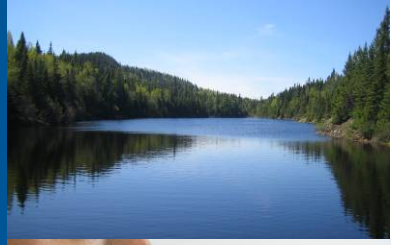
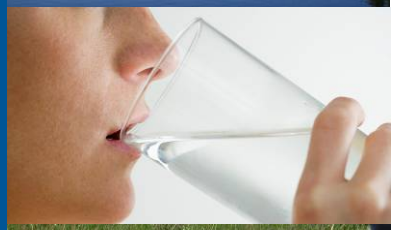



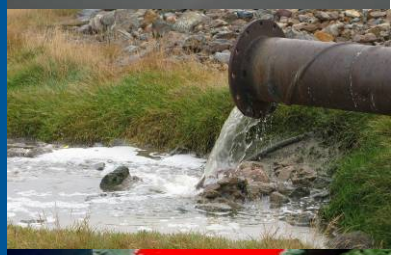


Real Time Water Quality Report
Humber River at Humber Village

Deployment Period 2012-08-03 to 2012-09-07

2012-09-18

Newfoundland Labrador

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.
- Staff of the Water Resources Management Division (WRMD) monitors the real-time web page on a daily basis. Any unusual observations are investigated.
- This site is easily accessed and the instrument is normally removed on a monthly to bi-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 August 3, 2012, and remained deployed continuously until September 7, 2012. This deployment period was a total of 32 days and the instrument performed well with the exception of pH which drifted off calibration significantly by the end of the deployment.

Quality Assurance / Quality Control (QA/QC) Measures

- As part of the Quality Assurance and Quality Control (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.

	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 *in situ,* adjacent to the Field **DataSonde®**. Depending on the degree of difference between each parameter from the Field and QA/QC sondes a qualitative rank is assigned (See Table 1). The possible ranks, from most to least desirable, are: Excellent, Good, Fair, Marginal and Poor. A grab sample is also taken for additional confirmation of conditions at deployment and to allow for future modelling studies.
- At the end of a deployment period, a freshly cleaned and calibrated QA/QC sonde is placed *in situ,* adjacent to the Field sonde. Values are compared between all parameters and differences are ranked for placement in Table 2.
- 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 and corrected data can be obtained upon request.

Humber River at Humber Village (NF02Y10012)		
Date (yyyy-mm-dd)	**Parameter**	**Ranking**
2012-08-03 Deployment	Temp (°C)	Excellent
	pH (units)	Excellent
	Sp. Conductivity (uS/cm)	Excellent
	Dissolved Oxygen (mg/L)	Excellent
	Turbidity (NTU)	Excellent
2012-09-07 Removal	Temp (°C)	Excellent
	pH (units)	Poor
	Sp. Conductivity (uS/cm)	Excellent
	Dissolved Oxygen (mg/L)	Excellent
	Turbidity (NTU)	Excellent

