Sensor Station User Group Gathering

May 24, 2019 at Great Marsh Institute
9:00a-3:00p (float trip to follow)





WILLIAM PENN FOUNDATION

STROUD WATER RESEARCH CENTER

Introduction – Overview of today

Agenda

- 9:00-9:15 Introductions and plan for the day
- 9:15-10:15 Updates on sensor stations, network, resources, data portal, support
- 10:15-10:30 Break
- 10:30-12:00 Discussion and begin presentations
  - Kim Hachadoorian, Addressing upstream impacts on streams in First State National Historical Park
  - Paul Wilson, Mayfly Networks in Higher Education
  - Sarah Crothers, Connecting Students from The Hill School to the Schuylkill River
  - Mike Bullard, Sediment Loading in Pickering Creek
  - George Seeds, Gaining an Understanding of Water Quality on Two Reaches of Pickering Creek in Chester Co.
- 12:00-12:30 Lunch
- 12:30-1:30 Presentations
  - Lauren McGrath, Ridley Creek Sensor Stations at Ashbridge Preserve
  - Chuck Wagner, Golf Course Stream Management
  - Francis Collins, Little creek with a lot of issues
  - Dave Yake, Watershed RunOff Sediment Model
  - Jim Moore, Low cost EC sensor station
- 1:30-1:45 Break
- 1:45-3:00 Presentations overflow, networking, discussions
- 3:00-6:00 Finish up and float trip

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Updates

- Overview of basics
  - Stroud support staff
  - Core group
  - Sites
  - Field maintenance, QC, EnviroDIY Field Visit data sheet, and online entry
  - Manuals and videos – DRWI-specific and comprehensive
  - Online group – review the tabs, locations of files, forum topics
- 4G/LTE
- MasterWS support - workshop to be planned for July, QC kits
- Full suite sampling
- Continuing to do storm sampling and Stroud support
- Stroud field support and resources to replace parts
- Possible bigger workshop winter 2020 (late Jan, Fe)
- Future workshops - June 7 (WS201, discharge and TSS); MWS training TBD July; Aug 9 sensor station management workshop; EnviroDIY Intro Sept 17-18, WS101 Sept 24-25

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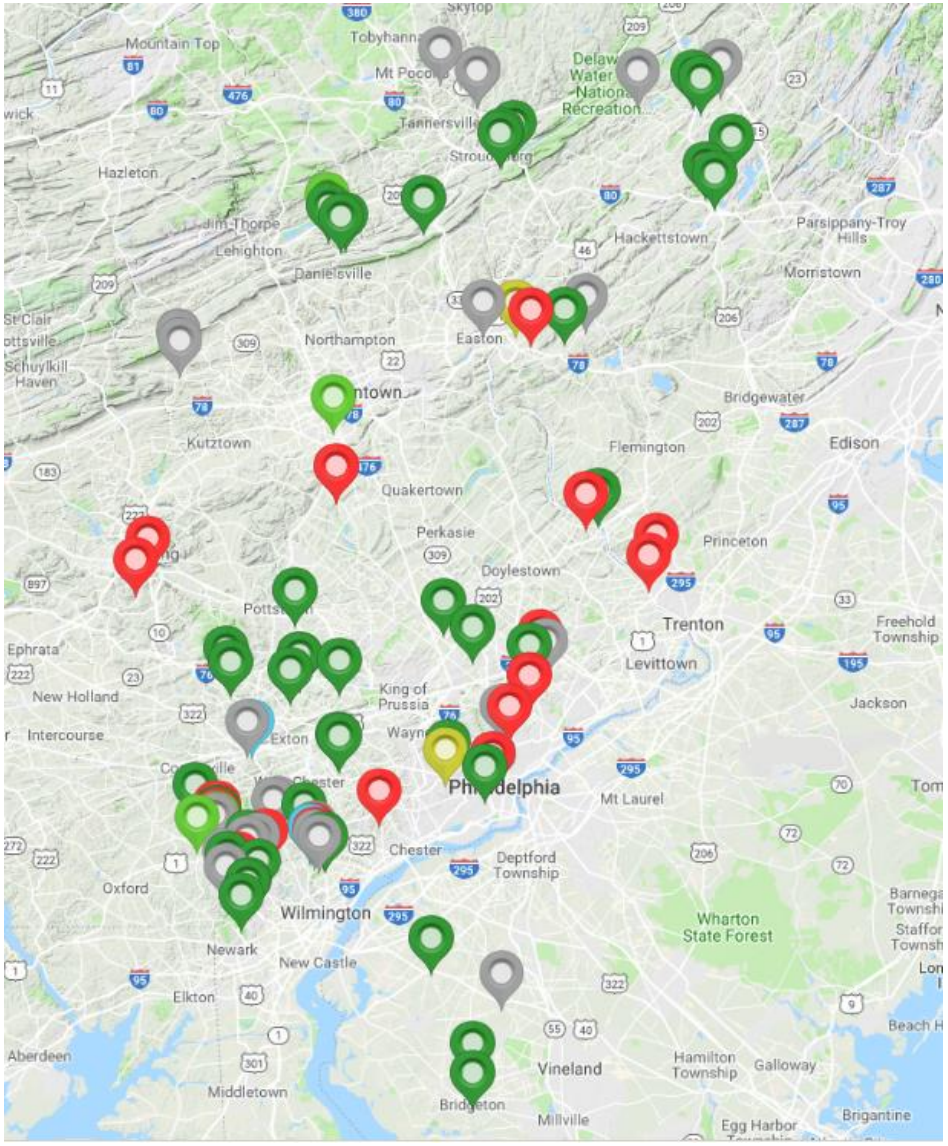
Distribution



