

April 2, 2014

Monitoring Data Analysis for February 17, 2014 – March 23, 2014

### Gills Creek Monitoring Sites

During this monitoring period, the data collected from the Gills Creek stations all displayed typical diurnal patterns with respect to dissolved oxygen, water temperature, and pH. Water temperatures are beginning to increase in the transition from winter to spring, and as a result, dissolved oxygen levels dropped slightly from the previous monitoring period, but all average values remained above 9 mg/L. No water quality violations were observed in any of the monitored parameters during this observation period.

Over this monitoring period, 7 storms were observed, where a storm is defined as at least 0.1" of precipitation separated from other storm events by at least three hours of dry conditions. For the most part, the Gills Creek water quality showed typical responses to these rain events, with one notable exception. Generally, specific conductivity values decrease following storm events, as the additional flow volume in the creek dilutes ion concentrations. However, the storm events observed early in this monitoring period coincided with brief peaks in specific conductivity levels. These storms were the first precipitation events to follow the ice storm of February 12th-13th, which necessitated significant salt application to roadways. Most likely, this salt was still being washed off of roads during the February 21st rain event. Indeed, all three sites showed a steady decline in specific conductivity values over the course of the monitoring period, as the precipitation events gradually transported the residual salts off of roadways and into Gills Creek. The increase in specific conductivity following the rain events was observed most strikingly at GILB; this site drains several major roadways in close proximity to the station, which explains the increased impact of salting at this location.

During this monitoring period, two interruptions in the continuous dataset were observed. At GILA, the operation of the Forest Lake control structure caused flow levels to drop below the depth of the sonde. The water temperature and specific conductivity probes became unsubmerged. Additionally, the dissolved oxygen (DO) probe, which depends upon the sonde's temperature readings to accurately determine the DO level, produced unreliable data. This period of very low flow was relatively brief, lasting just over 1 day.

