Real Time Water Quality Monthly Report
Lower Humber River at Humber Village Bridge
August – September 2006

General

- The Water Resources Management Division staff monitors the real-time web page on a daily basis.

Maintenance and Calibration of Instrumentation

- The Datasonde was deployed in the river for the period of August 15th – September 14th, 2006 (exactly one month deployment period).
- The Datasonde was removed on August 14th, 2006 for maintenance and calibration and returned to the river on August 15th, 2006 to begin this reporting period. Then the instrument was removed on September 14th, 2006 for cleaning and calibration and returned to the water on September 15th, 2006.
- Upon removal and redeployment at the station, Minisonde readings were taken for QA/QC purposes. The results from comparing the Minisonde values to the Datasonde values can be seen in **Table 1**. As was reported in the previous monthly report, it appears as though either the Datasonde or the Minisonde did not calibrate properly (ie: marginal; fair and poor readings for conductivity, pH and dissolved oxygen respectively) upon reinstallation on August 15th, 2006. By looking at the most recent reinstallation QA/QC rankings for September 15th, 2006 again the problem remains whereby pH and conductivity are ranking fair and poor respectively. Investigation into this issue has lead to the finding that the Minisonde is not reading accurately and that servicing on this instrument is needed. Through further investigation it was determined that the QA/QC comparisons for dissolved oxygen oftentimes ranked "poor" in the past. To improve the rankings, it was decided that the Minisonde readings be taken from inside the deployment pipe (that is secured to the concrete weir) to ensure that the Minisonde is reading dissolved oxygen at the same vertical location in the river as the Datasonde. It appears as though this slight adjustment in protocol has led to improved dissolved oxygen readings as can be seen by the "good" comparison ranking of the dissolved oxygen upon reinstallation on September 15th, 2006

Table 1: QA/QC Data Comparison Rankings

Station	Date	Action	Minisonde vs. Datasonde Comparison Ranking			
			Temperature	pH	Conductivity	Dissolved Oxygen
Humber River @ Humber Village Bridge	August 14th, 2006	Removal	Excellent	Good	Fair	Poor
	August 15th, 2006	Installation	Excellent	Fair	Marginal	Poor
	September 14th, 2006	Removal	Excellent	Fair	Fair	Poor
	September 15th, 2006	Installation	Good	Fair	Poor	Good

- A water sample was taken for laboratory analysis as part of QA/QC procedures upon reinstallation.

Data Interpretation

- During the deployment period of August 14th – September 14th, 2006 the water quality remained relatively stable for most parameters.

- The water temperature (**Figure 1**) remained constant from mid August to mid September only ranging from 15°C to 18°C. Additionally, the dissolved oxygen graph (**Figure 2**) also remained relatively constant with a slight decrease in dissolved oxygen values over this period. It is possible that the dissolved oxygen drifted slightly off calibration over the deployment period. The dissolved oxygen values ranged from 7.67mg/L to 8.67mg/L. These values fall within the recommended CCME Protection of Aquatic Life guidelines for dissolved oxygen in most cases (cold water/other life stages – above 6.5; warm water/other life stages – above 5.5; warm water/early life stages – above 6); however, they fall below the most conservative limit for cold water/early life stages – 9.5 mg/L.

