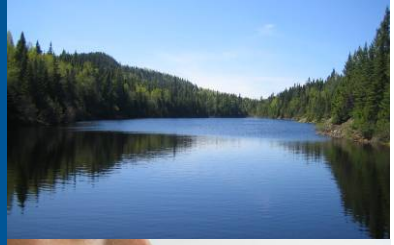
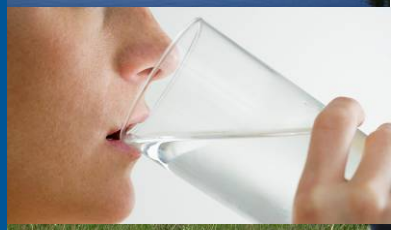



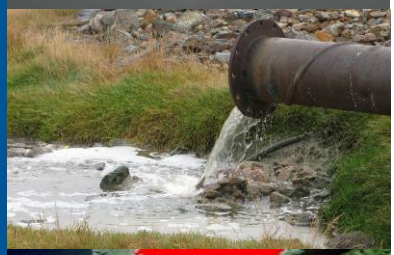


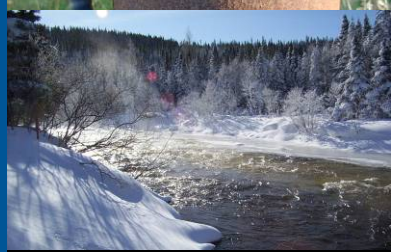

Real Time Water Quality Report Southwest Brook below Southwest Pond

Deployment Period 2012-03-14 to 2012-07-11

2012-08-07

Newfoundland Labrador

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

General

- This station is operated cooperatively with the Miawpukek First Nation (Conne River) as a Pilot Project for Drinking Water Source Monitoring. This is the only known application of Real Time Water Quality Monitoring for a drinking water source for any First Nations community in Canada.
- The Water Resources Management Division (WRMD) staff monitors the real-time web page on a daily basis. Any unusual observations are investigated, with site visits being carried out as warranted.
- Operators at Conne River are informed of any significant water quality events or instrumentation problems by WRMD.
- Site visits for QA/QC purposes are conducted by WRMD approximately four times per year.
- Monthly calibration and maintenance is undertaken by Cyrus Lambert at the Conne River Water Treatment Plant.

Maintenance and Calibration of Instrumentation

- After being cleaned and freshly calibrated a spare **DataSonde®** (s/n 46323) was installed on March 14 24, 2012, and remained deployed continuously until July 11, 2012, a 117 day period. The regular **DataSonde®** (s/n 44422) was due for its regular semi-annual servicing and maintenance and was sent out to the St. John's lab. Unfortunately, the spare instrument had issues with Dissolved Oxygen and Turbidity and there was no data for these parameters for the entire period. No other instrument was available for replacement. During the deployment and removal for this period, the regular QA/QC **MiniSonde®** (s/n 44998) was also out for service, thus the **MiniSonde®** from Central Office (s/n 47591) was used.

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)	<=+/-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 and removal, a QA/QC **MiniSonde®** is temporarily deployed along side the Field **DataSonde®**. Values for each recorded parameter are compared between the two instruments. Based on the difference between parameters recorded by the Field **DataSonde®** and QA/QC **MiniSonde®** a qualitative statement (Ranking) is usually made on the data.
- The ranking at the beginning and end of the deployment period are shown in **Table 2**.

- As the Dissolved Oxygen sensor failed during this deployment, this parameter cannot be ranked. No Dissolved Oxygen data are available for the deployment period.
- The poor value for Turbidity at the end of the deployment period is the result of significant fouling of the sensor over the long deployment period. The sensor worked OK, but failed to transmit reliable data (turbidity = 3000 error) over the deployment period. No Turbidity data are available for the deployment period.
- With the exception of water quantity data (Stage and Flow), all data used in the preparation of the graphs and subsequent discussion below adhere to this stringent QA/QC protocol. Water Survey of Canada is responsible for QA/QC of water quantity data. Corrected data can be obtained upon request.

