WELCOME!

Master Watershed Stewards
EnviroDIY Sensor Station Support Workshop

Online, May 17, 2020, 1:00-3:00p
Zoom Orientation

★ Audio-Visual Check

★ Using the Features: Chat, Mute, Video, Share screen, Breakout rooms

★ Privacy Permissions

Stroud Water Research Center will be recording this live workshop or webinar, including all questions, comments, etc. by the audience. By participating, you agree to allow the recording to be posted on the Stroud Center's YouTube channel, website, Facebook page, Instagram feed, and other media.

*Audio and Video should be disabled for everyone except current speaker*
Audio – Other than the current presenter, **everyone MUTE audio**

Video – Other than the current presenter, **please keep video disabled**

*Tip – Press space-bar on keyboard to temporarily unmute (you are unmuted while space bar is held down)*
★★ If you have a question type it into the CHAT BOX★★
★★ Anything urgent technical use the RAISE HAND feature, then unmute★★
★★ Unmute and speak freely during designated question period at 2:30★★
★ All Stroud Center folks are co-hosts – ability to control audio/video
★ Waiting room has been disabled
Master Watershed Stewards
EnviroDIY Sensor Station Support Workshop

Online, May 17, 2020, 1:00-3:00p
Introductions

**Workshop**

Stroud Center: David Bressler, Shannon Hicks, Rachel Johnson

Master Watershed Stewards: Carol Armstrong, George Seeds (Chester & Delaware Co.)

**Special Talks**

Stroud Center: Diana Oviedo-Vargas and Marc Peipoch
Roles

- George Seeds – organizer, big picture presenter
- Carol Armstrong – organizer, context and case study presenter
- Rachel Johnson – technical presenter, questions
- Shannon Hicks – questions, feedback
- Diana Oviedo, PhD and Marc Peipoch, PhD – special talks, questions
- Dave Bressler – moderator, presenter
Agenda

A. THE BIG PICTURE OF CITIZEN SCIENCE IN THE DRWI – 20 MIN.
   i. Welcome, introduction, housekeeping
   ii. Big picture of citizen science and its application to EnviroDIY/DRWI and MWS efforts
   iii. Overview of DRWI and Stroud role in supporting citizen science and sensor stations –
   iv. Application of data to protect watersheds: education, watershed management, reporting problems

B. THE DATA AND RESOURCES YOU NEED TO SUPPORT THE WORK – 30 MIN.
   i. Intro to Wikiwatershed
   ii. Review of Monitor My Watershed tool (MonMW) and practical usage issues
   iii. Review of basic maintenance and QC, using MonMW: understanding sensor and station functions, and critical tasks needed to achieve usable data, using quick guides
   iv. Support: Contacts for emergencies, technical problems, communication options, use of mentors

C. HOW DATA BECOMES USEFUL – 25 MIN.
   i. Stroud’s role and capacities versus station owners
   ii. Broad scale interpretation of the data to understand the watershed; Temperature and Conductivity

D. PRACTICAL ISSUES IN WORKING WITH STATIONS – 20 MIN.
   i. Guidelines for the roles, responsibilities, communication, and learning opportunities for volunteers
   ii. Overview of building your own station

E. QUESTIONS AND DISCUSSION – 25 MIN.
Goal for today

Build capacity to work with EnviroDIY stations and data

- This is an overview – lots of subtlety beyond what we can discuss today

- Use the resources that are available and be patient with your knowledge building

- Communicate and ask questions of station owner, the team, mentors, and Stroud Center
Delaware River Watershed Initiative

4States1Source
The Delaware River Watershed Initiative

Working across four states to protect one shared source of clean water

DELAWARE RIVER WATERSHED INITIATIVE

OUR WATER  OUR WORK  FIELD NOTES  TAKE ACTION

STROUD
WATER RESEARCH CENTER
Stroud Center – EnviroDIY in DRWI

- **Primary Goal**
  - Support station owners in using stations for their own purposes
    - Workshops
    - Guidance materials
    - 1:1 support, trainings, small group events

- **Secondary Goal**
  - Analyze basin-wide data set
  - Develop tools to characterize and contextualize watersheds
It’s a new project with a new product.
The Big Picture
Viewing our role as volunteer MWS’s in the context of the overall Delaware River Watershed Initiative (DRWI) and the broader citizen science movement gives our work larger meaning and value.