Table 2

Data Interpretation

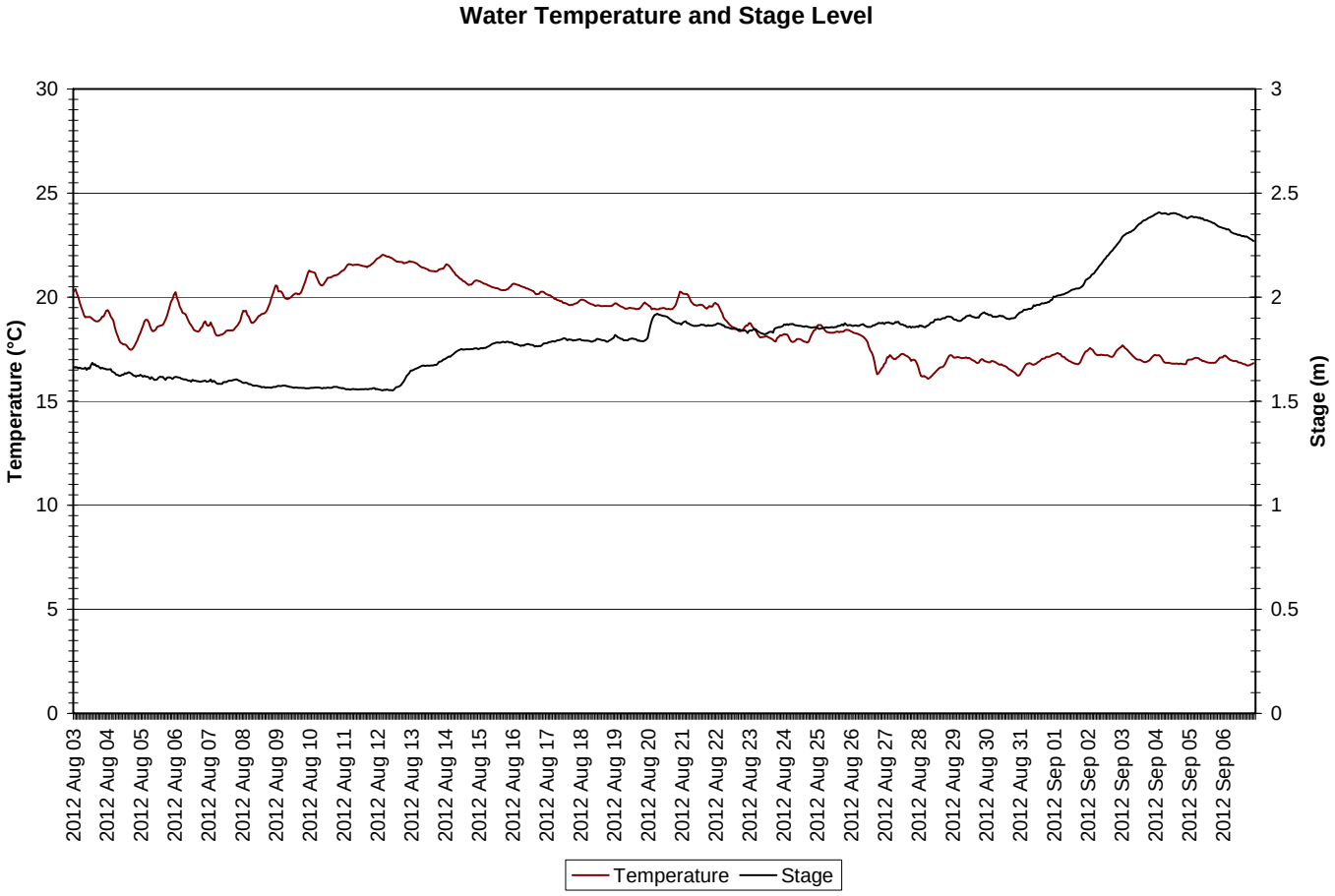

Figure 1

- Over the deployment period the water temperature (**Figure 1**) ranged from a minimum of 16.08 ˚C to a maximum of 22.04 ˚C, with an average temperature of 18.76˚C.

- For most of the deployment period there is a diurnal temperature cycling trend visible. This trend is caused by cooling each night and warming during the day.