Southwest Brook below Southwest Pond (NF02ZE0033)		
Date (yyyy-mm-dd)	**Parameter**	**Ranking**
2012-03-14 Deployment	Temp (^{o}C)	Excellent
	pH (units)	Good
	Sp. Conductivity (uS/cm)	Excellent
	Dissolved Oxygen (mg/L)	n/a
	Turbidity (NTU)	Excellent
2012-07-11 Removal	Temp (^{o}C)	Excellent
	pH (units)	Excellent
	Sp. Conductivity (uS/cm)	Good
	Dissolved Oxygen (mg/L)	n/a
	Turbidity (NTU)	Poor

Table 2

Data Interpretation

- The water temperature (**Figure 1**) ranged from a minimum of 0.47 ˚C to a maximum of 27.07 ˚C, with temperature rising as the summer progressed over the deployment period.

- There appears to be little correlation with stage, however, there is less diurnal variation when stage is increased.

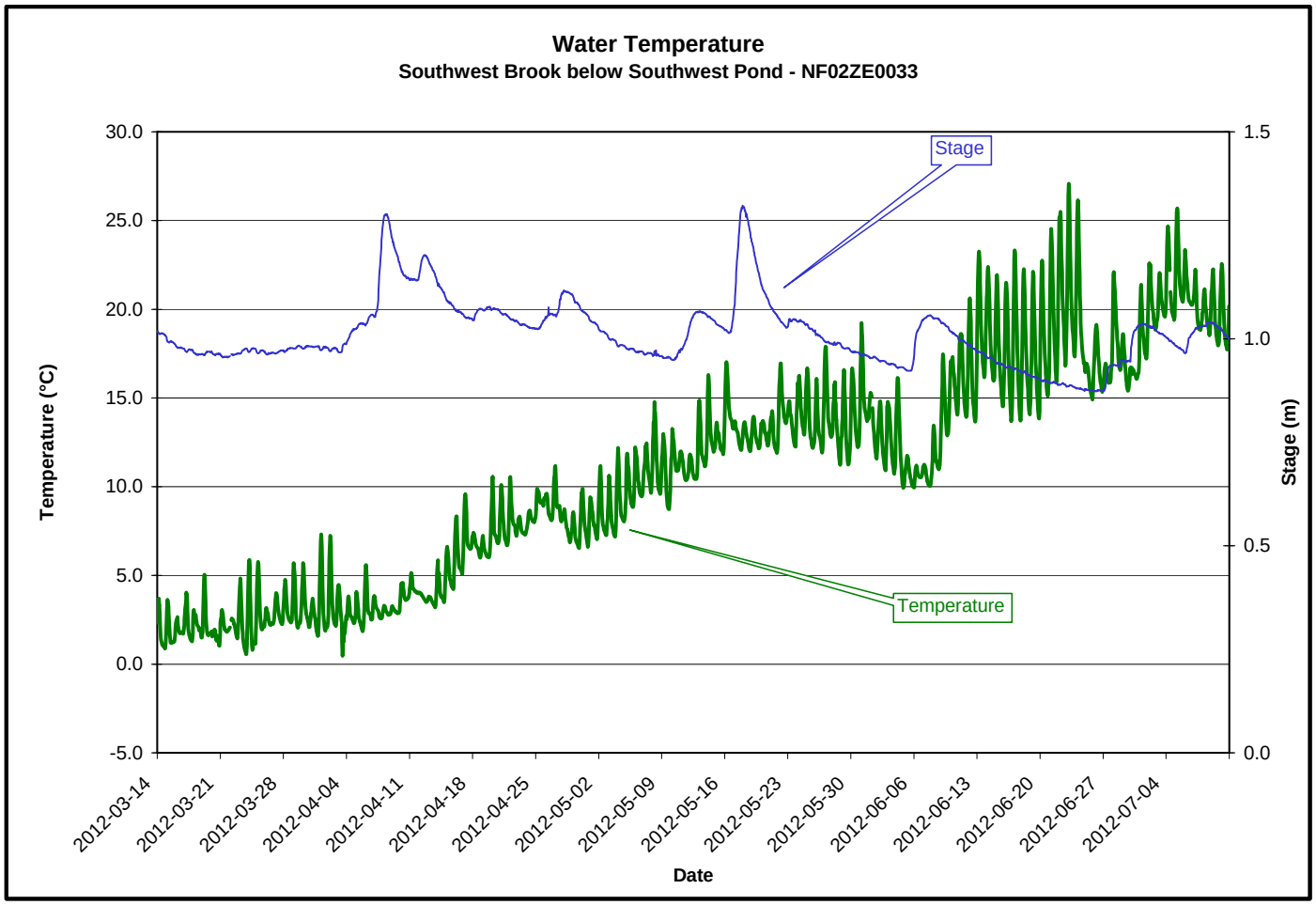

Figure 1

- Throughout the deployment period pH values (**Figure 2**) ranged from a minimum of 4.41 to a maximum of 5.49 with all the values falling well below the recommended range (6.5 – 9.0) for the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life*.

