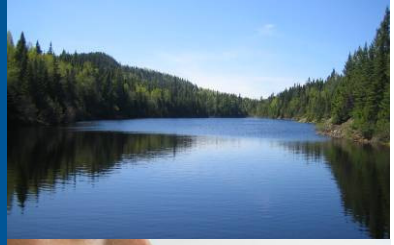
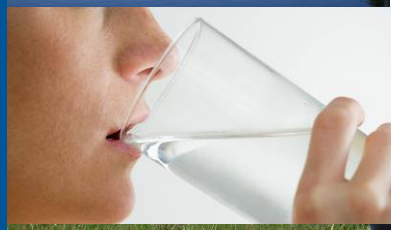






Real Time Water Quality Report
Humber River at Humber Village

Deployment Period 2012-05-04 to 2012-06-07

2012-06-15

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.

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Maintenance and Calibration of Instrumentation

- After being freshly calibrated the **DataSonde®** for Humber River at Humber Village was installed on May 4, 2012, and remained deployed continuously until June 7, 2012. This deployment period was a total of 33 days and the instrument maintained good operation for the duration 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**
2012-02-15 Deployment	Temp (°C)	Good
	pH (units)	Good
	Sp. Conductivity (uS/cm)	Good
	Dissolved Oxygen (mg/L)	Excellent
	Turbidity (NTU)	Excellent
2012-05-03 Removal	Temp (°C)	Excellent
	pH (units)	Excellent
	Sp. Conductivity (uS/cm)	Good
	Dissolved Oxygen (%)	Marginal
	Turbidity (NTU)	Excellent