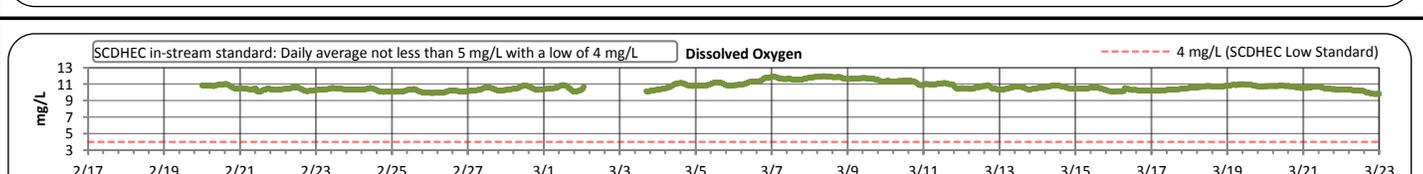
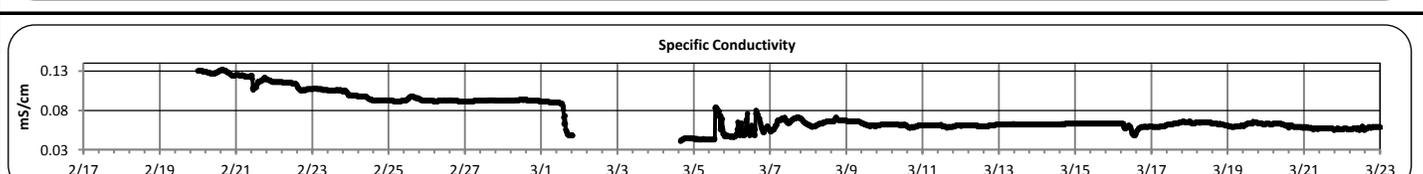
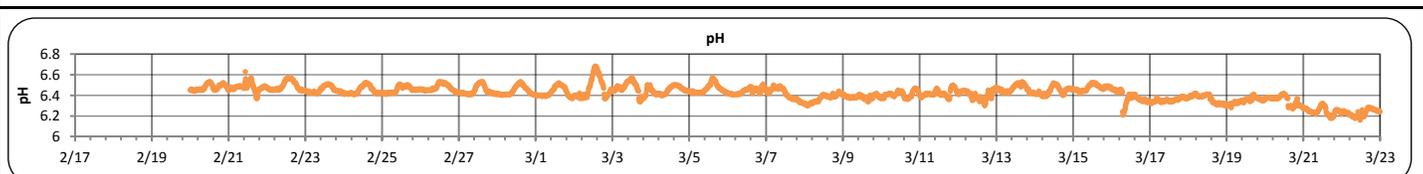
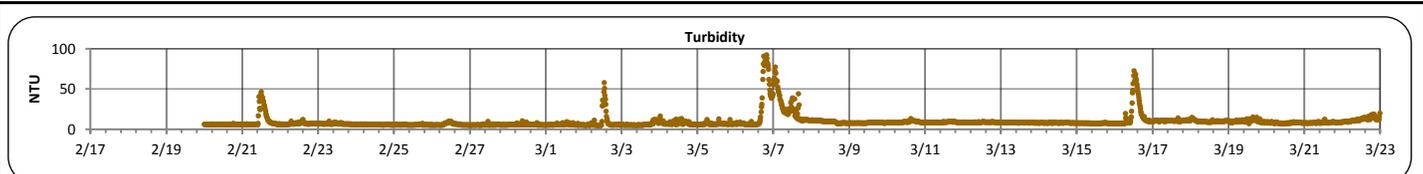
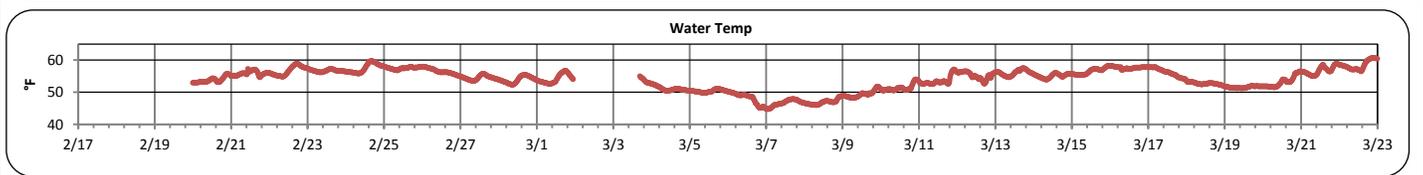
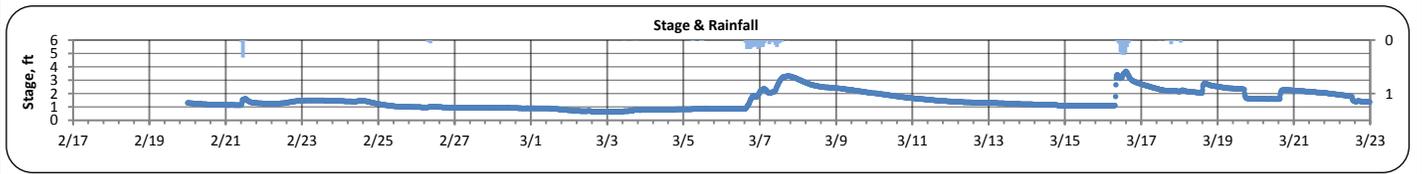
The second data interruption occurred with the turbidity probe at GILB. Following the storm event on March 7th and March 8th, the turbidity probe appears to have experienced fouling of some sort, most probably due to the presence of debris within the sonde guard. On March 10th, a field visit was performed to clear the sonde of the debris.

The specific conductivity dataset recorded at GILA during this monitoring period displayed some unusual behavior, not due to inaccurate data, but due to in stream conditions. On March 1st, as the flow out of Forest Lake was restricted and the stage at GILA dropped, a larger percentage of the flow passing GILA

was sourced from Eightmile Creek, the tributary which enters Gills Creek just above the GILA station. The increasing fraction of flow volume from Eightmile Creek appears to have caused a steady decrease in the specific conductivity, implying that Eightmile Creek may be contributing water with a lower specific conductivity value than that found in Gills Creek itself; unfortunately, the flow from Forest Lake was decreased to the point where the sonde became unsumberged, so the dataset is not complete during this time period. As the flow from Forest Lake increased again, on March 4th, the sonde became submerged, and specific conductivity readings increased over the following days. During this period, a noticeable spike in conductivity occurred that was associated with a slight increase in stage at GILA. This occurred during the evening of March 5th, and was accompanied by a spike in pH. These changes may have been due to a change in the outflow from Forest Lake, or perhaps an illicit discharge. On the following day, March 6th, a rain event caused additional fluctuations in the specific conductivity readings. It is important that the explanations described above are preliminary and have not been supported by field observations.