- The background pH of this stream is normally lower than the lower limit of the recommended range.
- During this deployment period, the inverse correlation with stage is obvious, with pH dropping slightly at the onset of each increase in stage.

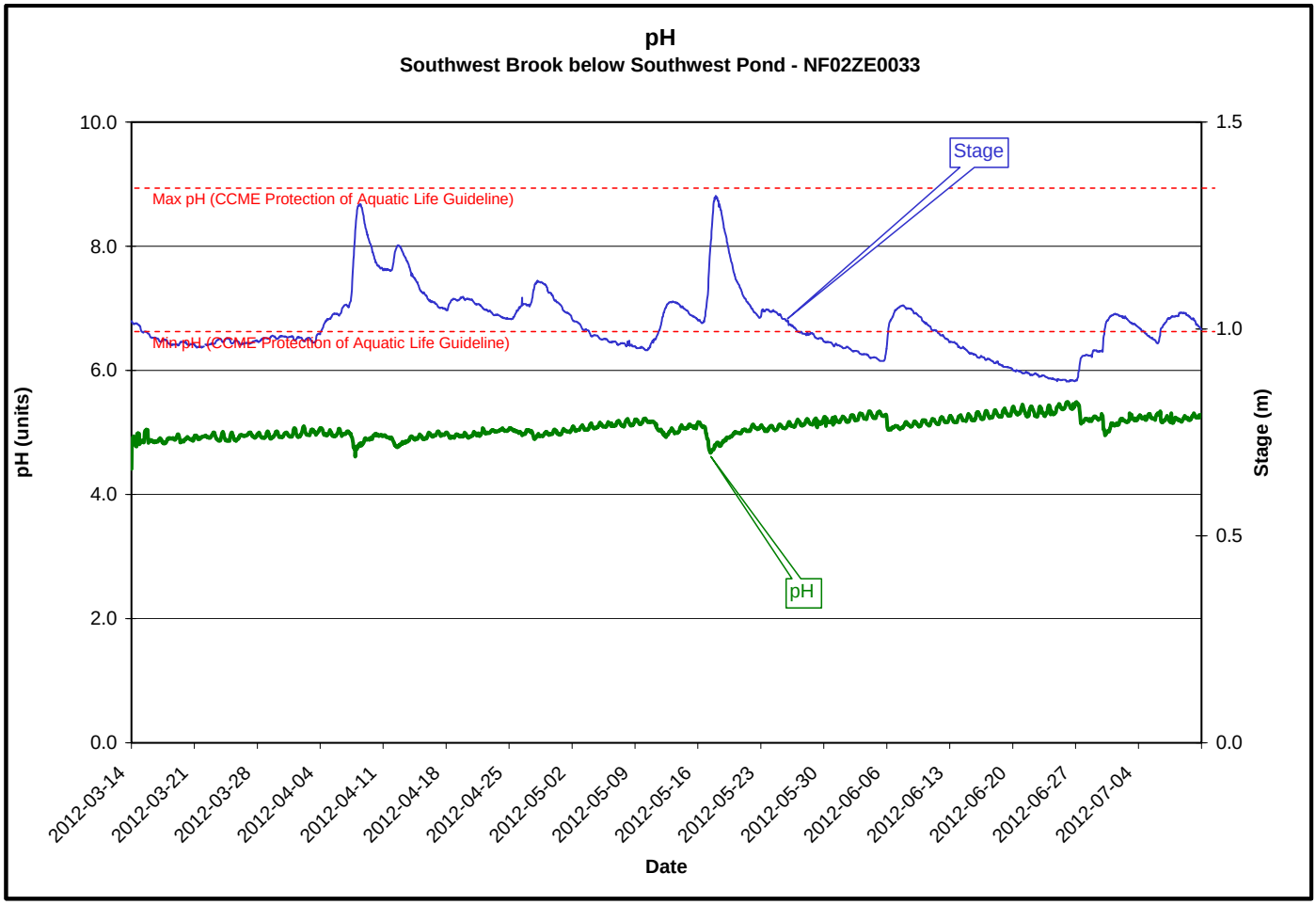

Figure 2

- The specific conductivity **(Figure 3)** ranged from a minimum of 17.8 µS/cm to a maximum of 23.1 µS/cm over the deployment period.

