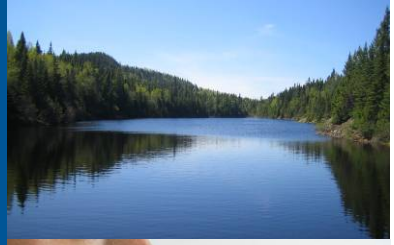
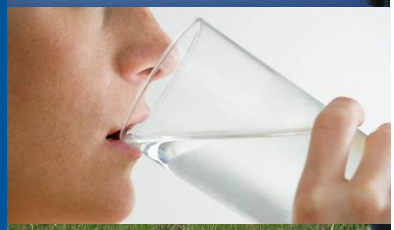



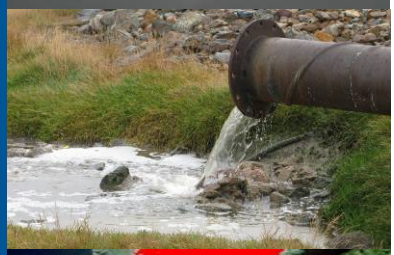


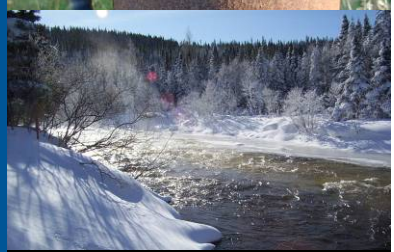

Real Time Water Quality Report
Humber River at Humber Village

Deployment Period 2010-03-25 to 2010-06-16

2010-07-09

Government of Newfoundland & Labrador
Department of Environment and Conservation
Water Resources Management Division

General

- This station is operated as part of the Provincial Real Time Water Quality (RTWQ) network.
- This station is operated year round.
- The Water Resources Management Division (WRMD) staff monitors the real-time web page on a daily basis. Any unusual observations are investigated.
- This site is easily accessed and the instrument is removed on a monthly basis for maintenance and calibration and is reinstalled within one to two days.

.

Maintenance and Calibration of Instrumentation

- After being freshly calibrated the **DataSonde®** for Humber River at Humber Village was installed on March 25, 2010, and remained deployed continuously until June 16, 2010. This is a relatively long deployment period, however the instrument maintained good operation for the duration of the deployment period.

Quality Assurance / Quality Control (QA/QC) Measures

- As part of the QA/QC protocol, an assessment of the reliability of data recorded by an instrument is made at the beginning and end of the deployment period. The procedure is based on the approach used by the United States Geological Survey. See **Table 1**.

	Rank				
Parameter	**Excellent**	**Good**	**Fair**	**Marginal**	**Poor**
Temperature (oC)	<=+/-0.2	>+/-0.2 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	<+/-1
pH (unit)	<=+/-0.2	>+/-0.2 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	>+/-1
Sp. Conductance (µS/cm)	<=+/-3	>+/-3 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20
Sp. Conductance > 35 µS/cm (%)	<=+/-3	>+/-3 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20
Dissolved Oxygen (mg/L) (% Sat)	<=+/-0.3	>+/-0.3 to 0.5	>+/-0.5 to 0.8	>+/-0.8 to 1	>+/-1
Turbidity <40 NTU (NTU)	<=+/-2	>+/-2 to 5	>+/-5 to 8	>+/-8 to 10	>+/-10
Turbidity > 40 NTU (%)	<=+/-5	>+/-5 to 10	>+/-10 to 15	>+/-15 to 20	>+/-20

Table 1

- Upon deployment, a QA/QC **DataSonde®** is temporarily deployed along side the Field **DataSonde®**. Values for temperature and dissolved oxygen are compared between the two instruments. A grab sample is taken to compare with the Field **DataSonde®** for specific conductivity, pH and turbidity parameters. Based on the difference between parameters recorded by the Field **DataSonde®**, QAQC **DataSonde®** and grab sample, a qualitative statement is made on the data quality upon deployment. In this incident, a grab sample was not collected during deployment thus a qualitative statement for these parameters cannot be made.

- At the end of a deployment period, readings are taken in the water body from the Field **DataSonde®** before and after a thorough cleaning in order to assess the degree of biofouling. During calibration in the laboratory, an assessment of calibration drift is made and the two error values are combined to give Total Error (T_e). If T_e exceeds a predetermined data correction criterion, a correction based on T_e is applied to the dataset using linear interpolation. Based on the value for T_e, a qualitative statement is also made on the data quality upon removal.
- The ranking at the beginning and end of the deployment period are shown in **Table 2**.
- With the exception of water quantity data (Stage), all data used in the preparation of the graphs and subsequent discussion below adhere to this stringent Quality Assurance and Quality Control (QA/QC) protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

Humber River at Humber Village (NF02Y10012)		
Date (yyyy-mm-dd)	**Parameter**	**Ranking**
2010-03-25 Deployment	Temp (°C)	Excellent
	pH (units)	NA
	Sp. Conductivity (uS/cm)	NA
	Dissolved Oxygen (mg/L)	Excellent
	Turbidity (NTU)	NA
2010-06-16 Removal	Temp (°C)	Excellent
	pH (units)	Fair
	Sp. Conductivity (uS/cm)	Excellent
	Dissolved Oxygen (%)	Excellent
	Turbidity (NTU)	Excellent

Table 2

Data Interpretation

- The water temperature (**Figure 1**) ranged from a minimum of 1.3 ˚C to a maximum of 8.81 ˚C, with temperature rising steadily throughout the deployment period.