Table 2

Data Interpretation

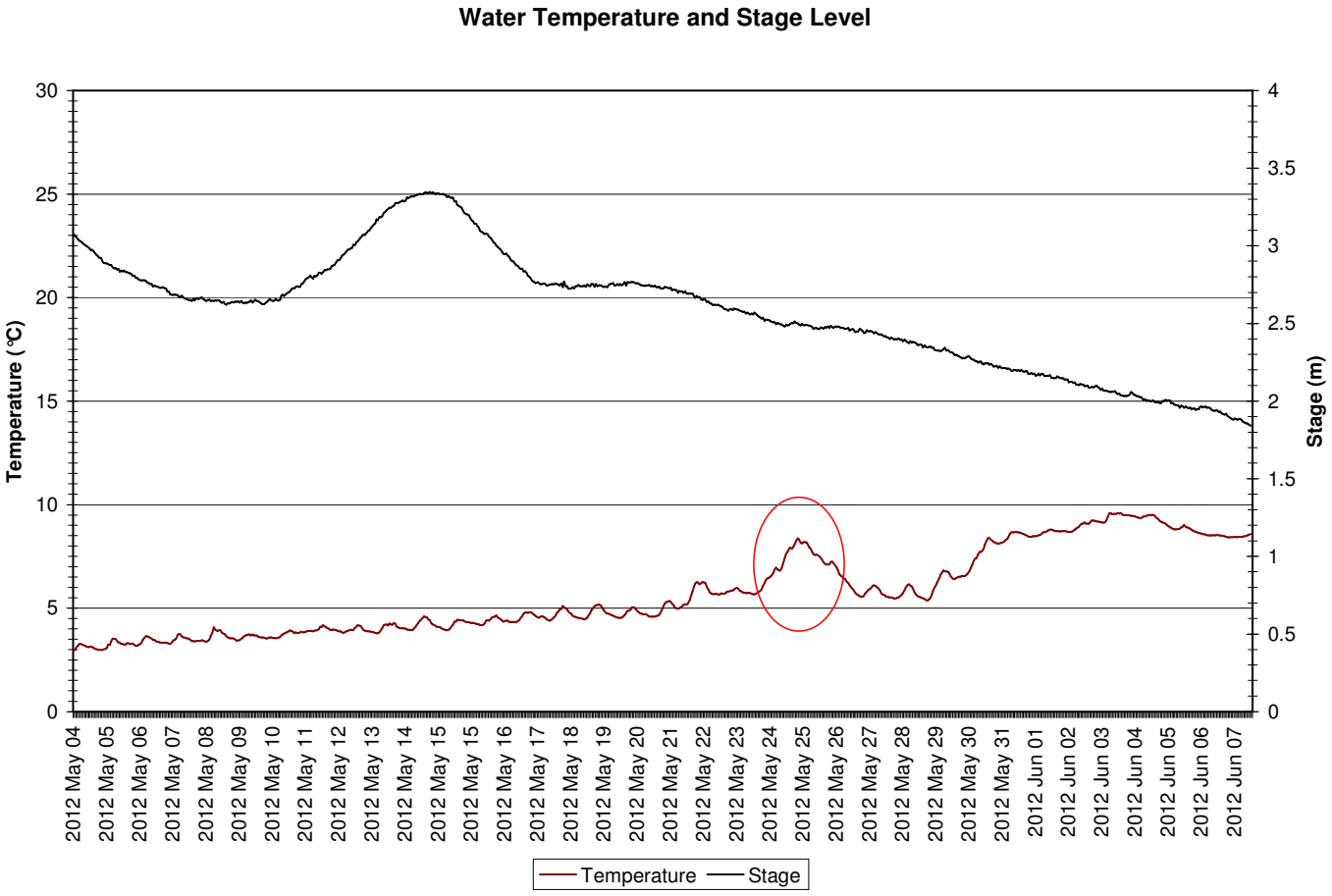

Figure 1

- The water temperature (**Figure 1**) ranged from a minimum of 2.95 ˚C to a maximum of 9.60 ˚C, with an increasing trend throughout the deployment period. The average temperature for the deployment period was 5.73˚C.

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

- It can be noted that around May 24 to 26 (see inside red oval) there is a noticeable spike in temperature. A review of the climate data in Appendix A shows that this temperature spike is most likely related to several consecutive days of very warm weather.