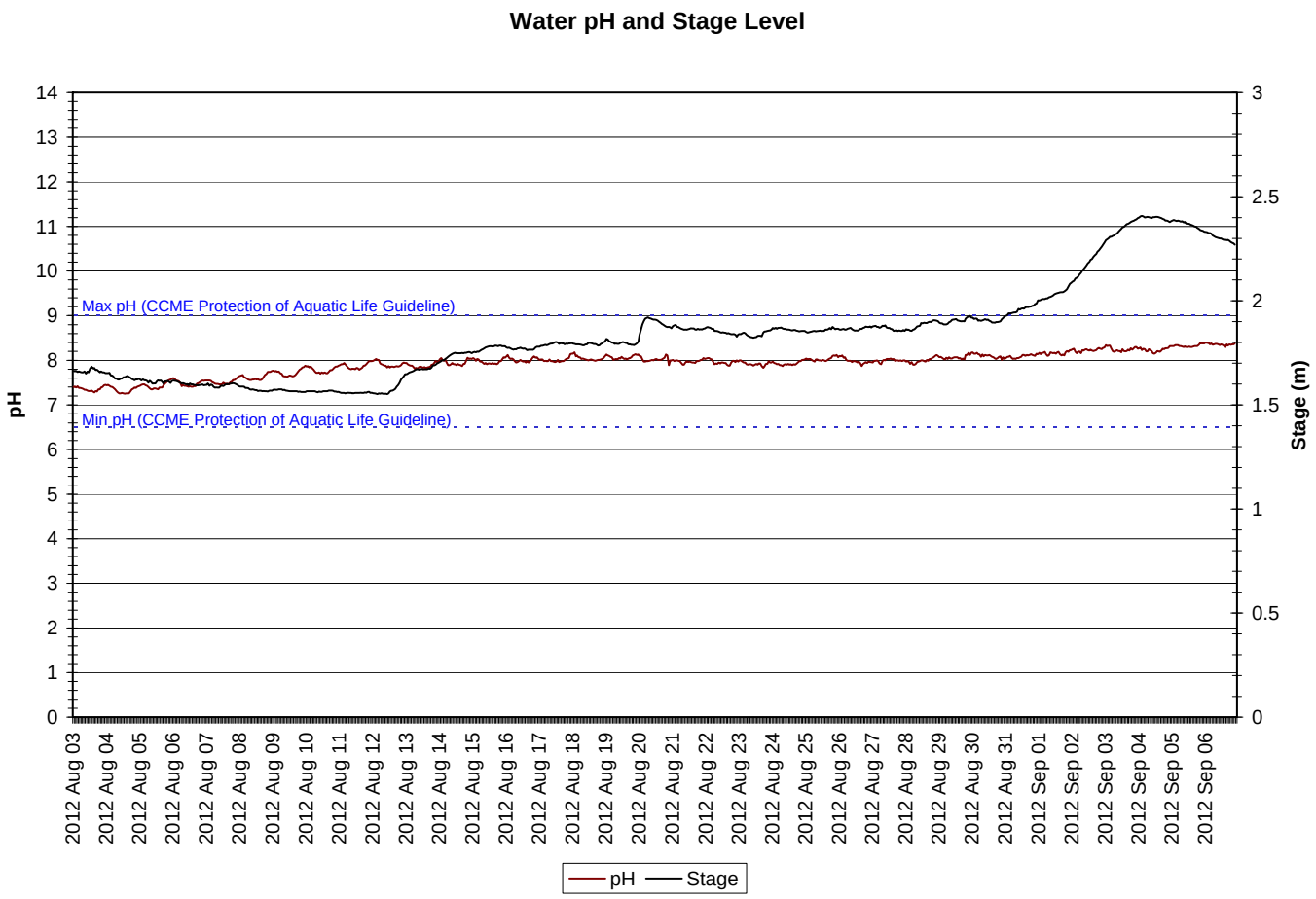

Figure 2

- The pH **(Figure2)** ranged from a minimum of 7.25 to a maximum of 8.40.
- It appears that the pH readings drifted off calibration significantly during this deployment which may indicate an issue with the sensor. After removal this instrument was sent to the technicians for a performance test and any necessary maintenance and repairs.
- All pH readings for the deployment period are within the range recommended by CCME for the protection of aquatic life.

