WELCOME! Monthly EnviroDIY in the DRB User Group Meeting Online, Thursday, September 15, 2022, 2:30-3:30p

Monitor My Watershed®

Savirod



*Meeting is being recorded



*Mute unless asking question

These Monthly Meetings

Recordings available at: https://wikiwatershed.org/drwi/



These Monthly Meetings

- Every third Thursday of the month
- 2:30-3:30p
- Zoom link will remain the same: <u>https://us02web.zoom.us/j/81881801310?pwd=eUFmbXZLbmRibV</u> <u>cxa1dtNVhzRmNvZz09</u>
- Reminder email one week prior to each month's meeting
 - All are welcome, please share
 - And let us know if others should be added

REMINDER

- Attendees include:
 - Groups working in Delaware River Watershed Initiative (DRWI)
 - Groups working in Delaware River Basin (DRB) but not DRWI
 - Folks from outside the DRB
- Stroud Center support via DRWI and C-SAW

Delaware River Watershed Initiative (DRWI)

https://4states1source.org/



The Delaware River Watershed Initiative

OUR WATER OUR WORK FIELD NOTES TAKE ACTION

DELAWARE RIVER WATERSHED INITIATIVE

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



https://www.c-saw.info/



Goals for these monthly meetings

- Time to check-in, ask questions, report issues, network, etc.
- **Updates** from the Stroud Center
- Presentations
 - Station Owner/Manager Presentations communicate about individual situations, local watershed work
 - Focus Topic Presentations guest presenters talk about technical/ecological/other focus topics

*All of this to support gathering good data and using it purposefully

Stroud Center project personnel

Stroud Center Facilitators:

David Bressler



Rachel Johnson



Project facilitator

Research Engineer Technician



Elena Hadley Part-Time Environmental Educator Research Technician

Christa Reeves



Northern DRB technician and organization collaborator

Shannon Hicks



Research Engineer, Mayfly and EnviroDIY Inventor/Designer

Stroud Center project personnel

Master Watershed Steward Facilitators:





George Seeds



Master Watershed Steward Program



PennState Extension

Stroud Center project personnel

Stroud Center DRWI Leads:

Dr. John Jackson



Senior Research Scientist

Matt Ehrhart



Director of Watershed Restoration

Dr. David Arscott



Executive Director, President Research Scientist

Stroud Center Perspective – EnviroDIY in the DRB

- Primary Goal
 - Support Station owners, managers, and volunteers
 - Use stations for local purposes
- Secondary Goal
 - Analyze basin-wide data set
 - Develop tools to characterize and contextualize watersheds





Today's Agenda

- 1. Introduction
- 2. Stroud Updates
- 3. Presentation: Watershed Salt Snapshot protocol, David Bressler, Stroud Water Research Center
- 4. Discussion
- 5. Conclusion

Stroud Center Updates

 Stroud Center (Rachel Johnson and Elena Hadley) collecting grab samples for lab analysis all new EnviroDIY sites deployed in 2022 in DRB

About 20 sites

 If permission is needed we will be in touch, but feel free to reach out

Stroud Center Updates

 Model My Watershed now has Land Use/Land Cover layers from 2001 to 2019



Any questions before we move on?

Watershed Salt Snapshot

- Take a "snapshot" of salt in a watershed (i.e., a detailed picture of salt contamination of streams throughout a watershed)
 - measure chloride (mg/l) and conductivity (uS/cm)
 - at lots of sites
 - during a short period of time (day 1-2weeks)
 - during baseflow conditions
- *Lots of sites
 - So that you can see in some level of detail where the worst and best spots are
 - And deduce what the sources of observed contamination might be

Group of participants meets at central location

Participants fan out across watershed and collect water samples at predetermined sites



Bring samples back to central location and measure Chloride (mg/l) and Conductivity (uS/cm)

Continuous data as a starting point

- Intended as a supplemental method to EnviroDIY continuous monitoring (or USGS) station (but can be done even if no continuous data)
 - Go upstream (and downstream) of EnviroDIY station and get more information to explain station data and identify patterns across the watershed



Continuous data as a starting point

- Continuous data gives you ongoing info on the watershed use snapshot to:
 - Help determine why continuous data looks like it does
 - Use snapshots to look more deeply at what's going on throughout the watershed



Do it during baseflow conditions

• Snapshot done when stream is at baseflow – use real-time data to determine baseflow (or other info if you don't have real-time data)

Baseflow:

- the resting state of a stream between precipitation events;
- a stream or river's normal flow state when not influenced by recent precipitation runoff, often composed primarily of groundwater;
- the flow that would exist in a stream without the contribution of direct overland runoff from rainfall or melting snow/ice.