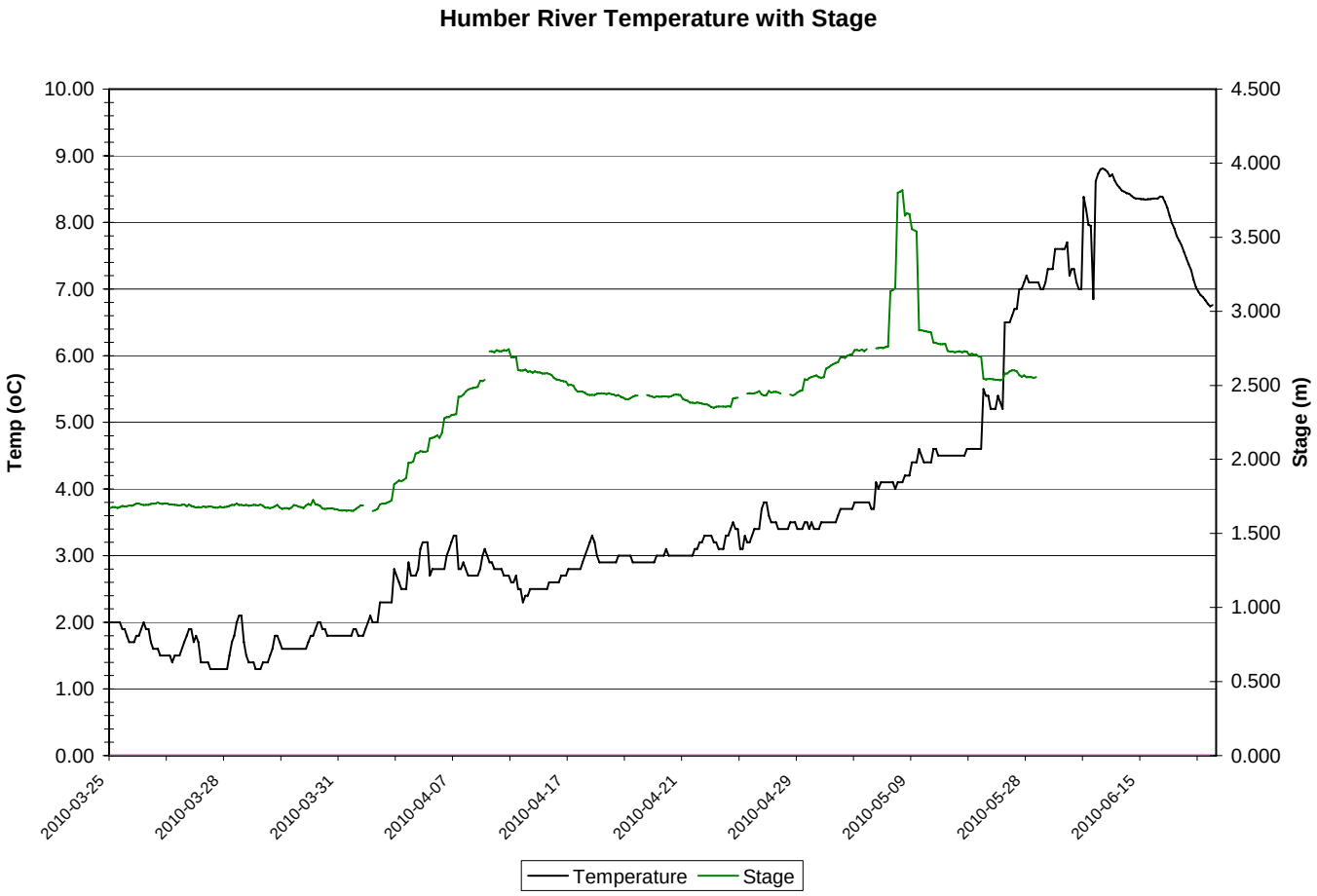

Figure 1

- The pH ranged from a low of 6.33 to a high of 7.24 and remained stable and relatively constant throughout the full deployment period. (**Figure 2**).
- All but a very few pH readings were within the range of 6.5 to 9.0 recommended by CCME for the protection of aquatic life.