**Citizen Science**

- Scientific work undertaken by members of the general public, often in collaboration with or under the direction of professional scientists and scientific institutions. — *Oxford Dictionary*

- The involvement of the public in scientific research – whether community-driven research or global investigations. – *Citizen Science Association*

- Citizen Science volunteer networks allow scientists to accomplish tasks that would be too expensive or time-consuming to accomplish through other means.

- Citizen Science is a growing global movement that is increasing in its importance as government funding becomes scarcer and the need for science-based information increases, particularly in the environmental sciences and ecology.
Delaware River Watershed Initiative Citizen Science

https://williampennfoundation.org/delaware-river-watershed-initiative

- "The goal of the DRWI citizen science is to not only engage the public with conservation, but to train volunteers to generate meaningful, professional-quality water data that can be shared more broadly across the watershed." - Andrew Johnson, Director of Watershed Protection, William Penn Foundation

- "We wanted to build a framework that would harness the enormous capacity of conservation organizations to work together on a shared approach, and to see whether that critical mass could affect greater change. The result is a model that will not only have an effect in the Delaware River watershed, but also will provide a model that can be replicated in other watersheds tackling similarly complex issues." - Janet Haas, Board Chair, William Penn Foundation

- MWS’s support local watershed groups across the Delaware River Basin and the Stroud Water Research Center in building science capacity to better address questions about how local watersheds function and how to restore and protect these resources.
Application, Case Studies
East Stroudsburg University at Cherry Valley National Wildlife Refuge
Action without Vision just passes time
Vision without Action is just a dream

The purpose of the National Wildlife Refuge system was to support survival of migrating species by giving protected space for breeding, wintering, and foraging. The U.S. Fish & Wildlife Service are planning for climate change on National Wildlife Refuges.

They plan to conserve the future with scientific excellence at a landscape scale, to benefit a diverse public, and to nurture the next generation of leaders.

The Cherry Valley National Wildlife Refuge was added in 2008 with up to 20,000 migrating raptors and more than 140 species due to large blocks of unfragmented forest along the Kittatinny Ridge for interior-forest birds breeding grounds.
Paul Wilson, Assoc. Professor of Biology, focuses on monitoring of aquatic ecosystems at CVNWR as part of the Delaware River Watershed Initiative. He involves ESU students through his Stream Ecology Class, ESU student research projects, and the ESU Environmental Club.
Stream Ecology is a field research class using 2 sites at CVNWR - students learn field and laboratory methods typically used by professionals. Each student presents their work in a science poster session.
Research students use data from four Mayfly Data Loggers in Cherry Creek, learn to maintain the sensor stations, and conduct macroinvertebrate and chemical sampling.
The Environmental Club includes students from all majors who are interested in stream ecology and aquatic life.
STREAM STEWARDS

Kim Hachadoorian, Project Manager, TNC

www.nature.org/destreamstewards
• **First State National Historical Park** was designated in 2013, after being created by President Obama as First State National Monument.

• Its purpose is to celebrate the European cultural diversity of this settlement in the 1600s, and to celebrate the role Delaware played in the establishment of the U.S.

• The **Stream Stewards** are a Citizen Monitoring Program. Its work focuses on Rocky Run, Hurricane Run, Ramsey Run, Beaver Creek, and Palmer Run, all tributaries running into the Brandywine Creek, which joins the Christina River where the Delaware River meets the Estuary.

• Estuaries host more wildlife births than any other ecosystem in the world and have a wide range of habitats. Stream Stewards’ work focuses on decreasing pollutants into the Estuary.
The Stream Stewards’ focus is on the impact of stormwater runoff on these tributaries for current and future research and management recommendations

- **Stream Stewards** is a Watershed Stewardship partnership between The Nature Conservancy, First State National Historical Park (FRST) and Stroud Water Research Center. Starting in 2016, a team of Citizen Science volunteers has been collecting water quality data on the streams that flow through FRST into Brandywine Creek.

