



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF POINT & NON-POINT SOURCE MANAGEMENT

Continuous Instream Monitoring Report (CIMR)

Most recent revision: 1/2/2012

Revised by: Lookenbill/Shull

Station Description

STREAM CODE: 24243

STREAM NAME: Horton Run

SITE CODE: 61424220-001

SITE NAME: Mouth

COUNTY: Potter

LATITUDE: 41.616436 **LONGITUDE:** -77.874906

LOCATION DESCRIPTION: Approximately 100 feet upstream of mouth.

HUC: 02050202

DRAINAGE AREA: 2.21 sq. miles

BACKGROUND AND HISTORY: Horton Run is a freestone tributary to the East Fork Sinnemahoning Creek within Wharton Township, Potter County (Figure 1). Horton Run has designated use of High Quality – Cold Water Fishes (HQ-CWF). The basin is characterized by relatively steep topography with land use consisting mostly of forested land (99%). The site is just downstream of an old railroad bed that's been converted to a walking trail. There are historical shallow gas wells in the upper portions of the basin. However, some of these wells are inactive and plugged. Deep well activity is centralized in the lower basin. The sonde was deployed just prior to deep well drilling, and continued to record during the drilling process.

The primary objectives of the assessment were to:

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

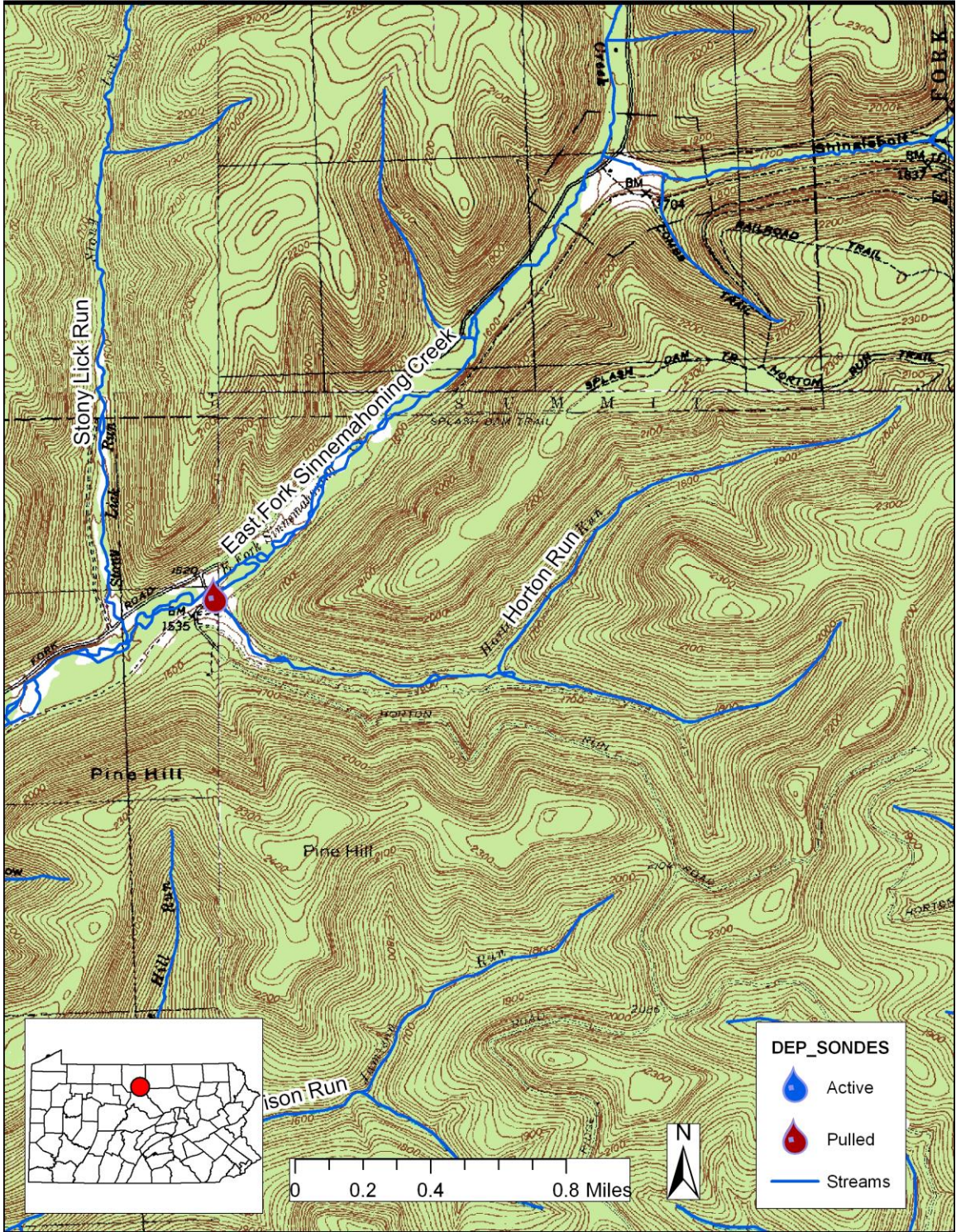


Figure 1. Location of the Horton Run continuous instream monitoring site.

WATER QUALITY PARAMETERS:

Parameter	Units
Temperature	°C
Depth	Feet
pH	standard units
Specific Conductance	µS/cm ^c

EQUIPMENT:

