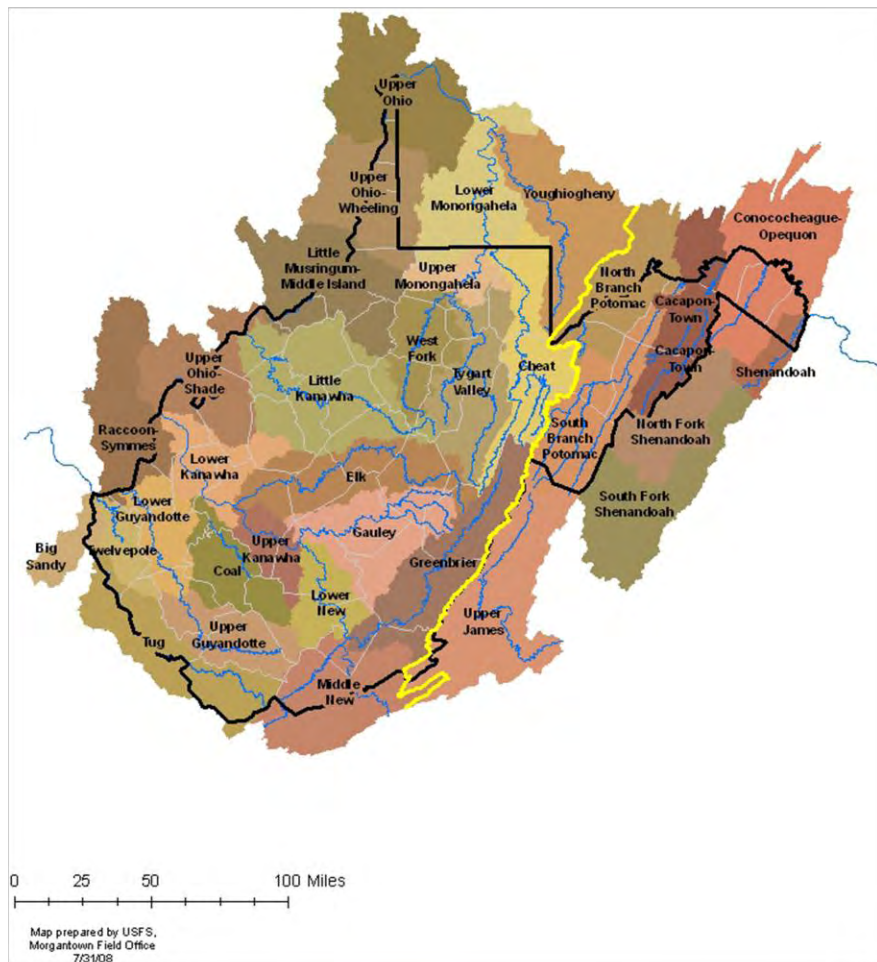




Appalachian Watershed & Stream Monitors: Fall 2010



Presented with major financial support from:



WV Department of Environmental Protection

Appalachian Watershed and Stream Monitors *(A WSM):*

Report on data collected from Potomac and Ohio Basin streams *during fall 2010 programs*

About A WSM

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 and its headwaters, *Potomac Stream Samplers* was designed by TMI to raise awareness of the connection between regions within the Potomac River drainage and the Bay itself.

Since 2004, TMI has successfully run the program for seven years with major funding from WV Department of Environmental Protection, Virginia Environmental Endowment, and the Toyota Foundation, National Fish and Wildlife Foundation, and expanded the program to schools in the Ohio River Basin under the new name of Appalachian Watershed and Stream Monitors. Each year TMI has built upon the previous year by enhancing, the curriculum, 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 WV-DEP staff and a cadre of enthusiastic, energetic teachers. Thousands of students have now been exposed to watershed education through stream testing and stewardship related exercises, both in their home environs and beyond. Many students have continued their *A WSM* education through science projects, presentations and involvement in local watershed organizations, while teachers have integrated the curriculum into their regular classroom lessons, and as local watershed associations have become involved. Furthermore, several teachers have gained graduate and continuing education credits through the program.

The *AWSM* 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 four 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 the WV-DEP and TMI senior staff. Near TMI's Spruce Knob Mountain Center, many of the most pristine streams in West Virginia serve as training sites in both the Potomac and Ohio watersheds. The workshop culminates in a visit to Spruce Knob, the highest point in West Virginia, to view and discuss local land use and its impact on water quality.

Throughout the autumn these trained teachers bring their students back to the mountain for a two-day field trip focusing on lessons related to stream and vegetation surveying, watershed awareness and stewardship. To put their new skills to work students then visit a local waterway to investigate water quality near their home. 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.

Through a partnership with Trout Unlimited (TU) all students are able to support real world 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, (just a few hundred feet from the Eastern Continental Divide and the Ohio Basin) visiting fence ex-closures, watering troughs, bridges and tree plantings. They themselves plant trees, including willow and spruce, along riparian zones, often beginning the process by making the cuttings from nearby willows shrubs.

Presented in this report is water quality data collected during student training sessions to the Spruce Knob Mountain Center and from streams local to the schools. Maps showing the location of each sampling site and a selection of photographs taken throughout the season are also included. All data in this report was collected by students and teachers with TMI staff support as part of *AWSM*.

In doing so *AWSM* participants come to understand how their actions affect water quality and gain an appreciation for the importance of clean water. As inhabitants of this mountain state, their ability to be stewards of their local water resources in turn benefits millions of people downstream. Those involved in the program share their knowledge with others and encourage a broader concern for water quality.

Brief Explanation of Data

All stream sampling was completed using the West Virginia DEP's *Save Our Streams* Level One survey protocols. Assessments were made along a 100 meter reach of stream. Generally students were broken into two or 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, alkalinity (measured in parts per million, ppm), dissolved oxygen is measured in ppm as well, but with the use of field titration kits), pH (1-14), turbidity (measured in Jackson Turbidity Units, JTU), temperature (Fahrenheit so that students have a reference) and conductivity (measured with electronic probes, in micro-semens, 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 year, a month, a week, and even a day. 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, and draw students attention as they consider land uses within the watershed. 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 (>26), Sub-Optimal (26-20), Marginal (19-13) or Poor (<13).

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
 - % 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.

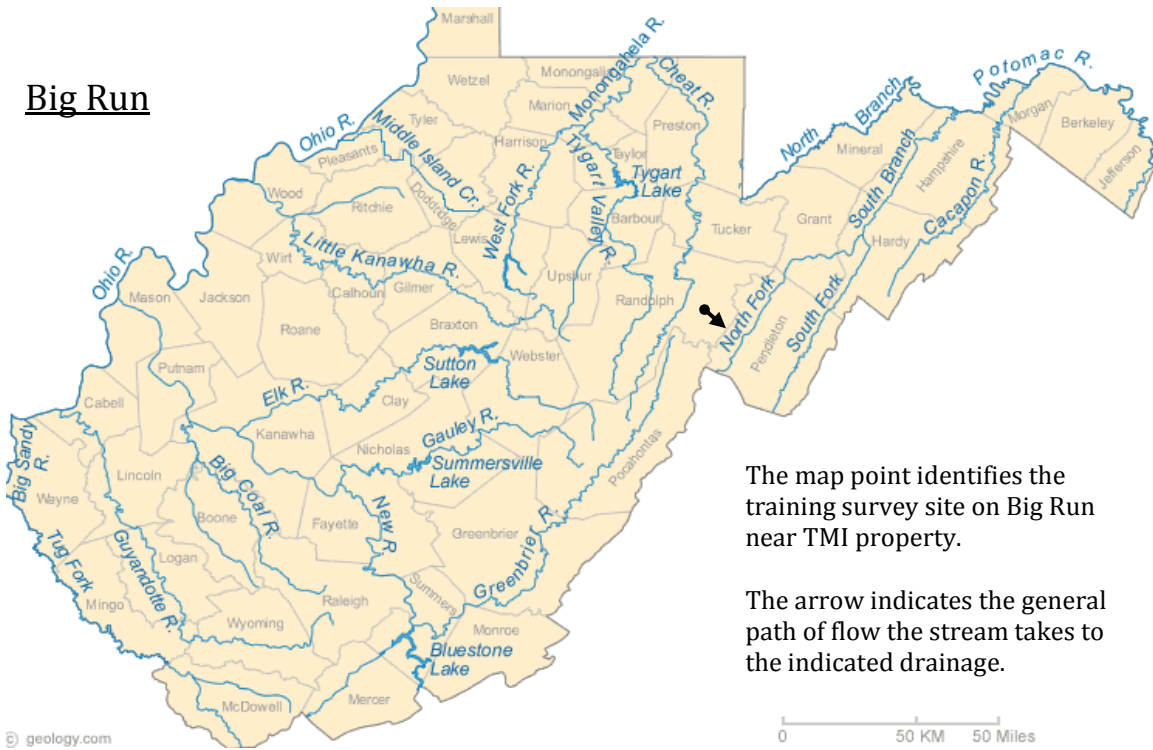
Biological

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 most cases three samples were collected. A Stream Integrity Index is computed from this data and corresponds to a rating of Optimal (>24), Sub-Optimal (24-19), Marginal (18-12) or Poor (<12). 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. These include:

- Total Taxa
 - the total number of different kinds of animals found, including how many different kinds of a particular family were observed. Diversity is important to an ecosystem.
- EPT Taxa
 - the number of Ephemeroptera (Mayfly), Plecoptera (Stonefly) and Trichoptera (Caddisfly) taxa found; EPT families are the most sensitive to negative 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

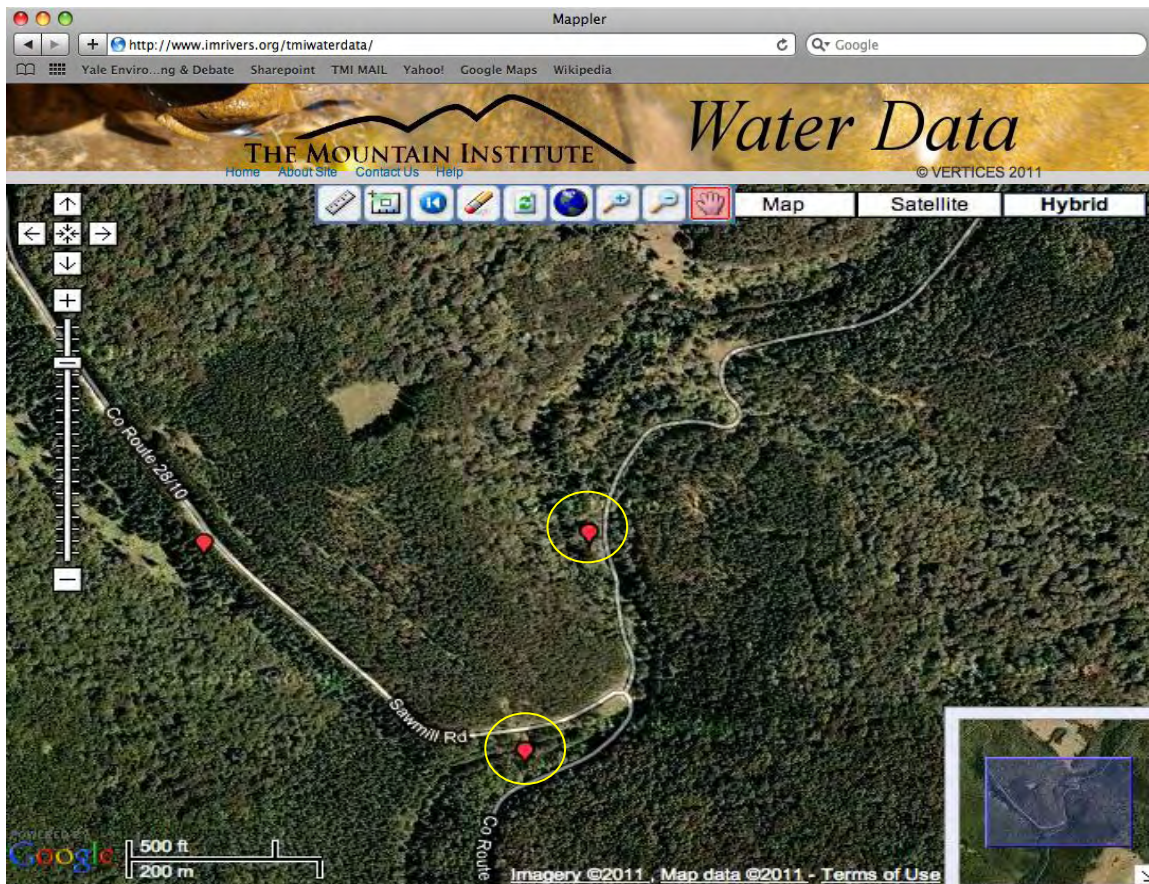
Data collected during TMI field trips.

