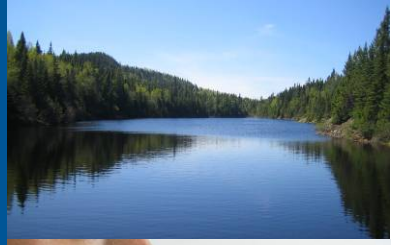
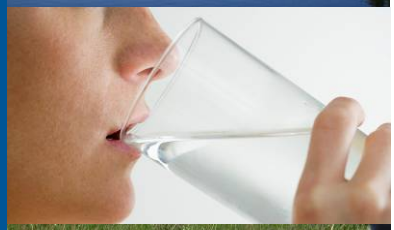



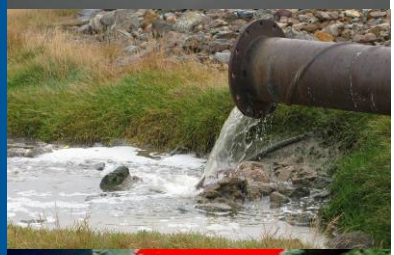


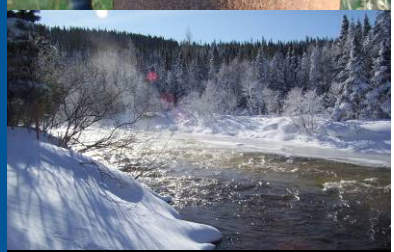

Real Time Water Quality Report Southwest Brook below Southwest Pond

Deployment Period 2012-07-11 to 2012-08-14

2012-08-23

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 return from the vendor for factory servicing and replacement of the pH sensor, the regular **DataSonde®** (s/n 44422) was cleaned and freshly calibrated and installed on July 11, 2012 and remained deployed continuously until August 14, 2012, a 33 day period.
- After being return from the vendor for factory servicing and replacement of the pH sensor, the regular QA/QC **MiniSonde®** (s/n 44998) was cleaned and freshly calibrated and used during the deployment and removal for QA/QC measurements.

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**.
- 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**
2012-07-11 Deployment	Temp (^{o}C)	Excellent
	pH (units)	Excellent
	Sp. Conductivity (uS/cm)	Excellent
	Dissolved Oxygen (mg/L)	Excellent
	Turbidity (NTU)	Good
2012-08-14 Removal	Temp (^{o}C)	Excellent
	pH (units)	Excellent
	Sp. Conductivity (uS/cm)	Excellent
	Dissolved Oxygen (mg/L)	Excellent
	Turbidity (NTU)	Excellent

Table 2

Data Interpretation

- The water temperature (**Figure 1**) ranged from a minimum of 16.41 ˚C to a maximum of 26.69 ˚C, with temperature rising slightly as the summer progressed over the deployment period.
- There appears to be little correlation with stage.