A single Yellow Springs Instruments (YSI) 6920v2 water-quality sonde was used at this station. The sonde (Serial #10B 100978) was installed on May 18, 2010. A Yellow Springs Instruments (YSI) Pro Plus 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 60 minutes.

PERIOD OF RECORD: May 18, 2010 to May 11, 2011

The station was visited seven times over 12 months for the purpose of downloading data, checking calibration, and cleaning. Water chemistry grabs and manual flow measurements were collected during each visit. Benthic macroinvertebrates were collected on 5/18/2010, 11/24/2010, and 5/5/2011 using the Department's Instream Comprehensive Evaluation (ICE) methods (PA DEP 2009).

DATA:

Continuous data collected from 5/18/2010 to 6/22/2010 is considered unverified due to lack of calibration checks, fouling checks, and/or lack of independent discrete measurements. No continuous data were collected during the period 1/24/2011 to 2/17/2011 due to battery failure.

Depth: Depth measurements from this YSI sonde are actually a measure of water column pressure plus atmospheric pressure. Depth is calibrated or zeroed with the sonde in air in order to subtract the atmospheric pressure during deployment. However, changes in atmospheric pressure while the sonde is deployed appear as changes in depth. The error is equal to 0.045 feet for every 1mm Hg change in atmospheric pressure. This data has not been corrected for confounding changes in atmospheric pressure. For this reason, depth data will be considered qualitative.

Temperature: Average: 9.39°C; Maximum: 20.77°C; Minimum: -0.04°C.