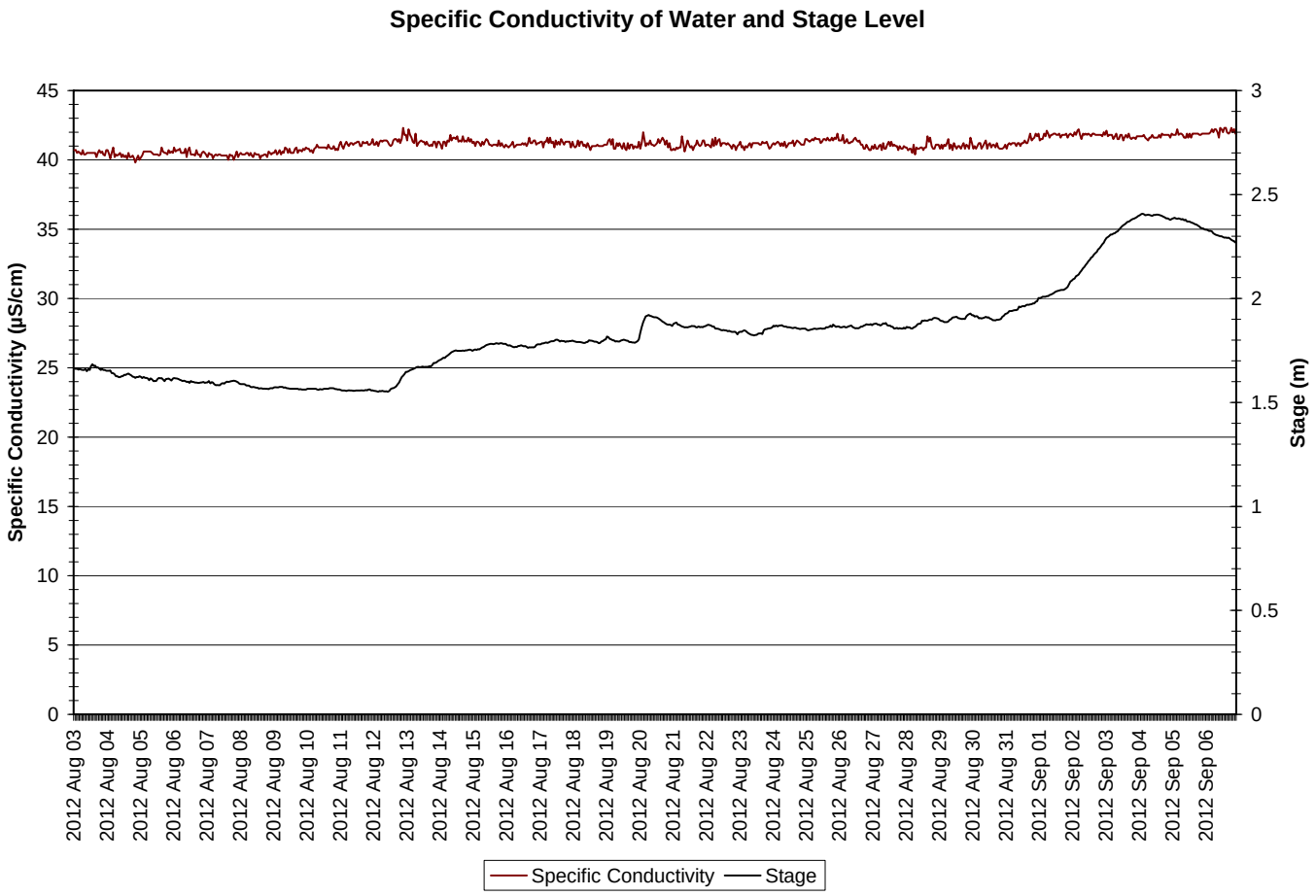

Figure 3

- The specific conductivity **(Figure 3)** ranged from a minimum of 39.8 µS/cm to a maximum of 42.3 µS/cm and showed a gentle increasing trend over the deployment period. The average specific conductivity for the entire deployment period was 41.1 µS/cm.