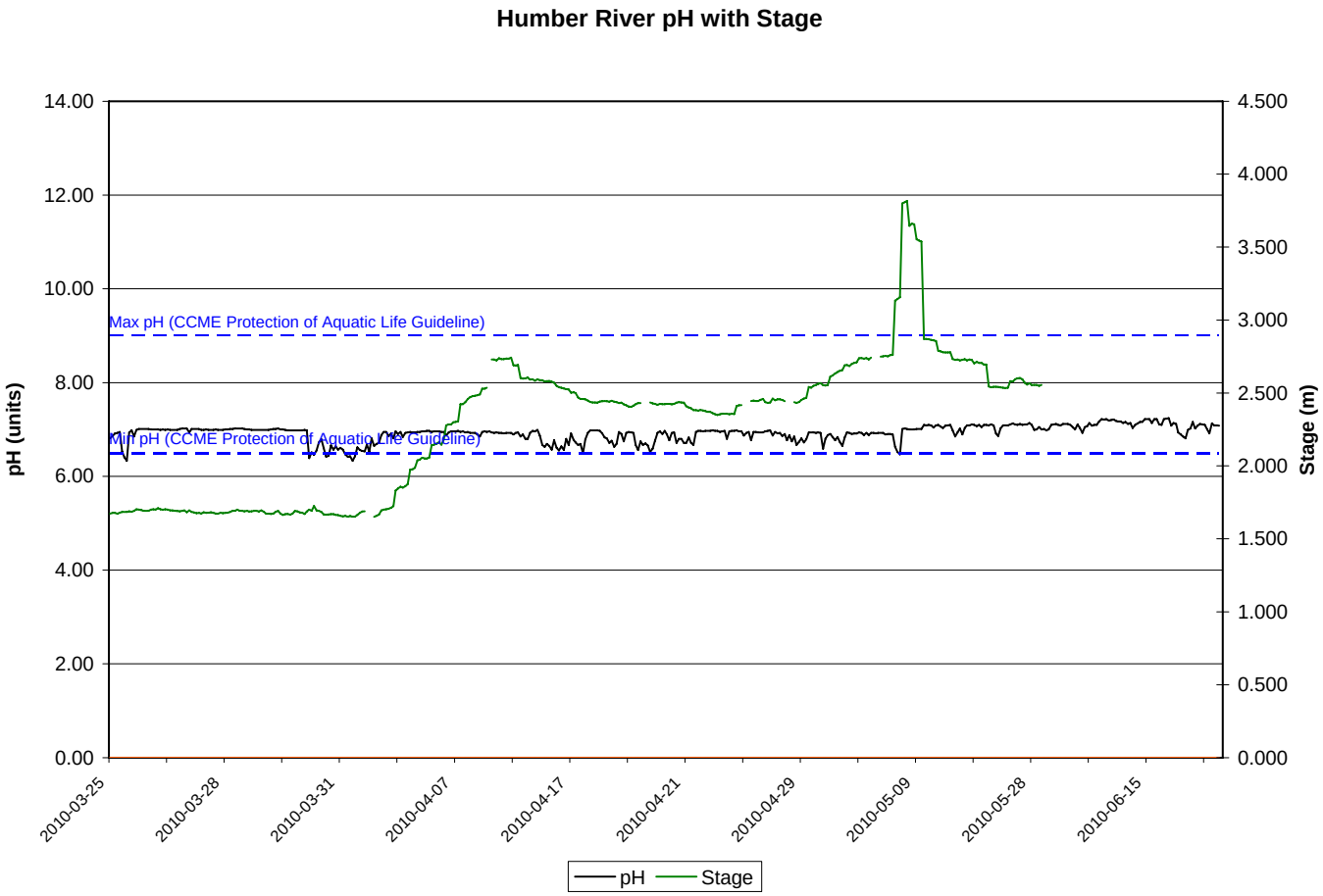

Figure 2

- The specific conductivity **(Figure 3)** ranged from a minimum of 34.1 µS/cm to a maximum of 40.6 µS/cm over the deployment period.
- It appears that as stage height and flow increased conductivity decreased.