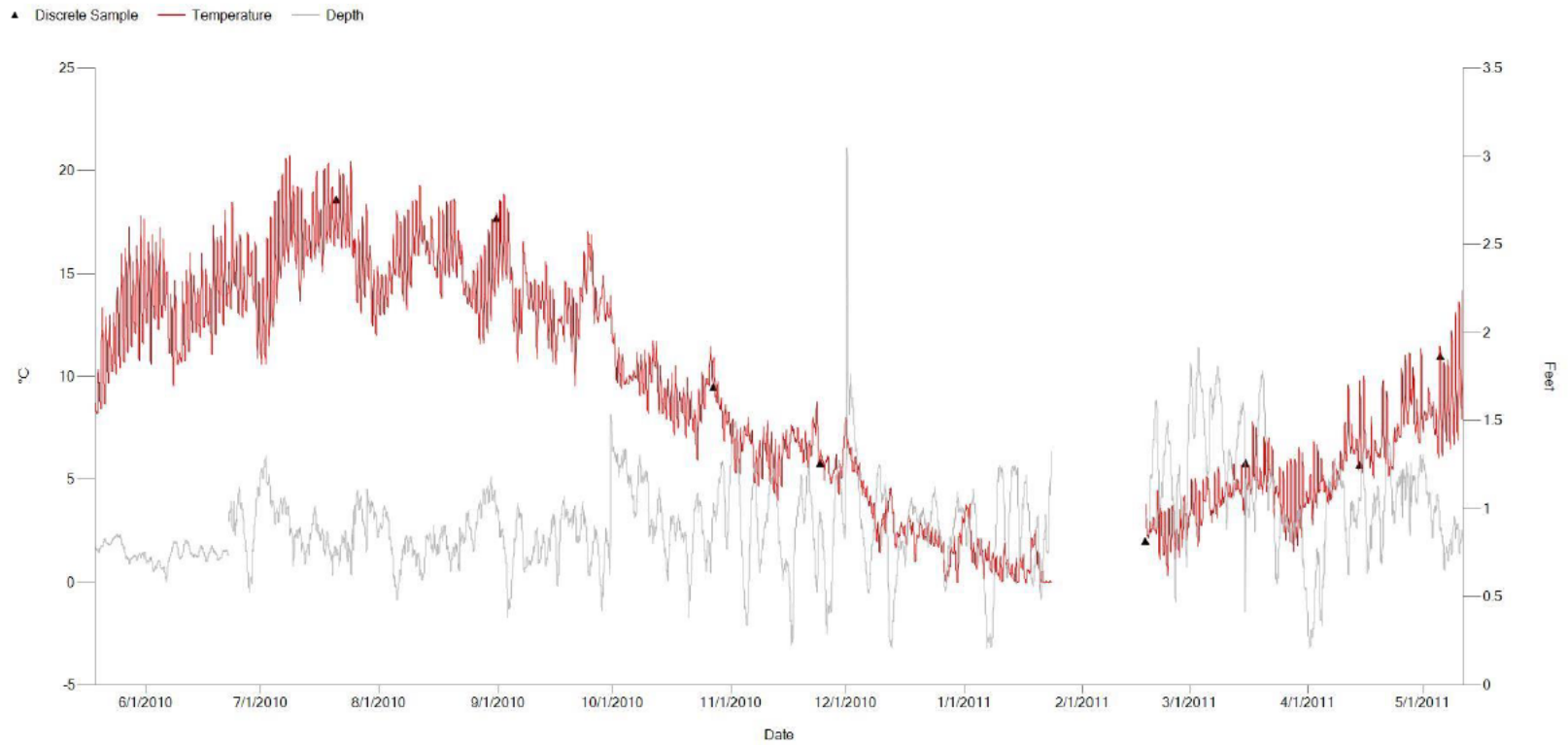


Figure 1. Continuous water temperature and continuous depth (not corrected) from May 18, 2010 to May 11, 2011.

Specific Conductance: Average: 44.8 $\mu\text{S}/\text{cm}$; Maximum: 59.7 $\mu\text{S}/\text{cm}$; Minimum: 28.8 $\mu\text{S}/\text{cm}$.

