Monitor My Watershed[®] Teach-the-teacher Workshop February 29, 2020, 9a-1p at Berks Nature















Introductions

- Hosts/Facilitators: David George (Berks Co. MWS, Angelica Creek Watershed Association), Regan Dohm and Michael Griffith (Berks Nature)
- Workshop: David Bressler, David Kline, Katie Chambers (Stroud Water Research Center)













Monitor My Watershed teach-the-teacher workshop

Saturday February 29, 2020, 9a-1p at The Nature Place, Berks Nature

Attendance: 25-30

Hosts/Facilitators: David George (Berks Co. MWS, Angelica Creek Watershed Association), Regan Dohm and Michael Griffith (Berks Nature)

Workshop: David Bressler, David Kline, Katie Chambers (Stroud Water Research Center)

<u>Agenda</u>

- 8:45-9:15 Welcome, light breakfast, refreshments; Act 48 Registration
- 9:15-11:00 Introduction, background, and Monitor My Watershed tutorial
- 11:00-11:15 Break
- 11:15-12:00 Activity, MonitorMW tutorial lesson plan
- 12:00-12:45 Activity, Data content MonitorMW lesson plans
- 12:45-1:00 Closing discussion and questions, lesson plan feedback, complete Act 48 evaluation (teachers only)



Purpose of Workshop

- Learn to use Monitor My Watershed
- Learn to utilize MonitorMW real time and continuous local sensor data to teach key concepts regarding water quality
- Introduce and test tutorials/lesson plans
- Build skills and resources to use in various teaching venues and to share with teachers/educators in our community



- Timely workshop request by David George, MonitorMW infancy, guidance materials needed
- One of the newer Wikiwatershed tools
- Stroud Center time for this event (and prep) paid via C-SAW and DRWI



What is C-SAW?

The Consortium for Scientific Assistance to Watersheds (C-SAW) is a team of specialists who provide free organizational and scientific technical assistance to Pennsylvania-based watershed and conservation organizations.

C-SAW does not conduct watershed monitoring or assessments. Instead, C-SAW helps watershed organizations do a better job with their own monitoring and assessments.

C-SAW can help your group:

- Learn how to assess watershed health
- Identify solutions
- Develop monitoring programs, protection plans, and restoration projects

C-SAW assistance is provided at no cost to qualified applicants!

Assistance is made possible by a Pennsylvania DEP Growing Greener Grant awarded to Pocono Northeast Resource Conservation & Development Council and its six partner institutions located throughout Pennsylvania. Learn more...









<u>WikiWatershed</u> is a web <u>toolkit</u> designed to help citizens, conservation practitioners, municipal decision-makers, researchers, educators, and students advance knowledge and stewardship of fresh water.

Explore the WikiWatershed Toolkit





- What is Monitor My Watershed?
 - Monitor My Watershed[®] is a data portal that allows you to share and explore do-it-yourself environmental monitoring data. It currently hosts <u>EnviroDIY</u>[™] sensor data and <u>Leaf Pack Network</u>[®] macroinvertebrate data. Monitor My Watershed is part of the WikiWatershed[®] toolkit.



• What is Monitor My Watershed?

https://monitormywatershed.org/





• What is Monitor My Watershed





• What is Monitor My Watershed





Medium

Sensor

Last observation

Medium Liquid aqueous

为 Monitor My Watershed*

Deployment By	Michael Griffith
Organization	Berks Nature
Registration Date	Sept. 16, 2019, 8:06 p.m.
🔁 Deployment Date	Sept. 18, 2019, 4:15 p.m.
I Latitude	40.31108
↔ Longitude	-75.92439
† Elevation (m)	
Elevation Datum	MSL
🔶 Site Type	Stream
55 Stream Name	Angelica Creek
🔺 Major Watershed	-



🖉 EnviroDIY Sensor Observations at this Site DOWNLOAD SENSOR DATA 0 Only the most recent 72 hours of available data are shown on Time Series Analyst ~ View data for this site. the sparkline plots. The plots are broken when there are gaps in the data longer than 6 hours. Plots shaded in green have recent Z Related Link data. Plots shaded in red have not reported data in the last 72 hours Water depth Provisional 0 0 1 Femperature Provisional Last observation Last observation 372.5 Feb. 27, 2020, 10 a.m. (UTC-05:00) Feb. 27, 2020, 10 a.m. (UTC-05:00)