Big Run



The map point identifies the training survey site on Big Run near TMI property.

The arrow indicates the general path of flow the stream takes to the indicated drainage.



Level-One Survey Summary

Stream	Big Run			Basin	South Branch Potomac				
Monitoring group	Hardy County Schools			Latitude	38	41	14.2		
Directions	From bridge over Big Run on Sawmill Run Road just before the hairpin turn, follow foot path down stream. X point is 100 feet above waterfall.			Longitude	79	33	56.5		
Station code		RR-miles		Date	18-Oct-10		Start-time	13:30	
Water chemistry			Streambed composition			Benthic macroinvertebrates			
pH	7.0		Silt/clay	0	0	Common names		Taxa	
Dissolved oxygen	10.8	ppm	Sand	6	6	1. Mayflies	40	2	
Conductivity	33	us/cm	Fine gravel	35	87.5	2. Stoneflies	17	1	
Nitrite/nitrate	0.2	ppm	Coarse gravel			3. Case-building caddisflies	1	1	
Alkalinity	26.6	ppm	Cobble	50	200	4. Net-spinning caddisflies	11	1	
Turbidity	0.0	JTU	Boulder	21	105	5. Free-living caddisfly			
Bacteria	No Data		Bedrock	1	6	6. Common net-spinner			
Temperature	48.2	F	Woody debris	0	0	7. Dragonflies			
Phosphate = 1. ppm			Riffle only or entire reach	rifle	No Data	8. Damselflies			
Physical conditions			Index	3.57	Count	Estimate	9. Riffle beetle		
Width (ft)		Depth (ft)		Habitat evaluation				10. Water penny	
Riffle	No Data	No Data	Discharge	9.6				11. Other beetles or bugs	
Run	26.0	0.4	Level	Normal				12. Hellgrammite	2
Water clarity	Clear		Sediment deposition	8				13. Alder fly	
Water color	None		Embeddedness	6				14. Non-biting midge	
Water odor	None		Estimate on both banks	Left - L	Right - R				15. Crane fly
Sediment color	Brown		Bank stability	3	3				16. Black fly
Algae color	Dark green		Riparian buffer width	3	3				17. Watersnipe fly
Algae abundance	Scattered		Habitat score	26					18. Other true flies
Algae growth habit	Even coat		Habitat integrity	Suboptimal					19. Water mite
Surface foam	None		Habitat (H) and Biological (B) codes and points						20. Crayfish
Channel shade	Good								21. Sideswimmer/Scud
Physical and habitat comments			Codes	Points					22. Aquatic sowbug
			(H) - (Optimal)	8	4				23. Operculate snails
			(H) - (Suboptimal)	6	3				24. Non-operculate snails
			(H) - (Marginal)	4	2				25. Clams
			(H) - (Poor)	2	1				26. Mussel
Metrics	Value	Points	(B) - (Abundant)	> 50	6				27. Aquatic worm
Total Taxa	7	3	(B) - (Common)	5 - 50	3				28. Leeches
EPT Taxa	5	5	(B) - (Rare)	< 5	1				29. Flatworms
Biotic Index	2.92	10	Miscellaneous invertebrates						
Stream score	18		Stream integrity	Marginal			Totals	73	7
Land use assessment			Additional comments						
Land use	(I)	(L)	Land use	(I)	(L)				
Recreation (parks etc.)	1	S	Paved roads	2	W				
Pastureland	1	S	Bridges	1	S	also found a fish in the biological station - Sculpin			
Unpaved roads	1	S							
Single-family homes	2	M							
								linolhy.d.craddock@wv.gov	

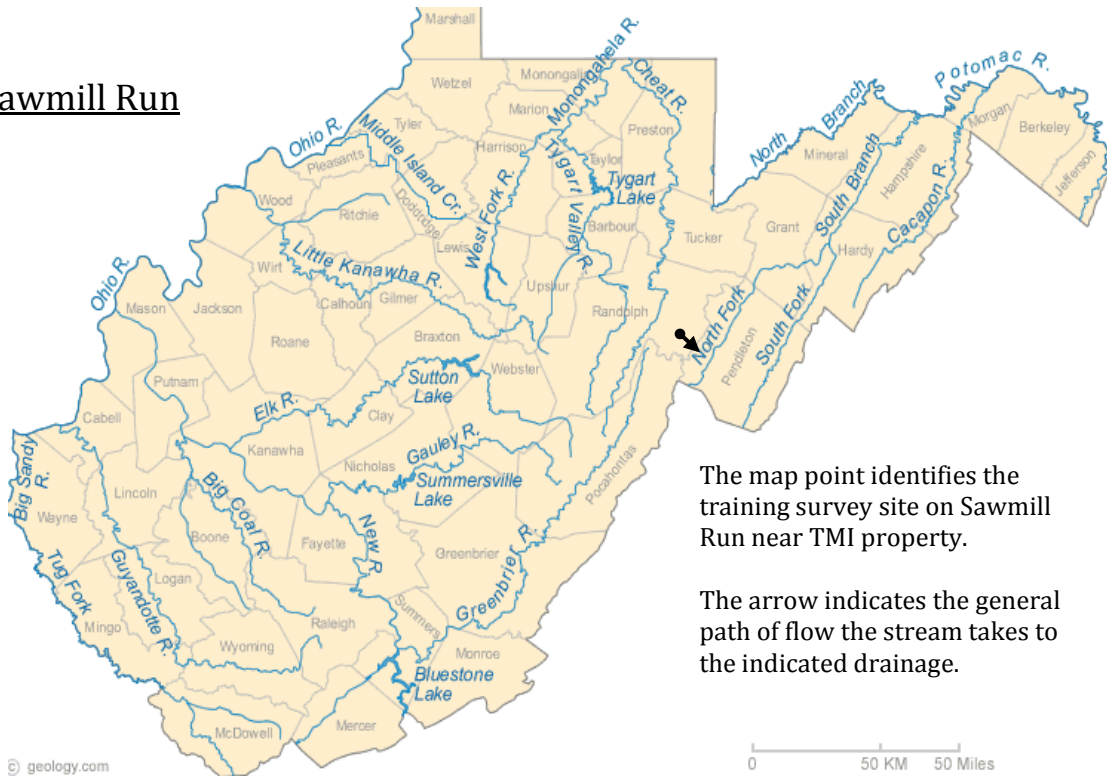


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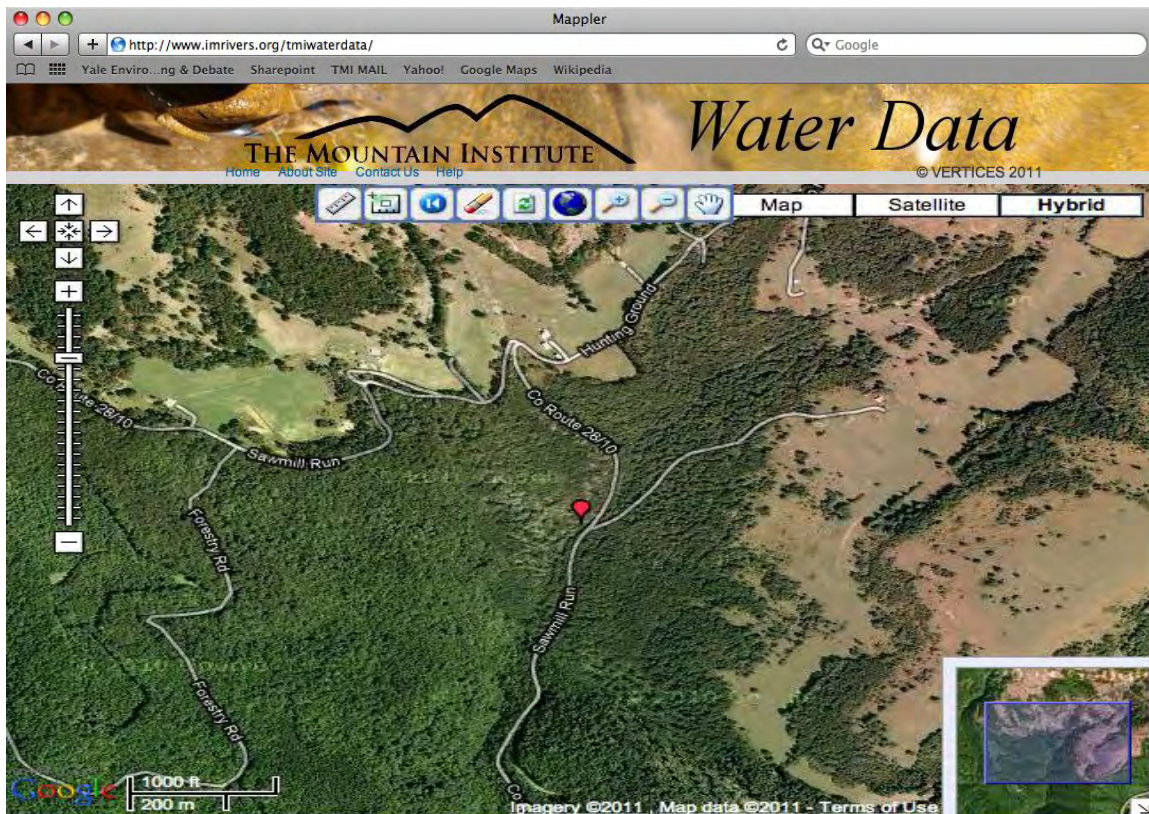
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Sawmill Run



The map point identifies the training survey site on Sawmill Run near TMI property.

The arrow indicates the general path of flow the stream takes to the indicated drainage.



Stream	Sawmill Run				Basin	South Branch Potomac																		
Monitoring group	Musselman HS 10th grade				Latitude	38	38	53																
Directions	Sawmill Run Road at Shade Tree lane on down streamside of the road. X point is 300 feet downstream from Sawmill Run Road.				Longitude	79	33	17																
Station code		RR-miles		Date	29-Oct-14			Start time	14:00															
Water chemistry				Streambed composition				Benthic macroinvertebrates																
pH	8.0			Silt/clay	0	0		Common names		Total	Taxa													
Dissolved oxygen	5.3	ppm		Sand	4	4		1. Mayflies	9	3														
Conductivity	No Data	µs/cm		Fine gravel	42	105		2. Stoneflies	16	4														
Nitrite/nitrate	3.3	ppm		Coarse gravel				3. Case-building caddisflies	3	1														
Alkalinity	No Data			Cobble	44	176		4. Net-spinning caddisflies	2															
Turbidity	26.7	JTU		Boulder	25	125		5. Free-living caddisfly	2											410				
Bacteria	No Data			Bedrock	0	0		6. Common netspinner												115				
Temperature	53.3	F		Woody debris	0	0		7. Dragonflies	1	1										3.5652174				
				Riffle only or entire reach	No Data	No Data		8. Damselflies																
				Index	3.56	Count	Estimate	9. Riffle beetle																
Physical conditions				Habitat evaluation																				
Width (ft)	25.0	Depth (ft)	0.5	Discharge	0.2			10. Water penny																
Rifle	No Data	No Data	Level	Low			11. Other beetles or bugs																	
Run	No Data	No Data	Level	Low			12. Hellgrammite																	
Water clarity	Clear	Sediment deposition	8			13. Alderfly																		
Water color	None	Embeddedness	8			14. Non-biting midge																		
Water odor	None	Estimate on both banks	Left - L	Right - R			15. Crane fly	3	1															
Sediment color	Brown	Bank stability	2	3			16. Black fly																	
Algae color	Dark green	Riparian buffer width	3	3			17. Watersnipe fly	1	1															
Algae abundance	Scattered	Habitat score	27				18. Other true flies																	
Algae growth habit	Even coat	Habitat integrity	Optimal				19. Water mite																	
Surface foam	None	Habitat (H) and Biological (B) codes and points						20. Crayfish	2	1														
Channel shade	Excellent							21. Sideswimmer/Scud																
Physical and habitat comments				Codes		Points		22. Aquatic sowbug																
				(H) - (Optimal)		8 4		23. Operculate snails																
				(H) - (Suboptimal)		6 3		24. Non-operculate snails																
				(H) - (Marginal)		4 2		25. Clams																
				(H) - (Poor)		2 1		26. Mussel																
Total Taxa	12	5	(B) - (Abundant)	> 50	6	27. Aquatic worm																		
EPT Taxa	8	7	(B) - (Common)	5 - 50	3	28. Leeches																		
Biotic Index	2.85	10	(B) - (Rare)	< 5	1	29. Flatworms																		
Stream score	22		Stream integrity	Suboptimal		Miscellaneous invertebrates																		
Land use assessment				Additional comments				Totals		39	12													
Land use	(I)	(L)	Land use	(I)	(L)	Culvert upstream.																		
Active construction	1	M	Unpaved roads	1	S																			
Logging	1	S	Single-family homes	1	M																			
Recreation (parks etc.)	1	S	Paved roads	1	S																			
Pastureland	1	S	Bridges	1	S																			
											timothy.d.craddock@ww.gov													