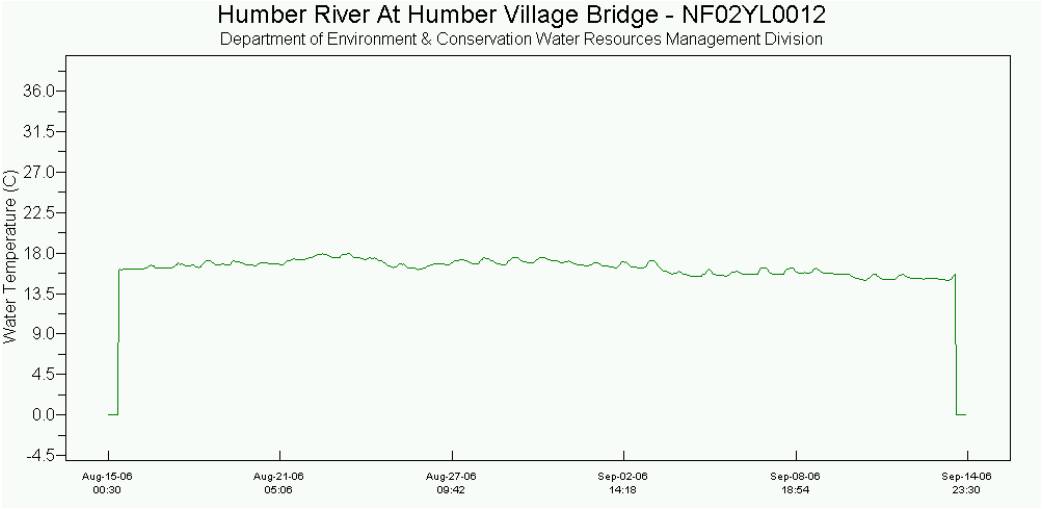

Figure 1

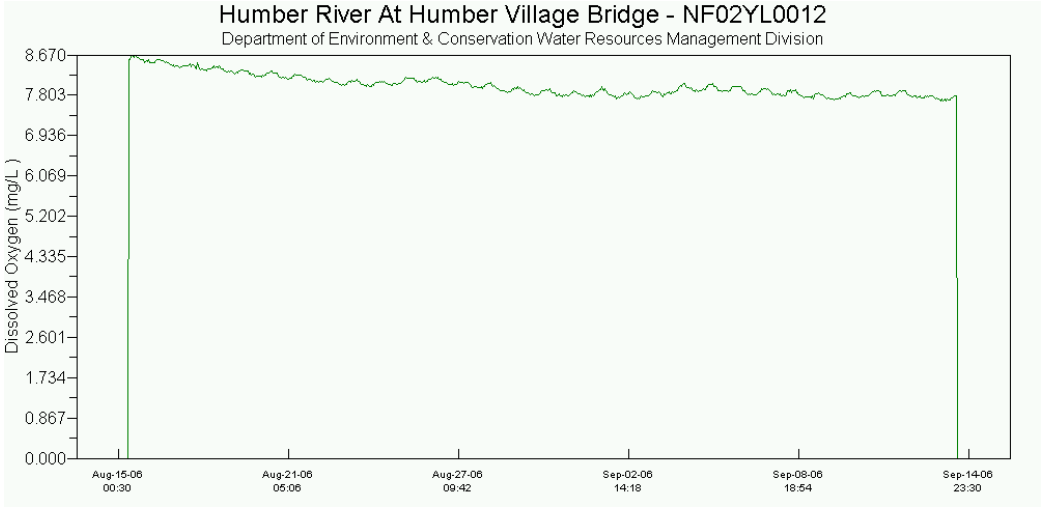

Figure 2

- pH values (**Figure 3**) from mid July to mid August remained stable at approximately 7.0 units.

