



## Continuous Instream Monitoring Report (CIMR)

**Most recent revision:** 2/12/2014  
**Revised by:** Shull

### Station Description

**STREAM CODE:** 21859

**STREAM NAME:** Asaph Run

**SITE CODE:** 66535327-001

**SITE NAME:** Asaph Run

**COUNTY:** Tioga

**LATITUDE:** N41°47'11.617" **LONGITUDE:** W77°26'20.259"

**LOCATION DESCRIPTION:** Along Asaph Run Road, approximately 0.5 miles upstream from Asaph Run Road Bridge.

**HUC:** 02050205

**DRAINAGE AREA:** 13.5 sq. miles

**BACKGROUND AND HISTORY:** Asaph Run is a freestone tributary to Marsh Creek within Shippen Township, Tioga County (Figure 1). The basin is characterized by relatively steep topography with land use consisting mostly of forested land (97%). The site is located within the Tioga State Forest. The purpose of this survey was to collect baseline data on an Exceptional Value stream where deep well activity is possible.

The primary objectives of the assessment were to:

1. Characterize seasonal and diel water temperature, specific conductance, pH, and turbidity using 24-hour monitoring.
2. Characterize water chemistry.
3. Characterize biological communities.

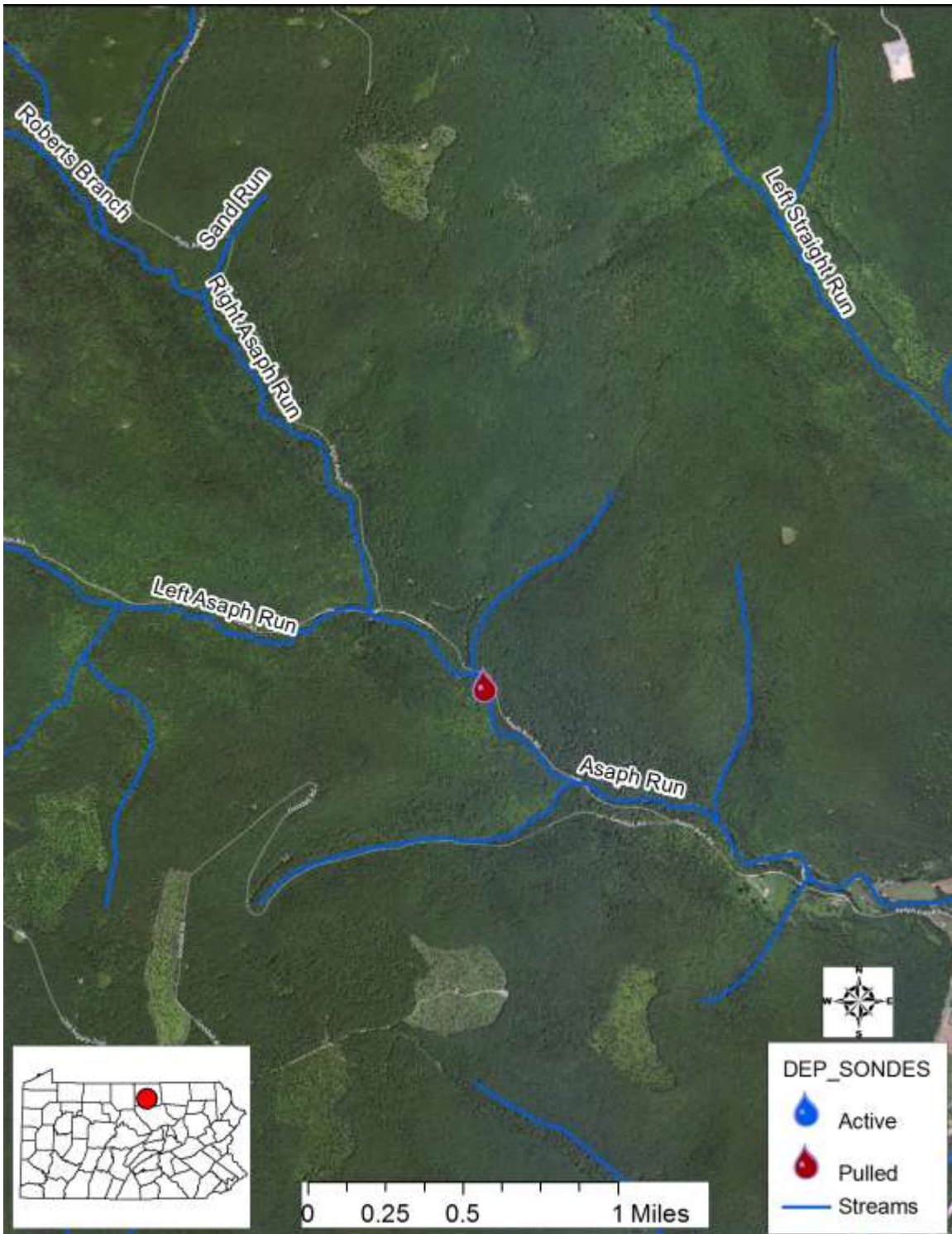


Figure 1. Location of the Asaph Run continuous instream monitoring site.



Figure 2. Location of sonde in stream (under branch).

**WATER QUALITY PARAMETERS:**

Parameter	Units
Depth	Feet
Water Temperature	°C
Specific Conductance (@25°C)	µS/cm <sup>c</sup>
pH	standard units
Turbidity	Formazin Nephelometric Units (FNU)

**EQUIPMENT:**

A single YSI 6920V2 water quality sonde was used at this station. The sonde (Serial # 00018BA4) was installed on March 13, 2012. A Yellow Springs Instruments (YSI) 6920V2 Sonde was used as a field meter during revisits.