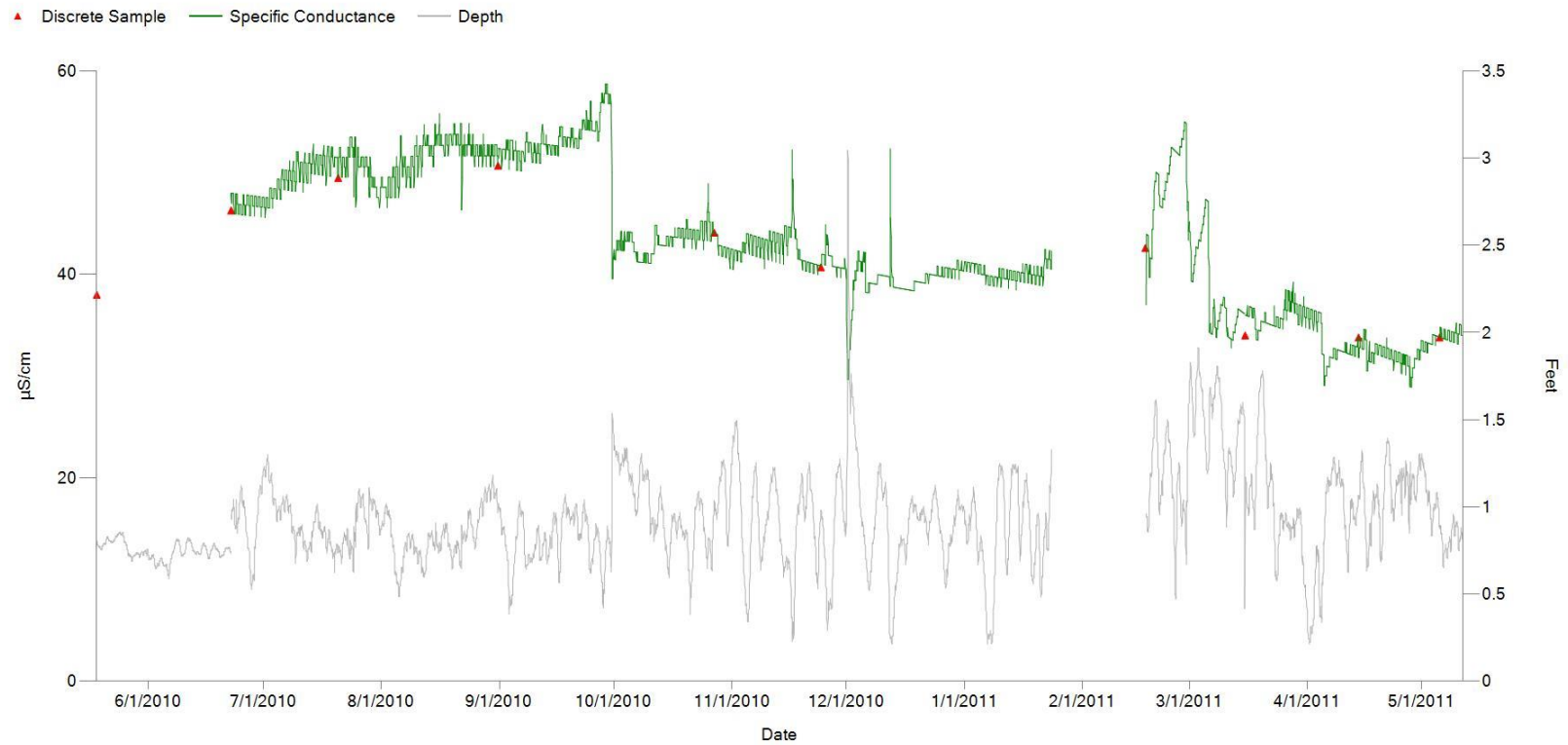


Figure 2. Continuous specific conductance, discrete samples, and continuous depth (not corrected) from May 18, 2010 to May 11, 2011.

pH: Average: 7.02 Maximum: 7.54 Minimum: 6.37.