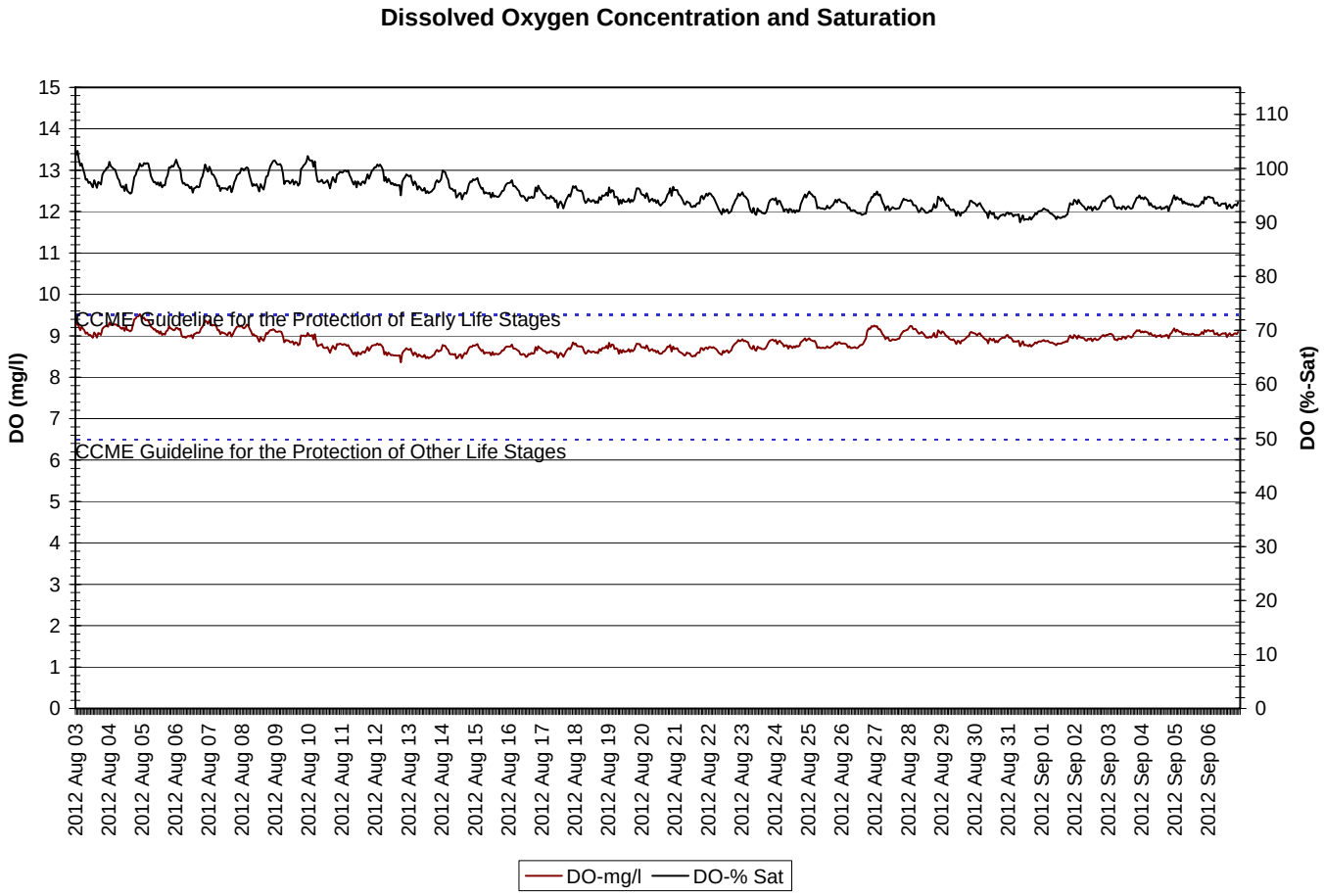

Figure 4

- The dissolved oxygen (**Figure 4**) values ranged from a minimum of 8.36 mg/L to a maximum of 9.53 mg/L over the deployment period with an average of 8.87 mg/L. The percent saturation for dissolved oxygen ranged from a low of 90.0% to a high of 103.2% with an average of 95.1%.

- Both the dissolved oxygen and percent saturation reading show a clear diurnal trend which is directly related to the diurnal temperature trend.

- All oxygen readings for the deployment period are well above the CCME guideline for the protection of other life stages which is the relevant guideline for this time of the year.