Level-One Survey Summary

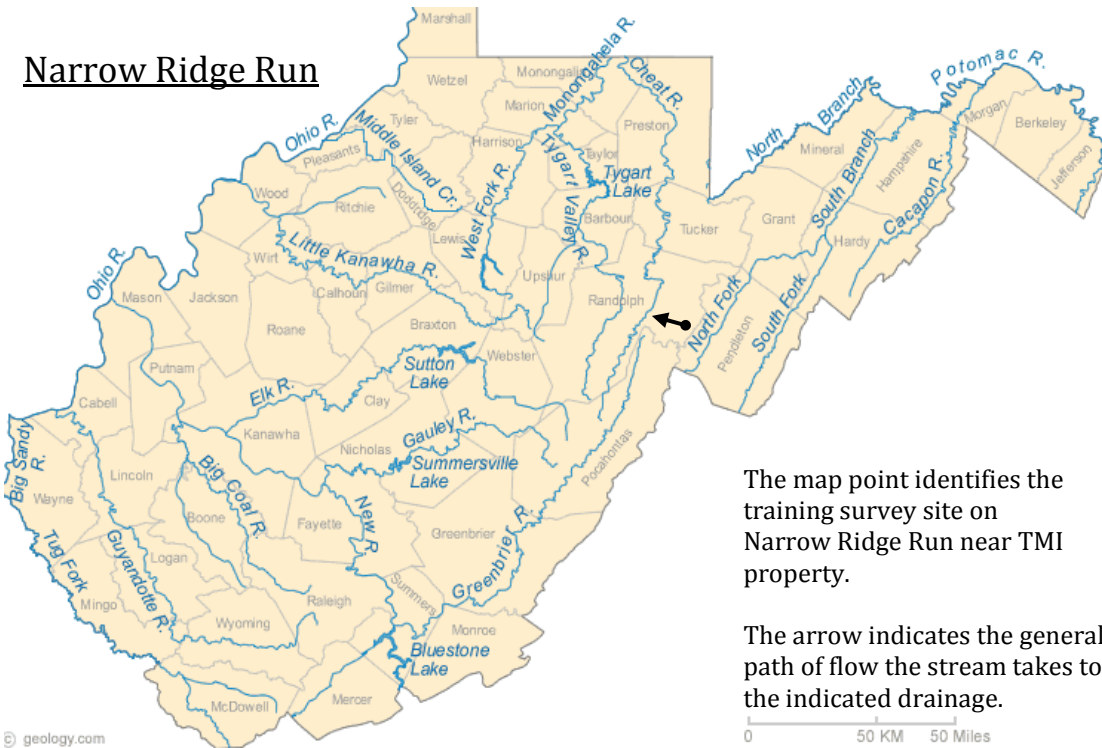
Stream	Sawmill Run				Basin	South Branch Potomac			
Monitoring group	Frankfort MS, 7th Grade				Latitude	38	38	53	
Directions	Sawmill Run road at Shade Tree lane on down stream side of the road . X point is 300 feet downstream from Sawmill Run Road.				Longitude	79	33	17	
					County	Pendleton			
Station code		RR-miles		Date	13-Oct-10	Start-time	14:00		
Water chemistry			Streambed composition			Benthic macroinvertebrates			
pH	7.5		Silt/clay	0	0	Common names		Total	Taxa
Dissolved oxygen	9.3	ppm	Sand	8	8	1. Mayflies		25	2
Conductivity	288	µs/cm	Fine gravel	0	58	2. Stoneflies		19	3
Nitrite/nitrate	1.0	ppm	Coarse gravel	23		3. Case-building caddisflies		2	1
Alkalinity	163.0	ppm	Cobble	44	176	4. Net-spinning caddisflies		2	1
Turbidity	0.0	JTU	Boulder		23	115	5. Free-living caddisfly		
Bacteria	No Data		Bedrock	2	12	6. Common netspinner			
Temperature	56.0	F	Woody debris	No Data	No Data	7. Dragonflies		2	1
Phosphate = 4 ppm			Riffle only or entire reach	Riffle		8. Damselflies		1	1
			Index	3.70	Count	Estimate	9. Riffle beetle		
Physical conditions					10. Water penny				
Width (ft)		Depth (ft)		11. Other beetles or bugs					
Riffle	5.3	0.3	Discharge	0.3	Habitat evaluation				
Run			Level	Low					
Water clarity	Clear		Sediment deposition	4	14. Non-biting midge				
Water color	None		Embeddedness	4	15. Crane fly				
Water odor	None		Estimate on both banks	Left - L	Right - R	16. Black fly			
Sediment color	Brown		Bank stability	3	2	17. Watersnipe fly			
Algae color	Brown		Riparian buffer width	2	4	18. Other true flies			
Algae abundance	Moderate		Habitat score	19		19. Water mite			
Algae growth habit	Even coat		Habitat integrity	Marginal		20. Crayfish		1	1
Surface foam	None		Habitat (H) and Biological (B) codes and points			21. Sideswimmer/Scud			
Channel shade	Good					22. Aquatic sowbug			
Physical and habitat comments			Codes		Points		23. Operculate snails		
			(H) - (Optimal)	8	4	24. Non-operculate snails			
			(H) - (Suboptimal)	6	3	25. Clams			
			(H) - (Marginal)	4	2	26. Mussel			
Metrics			Value	Points	(H) - (Poor)	2	1	27. Aquatic worm	
Total Taxa	11	5	(B) - (Abundant)	> 50	6	28. Leeches			
EPT Taxa	7	7	(B) - (Common)	5 - 50	3	29. Flatworms			
Biotic Index	2.96	10	(B) - (Rare)	< 5	1	Miscellaneous invertebrates			
Stream score	22		Stream integrity	Suboptimal		Totals		53	11
Land use assessment					Additional comments				
Land use	(I)	(L)	Land use	(I)	(L)				
Recreation (parks etc.)	2	S	Single-family homes	2	M				
Pastureland	2	M	Paved roads	1	M				
Cropland	1	W	Unpaved roads	2	M				
Bridges	2	M							



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Narrow Ridge Run



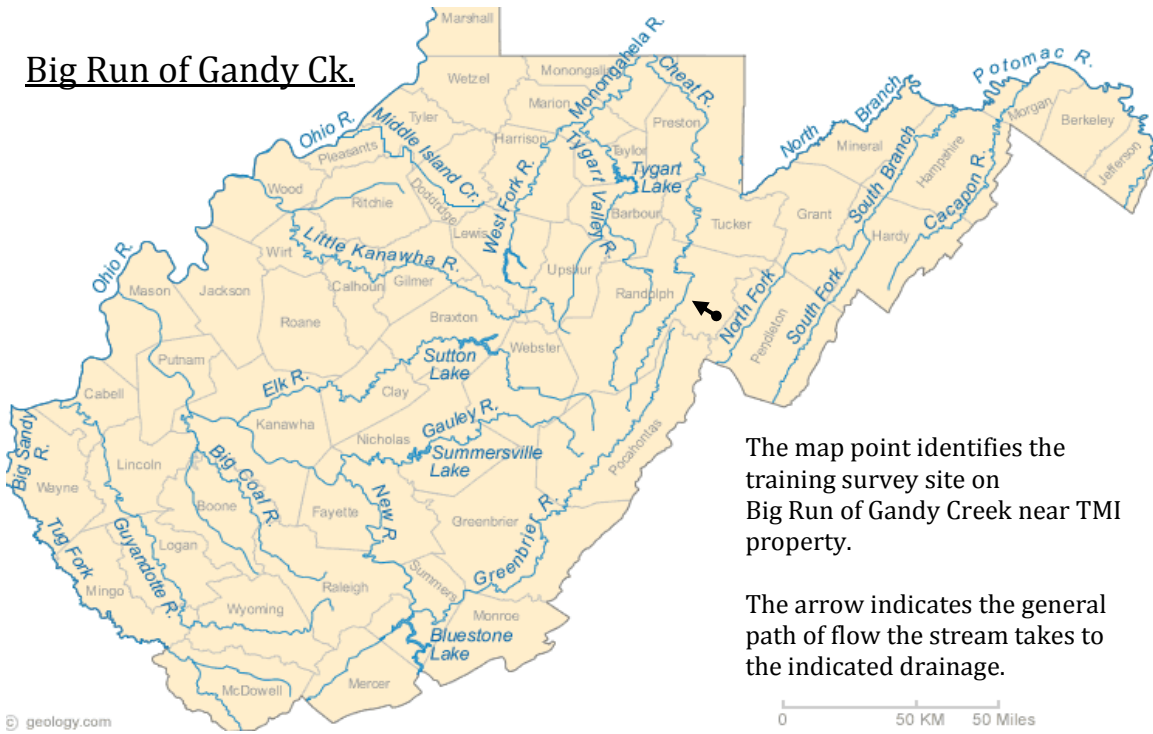
The map point identifies the training survey site on Narrow Ridge Run near TMI property.

The arrow indicates the general path of flow the stream takes to the indicated drainage.

Level-One Survey Summary

Stream	Narrow Ridge Run				Basin	Cheat River				
Monitoring group	Sissonville HS				Latitude	38	43	12.990		
Directions	From intersection of Forest rd. 1 and Co. rd. 29/1, go south on Co. rd. 29/1 until crossing with Narrow Ridge Run. X point is 30 feet upstream from CR 29/1.				Longitude	-79	37	11.504		
					County	Randolph				
Station code		RR-miles		Date	November 8 2010	Start time	15:00			
Water chemistry			Streambed composition			Benthic macroinvertebrates				
pH	6.3		Silt/clay	4	0	Common names		Total	Taxa	
Dissolved oxygen	4.7	ppm	Sand	9	9	1. Mayflies	1	1	TV	
Conductivity	36	µs/cm	Fine gravel	25	62.5	2. Stoneflies	18	4	3	
Nitrite/nitrate	0.2	ppm	Coarse gravel			3. Case-building caddisflies			3	
Alkalinity	23.0	ppm	Cobble	47	188	4. Net-spinning caddisflies			4	
Turbidity	40.0	JTU	Boulder	23	115	5. Free-living caddisfly	4	1	3	
Bacteria	No Data		Bedrock	3	18	6. Common netspinner			5	
Temperature	39.8	F	Woody debris	No Data	No Data	7. Dragonflies			4	
			Riffle only or entire reach	X		8. Damselflies			7	
			Index	3.54	Count	9. Riffle beetle			4	
			Estimate			10. Water penny			3	
Physical conditions			Habitat evaluation			11. Other beetles or bugs				
Width (ft)	11.0	Depth (ft)	0.5	Discharge	1.9	12. Hellgrammite				
Riffle	No Data	No Data	Level	Normal		13. Alderfly				
Run	No Data	No Data				14. Non-biting midge				
Water clarity	Clear		Sediment deposition	6		15. Crane fly				
Water color	None		Embeddedness	4		16. Black fly				
Water odor	Musky		Estimate on both banks	Left - L	Right - R	17. Watersnipe fly				
Sediment color	Brown		Bank stability	2	3	18. Other true flies				
Algae color	Brown		Riparian buffer width	3	4	19. Water mite				
Algae abundance	Moderate		Habitat score	22		20. Crayfish				
Algae growth habit	Even coat		Habitat integrity	Suboptimal		21. Sideswimmer/Scud				
Surface foam	None		Habitat (H) and Biological (B) codes and points			22. Aquatic sowbug				
Channel shade	Good		Codes		Points		23. Operculate snails			
Physical and habitat comments			(H) - (Optimal)		8	4	24. Non-operculate snails			
			(H) - (Suboptimal)		6	3	25. Clams			
			(H) - (Marginal)		4	2	26. Mussel			
			(H) - (Poor)		2	1	27. Aquatic worm			
Metrics			Value		Points		28. Leeches			
Total Taxa	8		(B) - (Abundant)		> 50	6	29. Flatworms			
EPT Taxa	6		(B) - (Common)		5 - 50	3	Miscellaneous invertebrates			
Biotic Index	3.16	10	(B) - (Rare)		< 5	1	Totals			
Stream score	20		Stream integrity		Suboptimal		38			
Land use assessment			Additional comments			8				
Land use	(I)	(L)	Land use	(I)	(L)					
Unpaved roads	1	S								

