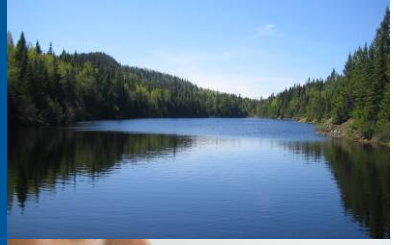
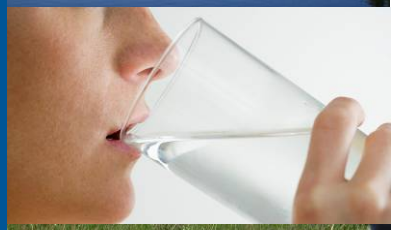



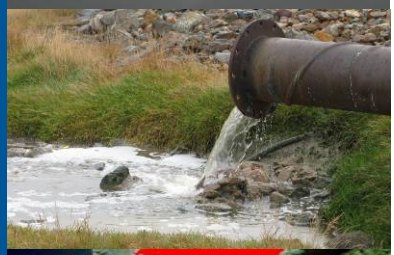


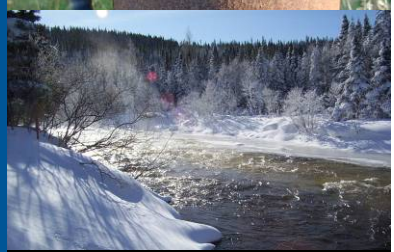

Real Time Water Quality Report
Humber River at Humber Village

Deployment Period 2012-11-13 to 2012-11-28

2013-01-08

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 November 13, 2012. Unfortunately, shortly after deployment the unit developed an issue with the turbidity sensor and the pH sensor also appeared to possibly have an issue. Therefore the unit was removed from the field on November 22, 2012, and replaced on a short term basis with another unit until November 28, 2012. This deployment period was a total of 15 days which was actually two separate deployments of 9 days and 6 days.

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 two deployment periods 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**
2012-11-13 Deployment	Temp (^{o}C)	Excellent
	pH (units)	Good
	Sp. Conductivity (uS/cm)	Good
	Dissolved Oxygen (mg/L)	Good
	Turbidity (NTU)	Excellent
2012-11-22 Removal	Temp (^{o}C)	Excellent
	pH (units)	Good
	Sp. Conductivity (uS/cm)	Excellent
	Dissolved Oxygen (mg/L)	Excellent
	Turbidity (NTU)	Cannot Rank
2012-11-22 Deployment	Temp (^{o}C)	Excellent
	pH (units)	Good
	Sp. Conductivity (uS/cm)	Excellent
	Dissolved Oxygen (mg/L)	Good
	Turbidity (NTU)	Excellent
2012-11-28 Removal	Temp (^{o}C)	Excellent
	pH (units)	Good
	Sp. Conductivity (uS/cm)	Good
	Dissolved Oxygen (mg/L)	Good
	Turbidity (NTU)	Excellent