- They use six Mayfly Data Loggers for conductivity, depth, temp, and turbidity. From additional sites they also take grab samples for E. coli counts and for macroinvertebrate indices, and measure pH and chloride.

- Those streams that are surrounded mostly by natural areas have low conductivity and are used for comparison with the monitored streams with headwaters in areas of dense residential and commercial development. These latter streams have high baseline conductivity and conductivity spikes into the tens of thousands $\mu$S/cm.
Macroinvertebrate Aggregated Index (MAIS) scores have declined, and the highest scores were within the “Fair” category.
Analyses
Rocky Run TMDL

- High conductivity throughout the year at Rocky Run from road salt in mall and other parking lots, maybe summer flushing of salt.
- High pH in one pipe being studied.
- Stream Stewards providing info to DNREC to assist with Pollution Control Strategies for TMDLs, and awareness & stewardship.
- Goals are to partner with landowners, water utilities, municipalities, state to influence policy and practice.
- Analyses shared with New Castle County who investigated and found and capped an oil/water separator at Auto store in Concord Mall that was inadvertently tied into the storm sewer system; Mall, store, County and SS worked very cooperatively to mitigate stream pollution.
### Chester County – Who to Call
For Water and Environmental Concerns and Complaints

#### Emergencies, including Spill and Fish Kills

<table>
<thead>
<tr>
<th>Issue</th>
<th>Contact</th>
<th>Availability</th>
<th>Phone Number</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spills and other emergencies should be reported immediately</td>
<td>PA DEP</td>
<td>24 hours 7/365</td>
<td>484-250-5900 or 1-800-541-2050 (866-255-5158 (statewide))</td>
<td>Chester County is in the Southeast Region. Water quality problems are in the DEP Clean Water Program</td>
</tr>
<tr>
<td>Environmental complaints including water quality should be reported immediately</td>
<td>PA DEP</td>
<td>Weekdays 8:00a – 4:00p</td>
<td>484-250-5991</td>
<td>Off hours, leave a message</td>
</tr>
<tr>
<td>Fish kills (1st call)</td>
<td>PA DEP</td>
<td>24 hours</td>
<td>484-250-5900</td>
<td>Off hours, leave a message</td>
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<tr>
<td>Fish kills (2nd call)</td>
<td>PA Fish and Boat Commission</td>
<td>Weekdays 8:00a – 4:00p</td>
<td>717-626-0228</td>
<td></td>
</tr>
<tr>
<td>Environmental health concerns (harmful env'l exposures, child care locations, natural gas and oil production health concerns, PFAS, lead)</td>
<td>PA Dept. of Health</td>
<td>24 hours 7 days</td>
<td>1-877-PA-HEALTH (1-877-7243)</td>
<td>601 Westtown Rd, West Chester.</td>
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<tr>
<td>Enforcement of violations related to on-lot sewage disposal systems, solid waste disposal</td>
<td>Chester County Dept. of Health</td>
<td>Weekdays 8:30a – 4:30p</td>
<td>610-344-6225 (sewage and water) 610-344-6688, 610-344-6526</td>
<td><a href="https://www.chesco.org/365/Sewage-Water">https://www.chesco.org/365/Sewage-Water</a></td>
</tr>
</tbody>
</table>

Non-emergency environmental complaints can be submitted online (“Report An Incident”) at: http://www.depweb.state.pa.us/portal/server.pt/community/southeast_regional_office/13778/environmental_complaints/617089
# Construction Site and Industrial Issues