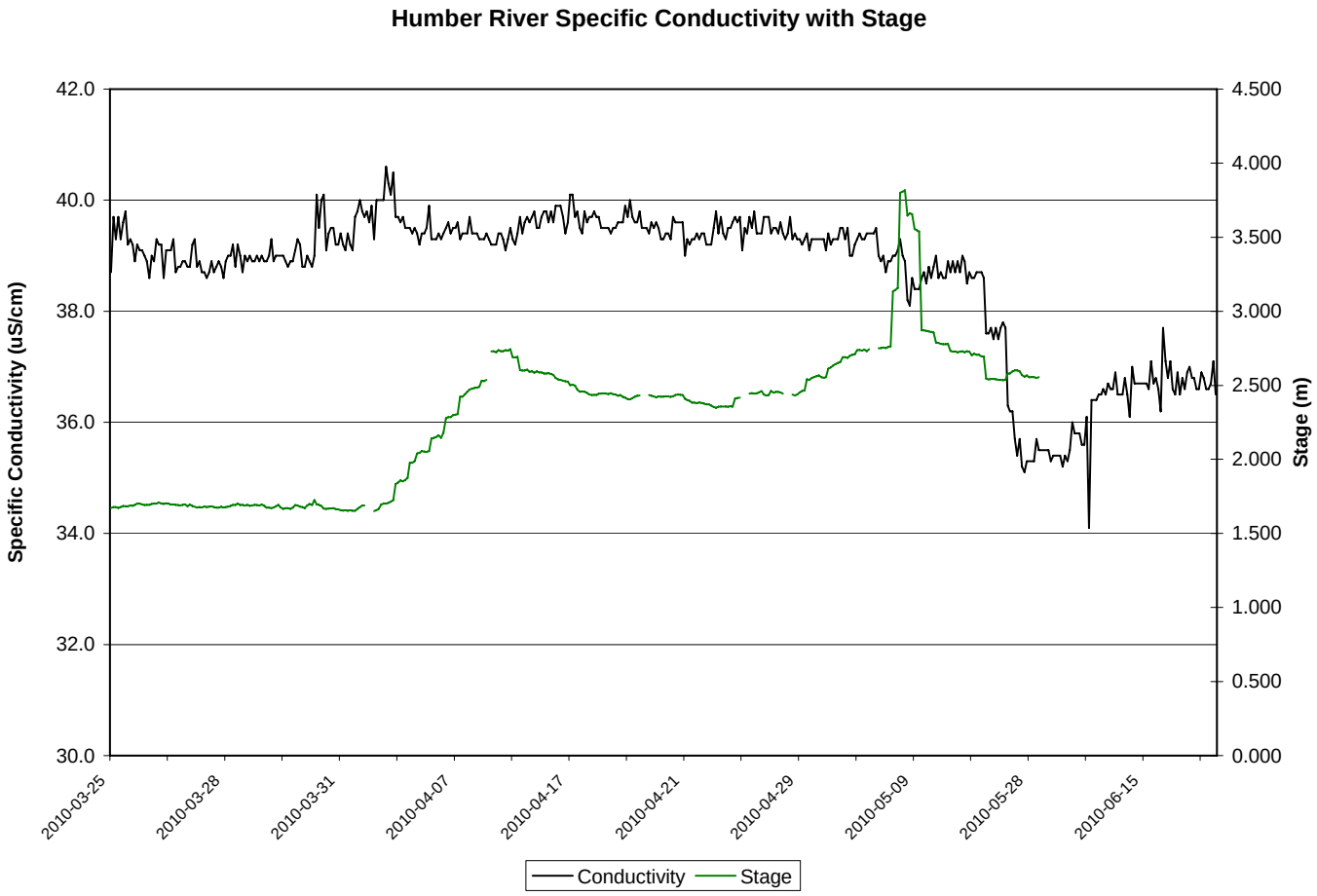

Figure 3

- The dissolved oxygen (**Figure 4**) values ranged from a minimum of 11.63 mg/L to a maximum of 13.98 mg/L over the deployment period. With the percent saturation ranging between 97.3% and 101.8%.
- Dissolved oxygen (mg/L) is generally inversely proportional to water temperature and gentle declining trend over the deployment period is related to increasing temperature.
- Throughout the deployment period, all dissolved oxygen values fell above the limits recommended by CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (cold water/other life stages – above 6.5 mg/L; cold water/early life stages – above 9.5 mg/L).