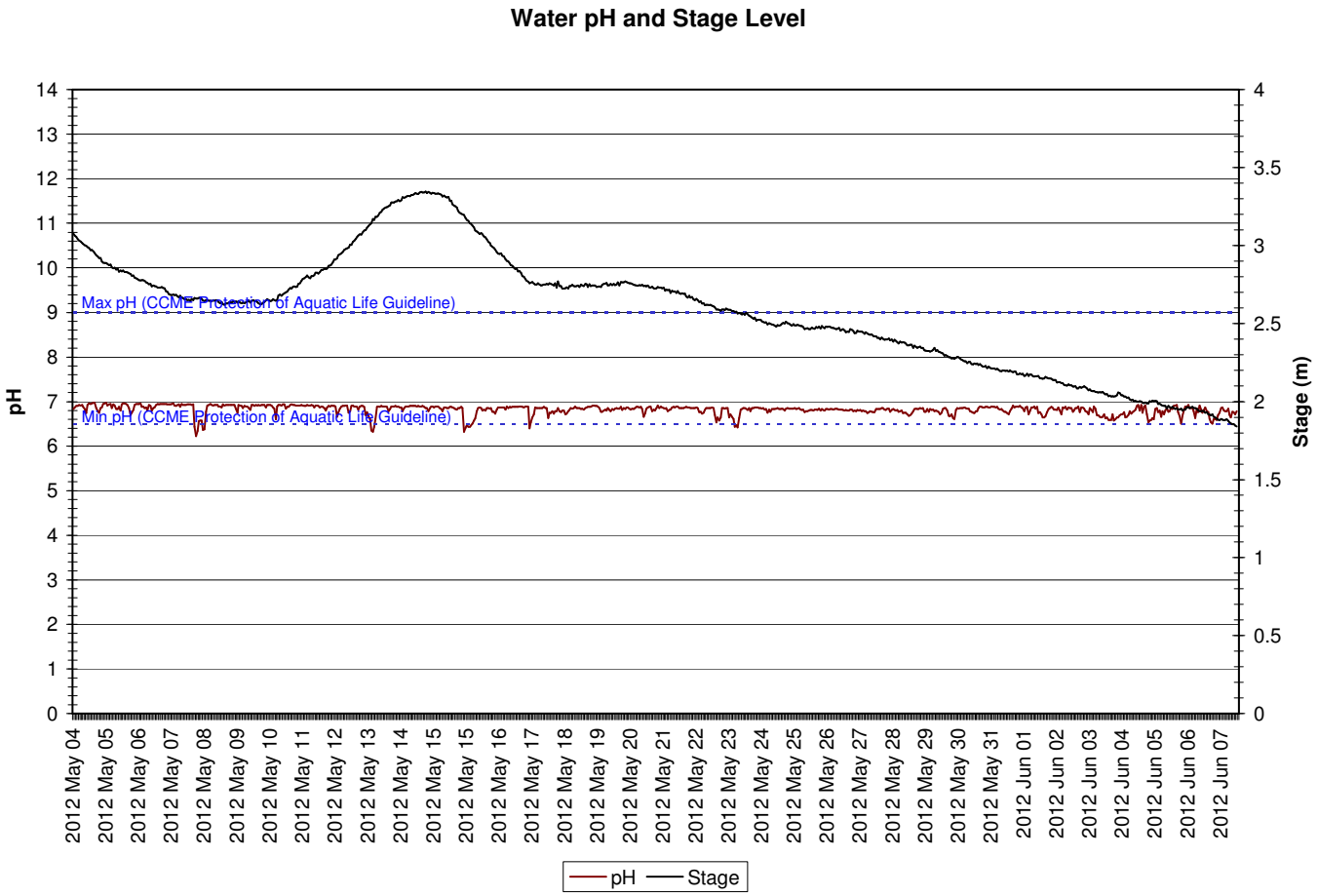

Figure 2

- The pH (**Figure 2**) ranged from a low of 6.22 to a high of 6.97 and remained relatively stable throughout the deployment period.

- Most pH readings were within the range of 6.5 to 9.0 as recommended by CCME for the Protection of Aquatic Life. While there were some readings below the recommended lower pH 6.5 guideline the average pH was 6.82.