<table>
<thead>
<tr>
<th>Issue</th>
<th>Contact</th>
<th>Availability</th>
<th>Phone Number</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction site pollution issues including erosion; off-site discharges of mud/sediment, improper or no silt fencing; sediment and stormwater discharges not controlled by BMPs</td>
<td>Chester County Conservation District</td>
<td>Weekdays 8:00a – 4:00p</td>
<td>610-925-4920</td>
<td></td>
</tr>
<tr>
<td>Salt piles secured poorly or unsecured, salt runoff should be reported</td>
<td>Public Works Dept. of relevant township</td>
<td>Weekdays</td>
<td></td>
<td>Can provide short film to township, “Salty Streams” by Stroud Water Res Ctr: <a href="https://www.youtube.com/watch?v=DvJ_-Zzz0kQ">https://www.youtube.com/watch?v=DvJ_-Zzz0kQ</a></td>
</tr>
<tr>
<td>Pipeline construction problems, discharge of industrial waste to waters of PA</td>
<td>PA DEP Bureau of Clean Water</td>
<td>Weekdays 8:00a – 4:00p</td>
<td>484-250-5990</td>
<td>Off hours, leave a message</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emergency: 24 hours 7/365</td>
<td></td>
<td></td>
</tr>
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# Broken Water Mains and other Water Supply Issues

<table>
<thead>
<tr>
<th>Issue</th>
<th>Contact</th>
<th>Availability</th>
<th>Phone Number</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broken water mains</td>
<td>Public Works Dept. of relevant township/borough/city</td>
<td>Weekdays</td>
<td></td>
<td>Information from Chester County Water Resources Authority – 610-344-5400</td>
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<tr>
<td>Broken water mains</td>
<td>Aqua Pennsylvania</td>
<td>24/7/365</td>
<td>610-525-1402</td>
<td></td>
</tr>
<tr>
<td>Clogged or leaking sanitary sewer lines</td>
<td>Sewer Dept. or Public Works Dept. of relevant township</td>
<td>Weekdays</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illegal water main or water pipe discharges into streams, storm drains, ponds</td>
<td>Public Works Dept. of relevant township</td>
<td>Weekdays 8:00a – 5:00p</td>
<td>610-692-3859</td>
<td>713 Tower Lane, West Chester</td>
</tr>
<tr>
<td>Contact PA DEP emergency line – 484-250-5900 or 1-800-541-2050 if unable to reach township and problem is urgent.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Salt piles on unnamed business uphill from Little Valley Creek, E. Whiteland
200 m from Pickering Creek

December 2019

March 2020

Site code: SHPK6S
Site name: Pickering downstream
Reporting sewage and broken sewer equipment

Site code: PUSR1S
Site name: Sandy Run, Abington
Data and Resources to Support the Work
Data and Resources to Support the Work

- [https://wikiwatershed.org/drwi/](https://wikiwatershed.org/drwi/)

Delaware River Watershed Initiative Resources

**EnviroDIY Field Visit Data Sheet**
- Enter field visit data
- View field visit data (looking for older data?)

**Data Sheets**
- EnviroDIY Field Visit Data sheet (blank)
- EnviroDIY Field Visit Data sheet tutorial
- Stream Discharge Data sheet

**Data and Data Visualization Resources**
- Monitor My Watershed
- Monitor My Watershed help resources

**Sensor Station Help Resources**

**Manuals**
- DRWI sensor station manual (more complete, access limited to DRWI users)
- Sensor station manual (formal, publicly available version)

**Quick Guides**
- Data patterns quick guide
- Time zone guide
- Maintenance quick guide
- Quality control quick guide
- Understanding your EnviroDIY Mayfly sensor station data

**Video Tutorials**
- Sensor station installation
- Discharge rating curve calculator: Using Flowmeter Data | Using Neutrally Buoyant Object Data
- Stage to Area Predictor: Entering Cross Section Data
- Sensor Bundle Maintenance: Sensor Cleaning and Bundle Removal
- Collecting a Grab Sample and Building Site Rating Curves
- Performing Quality Control on the Site and Sensor Station
- Downloading Sensor Station Data
- Installing a Staff Gauge at Your Sensor Station Site
A web toolkit designed to help people advance knowledge and stewardship of fresh water.
Wikiwatershed help

- [https://wikiwatershed.org/help/](https://wikiwatershed.org/help/)
  - Videos
  - Manuals
  - Curricula
Angelica Creek Downstream of The Nature Place (MSAC2S)
Angelica Creek Downstream of The Nature Place (MSAC2S)
Angelica Creek Downstream of The Nature Place (MSAC2S)
Monitor My Watershed® is a data portal that allows you to share and explore do-it-yourself environmental monitoring data.

