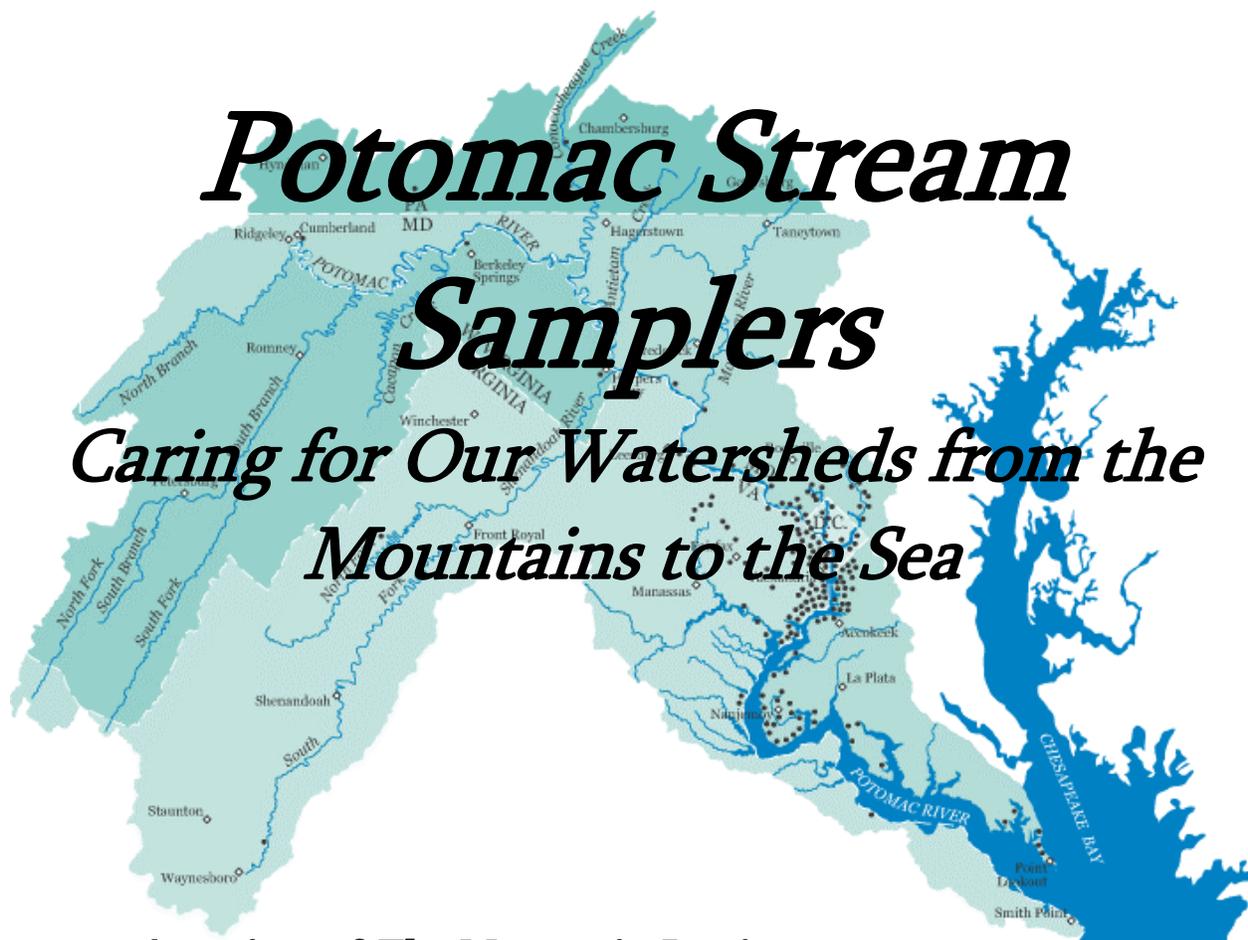


# 2007 Data Report

## *Potomac Stream*

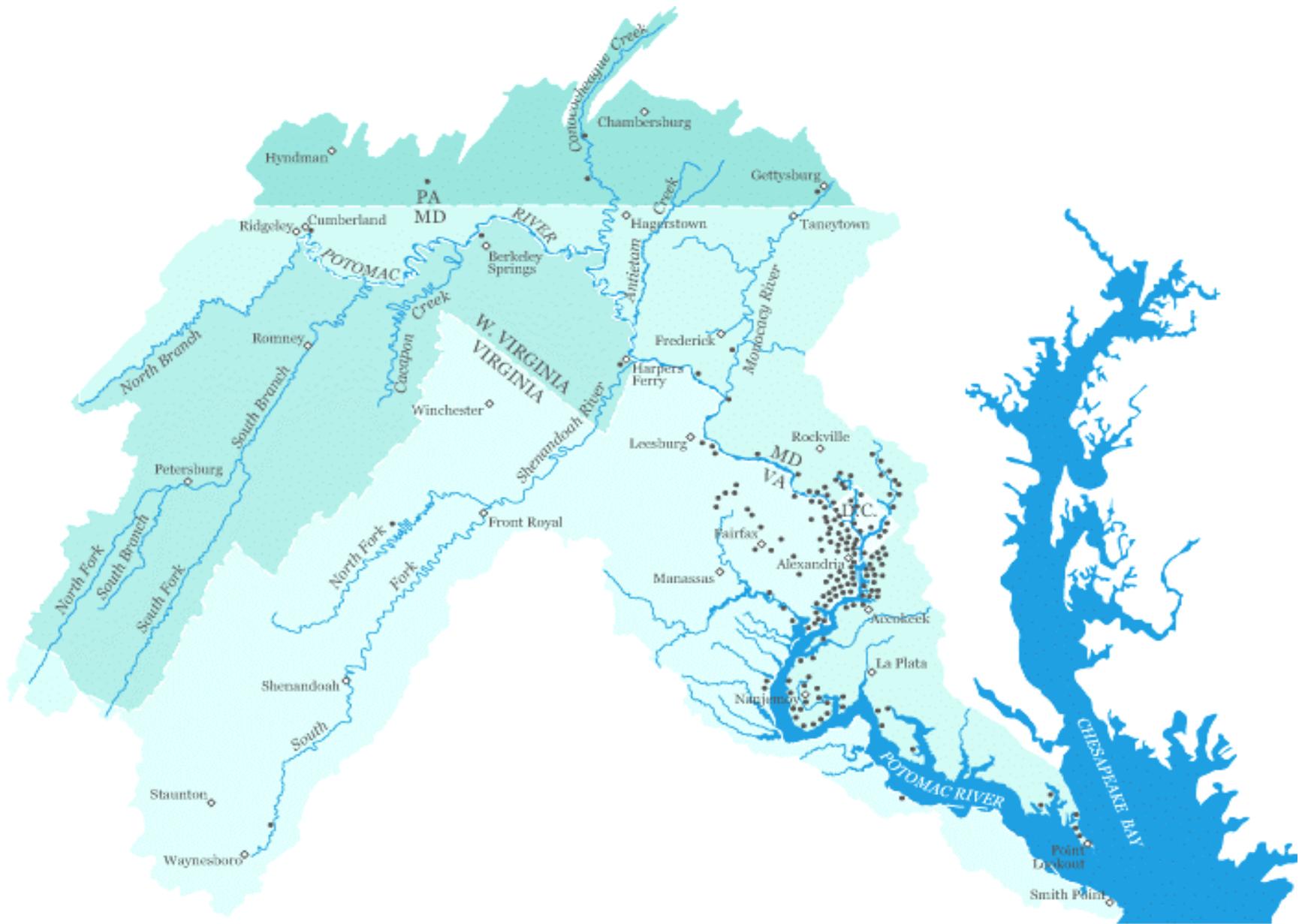
## *Samplers*

*Caring for Our Watersheds from the  
Mountains to the Sea*



**A project of *The Mountain Institute*,  
in cooperation with the  
*National Oceanic and Atmospheric Administration***





*(Image from the Potomac Conservancy website)*

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## About the Potomac Stream Samplers Program

In 2004, The Mountain Institute (TMI) received funding from the National Oceanic and Atmospheric Administration (NOAA) to implement a watershed education project involving students and educators who live in West Virginia's Potomac River watershed. As part of a broader effort to educate the public about the compromised and increasingly stressed health of the Chesapeake Bay, Potomac Stream Samplers was designed by TMI to raise awareness of the connection between regions within the Potomac River drainage and the Bay itself. The program partners with the West Virginia Department of Environmental Protection (WVDEP) and, since 2006, with Trout Unlimited (TU), and is geared to serve educators in Pendleton, Berkeley, Hardy, Grant, Mineral, Morgan, Hampshire and Jefferson Counties of West Virginia.

Since receiving the grant, TMI has successfully run four years of programming, each year building upon the last with enhanced curriculum and TMI staff development, teacher participation levels, and overall structure of activities. Over the course of the project, TMI has forged meaningful and long lasting relationships with WVDEP staff and a cadre of enthusiastic, energetic teachers. Hundreds of students have been exposed to watershed education through stream testing and stewardship related exercises, both in their home environs and abroad. Many students have continued their Potomac Stream Samplers education through science projects, presentations and involvement in local watershed organizations, while teachers have integrated the curriculum into their regular classroom lessons. Furthermore, several teachers have gained graduate and continuing education credits for their involvement in the program.

The Potomac Stream Samplers model facilitates multiple interactions between staff, students and teachers to ensure greater impact on participants in terms of understanding concepts and developing stewardship mentalities. The initial activity is a three-day professional development workshop for teachers at TMI's Spruce Knob Mountain Center. Here, teachers and TMI staff engage in detailed stream investigations and watershed assessment skills through the instruction of Tim Craddock and Alana Hartman of the WVDEP. Nearby Big Run, one of the most pristine streams in West Virginia serves as the study site. The workshop culminates in a visit to Spruce Knob, the highest point in West Virginia and in the Chesapeake Bay watershed.

Throughout the autumn these teachers bring their students up to the mountain for two-day field trips focusing on stream surveying, watershed awareness and stewardship. To put their new stream sampling skills to work students then visit a local waterway to investigate water quality in their own reaches of the Potomac basin. With the help of their teachers and a crew of TMI staff, students collect information on the biological, physical and chemical conditions of the streams.

Many of the six participating schools in 2007 have been a part of Potomac Stream Samplers for most of its duration, while some were welcomed to the program for the first time. This year's participating schools were Musselman High School and Spring Mills Middle School of Berkeley

County, East Hardy High of Hardy County, Frankfort Middle School of Mineral County, Pendleton County Middle School, and Rockwood High School of Somerset County, Pennsylvania.

This year the program's partnership with Trout Unlimited grew to include all students in TU restoration projects. During their field trips to TMI students spent a morning touring the components of TU's Potomac Headwaters Initiative restoration project along tributaries of Big Run, visiting fence ex-closures, watering troughs, bridges and tree plantings. They themselves planted trees, including willow and spruce, along riparian zones, often beginning the process by making the cuttings from nearby willows. As a bonus treat, a family of beavers recently moved in near the planting site and many students were able to visit the beautiful new ponds and discuss beaver ecology. A few keen students even spotted a beaver dashing back to its lodge! Pendleton County Middle School students again had the opportunity to plant trees along one of their local sampling sites on the Blackthorn Creek, also part of TU's Potomac Headwaters project.

Presented in this report are water quality data collected from Big Run during the professional development workshop and student field trips to the Spruce Knob Mountain Center, and from streams local to the schools. Maps of each sampling location and photographs taken throughout the season are also included. Stream status maps reflecting stream conditions across the Potomac basin in West Virginia summarize the 2007 results as well as the culmination of available data since the program began in 2004. All data in this report were collected by students, teachers and TMI staff as part of the Potomac Stream Samplers program.

It is the hope that Potomac Stream Samplers participants will come to understand how their actions affect water quality and gain an appreciation for the importance of clean water. As inhabitants of the headwaters of the Chesapeake Bay, their ability to be stewards of their local water resources in turn benefits thousands of people downstream. Of course, it is also hoped that those involved in the program share their knowledge with others and encourage a broader concern for water quality. This 2007 Potomac Stream Samplers Data Report is a step towards that goal. After all, informed citizens are the best equipped to become stream stewards.