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Stroud support

- Stroud Center support personnel
  - David Bressler – main contact
  - Shannon Hicks – high level technical support
  - Rachel Johnson – technical support, field assistance, small workshop facilitation
  - Matt Gisondi – data analysis (rating curves, loads), field assistance, 1:1 training
  - Christa Reeves – regional assistance, northern Delaware Basin
  - Carol Armstrong – citizen science volunteer assistance, field maintenance and storm sampling, PSU Master Watershed Stewards mentor
  - Dave Arscott (ex dir), John Jackson (senior sci), and Matt Ehrhart (dir of restoration) – original citsci project designers

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Core group

- Sensor Station **Core Group**
  - Individuals who are experienced and plan for long term involvement with sensor station network development
  - Geographic coverage of Delaware Basin – support development of the network, facilitate regional workshops, facilitate assistance to groups, technical feedback
  - Individuals
    - Stroud Center – David Bressler, Matt Gisondi, Shannon Hicks, Rachel Johnson, Christa Reeves,
    - Carol Armstrong, PSU Master Watershed Steward, Stroud volunteer
    - Nancy Lawler, Musconetcong Watershed Association
      - Cole Baldino, Trout Unlimited, NJ
    - Christa Reeves, Musconetcong Watershed Association
    - Paul Wilson, PhD, East Stroudsburg University
    - Kim Hachadoorian, The Nature Conservancy, DE
    - Steve Tuorto, PhD, The Watershed Institute
    - Lauren McGrath, Willistown Conservation Trust
    - Kent Himelright, Berks Co. Conservation Trust

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Important Field Work

- **Maintenance – every two weeks**
  - Clean sensors
  - Clean around logger
  - Complete Field Visit Data sheet
  - Other site observations, upkeep, photos, etc.
  - Enter data online - https://wikiwatershed.org/drwi/; pass: drwi

- **Quality Control – quarterly**
  - Clean sensors
  - QC Depth
  - QC Chemistry
  - SD card swapping (data download)

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Biweekly – Maintenance and sensor cleaning

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EnviroDIY Field Visit Data

Enter all data online: wikiwatershed.org/drwi; password: drwi

Name(s):

Site ID: | LoggerID:

Stream Name: | Location:

GPS (Lat/Long): | Date: Arrival Time: AM/PM? *EST/EDT?

*EST=Eastern Standard Time; EDT=Eastern Daylight Time (Daylight Savings)

Photos? Yes/No | Water Clarity (Clear, Cloudy, Muddy):

Precipitation last 24 Hours? Yes/No Amount:

General Notes/ Photo Descriptions:

SENSOR CLEANING (*Recommended frequency: weekly or biweekly; monthly if only CTD sensor*)

*Cleaned Sensors? Yes/No If Yes, exact time: AM/PM? EST/EDT? *Clean >5 min. before grab sampling*

GRAB SAMPLES (*Rec frequency: Situational; for rating curves, collect when water is high/turbid or higher than normal conductivity*)

Grab Sample Taken? Yes/No | Time collected (to minute): AM/PM? EST/EDT?