The sonde was housed in a 24-inch length of 4-inch diameter schedule 80 PVC pipe with holes drilled in it to allow for flow through. One end of the pipe was capped, and a notch was cut to accommodate the metal attachment bar on the top of the sonde. The attachment bar was clipped to an eye-bolt attached to rebar driven into the stream bed. The attachment bar was also clipped to a cable attached to a second piece of rebar located just upstream of the first. The sonde recorded water quality parameters every 15 minutes.

**PERIOD OF RECORD:** March 13, 2012 to March 13, 2013

The station was visited ten times over twelve months for the purpose of downloading data, checking calibration, and cleaning.

**DATA:**

Water chemistry grabs were collected seven times during the sampling period. Benthic macroinvertebrates were collected on April 4, 2012 using the Department's Instream Comprehensive Evaluation (ICE) methods (PA DEP 2013a). Continuous data are graded based on a combination of fouling and calibration error (PA DEP, 2013b).

**Depth:**

Depth measured by this non-vented YSI 6920 is actually the measure of water column pressure plus atmospheric pressure. Depth was calibrated with the sonde in air during deployment. Changes in atmospheric pressure while the sonde was deployed appear as changes in depth. Data in this report were corrected for barometric pressure using a Solinst Barologger Edge located at the USGS Northern Appalachian Research Laboratory. These data are used only as qualitative interpretation for changes in other parameters due to a lack of verification.