## Explanation of Data

All stream sampling was completed using WVDEP'S [Save Our Streams](#) Level One-Two survey forms. Assessments are made along a 100-meter reach of stream. Generally students were broken into two to three groups, each performing a complete survey along a portion of the reach so that the entire reach was assessed. These groups collected data on three major aspects of the stream: chemical, biological, and physical/habitat.

### Chemical

Chemical data is procured using basic LaMotte test kits for nitrates, phosphates, dissolved oxygen (measured in parts per million, or ppm), pH (1-14), turbidity (measured in Jackson Turbidity Units, or JTU), temperature (Celsius) and conductivity (measured in micro-siemens, or uS). It is important to realize that chemical data is merely a snapshot of stream quality at the time of testing. Many chemical conditions naturally fluctuate over the course of a day, a week, a month and even a year. However, each chemical parameter has its own specific range associated with ideal conditions, and results ought to fall within these ranges regardless of natural cycles. Any parameters that fall too far outside these acceptable ranges may be cause for concern. There is no overall chemical score; rather a general picture of water quality emerges from all results taken together.

### Physical/Habitat

Physical and habitat aspects of the stream are assessed both through simple observations as well as measurements and are used to calculate a Habitat Condition Index for the stream. This score corresponds to a rating of Optimal (>80), Sub-Optimal (65-80), Marginal (50-64.9) or Poor (<50).

Physical conditions include:

- Water Level/Discharge
  - Measured in cubic feet per second (cfs) and refers to how many cubic feet of water pass by a given cross section of stream per second
- Channel measurements
  - Depth and width of riffles, runs or pools; depth measured at deepest part of habitat
- Water clarity, color and odor
- Algae abundance, texture and color
- Streambed color
- Surface foam abundance
- Channel shade
  - Percent of the reach that would be shaded in full leaf conditions at the sun's zenith

Habitat conditions include:

- Sediment Deposition & Embeddedness
  - Affected by how much extra sediment is being introduced into streams; sediment deposition is evidenced by an increase in point bar and island formation and infilling of the channel; embeddedness refers to how much space around streambed gravel and cobble is filled in by fine sediment
- Bank Stability
  - Relates to evidence of erosion and potential for bank collapse or failure
- Buffer Width

- Scored based on how far the zone of mixed vegetation extends on either side of the stream before being disturbed
- Streambed Composition
  - Percentage of silt/clay, sand, gravel, cobble, boulder, bedrock and woody debris that comprises streambed; this relates to sedimentation and available habitat for macroinvertebrates and is used to calculate a Composition Index.

### Biological

Biological data is gathered through the collection, identification and counting of macroinvertebrates. Two to four samples must be collected along the reach for an accurate assessment, and in most cases three were collected. Where only two samples were collected a note is made in the data. A Stream Condition Index is computed from this data and corresponds to a rating a rating of Optimal (>80), Sub-Optimal (65-80), Marginal (50-64.9) or Poor (<50). In addition, macroinvertebrate information can be used to find a set of biological metrics, which provide a general picture of tolerance levels and biodiversity in the sample.

The metrics include:

- Total Taxa
  - The total number of different kinds of animals found, including how many different kinds of a particular family were observed
- EPT Taxa
  - The number of Ephemeroptera (Mayfly), Plecoptera (Stonefly) and Trichoptera (Caddisfly) taxa found; EPT families are the most sensitive to changes in stream conditions
- Biotic Index
  - Relates to overall abundance and tolerance levels of macroinvertebrates; used to calculate Stream Condition Index
- % EPT
  - Percentage of all animals found that are EPT taxa
- % Tolerant
  - The percentage of animals found that are considered stress tolerant; a high score may indicate unstable water conditions in which more tolerant species can thrive

Finally, the Stream Condition Index and Habitat Condition Index are used to calculate an Overall Score for the stream. This score corresponds to an Integrity classification of Optimal (>80), Sub-Optimal (65-80), Marginal (50-64.9) or Poor (<50). Each stream sampled was given one of these designations and these are reflected on the Stream Status Maps. Additionally, an assessment of Fully Supporting, Partially Supporting, Threatened or Non-Supporting can be given based upon sampling results.

# Data Summaries

## BIG RUN: LOWER (1) & UPPER (2) REACHES

(1) Latitude: N 38-41-22

Longitude: W 79-34-3.5

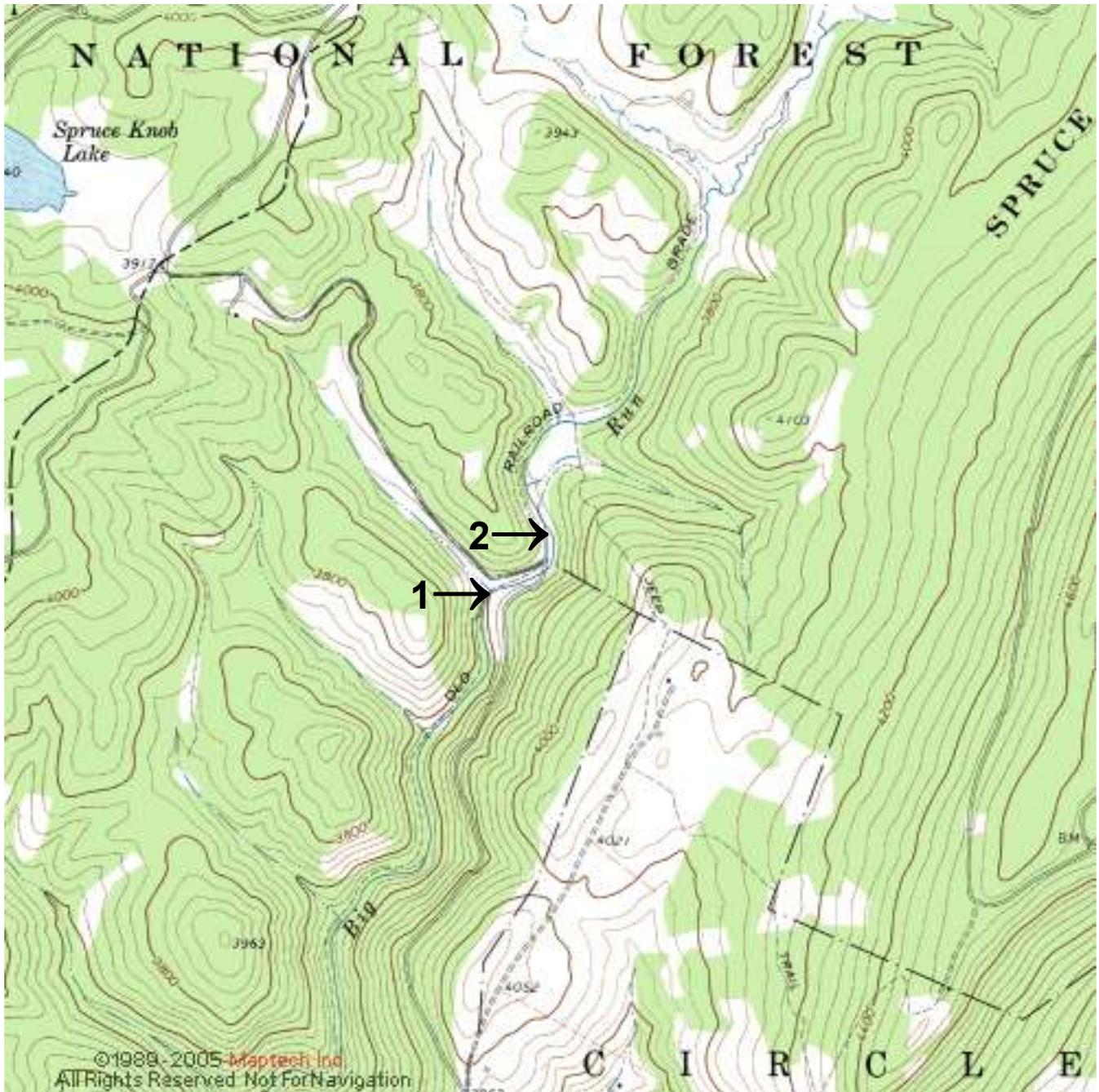
USGS Quad: Spruce Knob

(2) Latitude: N 38-41-26

Longitude: W 79-33-59

USGS Quad: Spruce Knob

**Directions:** From TMI gate turn right, go approximately 1.3 miles down the hill to hairpin turn and park at the Forest Service gate; lower reach begins approx. 1/8 mile downstream of road bridge; upper reach begins approx. 100m upstream of second bridge at the start of Gatewood Trail



Stream name BIG RUN (PROFESSIONAL DEVELOPMENT) Basin SOUTH BRANCH POTOMAC  
 Monitor(s) TMI STAFF, TEACHERS, WVDEP  
 County PENDLETON Latitude 38 41 22 Longitude 79 34 3.5  
 Survey date 08/07/07 Topo quad: SPRUCE KNOB  
 Station code LOWER REACH (1) River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	18 C
pH	8.4
Conductivity	50
Dissolved Oxygen	8.0
Phosphate	
Nitrate/Nitrite	
Turbidity (NTU)	
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	A	5
Plecoptera ( <b>Stoneflies</b> )	A	4
Trichoptera ( <b>Caddisflies</b> )	C	4
Hydropsychidae ( <b>Common netspinner</b> )	A	1
Anisoptera ( <b>Dragonflies</b> )	R	2
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )		
Psephenidae ( <b>Water penny</b> )	C	1
Coleoptera ( <b>Other beetles</b> )	R	1
Corydalidae ( <b>Fishfly/Hellgrammite</b> )	R	1
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )	R	1
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )		
Athericidae ( <b>Watersnipe fly</b> )	C	1
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )	R	1
Amphipoda ( <b>Scud/Sideswimmer</b> )		
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )	R	1
Oligochaeta ( <b>Aquatic worms</b> )		
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>		24

**Physical Conditions**

Run width (ft) 10.6 Run depth (ft) 0.5

Discharge (cfs)	5.9
Water level	LOW
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	NONE
Algae color	BROWN/GREEN
Algae abundance	IN SPOTS
Algae texture	EVEN COAT
Channel shade	EXCELLENT

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	0		<input type="checkbox"/>
% Sand	3		
% Gravel	26		
% Cobble	40		
% Boulder	6		
% Bedrock	25		
% Woody debris	0		
<b>Index</b>	4.08		

Other invertebrates (**describe**) \_\_\_\_\_

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed SCULPINS AND BROOK TROUT

**Habitat Conditions**

Sediment deposition	O	
Embeddedness	O	
	<b>LEFT</b>	<b>RIGHT</b>
Bank stability	S	S
Bank protection		
Riparian buffer width	S	S
Total score	64	
<b>Habitat Index</b>	80.0	SUBOPTIMAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Suboptimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	24	100
EPT Taxa	14	100
Biotic Index	3.96	86.3
% EPT		
% Tolerant		
<b>Stream Index</b>	95.4	OPTIMAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

**Abundance Codes**

A (Abundant) > 50 (4), C (Common) 5 – 50 (2), R (Rare) < 5 (1)