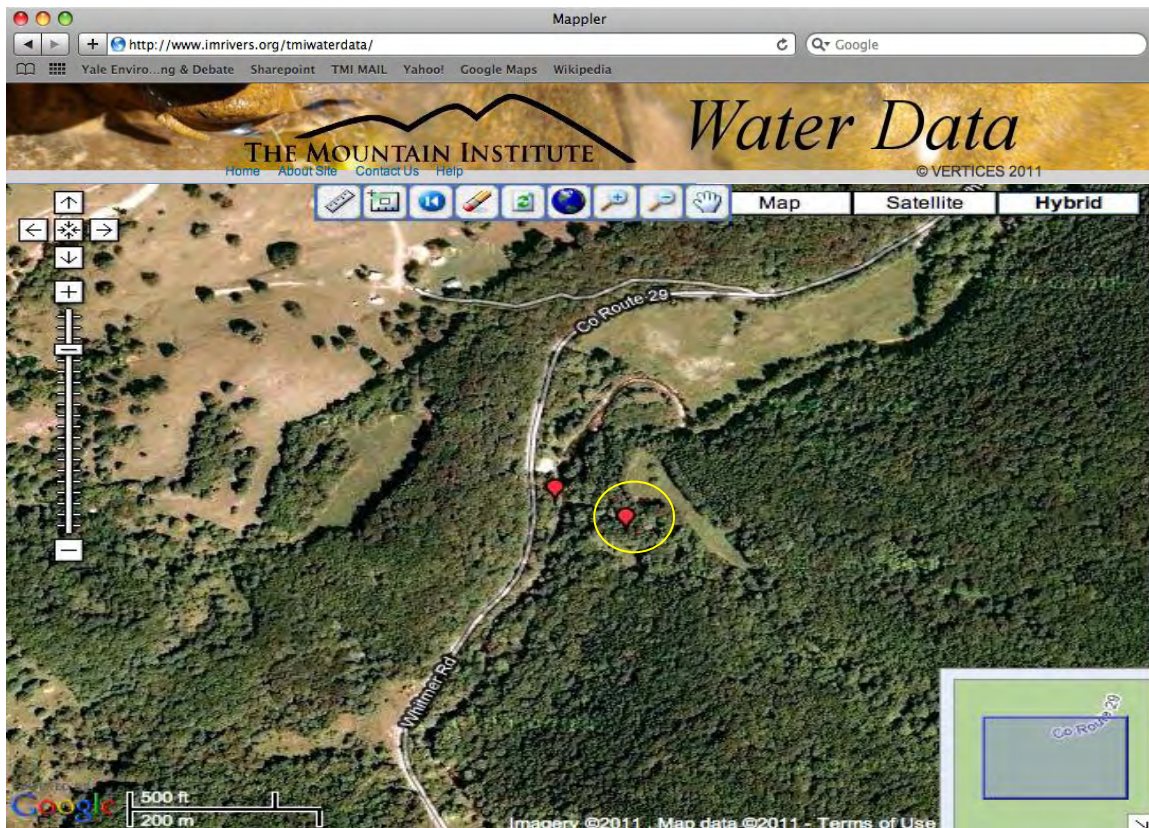
Big Run of Gandy Ck.



The map point identifies the training survey site on Big Run of Gandy Creek near TMI property.

The arrow indicates the general path of flow the stream takes to the indicated drainage.

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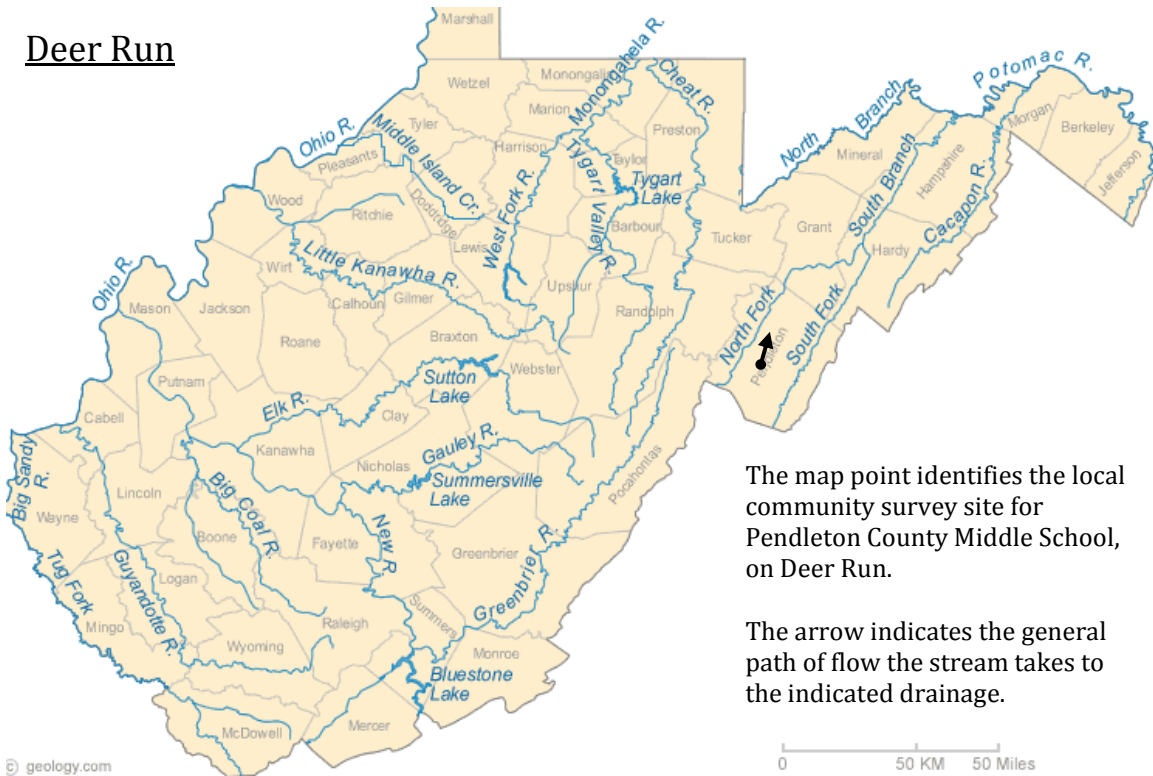
Level-One Survey Summary

Stream	Big Run of Gandy Creek				Basin	Cheat River					
Monitoring group	Sherrard MS 8th Grade				Latitude	38	44	35			
Directions	x point is 300 feet upstream from mouth of Big Run of Gandy Creek near the Big Run trailhead on Whitner Road				Longitude	79	36	5			
Station code		RR-miles		Date	3-Nov-10		Start time	15:50			
Water chemistry		Streambed composition			Benthic macroinvertebrates						
pH	8.0		Silt/clay	0	0	Common names		Total	Taxa		
Dissolved oxygen	No Data		Sand	0	0	1. Mayflies	72	3	TV		
Conductivity	No Data	us/cm	Fine gravel	0	35	2. Stoneflies	35	4	3		
Nitrite/nitrate	2.0	ppm	Coarse gravel	14		3. Case-building caddisflies	0		2		
Alkalinity	No Data		Cobble	38	152	4. Net-spinning caddisflies	123	2	3		
Turbidity	20.0	JTU	Boulder	43	215	5. Free-living caddisfly	60	1	4		
Bacteria	No Data		Bedrock	0	0	6. Common netspinner	55	1	3		
Temperature	45.0	F	Woody debris	0	0	7. Dragonflies	0		5		
Several of these measurements could not be recorded due to lack of necessary materials and have thus been denoted as No Data. Phosphate levels were 1 ppm.				Riffle only or entire reach	X		8. Damselflies	0	4		
				Index	4.23	Count	Estimate	9. Riffle beetle	0		3
				Physical conditions				Habitat evaluation		10. Water penny	0
Width (ft)	Depth (ft)	Discharge		6.4	Habitat evaluation				11. Other beetles or bugs	0	
No Data	No Data	Level		Low					12. Hellgrammite	0	3
Run	17.5	0.2			Estimate on both banks	Left - L	Right - R	13. Alderfly	0	6	
Water clarity	Clear		Sediment deposition	6				14. Non-biting midge	0	8	
Water color	None		Embeddedness	6				15. Crane fly	0	4	
Water odor	None		Bank stability	3	2			16. Black fly	0	6	
Sediment color	Brown		Riparian buffer width	4	3			17. Watersnipe fly	0	3	
Algae color	Brown		Habitat score	24				18. Other true flies	1	6	
Algae abundance	Moderate		Habitat integrity	Suboptimal				19. Water mile	0	6	
Algae growth habit	Even coat		Habitat (H) and Biological (B) codes and points						20. Crayfish	3	5
Surface foam	None		Codes		Points				21. Sideswimmer/Scud	0	5
Channel shade	Excellent		(H) - (Optimal)	8	4			22. Aquatic sowbug	0	7	
Physical and habitat comments			(H) - (Suboptimal)	6	3			23. Operculate snails	0	4	
			(H) - (Marginal)	4	2			24. Non-operculate snails	0	7	
			(H) - (Poor)	2	1			25. Clams	0	6	
			(B) - (Abundant)	> 50	6			26. Mussel	0	4	
Metrics	Value	Points	(B) - (Common)	5 - 50	3			27. Aquatic worm	0	10	
Total Taxa	13	7	(B) - (Rare)	< 5	1			28. Leeches	0	10	
EPT Taxa	11	10	Stream integrity		Optimal			29. Flatworms	0	7	
Biotic Index	3.59	10						Miscellaneous invertebrates	0		
Stream score	27						Totals	349	13		
Land use assessment					Additional comments						
Land use	(I)	(L)	Land use	(I)	(L)	Three separate biological composition studies were conducted within the reach to compile this data. Because of time constraints only one of the kicknet compilations were able to be accurately counted.					
Active construction	1	W	Pastureland	1	M						
Logging	1	W	Unpaved roads	1	S						
Oil and gas wells	2	M	Single-family homes	1	M						
Recreation (parks etc.)	2	S	Bridges	1	M						

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Data collected during local sampling / restoration events.

Deer Run



Level-One Survey Summary

Stream	Deer Run			Basin	South Branch Potomac			
Monitoring group	Pendleton County MS			Latitude	38	43	32	
Directions	From PCMS follow 33 E before you head over the mountain, you'll turn left onto Kiser Gap Road. It's about 6 miles on Kiser Gap Road until you turn right onto Steele Gap Road. X point is 300 feet downstream of the culvert.			Longitude	79	14	9	
				County	Pendleton			
Station code		RR-miles		Date	10-Nov-10	Start-time	9:30	
Water chemistry		Streambed composition			Benthic macroinvertebrates			
pH	7.5		Silt/clay	No Data	No Data	Common names		
Dissolved oxygen	11.0	ppm	Sand	No Data	No Data	Total	Taxa	
Conductivity	227	µs/cm	Fine gravel	No Data	No Data	1. Mayflies	23	
Nitrite/nitrate	0.5	ppm	Coarse gravel	No Data	No Data	2. Stoneflies	55	
Alkalinity	75.0	ppm	Cobble	No Data	No Data	3. Case-building caddisflies	10	
Turbidity	0.0	JTU	Boulder	No Data	No Data	4. Net-spinning caddisflies	1	
Bacteria	No Data		Bedrock	No Data	No Data	5. Free-living caddisfly	1	
Temperature	47.0	F	Woody debris	No Data	No Data	6. Common netspinner	15	
Iron: 0.5 PPM; Phosphates: 1.5 PPM			Riffle only or entire reach	No Data	No Data	7. Dragonflies	2	
			Index	No Data	Count	8. Damselflies	4	
					Estimate	9. Riffle beetle	1	
Physical conditions						10. Water penny	11	
Width (ft)		Depth (ft)				11. Other beetles or bugs	1	
Riffle	No Data	No Data	Discharge				12. Hellgrammite	
Run	No Data	No Data	Level	Habitat evaluation			13. Alderfly	
Water clarity	No Data		Sediment deposition	No Data		14. Non-biting midge	1	
Water color	No Data		Embeddedness	No Data		15. Crane fly	4	
Water odor	No Data		Estimate on both banks	Left - L	Right - R	16. Black fly	1	
Sediment color	No Data		Bank stability	No Data	No Data	17. Watersnipe fly		
Algae color	No Data		Riparian buffer width	No Data	No Data	18. Other true flies		
Algae abundance	No Data		Habitat score	0			19. Water mite	
Algae growth habit	No Data		Habitat integrity	Poor			20. Crayfish	
Surface foam	No Data		Habitat (H) and Biological (B) codes and points			21. Sideswimmer/Scud		
Channel shade	No Data					22. Aquatic sowbug		
Physical and habitat comments			Codes	Points		23. Operculate snails		
Group did not perform streambed composition due to cold weather.			(H) - (Optimal)	8	4	24. Non-operculate snails		
			(H) - (Suboptimal)	6	3	25. Clams		
			(H) - (Marginal)	4	2	26. Mussel		
			(H) - (Poor)	2	1	27. Aquatic worm	1	
Metrics	Value	Points	(B) - (Abundant)	> 50	6	28. Leeches	1	
Total Taxa	15	7	(B) - (Common)	5 - 50	3	29. Flatworms	1	
EPT Taxa	7	7	(B) - (Rare)	< 5	1	Miscellaneous invertebrates		
Biotic Index	3.11	10				Totals	128	
Stream score	24		Stream integrity	Suboptimal		Totals	15	
Land use assessment						Additional comments		
Land use	(I)	(L)	Land use	(I)	(L)	Beavers upstream. 5 Salamanders were found in bio collection as well.		
No Data			No Data					