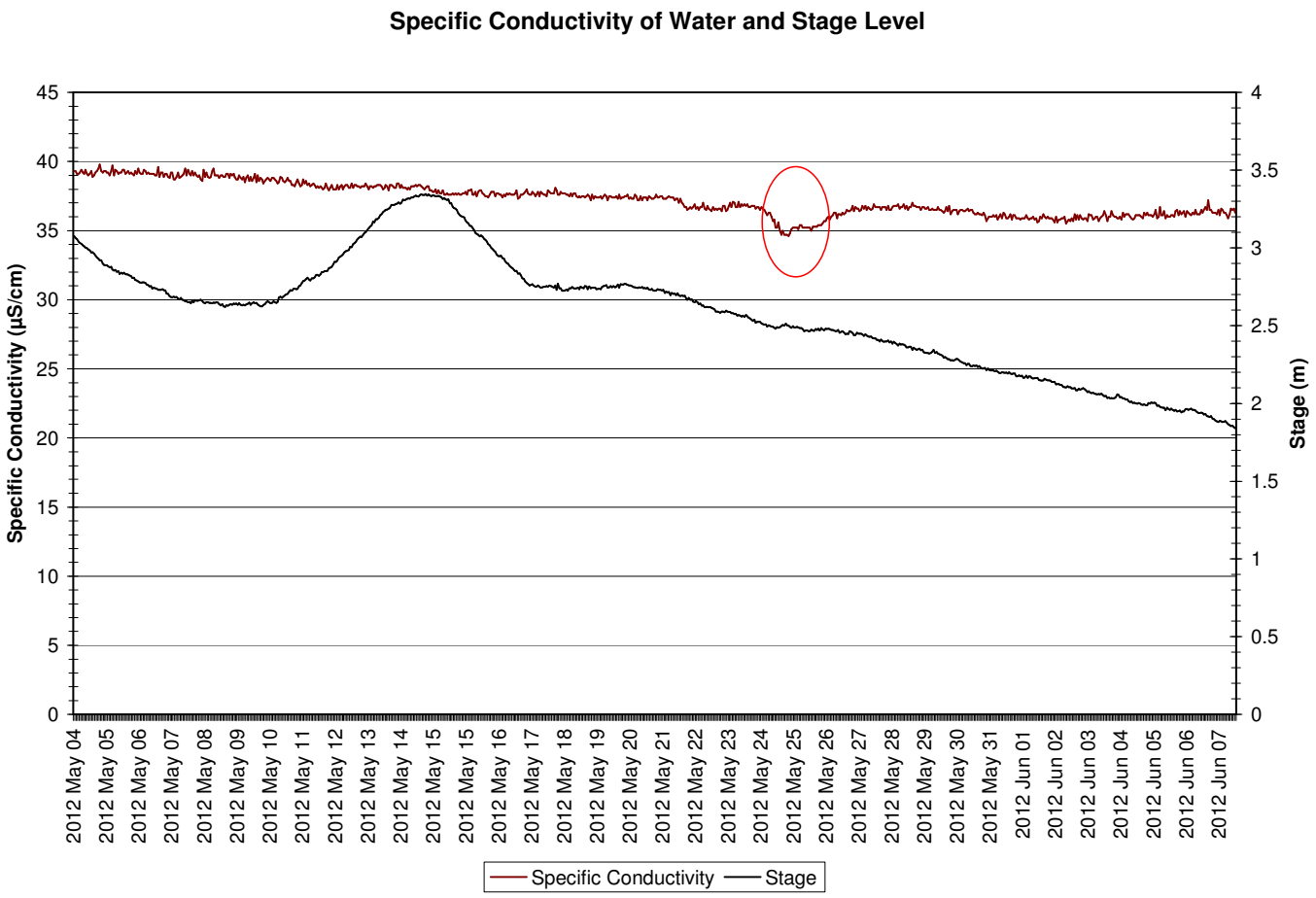

Figure 3

- The specific conductivity **(Figure 3)** ranged from a minimum of 34.6 µS/cm to a maximum of 39.8 µS/cm and showed a gentle declining trend over the deployment period. The average specific conductivity for the entire deployment period was 37.3 µS/cm.

- Between May 24 and May 26 specific conductance takes a noticeable drop (see inside the red oval). It appears that this drop is related to a spike in temperature for the same period.