Sample Number: | Volume:

Bottle Type: | Date Shipped:

Lab Sent To: | Notes:

*SENSOR STATION DATA TO MATCH WITH GRAB SAMPLE LAB RESULTS (*Complete in field or office*)

Sensor station Conductivity (uS/cm):	Time (military):	Not applicable	Always EST
Sensor station Turbidity (NTU):	Time (military):	Not applicable	Always EST

**For use in Turbidity/TSS and Conductivity/Chloride rating curve development. Record sensor station Cond and Turb data at time nearest to grab sample collection time. Can be completed in field (by accessing online data) or in office (online or download from microSD card). Acquire final grab sample lab results from Stroud Center (or lab that processed sample).*

QUALITY CONTROL - WATER LEVEL DATA (*Rec frequency: quarterly and/or more frequently as needed*)

[a]Staff Gauge Height (m):	Time:	AM/PM?	EST/EDT?
[a]Sensor Station Water Depth (mm):	Time (military):	Not applicable	Always EST
[b]QC Sensor Station Water Depth (mm):	Time:	AM/PM?	EST/EDT?

Offset (=Staff Gauge Height - Sensor Station Water Depth)(mm):

a - Staff Gauge Height and Sensor Station Water Depth readings should be from about the same time (+/- 5 minutes).
b - Use metric ruler to measure from pressure transducer (white disc in CTD sensor) to water surface. Note - this depth measure may be slightly different from the sensor-measured depth but should be consistent over time.

QUALITY CONTROL - CHEMISTRY DATA (*Rec frequency: quarterly and/or more frequently as needed*)

Parameter	QC Hand-held Meter Result	QC Time	QC AM/PM?	QC EST/EDT?	Sensor Station Result	Sensor Station-Time (Military, EST)
Conductivity (uS/cm):			AM/PM	EST/EDT		
Temperature (degC):			AM/PM	EST/EDT		
Turbidity (NTU):			AM/PM	EST/EDT		
Dissolved Oxygen (mg/L):			AM/PM	EST/EDT		

QUALITY CONTROL CHEMISTRY FIELD METER INFORMATION

Parameter	Field Meter Brand/Model/Serial # or unique ID	Meter calibrated?	Standard	Calibration
Conductivity (uS/cm):		Yes/No		
Temperature (degC):		Yes/No		
Turbidity (NTU):		Yes/No		
Dissolved Oxygen (mg/L):		Yes/No		

SENSOR STATION MAINTENANCE

Sensors Submerged? Yes/No
If no or partially, describe in Notes.

Location of Sensors Changed? Yes/No
If yes, explain in notes. **Please consult Stroud Center before changing location of sensors.*

Retrieved Memory Card? Yes/No
(*Rec frequency for QC: quarterly if online; biweekly-monthly if not online*)

Changed Batteries? Yes/No

Cleaned Solar Panel? Yes/No

Other sensor station maintenance? Yes/No
(If Yes, describe in Notes)

Notes (Describe specific sensor station management actions and any other issues):

OTHER IN-SITU PARAMETERS (e.g., Nitrate, Phosphate, Chloride, pH, Dissolved Oxygen)

Parameter	Result	Brand/Model

OTHER INFORMATION

Field Duplicate Taken of Grab Sample? Yes/No

Performed Cross Section Survey? Yes/No

Flow Measurement w/ Flow Meter? Yes/No

Flow Measurement w/ Neutrally Buoyant Object? Yes/No

Flow Measurement w/ another method? Yes/No
If Yes, explain in Notes

Quarterly – Quality Control

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www.stroudcenter.org

EnviroDIY Field Visit Data

Enter all data online: wikiwatershed.org/drwi; password: drwi

Name(s):

Site ID:
LoggerID:
Stream Name:
Location:
GPS (Lat/Long):
Date: Arrival Time: AM/PM? *EST/EDT?
*EST=Eastern Standard Time; EDT=Eastern Daylight Time (Daylight Savings)
Photos? Yes/No
Precipitation last 24 Hours? Yes/No Amount:
Water Clarity (Clear, Cloudy, Muddy):
General Notes/ Photo Descriptions:

SENSOR CLEANING (*Recommended frequency: weekly or biweekly; monthly if only CTD sensor*)

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GRAB SAMPLES (*Rec frequency: Situational; for rating curves, collect when water is high/turbid or higher than normal conductivity*)

Grab Sample Taken? Yes/No
Time collected (to minute): AM/PM? EST/EDT?
Sample Number:
Volume:
Bottle Type:
Date Shipped:
Lab Sent To:
Notes:

*SENSOR STATION DATA TO MATCH WITH GRAB SAMPLE LAB RESULTS (*Complete in field or office*)

Sensor station Conductivity (uS/cm):	Time (military):	Not applicable	Always EST
Sensor station Turbidity (NTU):	Time (military):	Not applicable	Always EST

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Parameter	QC Hand-held Meter Result	QC Time	QC AM/PM?	QC EST/EDT?	Sensor Station Result	Sensor Station-Time (Military, EST)
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Dissolved Oxygen (mg/L):			AM/PM	EST/EDT		