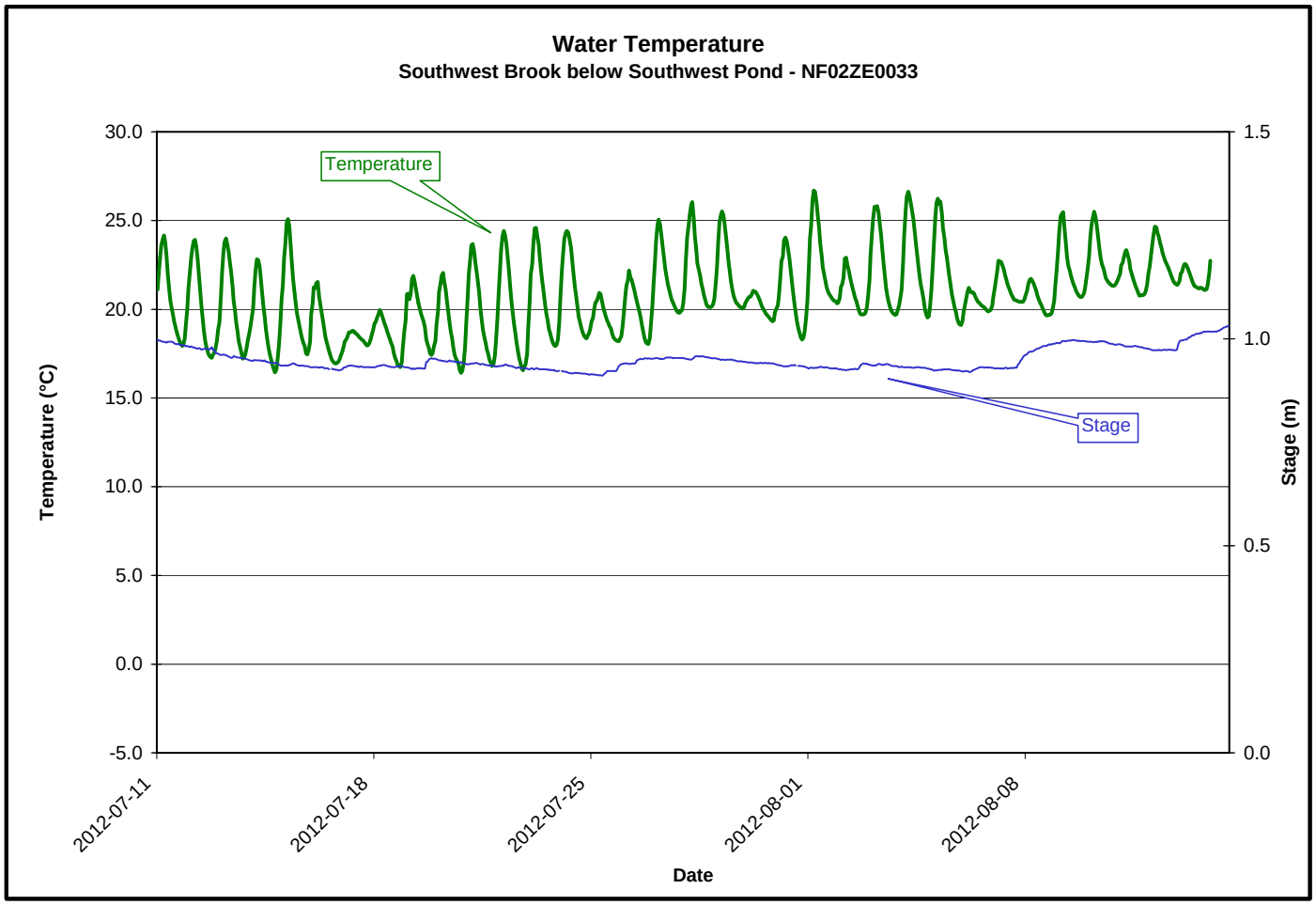

Figure 1

- Throughout the deployment period pH values (**Figure 2**) ranged from a minimum of 5.44 to a maximum of 5.74 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*.
- There was very little variation in pH over this deployment period.
- The background pH of this stream is normally lower than the lower limit of the recommended range.