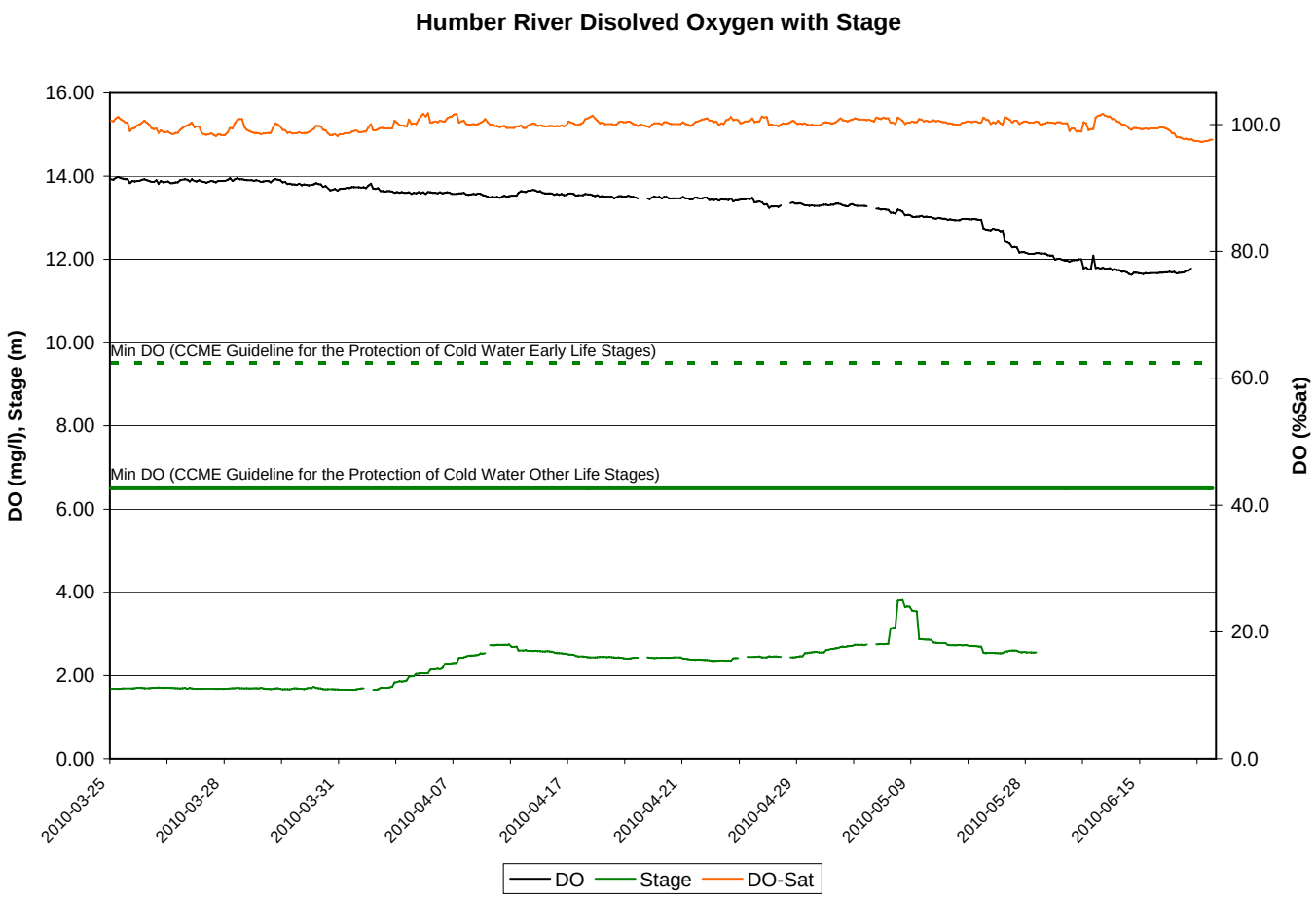

Figure 4

- The turbidity values **(Figure 5)** were consistently at 0 NTU for the entirety of the deployment period.