**Overall Score** 87.7 OPTIMAL

Comments: \_\_\_\_\_

	1	W	UNPAVED RDS	2	S		
LOGGING							
RECREATION							
PASTURE							

Stream name BIG RUN Basin SOUTH BRANCH POTOMAC  
 Monitor(s) TMI STAFF, STUDENTS AND TEACHERS (MUSSELMAN, FRANKFORT AND PENDLETON)  
 County PENDLETON Latitude 38 41 26 Longitude 79 33 59  
 Survey date 10/15/23/29/2007 Topo quad: SPRUCE KNOB  
 Station code UPPER REACH (2) River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	10 C
pH	7.5
Conductivity	32
Dissolved Oxygen	3.6
Phosphate	1.2
Nitrate/Nitrite	2.5
Turbidity (NTU)	10 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	232	4
Plecoptera ( <b>Stoneflies</b> )	29	3
Trichoptera ( <b>Caddisflies</b> )	77	2
Hydropsychidae ( <b>Common netspinner</b> )	53	1
Anisoptera ( <b>Dragonflies</b> )	3	1
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )		
Psephenidae ( <b>Water penny</b> )	1	1
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )	6	1
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )	1	1
Tipulidae ( <b>Crane fly</b> )	4	1
Athericidae ( <b>Watersnipe fly</b> )	7	1
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )	6	1
Amphipoda ( <b>Scud/Sideswimmer</b> )		
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )		
Oligochaeta ( <b>Aquatic worms</b> )		
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	<b>419</b>	<b>17</b>

**Physical Conditions**

Run width (ft) 20.5 Run depth (ft) 0.9

Discharge	8.2
Water level	VERY LOW - HIGH
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	SLIGHT
Algae color	BROWN
Algae abundance	IN SPOTS
Algae texture	EVEN COAT
Channel shade	GOOD

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	1		<input type="checkbox"/>
% Sand	2		
% Gravel	39		
% Cobble	31		
% Boulder	20		
% Bedrock	3		
% Woody debris	4		
<b>Index</b>	<b>3.56</b>		

Other invertebrates (describe) \_\_\_\_\_

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed SUCKERS, BROOK TROUT AND SALAMANDERS

**Habitat Conditions**

Sediment deposition	16	
Embeddedness	16	
	<b>LEFT</b>	<b>RIGHT</b>
Bank stability	9	8
Bank protection		
Riparian buffer width	9	9
Total score	67	
<b>Habitat Index</b>	<b>83.8</b>	OPTIMAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	17	81
EPT Taxa	10	76.9
Biotic Index	3.27	96.1
% EPT	93.3	100
% Tolerant	0	100
<b>Stream Index</b>	<b>90.8</b>	OPTIMAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

**Abundance Codes**

**A** (Abundant) > 50 (**4**), **C** (Common) 5 – 50 (**2**), **R** (Rare) < 5 (**1**)

**Overall Score** 87.3 OPTIMAL

Comments: DATA REPORTED ARE AVERAGES FROM ALL SURVEY DATES

LOGGING	1	W	UNPAVED RDS	2	S		
RECREATION	2	S	BRIDGES	2	S		
PASTURE	1	W					

Stream name BIG RUN Basin SOUTH BRANCH POTOMAC  
 Monitor(s) TMI STAFF, TEACHERS AND STUDENTS (SPRING MILLS, EAST HARDY, ROCKWOOD)  
 County PENDLETON Latitude 38 41 22 Longitude 79 34 3.5  
 Survey date 10/17/25; 11/1/2007 Topo quad: SPRUCE KNOB  
 Station code UPPER REACH (2) River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	9.0 C
pH	7.0
Conductivity	31
Dissolved Oxygen	10.0
Phosphate	1.0
Nitrate/Nitrite	0.5
Turbidity (NTU)	10 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	179	4
Plecoptera ( <b>Stoneflies</b> )	107	3
Trichoptera ( <b>Caddisflies</b> )	30	2
Hydropsychidae ( <b>Common netspinner</b> )	131	1
Anisoptera ( <b>Dragonflies</b> )	7	1
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )	1	1
Psephenidae ( <b>Water penny</b> )	2	1
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )	2	1
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )	5	1
Athericidae ( <b>Watersnipe fly</b> )	9	1
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )	15	1
Amphipoda ( <b>Scud/Sideswimmer</b> )	1	1
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )	4	1
Oligochaeta ( <b>Aquatic worms</b> )	2	1
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	495	20

**Physical Conditions**

Run width (ft) 12.5 Run depth (ft) 0.6

Discharge (cfs)	11.2
Water level	VERY LOW – HIGH
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	SLIGHT
Algae color	BROWN
Algae abundance	IN SPOTS
Algae texture	EVEN COAT
Channel shade	EXCELLENT

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	0		<input type="checkbox"/>
% Sand	3		
% Gravel	41		
% Cobble	27		
% Boulder	9		
% Bedrock	20		
% Woody debris	0		
<b>Index</b>	3.79		

Other invertebrates (**describe**) \_\_\_\_\_

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	18	
Embeddedness	16	
	<b>LEFT</b>	<b>RIGHT</b>
Bank stability	8	8
Bank protection		
Riparian buffer width	9	8
Total score	67	
<b>Habitat Index</b>	83.8	OPTIMAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	20	95.2
EPT Taxa	10	76.9
Biotic Index	3.51	92.7
% EPT	90.3	100
% Tolerant	1.9	100
<b>Stream Index</b>	93	OPTIMAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

**Abundance Codes**

A (Abundant) > 50 (4), C (Common) 5 – 50 (2), R (Rare) < 5 (1)

**Overall Score** 88.4 OPTIMAL

Comments: DATA REPORTED ARE AVERAGES FROM ALL SURVEY DATES

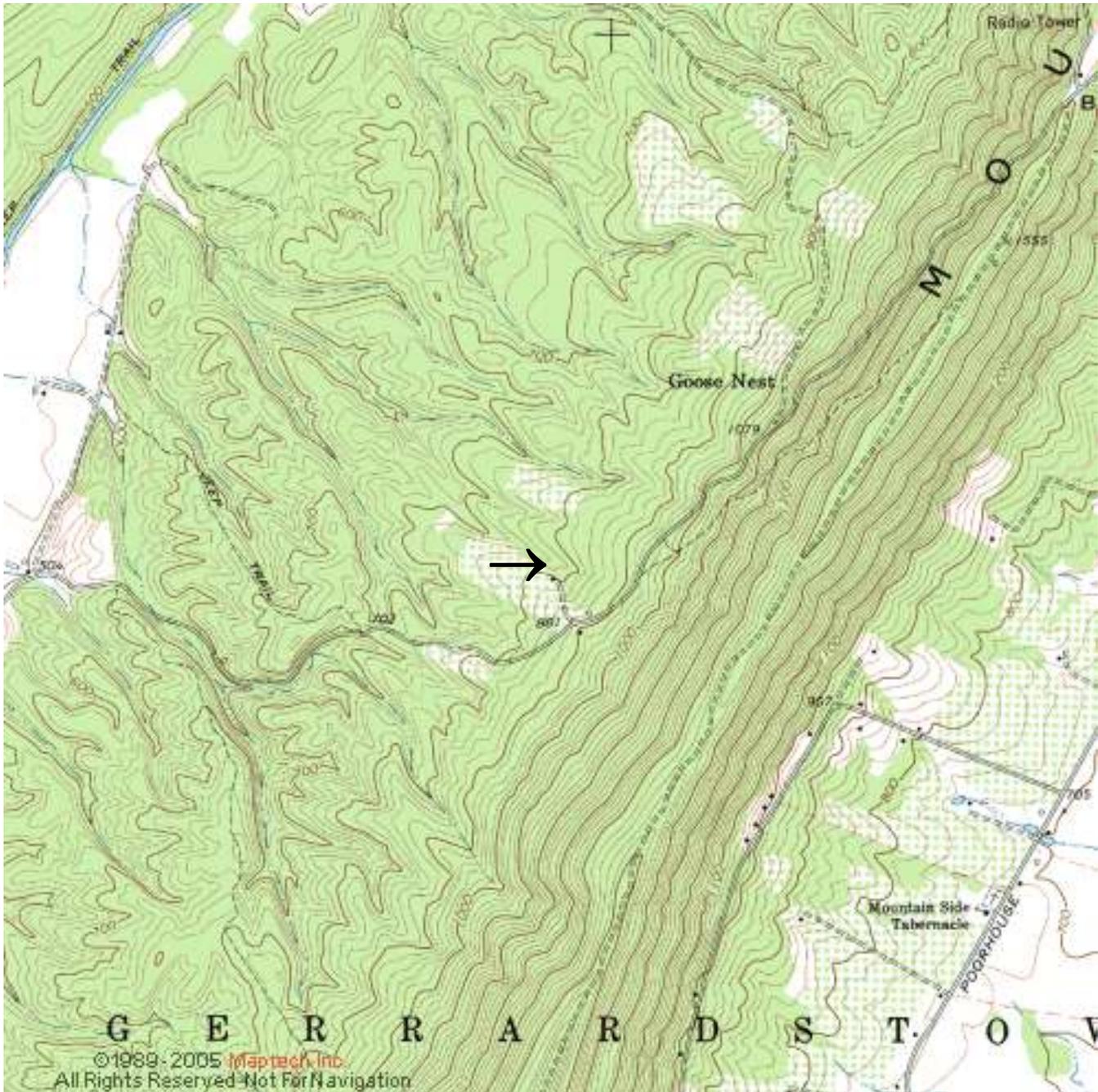
LOGGINS	1	W	UNPAVED RD	1	S
RECREATION	2	S	BRIDGE	2	S
PASTURE	1	W			

# UNNAMED TRIBUTARY OF BACK CREEK

Latitude: N 39-26-32

Longitude: W 78-5-08 USGS Quad: Tablers Station

**Directions:** On the Raine's family property take access road down to orchards; reach begins approximately 50m downstream of trout pond



Stream name UNT BACK CREEK Basin POTOMAC DIRECT DRAINS  
 Monitor(s) MUSSELMAN HIGH SCHOOL  
 County BERKELEY Latitude 39 26 32 Longitude 78 05 08  
 Survey date 11/05/2007 Topo quad: TABLERS STATION  
 Station code \_\_\_\_\_ River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	11 C
pH	8.0
Conductivity	324
Dissolved Oxygen	5.0
Phosphate	2.0
Nitrate/Nitrite	1.0
Turbidity (NTU)	10 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	5	1
Plecoptera ( <b>Stoneflies</b> )		
Trichoptera ( <b>Caddisflies</b> )	8	1
Hydropsychidae ( <b>Common netspinner</b> )	6	1
Anisoptera ( <b>Dragonflies</b> )		
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )		
Psephenidae ( <b>Water penny</b> )		
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )		
Sialidae ( <b>Alderfly</b> )	2	1
Chironomidae ( <b>Non-biting midge</b> )	1	1
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )	1	1
Athericidae ( <b>Watersnipe fly</b> )		
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )	6	1
Amphipoda ( <b>Scud/Sideswimmer</b> )	60	1
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )		
Oligochaeta ( <b>Aquatic worms</b> )		
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	89	8

**Physical Conditions**

Run width (ft) 5.3 Run depth (ft) 0.3

Discharge (cfs)	1.6
Water level	LOW
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	NONE
Algae color	BROWN
Algae abundance	IN SPOTS
Algae texture	EVEN COAT
Channel shade	GOOD

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	7		<input type="checkbox"/>
% Sand	12		
% Gravel	49		
% Cobble	10		
% Boulder	3		
% Bedrock	8		
% Woody debris	11		
<b>Index</b>	2.67		

Other invertebrates (describe) \_\_\_\_\_

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	17	
Embeddedness	15	
<b>LEFT</b>	<b>RIGHT</b>	
Bank stability	7	9
Bank protection		
Riparian buffer width	8	10
Total score	66	
<b>Habitat Index</b>	82.5	OPTIMAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	8	38.1
EPT Taxa	3	23.1
Biotic Index	4.82	74
% EPT	21.3	23.7
% Tolerant	1.1	100
<b>Stream Index</b>	51.7	MARGINAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

**Abundance Codes**

**A** (Abundant) > 50 (**4**), **C** (Common) 5 – 50 (**2**), **R** (Rare) < 5 (**1**)

**Overall Score** 67.1 SUBOPTIMAL

Comments: SITE IS ABOUT 100-METERS DOWNSTREAM OF THE SPRING SOURCE

	Count	M		Count	M	
PASTURE	1	M	RESIDENCES	2	M	
CROPLAND	1	M	PAVED RDS	2	W	
UNPAVED RDS	2	M	APPLE ORCHARDS	2	M	

# PATTERSON CREEK

Latitude: N 39-30-36

Longitude: W 78-46-20

USGS Quad: Cresaptown

**Directions:** From Fort Ashby head North on Rt. 28 about 1 mile, cross Patterson Creek and turn left on opposite side of bridge, park by water treatment plant; reach begins just below plant