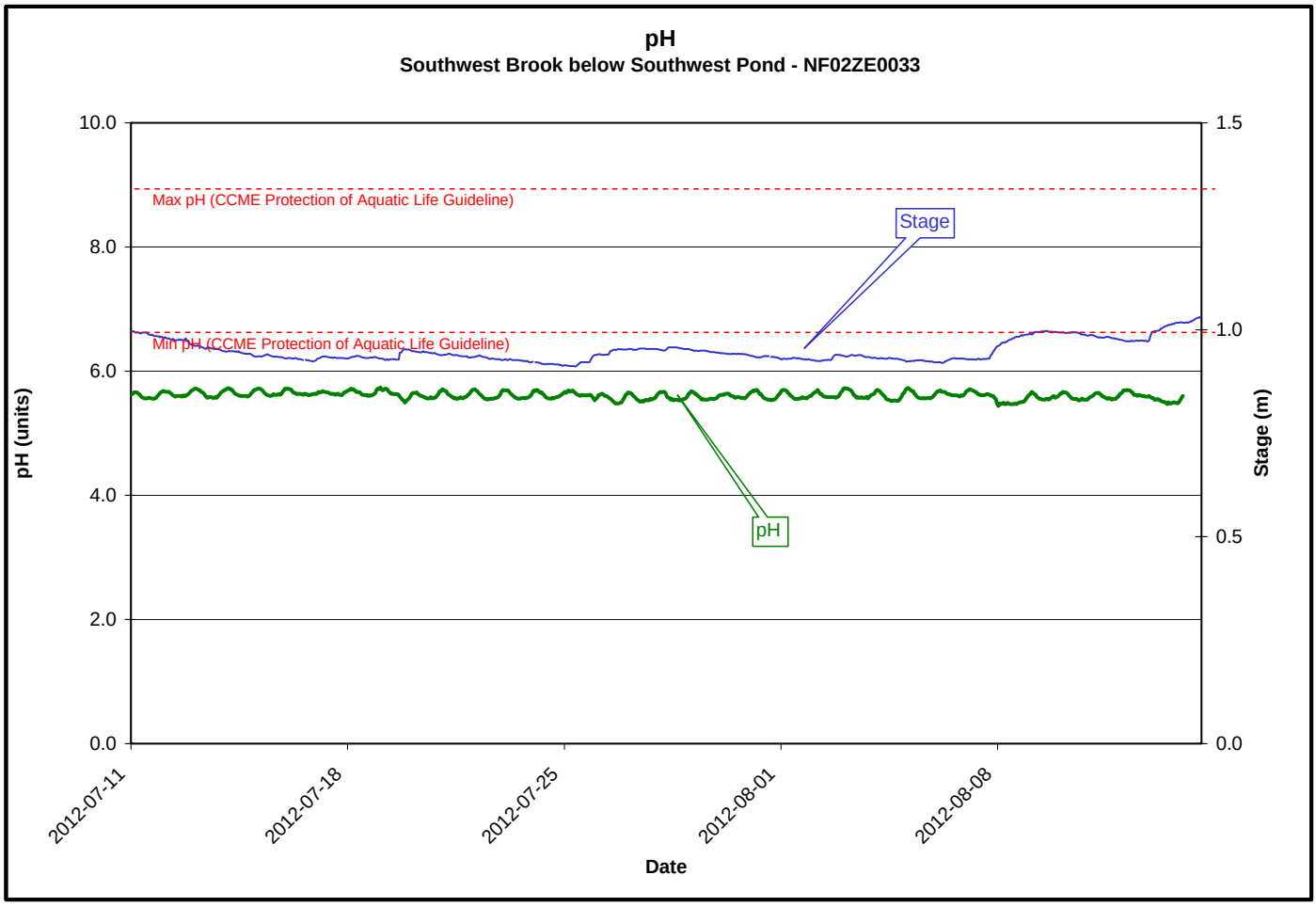

Figure 2

- The specific conductivity **(Figure 3)** ranged from a minimum of 17.8 µS/cm to a maximum of 21.2 µS/cm over the deployment period.

- During this deployment period, there was a slight increase in Specific Conductivity, with no relationship with stage being obvious.