QUALITY CONTROL CHEMISTRY FIELD METER INFORMATION

Parameter	Field Meter Brand/Model/Serial # or unique ID	Meter calibrated?	Standard	Calibration
Conductivity (uS/cm):		Yes/No		
Temperature (degC):		Yes/No		
Turbidity (NTU):		Yes/No		
Dissolved Oxygen (mg/L):		Yes/No		

SENSOR STATION MAINTENANCE

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If no or partially, describe in Notes.
Location of Sensors Changed? Yes/No
If yes, explain in notes. *Please consult Stroud Center before changing location of sensors*
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Changed Batteries? Yes/No
Cleaned Solar Panel? Yes/No
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Notes (Describe specific sensor station management actions and any other issues):

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Parameter	Result	Brand/Model

OTHER INFORMATION

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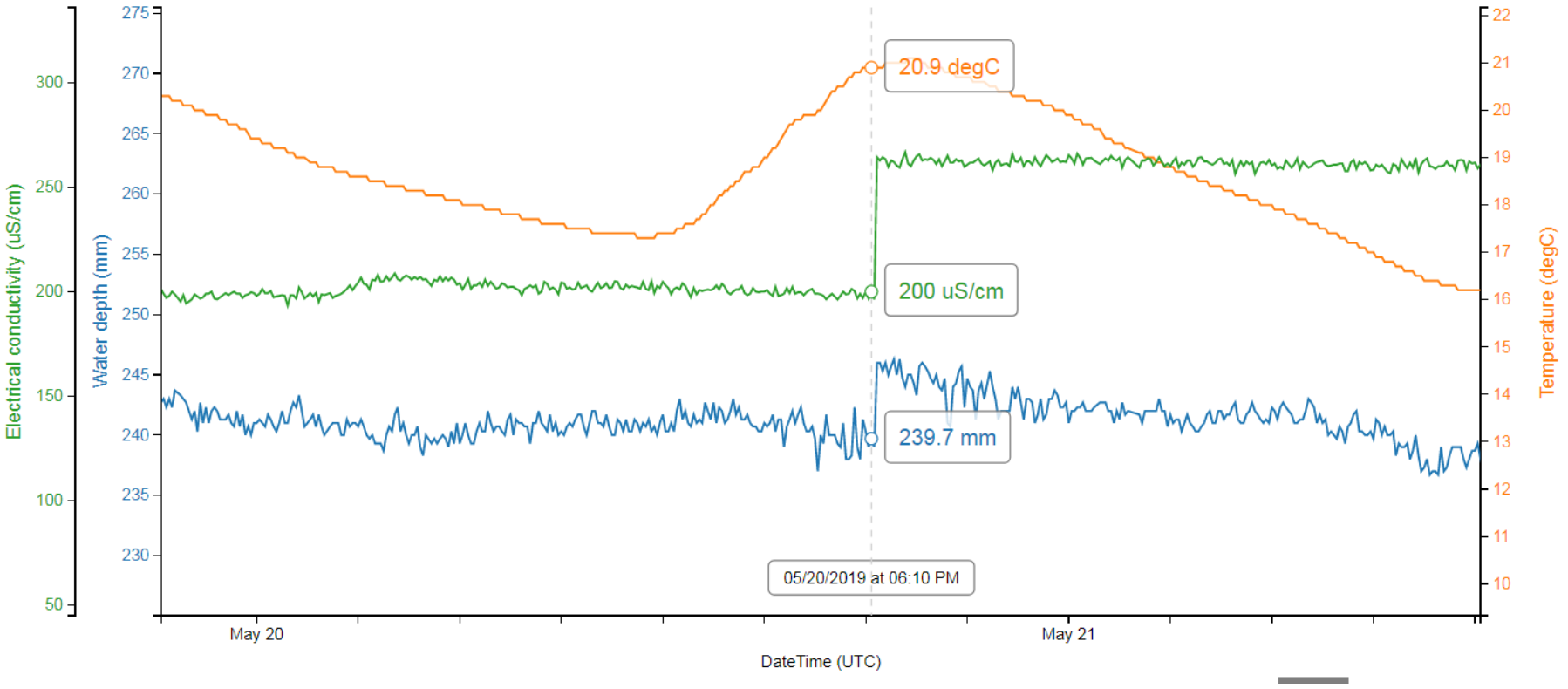
Performed Cross Section Survey? Yes/No
Flow Measurement w/ Flow Meter? Yes/No
Flow Measurement w/ Neutrally Buoyant Object? Yes/No
Flow Measurement w/ another method? Yes/No
If Yes, explain in Notes