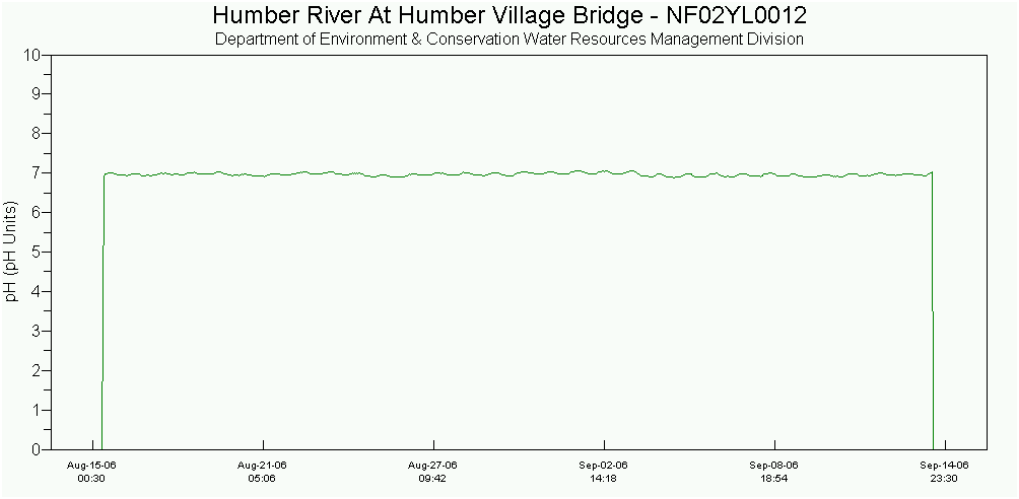

Figure 3

- Conductivity and total dissolved solids values (**Figures 4a and 4b**) remained constant throughout the deployment period. The conductivity values ranged from 39.9uS/cm to 42.2uS/cm.

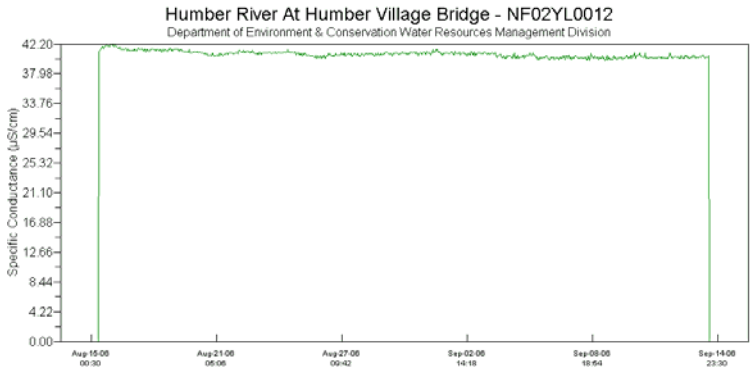

Figure 4a

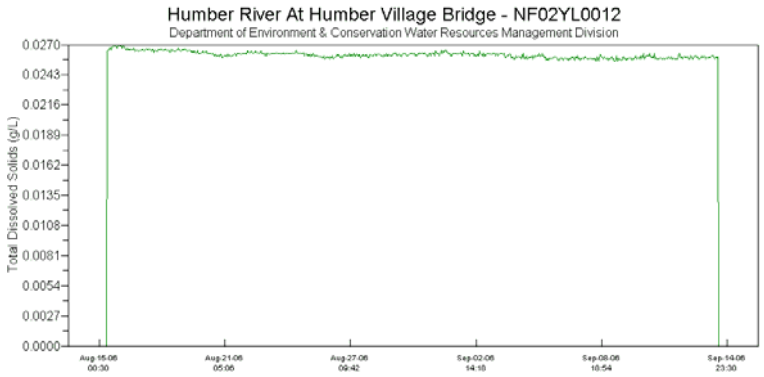

Figure 4b

- The turbidity values (**Figure 5**) generally remained between 1-2 NTU which is the typical background concentration for this station. There was one spike in turbidity over the deployment period (10.4 NTU – August 17th, 2006). This spike in turbidity occurred and immediately returned to background levels within one hour. This increase was sporadic in nature indicating a possible disturbance to the probe (ie: leaf, debris, etc.).