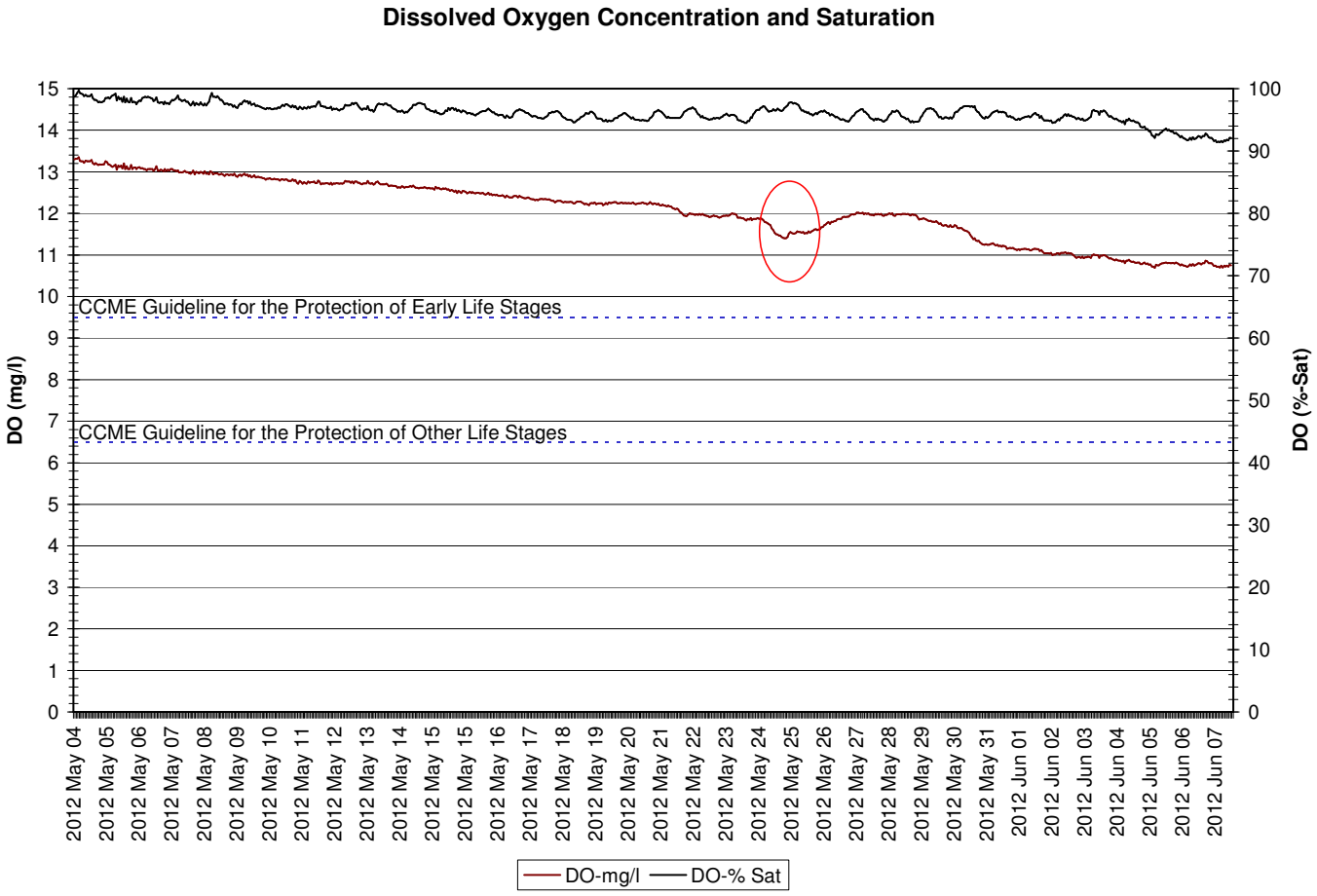

Figure 4

- The dissolved oxygen (**Figure 4**) values ranged from a minimum of 10.69 mg/L to a maximum of 13.35 mg/L over the deployment period with an average of 12.07 mg/L. The percent saturation for dissolved oxygen ranged from a low of 91.4% to a high of 99.7% with an average of 96.1%.

- During the deployment period the dissolved oxygen readings show a gentle declining trend which is related to the increasing temperature trend. There is also a distinct diurnal trend which is most notable with the percent saturation readings and is related to the diurnal temperature trend.

- Between May 24 and May 26 dissolved oxygen takes a noticeable drop (see inside the red oval). This drop is related to a spike in temperature for the same period. While this dip is noticeable in the actual dissolved oxygen readings it is not noticeable in the percent saturation readings as they are temperature compensated.

- 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* for early life stages (above 9.5 mg/L).