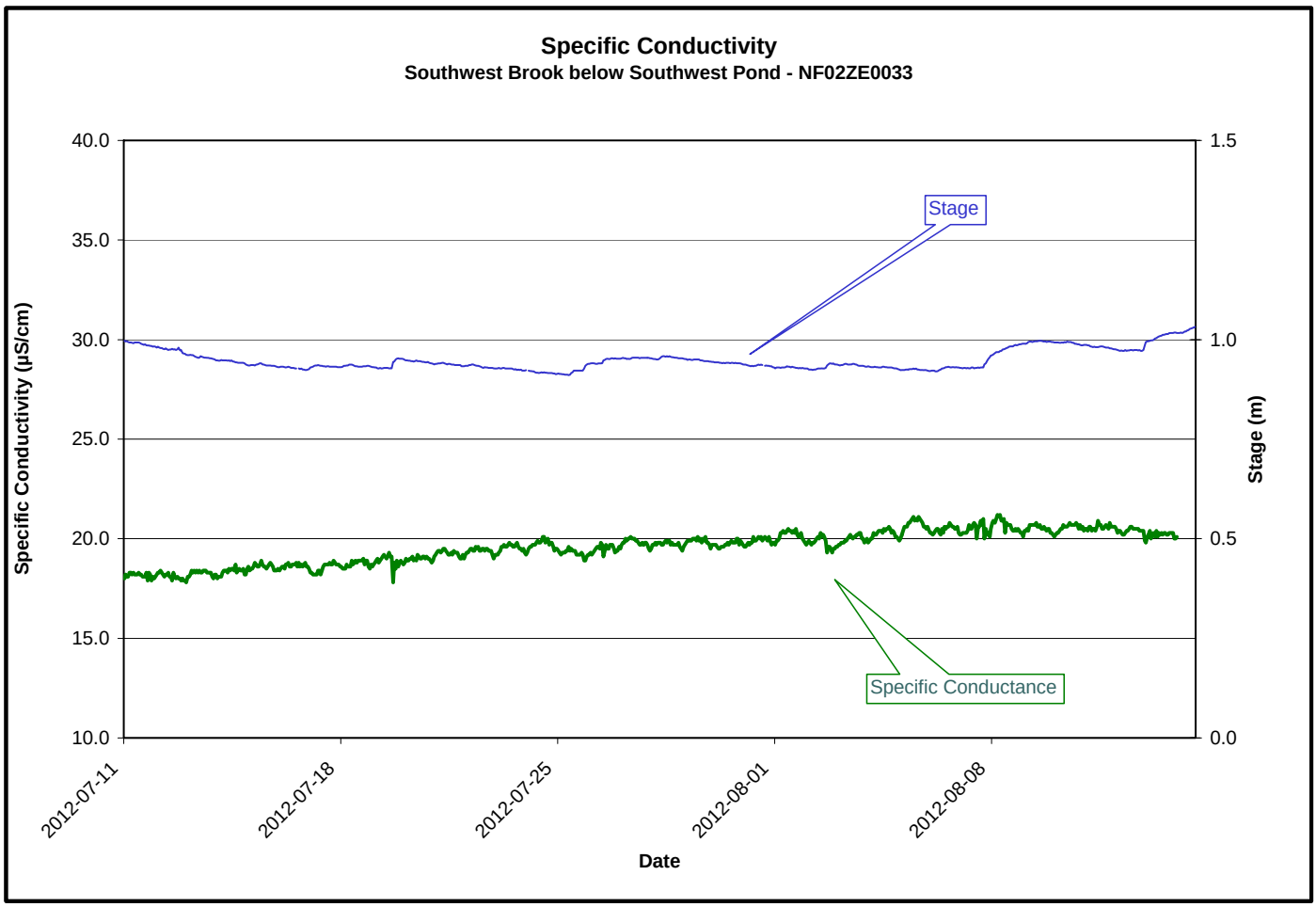

Figure 3

- The dissolved oxygen (**Figure 4**) values ranged from a minimum of 7.84 mg/L to a maximum of 9.39 mg/L over the deployment period; with the percent saturation ranging between 89.7 and 104.6.
- Dissolved oxygen (mg/L) is generally inversely proportional to water temperature.
- Throughout the deployment period dissolved oxygen values consistently fell above the lower limit 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).
- Based upon the fact that Dissolved Oxygen % Saturation had minimal change over the deployment period, we can be confident that the Dissolved Oxygen mg/L values are accurate.