Stream name PATTERSON CREEK Basin POTOMAC DIRECT DRAINS  
 Monitor(s) FRANKFORT MIDDLE SCHOOL  
 County MINERAL Latitude 39 30 36 Longitude 78 46 20  
 Survey date 11/06/2007 Topo quad: CRESAPTOWN  
 Station code \_\_\_\_\_ River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	9.0 C
pH	7.5
Conductivity	325
Dissolved Oxygen	6.0
Phosphate	0.5
Nitrate/Nitrite	1.0
Turbidity (NTU)	20 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	28	2
Plecoptera ( <b>Stoneflies</b> )		
Trichoptera ( <b>Caddisflies</b> )	50	2
Hydropsychidae ( <b>Common netspinner</b> )	16	1
Anisoptera ( <b>Dragonflies</b> )	1	1
Zygoptera ( <b>Damselflies</b> )	4	1
Elmidae ( <b>Riffle beetle</b> )		
Psephenidae ( <b>Water penny</b> )	48	1
Coleoptera ( <b>Other beetles</b> )	1	1
Corydalidae ( <b>Fishfly/Hellgrammite</b> )		
Sialidae ( <b>Alderfly</b> )	8	1
Chironomidae ( <b>Non-biting midge</b> )	4	1
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )	1	1
Athericidae ( <b>Watersnipe fly</b> )	9	1
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )		
Amphipoda ( <b>Scud/Sideswimmer</b> )	24	1
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )	30	1
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )	7	1
Pulmonata ( <b>Non-operculate snails</b> )		
Oligochaeta ( <b>Aquatic worms</b> )	3	1
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )	2	1
Other Aquatic Invertebrates		
<b>Totals</b>	236	18

**Physical Conditions**

Run width (ft) 17 Run depth (ft) 0.9

Discharge (cfs)	35.5
Water level	NORMAL
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	SLIGHT
Algae color	BROWN
Algae abundance	EVERYWHERE
Algae texture	EVEN COAT
Channel shade	POOR

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	49		<input type="checkbox"/>
% Sand			
% Gravel	49		
% Cobble	1		
% Boulder			
% Bedrock			
% Woody debris	1		
<b>Index</b>	1.17		

Other invertebrates (describe) \_\_\_\_\_

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	11	
Embeddedness	18	
	<b>LEFT</b>	<b>RIGHT</b>
Bank stability	8	6
Bank protection		
Riparian buffer width	4	3
Total score	50	
<b>Habitat Index</b>	62.5	MARGINAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	18	85.7
EPT Taxa	5	38.5
Biotic Index	4.84	73.7
% EPT	39.8	44.2
% Tolerant	3.8	98.2
<b>Stream Index</b>	68.1	SUBOPTIMAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

CONSTRUCTION	1	W	FEEDLOTS	2	W	RESIDENCES	2	S
OIL/GAS RDS	1	W	TRASH DUMPS	1	W	PAVED RDS	2	S
UNPAVED RDS	1	W	SUB-URBAN	2	M	PASTURE/CROP	2	M

**Abundance Codes**

**A** (Abundant) > 50 (**4**), **C** (Common) 5 – 50 (**2**), **R** (Rare) < 5 (**1**)

**Overall Score** 65.3 SUBOPTIMAL

Comments: \_\_\_\_\_



Stream name CONOCOCHIEGUE CREEK Basin POTOMAC DIRECT DRAINS (MD)  
 Monitor(s) SPRING MILLS MIDDLE SCHOOL SCIENCE CLUB  
 County WASHINGTON (MD) Latitude 39 36 02 Longitude 77 49 43  
 Survey date 11/07/2007 Topo quad: WILLIAMSPORT  
 Station code \_\_\_\_\_ River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	9.0 C
pH	7.5
Conductivity	566
Dissolved Oxygen	7.0
Phosphate	1.0
Nitrate/Nitrite	9.5
Turbidity (NTU)	70 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )		
Plecoptera ( <b>Stoneflies</b> )		
Trichoptera ( <b>Caddisflies</b> )		
Hydropsychidae ( <b>Common netspinner</b> )		
Anisoptera ( <b>Dragonflies</b> )	2	1
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )	1	1
Psephenidae ( <b>Water penny</b> )		
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )		
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )		
Athericidae ( <b>Watersnipe fly</b> )		
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )		
Amphipoda ( <b>Scud/Sideswimmer</b> )	24	1
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )	1	1
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )	4	1
Oligochaeta ( <b>Aquatic worms</b> )		
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	<b>32</b>	<b>5</b>

**Physical Conditions**

Run width (ft) \_\_\_\_\_ Run depth (ft) \_\_\_\_\_

Discharge (cfs)	
Water level	NORMAL
Water clarity	MURKY
Water color	NONE
Water odor	MUSKY
Sediment odor	
Streambed color	BROWN
Surface foam	SLIGHT
Algae color	BROWN
Algae abundance	EVERYWHERE
Algae texture	EVEN COAT
Channel shade	POOR

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	30		<input type="checkbox"/>
% Sand	26		<input type="checkbox"/>
% Gravel	14		<input type="checkbox"/>
% Cobble	8		<input type="checkbox"/>
% Boulder	6		<input type="checkbox"/>
% Bedrock			<input type="checkbox"/>
% Woody debris	16		<input type="checkbox"/>
<b>Index</b>	<b>1.46</b>		

Other invertebrates (**describe**) 1 BACKSWIMMER

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	16	
Embeddedness	3	
<b>LEFT</b>	<b>RIGHT</b>	
Bank stability	4	8
Bank protection		
Riparian buffer width	3	8
Total score	42	
<b>Habitat Index</b>	<b>52.5</b>	MARGINAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	6	28.6
EPT Taxa	0	0
Biotic Index	5.33	66.7
% EPT	0	0
% Tolerant	12.5	89.3
<b>Stream Index</b>	<b>36.9</b>	POOR

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

**Abundance Codes**

**A** (Abundant) > 50 (**4**), **C** (Common) 5 – 50 (**2**), **R** (Rare) < 5 (**1**)

**Overall Score** 44.7 POOR

Comments: \_\_\_\_\_  
 ADDITIONAL LAND USES (INDUSTRIAL AREAS; BRIDGES) \_\_\_\_\_

RESIDENCES	M	2	RECREATION	1	S	UNPAVED RDS	2	S
SUB-URBAN	M	2	PASTURE/CROP	2	M	PAVED RDS	2	M
CONSTRUCTION	1	W	LANDFILL/TRASH	2	W	PARKING LOTS	2	M

Stream name POTOMAC RIVER Basin POTOMAC DIRECT DRAINS (MD)  
 Monitor(s) SPRING MILLS MIDDLE SCHOOL SCIENCE CLUB  
 County WASHINGTON (MD) Latitude 39 55 57 Longitude 77 49 46  
 Survey date 11/07/2007 Topo quad: WILLIAMSPORT  
 Station code \_\_\_\_\_ River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	8.5 C
pH	7.5
Conductivity	564
Dissolved Oxygen	6.0
Phosphate	1.0
Nitrate/Nitrite	10.0
Turbidity (NTU)	10 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	2	1
Plecoptera ( <b>Stoneflies</b> )		
Trichoptera ( <b>Caddisflies</b> )		
Hydropsychidae ( <b>Common netspinner</b> )		
Anisoptera ( <b>Dragonflies</b> )		
Zygoptera ( <b>Damselflies</b> )	3	1
Elmidae ( <b>Riffle beetle</b> )		
Psephenidae ( <b>Water penny</b> )	1	1
Coleoptera ( <b>Other beetles</b> )	1	1
Corydalidae ( <b>Fishfly/Hellgrammite</b> )		
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )		
Athericidae ( <b>Watersnipe fly</b> )		
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )		
Amphipoda ( <b>Scud/Sideswimmer</b> )	75	1
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )	91	1
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )	1	1
Pulmonata ( <b>Non-operculate snails</b> )	30	1
Oligochaeta ( <b>Aquatic worms</b> )	1	1
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	<b>205</b>	<b>9</b>

**Physical Conditions**

Run width (ft) \_\_\_\_\_ Run depth (ft) \_\_\_\_\_  
 TO WIDE AND DEEP FOR WIDTH/DEPT

Discharge	-
Water level	NORMAL
Water clarity	CLEAR
Water color	NONE
Water odor	MUSKY
Sediment odor	
Streambed color	BRONW
Surface foam	SLIGHT
Algae color	BROWN
Algae abundance	EVERYWHERE
Algae texture	EVEN COAT
Channel shade	POOR

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	20		<input type="checkbox"/>
% Sand	4		
% Gravel	22		
% Cobble	6		
% Boulder	2		
% Bedrock	0		
% Woody debris	46		
<b>Index</b>	<b>1.72</b>		

Other invertebrates (describe) BACKSWIMMERS WERE COMMON

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	14	
Embeddedness	8	
<b>LEFT</b>	<b>RIGHT</b>	
Bank stability	8	5
Bank protection		
Riparian buffer width	2	7
Total score	44	
<b>Habitat Index</b>	<b>55</b>	MARGINAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	10	47.6
EPT Taxa	1	7.7
Biotic Index	5.77	60.4
% EPT	1.0	0.01
% Tolerant	16.6	85.1
<b>Stream Index</b>	<b>40.2</b>	<b>POOR</b>

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

CONSTRUCTION	1	W	OIL/GAS RDS	1	W	PASTURE/CROP	2	M
MINING	1	W	RESIDNECES	2	M	TRASH DUMPS	1	W
LOGGING	1	W	SUB-URBAN	2	M	PAVED RDS	3	S

**Abundance Codes**

A (Abundant) > 50 (4), C (Common) 5 – 50 (2), R (Rare) < 5 (1)

**Overall Score** 47.6 **POOR**

Comments: \_\_\_\_\_  
 ADDITIONAL LAND USES (INDUSTRIAL AREAS, BRIDGES, UNPAVED ROADS)