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- EnviroDIY is a community for do-it-yourself environmental science and monitoring. EnviroDIY is part of <u>WikiWatershed</u>, a web toolkit designed to help citizens, conservation practitioners, municipal decision-makers, researchers, educators, and students advance knowledge and stewardship of fresh water.
- *These are the folks who are building the monitoring stations
 - Data from these stations can be uploaded or transmitted (e.g., via cell signal) to Monitor My Watershed









EnviroDIY



Continuous Data – data point every 5 minutes

			Decagon_CTD-	Decagon_CTD-	Decagon_CTD-	Campbell_OBS	Campbell_OBS	EnviroDIY_May	EnviroDIY_May	Digi_Cellular_	Digi_Cellular_
DateTime	TimeOffset	DateTimeUTC	10_Depth	10_Temp	10_Cond	3_Turb-1	3_Turb-2	fly_Temp	fly_Batt	RSSI	SignalPercent
9/18/2019 11:15	-5:00	9/18/2019 16:15	303.3	17.3	403.8	4.61499	4.07552	23.5	4.078	-57	90
9/18/2019 11:20	-5:00	9/18/2019 16:20	304.5	17.1	409.3	3.8014	3.22395	24	4.078	-45	109
9/18/2019 11:25	-5:00	9/18/2019 16:25	303.3	17.1	410.7	5.06607	4.5499	24.5	4.078	-45	109
9/18/2019 11:30	-5:00	9/18/2019 16:30	304.7	17.1	410.5	5.55909	5.05835	24.5	4.078	-57	90
9/18/2019 11:35	-5:00	9/18/2019 16:35	302.7	17.2	414.8	6.5625	6.07589	24.75	4.078	-57	90
9/18/2019 11:40	-5:00	9/18/2019 16:40	301.2	17.2	413.8	6.3067	5.8192	25	4.078	-57	90
9/18/2019 11:45	-5:00	9/18/2019 16:45	299.7	17.2	413.5	9.61286	9.25615	25.25	4.154	-45	109
9/18/2019 11:50	-5:00	9/18/2019 16:50	301.2	17.3	413.8	11.156	10.90822	26.25	4.154	-57	90
9/18/2019 11:55	-5:00	9/18/2019 16:55	300.8	17.3	414.5	9.28674	8.92836	29	4.139	-45	109
9/18/2019 12:00	-5:00	9/18/2019 17:00	302.5	17.3	414.2	2.80841	2.1842	28.75	4.109	-57	90
9/18/2019 12:05	-5:00	9/18/2019 17:05	302.8	17.32	412.8	1.59383	0.91303	28	4.094	-57	90
9/18/2019 12:10	-5:00	9/18/2019 17:10	301.7	17.4	413.7	1.39442	0.71011	27.75	4.094	-45	109
9/18/2019 12:15	-5:00	9/18/2019 17:15	300.7	17.4	408.8	12.71542	12.49092	27.25	4.094	-57	90
9/18/2019 12:20	-5:00	9/18/2019 17:20	301.3	17.4	409.7	1.82901	1.16912	27.25	4.094	-57	90
9/18/2019 12:25	-5:00	9/18/2019 17:25	302.5	17.42	408.8	1.31029	0.61832	27.75	4.094	-57	90
9/18/2019 12:30	-5:00	9/18/2019 17:30	303.3	17.5	414	1.27918	0.58451	27.75	4.094	-57	90
9/18/2019 12:35	-5:00	9/18/2019 17:35	301.2	17.5	413.7	1.22848	0.5362	29	4.124	-57	90

MSAC2S_TimeSeriesResults.csv

Site Code: MSAC2S Site Name: Angelica Creek, Berks Nature, downstream of The Nature Place





CTD sensor – <u>C</u>onductivity, <u>T</u>emperature, <u>D</u>epth



- A measure of how well water conducts electricity
- Directly related to the concentration of dissolved ions in the water
- Commonly used to screen for pollution generally higher in areas with human activity
- Is an indicator of water quality









Temperature

- Water temperature (degrees C)
- Important to fish (especially Trout) and other organisms









Depth (water depth)

- Measures distance from pressure transducer (white disk) to surface of water
- Compensates for air pressure
- Coarse measure of discharge (i.e., flow, amount of water per unit time)





Turbidity sensor

- Measures the clarity of the water in Nephelometric Turbidity Units (NTU)\
- A measure of material *suspended* in the water (*not dissolved*)











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Water temperature and battery level of the monitoring station are usually correlated

• Solar energy heats the water and charges the station



Site Code: MSAC2S Site Name: Angelica Creek, Berks Nature, downstream of The Nature Place