Do it during baseflow conditions

• Snapshot done when stream is at baseflow – use real-time data to determine baseflow (or other info if you don't have real-time data)



Goose Ck in West Chester, PA

You don't have to have continuous data though

- But, you don't have to have continuous data to do this snapshot method
 - Instead, confirm you're at baseflow by:
 - Visual observations of stream levels, water clarity, etc.
 - Length of time since last storm (e.g., at least 48 hours since storm)
 - *Note this will vary between streams so be careful to ensure you're really at baseflow
 - Online/real-time continuous data (i.e., EnviroDIY or USGS) from nearby watersheds



People power

- How to visit a lot of sites in a short period of time?
 - People power round up volunteers to fan out across the watershed in a single afternoon, a day, a couple days, longer?? (as long as you're at baseflow the whole time)



Protocol

Watershed Salt Snapshot – Instructions

Overview

The following is a method for documenting salt levels in streams and rivers across a watershed by measuring the concentration of chloride (CI:)(milligrams/liter, mg/l) during baseflow conditions. Measuring electrical conductivity is also recommended as it can provide explanatory information and is directly related to chloride concentration.

The intent of this method is to 1) determine salt levels that aquatic life is exposed to the majority of the time (i.e., during <u>baseflow</u> conditions) in streams of a watershed(s) and 2) identify specific areas of the watershed(s) that may be contributing to or preventing salt contamination of nearby streams.

The basic method:

Over a short period of time (less than a week, to ensure consistency in data) a group of people fans out across a watershed (or other area of interest) during baseflow conditions and collects water samples from pre-determined stream sites. Sites are strategically chosen to help identify specific areas of the landscape that may be contributing to or protecting nearby streams from salt contamination. The samples are returned to a central meeting location where they are measured for chloride (mg/l) and specific conductivity (uS/cm). Because sampling is recommended to occur over a relatively short time period, it is important to consider the number of people available to conduct the work and the number of sites that can be visited in the allotted time. Judgment will be required to balance desired number of sites with personnel and time availability.

Baseflow: the resting state of a stream between precipitation events; a stream or river's normal flow state when not influenced by recent precipitation runoff, often composed primarily of groundwater; the flow that would exist in a stream without the contribution of direct overland runoff from rainfall or melting snow/ice.

Equipment/Supplies

- <u>Chloride QuanTab® Test Strips</u>, 30-600 mg/L or other chloride measurement method
- Conductivity meter (e.g., <u>Hanna DiST®3 Waterproof EC Tester</u>)
- Conductivity meter calibration solution (e.g., <u>1413 µS/cm Conductivity Standard</u>)
- 500-1000mL clean plastic or glass bottles with lids (one bottle per site).
- Waterproof bottle labels (if possible). Bottles can be directly labeled if necessary or labels can be prepared with
 normal paper and covered with packaging tape after labeling is completed
- Small plastic cups/containers (one per site) for chloride strip measurements, should be small enough so chloride strip can stand upright on its own
- Pencils
- Watershed Salt Snapshot Data Sheet
- Portable/collapsible table (big enough to hold all sample bottles)
- Optional: white board to record sample results for group discussion
- Optional: large map to record sample results and locations for group discussion
- Participant-sourced supplies:
 - o Boots (waterproof if possible)
 - Backpack/bag
 - Sunglasses, sunscreen, etc.

The Basic Logistics of the Watershed Salt Snapshot





Figure 1. To help determine specific areas of the landscape that are contributing to or preventing salt contamination of nearby streams, sites should be positioned on tribuaries, systemm and downstream of confinences, and qustream and downstream of high-risk land uses such as high intensity urban (red). The amount of time available and number of people will determine how many sites can be sampled and thus the level of detail at which the salt contamination actreas a watershed can be documented.



Figure 3. Chloride strip usage: Stand a test strip vertically in about an inch of water (in any small plastic or glass container), wait several minutes for the horizontal yellow line at the top of the strip to turn black, then read the test strip and use the chart to translate results into a chloride concentration (mg/l). Note that the chart conversions may



Site ID: Organizer completes this Stream: Organizer completes this Location: Organizer completes this Date: Participant completes this Time: Participant completes this Sampler: Participant completes this

Figure 2. Example label for sample bottle.