Importance of sensor cleaning and QC

Pike Creek, The Independence School



Conductivity, temperature and depth readings *before* cleaning

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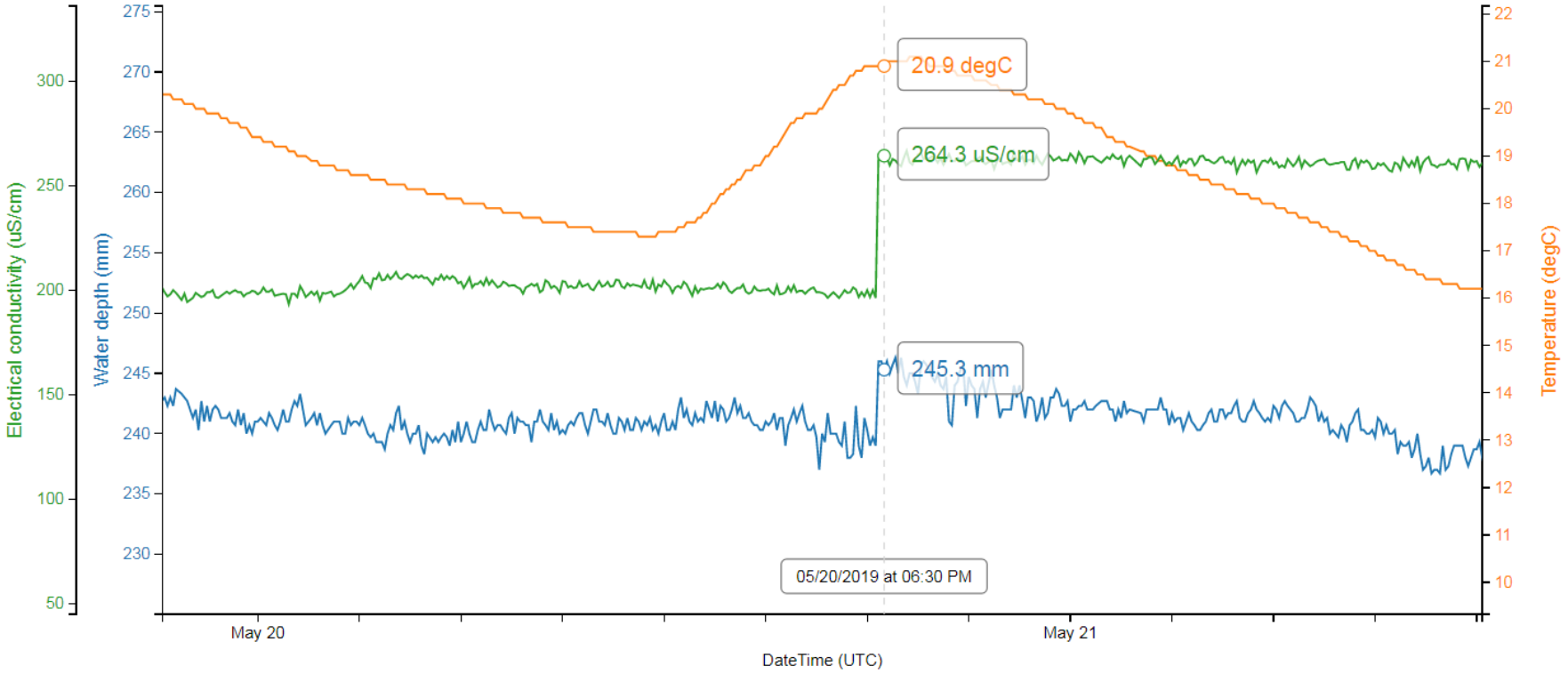
Importance of sensor cleaning and QC



Conductivity, temperature and depth readings *after* cleaning

Conductivity change of ~60 uS/cm
Depth change of ~5mm;
Temp change of 0 deg C

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Manuals

- EnviroDIY Sensor Station Operation Manual V1, DRWI
  - Operation manual for CTD/Turbidity EnviroDIY sensor stations (Delaware River Watershed Initiative context)
  - Access web link via Delaware Basin Sensor Station online group, Uploaded Files tab, “Guidance docs” category; link: https://docs.google.com/document/d/17iWKFOjD6tSFT6-a5mItXlgO8uhXjsA_voGDVRxEBTI/edit?usp=sharing

- EnviroDIY Mayfly Sensor Station Manual
  - Comprehensive – building, coding, installation, management
    - Does not contain DRWI specific info, e.g., online EnviroDIY Field Visit Data sheet
    - Access via EnviroDIY.org: https://www.envirodiy.org/mayfly-sensor-station-manual/