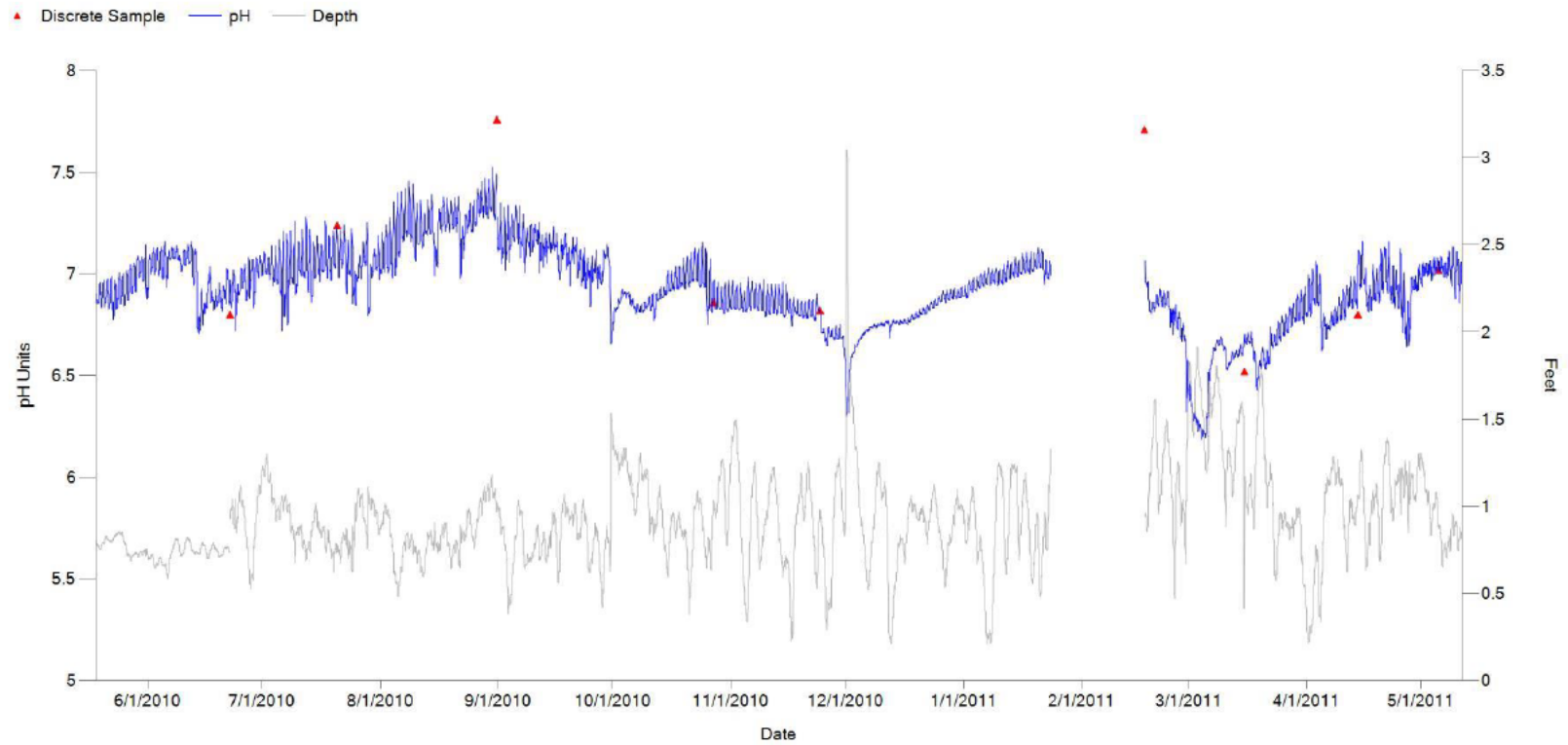


Figure 3. Continuous pH, discrete samples, and continuous depth (not corrected) from May 18, 2010 to May 11, 2011.

In-situ Water Chemistry: Samples were collected ten times using standard analysis code 046 and 018 (5/5/2011). Measurements with "<" indicate concentrations below the reporting limit.

Table 1. Chemical grab sample results.

