7, 12, 13, 16 and 25 as seen in **Figure 6**. Light rain and moderate winds near those dates may have contributed to turbidity, but it's probable that events upstream from the monitoring station adversely impacted water quality water on or preceding those dates, particularly on May 25.

**Figure 6**




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

Daily Data Report for April 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 | 2.0 | -2.8 | -0.4 | 18.4 | 0.0 | 0.0 | 0.0 | 0.0 | 8 | 35E | 37E |
| 02 | 5.8 | -3.2 | 1.3 | 16.7 | 0.0 | 0.0 | T | T | 7 | 25E | 44E |
| 03 | 9.4 | 1.1 | 5.3 | 12.7 | 0.0 | 0.0 | 0.0 | 0.0 | 1 | 27E | 44E |
| 04 | 10.9 | 1.2 | 6.1 | 11.9 | 0.0 | 14.4 | 0.0 | **14.4** | 1 | 18E | 48E |
| 05 | 12.8 | 6.2 | 9.5 | 8.5 | 0.0 | 2.6 | 0.0 | 2.6 | T | 18E | 48E |
| 06 | 8.9 | 0.2 | 4.6 | 13.4 | 0.0 | 2.8 | 0.0 | 2.8 | T | 29E | 44E |
| 07 | 6.0 | -0.3 | 2.9 | 15.1 | 0.0 | 0.4 | 0.0 | 0.4 | T | 29E | 37E |
| 08 | 15.0 | 1.3 | 8.2 | 9.8 | 0.0 | 8.2 | T | 8.2 | 0 | 21E | 67E |
| 09 | 12.5 | -0.1 | 6.2 | 11.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 26E | 50E |
| 10 | 6.7 | 0.2 | 3.5 | 14.5 | 0.0 | 11.2 | 0.0 | **11.2** | 0 | | <31 |
| 11 | 9.2 | 0.4 | 4.8 | 13.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 26E | 46E |
| 12 | 8.1 | 0.6 | 4.4 | 13.6 | 0.0 | 7.0 | 0.0 | 7.0 | 0 | 18E | 63E |
| 13 | 9.3 | 2.2 | 5.8 | 12.2 | 0.0 | 4.2 | 0.0 | 4.2 | 0 | 19E | 63E |
| 14 | 7.3 | -0.5 | 3.4 | 14.6 | 0.0 | 0.4 | 3.4 | 3.0 | 1 | 26E | 46E |
| 15 | 2.7 | -3.3 | -0.3 | 18.3 | 0.0 | 0.0 | 1.2 | 0.6 | T | 33E | 44E |
| 16 | -2.0 | -5.8 | -3.9 | 21.9 | 0.0 | 0.0 | T | T | T | 31E | 48E |
| 17 | 0.4 | -6.5 | -3.1 | 21.1 | 0.0 | 0.0 | 0.2 | T | 0 | 29E | 44E |
| 18 | 2.9 | -7.1 | -2.1 | 20.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | | <31 |
| 19 | 3.8 | -4.0 | -0.1 | 18.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 26E | 33E |
| 20 | 3.6 | -4.9 | -0.7 | 18.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | | <31 |
| 21 | 9.8 | -1.8 | 4.0 | 14.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 28E | 33E |
| 22 | 12.3 | -0.6 | 5.9 | 12.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 21E | 41E |
| 23 | 13.1 | 6.4 | 9.8 | 8.2 | 0.0 | 2.8 | 0.0 | 2.8 | 0 | 19E | 65E |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 16.3 | 2.5 | 9.4 | 8.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 22E | 50E |
| 25 | 12.9 | 0.8 | 6.9 | 11.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 14E | 39E |
| 26 | 17.9 | -0.2 | 8.9 | 9.1 | 0.0 | T | T | T | 0 | 25E | 48E |
| 27 | 6.6 | -2.0 | 2.3 | 15.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 1E | 33E |
| 28 | 7.2 | 1.1 | 4.2 | 13.8 | 0.0 | 1.8 | T | 1.8 | 0 | 25E | 59E |
| 29† | 7.5 | -2.2 | 2.7 | 15.3 | 0.0 | 7.0 | 0.6 | 7.0 | 1 | 33 | 67 |
| 30 | 8.1 | -2.6 | 2.8 | 15.2 | 0.0 | 0.0 | 0.0 | 0.0 | T | 29E | 48E |
| Sum | | | | **427.7** | **0.0** | **62.8** | **5.4** | **66.0** | | | |
| Avg | **8.2** | **-0.8** | **3.72** | | | | | | | | |
| Xtrm | **17.9** | **-7.1** | | | | | | | | **21E** | **67E** |