- During this Deployment Period, there is little change in Specific Conductivity during changes in the stage.

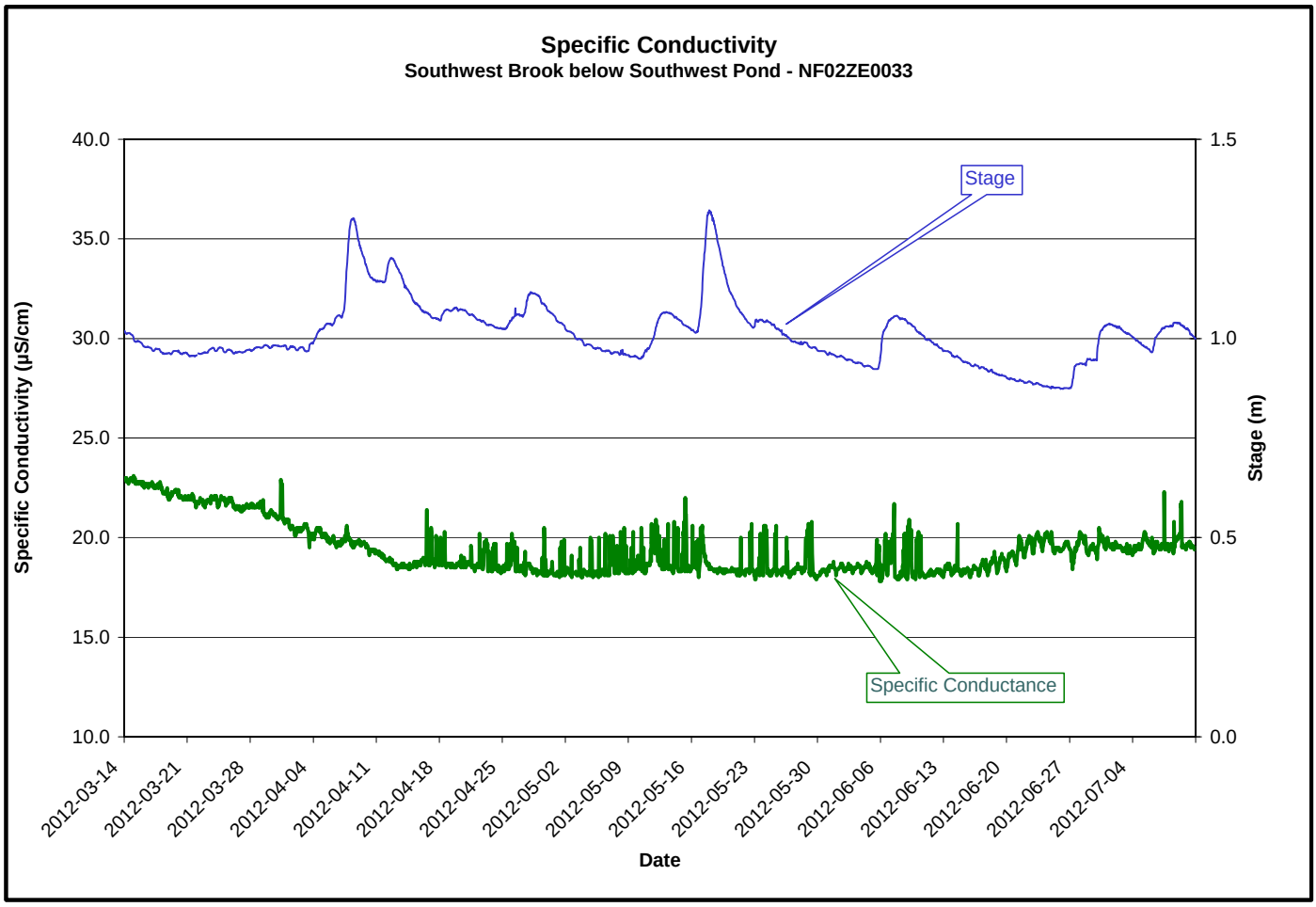

Figure 3

- The stage or water level ranged from a minimum of 0.87 m to a maximum of 1.32 m. The flow or discharge ranged from a minimum of 0.03 m^3/s to a maximum of 2.82 m^3/s (**Figure 4)**.
- The increase in stage and flow is resultant from precipitation and snowmelt events.
- Stream stage and flow are within normal ranges.
- There are brief periods during low stage when stream flow values could not be calculated due to the fact that the stage/flow curve has not yet been established for these low periods.