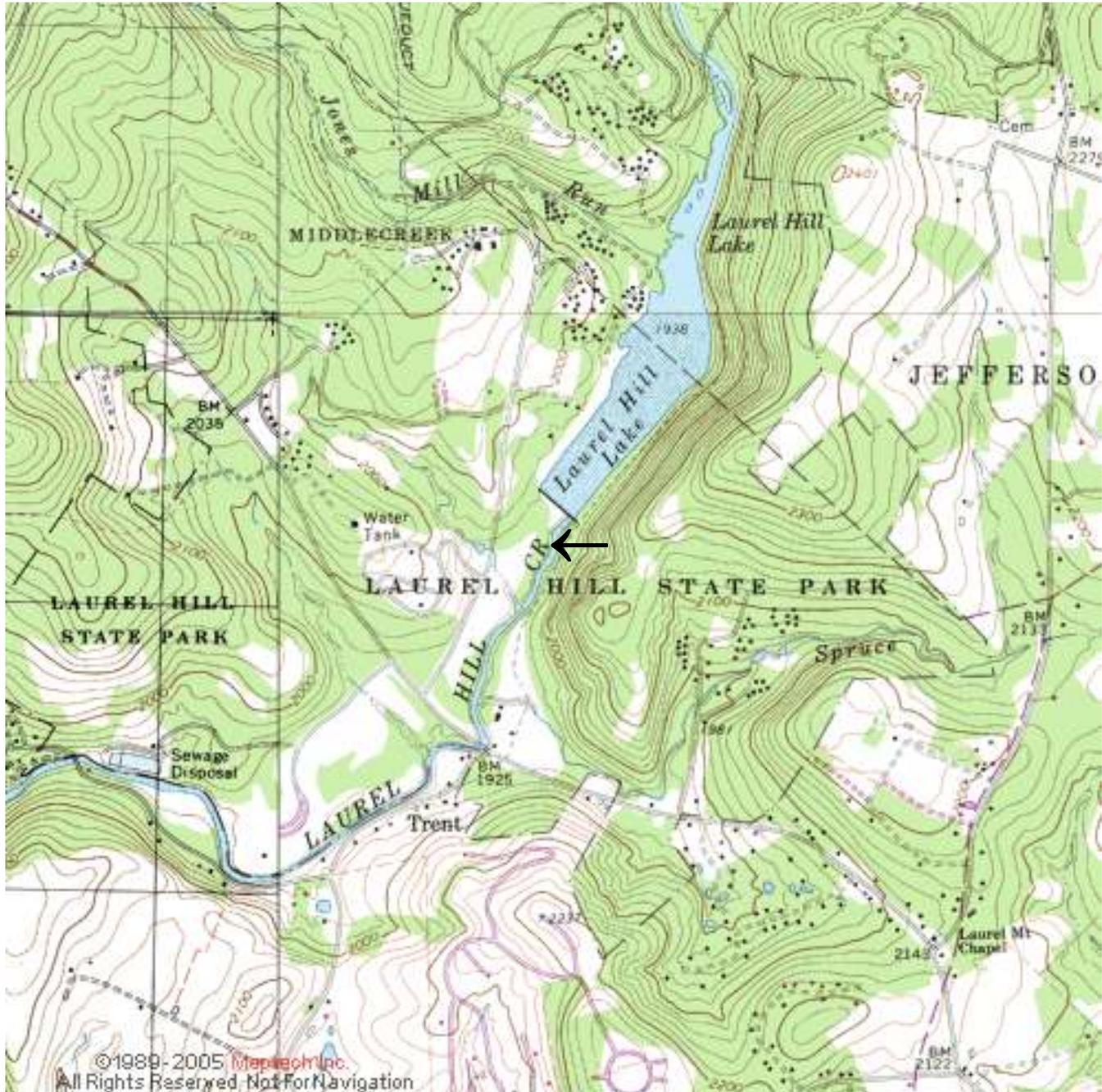
# LAUREL HILL CREEK

Latitude: N 39-59-33

Longitude: W 79-14-20

USGS Quad: Rockwood

**Directions:** Enter Laurel Hill State Park at campground entrance, park by ranger station and walk across field to stream; reach begins a few hundred meters below recreational dam



Stream name LAUREL HILL CREEK Basin CASSELMAN (PA)  
 Monitor(s) ROCKWOOD HIGH SCHOOL  
 County SOMERSET (PA) Latitude 39 59 33 Longitude 79 14 20  
 Survey date 11/09/2007 Topo quad: ROCKWOOD  
 Station code \_\_\_\_\_ River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	6.0 C
pH	8.0
Conductivity	292
Dissolved Oxygen	4.0
Phosphate	1.0
Nitrate/Nitrite	
Turbidity (NTU)	10 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	7	2
Plecoptera ( <b>Stoneflies</b> )		
Trichoptera ( <b>Caddisflies</b> )	50	2
Hydropsychidae ( <b>Common netspinner</b> )	50	1
Anisoptera ( <b>Dragonflies</b> )		
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )		
Psephenidae ( <b>Water penny</b> )		
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )	4	1
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )	1	1
Tipulidae ( <b>Crane fly</b> )		
Athericidae ( <b>Watersnipe fly</b> )		
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )	3	1
Amphipoda ( <b>Scud/Sideswimmer</b> )	17	1
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )		
Oligochaeta ( <b>Aquatic worms</b> )		
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	123	9

**Physical Conditions**

Run width (ft) 34 Run depth (ft) 1.0

Discharge (cfs)	35.9
Water level	HIGH
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	SLIGHT
Algae color	BROWN
Algae abundance	EVERYWHERE
Algae texture	EVEN COAT
Channel shade	GOOD

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	2		<input type="checkbox"/>
% Sand			
% Gravel	40		
% Cobble	40		
% Boulder	14		
% Bedrock	0		
% Woody debris	4		
<b>Index</b>	3.47		

Other invertebrates (describe) \_\_\_\_\_

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	15	
Embeddedness	16	
<b>LEFT</b>	<b>RIGHT</b>	
Bank stability	6	6
Bank protection		
Riparian buffer width	10	10
Total score	63	
<b>Habitat Index</b>	79.8	SUBOPTIMAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	9	42.9
EPT Taxa	5	38.5
Biotic Index	4.27	81.9
% EPT	87	96.7
% Tolerant	0	100
<b>Stream Index</b>	72	SUBOPTIMAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

CONSTRUCTION	1	W	PAVED RDS	2	M	BRIDGES	2	M
MINING	1	W	RESIDENCES	1	W	PARKING LOTS	2	M
PASTURE/CROP	2	M	UNPAVED RDS	1	W			

**Abundance Codes**

A (Abundant) > 50 (4), C (Common) 5 – 50 (2), R (Rare) < 5 (1)

**Overall Score** 75.9 SUBOPTIMAL

Comments: RECENT DAM RELEASES CAUSED HIGH WATER AND COVERED RIFFLE AREAS

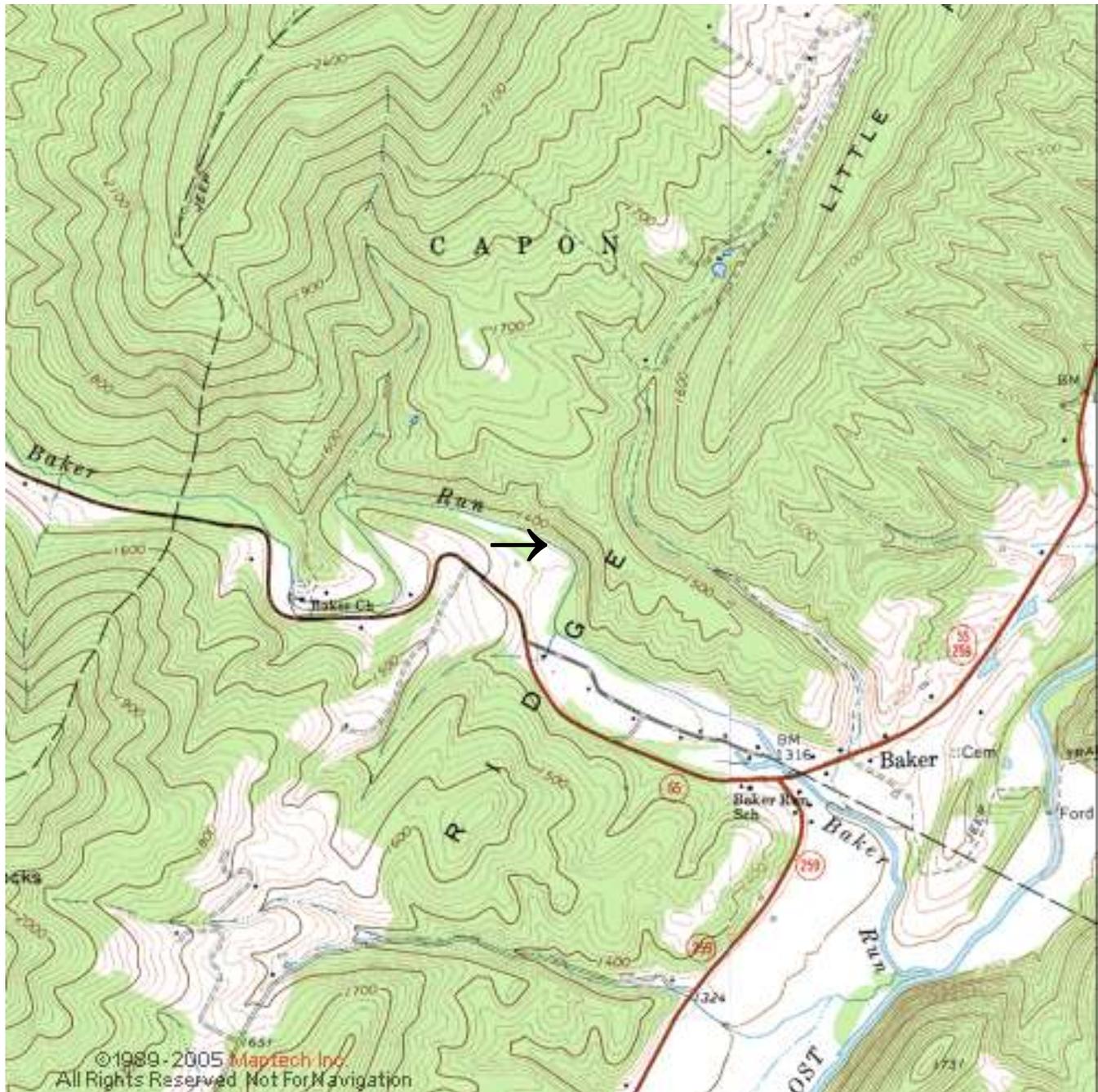
# BAKERS RUN

Latitude: N 39-02-54

Longitude: W 78-45-26

USGS Quad: Needmore

**Directions:** From lower parking lot behind East Hardy High School, follow path from pavilion down to stream



Stream name BAKERS RUN Basin CACAPON RIVER  
 Monitor(s) EAST HARDY MIDDLE/HIGH SCHOOL  
 County HARDY Latitude 39 02 54 Longitude 78 45 26  
 Survey date 11/13/2007 Topo quad: NEEDMORE  
 Station code \_\_\_\_\_ River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	11.0 C
pH	7.5
Conductivity	250
Dissolved Oxygen	5.0
Phosphate	1.0
Nitrate/Nitrite	
Turbidity (NTU)	5 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	23	2
Plecoptera ( <b>Stoneflies</b> )	8	2
Trichoptera ( <b>Caddisflies</b> )	7	1
Hydropsychidae ( <b>Common netspinner</b> )	42	1
Anisoptera ( <b>Dragonflies</b> )	4	1
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )	1	1
Psephenidae ( <b>Water penny</b> )	14	1
Coleoptera ( <b>Other beetles</b> )	2	1
Corydalidae ( <b>Fishfly/Hellgrammite</b> )	13	1
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )	1	1
Tipulidae ( <b>Crane fly</b> )	1	1
Athericidae ( <b>Watersnipe fly</b> )	11	1
Diptera ( <b>Other true flies</b> )	1	1
Decapoda ( <b>Crayfish</b> )		
Amphipoda ( <b>Scud/Sideswimmer</b> )		
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )		
Oligochaeta ( <b>Aquatic worms</b> )	4	1
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	134	16

**Physical Conditions**

Run width (ft) 10 Run depth (ft) 0.5

Discharge (cfs)	8.5
Water level	LOW
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	SLIGHT
Algae color	DARK GREEN
Algae abundance	EVERYWHERE
Algae texture	HAIRY
Channel shade	GOOD

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	0		<input type="checkbox"/>
% Sand	6		
% Gravel	41		
% Cobble	27		
% Boulder	19		
% Bedrock	3		
% Woody debris	4		
<b>Index</b>	3.43		

Other invertebrates (describe) 2 WATER MITES

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	17	
Embeddedness	12	
<b>LEFT</b>	<b>RIGHT</b>	
Bank stability	7	8
Bank protection		
Riparian buffer width	9	4
Total score	57	
<b>Habitat Index</b>	71.3	SUBOPTIMAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	17	81
EPT Taxa	6	46.2
Biotic Index	4.24	82.3
% EPT	60.6	67.3
% Tolerant	3.8	98.2
<b>Stream Index</b>	75	SUBOPTIMAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

CONSTRUCTION	1	W	RESIDENCES	1	W	RECREATION	1	S
LOGGING	1	W	PAVED RDS	2	M	BRIDGES	2	M
PASTURE/CROP	2	M	PARKING LOTS	2	M			

**Abundance Codes**

A (Abundant) > 50 (4), C (Common) 5 – 50 (2), R (Rare) < 5 (1)