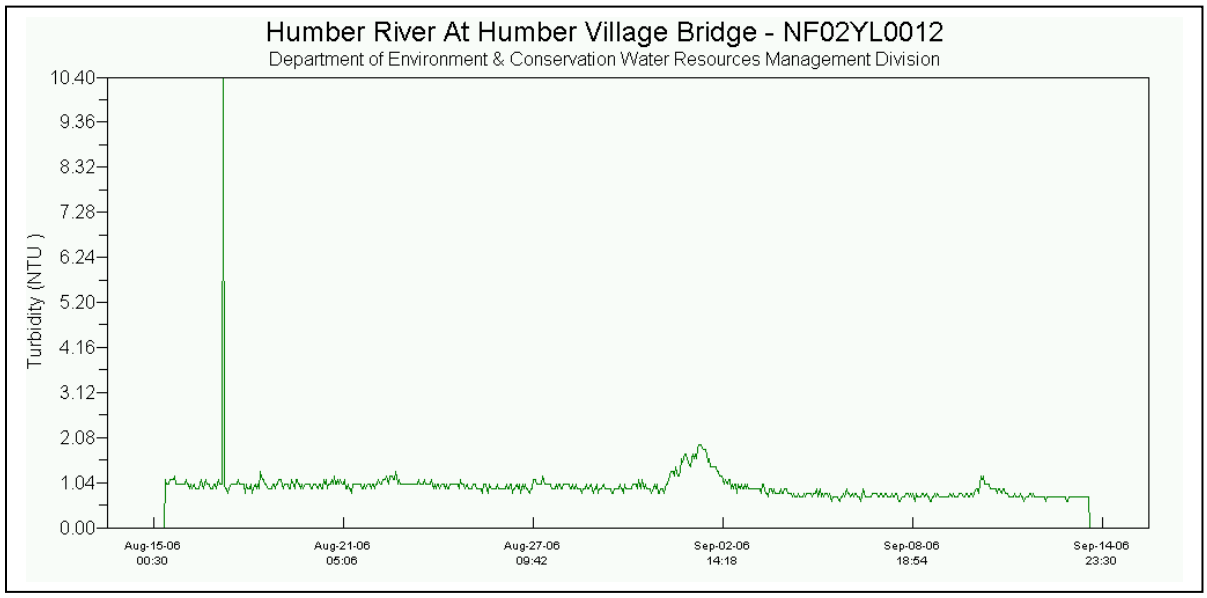

Figure 5

- The stage values (**Figure 6**) decreased steadily over the deployment period. It appears as though rainfall amounts (**Table 2**) for the area (Deer Lake) did not significantly influence the water quality throughout the deployment period.