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Stream	Deer Run			Basin	South Branch Potomac				
Monitoring group	Pendleton County MS				Latitude	38	43	33	
Directions	From PCMS follow 33 E before you head over the mountain, you'll turn left onto Kiser Gap Road. It's about 6 miles on Kiser Gap Road until you turn right onto Steele Gap Road. X point is 300 feet down stream of the culvert.				Longitude	79	14	9	
					County	Pendleton			
Station code		RR-miles		Date	15-Oct-10		Start-time	9:00	
Water chemistry			Streambed composition			Benthic macroinvertebrates			
pH	7.0		Silt/clay	No Data	No Data	Common names		Total	Taxa
Dissolved oxygen	10.0	ppm	Sand	No Data	No Data	1. Mayflies		8	2
Conductivity	255	µs/cm	Fine gravel	No Data	No Data	2. Stoneflies		12	3
Nitrite/nitrate	1.0	ppm	Coarse gravel	No Data	No Data	3. Case-building caddisflies		9	1
Alkalinity	245.0	ppm	Cobble	No Data	No Data	4. Net-spinning caddisflies			
Turbidity	20.0	JTU	Boulder	No Data	No Data	5. Free-living caddisfly			
Bacteria	No Data		Bedrock	No Data	No Data	6. Common netspinner			
Temperature	49.5	F	Woody debris	No Data	No Data	7. Dragonflies			
Iron: 0.5 ppm, Phosphate = 2 ppm			Riffle only or entire reach	No Data	No Data	8. Damsel flies			
			Index	No Data	Count	9. Riffle beetle			
Physical conditions			Habitat evaluation						
Width (ft)		Depth (ft)		Discharge		3.4			
Riffle				Level	Normal				
Run	8.0	0.4							
Water clarity	Clear		Sediment deposition	4			14. Non-biting midge		
Water color	None		Embeddedness	4			15. Crane fly		
Water odor	None		Estimate on both banks	Left - L	Right - R	16. Black fly			
Sediment color	None		Bank stability	2	2	17. Watersnipe fly			
Algae color	Brown		Riparian buffer width	1	1	18. Other true flies			
Algae abundance	Moderate		Habitat score	14		19. Water mite			
Algae growth habit	Even Coating		Habitat integrity	Marginal		20. Crayfish			
Surface foam	slight		Habitat (H) and Biological (B) codes and points			21. Sideswimmer/Scud			
Channel shade	poor					22. Aquatic sowbug			
Physical and habitat comments			Codes	Points		23. Operculate snails			
Cattle fenced from Riparian area 2 years ago. Recent evidence of cattle inside fenced area present. There is a bridge at the top of the reach.			(H) - (Optimal)	8	4	24. Non-operculate snails			
			(H) - (Suboptimal)	6	3	25. Clams			
			(H) - (Marginal)	4	2	26. Mussel			
			(H) - (Poor)	2	1	27. Aquatic worm			
Metrics			Value	Points		28. Leeches			
Total Taxa	6	3	(B) - (Abundant)	> 50	6	29. Flatworms			
EPT Taxa	6	5	(B) - (Common)	5 - 50	3	Miscellaneous invertebrates			
Biotic Index	2.59	10	(B) - (Rare)	< 5	1				
Stream score	18		Stream integrity	Marginal		Totals	29	6	
Land use assessment						Additional comments			
Land use	(I)	(L)	Land use	(I)	(L)	Streambed composition was not done due to Cold Weather.			
Active Construction	2	M	Paved roads	2	S				
Pastureland	3	S	Bridges	3	S				
Unpaved roads	2	S							
Single-family residences	3	S							



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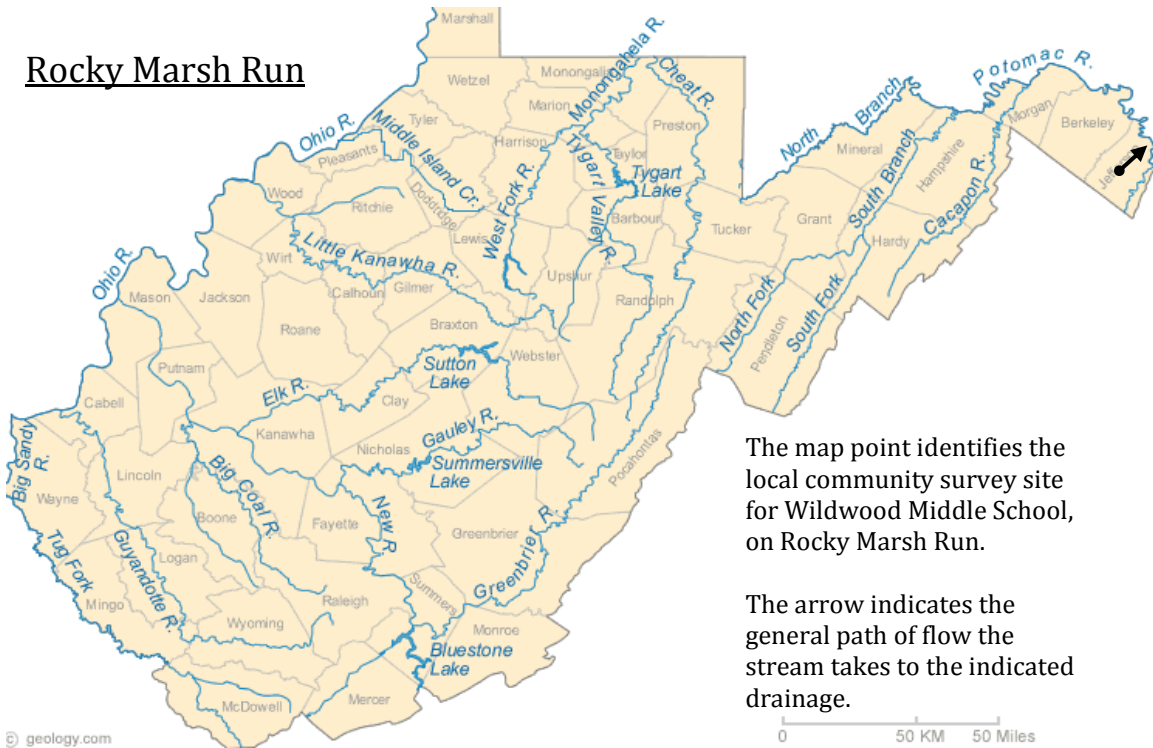
Level-One Survey Summary

Stream	Deer Run			Basin	South Branch Potomac			
Monitoring group	Pendleton County MS			Latitude	38	43	35	
Directions	From PCMS follow 33 E before you head over the mountain, you'll turn left onto Kiser Gap Road. It's about 6 miles on Kiser Gap Road until you turn right onto Steele Gap Road. X point is 300 feet downstream of the culvert.			Longitude	79	14	13	
				County	Pendleton			
Station code		RR-miles		Date	28-Oct-10	Start-time	9:00	
Water chemistry		Streambed composition			Benthic macroinvertebrates			
pH	7.3		Silt/clay	No Data	No Data	Common names	Total	Taxa
Dissolved oxygen	9.7	ppm	Sand	No Data	No Data	1. Mayflies	22	2
Conductivity	24	µs/cm	Fine gravel	No Data	No Data	2. Stoneflies	24	1
Nitrite/nitrate	1.7	ppm	Coarse gravel	No Data	No Data	3. Case-building caddisflies	2	2
Alkalinity	101.7	ppm	Cobble	No Data	No Data	4. Net-spinning caddisflies	30	2
Turbidity	0.0	JTU	Boulder	No Data	No Data	5. Free-living caddisfly		
Bacteria	No Data		Bedrock	No Data	No Data	6. Common netspinner	2	1
Temperature	54.5	F	Woody debris	No Data	No Data	7. Dragonflies	2	1
Iron: 0.6 ppm, Phosphate = 1 ppm			Riffle only or entire reach	No Data	No Data	8. Damselflies	38	2
			Index	No Data	Count	Estimate	9. Riffle beetle	1
Physical conditions								
Width (ft)		Depth (ft)						
Riffle Run	3.0	0.2	Discharge Level	1.2 normal	Habitat evaluation			
Water clarity	Clear		Sediment deposition	2				
Water color	None		Embeddedness	2				
Water odor	None		Estimate on both banks	Left- L	Right- R			
Sediment color	None		Bank stability	1	1			
Algae color	Brown		Riparian buffer width	1	1			
Algae abundance	Heavy		Habitat score	8				
Algae growth habit	Even Coating, Floating		Habitat integrity	Poor				
Surface foam	None		Habitat(H) and Biological (B) codes and points					
Channel shade	Poor							
Physical and habitat comments			Codes	Points				
Cattle fenced from riparian area 2 years ago. However fence is compromised and breached by cattle. There is a bridge at the top of the reach.			(H) - (Optimal)	8	4			
			(H) - (Suboptimal)	6	3			
			(H) - (Marginal)	4	2			
Metrics			(H) - (Poor)	2	1			
Total Taxa	18	7	(B) - (Abundant)	> 50	6			
EPT Taxa	8	7	(B) - (Common)	5 - 50	3			
Biotic Index	4.45	7	(B) - (Rare)	< 5	1			
Stream score	21		Stream integrity	Suboptimal		Totals	139	18
Land use assessment				Additional comments				
Land use	(I)	(L)	Land use	(I)	(L)			
Active Construction	2	M	Paved roads	2	S	Groups did not do streambed composition due to cold weather. Groups performed biology test, chemistry test and tree planting.		
Pastureland	3	S	Bridges	3	S			
Unpaved roads	2	S						
Single-family residences	3	S						



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0.23683333 -79.236833

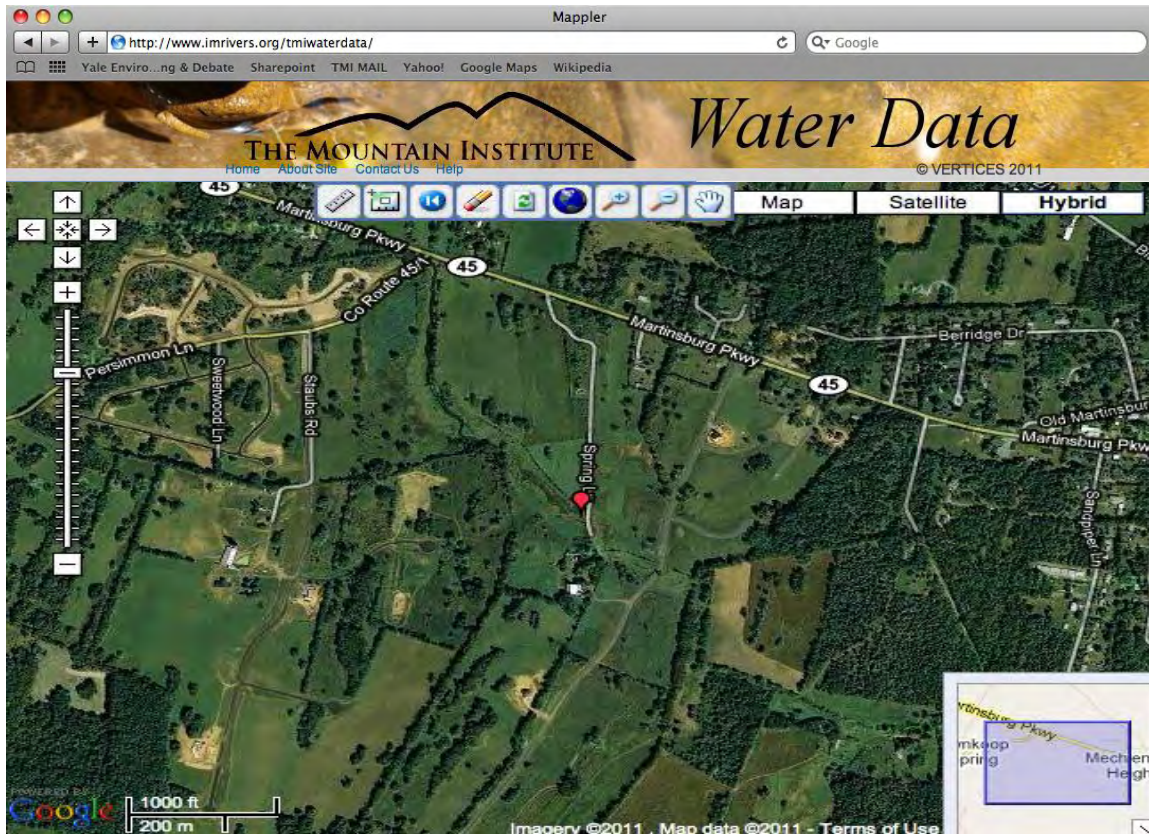
Rocky Marsh Run



The map point identifies the local community survey site for Wildwood Middle School, on Rocky Marsh Run.