Table 2

Data Interpretation

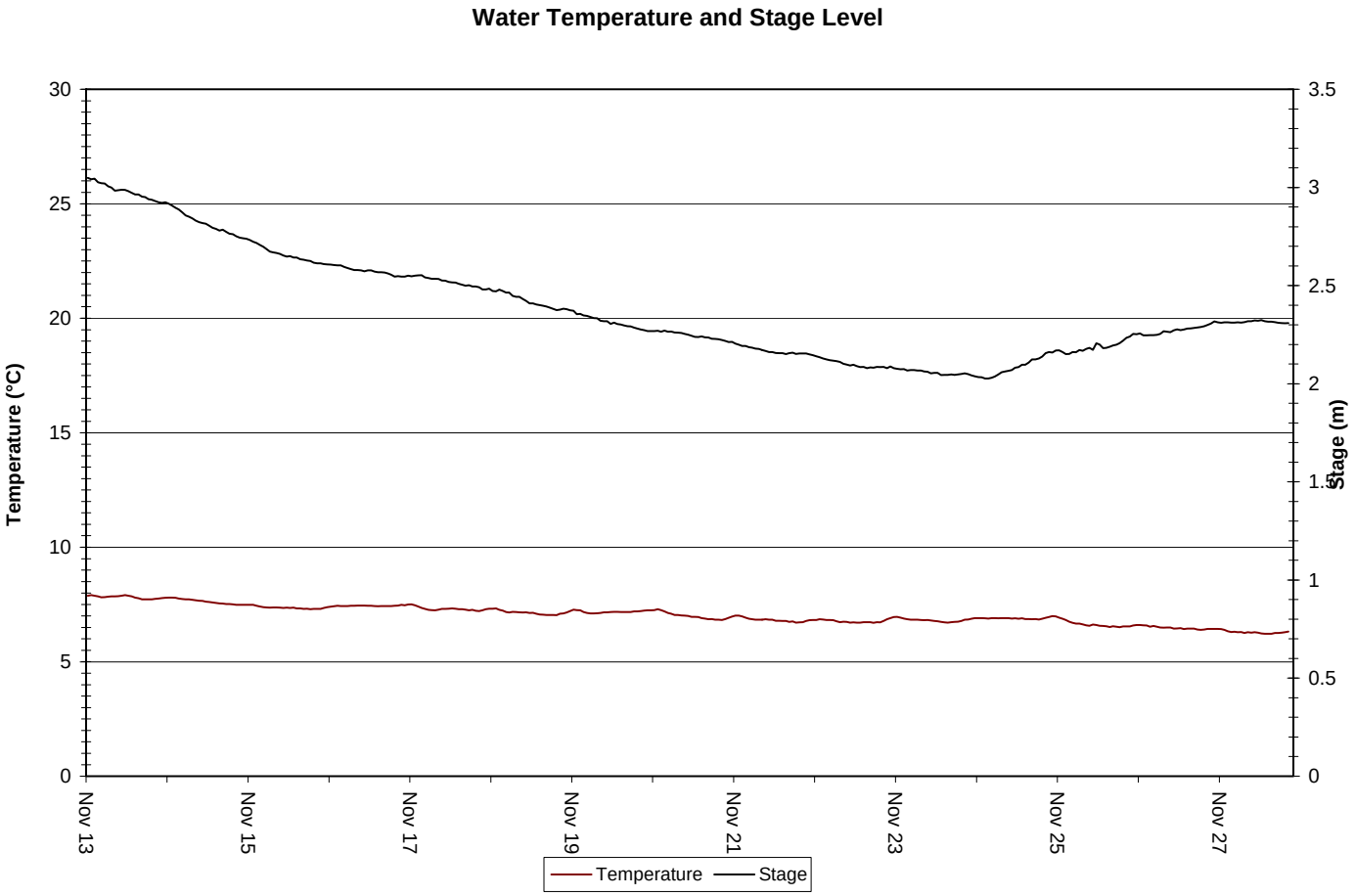

Figure 1

- Over the deployment period the water temperature (**Figure 1**) ranged from a minimum of 6.22 ˚C to a maximum of 7.91 ˚C, with an average temperature of 7.05˚C. There is a general cooling trend over the course of the deployment period.