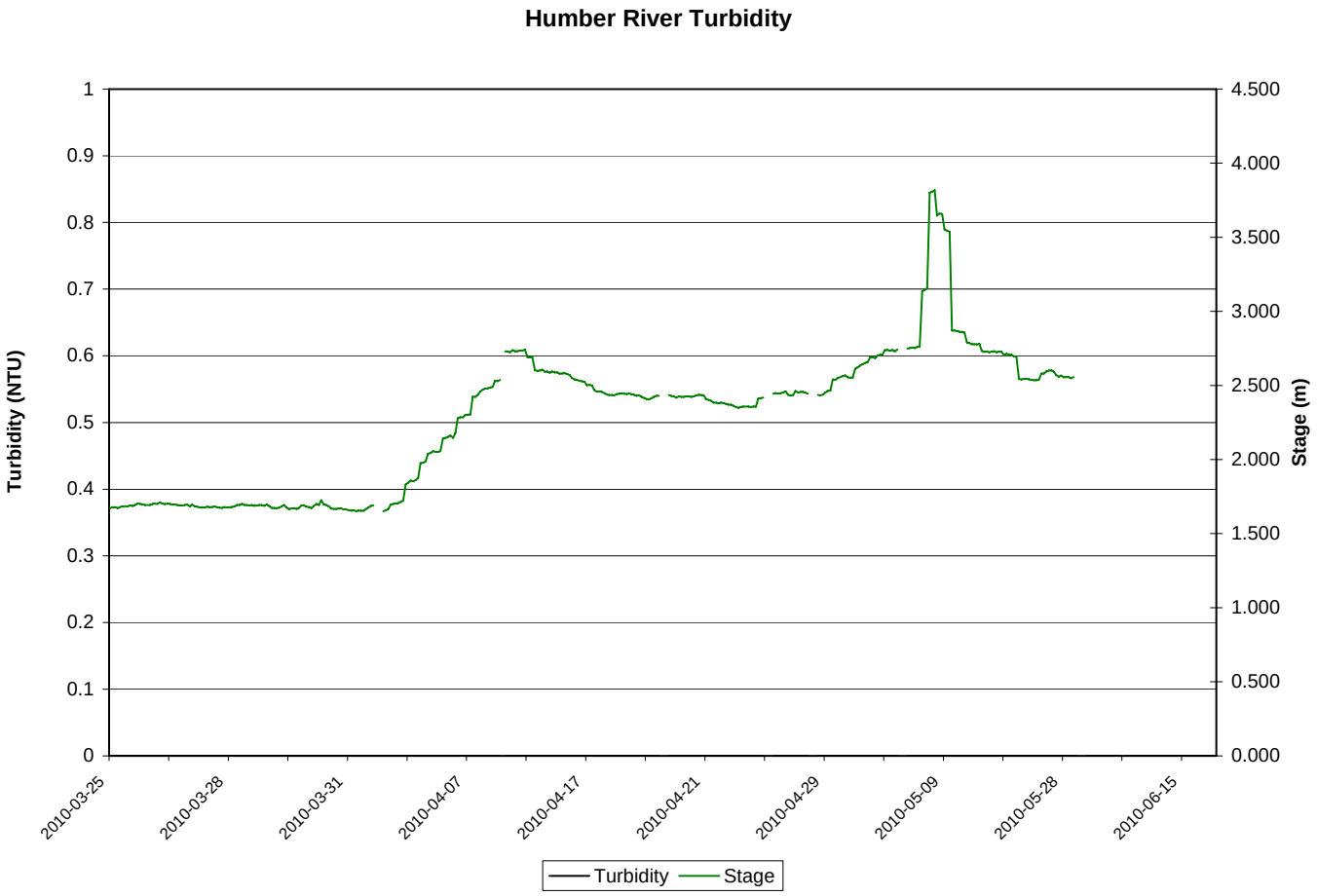

Figure 5

- The stage (**Figure 6)** or water level ranged from a minimum of 1.651 m to a maximum of 3.817 m with the highest peak presumably resulting from spring runoff which is a combination of precipitation and snowmelt.