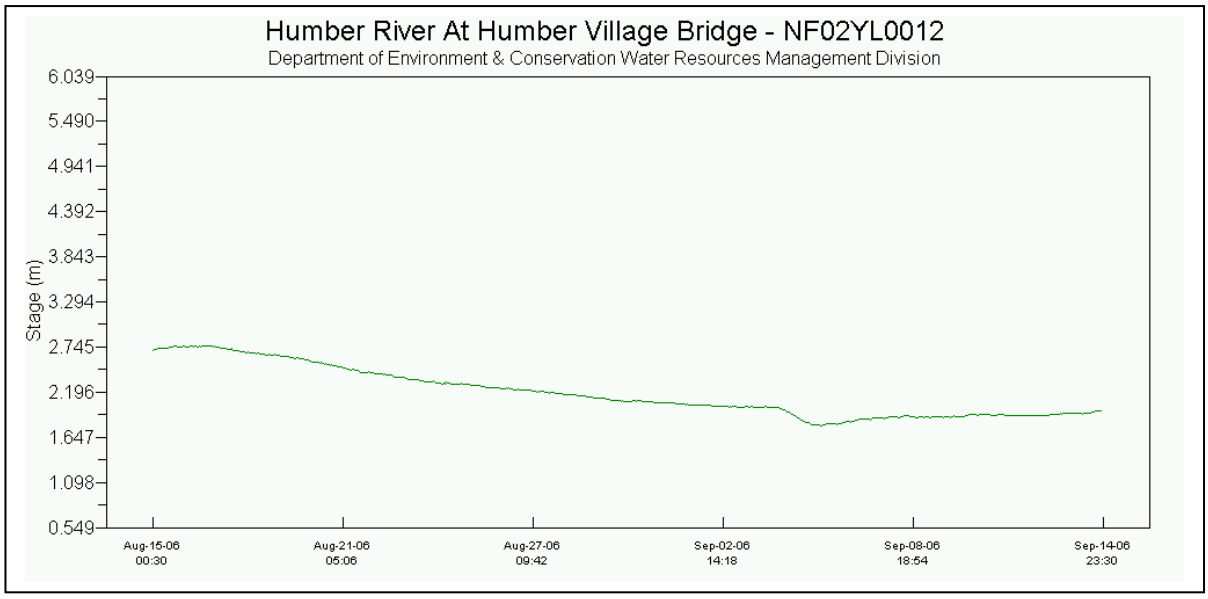

Figure 6

Table 2: Precipitation Amounts - Deer Lake NL

Daily Data Report for August 2006

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	18.3	10.4	14.4	3.6	0.0	0.4	0.0	0.4	0		
02	18.0	10.8	14.4	3.6	0.0	16.8	0.0	16.8	0		
03	15.6	7.8	11.7	6.3	0.0	1.4	0.0	1.4	0		
04	21.6	4.4	13.0	5.0	0.0	0.0	0.0	0.0	0		
05	21.5	9.5	15.5	2.5	0.0	3.2	0.0	3.2	0		
06	21.2	8.1	14.7	3.3	0.0	0.0	0.0	0.0	0		
07	26.1	7.8	17.0	1.0	0.0	0.4	0.0	0.4	0		
08	18.9	15.5	17.2	0.8	0.0	21.2	0.0	21.2	0		
09	16.3	9.5	12.9	5.1	0.0	2.0	0.0	2.0	0		
10	24.8	10.3	17.6	0.4	0.0	0.0	0.0	0.0	0		
11	23.0	10.9	17.0	1.0	0.0	10.8	0.0	10.8	0		
12	17.3	12.2	14.8	3.2	0.0	11.4	0.0	11.4	0		
13	20.1	8.5	14.3	3.7	0.0	0.0	0.0	0.0	0		
14	18.0	9.1	13.6	4.4	0.0	5.8	0.0	5.8	0		
15	21.4	9.6	15.5	2.5	0.0	5.1	0.0	5.1	0		
16	25.4	14.8	20.1	0.0	2.1	1.2	0.0	1.2	0		
17	22.3	12.0	17.2	0.8	0.0	0.0	0.0	0.0	0		
18	25.2	11.4	18.3	0.0	0.3	0.0	0.0	0.0	0		
19	24.4	10.6	17.5	0.5	0.0	0.0	0.0	0.0	0		
20	23.2	6.4	14.8	3.2	0.0	0.2	0.0	0.2	0		
21	22.8	5.1	14.0	4.0	0.0	2.2	0.0	2.2	0		
22	20.6	9.7	15.2	2.8	0.0	3.6	0.0	3.6	0		
23	22.0	8.1	15.1	2.9	0.0	T	0.0	T	0		
24	17.8	10.1	14.0	4.0	0.0	6.2	0.0	6.2	0		
25	17.8	5.3	11.6	6.4	0.0	3.2	0.0	3.2	0		
26	17.3	4.7	11.0	7.0	0.0	0.6	0.0	0.6	0		
27	17.0	2.6	9.8	8.2	0.0	0.0	0.0	0.0	0		
28	20.0	0.6	10.3	7.7	0.0	0.0	0.0	0.0	0		
29	22.1	1.7	11.9	6.1	0.0	0.0	0.0	0.0	0		
30	21.5	9.8	15.7	2.3	0.0	1.4	0.0	1.4	0		
31	14.9	9.5	12.2	5.8	0.0	1.4	0.0	1.4	0		
Sum				**108.1**	**2.4**	**98.5**	**0.0**	**98.5**			
Avg	**20.5**	**8.6**	**14.6**								
Xtrm	**26.1**	**0.6**									