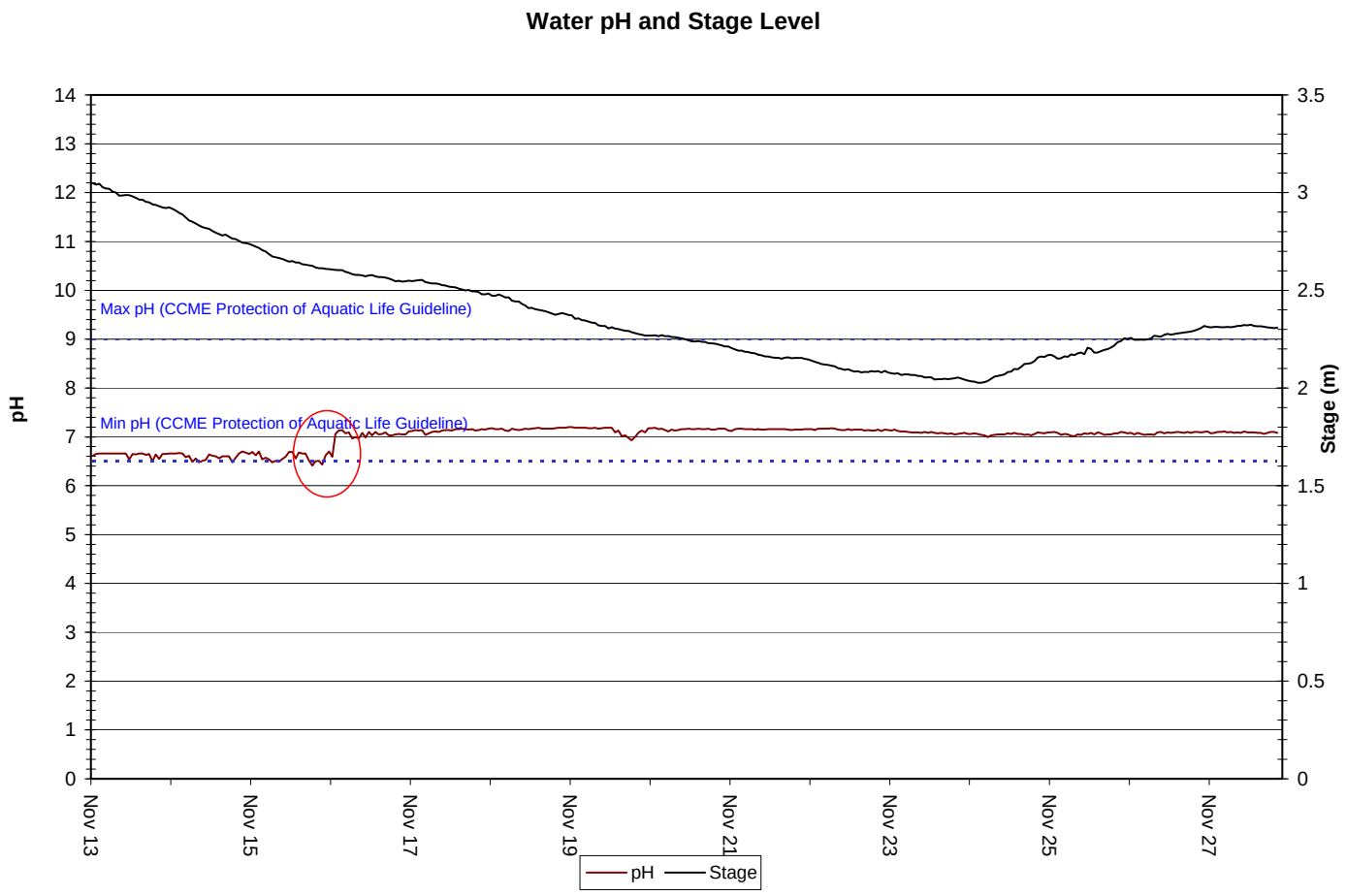

Figure 2

- The pH **(Figure2)** ranged from a minimum of 6.41 to a maximum of 7.20, with an average of 7.01.
- All but a handful of pH readings for the deployment period are within the range recommended by CCME for the protection of aquatic life.
- After several days of deployment there was a jump in pH (see inside red oval) which could indicate that the sensor was not reading accurately for the first few days.
- The change of instruments on the 22nd was not noticeable on the graph which gives a clear indication that there was a pH issue at the beginning of the deployment period even though the QA/QC ranking was "good".