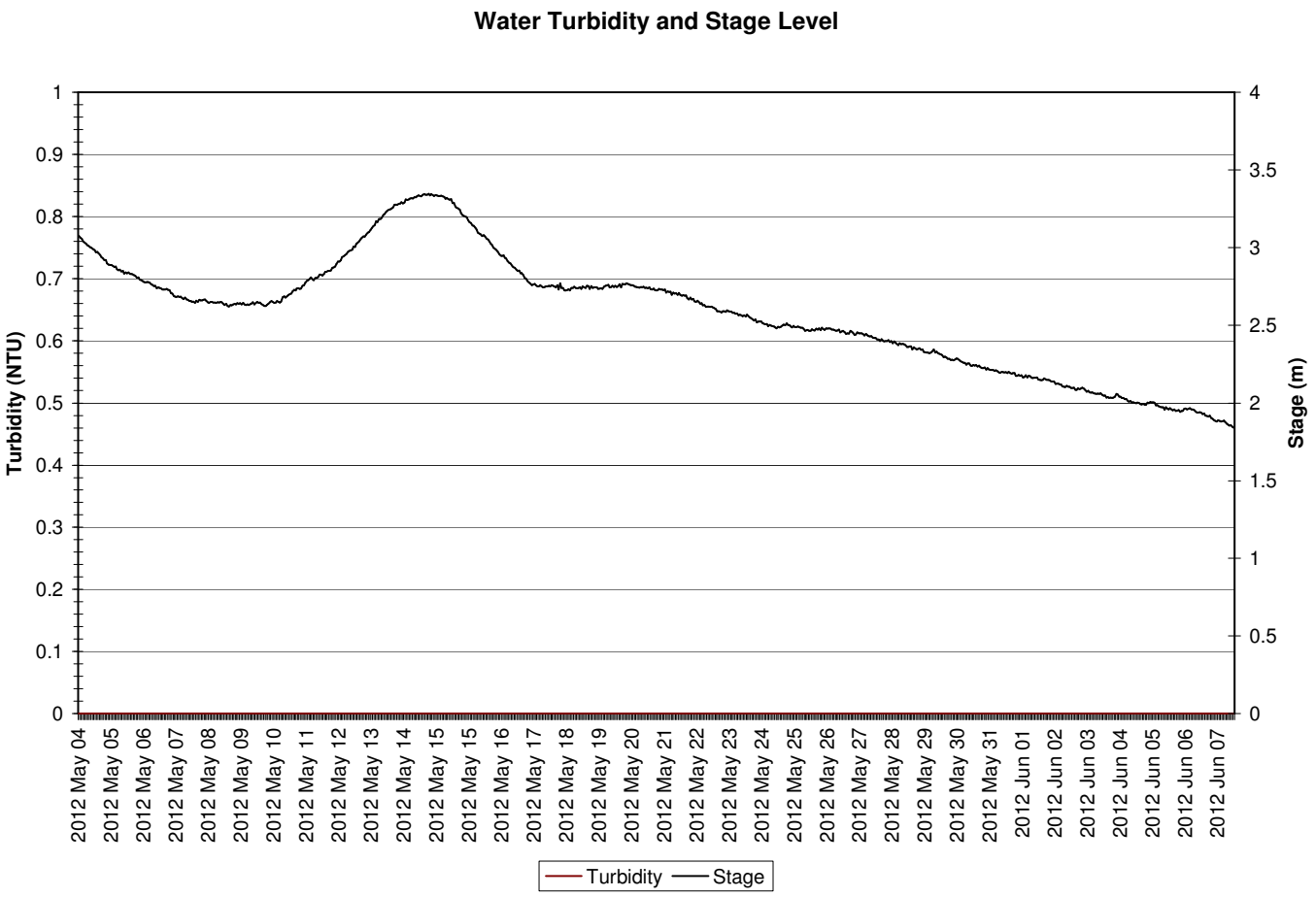

Figure 5

- All turbidity values were at 0.0 NTU for the duration of the deployment.