**Overall Score** 73.2 SUBOPTIMAL

Comments: \_\_\_\_\_



Stream name BLACKTHORN CREEK Basin SOUTH BRANCH POTOMAC  
 Monitor(s) PENDLETON MIDDLE SHCOOL  
 County PENDLETON Latitude 38 31 11 Longitude 79 22 38  
 Survey date 11/14/2007 Topo quad: MOATSTOWN  
 Station code UPPER REACH River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	10.0 C
pH	7.5
Conductivity	166
Dissolved Oxygen	9.0
Phosphate	1.0
Nitrate/Nitrite	1.5
Turbidity (NTU)	20 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	38	2
Plecoptera ( <b>Stoneflies</b> )	18	3
Trichoptera ( <b>Caddisflies</b> )	50	4
Hydropsychidae ( <b>Common netspinner</b> )	50	1
Anisoptera ( <b>Dragonflies</b> )	4	2
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )	2	1
Psephenidae ( <b>Water penny</b> )	3	1
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )	9	1
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )	1	1
Athericidae ( <b>Watersnipe fly</b> )	4	1
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )		
Amphipoda ( <b>Scud/Sideswimmer</b> )		
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )		
Oligochaeta ( <b>Aquatic worms</b> )	8	1
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	187	18

**Physical Conditions**

Run width (ft) 22 Run depth (ft) 0.6

Discharge (cfs)	9.9
Water level	NORMAL
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	SLIGHT
Algae color	BROWN
Algae abundance	IN SPOTS
Algae texture	EVEN COAT
Channel shade	POOR

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	0		<input type="checkbox"/>
% Sand	1		
% Gravel	47		
% Cobble	47		
% Boulder	4		
% Bedrock	1		
% Woody debris	0		
<b>Index</b>	3.33		

Other invertebrates (describe) \_\_\_\_\_

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	17	
Embeddedness	14	
	<b>LEFT</b>	<b>RIGHT</b>
Bank stability	7	7
Bank protection		
Riparian buffer width	2	3
Total score	50	
<b>Habitat Index</b>	62.5	MARGINAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	18	85.7
EPT Taxa	10	76.9
Biotic Index	4.29	81.6
% EPT	83.4	92.7
% Tolerant	4.3	97.7
<b>Stream Index</b>	86.9	OPTIMAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

**Abundance Codes**

**A** (Abundant) > 50 (4), **C** (Common) 5 – 50 (2), **R** (Rare) < 5 (1)

**Overall Score** 74.7 SUBOPTIMAL

CONSTRUCTION	2	M	RECREATION	1	S	BRIDGES	2	S
RESIDENCES	2	S	PASTURE/CROP	2	M			
LOGGING	1	W	PAVED RDS	2	M			

Comments: \_\_\_\_\_

Stream name BLACKTHORN CREEK Basin SOUTH BRANCH POTOMAC  
 Monitor(s) PENDLETON MIDDLE SHCOOL  
 County PENDLETON Latitude 38 31 11 Longitude 79 22 33  
 Survey date 11/14/2007 Topo quad: \_\_\_\_\_  
 Station code LOWER REACH River reach \_\_\_\_\_ miles

**Water Quality**

Temperature (C/F)	11.0 C
pH	8.5
Conductivity	162
Dissolved Oxygen	9.0
Phosphate	1.0
Nitrate/Nitrite	1.5
Turbidity (NTU)	10 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	33	4
Plecoptera ( <b>Stoneflies</b> )	10	2
Trichoptera ( <b>Caddisflies</b> )	83	3
Hydropsychidae ( <b>Common netspinner</b> )	85	1
Anisoptera ( <b>Dragonflies</b> )	5	2
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )	6	1
Psephenidae ( <b>Water penny</b> )	6	1
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )	4	1
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )	1	1
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )		
Athericidae ( <b>Watersnipe fly</b> )	20	1
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )	1	1
Amphipoda ( <b>Scud/Sideswimmer</b> )		
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )	1	1
Oligochaeta ( <b>Aquatic worms</b> )	6	1
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	261	20

Other invertebrates (describe) OBSERVED WATER MITES

**Physical Conditions**

Run width (ft) 15 Run depth (ft) 0.7

Discharge (cfs)	12.2
Water level	NORMAL
Water clarity	CLEAR
Water color	NONE
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	SLIGHT
Algae color	BRONW
Algae abundance	IN SPOTS
Algae texture	HAIRY
Channel shade	MARGINAL

**Streambed Composition**

	Count	X	Estimate
% Silt/clay	1		<input type="checkbox"/>
% Sand	5		
% Gravel	44		
% Cobble	29		
% Boulder	17		
% Bedrock	2		
% Woody debris	2		
<b>Index</b>	3.35		

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	14	
Embeddedness	15	
	<b>LEFT</b>	<b>RIGHT</b>
Bank stability	7	7
Bank protection		
Riparian buffer width	5	7
Total score	55	
<b>Habitat Index</b>	68.8	SUBOPTIMAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	20	95.2
EPT Taxa	10	76.9
Biotic Index	3.92	86.9
% EPT	80.8	89.8
% Tolerant	3.1	98.9
<b>Stream Index</b>	89.5	OPTIMAL

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

RESIDENCES	2	M	PASTURE/CROP	2	M		
BRIDGES	2	S	UNPAVED RDS	2	M		
LOGGING	1	W	PAVED RDS	2	S		

**Abundance Codes**

**A** (Abundant) > 50 (**4**), **C** (Common) 5 – 50 (**2**), **R** (Rare) < 5 (**1**)

**Overall Score** 79.2 SUBOPTIMAL

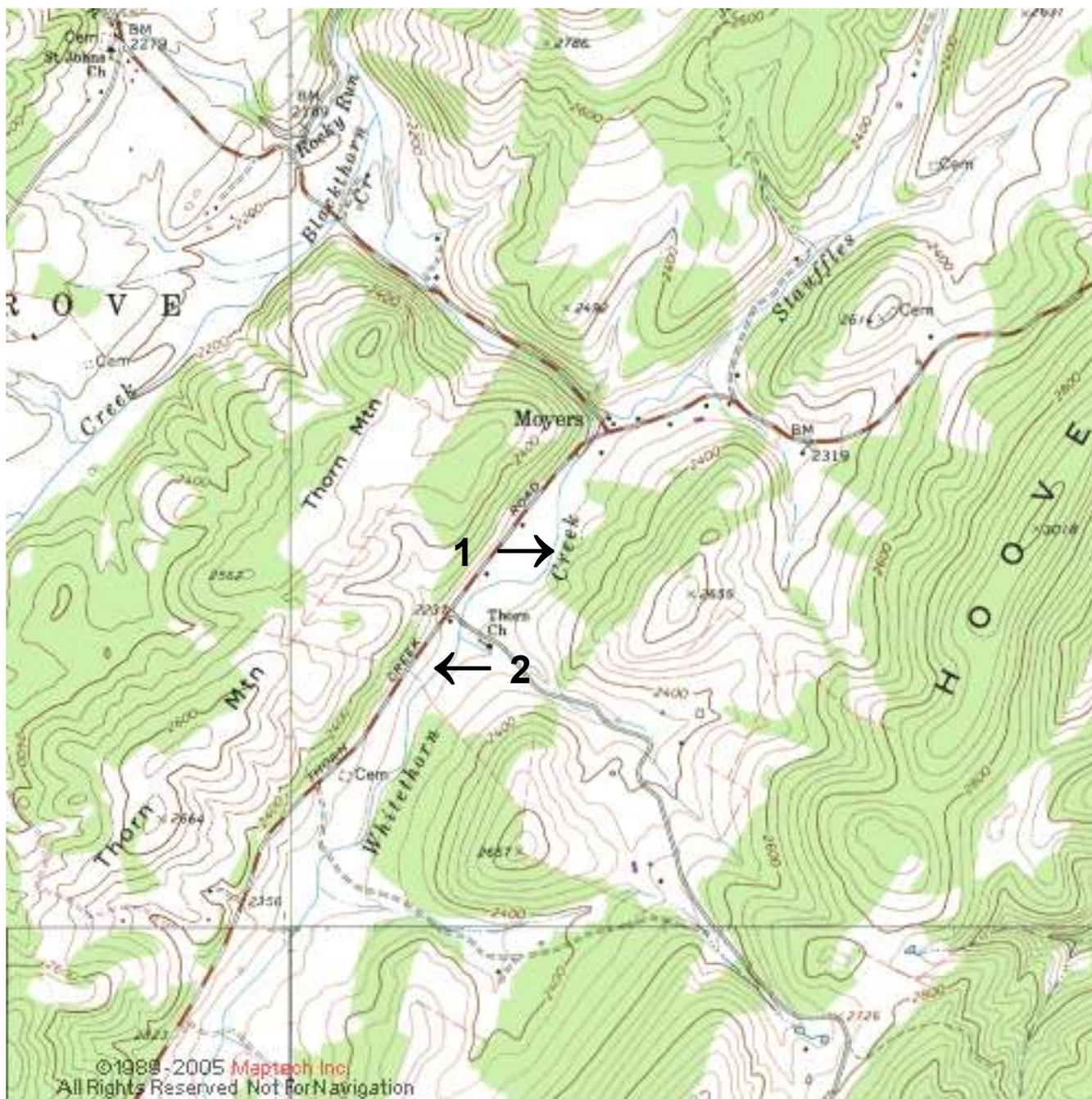
Comments: \_\_\_\_\_

## WHITETHORN CREEK: UPPER (1) & LOWER (2) REACHES

(1) Latitude: N 38-30-28      Longitude: W 79-22-08      USGS Quad: Sugar Grove

(2) Latitude: N 38-30-42      Longitude: W 79-21-52      USGS Quad: Sugar Grove

**Directions:** From Moyers, go south on Doe Hill Rd. approximately 2 miles, left onto Simmons Mountain Road and park at church; upper reach begins approximately 150m upstream from bridge over creek; lower reach begins approximately ¼ mile below bridge, just below large eroded cut bank



Stream name WHITETHORN CREEK Basin SOUTH BRANCH POTOMAC  
 Monitor(s) PENDLETON COUNTY MIDDLE SCHOOL  
 County PENDLETON Latitude 38 30 28 Longitude 79 22 08  
 Survey date 11/15/2007 Topo quad: SUGAR GROVE  
 Station code UPPER REACH River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	11.0 C
pH	7.0
Conductivity	163
Dissolved Oxygen	6.0
Phosphate	1.0
Nitrate/Nitrite	1.5
Turbidity (NTU)	40 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	4	1
Plecoptera ( <b>Stoneflies</b> )	5	1
Trichoptera ( <b>Caddisflies</b> )	25	1
Hydropsychidae ( <b>Common netspinner</b> )		
Anisoptera ( <b>Dragonflies</b> )		
Zygoptera ( <b>Damselflies</b> )		
Elmidae ( <b>Riffle beetle</b> )	1	1
Psephenidae ( <b>Water penny</b> )		
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )		
Sialidae ( <b>Alderfly</b> )	1	1
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )		
Athericidae ( <b>Watersnipe fly</b> )	6	1
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )		
Amphipoda ( <b>Scud/Sideswimmer</b> )		
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroidea ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )		
Oligochaeta ( <b>Aquatic worms</b> )		
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	<b>42</b>	<b>6</b>

**Physical Conditions**

Run width (ft) 16.8 Run depth (ft) 0.9

Discharge (cfs)	38.6
Water level	HIGH
Water clarity	MURKY
Water color	BROWN
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	MODERATE
Algae color	BROWN
Algae abundance	IN SPOTS
Algae texture	EVEN COAT
Channel shade	POOR

**Streambed Composition**

	Count	Estimate
% Silt/clay		<input type="checkbox"/>
% Sand		
% Gravel		
% Cobble		
% Boulder		
% Bedrock		
% Woody debris		
<b>Index</b>		