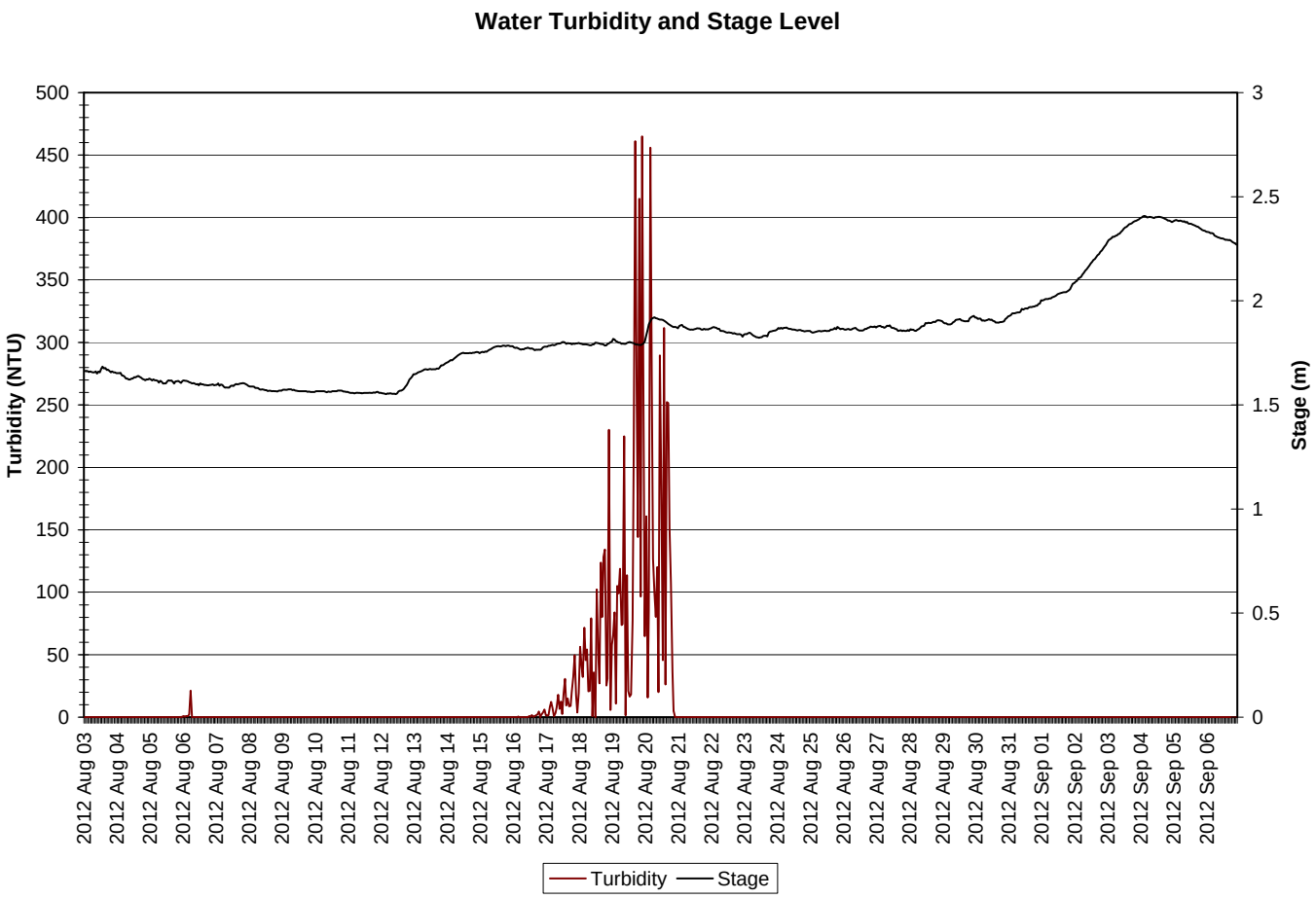

Figure 5

- Most of the turbidity values (**Figure 5**) were at 0.0 NTU during the deployment, however there is a period during the middle of the deployment with excessively high turbidity readings which at times exceeded 450 NTU. These high readings are false readings related to organic debris, such as plant matter, trapped in the sensor area. A small spike around August 6 is also most likely a false reading related to organic debris trapped in the sensor area.