The arrow indicates the general path of flow the stream takes to the indicated drainage.

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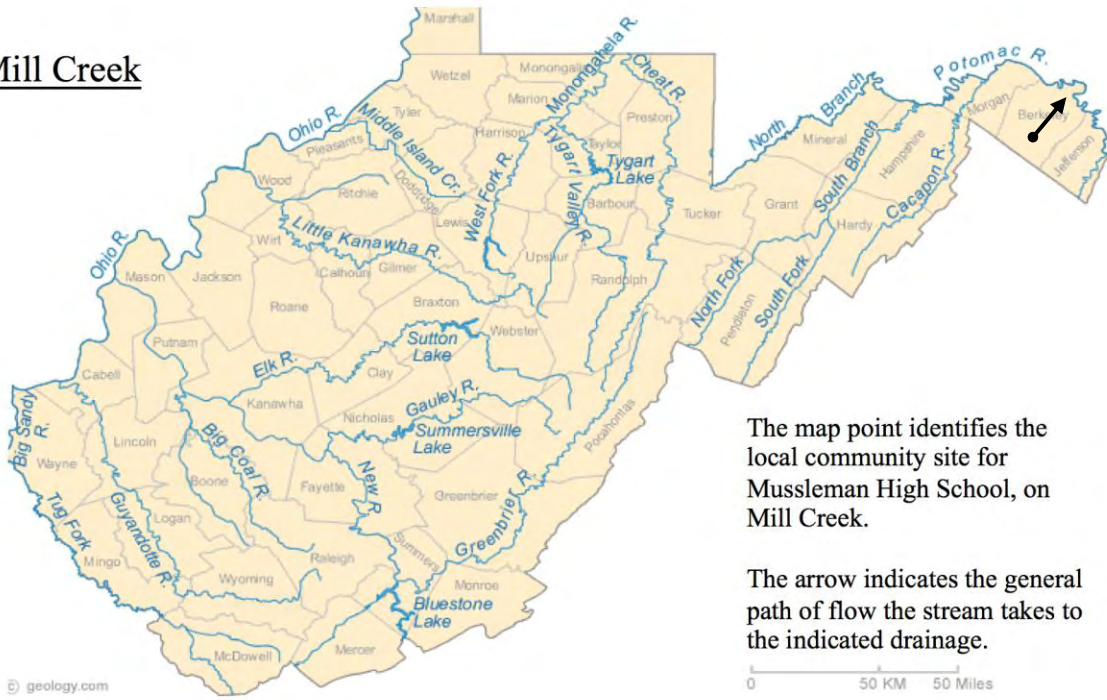
Level-One Survey Summary

Stream		Rockymarsh Run		Basin		Potomac Main Stem			
Monitoring group		Wildwood MS		Latitude	39	26	13		
Directions		45W turn left onto Marsh Hawk Way, cross over the bridge and take first right onto driveway. Follow driveway to the stream. X point is upstream of driveway.				Longitude	77	50	43
Station code			RR-miles		Date	3-Nov-10		Start-time	9:30
Water chemistry		Streambed composition			Benthic macroinvertebrates				
pH	7.5		Silt/clay	No data	No Data	Common names		Total	Taxa
Dissolved oxygen	10.0	ppm	Sand	No data	No Data	1. Mayflies			
Conductivity	54	us/cm	Fine gravel	No data	No Data	2. Stoneflies			
Nitrite/nitrate	No data		Coarse gravel	No data	No Data	3. Case-building caddisflies			
Alkalinity	No data		Cobble	No data	No Data	4. Net-spinning caddisflies			
Turbidity	No data		Boulder	No data	No Data	5. Free-living caddisfly			
Bacteria	No data		Bedrock	No data	No Data	6. Common netspinner		1	1
Temperature	50.8	F	Woody debris	No data	No Data	7. Dragonflies			
Nitrite/nitrate test was inconclusive. Something was causing our result liquid to have a yellow color instead of a pink color.			Riffle only or entire reach	No data	No Data	8. Damselflies			
			Index	No data	Count	Estimate	9. Riffle beetle	1	1
Physical conditions		Width (ft)		2.3	0.2	Discharge	0.3	Habitat evaluation	
Riffle	2.3	Depth (ft)	0.2	Discharge	0.3	Level		normal	
Run	No Data	No data	No data	Level	normal				
Water clarity	No data		Sediment deposition	No data					
Water color	No data		Embeddedness	No data					
Water odor	No data		Estimate on both banks	Left - L	Right - R				
Sediment color	No data		Bank stability	No data	No Data				
Algae color	No data		Riparian buffer width	No data	No Data				
Algae abundance	No data		Habitat score	No data					
Algae growth habit	No data		Habitat integrity	Optimal					
Surface foam	No data		Habitat (H) and Biological (B) codes and points						
Channel shade	No data								
			Codes	Points					
			(H) - (Optimal)	8	4				
			(H) - (Suboptimal)	6	3				
			(H) - (Marginal)	4	2				
			(H) - (Poor)	2	1				
			(B) - (Abundant)	> 50	6				
			(B) - (Common)	5 - 50	3				
			(B) - (Rare)	< 5	1				
Metrics		Value	Points						
Total Taxa	4	3							
EPT Taxa	1	3							
Biotic Index	6.80	3							
Stream score		9	Stream integrity		Poor		Totals	55	4
Land use assessment				Land use				Additional comments	
Land use	(I)	(L)	Land use	(I)	(L)				
Pastureland	3	S	Paved roads	2	S	Cold day, No physical test or pebble count. Rocky marsh enters Potoamc just below Potomac Dam 4.			
Unpaved roads	3	S	Bridges	2	S				
Single-family residences	2	S							
Suburban developments	2	S							



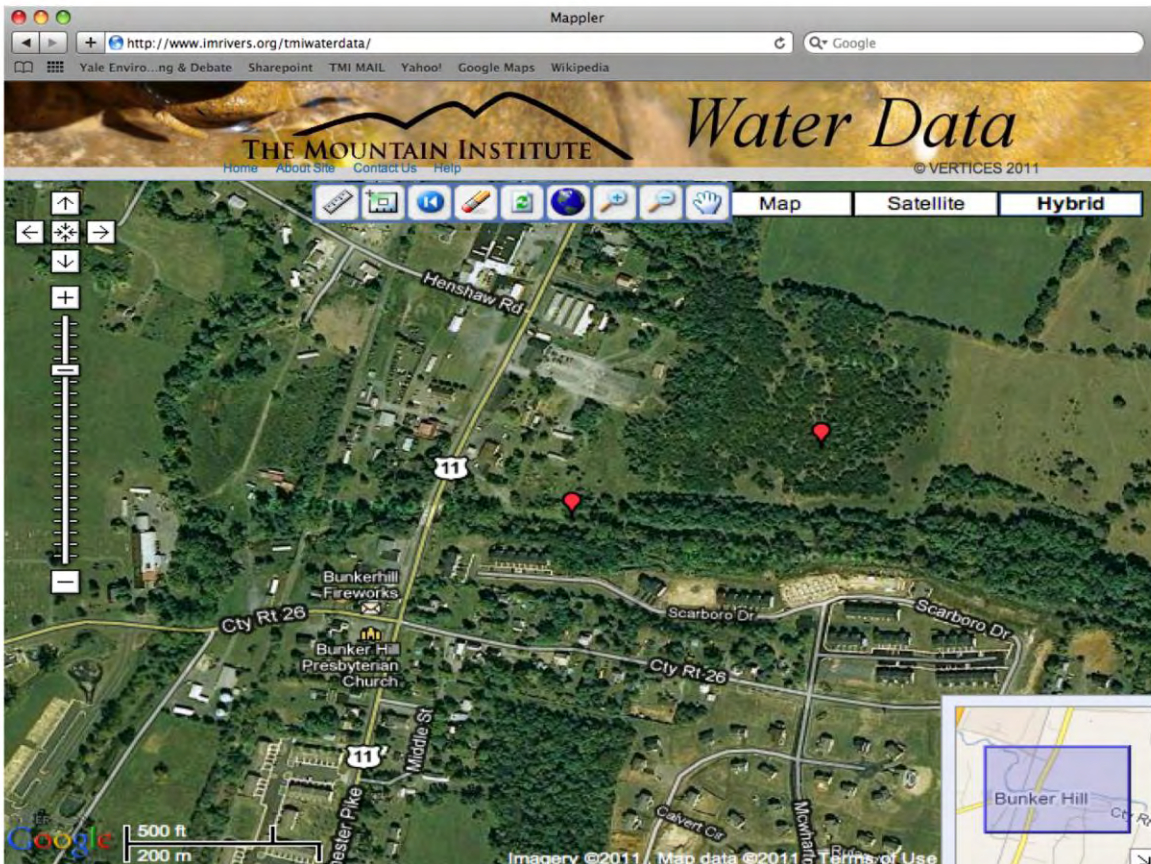
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Mill Creek



The map point identifies the local community site for Musselman High School, on Mill Creek.

The arrow indicates the general path of flow the stream takes to the indicated drainage.