**Temperature:** Average: 6.9°C; Maximum: 20.0°C; Minimum: -0.04°C.

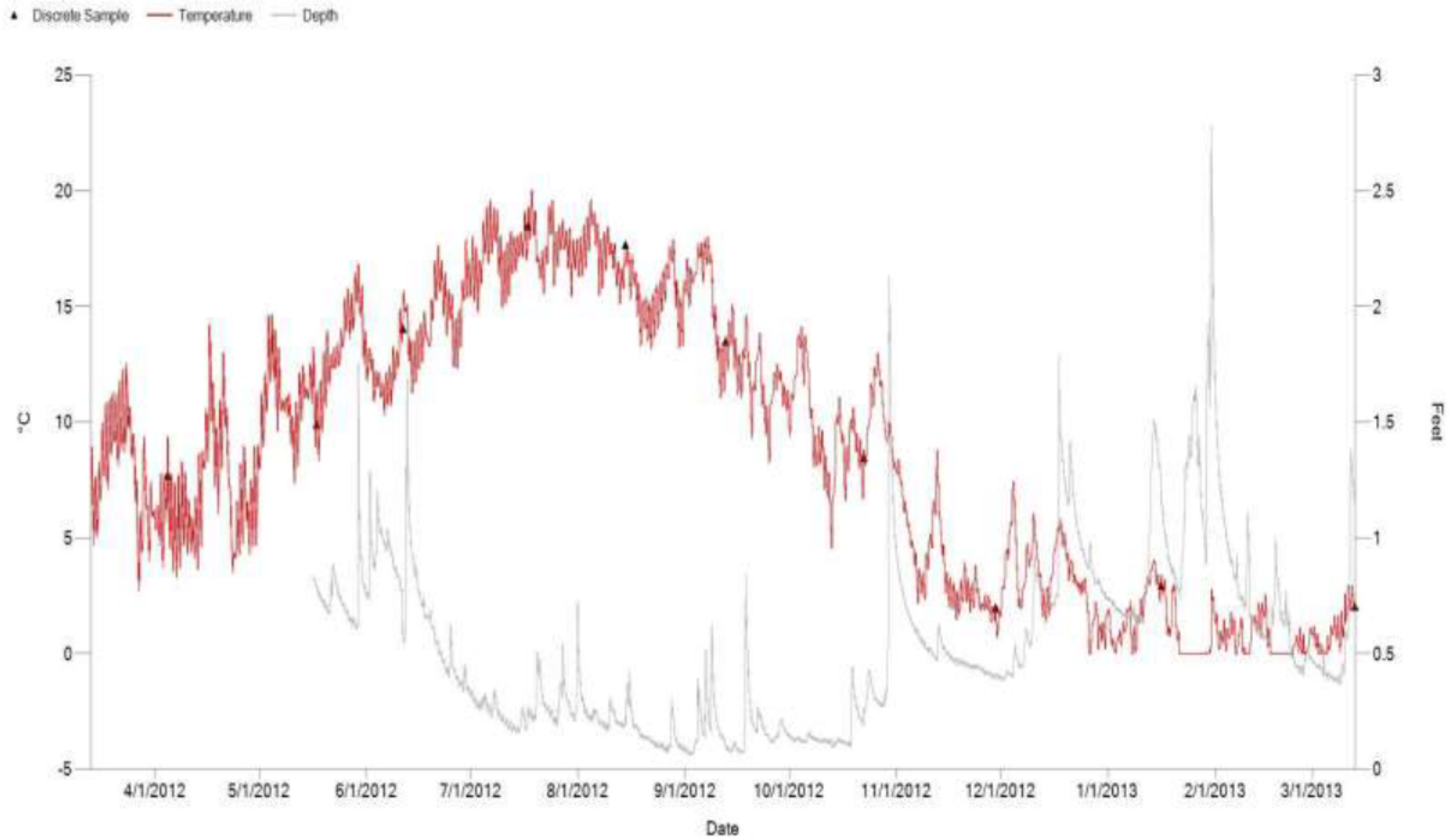


Figure 2. Continuous water temperature, continuous depth and discrete samples from March 13, 2012, to March 13, 2013.

**Specific Conductance:** Average: 50.6  $\mu\text{S}/\text{cm}$ ; Maximum: 77.4  $\mu\text{S}/\text{cm}$ ; Minimum: 29.0  $\mu\text{S}/\text{cm}$ .