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Videos

- Stroud sensor station video tutorials:
  - Installation is done
    - https://www.envirodiy.org/videos/
    - Youtube: https://www.youtube.com/results?search_query=envirodiy+mayfly+data+logger+steps+1-5
    - Link also on Delaware Basin Sensor Stations online group forum
  - Sensor cleaning
  - Data download
  - Sensor bundle removal
  - Discharge calculator, Stage-to-Area predictor, Load calculator

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Monitor My Watershed

- Monitor My Watershed (MonitorMyWatershed.org)
- Personal Login info (make custom modifications to page, site info, etc.)
  - Personal/group site login – edit/modify personal sensor station page
    - Login = first name initial + last name e.g., khachadoorian
    - Default Pass = “stroud970”
  - Spreadsheet *“Sensor station information and site specific Monitor My Watershed login details”* in **Uploaded Files** tab in **Delaware Basin Sensor Stations online group**

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Monitor My Watershed

- **Limnotech restructuring system for the long term – please bear with us during this process**
  - **Drwisensors.dreamhosters.com continues to be functional**
    - For longer term stations modifications being made to display historical data

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Monitor My Watershed

- Can demonstrate usage today if some folks would like
- **Notable functions:**
  - Custom overlay of sensor parameters
  - Custom overlay of multiple sites
  - Upload data (for offline stations and to fill data gaps for online stations) – *in development*
  - Zoom on x and y axes
  - Data summaries
  - Custom time ranges
  - Edit personal station pages
  - Follow and get updates on chosen stations
  - For online stations, get alerts if/when data stop transmitting

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Monitor My Watershed

- Online demonstration: http://monitormywatershed.org/

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Delaware Basin Sensor Station online group

- Weekly reports from Carol Armstrong
- General updates from Bressler
- Gisondi uploading lab results, rating curves, etc.
- Uploaded Files tab – multiple categories – lots of files here
- Guidance docs for use of the site and the forum
- Forum topics – important ones pinned to the top
- Review today if folks would like: https://wikiwatershed.org/groups/delaware-basin-sensor-stations/

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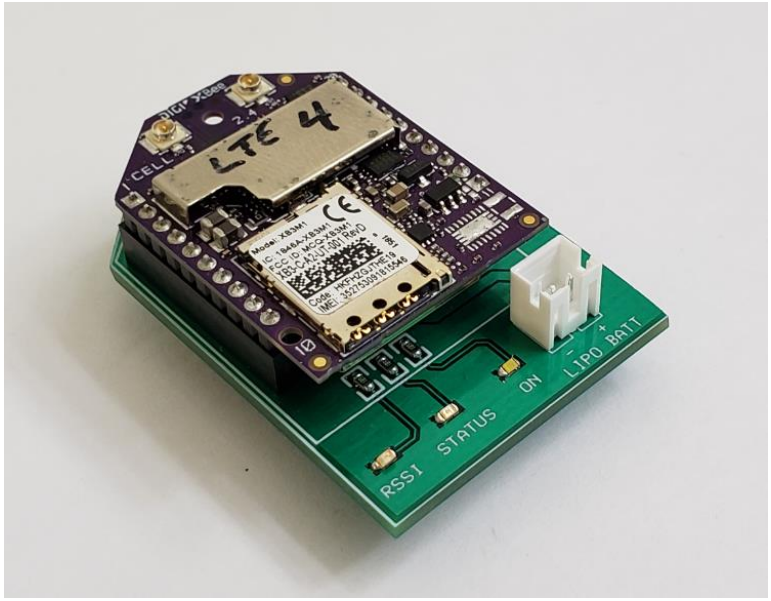
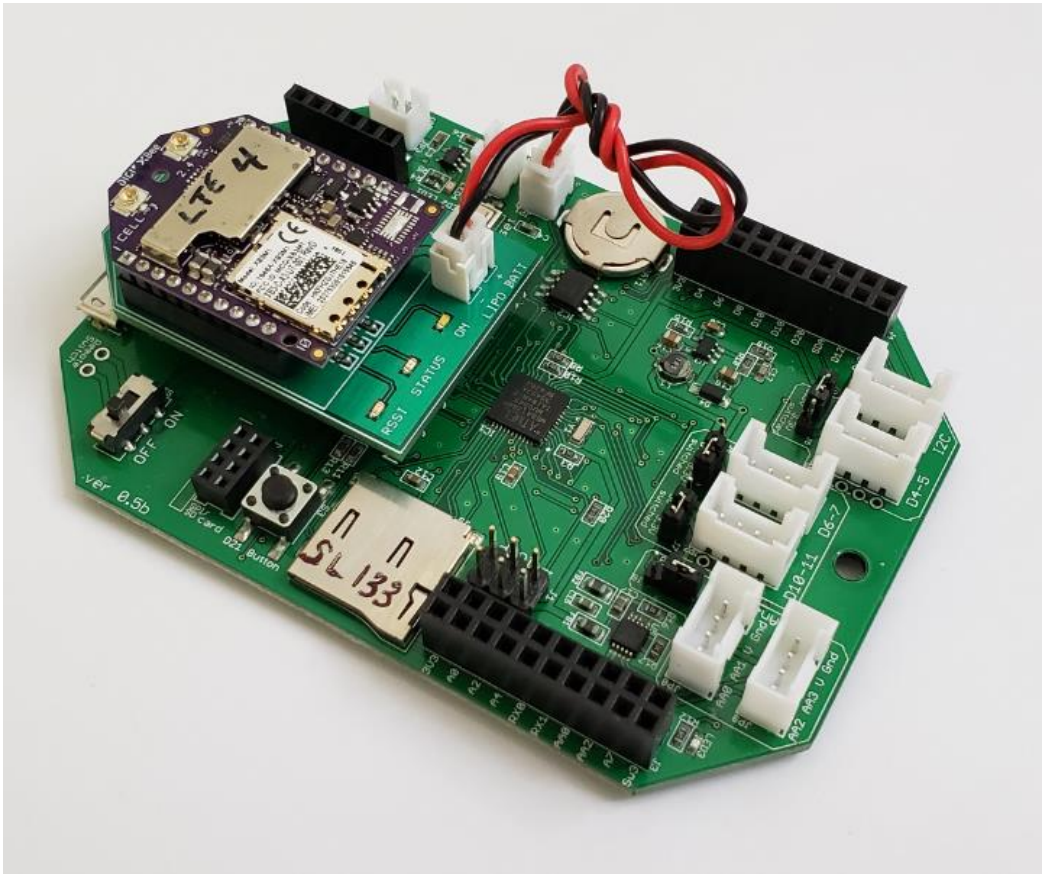
4G/LTE