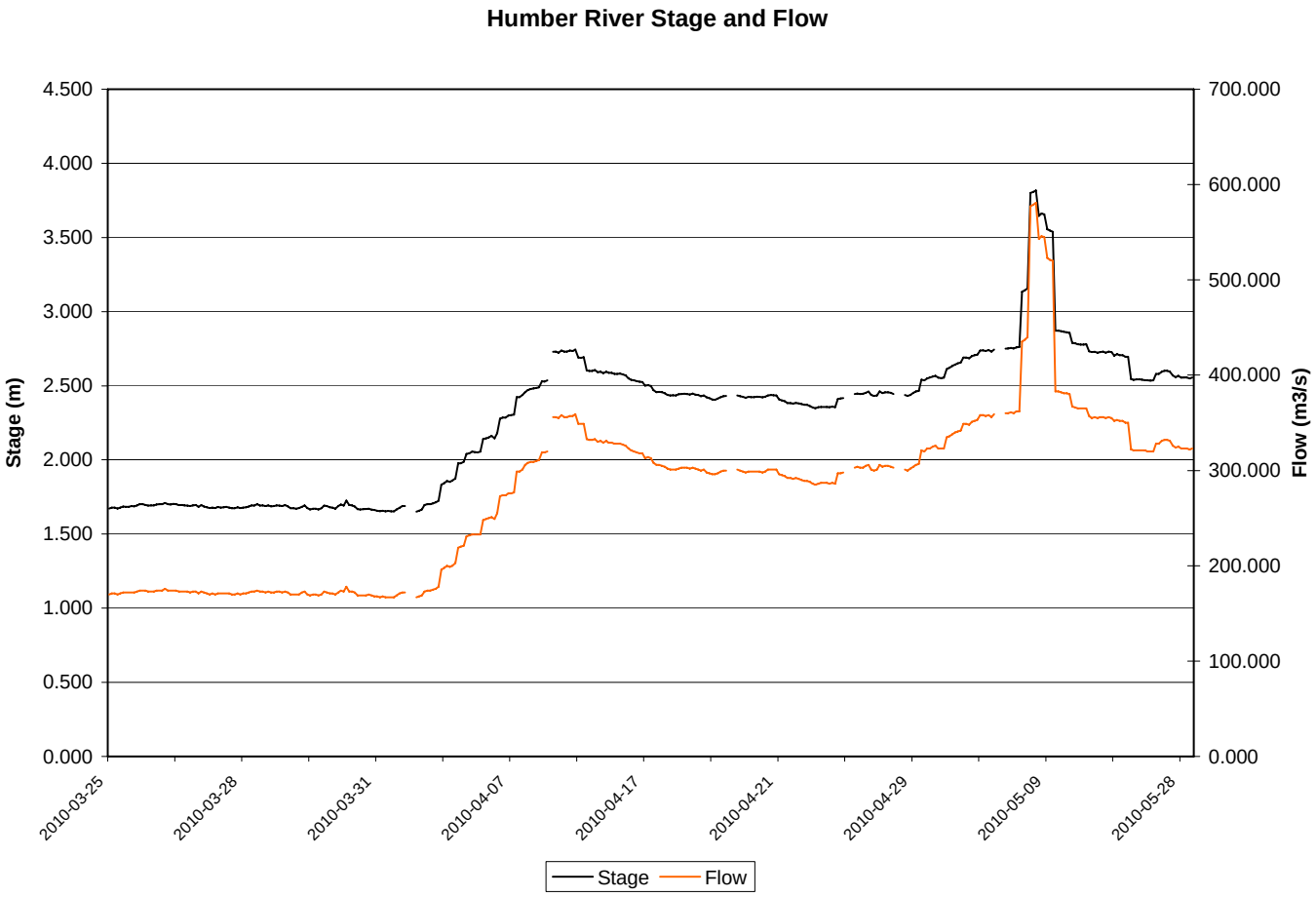

Figure 6

Climate Data

- Climate data for the full deployment period from the nearest station (Corner Brook) is included in Appendix A.

Prepared by:

Ian Bell
Environmental Scientist
Water Resources Management Division
Department of Environment and Conservation
Tel: 709-637-2431
Fax: 709-637-2541
e-mail: ianbell@gov.nl.ca

Appendix A

Climate Data for March 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
25†	3.1	-1.8	0.7	17.3	0.0	M	M	0.6		7	39
26†	7.5	-6.0	0.8	17.2	0.0	M	M	0.6		30	32
27†	-5.5	-12.5	-9.0	27.0	0.0	M	M	0.0		28	43
28†	-3.4	-13.6	-8.5	26.5	0.0	M	M	0.0			<31
29†	3.1	-8.5	-2.7	20.7	0.0	M	M	0.0		23	35
30†	7.8	-0.7	3.6	14.4	0.0	M	M	12.2		20	35
31†	2.8	0.3	1.6	16.4	0.0	M	M	M			<31
Sum				**619.3**	**0.0**	**M**	**M**	**30.0***			
Avg	**2**	**-5.9**	**-1.97**								
Xtrm	**7.8**	**-13.6**								**8**	**63**

Climate Data for April 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†	5.2	0.2	2.7	15.3	0.0	M	M	0.6		7	33
02†	14.2	2.0	8.1	9.9	0.0	M	M	0.0			<31
03†	9.9	3.7	6.8	11.2	0.0	M	M	0.0		21	32
04†	16.1	2.1	9.1	8.9	0.0	M	M	0.0		8	35
05†	9.3	1.0	5.2	12.8	0.0	M	M	0.0		24	41
06†	11.1	0.3	5.7	12.3	0.0	M	M	5.8		15	35
07†	12.8	1.9	7.4	10.6	0.0	M	M	0.0			<31
08†	7.0	2.7	4.9	13.1	0.0	M	M	M			<31
09†	14.3	1.6	8.0	10.0	0.0	M	M	0.0		19	35
10†	13.1	1.4	7.3	10.7	0.0	M	M	3.2		15	48
11†	5.2	0.9	3.1	14.9	0.0	M	M	0.7		25	67
12†	6.1	-0.5	2.8	15.2	0.0	M	M	0.0		22	44
13†	7.5	-1.1	3.2	14.8	0.0	M	M	0.0			<31
14†	7.4	-2.5	2.5	15.5	0.0	M	M	0.6			<31
15†	4.6	-3.8	0.4	17.6	0.0	M	M	0.0		5	41
16†	2.2	-2.2	0.0	18.0	0.0	M	M	8.4		8	56
17†	8.6	1.9	5.3	12.7	0.0	M	M	3.0		8	50
18†	11.2	2.3	6.8	11.2	0.0	M	M	0.0		8	43
19†	5.7	1.5	3.6	14.4	0.0	M	M	4.8		7	54
20†	5.4	1.5	3.5	14.5	0.0	M	M	0.6		5	44
21†	3.7	1.9	2.8	15.2	0.0	M	M	0.6		29	39
22†	8.3	0.3	4.3	13.7	0.0	M	M	0.0		30	33
23†	8.5	0.5	4.5	13.5	0.0	M	M	0.0			<31
24†	5.4	-2.4	1.5	16.5	0.0	M	M	0.0			<31
25†	6.5	-2.5	2.0	16.0	0.0	M	M	0.0			<31
26†	11.6	1.1	6.4	11.6	0.0	M	M	0.8		21	33
27†	11.5	2.0	6.8	11.2	0.0	M	M	2.0		13	44