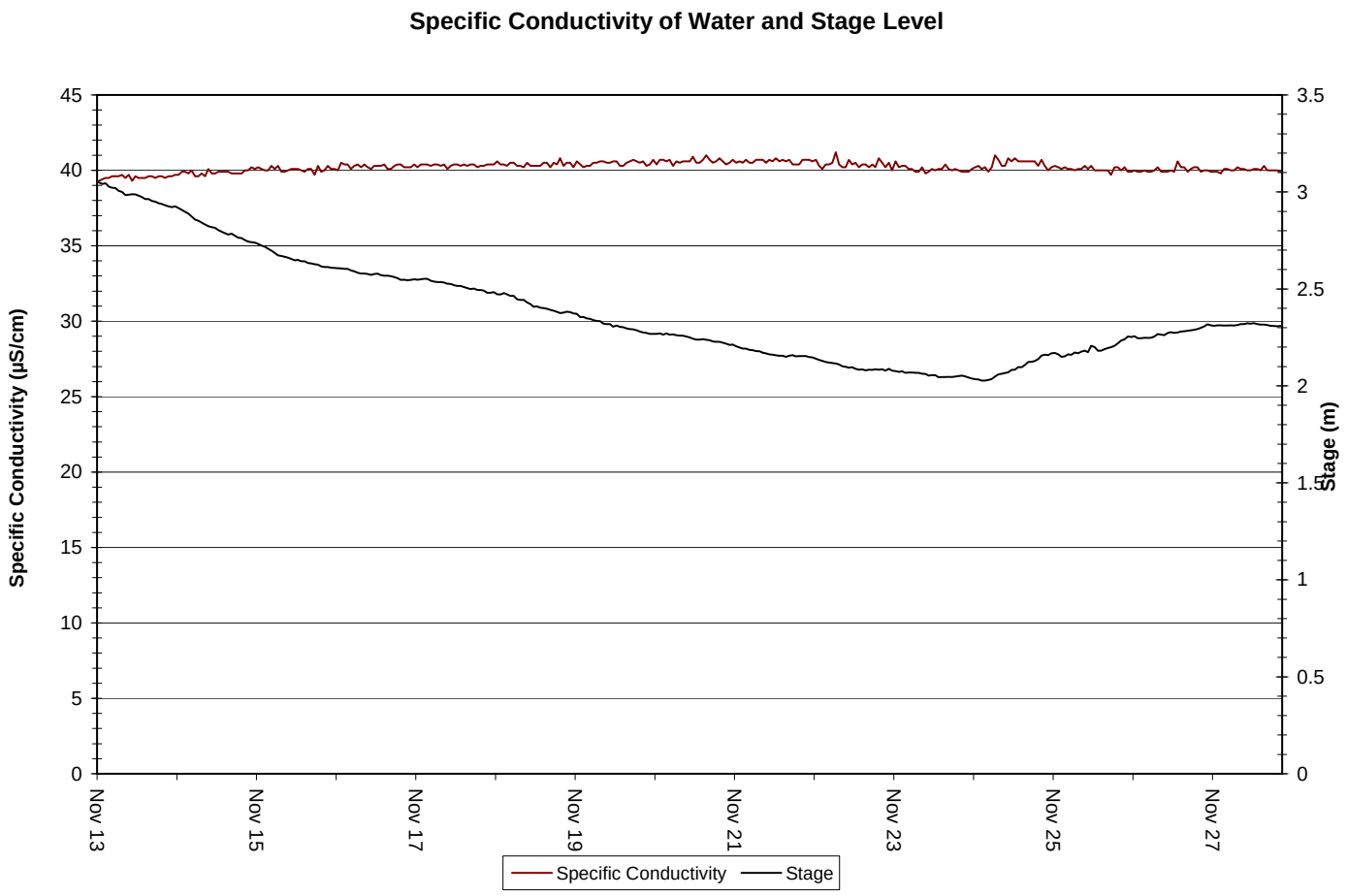

Figure 3

- The specific conductivity **(Figure 3)** ranged from a minimum of 39.3 S/cm to a maximum of 41.2 µS/cm and remained relatively stable over the deployment period. The average specific conductivity for the entire deployment period was 40.2 µS/cm.