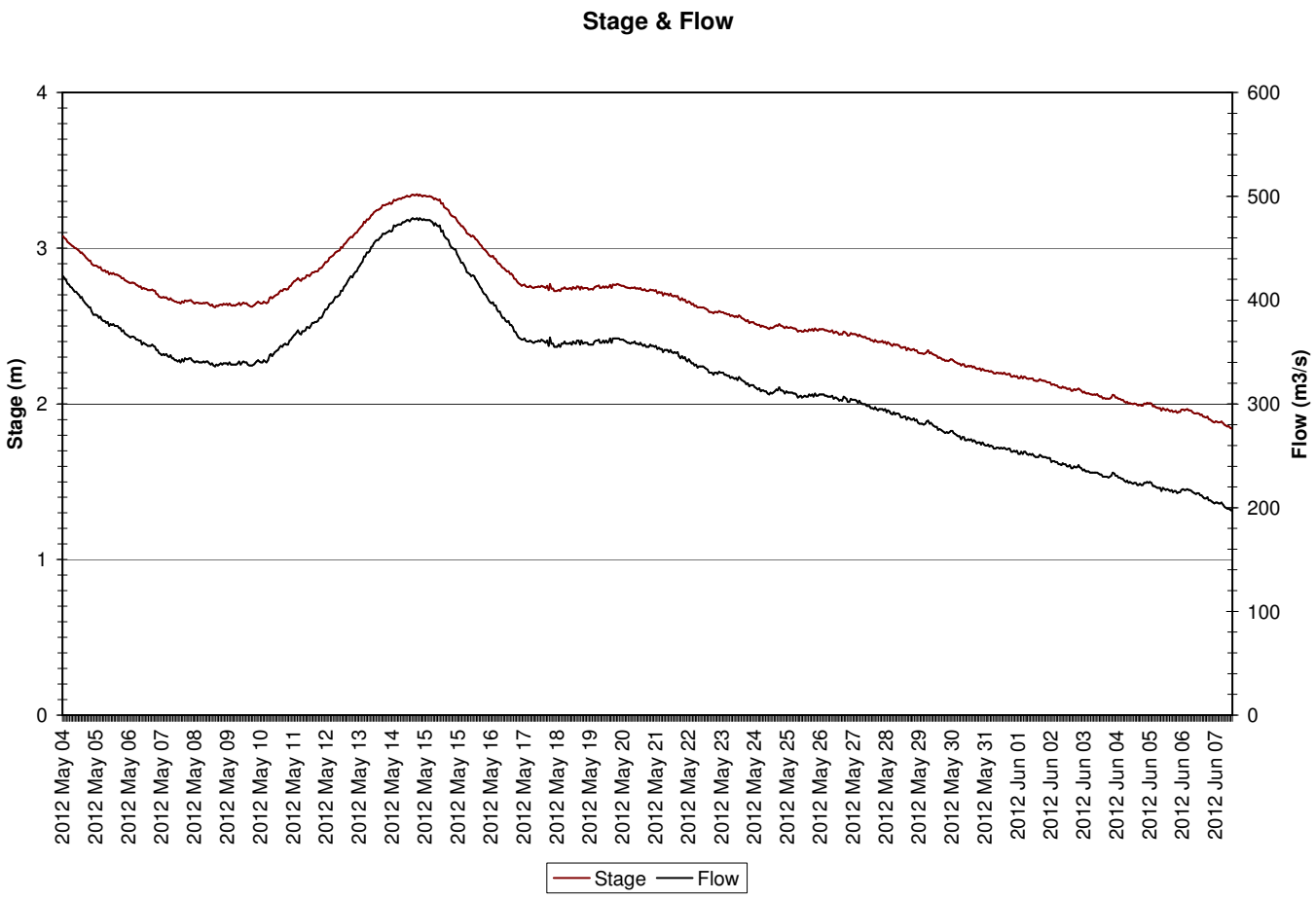

Figure 6

- The stage height (**Figure 6**) or water level ranged from a minimum of 1.84 m to a maximum of 3.35 m with the corresponding flow ranging from 197 m^3/s to 479 m^3/s.

- There is a peak in stage height and flow around May 14th to 15th which is related to normal spring runoff with significantly increased flow due to snowmelt.

Climate Data

- Climate data for most of the deployment period from the nearest station (Corner Brook) is included in Appendix A. It should be noted that the climate data for the last 9 days of the deployment period were not available at the time this report was prepared.

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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
04†	12.0	3.0	7.5	10.5	0.0	0.0	0.0	0.0	0		
05†	17.5	3.0	10.3	7.7	0.0	0.0	0.0	0.0	0		
06†	15.5	4.5	10.0	8.0	0.0	0.0	0.0	0.0	0		
07†	13.5	5.0	9.3	8.7	0.0	0.0	0.0	0.0	0		
08†	14.0	5.0	9.5	8.5	0.0	0.0	0.0	0.0	0		
09†	12.5	5.5	9.0	9.0	0.0	3.4	0.0	3.4	0		
10†	17.5	7.0	12.3	5.7	0.0	2.0	0.0	2.0	0		
11†	20.5	14.0	17.3	0.7	0.0	0.2	0.0	0.2	0		
12†	17.5	10.5	14.0	4.0	0.0	0.0	0.0	0.0	0		
13†	14.0	2.5	8.3	9.7	0.0	0.0	0.0	0.0	0		
14†	17.5	4.5	11.0	7.0	0.0	0.0	0.0	0.0	0		
15†	20.5	7.5	14.0	4.0	0.0	0.3	0.0	0.3	0		
16†	22.0	14.0	18.0	0.0	0.0	3.0	0.0	3.0	0		
17†	19.0	13.5	16.3	1.7	0.0	3.8	0.0	3.8	0		
18†	11.0	6.5	8.8	9.2	0.0	0.0	0.0	0.0	0		
19†	13.0	5.0	9.0	9.0	0.0	0.0	0.0	0.0	0		
20†	9.5	3.5	6.5	11.5	0.0	0.0	0.0	0.0	0		
21†	22.5	1.0	11.8	6.2	0.0	0.0	0.0	0.0	0		
22†	26.5	14.0	20.3	0.0	2.3	1.4	0.0	1.4	0		
23†	17.0	9.0	13.0	5.0	0.0	11.8	0.0	11.8	0		
24†	17.0	4.5	10.8	7.2	0.0	0.0	0.0	0.0	0		
25†	23.0	9.0	16.0	2.0	0.0	0.0	0.0	0.0	0		
26†	20.0	10.5	15.3	2.7	0.0	0.4	0.0	0.4	0		
27†	13.0	5.5	9.3	8.7	0.0	0.2	0.0	0.2	0		
28†	11.0	2.0	6.5	11.5	0.0	0.0	0.0	0.0	0		
29†	9.5	0.5	5.0	13.0	0.0	0.0	0.0	0.0	0		