28†	8.8	1.5	5.2	12.8	0.0	M	M	7.3	8	32
29†	6.6	1.3	4.0	14.0	0.0	M	M	6.0	22	35
30†	9.3	-0.6	4.4	13.6	0.0	M	M	2.5		<31
Sum				**401.7**	**0.0**	**M**	**M**	**46.9***		
Avg	**8.6**	**0.6**	**4.58**							
Xtrm	**16.1**	**-3.8**								

Climate Data for May 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†	6.3	-1.7	2.3	15.7	0.0	M	M	0.0		29	37
02†	11.4	2.8	7.1	10.9	0.0	M	M	0.0			<31
03†	18.8	5.2	12.0	6.0	0.0	M	M	0.0		10	41
04†	8.0	2.7	5.4	12.6	0.0	M	M	0.0		29	41
05†	5.3	1.7	3.5	14.5	0.0	M	M	0.0		31	44
06†	9.7	1.5	5.6	12.4	0.0	M	M	0.0		29	41
07†	8.6	3.4	6.0	12.0	0.0	M	M	0.0			<31
08†	9.3	2.1	5.7	12.3	0.0	M	M	0.0		21	37
09†	13.8	4.3	9.1	8.9	0.0	M	M	0.0		25	52
10†	11.7	4.7	8.2	9.8	0.0	M	M	0.0		22	39
11†	11.2	4.4	7.8	10.2	0.0	M	M	0.0			<31
12†	5.7	0.9	3.3	14.7	0.0	M	M	0.0		28	41
13†	5.7	0.2	3.0	15.0	0.0	M	M	0.0		21	50
14†	8.3	0.0	4.2	13.8	0.0	M	M	0.0		30	33
15†	4.8	1.8	3.3	14.7	0.0	M	M	0.0		29	43
16†	4.3	1.7	3.0	15.0	0.0	M	M	0.0		27	43
17†	8.8	0.8	4.8	13.2	0.0	M	M	0.0		30	39
18†	11.3	0.9	6.1	11.9	0.0	M	M	0.0		28	32
19†	21.8	0.6	11.2	6.8	0.0	M	M	0.0		21	52
20†	14.8	6.7	10.8	7.2	0.0	M	M	0.0		14	46
21†	6.9	-0.4	3.3	14.7	0.0	M	M	0.0		29	41
22†	14.6	0.1	7.4	10.6	0.0	M	M	0.0		20	61
23†	19.1	9.0	14.1	3.9	0.0	M	M	0.0		24	56
24†	11.4	0.1	5.8	12.2	0.0	M	M	0.0		28	32
25†	11.3	-0.5	5.4	12.6	0.0	M	M	0.0		29	37
26†	10.1	3.6	6.9	11.1	0.0	M	M	0.0		32	44
27†	7.9	2.7	5.3	12.7	0.0	M	M	0.0		4	48
28†	8.3	2.7	5.5	12.5	0.0	M	M	0.0			<31
29†	12.9	2.6	7.8	10.2	0.0	M	M	0.0			<31
30†	18.5	2.8	10.7	7.3	0.0	M	M	0.0		8	46
31†	8.9	0.3	4.6	13.4	0.0	M	M	0.0		7	46
Sum				**358.8**	**0.0**	**M**	**M**	**0.0**			
Avg	**10.6**	**2.2**	**6.41**								
Xtrm	**21.8**	**-1.7**								**20**	**61**

Climate Data for June 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†	15.9	0.4	8.2	9.8	0.0	M	M	0.0			<31
02†	18.8	3.5	11.2	6.8	0.0	M	M	0.0			<31
03†	12.2	5.9	9.1	8.9	0.0	M	M	0.0		21	44
04†	11.4	4.4	7.9	10.1	0.0	M	M	0.0			<31
05†	22.3	4.0	13.2	4.8	0.0	M	M	0.0		21	35
06†	15.2	6.1	10.7	7.3	0.0	M	M	0.0		7	39
07†	15.8	5.3	10.6	7.4	0.0	M	M	0.0		8	39
08†	14.8	5.2	10.0	8.0	0.0	M	M	0.0		24	43
09†	11.3	4.9	8.1	9.9	0.0	M	M	0.0		28	37
10†	13.7E	4.9E	9.3E	8.7E	0.0E	M	M	0.0E		30E	35E
11†	24.8	8.0	16.4	1.6	0.0	M	M	0.0		22	46
12†	20.5	5.9	13.2	4.8	0.0	M	M	0.0			<31
13†	19.8	5.0	12.4	5.6	0.0	M	M	0.0		31	32
14†	19.2	7.5	13.4	4.6	0.0	M	M	0.0		21	52
15†	8.8	5.1	7.0	11.0	0.0	M	M	0.0		32	52
16†	13.5	2.0	7.8	10.2	0.0	M	M	0.0			