WELCOME!
Monthly EnviroDIY in the DRB User Group Meeting

Online, Thursday, August 18, 2022, 2:30-3:30p
*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: https://us02web.zoom.us/j/81881801310?pwd=eUFmbXZLbmRibVcxa1dtNVhzRmNvZz09
- 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/

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

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  
Project facilitator

Rachel Johnson  
Research Engineer Technician

Christa Reeves  
Northern DRB technician and organization collaborator

Shannon Hicks  
Research Engineer, Mayfly and EnviroDIY Inventor/Designer

Elena Hadley  
Part-Time Environmental Educator Research Technician
Master Watershed Steward Facilitators:

Carol Armstrong  George Seeds
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
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:
   - review some features of Monitor My Watershed that can help with tracking station function
   - revisit the pilot Salt in Tap Water Survey results and participation
   - review some statistics on EnviroDIY station visits across the DRB
   - review some summaries of the continuous data from stations throughout the DRB
4. Discussion
5. Conclusion
Stroud Center Updates

- EnviroDIY Monitoring Station Manual has been updated and has a new searchable format
Stroud Center Updates

https://www.envirodiy.org/knowledge-base/
# Stroud Center Updates

[https://www.envirodiy.org/envirodiy-monitoring-station-parts-list/](https://www.envirodiy.org/envirodiy-monitoring-station-parts-list/)

## EnviroDIY Monitoring Station Parts List

This is the comprehensive parts list for building an EnviroDIY Monitoring station. Detailed instructions can be found in the EnviroDIY Monitoring Station Manual and Appendices available in the knowledge base.

Items with (*) in the Product Name are included in the EnviroDIY Monitoring Kit.

Please email webmaster@stroudcenter.org if you have trouble viewing this table.