Parameter	Units	5/18/2010	6/22/2010	7/20/2010	8/31/2010	10/27/2010	2/17/2011	3/15/2011	4/14/2011	5/5/2011
		11:00	15:00	17:00	15:00	08:30	09:10	13:40	08:30	14:20
Acidity, T	MG/L									-8
Alkalinity	MG/L	7.8		14.4	12.8	9.2	7.6	4.6	5.2	6.2
Alkalinity Field	MG/L	12	16							6
Aluminum D	UG/L									10
Aluminum T	UG/L	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	64.4
Ammonia T	MG/L	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		0.03
Arsenic D	UG/L									< 3.0
Arsenic T	UG/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
Barium T	UG/L	12	13	13	13	14	11	11	12	
BOD	MG/L	0.7	< 0.2	0.3	0.7	0.6	0.5	0.5	1.1	
Boron T	UG/L	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	
Bromide	MG/L	< 0.2	< 0.2	< 0.2						
Bromide	UG/L				< 50	< 50	< 50	< 50	< 50	
Cadmium D	UG/L									< 0.20
Cadmium T	UG/L									< 0.2
Calcium T	MG/L	4.282	5.006	5.479	5.331	4.9	4.81	3.726	3.854	3.621
Chloride	MG/L	< 0.50	< 0.50	0.74	0.92	0.93	0.83	0.66	0.56	
Chromium T	UG/L									< 50
Copper D	UG/L									< 4
Copper T	UG/L									< 4
DO	MG/L	10.57	10.8	8.64	9.28	10.94			12.14	13.4
Flow	CFS		0.485	0.065	0.038	3.464	0.668	7.581	9.672	4.086
Hardness	MG/L	15	18	19	19	17	17	13	14	13
Iron T	UG/L	55	96	73	69	72	73	51	53	142
Lead D	UG/L									< 1.0
Lead T	UG/L									< 1.0
Magnesium T	MG/L	1.053	1.223	1.346	1.31	1.17	1.207	0.919	0.957	0.91
Manganese T	UG/L	12	35	35	23	12	16	< 10.00	< 10.00	< 10.00

Table 1 (Cont.)

Parameter	Units	5/18/2010	6/22/2010	7/20/2010	8/31/2010	10/27/2010	2/17/2011	3/15/2011	4/14/2011	5/5/2011
		11:00	15:00	17:00	15:00	08:30	09:10	13:40	08:30	14:20
Nickel D	UG/L									< 4.0
Nickel T	UG/L									< 4.0
Nitrate	MG/L									0.3
Nitrate/Nitrite T	MG/L	0.24	0.31	0.25	0.4	0.43	0.56	0.47	0.43	
Nitrite T	MG/L									< 0.01
Osmotic P	MOSM	1	< 1	< 1	< 1	2	3	3	2	
Phosphorus T	MG/L	0.015	0.012	< 0.01	0.01	0.01	< 0.01	< 0.01	< 0.01	0.011
Selenium T	UG/L	< 7	< 7	< 7	< 7	< 7	< 7	< 7	< 7	
Sodium T	MG/L	0.54	0.799	1.05	1.073	0.701	0.927	0.491	0.495	
Strontium T	UG/L	15	19	21	21	18	19	13	13	
Sulfate	MG/L	7.05	6.88	6.99	6.87	6.45	8.32	7.39	7.6	< 15.0
TDS	MG/L	26	56	34	42	28	14	32	26	48
Zinc D	UG/L									< 5.0
Zinc T	UG/L	< 10	< 10	< 10	< 10	< 10	32	< 10	< 10	< 5.0

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 5/18/2010, 11/24/2010, and again on 5/5/2011 using the Department's ICE protocol (PA DEP, 2009).

Table 2. Taxa list for benthic macroinvertebrate surveys.