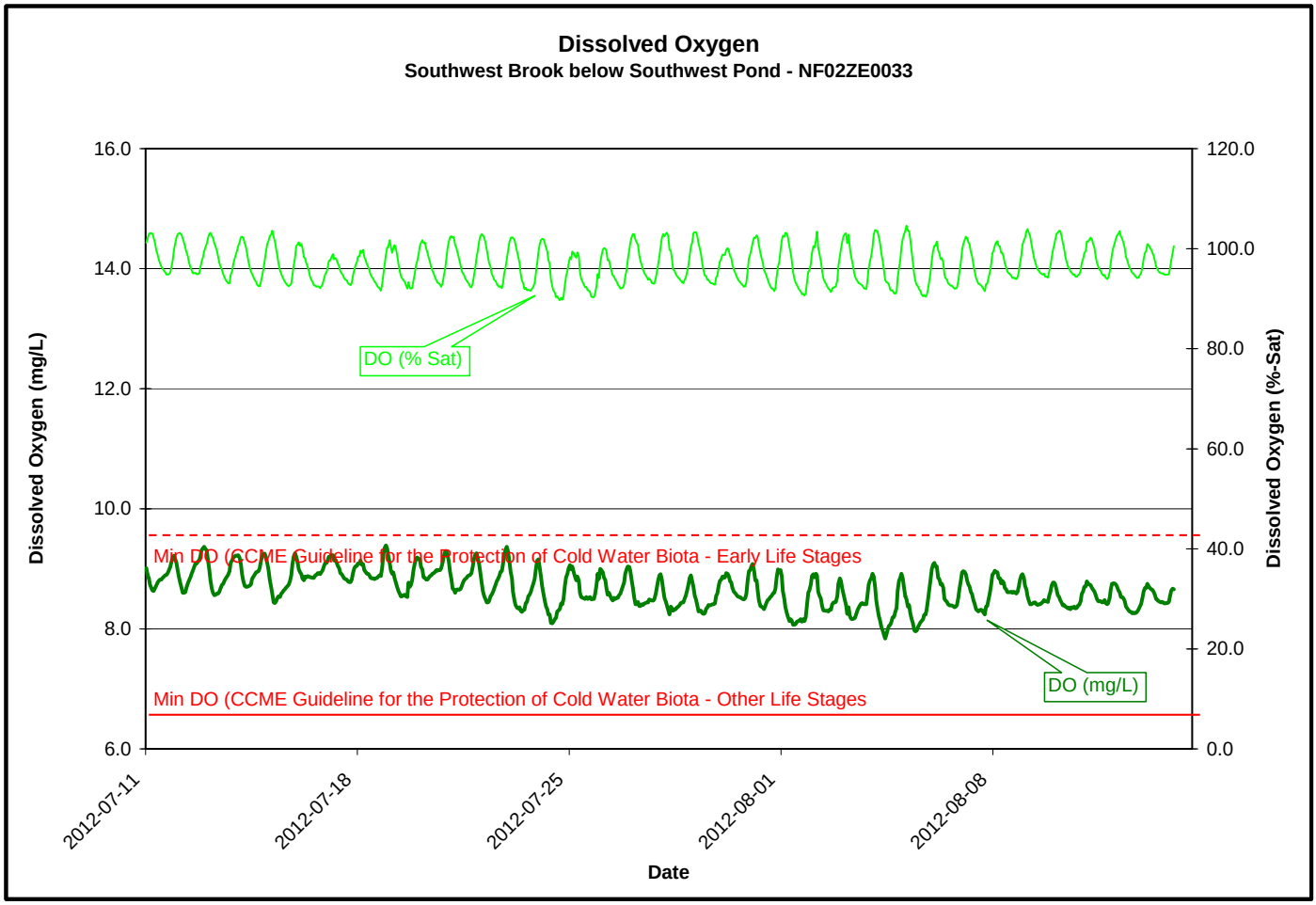

Figure 4

- The turbidity values **(Figure 5)** ranged from a minimum of 0.0 NTU to a maximum of 0.8 NTU.
- Turbidity was minimal during this deployment period, with only two minor events recorded.