Level-One Survey Summary

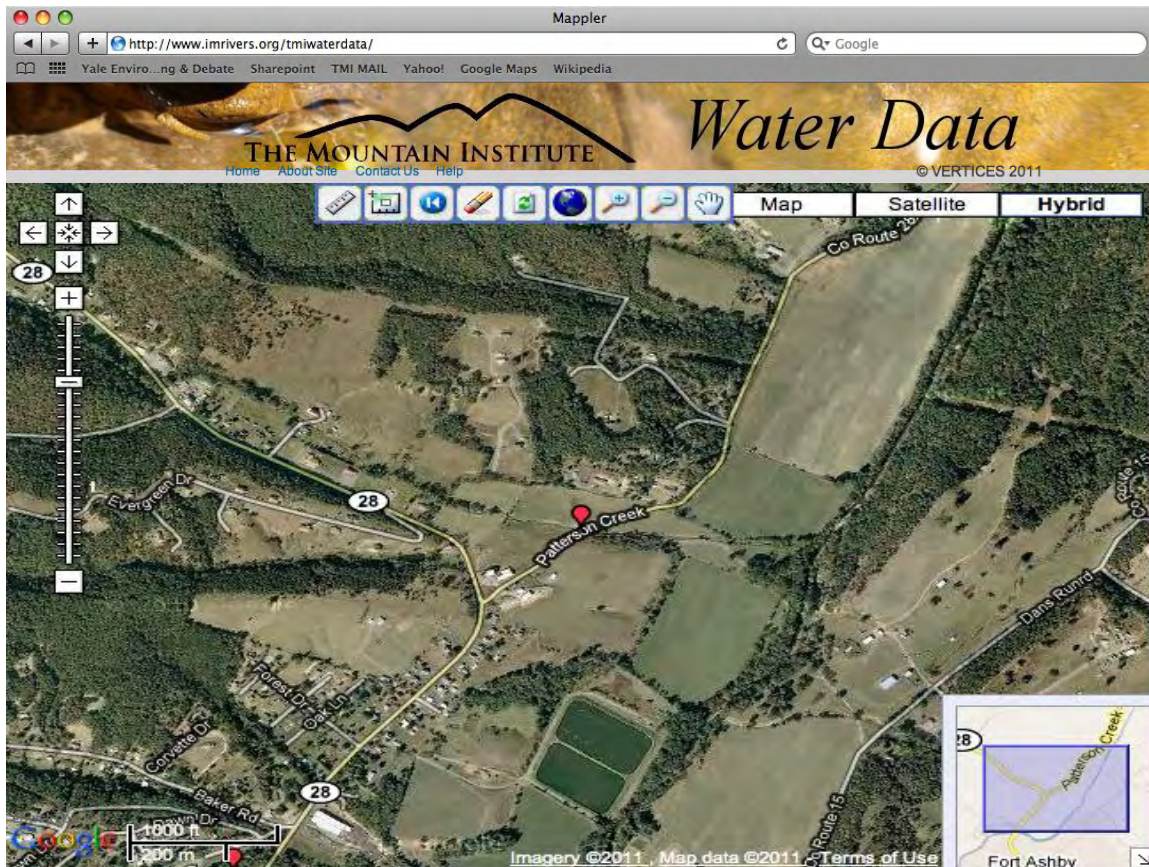
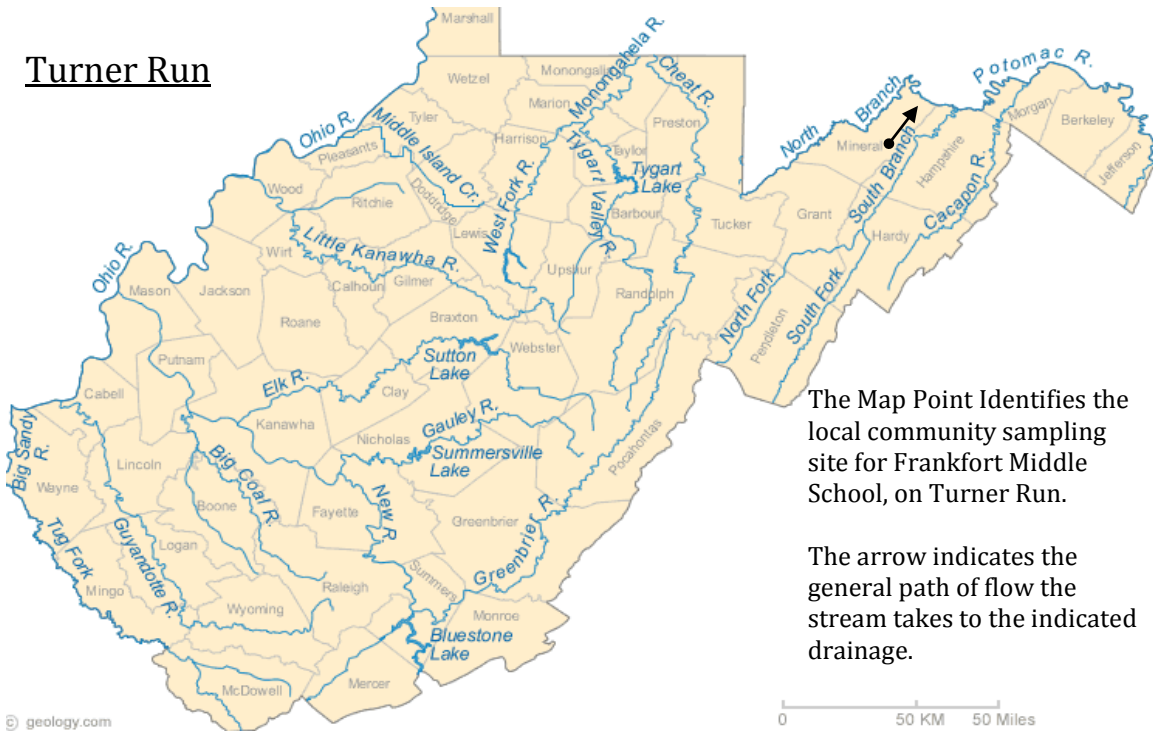
Stream	Mill Creek			Basin	Polomac Direct Drains						
Monitoring group	Musseleman HS						Latitude	39	20	5	
Directions	Hwy 11 in Bunker Hill, turn left into Morgan Park just before crossing Mill Creek. X point is 300 feet downstream from bridge over Hwy 11.						Longitude	78	3	6	
							County	Berkeley County			
Station code		RR-miles		Date	4-Nov-10		Start-time	9:00			
Water chemistry			Streambed composition			Benthic macroinvertebrates					
pH	7.5		Silt/clay	No Data	No Data	Common names		Total	Taxa	TV	
Dissolved oxygen	10.0	ppm	Sand	No Data	No Data	1. Mayflies		8	2	3	
Conductivity	52	µs/cm	Fine gravel	No Data	No Data	2. Stoneflies		1	1	2	
Nitrite/nitrate	1.5	ppm	Coarse gravel	No Data	No Data	3. Case-building caddisflies				3	
Alkalinity	392.5	ppm	Cobble	No Data	No Data	4. Net-spinning caddisflies		5	2	4	
Turbidity	10.0	JTU	Boulder	No Data	No Data	5. Free-living caddisfly				3	
Bacteria	No Data		Bedrock	No Data	No Data	6. Common netspinner		11	1	5	
Temperature	45.4	F	Woody debris	No Data	No Data	7. Dragonflies				4	
Iron: 0.5 PPM, Phosphate = 4 ppm			Riffle only or entire reach	No Data	No Data	8. Damselflies				7	
			Index	No Data	Count	Estimate	9. Riffle beetle				4
Physical conditions											
Width (ft)		Depth (ft)									
Riffle	No Data	No Data	Discharge	No Data	Habitat evaluation			12. Hellgram mite		3	
Run	No Data	No Data	Level	No Data				13. Alderfly			
Water clarity	Other: Foggy		Sediment deposition		8	14. Non-biting midge				8	
Water color	Gray/White		Embeddedness		6	15. Crane fly		1	1	4	
Water odor	Musky, Sewage		Estimate on both banks		Left - L	Right - R	16. Black fly			6	
Sediment color	Green		Bank stability		3	3	17. Watersnipe fly			3	
Algae color	Dark Green, Brown		Riparian buffer width		2	1	18. Other true flies			6	
Algae abundance	Scattered, Moderate		Habitat score		23		19. Water mite			6	
Algae growth habit	Even Coating, Matted		Habitat integrity		Suboptimal		20. Crayfish		2	1	
Surface foam	None		Habitat (H) and Biological (B) codes and points								
Channel shade	Good										
Physical and habitat comments			Codes		Points		23. Operculate snails			4	
Collected on a day with very cold air temp. Too cold to do pebble count.			(H) - (Optimal)		8	4	24. Non-operculate snails			7	
			(H) - (Suboptimal)		6	3	25. Clams				6
			(H) - (Marginal)		4	2	26. Mussel				4
			(H) - (Poor)		2	1	27. Aquatic worm				10
Metrics		Value	Points	(B) - (Abundant)		> 50	6	28. Leeches		10	
Total Taxa	10	5	(B) - (Common)		5 - 50	3	29. Flatworms		7		
EPT Taxa	6	5	(B) - (Rare)		< 5	1	Miscellaneous invertebrates				
Biotic Index	6.07	3	Stream score		13		Stream integrity		Marginal		
								Totals	85	10	
Land use assessment											
Land use	(I)	(L)	Land use	(I)	(L)	Additional comments					
Active construction	2	M	Bridges	3	S						
Paved Roads	3	S	Unpaved roads	1	M						
Recreation	1	M	Trash dumps	2	M						
Pastureland	2	M	Single-family residences	3	S						
Sub-urban developments	3	S	Parking lots	2	S						



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0.05175 -78.05175

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Turner Run



Level-One Survey Summary

Stream	Turner Run				Basin	North Branch Potomac				
Monitoring group	Frankfort MS 6th and 8th grade				Latitude	39	31	4		
Directions	From Middle School. Left on 28 S. travel 3.5 miles and turn left on to Patterson Creek rd. Go .2 miles and the stream travels under first bridge. X point is on upstream side of bridge.				Longitude	78	45	45		
					County	Mineral				
Station code		RR-miles		Date	5-Nov-10	Start-time	8:20			
Water chemistry		Streambed composition			Benthic macroinvertebrates					
pH	8.0		Silt/clay	No data	No Data	Common names		Total	Taxa	TV
Dissolved oxygen	No data	ppm	Sand	No data	No Data	1. Mayflies		1	1	3
Conductivity	476	µs/cm	Fine gravel	No data	No Data	2. Stoneflies				2
Nitrite/nitrate	2.7	ppm	Coarse gravel	No data	No Data	3. Case-building caddisflies				3
Alkalinity	110.0	ppm	Cobble	No data	No Data	4. Net-spinning caddisflies		4	1	4
Turbidity	20.0	JTU	Boulder	No data	No Data	5. Free-living caddisfly				3
Bacteria	No data		Bedrock	No data	No Data	6. Common netspinner		2	1	5
Temperature	48.2	F	Woody debris	No data	No Data	7. Dragonflies		3	1	4
DO test was not accurate and seems there was some problem with the chemicals.			Riffle only or entire reach	No data	No Data	8. Damselflies				7
			Index	No data	Count	Estimate	9. Riffle beetle	1	1	4
Physical conditions					10. Water penny		15	1	3	
Width (ft)		Depth (ft)		Discharge	1.5	11. Other beetles or bugs				8
Riffle	No Data	No Data	Level	Normal	Habitat evaluation		12. Hellgrammite	2	1	3
Run	10.5	0.2					13. Alderfly			6
Water clarity	Clear		Sediment deposition	6			14. Non-biting midge	14	1	8
Water color	None		Embeddedness	5			15. Crane fly			4
Water odor	None		Estimate on both banks	Left - L	Right - R	16. Black fly				6
Sediment color	None		Bank stability	2	1	17. Watersnipe fly				3
Algae color	Brown		Riparian buffer width	1	1	18. Other true flies				6
Algae abundance	Moderate		Habitat score	16		19. Water mite				6
Algae growth habit	Even Coating		Habitat integrity	Marginal		20. Crayfish				5
Surface foam	None		Habitat (H) and Biological (B) codes and points			21. Sideswimmer/Scud				5
Channel shade	Poor					22. Aquatic sowbug				7
Physical and habitat comments			Codes	Points		23. Operculate snails				4
			(H) - (Optimal)	8	4	24. Non-operculate snails				7
			(H) - (Suboptimal)	6	3	25. Clams				6
			(H) - (Marginal)	4	2	26. Mussel				4
Metrics			(H) - (Poor)	2	1	27. Aquatic worm		3	1	10
Total Taxa	10	5	(B) - (Abundant)	> 50	6	28. Leeches				10
EPT Taxa	3	3	(B) - (Common)	5 - 50	3	29. Flatworms		1	1	7
Biotic Index	5.33	5	(B) - (Rare)	< 5	1	Miscellaneous invertebrates				
Stream score	13		Stream integrity	Marginal		Totals		46	10	
Land use assessment					Additional comments					
Land use	(I)	(L)	Land use	(I)	(L)	7 small fish were also collected in the stream.				
Recreation	1	W	Pastureland	3	S					
Unpaved Roads	1	W	Suburban development	3	M					
Cropland	2	M	Parking lots	1	M					
Single-family residences	3	M	Paved Roads	3	S					
Bridges	3	S				timothy.d.craddock@wv.gov				