Other invertebrates (describe) \_\_\_\_\_

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	10	
Embeddedness	10	
<b>LEFT</b>	<b>RIGHT</b>	
Bank stability	6	6
Bank protection		
Riparian buffer width	5	6
Total score	43	
<b>Habitat Index</b>	53.8	MARGINAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	6	28.6
EPT Taxa	3	23.1
Biotic Index	3.00	100
% EPT	81.0	90
% Tolerant	0.0	100
<b>Stream Index</b>	68.3	

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed

**Abundance Codes**

A (Abundant) > 50 (4), C (Common) 5 – 50 (2), R (Rare) < 5 (1)

**Overall Score** 61.1 MARGINAL

Comments: HIGH WATER AND VERY COLD WEATHER  
HINDERED ASSESSMENT AND SAMPLING EFFORTS

	RESIDENCES			PASTURE/CROP			BRIDGES		
	2	M		2	M		2	S	
	CONSTRUCTION	1	W	UNPAVED RDS	2	M			
	LOGGING	2	M	PAVED RDS	2	S			

Stream name WHITETHORN CREEK Basin SOUTH BRANCH POTOMAC  
 Monitor(s) PENDLETON COUNTY MIDDLE SCHOOL  
 County PENDLETON Latitude 38 30 42 Longitude 79 21 52  
 Survey date 11/15/2007 Topo quad: SUGAR GROVE  
 Station code LOWER REACH River reach miles \_\_\_\_\_

**Water Quality**

Temperature (C/F)	9.0 C
pH	7.5
Conductivity	162
Dissolved Oxygen	7.0
Phosphate	1.0
Nitrate/Nitrite	2.0
Turbidity (NTU)	40 JTU
Other (describe and record results)	_____

**Macroinvertebrates**

	Total	Taxa
Ephemeroptera ( <b>Mayflies</b> )	41	2
Plecoptera ( <b>Stoneflies</b> )		
Trichoptera ( <b>Caddisflies</b> )	13	2
Hydropsychidae ( <b>Common netspinner</b> )		
Anisoptera ( <b>Dragonflies</b> )	3	1
Zygoptera ( <b>Damselflies</b> )	3	1
Elmidae ( <b>Riffle beetle</b> )		
Psephenidae ( <b>Water penny</b> )	4	1
Coleoptera ( <b>Other beetles</b> )		
Corydalidae ( <b>Fishfly/Hellgrammite</b> )	1	1
Sialidae ( <b>Alderfly</b> )		
Chironomidae ( <b>Non-biting midge</b> )		
Simuliidae ( <b>Black fly</b> )		
Tipulidae ( <b>Crane fly</b> )		
Athericidae ( <b>Watersnipe fly</b> )		
Diptera ( <b>Other true flies</b> )		
Decapoda ( <b>Crayfish</b> )		
Amphipoda ( <b>Scud/Sideswimmer</b> )		
Isopoda ( <b>Aquatic sowbug</b> )		
Veneroida ( <b>Clams</b> )		
Unionidae ( <b>Mussel</b> )		
Prosobranchia ( <b>Operculate snails</b> )		
Pulmonata ( <b>Non-operculate snails</b> )		
Oligochaeta ( <b>Aquatic worms</b> )	3	1
Hirudinea ( <b>Leech</b> )		
Turbellaria ( <b>Flatworms</b> )		
Other Aquatic Invertebrates		
<b>Totals</b>	68	9

**Physical Conditions**

Run width (ft) 20 Run depth (ft) 1.0

Discharge (cfs)	43.9
Water level	HIGH
Water clarity	CLEAR/MURKY
Water color	NONE/BROWN
Water odor	NONE
Sediment odor	
Streambed color	BROWN
Surface foam	MODERATE
Algae color	BROWN
Algae abundance	IN SPOTS
Algae texture	EVEN COAT
Channel shade	MARGINAL

**Streambed Composition**

	Count	Estimate
% Silt/clay		<input type="checkbox"/>
% Sand		
% Gravel		
% Cobble		
% Boulder		
% Bedrock		
% Woody debris		
<b>Index</b>		

Other invertebrates (describe) TWO SAMPLES COLLECTED

**The shaded box indicates one-taxa within that group.**

Other aquatic animals observed \_\_\_\_\_

**Habitat Conditions**

Sediment deposition	16	
Embeddedness	15	
	<b>LEFT</b>	<b>RIGHT</b>
Bank stability	7	6
Bank protection	3	7
Riparian buffer width		
Total score	54	
<b>Habitat Index</b>	67.5	SUBOPTIMAL

**Habitat Rating Codes**

Rating	Score	L/R
Optimal (O)	20	10/10
Sub-optimal (S)	16	8/8
Marginal (M)	10	5/5
Poor (P)	4	2/2

**Metrics**

	Value	Points
Total Taxa	9	42.9
EPT Taxa	4	30.8
Biotic Index	3.60	91.4
% EPT	79.4	88.2
% Tolerant	8.8	93.1
<b>Stream Index</b>	69.3	SUBOPTIMAL

**Abundance Codes**

**A** (Abundant) > 50 (**4**), **C** (Common) 5 – 50 (**2**), **R** (Rare) < 5 (**1**)

**Overall Score** 68.4 SUBOPTIMAL

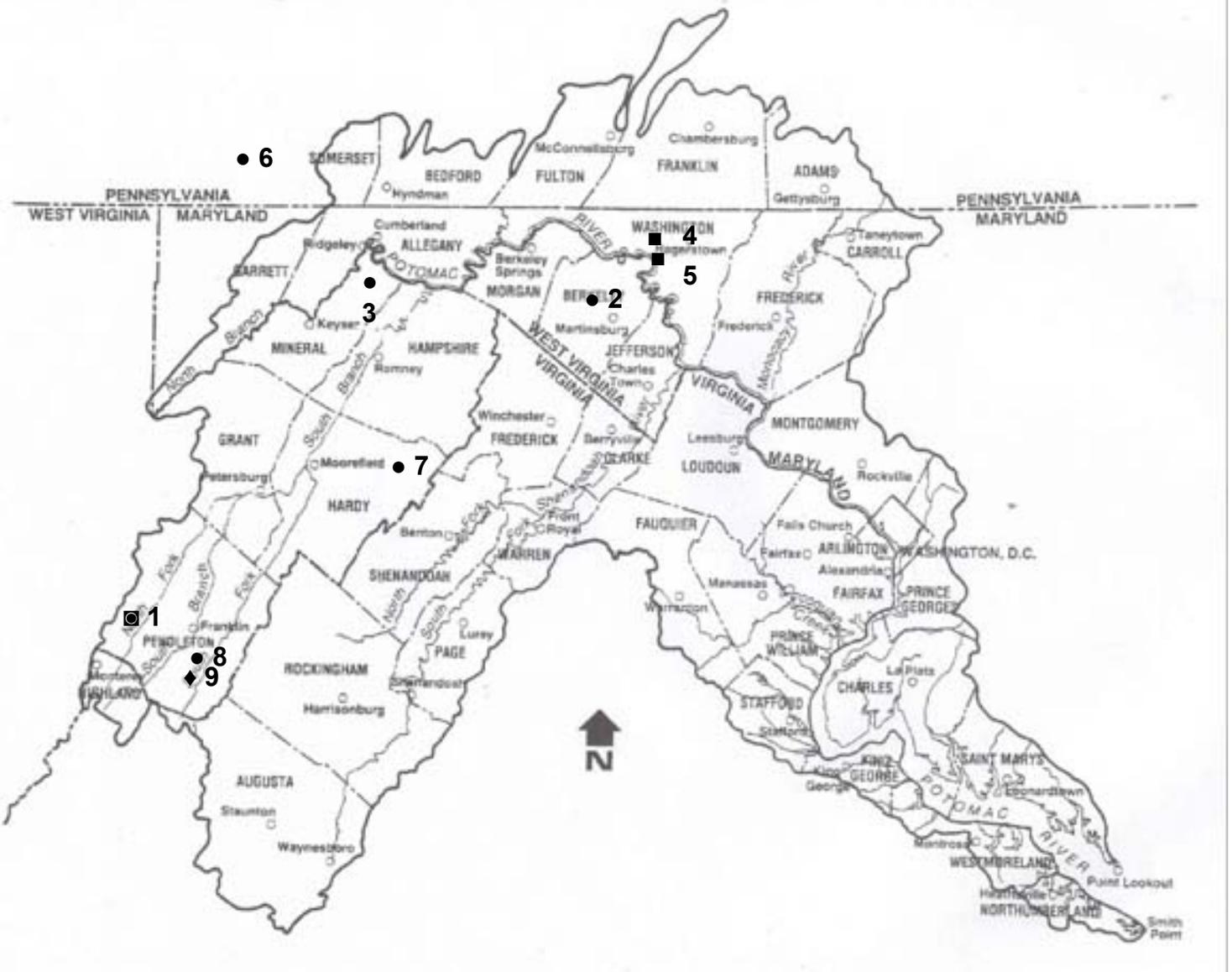
Comments: HIGH WATER AND VERY COLD WEATHER  
HINDERED ASSESSMENT AND SAMPLING EFFORTS

**Land Use:** Estimate of impacts and location: (1) low, (2) moderate, (3) high; (S) streamside, (M) within 1/4 mile, (W) in the watershed


# Stream Status Maps

2007

*Integrities of Streams Surveyed by Potomac Stream Samplers in 2007*

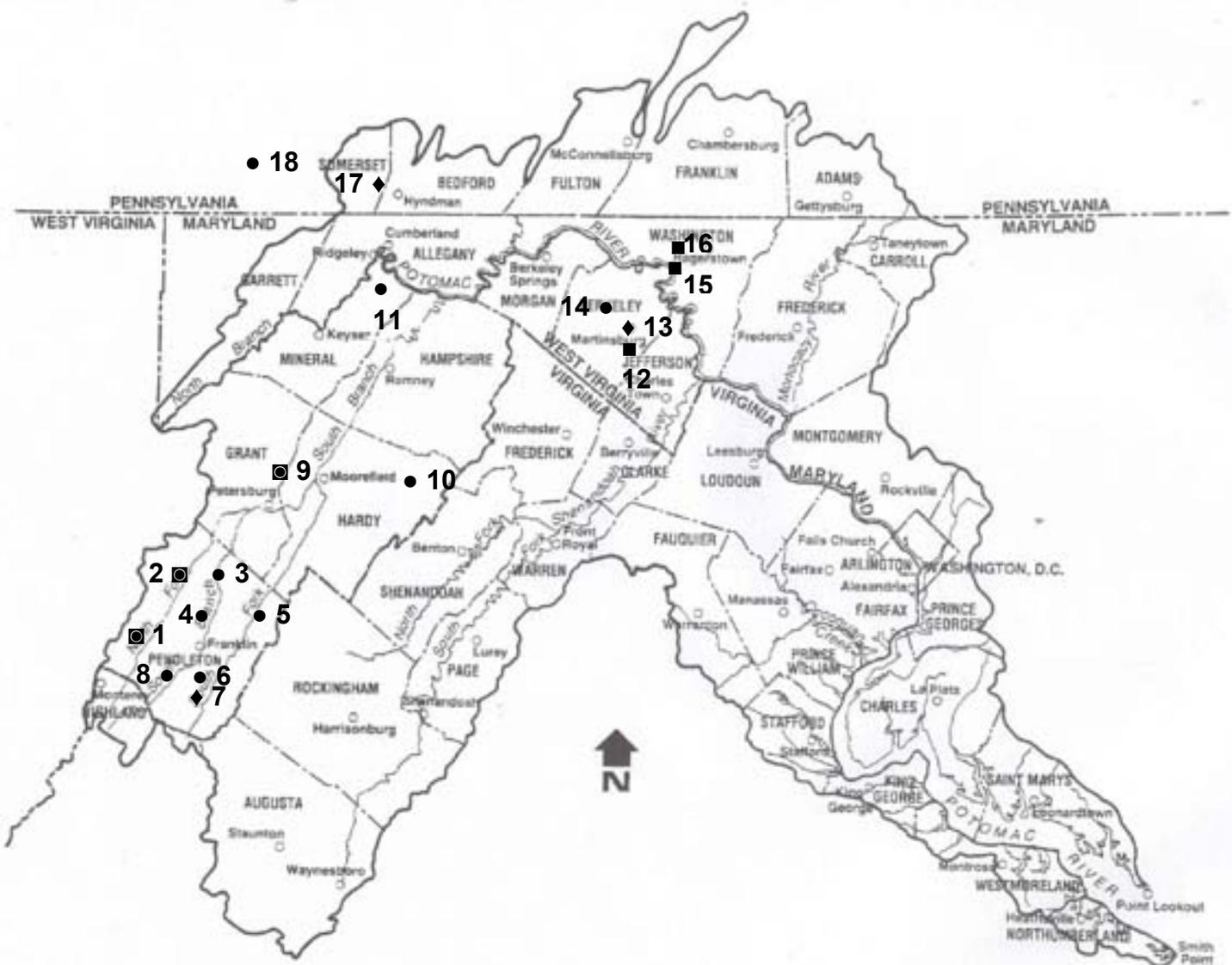


**KEY:**

- |               |                                    |                      |
|---------------|------------------------------------|----------------------|
| ■ Optimal     | 1. Big Run                         | 6. Laurel Hill Creek |
| ● Sub-optimal | 2. Unnamed Tributary of Back Creek | 7. Bakers Run        |
| ◆ Marginal    | 3. Patterson Creek                 | 8. Blackthorn Creek  |
| ■ Poor        | 4. Conococheague Creek             | 9. Whitethorn Creek  |
|               | 5. Potomac River                   |                      |