It currently hosts EnviroDIY™ sensor data and Leaf Pack Network® macroinvertebrate data.

https://monitormywatershed.org/
Key points about MonitorMW
- It is entirely public – no login or pass needed to access, visualize, and download data
Key points about MonitorMW

- There are **now** help resources, guidance materials, and lesson plans (drafts)
Key points about MonitorMW

- There is a way to provide feedback on bugs and feature requests
Monitor My Watershed

- https://monitormywatershed.org/

Data Sharing Portal
Contribute your water-quality data
Ready to start sharing your data? SIGN UP

How It Works
Monitor My Watershed supports multiple types of water-quality data.
Monitor My Watershed®

Browse Data Collection Sites

Browse all sites that have been registered in the database by all users. Clicking on a site shows its details and provides a link to view the data collected at that site.

Map

Site Code: MSAC25
Site Name: Angelica Creek, Berks Nature, downstream of The Nature Place
Latitude: 40.31108
Longitude: -75.92439
Elevation: m
Latest Measurement: Feb. 27, 2020, 11:45 a.m. (UTC-05:00)
(3 minutes ago)

View data for this site

Showing 395 out of 395 results.
Angelica Creek, Berks Nature, downstream of The Nature Place (MSAC25)

**Deployment By:** Michael Griffith  
**Organization:** Berks Nature  
**Registration Date:** Sept. 16, 2019, 8:04 p.m.  
**Deployment Date:** Sept. 18, 2019, 4:15 p.m.  
**Latitude:** 40.31108  
**Longitude:** -78.92899  
**Elevation (m):** -  
**Elevation Datum:** MSL  
**Site Type:** Stream  
**Stream Name:** Angelica Creek  
**Major Watershed:** -

**Sensor Observations at this Site**

- **Water depth**
  - Last observation: Feb. 27, 2020, 10 a.m. (UTC-05:00)
  - 372.5 (mm)

- **Temperature**
  - Last observation: Feb. 27, 2020, 10 a.m. (UTC-05:00)
  - 6.4 (degC)

- **Electrical conductivity**
  - Last observation: Feb. 27, 2020, 10 a.m. (UTC-05:00)
  - 272.2 (μS/cm)

- **Turbidity**
  - Last observation: Feb. 27, 2020, 10 a.m. (UTC-05:00)
  - 5.6225 (NTU)
Time Series Analyst for comparison of time, site, chemistry, and downloading of data

- Find your station, select the data you want to review

<table>
<thead>
<tr>
<th>Plot</th>
<th>Series</th>
<th>Network</th>
<th>Site Code</th>
<th>Variable Code</th>
<th>Variable Name</th>
<th>Quality Control Level</th>
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<tr>
<td>366</td>
<td>EnviroDIY</td>
<td>SHPK5S</td>
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<td>Decagon_CTD-10_Depth</td>
<td>Water depth</td>
<td>Raw Data</td>
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<td>Raw Data</td>
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<td>369</td>
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<td>Campbell_OBS3_Turb</td>
<td>Turbidity</td>
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<td>EnviroDIY</td>
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<td>Campbell_OBS3_Turb</td>
<td>Turbidity</td>
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<td></td>
<td>EnviroDIY_Mayfly_Temp</td>
<td>Temperature</td>
<td>Raw Data</td>
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<td>372</td>
<td>EnviroDIY</td>
<td>SHPK5S</td>
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<td>EnviroDIY_Mayfly_Batt</td>
<td>Battery voltage</td>
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<td>1929</td>
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<td>SHPK5S</td>
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<td>Sodaq_2GBe_SignalPercent</td>
<td>Percent full scale</td>
<td>Raw Data</td>
</tr>
</tbody>
</table>
Time Series Analyst Graphs and data

- Select data from multiple sites to make comparisons
- Select your desired time period for analysis
- Can also display as histogram, or box and whisker graphs.
- Cursor will give specific data points, and graph can be expanded by dragging, too.

Side code: SHPK6S
Site name: Pickering Creek downstream
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
Station Maintenance and QC
Sensor Station Maintenance and QC

Introduction

- Brief overview of what we will be covering in this section:
  - Review of how the sensor station functions
  - Review maintenance and QC critical tasks
  - Relating tasks to MonitorMyWatershed data

What do we mean when we mention maintenance and QC?