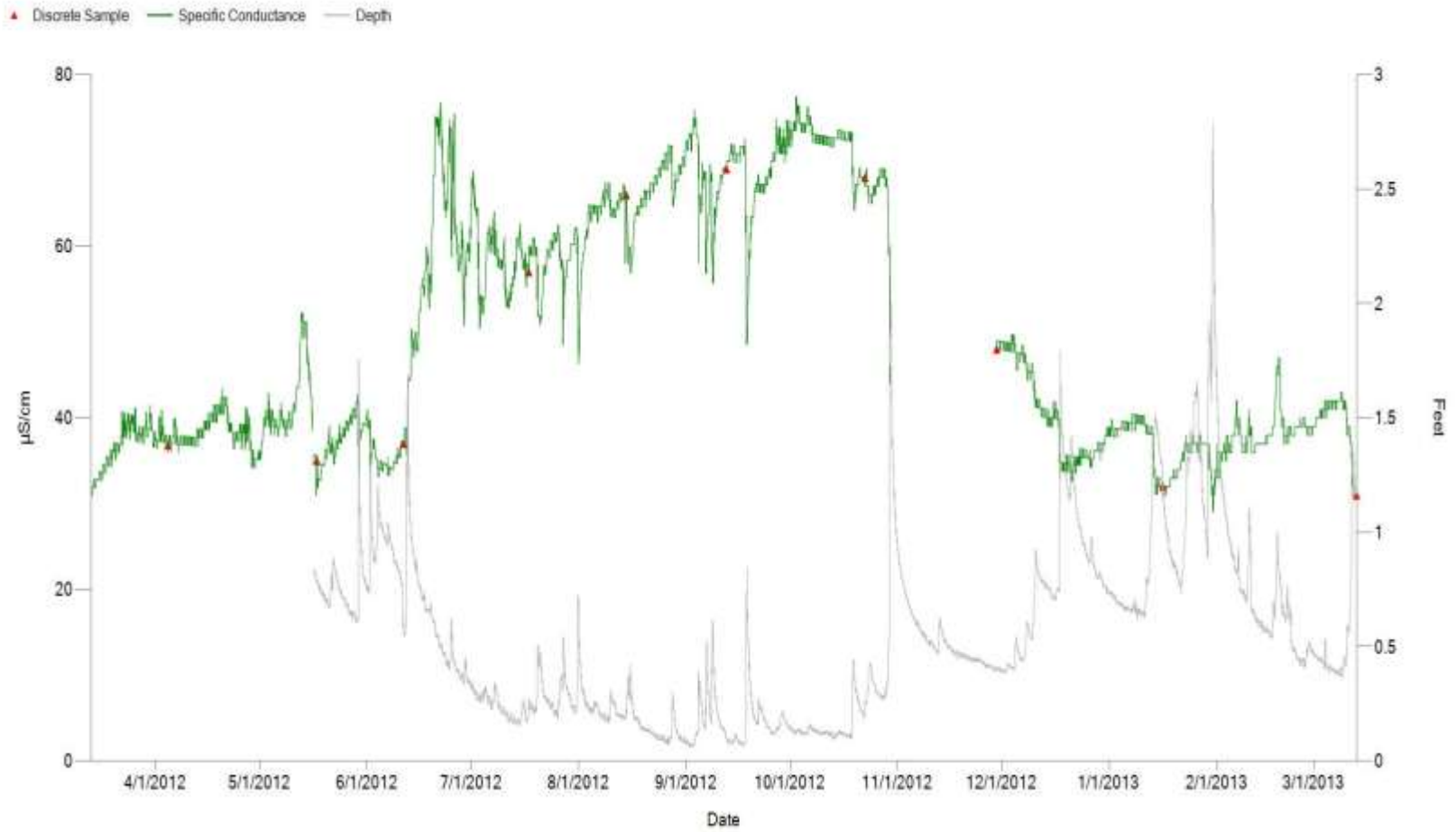


Figure 3. Continuous specific conductance, continuous depth and discrete samples from March 13, 2012 to March 13, 2013.