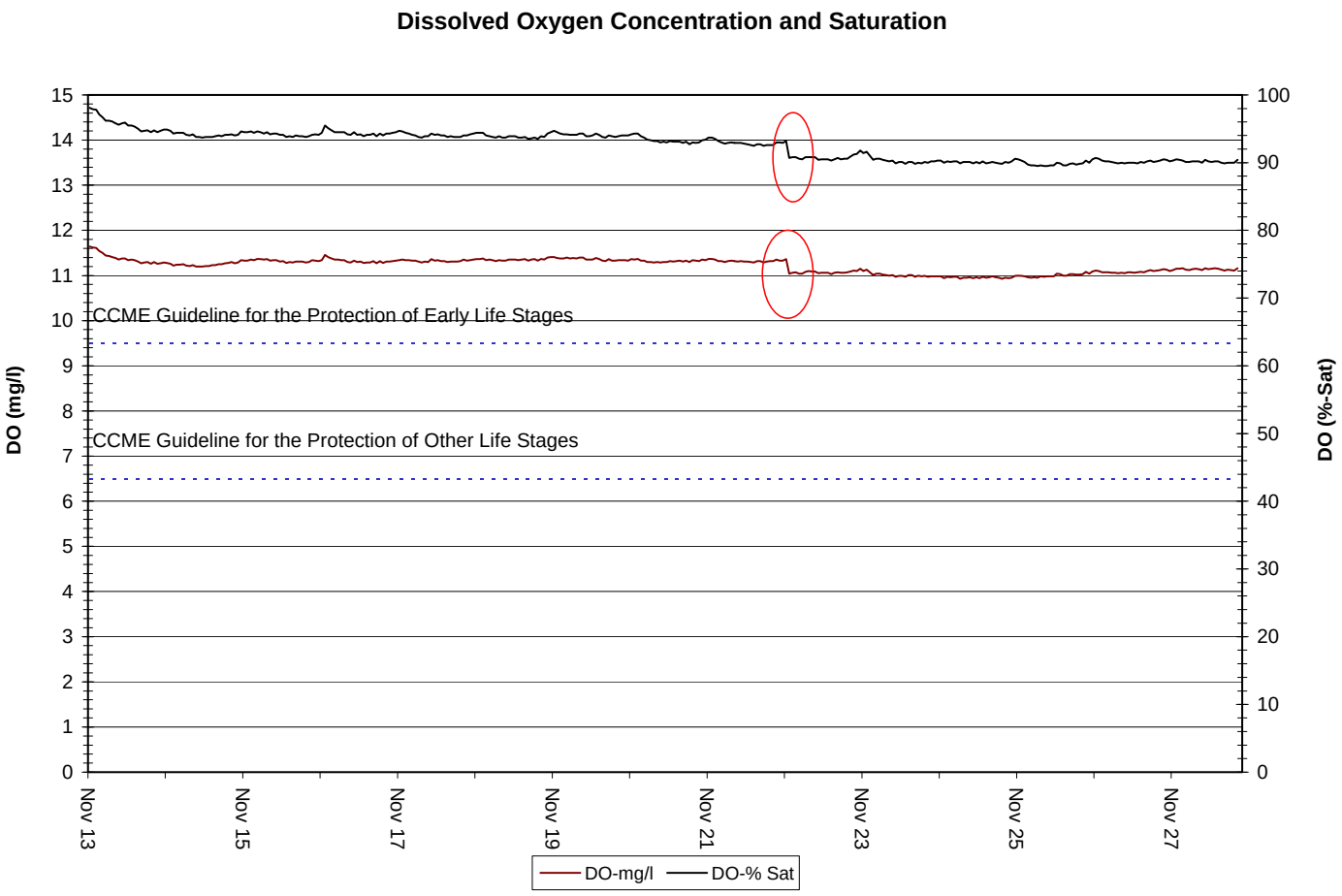

Figure 4

- The dissolved oxygen (**Figure 4**) values ranged from a minimum of 10.93 mg/L to a maximum of 11.64 mg/L over the deployment period with an average of 11.22 mg/L. The percent saturation for dissolved oxygen ranged from a low of 89.5% to a high of 98.1% with an average of 92.6%.

- Both the dissolved oxygen and percent saturation readings were relatively stable over the deployment with the only significant change being when the instruments were changed on November 22, 2012 (see inside red oval).

- All oxygen readings for the deployment period are well above the CCME guideline for the protection of aquatic life.