Why does it matter?
Sensor Station functions

The mayfly data logger – sending continuous data every 5 minutes to MonitorMyWatershed.org

MSAC2S_TimeSeriesResults.csv

Site Code: MSAC2S
Site Name: Angelica Creek, Berks Nature, downstream of The Nature Place
Sensor Station functions cont.

A - ON/OFF Switch
B - MicroSD card adapter
C - LED lights
Sensor Station Functions

Sensors most commonly used for our purposes:

1. HYDROS21 CTD sensor by METER Group
2. OBS-3+ Turbidity sensor by Campbell Scientific
The OBS-3+ Turbidity Sensor

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

Turbidity (NTU)

*Water Samples:*

- 250
- 100
- 50
- 25
- 10
The OBS-3+ Turbidity Sensor
CTD sensor – Conductivity, Temperature, Depth

**Conductivity** (Electrical Conductivity) (uS/cm, microsiemens per centimeter)

- 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
HYDROS21 CTD Sensor cont.

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)
• **Frequency of visits:** site specific, but recommend once a week.
Quality Control Visit

- **Frequency of visits:** Quarterly, or as needed
- Review QC quick guide

More help here:
Familiarizing yourself with the normal functioning of your station

In baseflow conditions…

How can you tell if an event you are seeing online is real?

Or if it is a malfunction / fouling of a sensor?

and in storm events…
Viewing data on MonitorMyWatershed

Angelica Creek, Berks Nature, downstream of The Nature Place (MSAC25)

<table>
<thead>
<tr>
<th>Deployment By</th>
<th>Michael Griffith</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>Berks Nature</td>
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<tr>
<td>Registration Date</td>
<td>Sept. 16, 2010, 8:39 p.m.</td>
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<td>Deployment Date</td>
<td>Sept. 16, 2010, 4:13 p.m.</td>
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<tr>
<td>Latitude</td>
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<td>Longitude</td>
<td>-75.03039</td>
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<tr>
<td>Elevation (m)</td>
<td>45.3</td>
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<td>Elevation Datum</td>
<td>NAD83</td>
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<tr>
<td>Site Type</td>
<td>Street</td>
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<tr>
<td>STREAM Name</td>
<td>Angelica Creek</td>
</tr>
<tr>
<td>Major Watershed</td>
<td>-</td>
</tr>
</tbody>
</table>

Sensor Observations at this Site

Water depth (m): 372.5 (m/nt)

Temperature (°C): 6.4 (°C)

Electrical conductivity: 272.2 (us/cm)

Turbidity (NTU): 5.6225 (NTU)
Viewing data on MonitorMyWatershed
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.

Sensor fouling is a major issue with turbidity – instantaneous and gradual. Cleaning the sensor is important and creates a clear pattern in the data stream.

Site Code: MSAC2S
Site Name: Angelica Creek, Berks Nature, downstream of The Nature Place
Conductivity can spike in winter due to flushes of road salt/de-icers. Usually conductivity goes down as water depth goes up - DILUTION.
How cleaning effects conductivity & depth

Conductivity, temperature and depth readings after cleaning
Conductivity change of ~60 uS/cm
Depth change of ~5mm;
Issues, Emergencies, Help

- Urgent issues – anything causing bad data or no data
  - Contact the station owner – *always keep them in the loop
  - As needed include:
    - Stroud Center – Dave Bressler, Shannon Hicks, Rachel Johnson
    - Carol Armstrong and George Seeds, MWS mentors
Issues, Emergencies, Help

- Non-urgent questions, issues
  - Station owner and the station team (if there is one)
  - Post to Delaware Basin Sensor Stations online group, [https://wikiwatershed.org/groups/delaware-basin-sensor-stations/](https://wikiwatershed.org/groups/delaware-basin-sensor-stations/)
  - Consult mentors – Carol Armstrong and George Seeds
Issues, Emergencies, Help

- Monitor My Watershed malfunction issues
  - [https://wikiwatershed.org/help/sensor-help/](https://wikiwatershed.org/help/sensor-help/) - confirm if issue has been reported

Forum and GitHub

Have a question about sharing sensor data on Monitor My Watershed? Before submitting a question by email, please do the following:

- Search the EnviRODIY forums for similar issues. If you don’t find the answer, try posting your question on the forum to allow EnviRODIY community members to help.
- Check GitHub for known issues (see below).