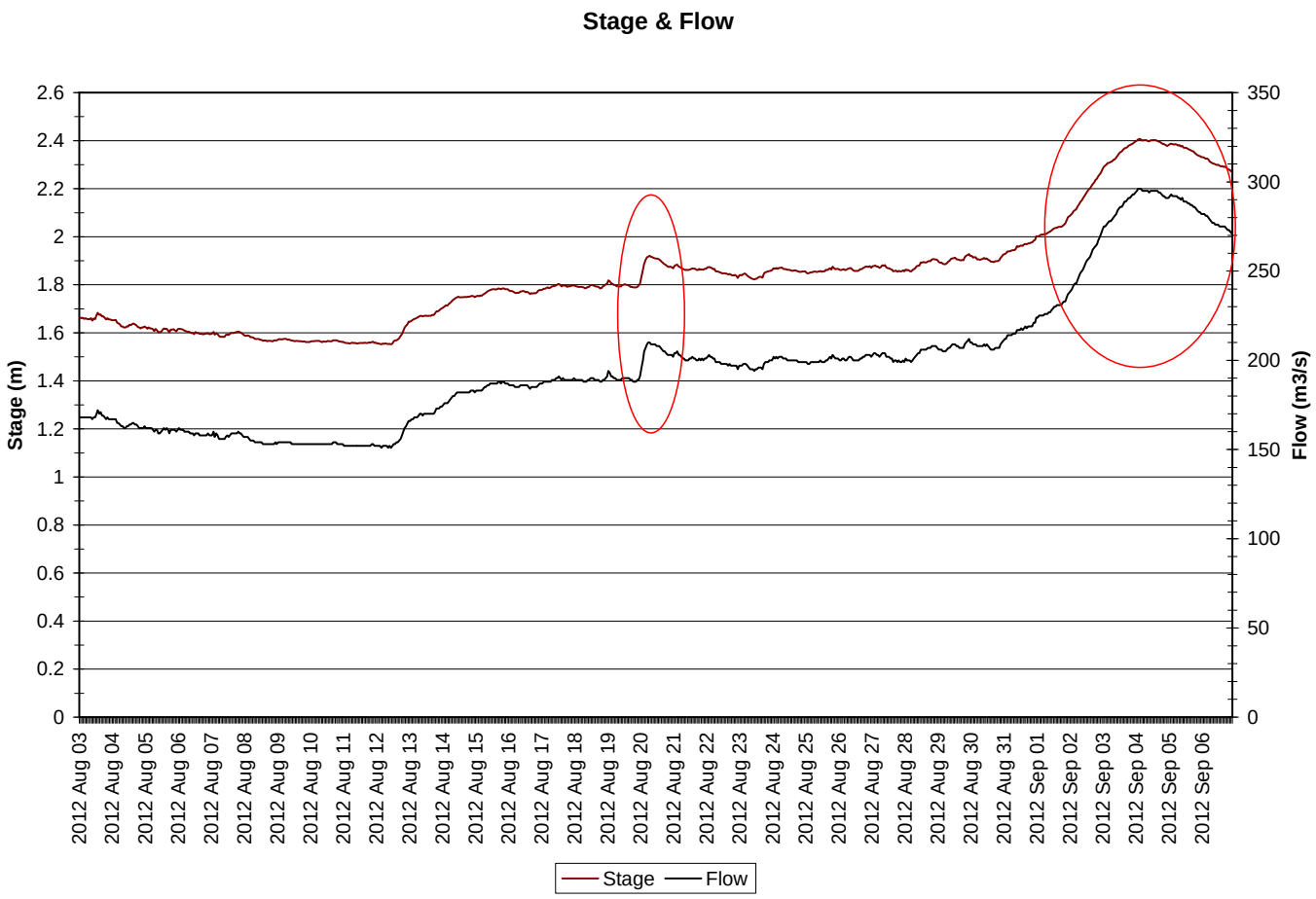

Figure 6

- The stage height (**Figure 6)** or water level ranged from a minimum of 1.55 m to a maximum of 2.41 m with the corresponding flow ranging from151 m^3/s to 296 m^3/s.