**Gills Creek A (Feb 17, 2014 -- Mar 23, 2014)**

PARAMETER	DESCRIPTION	CONTINUOUS WATER QUALITY PARAMETERS:	SUMMARY STATISTICS				
			MINIMUM OBSERVED	MAXIMUM OBSERVED	MEDIAN OBSERVED	MEAN OBSERVED	STANDARD DEVIATION
STREAM NAME:	Gills Creek	STAGE (FT):	0.6	3.7	1.3	1.5	0.6
LOCATION:	Forest Drive Bridge	TEMPERATURE (°F):	45	61	55	54	3
ADDRESS:	4840 Forest Drive, Columbia, SC 29206	TURBIDITY (NTU):	5	92	8	10	9
COORDINATES:	34.019826, -80.963566	pH:	6.2	6.7	6.4	6.4	0.1
TMDL/IMPAIRMENT:	Fecal & Dissolved Oxygen	SPECIFIC CONDUCTIVITY (mS/cm):	0.041	0.132	0.063	0.074	0.022
NEIGHBORING LANDUSE:	Residential and commercial	DISSOLVED OXYGEN (mg/L):	9.7	12.0	10.5	10.7	0.5
APPROX. DRAINAGE AREA:	48 square miles						
SPATIAL LOCATION:	Most upstream site						
TOTAL NO. STORMS OVER 0.1 INCH:	5						
MAX. DAILY RAINFALL:	1.3 inches						
TOTAL RAINFALL (FOR PERIOD):	4.4 inches						



Note: Data gaps appear when the sonde is removed for calibration or when the flow depth is below the sensors