Turbidity increases during storms as sediment is washed into stream and mobilized from stream bed and banks, i.e., turbidity and depth are usually positively correlated



Site Code: MSAC2S Site Name: Angelica Creek, Berks Nature, downstream of The Nature Place

WATER RESEARCH CENTER

- Key points about MonitorMW
 - It's new and in development, this is important for users to understand
 - It is entirely public no login or pass needed to access, visualize, and download data
 - There are now help resources, guidance materials, and lesson plans (drafts)
 - There is a way to provide feedback on bugs and feature requests, GitHub
 - A lot more than what was provided here ability to build station, establish a site on MonitorMW, and upload/transmit data



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 - There are now help resources, guidance materials, and lesson plans/curricula (drafts)

https://wikiwatershed.org/curricula/



Middle and High School Curricula

Watershed Modeling STEM Mini-Unit

This mini-unit was designed for middle school students to learn systems thinking and geospatial analysis skills in the context of place-based problem-solving for watershed science. It consists of two interactive lessons where students use online GIS-based modeling tools to develop an understanding of stormwater dynamics within a watershed. <u>Download the mini-unit teacher guide</u>

Watershed Modeling STEM Lesson One: Effects of Land Cover and Soils in Watersheds

What can you do to improve water in the lakes, rivers, and streams in your watershed?

Students will identify how land cover, rainfall totals, and soil texture affect evapotranspiration, runoff, and infiltration, and will explain the impact of land cover and soil texture on the health of the watershed. <u>Download the student worksheet</u>

Watershed Modeling STEM Lesson Two: Modeling Improvements to My Schoolyard

How can I improve my watershed... starting with my own schoolyard?

Students will model possible changes in land cover and conservation practices on their watershed and describe the impact of these changes. They will design a watershed plan for their schoolyard that maximizes the health of the watershed by implementing conservation practices and land cover changes. <u>Download the student worksheet</u>

Teaching Environmental Sustainability – Model My Watershed Five-Lesson Unit

Go to the Innovative Technology in Science Inquiry.(ITSI) portal and click the "Explore ITSI activities" button. Scroll down and click on "High School Environmental Science."

College Curriculum

See Earth-focused Modules and Courses for the Undergraduate Classroom, Unit 7.1 – Model My Watershed in Carleton College's InTeGrate portal.





- Key points about MonitorMW
 - There is a way to provide feedback on bugs and feature requests



View the Monitor My Watershed Terms of Use and Privacy Policy



- Key points about MonitorMW
 - Lot's more on the equipment/building via EnviroDIY.org
 - EnviroDIY.org forum for tech support on EnviroDIY stations
 - Comprehensive manual build from scratch, management, Quality Control, etc.

<u>https://www.envirodiy.org/mayfiy-sensor-station-manual</u>

	About 🗸 Pa	articipate 🗸	Mayfly 🖌 E	Blog Forum	s 🗸 Video	s Help	Register	Log In	۹	
An Initiative of Stroud Water Research Center			Getting Started				Subscribe	O EnviroDIY o	n GitHub	
Welcome to EnviroDIY, a community for do-it-yourself environ	mental science and	monitoring. Er	Hardware		veb toolk	t designed to	help citizen	s, conservat	ion	
practitioners, municipal decision makers, researchers, educat	ors, and students ad	Ivance knowler	Software		New to E	New to Envirobit ? Start here				
Check out the EnviroDIY Mayfly Data Logger, a powerful u	user-programmable		Forum				Acka	Questie	0	
	o ibe continuite.		Mayny Sensor Si	tation Manual		Have a q	uestion abou	ut DIY enviro	onmental	
For sketches, libraries, and documentation, <u>visit our EnviroDIY</u>	GitHub repository.				D.J.	monitorir	ng? Post it in	the forum.		
Status updates and community groups were disabled on Februa forward, all conversations should be posted on the forum.	ry 3, 2020. Moving	6					<u>Start a </u>	forum topic		
	SEE ALL ACTIVIT	TY Nev	w Tutorial: Lear	n EnviroDIY		FORUN	I TOPICS		ACTIVITY	>
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Onward!

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David Bressler Stroud Water Research Center dbressler@stroudcenter.org 610-268-2153 ext312

- Katie Chambers
 - Recent Chemistry Education graduate from U of Delaware
 - Volunteer role with the Stroud Center
 - *Major contributor to the materials developed for this workshop
 - The baker of the cookies