- There is a general increasing trend for stage height and stream flow during the deployment period with two periods with marked increases (see inside red ovals). Both these periods of marked increase in stage height and flow are related to significant rainfall in the watershed area.

Climate Data

- Climate data for most of the deployment period from the nearest station (Corner Brook) is included in Appendix A. Data for the end of the deployment period was not available for this report.

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Daily Data Report for August 2012

Day	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10s deg	Spd of Max Gust km/h
03†	28.0	18.0	23.0	0.0	5.0	0.0	0.0	0.0	0		
04†	23.5	21.0	22.3	0.0	4.3	0.0	0.0	0.0	0		
05†	26.0	11.5	18.8	0.0	0.8	0.0	0.0	0.0	0		
06†	29.5	17.5	23.5	0.0	5.5	2.2	0.0	2.2	0		
07†	27.5	19.0	23.3	0.0	5.3	16.3	0.0	16.3	0		
08†	24.0	18.5	21.3	0.0	3.3	0.6	0.0	0.6	0		
09†	24.5	17.0	20.8	0.0	2.8	0.0	0.0	0.0	0		
10†	24.5	19.5	22.0	0.0	4.0	2.6	0.0	2.6	0		
11†	22.5	16.5	19.5	0.0	1.5	1.9	0.0	1.9	0		
12†	25.0	15.0	20.0	0.0	2.0	23.0	0.0	23.0	0		
13†	25.0	18.5	21.8	0.0	3.8	4.2	0.0	4.2	0		
14†	21.5	20.0	20.8	0.0	2.8	0.4	0.0	0.4	0		
15†	21.0	15.5	18.3	0.0	0.3	0.0	0.0	0.0	0		
16†	21.5	16.5	19.0	0.0	1.0	0.0	0.0	0.0	0		
17†	20.0	16.5	18.3	0.0	0.3	7.2	0.0	7.2	0		
18†	20.0	15.0	17.5	0.5	0.0	5.5	0.0	5.5	0		
19†	22.0	15.5	18.8	0.0	0.8	10.4	0.0	10.4	0		
20											
21											
22†	26.5	15.5	21.0	0.0	3.0	0.0	0.0	0.0	0		
23†	25.0	13.0	19.0	0.0	1.0	21.9	0.0	21.9	0		
24†	26.0	15.5	20.8	0.0	2.8	0.5	0.0	0.5	0		
25†	21.0	10.5	15.8	2.2	0.0	0.0	0.0	0.0	0		
26†	22.0	13.5	17.8	0.2	0.0	0.4	0.0	0.4	0		
27†	30.0	18.0	24.0	0.0	6.0	0.0	0.0	0.0	0		
28†	23.0	20.0	21.5	0.0	3.5	19.7	0.0	19.7	0		
29†	20.5	16.0	18.3	0.0	0.3	2.4	0.0	2.4	0		
30†	19.5	16.5	18.0	0.0	0.0	0.7	0.0	0.7	0		
31†	20.5	13.5	17.0	1.0							

Daily Data Report for September 2012

Day	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10s deg	Spd of Max Gust km/h
01†	14.5	13.5	14.0	4.0	0.0	2.1	0.0	2.1	0		
02†	21.5	5.0	13.3	4.7	0.0	0.0	0.0	0.0	0		
03†	21.5	7.5	14.5	3.5	0.0	0.0	0.0	0.0	0		
04†	21.5	9.5	15.5	2.5	0.0	0.0	0.0	0.0	0		
05†	19.0	9.5	14.3	3.7	0.0	0.0	0.0	0.0	0		
06†	19.5	13.5	16.5	1.5	0.0	7.4	0.0	7.4	0		
07†	18.5	12.5	15.5	2.5	0.0	0.0	0.0	0.0	0		