Known Issues

Monitor My Watershed is under development and there are a number of known issues:

- Users being warned that site is unsafe due to expired SSL certificate FIXED
- Error when attempting a password reset FIXED
- Website timing out when uploading CSV files
- Registration form says organization name is optional but it is currently set as required FIXED
- Uploaded sensor data not appearing in Time Series Analyst FIXED
- Uploaded data not appearing/not filling gaps

Still Need Help?

If you’ve reviewed the resources and still need help, or would like to report a bug or request a feature, please use our contact form. GitHub users are welcome to report problems in the issue tracker.

- If issue has not been reported, report it on: [https://github.com/ODM2/ODM2DataSharingPortal/issues](https://github.com/ODM2/ODM2DataSharingPortal/issues)
How Data Becomes Useful
Station and Data Usage

- EnviroDIY in DRWI, Stroud support and intentions:
  - **Primary goal** - station owners and their support use data for own purposes
    - Lines of communication, roles and responsibilities, goals for the specific sensor
    - Reference initial project plans, continue to refine
    - Ongoing brief oral reports to station owners, checking in
    - Develop rapport with station owner
  - **Secondary goal** – basin-wide analysis - Diana and Marc’s special talks
    - Currently in development
    - Extent uncertain next several years
Station and Data Usage

- Primary purpose in DRWI context
  - Station owners use station for own purposes

*Dialogue with station owner on project plan, station owner intentions for the station(s) e.g.,

Monitoring Station Project Plan

Berks Nature
Michael Griffith
Michael.griffith@berksnature.org
610-372-4992 Ext.108

Background

Berks Nature is planning on putting in 2 monitoring stations in the same watershed. The first station will be put on Punches Run which starts in Nolde Forest. The station on Punches Run will be positioned in the headwater area upstream of all trail and road crossings and upstream of a private “grandfathered” water diversion. This station will serve as a reference for water quality in Berks County and potentially the broader geography. This stream is in a valley and surrounded by forest. The second station will be placed downstream on Angelica Creek which Punches Run is a tributary. This is a heavily populated area. There are a lot of salt trucks putting down salt in the area, which could have a major impact on the stream. Having these 2 stations within a 3 mile stretch of the same watershed will allow us to have a reference point of what it should be and what it is after traveling through civilization. Also, both Nolde forest and Angelica are part of an environmental education center. The Nature Place at
Station and Data Usage

- Primary purpose in DRWI context
  - Station owners use station for own purposes

*Work with station owner (and with Stroud Center and MWS assistance) to build out expertise, goals, roles, and responsibilities*
Station and Data Usage

- DRWI efforts and focus
  - Primary goal - station owners use data for own purposes
  - Secondary goal – basin-wide analysis by the Stroud Center
Basin-wide Data Analyses

Diana Oviedo-Vargas, PhD
Topic: Conductivity

Marc Peipoch, PhD
Topic: Water Temperature
Proposed Guidelines to Establish Structure, Roles & Responsibilities for MWS Stream Monitoring Support

- MWS and station owner/manager meet in person
- Understand the owner organization’s purpose and goals for stream monitoring and data collection
- MWS obtain a copy of the sensor station project plan if possible
- Understand the station owner/manager’s needs and what specific tasks they need support with
- Be clear about MWS interests, skill set and availability to ensure there is a good fit with the owner’s needs and expectations
- Establish if additional training or the support of a mentor is needed
- Agree on specific MWS tasks and schedule
- Discuss and agree on best way to communicate for questions, troubleshooting, routine updates
- Determine if other volunteers are involved, clarify responsibilities and how communication and activities will be coordinated
- Monthly online meetings for MWS’s, other volunteers, station owners and SRW.
MWS Stream Sensor Initial Assignment Questionnaire (Draft)