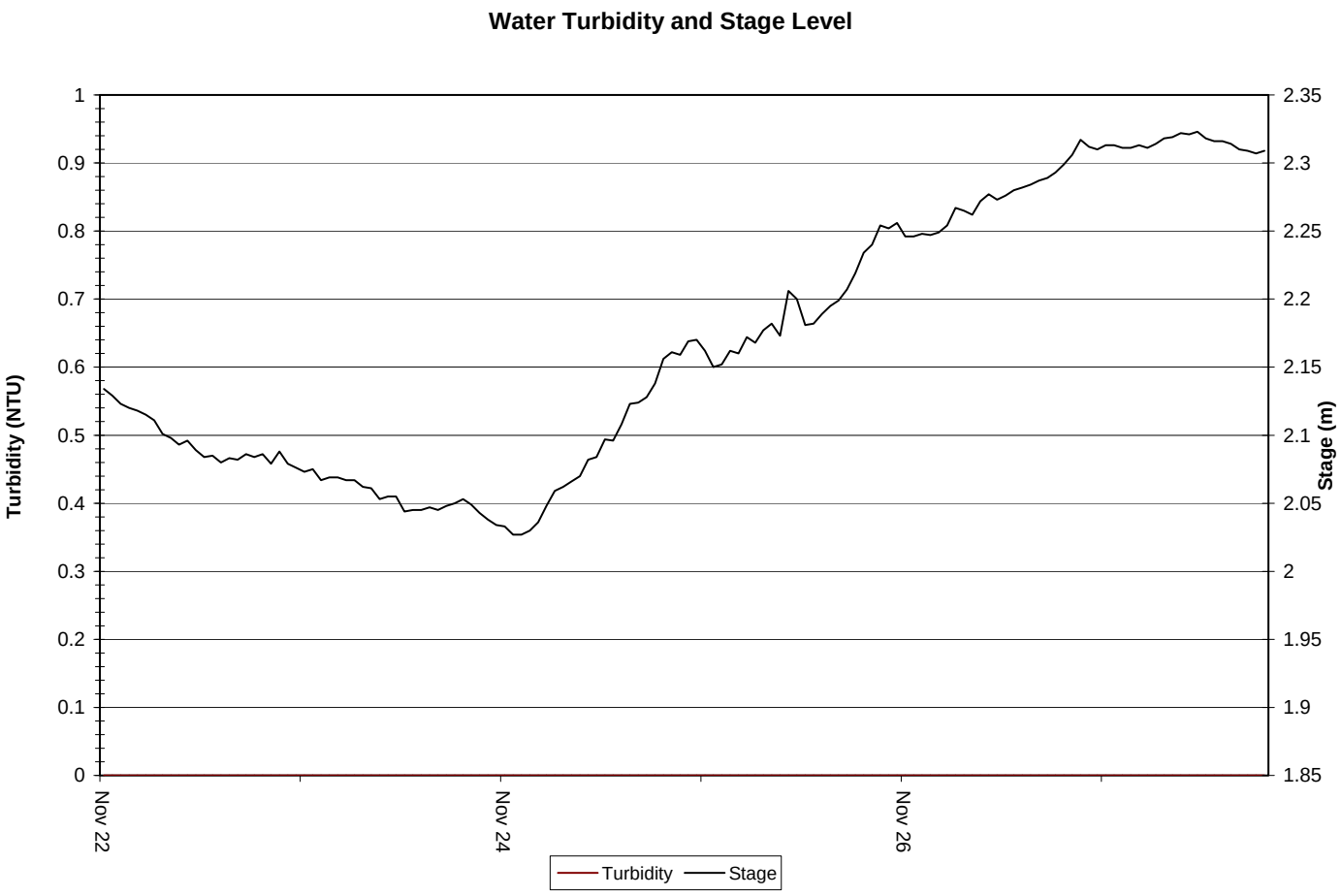

Figure 5

- Because of the false readings caused by plant matter entwined in the turbidity sensor there are no reliable turbidity reading from the first phase of this deployment. All of the turbidity values (**Figure 5**) were at 0.0 NTU during the second phase of the deployment.