**Continuous Water Quality  
Monitoring Periodic Report**

**Gills Creek A (Feb 17, 2014 -- Mar 23, 2014)**

**Explanation of Statistics:**

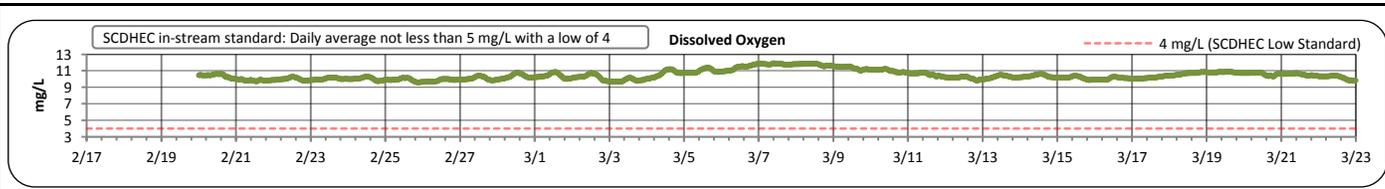
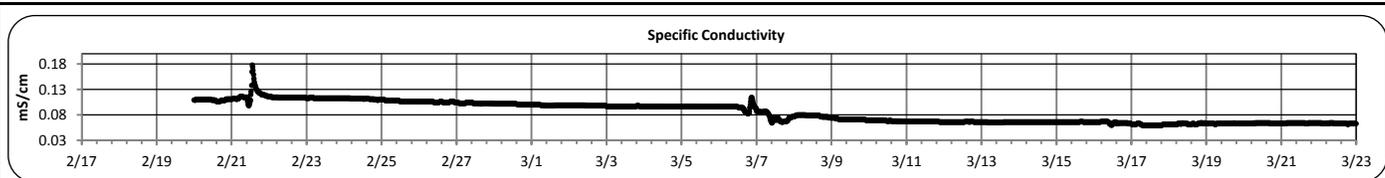
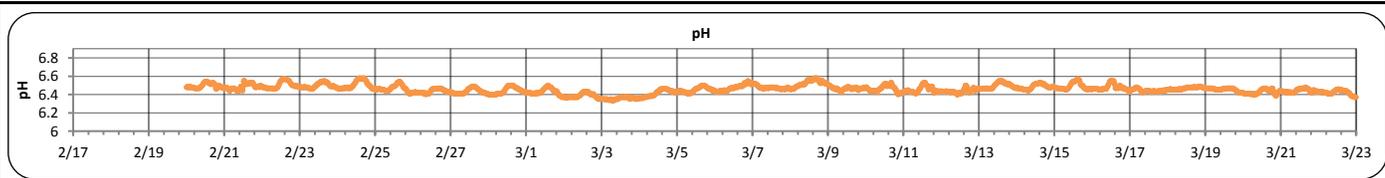
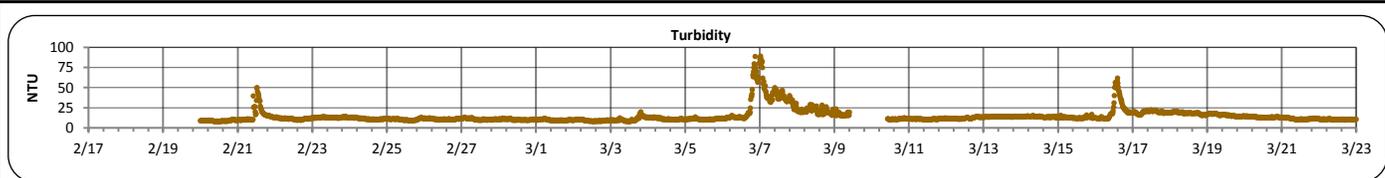
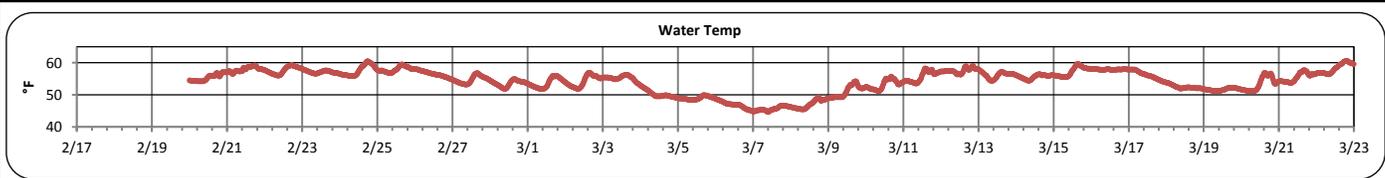
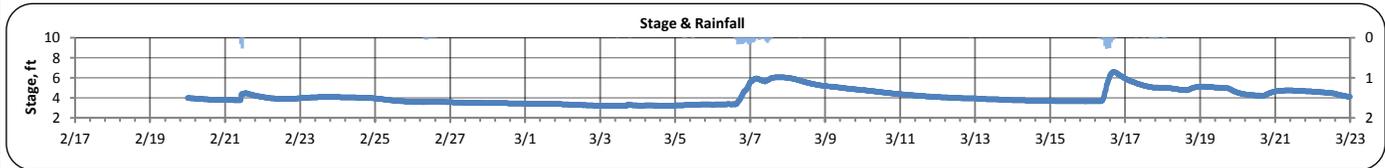
<b>MINIMUM OBSERVED</b>	The minimum of the values recorded by the datasonde in 15 minute intervals.
<b>MAXIMUM OBSERVED</b>	The maximum of the values recorded by the datasonde in 15 minute intervals.
<b>MEDIAN OBSERVED</b>	The median of all the values recorded by the datasonde in 15 minute intervals.
<b>MEAN OBSERVED</b>	The average of all the values recorded by the datasonde in 15 minute intervals.
<b>STANDARD DEVIATION</b>	The standard deviation of all the values recorded by the datasonde in 15 minute intervals.

Note: Data gaps appear when the sonde is removed for calibration or when the flow depth is below the sensors

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**Gills Creek B (Feb 17, 2014 -- Mar 23, 2014)**

PARAMETER	DESCRIPTION	CONTINUOUS WATER QUALITY PARAMETERS:	SUMMARY STATISTICS				
			MINIMUM OBSERVED	MAXIMUM OBSERVED	MEDIAN OBSERVED	MEAN OBSERVED	STANDARD DEVIATION
STREAM NAME:	Gills Creek	STAGE (FT):	3.2	6.6	4.0	4.0	0.7
LOCATION:	Devine Street bridge	TEMPERATURE (°F):	45	61	55	54	4
ADDRESS:	4716 Devine Street Columbia, SC 29209	TURBIDITY (NTU):	8	89	12	14	9
COORDINATES:	33.989656, -80.97433	pH:	6.3	6.6	6.5	6.5	0.0
TMDL/IMPAIRMENT:	Fecal & Dissolved Oxygen	SPECIFIC CONDUCTIVITY (mS/cm):	0.059	0.178	0.078	0.084	0.020
NEIGHBORING LANDUSE:	Residential and commercial	DISSOLVED OXYGEN (mg/L):	9.6	11.9	10.3	10.4	0.6
APPROX. DRAINAGE AREA:	59 square miles						
SPATIAL LOCATION:	Middle site						
TOTAL NO. STORMS OVER 0.1 INCH:	5						
MAX. DAILY RAINFALL:	1.4 inches						
TOTAL RAINFALL (FOR PERIOD):	4.3 inches						