	Chronic/Long-Term	Acute/Short-Term	
	Chloride Threshold	Chloride Threshold	
Organization	(mg/l)	(mg/l)	Links
			https://www.epa.gov/sites/default/files/2014-
New York Department of Environmental Conservation	250		12/documents/nywqs-section2.pdf#page=24
New Jersey Departement of Environmental Protection	230	860	https://www.nj.gov/dep/standards/njac7_9b.pdf
			https://www.epa.gov/sites/default/files/2018-
U.S. Environmental Protection Agency (Aquatic Life)	230	860	08/documents/chloride-aquatic-life-criteria-1988.pdf
			https://www.umweltbundesamt.de/en/topics/water/rivers/
			assessment-of-watercourses/chemical-quality-standards-
Germany Environment Agency, Umweltbundesamt	50-200		assessment#chemical-water-quality-classification
			https://www.epa.gov/sites/default/files/2016-
Delaware River Basin Commission, Delaware River Zone 3	180		10/documents/dewqs-drbc.pdf#page=109
			https://www.michigan.gov/-
			/media/Project/Websites/egle/Documents/Programs/WRD/
			NPDES/chloride-sulfate-implementation-
Michigan Department of Environment	150	640	plan.pdf?rev=07c3a64eed2849a6aae7130eda1fe384
			https://sustainabletechnologies.ca/app/uploads/2014/05/C
Canadian Council of Ministers of the Environment	120	640	WQG_chlorides.pdf
			Hazard concentration:
			https://www.researchgate.net/publication/352922966_Asses
			sing_the_Impacts_of_Chloride_and_Sulfate_Ions_on_Macroi
Ohio EPA Recommended Hazard Concentration for Aquatic Biota	52		nvertebrate_Communities_in_Ohio_Streams
			https://www.epa.gov/sites/default/files/2016-
Delaware River Basin Commission, Delaware River Zone 2	50		10/documents/dewqs-drbc.pdf#page=96
			Threshold concentration:
			https://mde.maryland.gov/programs/Water/TMDL/Approved
			FinalTMDLs/Documents/BSID_Methodology_Final_2009.pdf
Maryland Department of Environment, MD Bio Stressor ID Process)	50		(p19-20)

Figure 4. Example chloride criteria and thresholds. To view Chloride criteria across the country:

https://www.epa.gov/wqs-tech/state-specific-water-quality-standards-effective-under-clean-water-act-cwa#tb3

Watershed Salt Snapshot - Instructions for Participants

- Review main Watershed Salt Snapshot Instructions.
- Attend pre-sampling event meeting.
- Receive event details and site list, which will include site locations and directions.
- Scout your site(s) in advance of the event if you would like.
- Show up to pre-determined meeting spot at scheduled date/time with proper supplies:
 - o Site list/directions
 - Boots (waterproof if possible)
 - o Backpack/bag
 - o Sunglasses, sunscreen, etc.
- Receive sample bottle(s), label(s), and pencils from event organizer(s).
- Travel to your site(s); at each site do the following:
 - Rinse bottle three times.
 - Collect sample (fill the bottle with stream water); make sure to collect water that has not been disturbed by your wading.
 - Write date, time, and your initials on sample label and attach it to the sample bottle.
- Return to central meeting location and give your sample(s) to the organizer(s) they will measure Chloride (mg/l) and Conductivity (uS/cm).
- Await results, then review and discuss with the group.
- After event, work with organizers to communicate results with local stakeholders.

Dynamic process, no best way to do it

- There is no set number of sites to visit but the idea is to get a picture of salt throughout a watershed so that
 - Contaminated areas can be identified
 - Sources of contamination can be identified
 - Uncontaminated areas can be identified (for reference and for potential preservation efforts)
 - Salt levels in as many subwatersheds as possible (to get as detailed a picture as possible)



Dynamic process, no best way to do it

- Sample enough sites to show salt variations in tributaries and in relation to land use variations – this is situational but in general, the more sites the better
 - Lots of variations in the method can be used to get the information using the people/time that are available



Variations of the protocol

- The current protocol: Large group, ~half-day, 1-2 samples per person
- Dynamic process, lots of other ways it can be done, e.g.,
 - Small group, half-day, multiple samples per person (experienced volunteers)
 - Small group, several days, 1 2 samples per person
 - Individual (experienced), short time frame, targeted high-risk locations
 - Individual (experienced), longer time frame, more sites



Variations of the protocol

- Remembering, these are just examples work according to what makes sense for your situation. Consider:
 - How many sites would be ideal? Work back from this according to time/people etc.
 - How many people you have available?
 - What time frame would work?
 - How long will it take to travel between sites, etc?
 - Does it make sense to do multiple events to get data you need?

*Just need to make sure it's done at baseflow – otherwise you're comparing apples to oranges



Final Thoughts

- A snapshot gives you a picture in time, remember:
 - You can do more snapshots over time monthly, seasonally, annually
 - You can add/adjust sites to get more/different info
 - As with most work, it will get easier/quicker with experience

Final Thoughts

- Be in touch if you would assistance on doing a snapshot, <u>dbressler@stroudcenter.org</u>.
- Will presumably be posting the protocol and supporting documents to <u>https://wikiwatershed.org/drwi/</u> sometime soon.

Mentors currently available

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

*Anyone else interested? If so get in touch with Stroud Center or Carol or George

Conclusion

Next month's meeting will be on:

Thursday October 20, 2022 2:30-3:30p

Onward!

Stroud Water Research Center, EnviroDIY-DRWI contacts:

- David Bressler, dbressler@stroudcenter.org, 410-456-1071
- Shannon Hicks, shicks@stroudcenter.org, 610-268-2153 x267
- Rachel Johnson, rjohnson@stroudcenter.org, 973-557-8995
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