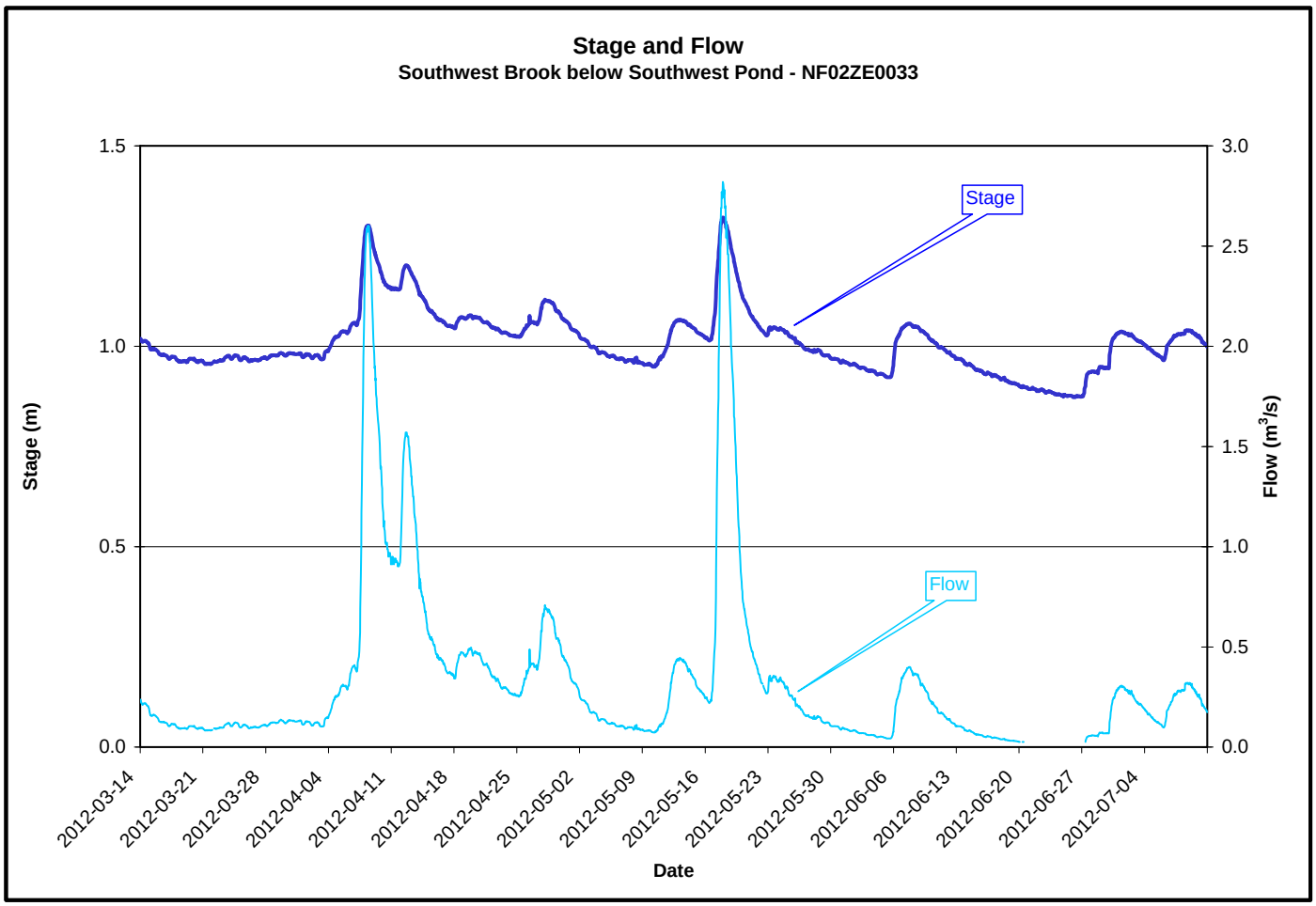

Figure 4

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