**pH:** Average: 7.20; Maximum: 7.52; Minimum: 6.61

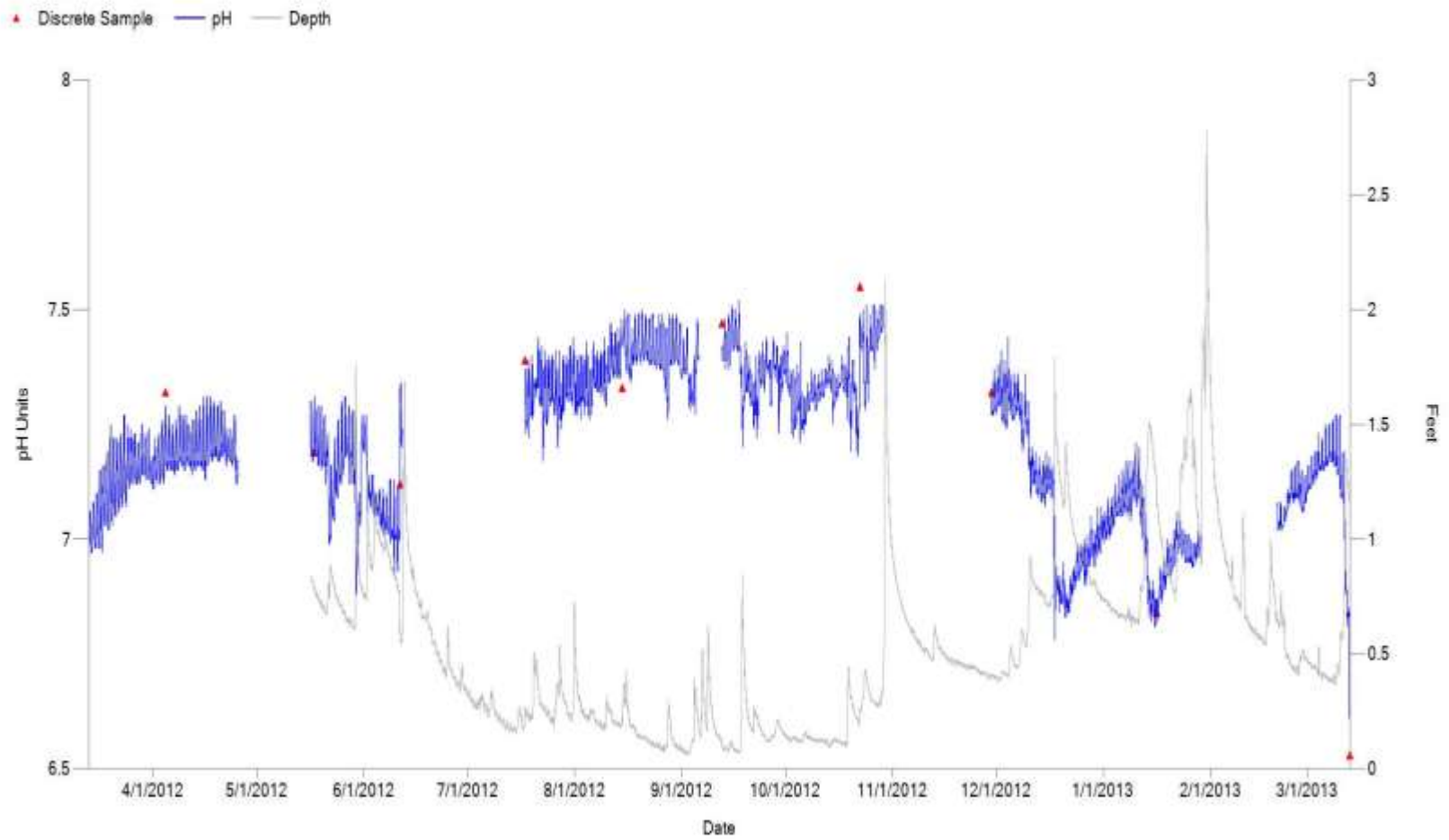


Figure 4. Continuous pH, continuous depth and discrete samples from March 13, 2012 to March 13, 2013.