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Level-One Survey Summary

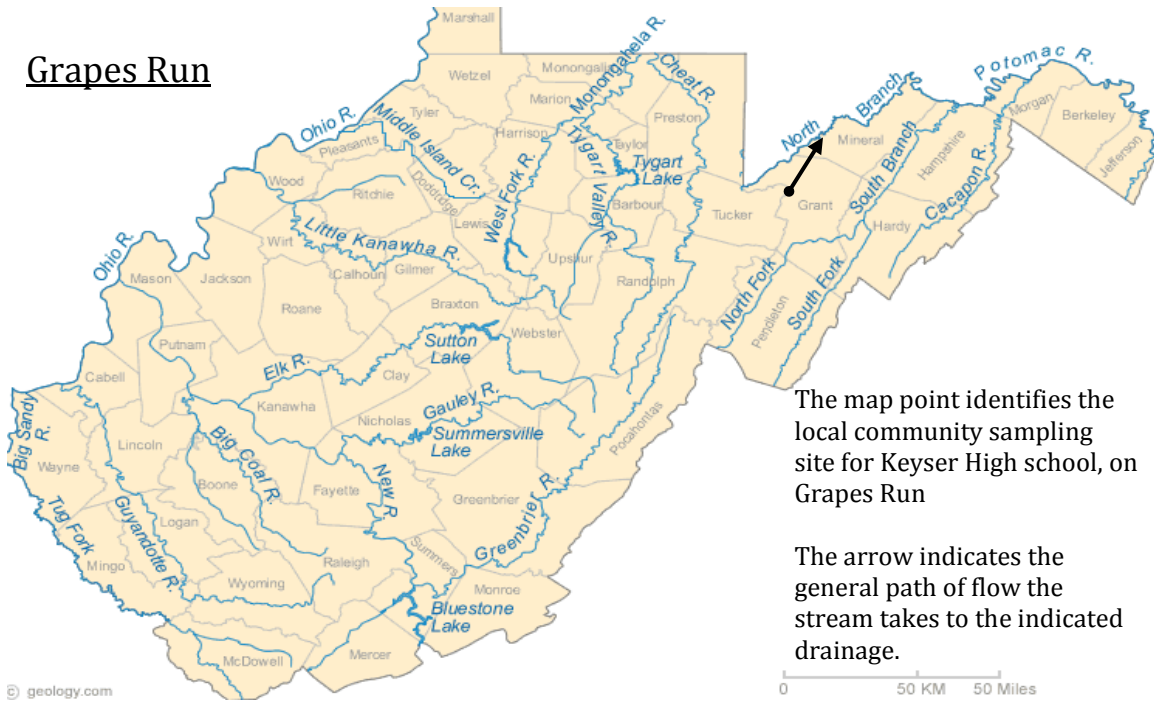
Stream	Turner Run			Basin	North Branch Polomac					
Monitoring group	Frankfort MS-7th graders			Latitude	39	31	4			
Directions	From Middle School: Left on 28 S. travel about 3.5 miles and turn left onto Patterson Creek Rd. Go about 0.2 miles and the stream travels under the first bridge. X point is on upstream side of bridge.			Longitude	78	45	50			
Station code		RR-miles		Date	26-Oct-10		Start-time	8:30		
Water chemistry		Streambed composition			Benthic macroinvertebrates					
pH	7.5		Silt/clay	No Data	No Data	Common names		Total	Taxa	TV
Dissolved oxygen	10.0	ppm	Sand	No Data	No Data	1. Mayflies		6	1	3
Conductivity	552	µs/cm	Fine gravel	No Data	No Data	2. Stoneflies		1	1	2
Nitrite/nitrate	0.5	ppm	Coarse gravel	No Data	No Data	3. Case-building caddisflies				3
Alkalinity	280.0	ppm	Cobble	No Data	No Data	4. Net-spinning caddisflies		7	2	4
Turbidity	0.0	JTU	Boulder	No Data	No Data	5. Free-living caddisfly				3
Bacteria	No Data		Bedrock	No Data	No Data	6. Common netspinner		8	1	5
Temperature	13.5	C	Woody debris	No Data	No Data	7. Dragonflies				4
Iron: 0.5 ppm, Phosphate = 4 ppm.			Rifle only or entire reach	No Data	No Data	8. Damselflies				7
			Index	No Data	Count	Estimate	9. Rifle beetle			4
Physical conditions			Habitat evaluation			10. Water penny		10	1	3
Width (ft)		Depth (ft)		Discharge		0.9		11. Other beetles or bugs		8
Rifle	9.0	0.1	0.1	Level	normal			12. Hellgrammite		3
Run	No Data	No Data	No Data					13. Alder fly		6
Water clarity	Clear		Sediment deposition	4			14. Non-biting midge		3	1
Water color	None		Embeddedness	2			15. Crane fly			
Water odor	None		Estimate on both banks	Left - L	Right - R			16. Black fly		4
Sediment color	None		Bank stability	2	1			17. Watersnipe fly		3
Algae color	Brown		Riparian buffer width	1	1			18. Other true flies		6
Algae abundance	Heavy		Habitat score	11				19. Water mite		6
Algae growth habit	Matted		Habitat integrity	Poor				20. Crayfish		5
Surface foam	None		Habitat (H) and Biological (B) codes and points					21. Sideswimmer/Scud		5
Channel shade	Poor							22. Aquatic sowbug		7
Physical and habitat comments			Codes	Points				23. Operculate snails		4
			(H) - (Optimal)	8	4			24. Non-operculate snails		7
			(H) - (Suboptimal)	6	3			25. Clams		6
			(H) - (Marginal)	4	2			26. Mussel		4
			(H) - (Poor)	2	1			27. Aquatic worm		3
			(B) - (Abundant)	> 50	6			28. Leeches		10
			(B) - (Common)	5 - 50	3			29. Flatworms		7
			(B) - (Rare)	< 5	1			Miscellaneous invertebrates		
Stream score		17		Stream integrity		Marginal		Totals	38	8
Land use assessment						Additional comments				
Land use	(I)	(L)	Land use	(I)	(L)					
Active Construction	1	W	Cropland	1	W					
Mountaintop mining	1	W	Unpaved roads	2	M					
Recreation	1	M	Single-family residences	2	M					
Pastureland	3	S	Paved roads	1	S					
Bridges	2	S								



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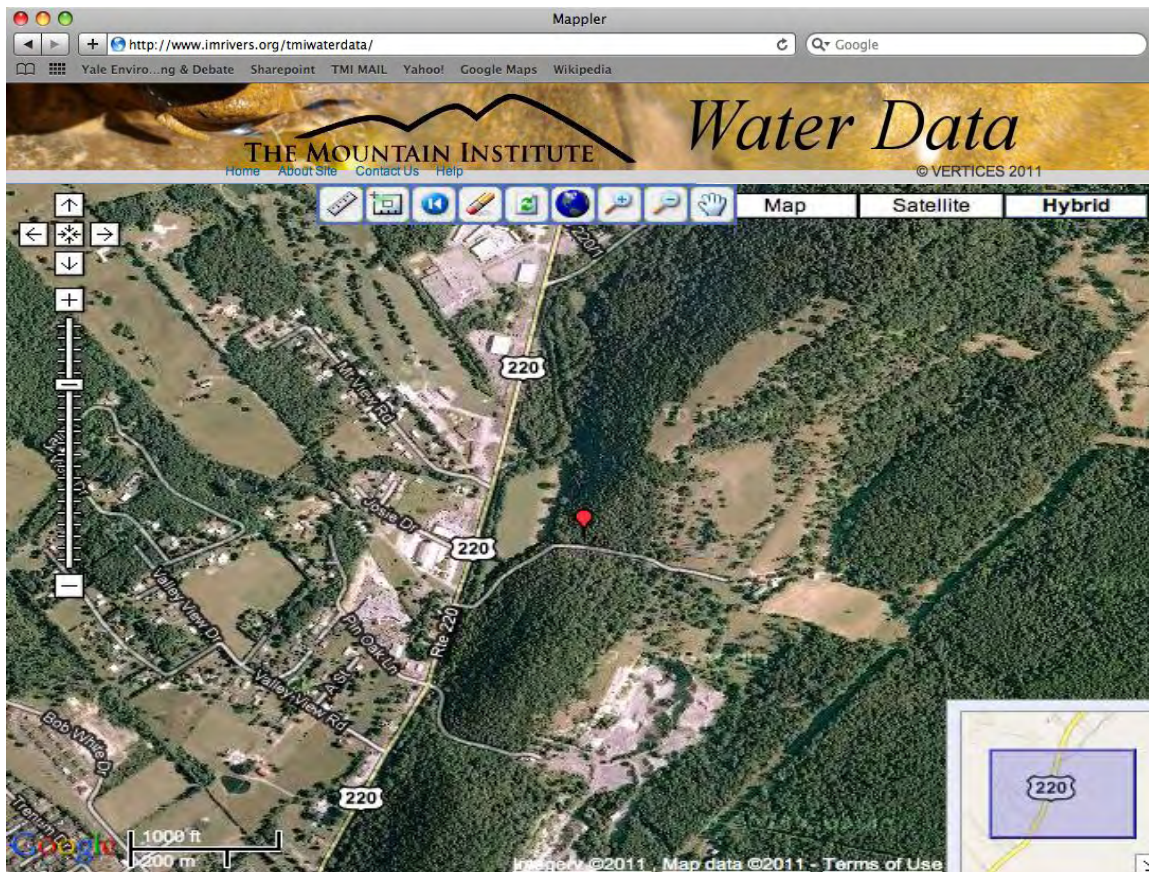
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Grapes Run



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0 50 KM 50 Miles



Level-One Survey Summary

Stream	Grape's Run			Basin	North Branch Potomac					
Monitoring group	Keyser High School				Latitude	39	24	40		
Directions	Turn on unmarked bridge on 220 S. across from Sheetz gas station. Walk up the road about 1/4 of mile and creek flows under a small bridge. X point is upstream from bridge.				Longitude	78	59	53		
					County	Mineral				
Station code		RR-miles		Date	27-Oct-10		Start-time	12:20		
Water chemistry			Streambed composition			Benthic macroinvertebrates				
pH	No Data		Silt/clay	No Data	No Data	Common names		Total	Taxa	
Dissolved oxygen	No Data	ppm	Sand	No Data	No Data	1. Mayflies			TV	
Conductivity	No Data	µs/cm	Fine gravel	No Data	No Data	2. Stoneflies			3	
Nitrite/nitrate	No Data	ppm	Coarse gravel	No Data	No Data	3. Case-building caddisflies			2	
Alkalinity	No Data	ppm	Cobble	No Data	No Data	4. Net-spinning caddisflies			3	
Turbidity	No Data	JTU	Boulder	No Data	No Data	5. Free-living caddisfly			4	
Bacteria	No Data		Bedrock	No Data	No Data	6. Common netspinner			3	
Temperature	57.2	F	Woody debris	No Data	No Data	7. Dragonflies			5	
Students arrived late. Chemistry analysis was not done. No streambed composition analysis done			Rifle only or entire reach	No Data	No Data	8. Damselflies			4	
			Index	No Data	Count	Estimate	9. Riffle beetle			7
Physical conditions						10. Water penny			4	
Width (ft)	No Data	Depth (ft)	No Data	Habitat evaluation			11. Other beetles or bugs		3	
Rifle	No Data	No Data	Discharge				12. Hellgrammite		8	
Run	No Data	No Data	Level				13. Alderfly		3	
Water clarity	Clear		Sediment deposition	4				14. Non-biting midge		6
Water color	None		Embeddedness	2				15. Crane fly		8
Water odor	None		Estimate on both banks	Left - L	Right - R				6	
Sediment color	None		Bank stability	2	2				6	
Algae color	Brown		Riparian buffer width	1	1				3	
Algae abundance	Moderate		Habitat score	12			17. Watersnipe fly		6	
Algae growth habit	Even Coating		Habitat integrity	Poor			18. Other true flies		6	
Surface foam	None		Habitat (H) and Biological (B) codes and points			19. Water mite			5	
Channel shade	Poor					20. Crayfish		17	1	
Physical and habitat comments			Codes	Points		21. Sideswimmer/Scud		100	1	
Pasture upstream and bridge downstream of the reach			(H) - (Optimal)	8	4	22. Aquatic sowbug			7	
			(H) - (Suboptimal)	6	3	23. Operculate snails			4	
			(H) - (Marginal)	4	2	24. Non-operculate snails			6	
			(H) - (Poor)	2	1	25. Clams			4	
Metrics	Value	Points	(B) - (Abundant)	> 50	6	26. Mussel			10	
Total Taxa	4	3	(B) - (Common)	5 - 50	3	27. Aquatic worm			10	
EPT Taxa	0	3	(B) - (Rare)	< 5	1	28. Leeches			7	
Biotic Index	4.93	7				29. Flatworms			7	
Stream score	13		Stream integrity	Marginal		Miscellaneous invertebrates				
						Totals	123	4		
Land use assessment						Additional comments				
Land use	(I)	(L)	Land use	(I)	(L)					
Pastureland	3	S	Parking lots, strip malls, etc	1	M					
Unpaved roads	3	S	Paved roads	1	M					
Single-family residence	2	S	Bridges	3	S					
Sub-urban developments	1	M								

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