### EnviroDIY Parts List (PUBLIC) - Dynamic List

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Section in EnviroDIY online manual</th>
<th>Manufacturer</th>
<th>Vendor</th>
<th>VendorLink</th>
<th>Unit Cost</th>
<th>Quantity</th>
<th>Unit x Quantity</th>
<th>Model/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EnviroDIY Mayfly Wireless Data Logging System</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EnviroDIY Monitoring Station Kit</td>
<td>Section 3.5</td>
<td>Stroud Water Research Center</td>
<td>EnviroDIY</td>
<td>Link</td>
<td>$475.00</td>
<td>1</td>
<td>$475.00</td>
<td>The EnviroDIY Monitoring Station Kit contains: Mayfly Data Logger and microUSB cable for connection with computer, EnviroDIY LTE box - Hologram Global SIM card, 2 microSD cards and standard SD card adapter, vertical microSIM clock, waterproof Pelican case with pre-cut foam and pre-drilled holes for cable glands (one for holding logger inside the Pelican case, 6-volt 3.5-watt solar panel with mounting bracket, Mayfly Data Logger, 2 waterproof cable glands: 1 small (3/8&quot; OD for cables 0.96&quot; - 3.24&quot;), 1 for mounting the waterproof box on a post, Grove cable and a Grove to 3.5 mm jack adapter and stainless steel retaining pin for attaching sensor bundle to steel rebar (rebar not included). Includes waterproof enclosure with clear lid, 0.5 Watt solar panel, custom microSD connector adapter, 1-meter microUSB cable, and 2 Grove cables.</td>
</tr>
<tr>
<td>EnviroDIY Mayfly Data Logger Starter Kit</td>
<td>Section 3.5</td>
<td>Stroud Water Research Center</td>
<td>Amazon / EnviroDIY</td>
<td>Link</td>
<td>$130.00</td>
<td>1</td>
<td>$130.00</td>
<td></td>
</tr>
<tr>
<td>CR1220 12mm Diameter - 3V Lithium Coin Cell Battery *</td>
<td>Section 4.4</td>
<td>Panasonic / BSG</td>
<td>Digi-Key</td>
<td>Link</td>
<td>$1.01</td>
<td>1</td>
<td>$1.01</td>
<td>lithium batteries for the Mayfly board so they retain the clock time after programming.</td>
</tr>
<tr>
<td>Lithium Ion Battery Pack - 3.7V 4400mAh (recommended size)</td>
<td>Section 6.1</td>
<td>Adafruit Industries LLC</td>
<td>Adafruit</td>
<td>Link</td>
<td>$19.95</td>
<td>1</td>
<td>$19.95</td>
<td>This Lithium ion pack is made of 2 balanced 2200mAh cells for total of 4400mAh capacity.</td>
</tr>
<tr>
<td>Lithium Ion Battery Pack - 3.7V 4400mAh (recommended size)</td>
<td>Section 6.1</td>
<td>Adafruit Industries LLC</td>
<td>Digi-Key</td>
<td>Link</td>
<td>$19.95</td>
<td>1</td>
<td>$19.95</td>
<td>optional vendor.</td>
</tr>
<tr>
<td>EnviroDIY LTE Bee *</td>
<td>Section 6.1</td>
<td>Stroud Water Research Center</td>
<td>EnviroDIY</td>
<td></td>
<td>$50.00</td>
<td>1</td>
<td>$50.00</td>
<td>Bluetooth, Cellular 4G LTE CAT-M1 (AT&amp;T/Verizon) Transceiver Module Antenna Not Included.</td>
</tr>
<tr>
<td>Cellular LTE antenna *</td>
<td>Section 6.1</td>
<td>Antennas</td>
<td>Digi-Key</td>
<td>Link</td>
<td>$4.50</td>
<td>1</td>
<td>$4.50</td>
<td>4G LTE cellular antenna with U.FI connector</td>
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<tr>
<td>Hologram Global SIM Card *</td>
<td>Section 6.1</td>
<td>Hologram</td>
<td>Hologram</td>
<td>Link</td>
<td>$5.00</td>
<td>1</td>
<td>$5.00</td>
<td>SIM card required for 2G or 3G communication</td>
</tr>
<tr>
<td>Medium 5V 2W Solar panel *</td>
<td>Section 6.4, 7.3</td>
<td>Voltalco Systems LLC</td>
<td>Adafruit</td>
<td>Link</td>
<td>$20.00</td>
<td>0</td>
<td>$20.00</td>
<td>Standard for CTD sensor install.</td>
</tr>
<tr>
<td>Grove 4Pin Cables 20cm (SPACK) *</td>
<td>Section 6.3</td>
<td>Sead Technology Co., Ltd</td>
<td>Digi-Key</td>
<td>Link</td>
<td>$3.20</td>
<td>1</td>
<td>$3.20</td>
<td>Grove series Cable Assembly.</td>
</tr>
<tr>
<td>Term Block Plug 2POS STR 2.5mm (connector for solar panel cable) *</td>
<td>Section 6.2</td>
<td>Phoenix Contact</td>
<td>Digi-Key</td>
<td>Link</td>
<td>$0.95</td>
<td>1</td>
<td>$0.95</td>
<td>2 Position Terminal Block Plug, Female Sockets 0.098&quot; (2.55mm) - 180° Free Hanging (in-Li</td>
</tr>
<tr>
<td>Grove to sensor adapter boards for CTD (Grove to 3.5mm stereo jack) 5 pack *</td>
<td>Section 6.2</td>
<td>EnviroDIY</td>
<td>EnviroDIY</td>
<td>Link</td>
<td>$35.00</td>
<td>1</td>
<td>$35.00</td>
<td>to connect CTD sensor to board via grove socket to headphone jack connector.</td>
</tr>
</tbody>
</table>
Stroud Center Updates

- Reminder to request assistance via the EnviroDIY Service Request Form
  - [https://wikiwatershed.org/drwi/](https://wikiwatershed.org/drwi/)

EnviroDIY Monitoring Station Service Request Form

Please complete this form with as much information as possible to assist Stroud Water Research Center technicians in troubleshooting your problem. For extremely urgent issues please contact the Stroud Center team directly (rjohnson@stroudcenter.org; shicks@stroudcenter.org; dbressler@stroudcenter.org).