**Turbidity:** Average: 1.9 FNU; Maximum: 273.4 FNU; Minimum: 0.0 FNU.

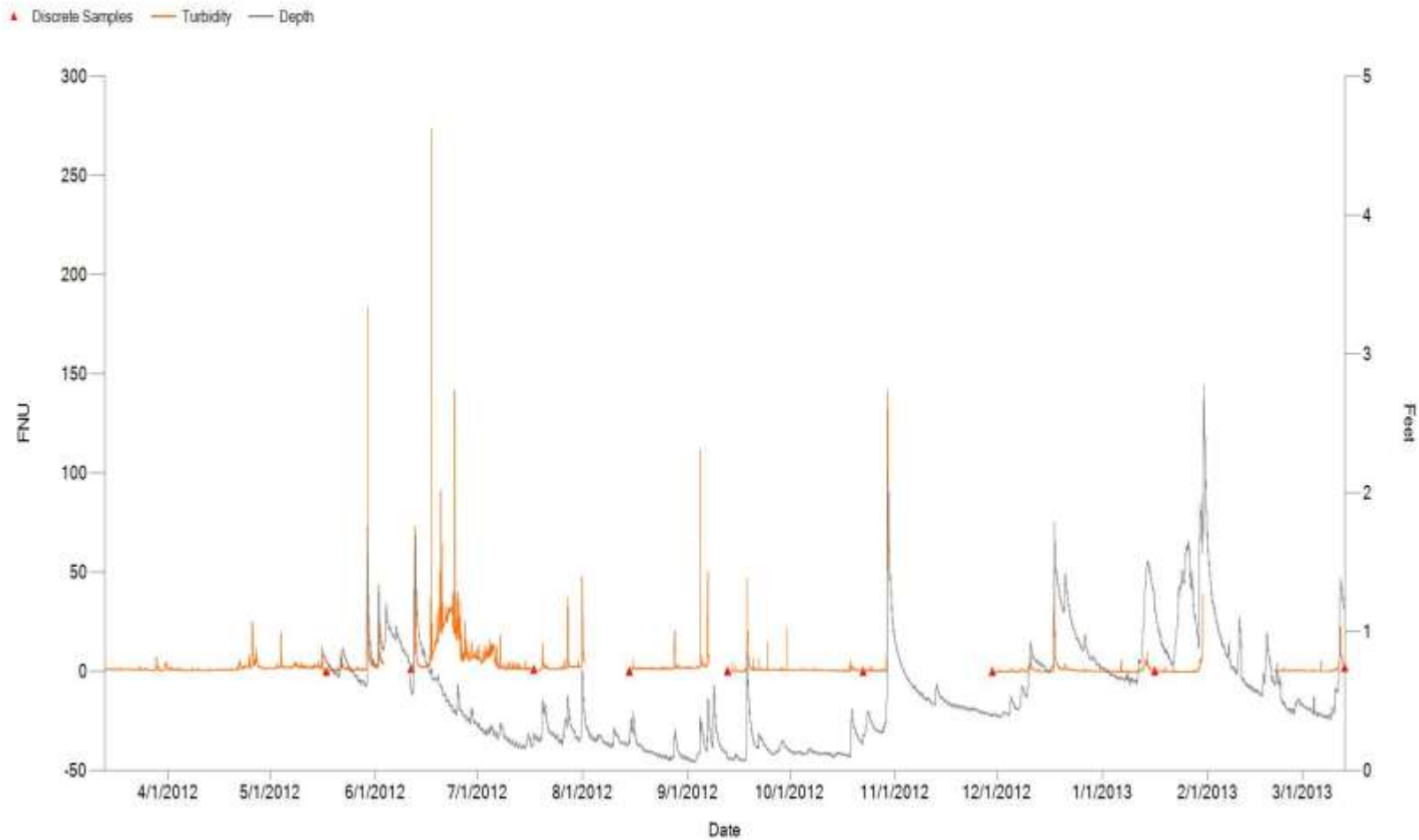


Figure 5. Continuous turbidity, continuous depth and discrete samples from March 13, 2012 to March 13, 2013.



**In-situ Water Chemistry:** Samples were collected seven times using standard analysis code 046. Measurements with "<" indicate concentrations below the reporting limit.

Table 1. Chemical grab sample results.

PARAMETER	UNITS	3/13/2012 9:45 AM	4/5/2012 8:00 AM	5/17/2012 11:05 AM	6/12/2012 7:30 AM	8/15/2012 9:10 AM	9/13/2012 6:00 AM	1/17/2013 7:30 AM
ALKALINITY T	MG/L	6	9	8.8	10	21.2	25.4	5
ALUMINUM T	UG/L	< 200	< 200	< 200	< 200	< 200	< 200	< 200
AMMONIA T	MG/L	< 0.02	< 0.02	0.02	0.02	< 0.02	< 0.02	< 0.02
ARSENIC T	UG/L	< 3	< 3	< 3	< 3	< 3	< 3	< 3
BARIUM T	UG/L	24	24	26	30	35	41	21
BOD	MG/L	< 0.2	6.5	1.4	0.7	0.8	0.9	1.1
Boron T	UG/L	< 200	< 200	< 200	< 200	< 200	< 200	< 200
BROMIDE	UG/L	< 50	< 50	< 50	< 50	< 25	< 25	< 25
CALCIUM T	MG/L	3.28	3.932	4.02	4.318	6.721	8.569	3.309
HARDNESS T	MG/L	12	14	14	15	23	29	12
IRON T	UG/L	52	38	46	96	67	23	73
LITHIUM T	UG/L	< 25	< 25	< 25	< 25	< 25	< 25	< 25
MAGNESIUM T	MG/L	0.873	0.978	1.021	1.086	1.574	1.896	0.87
MANGANESE T	UG/L	< 10	< 10	< 10	12	< 10	< 10	< 10
OSMOTIC PRESSURE	MOSM	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SELENIUM T	UG/L	< 7	< 7	< 7	< 7	< 7	< 7	< 7
SODIUM T	MG/L	0.53	0.71	0.607	0.66	1.114	1.57	0.54
SPECIFIC CONDUCTIVITY @ 25.0 C	µS/cm	28.3	36	32.9	34.6	55.4	66.4	30.6
STRONTIUM T	UG/L	13	16	16	18	28	36	14
CHLORIDE T	MG/L	0.83	0.73	0.65	0.64	1.13	1.72	0.77
TDS @ 180C	MG/L	34	40	46	44	< 5	48	32
NITRATE & NITRITE T	MG/L	0.14	0.11	0.08	0.16	0.22	0.15	0.2
PHOSPHORUS T	MG/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SULFATE T	MG/L	6.05	6.16	5.86	5.7	5.48	6	5.91
TSS	MG/L	< 5	< 5	< 5	8	< 5	< 5	6
ZINC T	UG/L	< 10	< 10	< 10	< 10	22	123	< 10

**Biology:** The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of water quality. Benthic macroinvertebrates (Table 2) were collected on 4/4/2012 using the Department's ICE protocol.