- MWS Name:
- MWS Email: Phone:
- MWS Mentor (if applicable)
- Sensor Owner Organization:
- Sensor Station Manager:
- Station Manager Email: Phone:
- Sensor Station Site ID: Logger ID:
- Stream Name:
- Purpose/Goals of Stream Sensor (see Sensor Project Plan):
- What specific tasks does the station owner need assistance with in managing this site and how frequently?
  - Regular maintenance/cleaning
  - QC
  - Discharge measurement
  - Data Analysis
  - Other
- Does the MWS interest, skill set and availability match the needs of station owner?
- Does MWS know how to use Monitor My Watershed to access and manipulate sensor station real-time data?
- Is additional training or the support of a mentor needed to optimally support this site?
- What is the preferred method of communication with station owner (email, text, phone call, WikiWatershed DRWI Forum)?
- Who does MWS contact first for questions and troubleshooting?
- Does the owner want periodic routine updates? How frequently?
- Are other MWS's or volunteers involved? If so, list names and contact information and responsibilities.
- Who is responsible for coordinating the activities of MWS's and volunteers involved and what is the best way to communicate with the group?
Mentoring is an essential part of success of working relationship within the context of ecology fieldwork

Responsibilities of the mentee

- Personal responsibility for one’s volunteerism and sense of effectiveness.
- The role of an Individual Development Plan in thinking about progress in the work. Be patient with the mentor’s time by being prepared when having a discussion. But never be reticent in approaching your mentor, and if needed, change mentors.
- Communication of expectations and needs?
- Other mentors and resources? Consider having more than one mentor from within the organization, or from another source.
- We are trying to develop leadership skills in ourselves and in others, and remember that you might become a mentor yourself.
Mentors currently available

- Carol Armstrong (MWS), mnem.np@gmail.com, 610-659-7477
- George Seeds (MWS), geoseeds@verizon.net, 484-886-9586
- Rachel Johnson (Stroud Center), rjohnson@stroudcenter.org, 973-557-8995
- Christa Reeves (Stroud Center)(in the north, situational), christa@musconetcong.org, 727-520-5849
Building a Station
Building a Station

- **Initial questions**
  - Why do you want a station?
  - What questions will the data help to answer?
  - What are your intentions for the station and data?

- **Resources needed**
  - Money to purchase supplies and equipment
  - Personnel to build and maintain station
  - Time to monitor data and deal with issues – they will happen!
Building a Station

- References and videos available
  - Blogs – recent ones by Moore and Sarnoski
  - Videos: https://www.envirodiy.org/videos/
Building a Station

- Programming a Mayfly data logger and assembling an EnviroDIY sensor station that collects continuous data and sends it to Monitor My Watershed.
Building a Station

- Options other than standard Stroud Center CTD/Turbidity station, e.g.,

  Building a Continuous Temperature Logger with the EnviroDIY Mayfly

https://www.envirodiy.org/building-continuous-temperature-logger-envirodiy-mayfly/
Building a Station

- May 13-14, 2020 – first EnviroDIY Build workshop
  - Recording will be available soon via
    [https://wikiwatershed.org/drwi/](https://wikiwatershed.org/drwi/)
Final Points

- Use https://wikiwatershed.org/drwi/
  - Access Field Visit Data sheet entry and past entries
  - Access manual, guidance, video, workshops

- Keep Quick Guides handy and reference them

- Dialogue with station owner and team regularly

- Use Monitor My Watershed to track the station function and data

- Visit the station and MonitorMW regularly
  - Know the site
  - Know the watershed
  - Know the data
  - Clean the sensors and do Quality Control
  - Complete and enter online Field Visit Data sheet
Master Watershed Stewards, EnviroDIY DRWI contacts:
- Carol Armstrong, mnem.np@gmail.com, 610-659-7477
- George Seeds, geoseeds@verizon.net, 484-886-9586

Stroud Water Research Center, EnviroDIY DRWI contacts:
- David Bressler, dbressler@stroudcenter.org, 410-456-1071
- Shannon Hicks, shicks@stroudcenter.org
- Rachel Johnson, rjohnson@stroudcenter.org