- Shannon Hicks making progress on the technology – again please bear with us
  - Currently testing on stations local to Stroud
- Most sites that are currently offline will have 4G capacity
- Once testing complete Shannon Hicks and Rachel Johnson will be updating stations according to need/requests
  - 4G will be a bit more expensive, probably <$20/month

4G/LTE





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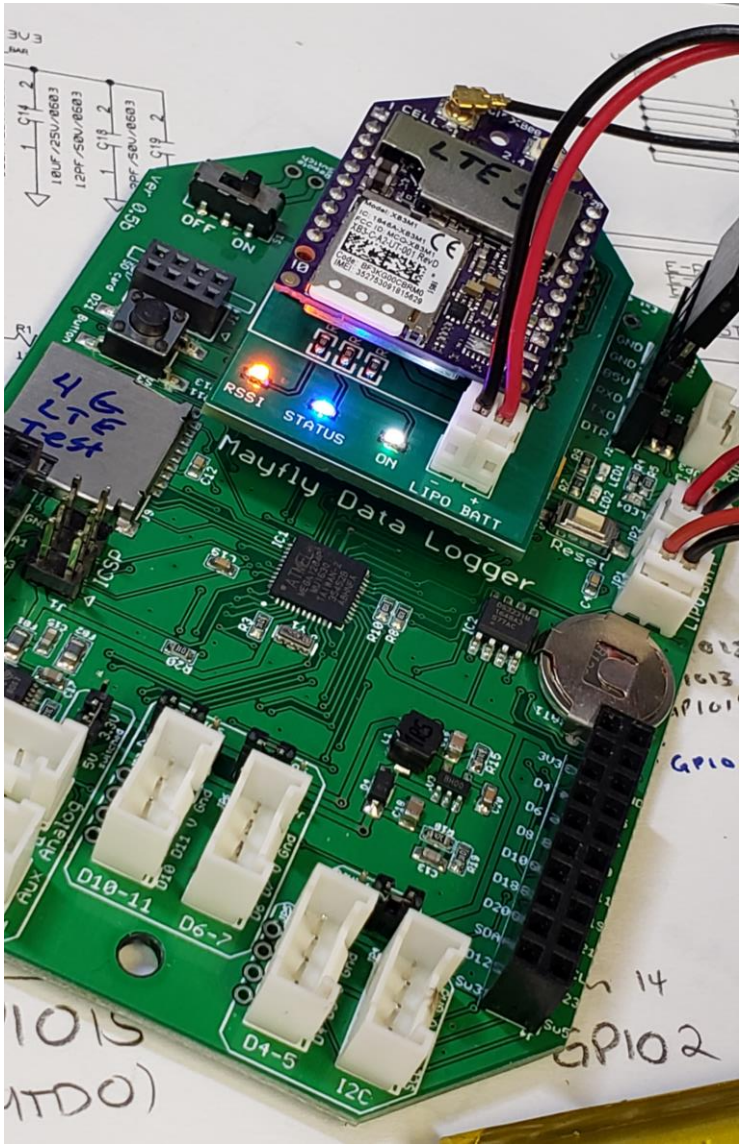
4G/LTE