*Please note, station assistance is only available to groups working within the Delaware River Basin.*
Stroud Center Updates

- Reminder on resources available at https://wikiwatershed.org/drwi/
- https://wikiwatershed.org
Stroud Center Updates

- Reminder on standard first step in troubleshooting station if it has gone offline:
  - Check battery power is >3.5v
    - If yes proceed to next step
    - If no, swap in new battery
  - Turn station off
  - Swap SD cards (if station is offline)
  - Turn station on
  - See if problem resolves
  - Send SD card file and description of key issue(s) to the Stroud Center and continue troubleshooting process
Stroud Center Updates

- New model (generation 2) of the Hydros 21 CTD sensor by Meter Group is now available

HYDROS 21
Conductivity, Temperature, Depth Sensor

* Need to change SDI-12 address (“channel”) from 0 to 1
Stroud Center Updates

- Technology Updates

<table>
<thead>
<tr>
<th>Qty</th>
<th>Item</th>
<th>Tax</th>
<th>Rate</th>
<th>Amount</th>
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<tbody>
<tr>
<td>1</td>
<td>40416 ZSC Bluetooth Sensor Interface for use with ZENTRA Utility Mobile stereo connector ZSC Bluetooth Sensor Interface, stereo</td>
<td>$70.00</td>
<td>$70.00</td>
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</table>

| Subtotal | $79.00 |
| Shipping & Handling | $14.00 |
| Tax Total (0%) | $0.00 |
| Total (USD) | $93.00 |

- Useful functions:
  - Viewing CTD sensor data
  - Changing CTD SDI-12 address (“channel”)
  - Other useful info
    - Status window that can warn of freeze damage
Stroud Center Updates

- Viewing sensor data

<table>
<thead>
<tr>
<th>Sensor Information</th>
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<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Firmware</td>
</tr>
<tr>
<td>Serial Number</td>
</tr>
<tr>
<td>Status</td>
</tr>
<tr>
<td>Extra Value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Level</td>
</tr>
<tr>
<td>Water Temperature</td>
</tr>
<tr>
<td>EC</td>
</tr>
</tbody>
</table>
● Changing sensor SDI-12 address ("channel") - **change from 0 to 1** for Hydros21 CTD
  o Click More -> sensor tools -> Sensor SDI-12 Address ->

*WARNING:* Selecting a non-zero SDI-12 address may prevent you from being able to use this sensor with METER loggers. Only change this if you know what you are doing or are instructed by support.
Any questions before we move on?
EnviroDIY online status updates

- Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline
  - Station owner log in to MonitorMW
  - Go to My Sites
  - Click on site
  - Click Edit
  - Scroll to bottom of page
  - Click on “Notify me if site stops receiving sensor data.”
  - Adjust hours in “Notify after # hours of site inactivity.”
    - 2hrs is the recommended alert time
EnviroDIY online status updates

- Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline

Log In
Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline
EnviroDIY online status updates

- Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline

Click on one of your sites

My Registered Sites

ORDER

PUSR4S

Sampling Feature
Schuylkill River at The Schuylkill Center for Environmental Education

Registration Date
July 27, 2020, 5:26 p.m.
EnviroDIY online status updates

- Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline

Click Edit
Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline.

Scroll to bottom and click “Notify me…”
Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline.

Adjust hours to 2 hrs

Notify me if site stops receiving sensor data.
Notify after [ ] hours of site inactivity.
EnviroDIY online status updates

- Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline

Save Edits

- Notify me if site stops receiving sensor data.
- Notify after 2 hours of site inactivity.

CANCEL  SAVE EDITS
EnviroDIY online status updates

- Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline

Confirmation will be given
EnviroDIY online status updates

- Station owners can get immediate email alerts from MonitorMW if/when station(s) go offline

Email alert if station goes offline

Monitor My Watershed Notification: No data received for site Schuylkill River at The Schuylkill Center for Environmental Education in the last 9309 hours

EnviroDIY Site Alert monitormywatershedalerts@stroudcenter.org ...

2:00 PM (5 minutes ago)

to me

David,

This email is to notify you that your Monitor My Watershed site "Schuylkill River at The Schuylkill Center for Environmental Education" has not received any new data values in the last 9309 hours. The last update was on 2021-07-18 20:40:00. You may want to check your equipment to ensure it's working as intended.

https://www.monitormywatershed.org/sites/PUSR4S/

Best regards,
The Monitor My Watershed Team
Follow sites – people are not station owners can “follow” sites if they have a Monitor My Watershed account
  - Following a site allows you to have whatever sites you want under the My Sites tab – easier access to the sites
  - Following a site does not currently allow you to receive alerts when a station goes offline.
EnviroDIY online status updates

- Follow sites – people are not station owners can “follow” sites if they have a Monitor My Watershed account