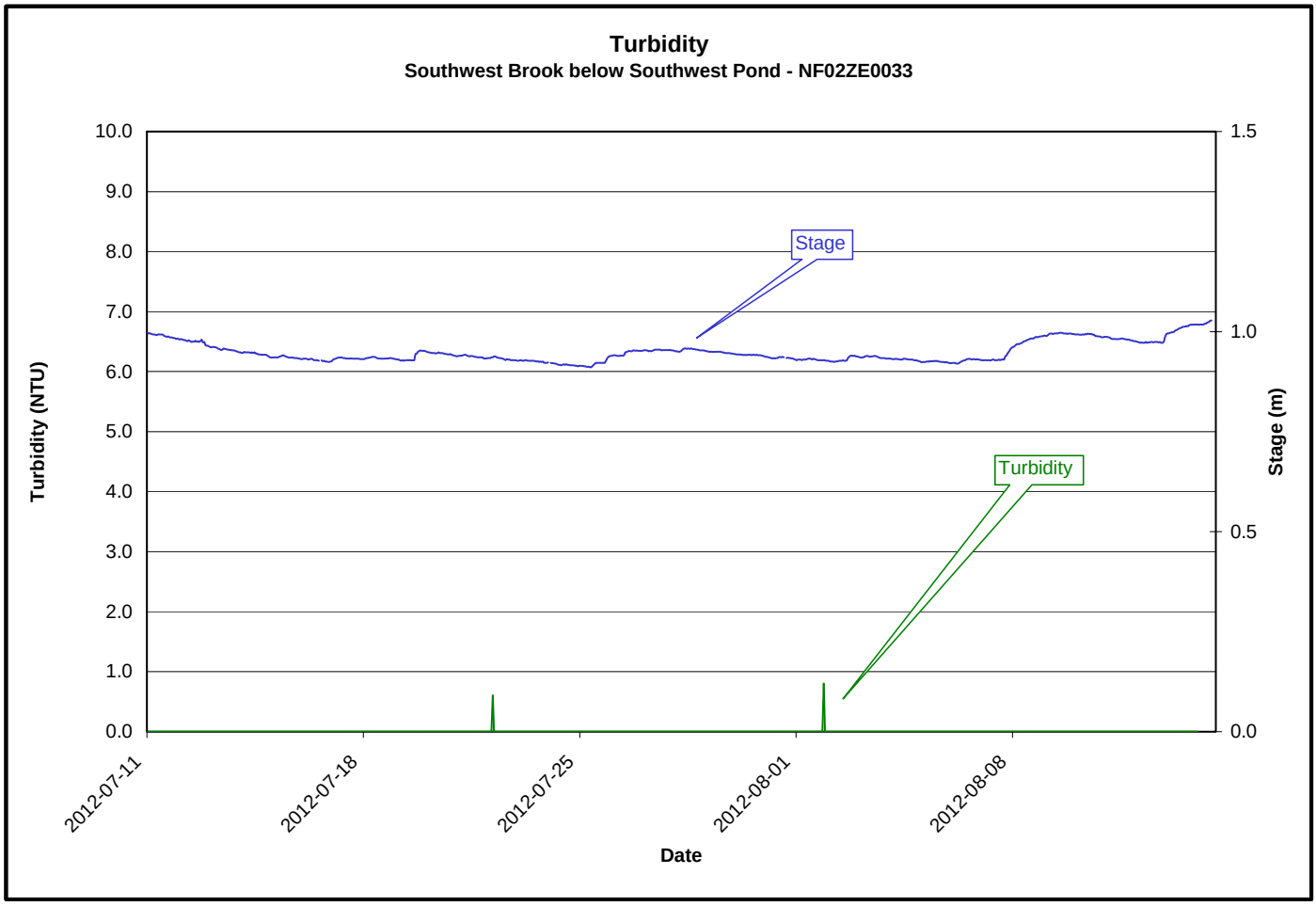

Figure 5

- The stage or water level ranged from a minimum of 0.91 m to a maximum of 1.03 m. The flow or discharge ranged from a minimum of 0.03 m^3/s to a maximum of 0.27 m^3/s (**Figure 6)**.
- The increase in stage and flow is resultant from precipitation events.
- Stream stage and flow are within normal ranges.