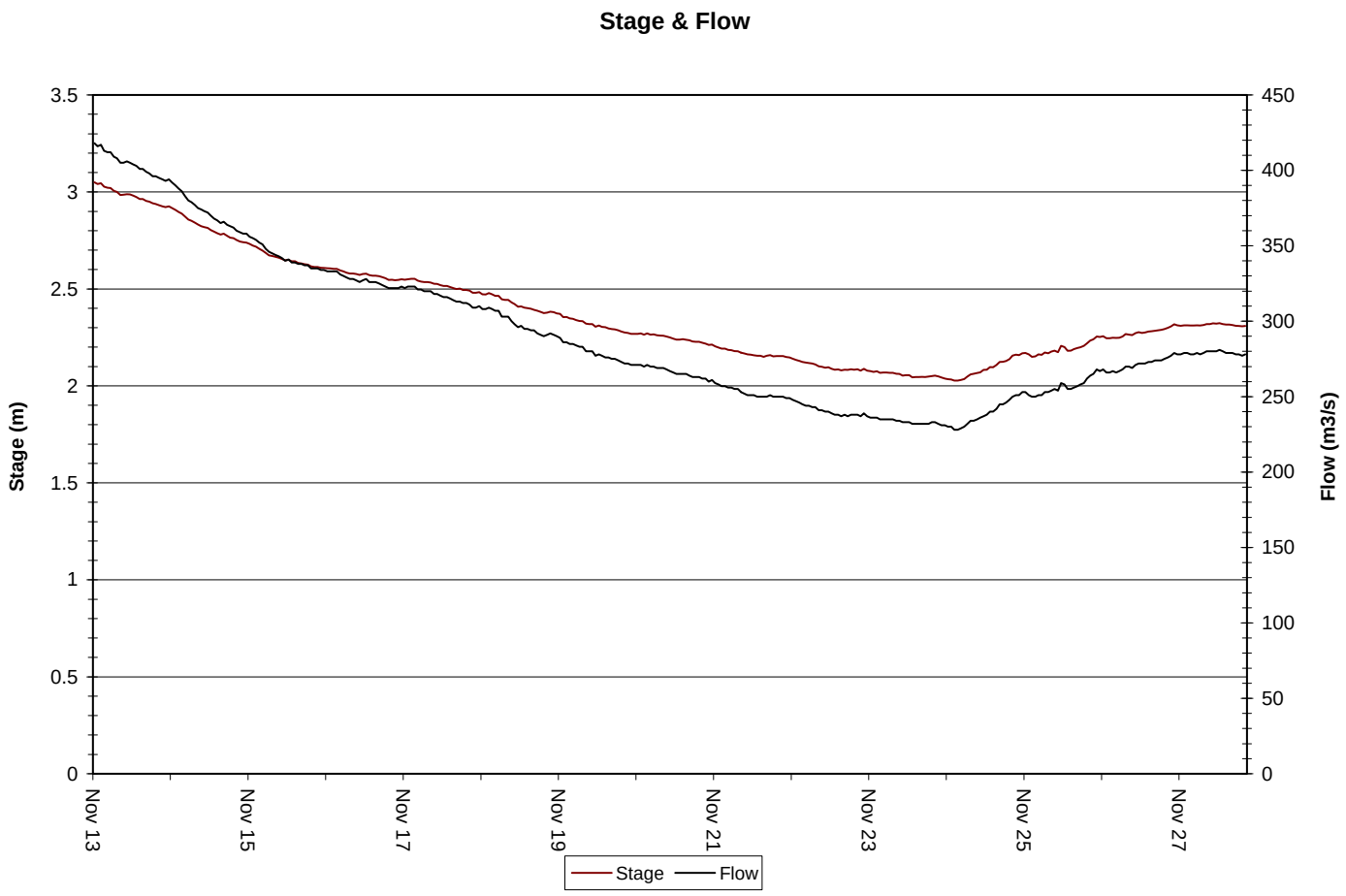

Figure 6

- The stage height (**Figure 6)** or water level ranged from a minimum of 2.03 m to a maximum of 3.05 m with an average of 2.38 m. The flow ranged from a low of 228.00 m^3/s to a high of 418.00 m^3/s with an average of 291.96 m^3/s.

Climate Data

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

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Daily Data Report for November 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
13†	19.0	3.5	11.3	6.7	0.0	2.4	0.0	2.4	0		
14†	8.5	5.0	6.8	11.2	0.0	0.0	0.0	0.0	0		
15†	4.5	2.0	3.3	14.7	0.0	0.0	0.0	0.0	0		
16†	4.0	1.0	2.5	15.5	0.0	0.0	0.0	0.0	0		
17†	2.5	1.0	1.8	16.2	0.0	0.0	0.0	0.0	0		
18†	2.0	-1.0	0.5	17.5	0.0	0.0	0.0	0.0	0		
19†	6.5	-2.0	2.3	15.7	0.0	0.6	0.0	0.6	0		
20†	6.0	3.5	4.8	13.2	0.0	0.0	0.0	0.0	0		
21†	2.0	-7.5	-2.8	20.8	0.0	0.0	0.0	0.0	0		
22†	7.5	-4.5	1.5	16.5	0.0	0.0	0.0	0.0	0		
23†	18.0	1.0	9.5	8.5	0.0	0.2	0.0	0.2	0		
24†	9.5	-1.5	4.0	14.0	0.0	14.4	0.0	14.4	0		
25†	10.5	5.5	8.0	10.0	0.0	0.0	21.0	21.0	0		
26†	2.5	-0.5	1.0	17.0	0.0	0.0	0.0	0.0	17		
27†	0.5	-3.0	-1.3	19.3	0.0	0.0	0.4	0.4	15		
28†	-0.5	-4.0	-2.3	20.3	0.0	0.0	0.0	0.0	15		