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Monitoring Periodic Report**

**Gills Creek B (Feb 17, 2014 -- Mar 23, 2014)**

**Explanation of Statistics:**

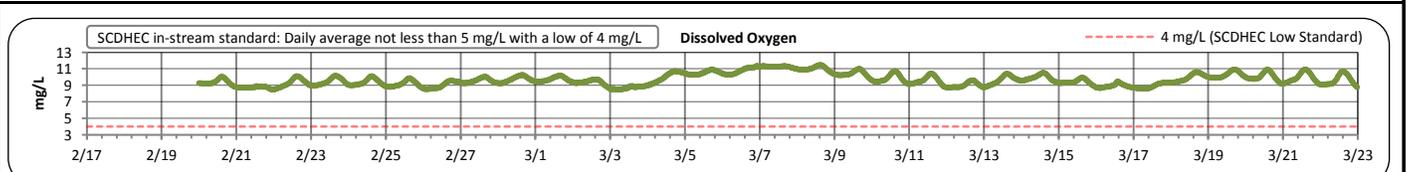
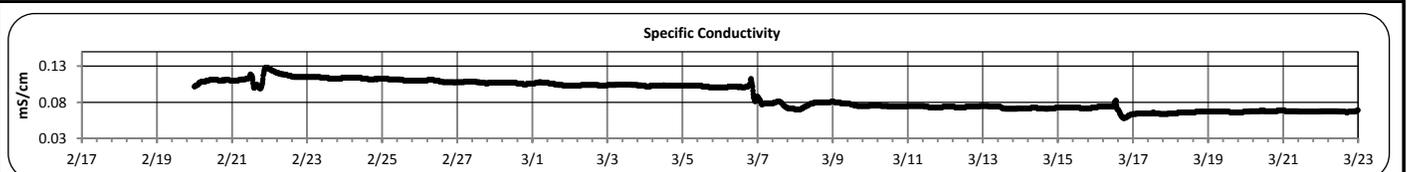
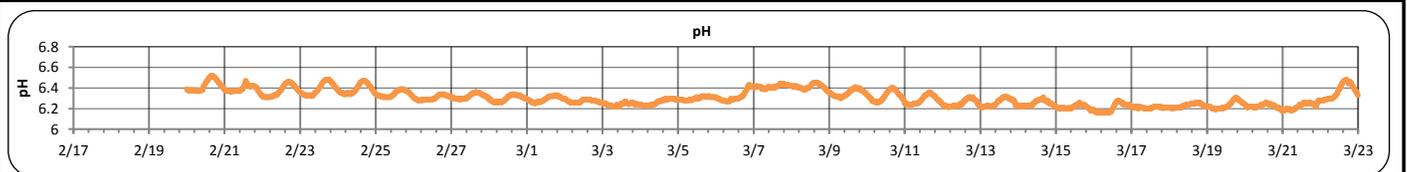
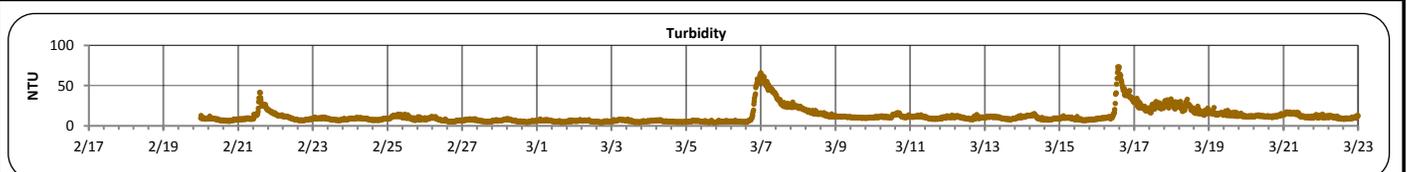
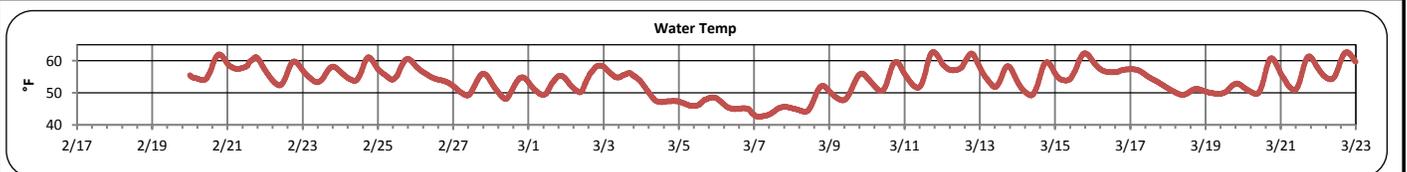
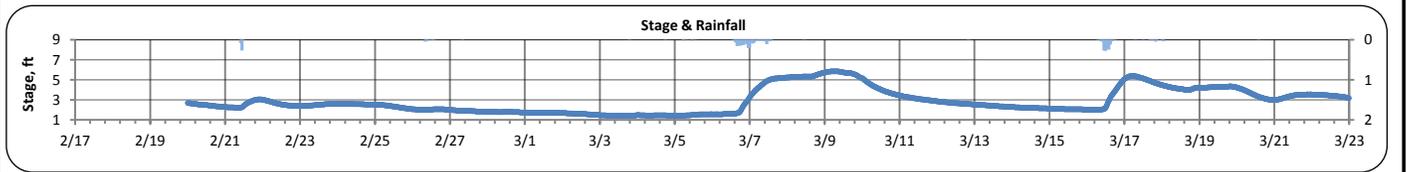
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REPORT GENERATED ON 4/1/2014