Log In
EnviroDIY online status updates

- Follow sites – people are not station owners can “follow” sites if they have a Monitor My Watershed account

Go to Browse Sites
EnviroDIY online status updates

- Follow sites – people are not station owners can “follow” sites if they have a Monitor My Watershed account

Select a site and go to site page
Follow sites – people are not station owners can “follow” sites if they have a Monitor My Watershed account

Click on “Follow”
EnviroDIY online status updates

- Follow sites – people are not station owners can “follow” sites if they have a Monitor My Watershed account

Site then shows up under My Sites
Salt in Tap Water Survey – Stroud Center pilot project looking at salt levels in tap water across the DRB

- Survey instructions: [https://wikiwatershed.org/drwi/#salt-monitoring](https://wikiwatershed.org/drwi/#salt-monitoring)
Salt in Tap Water

Overview
The following is a protocol for documenting salt levels in tap water as represented by the concentration of chloride ions (Cl\(^-\)). Measuring electrical conductivity is also recommended as it can provide additional explanatory information and is directly related to chloride concentration. Questions? Contact David Bressler (jbressler@stroudcenter.org)

Equipment/Supplies
- Chloride QuanTab® Test Strips, 30-600 mg/L, or other chloride measurement method
- Conductivity meter (e.g., Hanna DISt®3 Waterproof FC Tester)
- Conductivity meter calibration solution (e.g., 1413 μS/cm Conductivity Standard)
- Data entry form: Delaware River Basin Survey of Salt in Tap Water

Method
The basic method:
1. Acquire some tap water from a house or building/offices. *Note: if a water softener is being used, please take the sample from an outdoor tap that is not treated with the softener.
2. Measure chloride using test strip (or other method; note method below is for Hach QuanTab strips).
3. Measure conductivity (make sure to calibrate the meter beforehand).
4. Enter this information along with the address of the tap water location and water source information into the data entry form (to find the source of your water check your local water utility's website).
5. After you submit the data form you will receive a confirmation email with a record of your data and with a link for viewing all data that have been submitted, viewable as a spreadsheet. Summary graphs and maps may be available at a later date.

Chloride strip usage: Follow directions provided by the manufacturer (on back of bottle). The basic process is to stand a test strip vertically in about an inch of tap water (in any 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 vary slightly between bottles.

<table>
<thead>
<tr>
<th>National Recommendations</th>
<th>Chloride (mg/L)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA Secondary Drinking Water Regulation</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>EPA Drinking Water Advisory on Sodium</td>
<td>146-184</td>
<td>30.60 mg/L Sodium (Na(^+)) recommendation</td>
</tr>
<tr>
<td>EPA Drinking Water Advisory on Sodium “low/no salt diets”</td>
<td>31°</td>
<td>20 mg/L Sodium (Na(^+)) recommendation</td>
</tr>
</tbody>
</table>

*Estimate based on atomic mass units of Sodium and Chloride (NaCl: Na=+1, Cl=−1); other salts such as MgCl₂, CaCl₂, and KCl not considered.
https://www.epa.gov/region2/drinkwater-regulations-and-contaminants
https://www.epa.gov/region2/drinkwater-regulations-and-contaminants

Conductivity meter usage: Calibrate the meter using conductivity calibration solution and measure conductivity.
Salt in Tap Water

Electronic data entry and access to results

Delaware River Basin Survey of Salt in Tap Water

Please use Chloride Quant卓 Test Strip, 30-600 mg/L (https://www.chemtronics.com/chloride-quant卓-test-strips-30-600-mg-l/) or another chloride measurement method and a calibrated conductivity meter (e.g., Harmo D1120 Waterproof) to detect chloride in tap water in your home and/or office.

Note: If you have a water softener in your house or office, please take your sample from an outdoor tap that is not treated with the softener.