## 2004-2007

### *Integrities of Streams Surveyed by Potomac Stream Samplers since 2004*



**KEY:**

- |               |                                    |                                     |
|---------------|------------------------------------|-------------------------------------|
| ▣ Optimal     | 1. Big Run                         | 10. Bakers Run                      |
| ● Sub-optimal | 2. North Fork South Branch Potomac | 11. Patterson Creek                 |
| ◆ Marginal    | 3. South Branch Potomac            | 12. Torytown Run                    |
| ■ Poor        | 4. South Branch Potomac            | 13. Tuscarora Creek                 |
|               | 5. South Fork South Branch Potomac | 14. Unnamed Tributary of Back Creek |
|               | 6. Blackthorn Creek                | 15. Potomac River                   |
|               | 7. Whitethorn Creek                | 16. Conococheague Creek             |
|               | 8. South Branch Potomac            | 17. Rhoad's Run                     |
|               | 9. Lunice Creek                    | 18. Laurel Hill Creek               |

\*NOTE: For streams sampled more than once and receiving variable ratings the most current rating is shown.

## Stream Survey History (Stream numbers refer to key on previous page)

### 2004

1. Big Run: Sub-optimal
2. North Fork South Branch Potomac: Optimal
3. South Branch Potomac: Sub-optimal
5. South Fork South Branch Potomac: Sub-optimal
8. South Branch Potomac: Marginal

### 2005

1. Big run: Sub-optimal
2. North Fork South Branch Potomac: Optimal
3. South Branch Potomac: Sub-optimal
4. South Branch Potomac: Sub-optimal
5. South Fork South Branch Potomac: Sub-optimal
8. South Branch Potomac: Sub-optimal\*
12. Torytown Run: Poor
13. Tuscarora Creek: Marginal

### 2006

1. Big Run: Sub-optimal
6. Blackthorn Creek: Sub-optimal
7. Whitethorn Creek: Marginal
9. Lunice Creek: Optimal
10. Bakers Run: Sub-optimal
13. Tuscarora Creek: Marginal
14. Unnamed Tributary of Back Creek: Marginal
17. Rhoad's Run: Marginal

### 2007

1. Big Run: Optimal\*
6. Blackthorn Creek: Sub-optimal
7. Whitethorn Creek: Marginal
10. Bakers Run: Sub-optimal
11. Patterson Creek: Sub-optimal
14. Unnamed Tributary of Back Creek: Sub-optimal\*
15. Potomac River: Poor
16. Conococheague Creek: Poor
18. Laurel Hill Creek: Sub-optimal

\*Indicates change in rating from previous years

# Photographs and Participant Lists

# Professional Development Workshop



## 2007 Professional Development Workshop Participants

### **WV-DEP Instructors**

Tim Craddock

Alana Hartman

### **Teachers**

Amanda Brennan

Jan Gillies

Art Halterman

Sandy Simmons

Dave Weaver

Kurt Woolslayer

### **TMI Staff**

Beth Altemus

Zach Bastow

John Broderick

# Musselman High School



## Musselman High School Participants

Mrs. Patty Reichenbaugh (teacher)

Mr. Tom Reichenbaugh (teacher)

Mrs. Brenda Waterworth (teacher)

Chad Armstrong

Brandon Bennett

Miranda Bias

Laura Bridges

April Brown

Nicole Carinelli

Louis Dusing

Adam Estes

Alex Frye

Nicklas Hecker

Natassia King

Sara Nauman

Trevor Phadden

Ethan Sherman

Danny Smith

Domenica Statler

Christopher White

# Frankfort Middle School



## Frankfort Middle School Participants

Mr. Daniel Clements (teacher)  
Ms. Sararose Lynch (teacher)  
Ms. Victoria Nielsen (teacher)  
Mr. Aaron Pratt (teacher)  
Mr. Brian Root (teacher)  
Mr. Dave Weaver (teacher)

Dylan Abe  
Kellsea Ault  
Marshall Barbe  
Austin Bennett  
Veronica Boden  
Tia Bradshaw  
Alex Brelsford  
Ben Brown  
Devin Burke  
Chris Faidley  
Karalee Geis  
Derek George  
Katelynn Grapes  
Morgan Greaser  
Shawn Grimm  
Shelby Hayes  
Marcellus Hockaday  
Nolan Holshey  
Allie Hott  
Ryan Hutchison  
Cassandra Johnson  
Morgan Kelly  
Kierstin Kinder  
Alyssa Lantz  
Zac Lease  
Alexis Martin  
Cody Martin

John McKenrick  
Rebekkah Messenger  
Trae Miller  
Taylor Miltenberger  
Austin Mull  
Cheyenne Parsons  
Jeff Pease  
Corlyss Peer  
Tyler Plumlee  
Brittany Pruitt  
Jesse Rafferty  
Cotton Readd  
Alexis Rice  
Dustin Richards  
Cody Rogers  
Tyler Shetler  
Christopher Shore  
Mariah Simmons  
Justine Smith  
Hayley Snoberger  
Cameron Spence  
Sarah Trocke  
Cody Vargo  
Emma Walton  
Bria Welker  
Jade Wharton  
Katlin Wilson

# Spring Mills Middle School Science Club

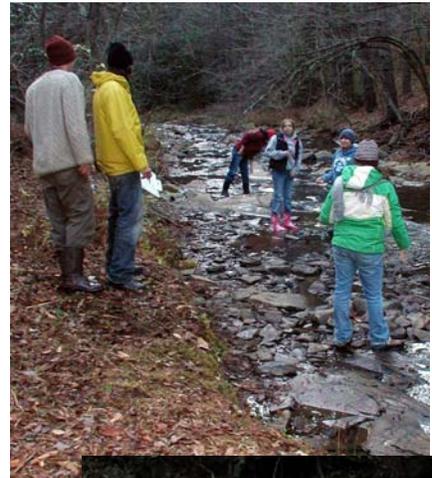


## Spring Mills Middle School Science Club Participants

Mr. Artie Arvin (chaperone)  
Mr. John Bell (chaperone)  
Mrs. Louise Black (teacher)  
Mr. Keith Brindle (chaperone)  
Mrs. Laura Giles (chaperone)  
Mrs. Jennifer Unger (chaperone)

Carrie Arvin	Mikayla Lawrence
Jacob Barrett	Heather Lemaster
Andrew Bell	Aaron Lloyd
Makenzee Bittorie	Cheyenne MacDonald
Sean Bright	Loran Margevich
Cody Brindle	Jacob Motter
Tony Brinkmeyer	Joshua Myers
Cody Brown	Clarabeth Novotny
Keira Cale	Brittany Palomo
Keith Carlson	Wesley Phelps
Anthony Carter	Daniel Pike
Mark Chaney	Zachary Pollard
Nicholas Crites	Sean Reidy
Andrew Crites	Klayton Richards
Hanna Davis	Austin Rowland
Martha Dillon	Corbin Saville
Savannah Dukeman	Jared Shackelford
Savannah Elder	Kristin Shank
JB Farmer	Shari Simpson
Shawn Fisher	Peyton Smith
Eli Gates	Aaron Straley
Shannon Giles	Daniel Sweeney
Tyler Giles	Emma Swirbliss
Stephany Himes	Carl Thomas
Taylor Hose	Kylie Unger
Ronnie Jackson	Philip Wagaman
Ian Joswick	Ana Willett
Lauren Kerill	JW Wright
Bailey Kershner	Jacob Younker

# Rockwood High School



## Rockwood High School Participants

Mrs. Linda Henry (teacher)  
Mrs. Karen Kaizen (chaperone)  
Mrs. Valerie King (chaperone)  
Mr. Vernon Shumaker (bus driver)  
Mr. Kurt Woolslayer (teacher)

Tony Coccioletti  
Lazar LaLone  
Jared Fencil  
Nathan Tunstall  
Abby Romesberg  
Jena Shaffer  
Whitney Kaizen  
Nichole Riddle  
Hailey King  
Leah Clay  
Leyna Deskevich  
Taylor Hoover  
Caytlin Shermenti  
Ariana Stull  
Beth Latuch  
Mariah Zur

# East Hardy Middle/High School



## East Hardy Middle/High School Participants

Mr. Glen Cook (chaperone)  
Mrs. Jan Gillie (teacher)  
Mr. Art Halterman (teacher)  
Ms. Jane Halterman (chaperone)

Tiffany Ayers  
Lara Basye  
Emily Bradfield  
Kaye Clark  
Jessica Collier  
Miranda Cook  
Jesse Cook  
Carolyn Dunsmore  
Aaron Lofton  
Jeremy Lohr  
Jamie Miller  
Resha Miller  
Anthony Sargent  
Chelsea Sears  
Lee Sipe  
Catherine Smith  
Carrie Vance  
Steven White

# Pendleton County Middle School



## Pendleton County Middle School Participants

Ms. Amanda Brennan (teacher)

Mr. Keith Hill (chaperone)

Mrs. Sandy Simmons (teacher)

Mr. Tom Turner (chaperone)

Travis Alt	Tyler Moore
Chad Arbogast	Cody Neil
Kennedy Armentrout	Gabrielle Paugh
Adam Bailey	Alexander Pritt
Miarandi Bennett	Travis Puffenbarger
Karissa Bjorkgren	Matthew Pultz
Destiny Bland	Logan Raines
Ranson Bland	Amanda Ratlief
Bradley Bland	Brittany Ratliff
Logan Bland	Kevin Rawson
Travis Bogan	Kaila Rexrode
Nick Bruneau	Zachary Rexrode
Victoria Carpenter	Alyssa Rexrode
Travis Cornett	Nikki Riddle
James Dever	Anna Ruddle
Justin Dove	Tyler Scheibner
Jonah Flynn	Miranda Self
Hayden Fox	Katelyn Shockey
Nathaniel George	Michael Shriver
Danielle Gray	Calijah Simmons
Dakota Grogg	Dustin Simpson
Justin Guy	John Skrzysz
Kali Halterman	Alexus Steckel
Courtney Hartman	Caitlyn Thompson
Nicole Hedrick	April Thompson
Justin Hertz	Travis Tingler
Daniel Hevener	Cody Turner
Joseph Hill	Raven Turner
Charles Hill	Danny VanMeter
Danielle Hinds	David Vargo
Adrian Jenkins	Chelsey Varner
Fannie Kline	Amelia Warner
Lindsey Kretschmar	Haley White
Dominique Malcom	Zackery Wilson
Sabrina Mallow	Natasha Wimer
Megan Marcum	Dalton Wright
Derek Moats	