**Gills Creek C (Feb 17, 2014 -- Mar 23, 2014)**

PARAMETER	DESCRIPTION	CONTINUOUS WATER QUALITY PARAMETERS:	SUMMARY STATISTICS				
			MINIMUM OBSERVED	MAXIMUM OBSERVED	MEDIAN OBSERVED	MEAN OBSERVED	STANDARD DEVIATION
STREAM NAME:	Gills Creek	STAGE (FT):	1.4	5.9	2.5	2.9	1.2
LOCATION:	Bluff Road bridge	TEMPERATURE (°F):	43	63	54	54	5
ADDRESS:	3009 Bluff Rd. Columbia, SC 29209	TURBIDITY (NTU):	4	73	10	12	9
COORDINATES:	33.948043, -80.9889	pH:	6.2	6.5	6.3	6.3	0.1
TMDL/IMPAIRMENT:	Fecal & Dissolved Oxygen	SPECIFIC CONDUCTIVITY (mS/cm):	0.058	0.128	0.08	0.088	0.019
NEIGHBORING LANDUSE:	Residential and commercial	DISSOLVED OXYGEN (mg/L):	8.5	11.5	9.6	9.7	0.7
APPROX. DRAINAGE AREA:	64 square miles						
SPATIAL LOCATION:	Most downstream site						
TOTAL NO. STORMS OVER 0.1 INCH:	5						
MAX. DAILY RAINFALL:	1.4 inches						
TOTAL RAINFALL (FOR PERIOD):	4.2 inches						



Note: Data gaps appear when the sonde is removed for calibration or when the flow depth is below the sensors

**Continuous Water Quality  
Monitoring Periodic Report**

**Gills Creek C (Feb 17, 2014 -- Mar 23, 2014)**

**Explanation of Statistics:**

<b>MINIMUM OBSERVED</b>	The minimum of the values recorded by the datasonde in 15 minute intervals.
<b>MAXIMUM OBSERVED</b>	The maximum of the values recorded by the datasonde in 15 minute intervals.
<b>MEDIAN OBSERVED</b>	The median of all the values recorded by the datasonde in 15 minute intervals.
<b>MEAN OBSERVED</b>	The average of all the values recorded by the datasonde in 15 minute intervals.
<b>STANDARD DEVIATION</b>	The standard deviation of all the values recorded by the datasonde in 15 minute intervals.

Note: Data gaps appear when the sonde is removed for calibration or when the flow depth is below the sensors

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