Taxa	May 18, 2010	November 24, 2010	May 5, 2011
EPHEMEROPTERA			
<i>Acentrella</i>	1		
<i>Acerpenna</i>		2	
<i>Baetis</i>	4	3	1
<i>Dipheter</i>	14	5	2
<i>Epeorus</i>	39	16	34
<i>Heptagenia</i>		1	1
<i>Maccaffertium</i>	3	9	
<i>Cinygmula</i>	2		1
<i>Drunella</i>	34		116
<i>Ephemerella</i>	6	5	13
<i>Serratella</i>	1		
<i>Habrophlebiodes</i>	1		
<i>Paraleptophlebia</i>	9	25	7
PLECOPTERA			
<i>Pteronarcys</i>	1	1	
<i>Tallaperla</i>		1	
<i>Taeniopteryx</i>		7	
<i>Taenionema</i>		19	
<i>Amphinemura</i>	4		4
<i>Ostrocerca</i>	1		
<i>Leuctra</i>	17	12	3
<i>Allocapnia</i>		3	
<i>Paracapnia</i>		29	
<i>Acroneuria</i>	1		3
<i>Malirekus</i>		1	
<i>Isoperla</i>		12	
<i>Suwallia</i>	1		2
<i>Sweltsa</i>	2	25	8
TRICOPTERA			
<i>Dolophilodes</i>		4	
<i>Wormaldia</i>	1		1
<i>Diplectronea</i>		1	2
<i>Ceratopsyche</i>		7	5
<i>Cheumatopsyche</i>		2	
<i>Rhyacophila</i>	1	8	1
<i>Lepidostoma</i>			1
<i>Neophylax</i>	2	1	

Table 2 (Cont.)

OTHER			
<i>Optioservus</i>	1	7	3
<i>Oulimnius</i>	19	3	10
<i>Promoresia</i>	1		
<i>Chelifera</i>	1		
<i>Antocha</i>	1	1	
<i>Dicranota</i>		2	
<i>Hexatoma</i>		2	
<i>Prosimulium</i>		10	1
<i>Simulium</i>	4		9
Chironomidae	27	27	11
Oligochaeta	1	1	

ASSESSMENT:

Continuous: Parameters collected by the instream monitor indicate excellent water quality conditions. Specific conductance measurements were low and were relatively consistent throughout the year with no unexpected variation. This suggests minimal, if any, anthropogenic impact. There were slight depressions in pH associated with high flow events. These depressions are characteristic of streams that have little geochemical buffering capacity.

Biological: Overall, the benthic macroinvertebrate community indicated excellent water quality throughout the year. On average, 61% of the total taxa consist of intolerant Ephemeroptera, Plecoptera & Trichoptera (EPT). The most dominant taxa were Epeorus and Drunella. Hilsenhoff Biotic Index (HBI) scores are indicative of a macroinvertebrate community that is relatively intolerant to pollution.

Table 3

Date	IBI	Richness	Mod EPT	HBI	% Dom	% Mod May	Beck3	Shannon Div
May 18, 2010	88.1	29	18	2.54	19.5	47.5	34	2.56
November 24, 2010	95.6	32	19	2.23	11.5	22.2	34	2.97
May 5, 2011	84.2	23	15	1.60	48.5	72.0	34	2.00

SUMMARY:

Overall water quality is good, exhibiting limited, if any, influences from upstream sources. Specific conductance over the period was low with highest levels occurring during the late-summer low flow period (Figure 2). This is common for many clean headwater streams in Pennsylvania. Circumneutral pH throughout the summer and fall are typical of a moderately buffered system. Slight depressions in pH did occur during colder months of the year. This is most likely due to reduced buffering capacity associated with the lack to instream production during these months. Chemistry samples indicate low levels of dissolved solids.

The benthic macroinvertebrate community contains a high diversity of intolerant taxa. Based on consistent IBI scores and stable diversity metrics any anthropogenic influence to Horton Run is likely minimal and episodic.

LITERATURE CITED

PA DEP. 2009. Instream Comprehensive Evaluations (ICE).
http://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Methodology/ice_2009am.pdf