To enter data from more than one location, submit the form and use the "Submit another response" link.

delaware@surveycenter.org Submit account

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Conductivity (uS/cm)</th>
<th>Conductivity meter used</th>
<th>Chloride method used</th>
<th>Type of water supply</th>
<th>Specific waterbody source</th>
<th>Direct address</th>
<th>City/town</th>
<th>State</th>
<th>Zip code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/1/2022</td>
<td>4:20 PM</td>
<td>39</td>
<td>Hanna Dist 3</td>
<td>Private well</td>
<td>water source is a spring, flowing year round</td>
<td>256 E. Main St, Oxford, PA 19363</td>
<td></td>
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<tr>
<td>3/1/2022</td>
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<td>491</td>
<td>Hanna Dist 3</td>
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<td>well in Middlefield well (135 yd) in Middlefield well (135 yd)</td>
<td>1151 Maple Rd, Strafford, PA 19370</td>
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<td>3/1/2022</td>
<td>10:00 AM</td>
<td>80</td>
<td>Hanna Dist 3</td>
<td>Private well</td>
<td>well in Forest Hills, well (135 yd) in Middlefield well</td>
<td>1108 Maple Ln, West Norriton, PA 19402</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3/1/2022</td>
<td>8:00 AM</td>
<td>209</td>
<td>Hanna Dist 3</td>
<td>Private well</td>
<td>well in Forest Hills, well (135 yd) in Middlefield well</td>
<td>1419 W. Main St, Livonia, PA 19402</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3/1/2022</td>
<td>11:16 AM</td>
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<td>Hanna Dist 3</td>
<td>Private well</td>
<td>well in Forest Hills, well (135 yd) in Middlefield well</td>
<td>518 N. 10th St, Havertown, PA 19083</td>
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<tr>
<td>2/25/2022</td>
<td>2:45 PM</td>
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<td>Hanna Dist 3</td>
<td>Public water system</td>
<td>Well in Stream</td>
<td>315 Concord St, West Chester, PA 19301</td>
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<td></td>
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<td>2/18/2022</td>
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<td>Private well</td>
<td>well in Forest Hills, well (135 yd) in Middlefield well</td>
<td>15 Del Mar Dr, Sperling, PA 19083</td>
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<td>well in Forest Hills, well (135 yd) in Middlefield well</td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>3/1/2022</td>
<td>10:00 AM</td>
<td>150</td>
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</table>
EPA low/no salt dietary guideline = 31 mg/l Chloride (per 20 mg/l Sodium)
Salt in Tap Water

Chloride in tap water in the DRB

*Note, <32 mg/l Chloride strip readings recorded as 16 mg/l

EPA low salt diet threshold for Sodium 20mg/l

(*31 mg/l Chloride, per NaCl)
Salt in Tap Water

- Salt in Tap Water protocol at [https://wikiwatershed.org/drwi/#salt-monitoring](https://wikiwatershed.org/drwi/#salt-monitoring)

- Yes, do multiple measurements – see about variability in salt at your home/office

- If you’d like Chloride strips be in touch with the Stroud Center – we can send you a few
Site visit statistics

*Note – more visits may have been made, but if data are not entered then the Stroud Center has no way to track it.
*Note – more cleanings may have been done, but if data are not entered then the Stroud Center has no way to track it.
Site visit statistics

*Note – more QC events may have been completed, but if data are not entered then the Stroud Center has no way to track it.
Site visit statistics

- After every site visit, please complete an EnviroDIY Field Visit Data form and enter the info into the online form

  - Online entry and blank forms for printing are here: [https://wikiwatershed.org/drwi/](https://wikiwatershed.org/drwi/)
Continuous data statistics from across the DRB

**Ecological Use Assessment**

- **Fully supporting**: DE (5), NJ (3), NY (2), PA (35)
- **Insufficient information**: DE (2), NJ (1), NY (1), PA (1)
- **Not assessed**: DE (1), NJ (1), NY (1), PA (1)
- **Not supporting**: DE (2), NJ (1), NY (1), PA (2)
Continuous data statistics from across the DRB

Average across all winter conductivity spikes
Continuous data statistics from across the DRB

Deviations from Olson/Cormier 2019 predicted natural conductivity levels
Continuous data statistics from across the DRB

EPA chronic 230 mg/l
Canada chronic 120 mg/l
OH, MD rec hazard thresholds 50 mg/l
EPA acute 860 mg/l
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

*Anyone else interested? If so get in touch with Stroud Center or Carol or George*
Next month’s meeting will be on:

Thursday September 15, 2021
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
- Christa Reeves, christa@musconetcong.org, 908-537-7060

Master Watershed Stewards, EnviroDIY-DRWI contacts:

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