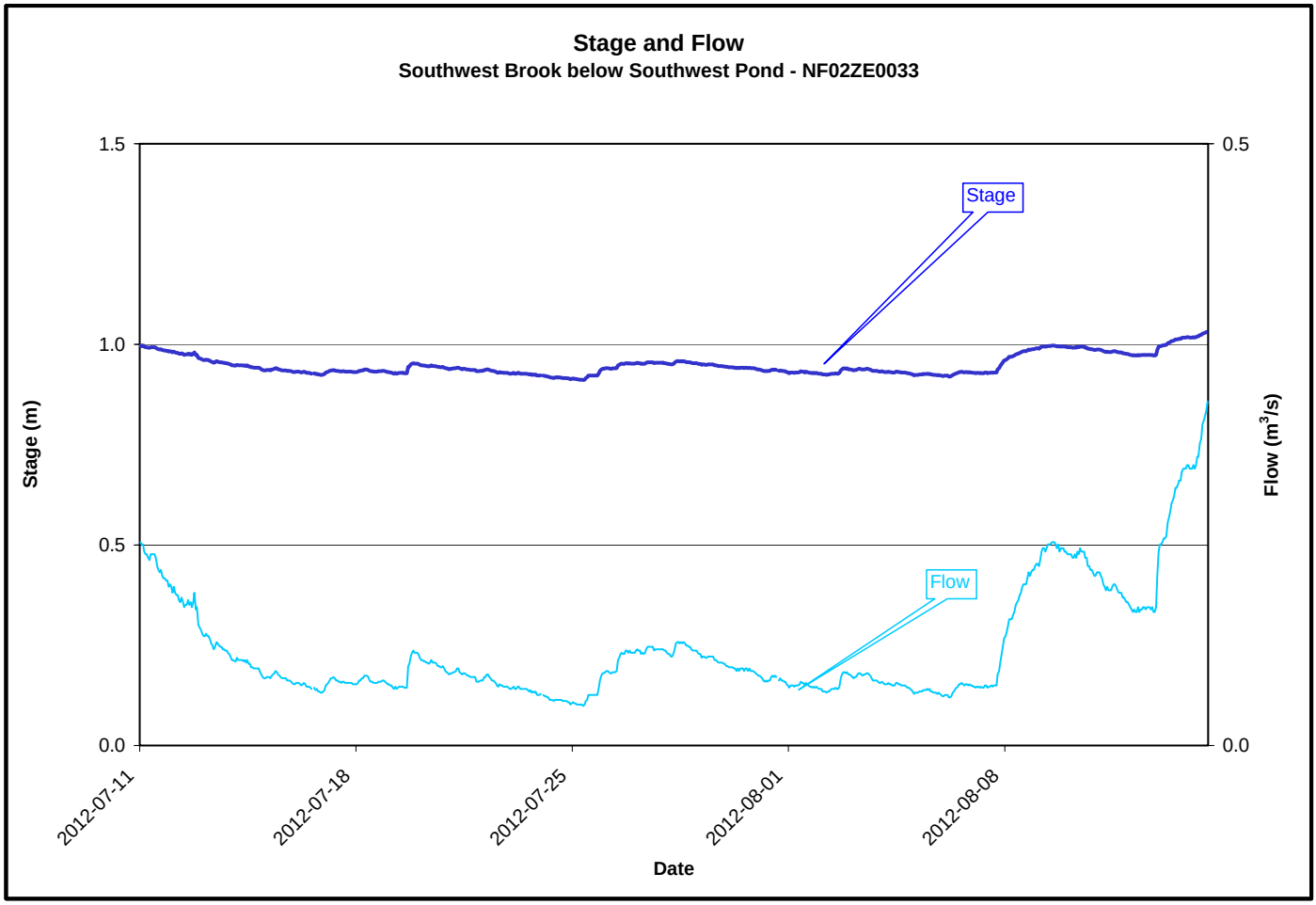

Figure 6

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