Daily Data Report for September 2006

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†	14.7	5.5	10.1	7.9	0.0	0.2	0.0	0.2		6E	56E
02†	18.7	3.5	11.1	6.9	0.0	0.0	0.0	0.0		25	37
03†	26.1	11.1	18.6	0.0	0.6	0.0	0.0	0.0			<31
04†	22.2	10.6	16.4	1.6	0.0	0.8	0.0	0.8		23	37
05†	22.9	13.1	18.0	0.0	0.0	2.4	0.0	2.4			<31
06†	21.9	11.7	16.8	1.2	0.0	1.6	0.0	1.6			<31
07†	21.0	5.7	13.4	4.6	0.0	0.0	0.0	0.0			<31
08†	23.1	6.2	14.7	3.3	0.0	0.0	0.0	0.0		24	37
09†	23.5	10.2	16.9	1.1	0.0	T	0.0	T			<31
10†	11.5	5.5	8.5	9.5	0.0	17.8	0.0	17.8			<31
11†	14.8	0.7	7.8	10.2	0.0	0.0	0.0	0.0			<31
12†	17.5	0.1	8.8	9.2	0.0	0.0	0.0	0.0			<31
13†	16.0	6.2	11.1	6.9	0.0	0.6	0.0	0.6			<31
14†	23.4	7.7	15.6	2.4	0.0	0.0	0.0	0.0			<31
15†	21.8	12.0	16.9	1.1	0.0	0.0	0.0	0.0			<31
16†	17.1	0.8	9.0	9.0	0.0	2.2	0.0	2.2			<31
17†	19.0	0.8	9.9	8.1	0.0	10.2	0.0	10.2		23	33
18†	10.2	4.2	7.2	10.8	0.0	1.8	0.0	1.8			<31
19†	10.4	6.2	8.3	9.7	0.0	4.4	0.0	4.4			<31
20†	20.5	10.2	15.4	2.6	0.0	4.0	0.0	4.0			<31
21†	19.3	10.0	14.7	3.3	0.0	0.8	0.0	0.8			<31
22†	14.1	7.9	11.0	7.0	0.0	0.4	0.0	0.4		27	33
23†	15.2	6.0	10.6	7.4	0.0	0.0	0.0	0.0		27	37
24†	16.4	6.2	11.3	6.7	0.0	15.8	0.0	15.8			<31
25†	16.6	6.2	11.4	6.6	0.0	2.2	0.0	2.2			<31
26†	14.1	2.1	8.1	9.9	0.0	0.8	0.0	0.8			<31
27†	16.4	0.7	8.6	9.4	0.0	T	0.0	T			<31
28†	18.6	-0.2	9.2	8.8	0.0	0.0	0.0	0.0			<31
29†	18.8	-0.3	9.3	8.7	0.0	T	0.0	T			<31
30†	20.4	8.6	14.5	3.5	0.0	0.2	0.0	0.2			<31
Sum				**177.4**	**0.6**	**66.2**	**0.0**	**66.2**			
Avg	**18.2**	**6**	**12.1**								
Xtrm	**26.1**	**-0.3**								**6E**	**56E**

Appendix A:

- The following table provides summary statistics on **corrected** water quality data from the Humber River station for the time period of August 14th – September 15th, 2006.

	Temp-Water (^{o}C)	pH	Conductance (uS/cm)	Diss-Solids (g/L)	% Saturation	Dissolved Oxygen (mg/L)
Max	18.00	7.54	42.08	0.03	102.27	9.44
Min	15.01	6.87	34.23	0.02	93.60	8.43
Average	16.44	7.23	37.74	0.02	97.20	8.83
Standard Deviation	0.74	0.15	2.09	0.00	2.15	0.29

- The following table provides summary statistics on **corrected** water quality data for the Humber River station dating back to December 2003.

	Temp-Water (^{o}C)	pH	Conductance (uS/cm)	Diss-Solids (g/L)	% Saturation	Dissolved Oxygen (mg/L)
Max	20.67	7.68	44.85	0.03	148.10	20.01
Min	-0.10	5.44	29.52	0.02	87.71	7.78
Average	7.80	6.85	37.15	0.02	99.83	11.91
Standard Deviation	5.96	0.32	2.90	0.00	8.32	2.13

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