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

Daily Data Report for May 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† | 11.0 | -1.4 | 4.8 | 13.2 | 0.0 | 1.2 | 0.0 | 1.2 | | 20 | 80 |
| 02† | 12.8 | 7.7 | 10.3 | 7.7 | 0.0 | 3.6 | 0.0 | 3.6 | | 23 | 76 |
| 03† | 10.4 | 5.8 | 8.1 | 9.9 | 0.0 | 6.8 | 0.0 | 6.8 | | | <31 |
| 04† | 11.9 | 6.8 | 9.4 | 8.6 | 0.0 | 4.8 | 0.0 | 4.8 | | 27 | 32 |
| 05† | 11.1 | 1.3 | 6.2 | 11.8 | 0.0 | 0.0 | 0.0 | 0.0 | | 4 | 35 |
| 06† | 15.5 | 2.7 | 9.1 | 8.9 | 0.0 | 9.2 | 0.0 | 9.2 | | 16 | 52 |
| 07† | 12.5 | 2.0 | 7.3 | 10.7 | 0.0 | 3.0 | 0.0 | 3.0 | | 26 | 61 |
| 08† | 12.7 | 1.6 | 7.2 | 10.8 | 0.0 | 15.8 | 0.0 | **15.8** | | 23 | 35 |
| 09† | 12.8 | 4.4 | 8.6 | 9.4 | 0.0 | T | 0.0 | T | | 27 | 57 |
| 10† | 7.6 | 0.5 | 4.1 | 13.9 | 0.0 | 17.8 | 0.0 | **17.8** | | 25 | 46 |
| 11† | 4.8 | -1.6 | 1.6 | 16.4 | 0.0 | 1.0 | 3.2 | 4.2 | | 33 | 67 |
| 12† | 8.8 | -0.9 | 4.0 | 14.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 13† | 15.5 | -0.1 | 7.7 | 10.3 | 0.0 | 0.0 | 0.0 | 0.0 | | 26 | 35 |
| 14† | 21.3 | 5.4 | 13.4 | 4.6 | 0.0 | 0.0 | 0.0 | 0.0 | | 26 | 48 |
| 15† | 16.7 | 6.9 | 11.8 | 6.2 | 0.0 | 0.0 | 0.0 | 0.0 | | 25 | 74 |
| 16† | 16.4 | 4.5 | 10.5 | 7.5 | 0.0 | 0.0 | 0.0 | 0.0 | | 26 | 46 |
| 17† | 18.9 | 2.6 | 10.8 | 7.2 | 0.0 | 0.0 | 0.0 | 0.0 | | 26 | 33 |
| 18† | 21.1 | 11.4 | 16.3 | 1.7 | 0.0 | T | 0.0 | T | | 18 | 39 |
| 19† | 20.1 | 13.8 | 17.0 | 1.0 | 0.0 | 1.0 | 0.0 | 1.0 | | 22 | 44 |
| 20† | 16.3 | 2.7 | 9.5 | 8.5 | 0.0 | T | 0.0 | T | | 26 | 52 |
| 21† | 10.6 | 2.1 | 6.4 | 11.6 | 0.0 | 0.4 | 0.0 | 0.4 | | 30 | 48 |
| 22† | 23.1 | 3.0 | 13.1 | 4.9 | 0.0 | 0.0 | 0.0 | 0.0 | | 26 | 65 |
| 23† | 13.7 | 0.3 | 7.0 | 11.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 28 | 48 |
| 24† | 15.9 | 0.6 | 8.3 | 9.7 | 0.0 | 1.0 | 0.0 | 1.0 | | 26 | 37 |
| 25† | 12.3 | 0.3 | 6.3 | 11.7 | 0.0 | 2.8 | 0.0 | 2.8 | | 26 | 39 |
| 26† | 4.8 | -0.5 | 2.2 | 15.8 | 0.0 | 0.0 | 5.0 | 4.6 | 3 | 36 | 41 |
| 27† | 7.8 | 0.7 | 4.3 | 13.7 | 0.0 | 0.0 | 0.0 | 0.0 | | 31 | 50 |
| 28† | 13.9 | 1.8 | 7.9 | 10.1 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 29† | 17.4 | 3.1 | 10.3 | 7.7 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 30† | 10.2 | 5.8 | 8.0 | 10.0 | 0.0 | 16.4 | 0.0 | 16.4 | | 15 | 69 |
| 31† | 21.9 | 6.5 | 14.2 | 3.8 | 0.0 | 2.6 | 0.0 | 2.6 | | 16 | 61 |
| Sum | | | | **292.3** | **0.0** | **87.4** | **8.2** | **95.2** | | | |
| Avg | **13.9** | **3.2** | **8.54** | | | | | | | | |

Xtrm **23.1 -1.6** **20 80**

Report prepared by:

Joanne Sweeney
Environmental Scientist
Water Resources Management Division
Department of Environment and Conservation
Confederation Building West Block 4th Floor
PO Box 8700
St. John's NL A1B 4J6

Ph. (709) 729-0351
Fax (709) 729-0320