Table 2. Taxa list for benthic macroinvertebrate survey.

Order	Family	Genus	20120404-1400-dushull
Ephemeroptera	Baetidae	Baetis	5
Ephemeroptera	Heptageniidae	Epeorus	28
Ephemeroptera	Heptageniidae	Leucrocuta	1
Ephemeroptera	Heptageniidae	Rhithrogena	1
Ephemeroptera	Heptageniidae	Cinygmula	30
Ephemeroptera	Ephemerellidae	Drunella	3
Ephemeroptera	Ephemerellidae	Ephemerella	22
Ephemeroptera	Ephemerellidae	Serratella	1
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	33
Odonata	Gomphidae	Lanthus	1
Plecoptera	Pteronarcidae	Pteronarcys	1
Plecoptera	Peltoperlidae	Tallaperla	1
Plecoptera	Nemouridae	Amphinemura	1
Plecoptera	Leuctridae	Leuctra	13
Plecoptera	Perlidae	Agnetina	2
Plecoptera	Perlidae	Acroneuria	3
Plecoptera	Perlodidae	Isoperla	2
Plecoptera	Chloroperlidae	Haploperla	6
Plecoptera	Chloroperlidae	Sweltsa	1
Trichoptera	Hydropsychidae	Ceratopsyche	6
Trichoptera	Rhyacophilidae	Rhyacophila	2
Trichoptera	Lepidostomatidae	Lepidostoma	1
Coleoptera	Elmidae	Optioservus	1
Coleoptera	Elmidae	Oulimnius	9
Diptera	Tipulidae	Tipula	1
Diptera	Tipulidae	Antocha	1
Diptera	Tipulidae	Dicranota	1
Diptera	Tipulidae	Hexatoma	4
Diptera	Simuliidae	Prosimulium	8

## ASSESSMENT:

**Continuous:** Overall, parameters collected by the instream monitor indicate excellent water quality conditions. Specific conductance measurements show a relatively consistent pattern throughout the sampling period with no unexpected variation. Continuous measurements in pH were remarkably consistent with little seasonal or diel variance. Constancy of pH through this period suggests minimal anthropogenic influence and moderate buffering capacity. Turbidity data were measured in a quantitative manner. A relatively low maximum during high flow events suggests minimal surface disturbance. However, a period from the middle of June through the beginning of July showed increased turbidity readings not related to flow. This could be due to the Susquehannock Trail Performance Rally that occurred during June 1<sup>st</sup> and 2<sup>nd</sup>, 2012, which attracts many people to the watershed during this time of year. Although this may be a significant impact on the watershed, the turbidity data show restoration through the remainder of the year.

**Biological:** The benthic macroinvertebrate community indicated excellent water quality during the period sampled (Table 3). The most dominant taxa were Cinygmula and Paraleptophlebia, two mayflies that are intolerant to pollution.

Table 3 Macroinvertebrate metric calculations.

Date	IBI	Richness	Mod EPT	HBI	% Dom	% Mod May	Beck3	Shannon Div
April 4, 2012	97.9	31	20	1.56	16.6	59.8	43	2.71

## SUMMARY:

Continuous monitoring, in-situ lab chemistries, and biological data all suggest that Asaph Run has excellent water quality conditions. Division of Water Quality Standards will continue to refine turbidity and depth data in order to establish rating curves for parameters such as discharge, total suspended solids, and others.

## **LITERATURE CITED**

PA DEP. 2013a. Instream Comprehensive Evaluations (ICE).

[http://www.portal.state.pa.us/portal/server.pt/community/water\\_quality\\_standards/10556/2013\\_assessment\\_methodology/1407203](http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10556/2013_assessment_methodology/1407203)

PA DEP. 2013b. Continuous Instream Monitoring Protocol.

[http://www.portal.state.pa.us/portal/server.pt/community/water\\_quality\\_standards/10556/2013\\_assessment\\_methodology/1407203](http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10556/2013_assessment_methodology/1407203)