Different lights give info on of 4G/LTE connection status and signal strength

White light - tells you when the radio is on

Blue status light - blinks a different pattern depending on whether it has a valid connection to the network or not,

Orange signal light - brightness gives you an idea of the signal strength. Really bright means high signal, really faint means really low signal.

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Penn State Master Watershed Steward support

- PSU MWS (https://extension.psu.edu/programs/watershed-stewards)
  - County level organization – coordinator for each county
    - Berks, Bucks, Chester/Delaware, Lackawanna/Luzerne/Wyoming, Lehigh/Northampton Monroe, Montgomery, Philadelphia (new)
  - Stewards pay to enter program and are formally trained in watershed science and conservation for several months
  - Required volunteer hours after graduation to hold certification

Penn State Extension

Stroud Water Research Center

Penn State Master Watershed Steward support

- MWS collaboration with Stroud on sensor station support
  - Stewards currently signing up to assist with specific stations (station owners on-board)
  - Training in July (date TBD) at Berks Ag Center
  - Mentorships after training

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Full suite grab samples

- Full suite samples collected at time of station installation (*if at baseflow*)
  - Analyzed at Stroud, Chesapeake Bay Labs, Univ of Del

- Full suite sample results on Delaware Basin Sensor Stations online group – **Uploaded Files tab – Grab Sample Lab Results category**

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Full suite grab samples

Suspended Sediments (mg/L)
DOC (µg C/L)
Chloride (ppm) [Dionex]
Nitrate-N (ppm) [Dionex]
Nitrate (ppm) [Dionex]
Nitrite-N (ppm) [Dionex]
Nitrite (ppm) [Dionex]
Sulfate (ppm) [Dionex]
Cl (mg/L) from SEAL
NH4N (mg/L) from CBL NASL
PO4P (mg/L) from CBL NASL
TDN (mg/L) from CBL NASL
TDP (mg/L) from CBL NASL
TN (mg/L) from CBL NASL
TP (mg/L) from CBL NASL
AL from DE-ICP (mg/L)
B from DE-ICP (mg/L)
CA from DE-ICP (mg/L)
CU from DE-ICP (mg/L)
FE from DE-ICP (mg/L)
K from DE-ICP (mg/L)
MG from DE-ICP (mg/L)
MN from DE-ICP (mg/L)
NA from DE-ICP (mg/L)
P from DE-ICP (mg/L)
S from DE-ICP (mg/L)
SI from DE-ICP (mg/L)
ZN from DE-ICP (mg/L)

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Full suite grab samples

- 43 of the 71 total sensor station sites have full suite lab analyses completed

- 28 of the 71 still need to collect grab samples
  - Gisondi and Stroud interns will be collecting these this summer

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Site code	Stream	Location	Watershed	Logger ID	Full Suite Sample date	# Full Suite Samples	# ANI/SS Samples
BEAV_MS2	Beaver Ck	300m US of Brandywine Creek Road crossing	Delaware	SL081		0	9
RAMS_MS2	Ramsey Run	50m DS of Ramsey Rd crossing	Delaware	SL082		0	4
ROCK_US3	Rocky Run, Upper	Rocky - 200m DS of Hwy 200, behind Courtyard Mar	Delaware	SL083		0	9
HURR_US2	Hurricane Run	Hurricane - DS side of Woodlawn Rd crossing	Delaware	SL091		0	9
ROCK_DS2	Rocky Run	300m DS of confluence with Hurricane	Delaware	SL092		0	5
PALM_MS3	Palmer (Unnamed Trib)	100m US of dirt road/trail crossing (off of Ramse	Delaware	SL093		0	4
NHMU9S	Musconetcong River	Waterloo Rd	Delaware	SL101	10/25/2017	1	3
NHMU10S	Musconetcong River	Riverside Park	Delaware	SL102	10/25/2017	1	2
PKCV2S	Cherry Creek	Cherry Creek Downstream	Delaware	SL103		0	10
PKCV3S	Cherry Creek	Cherry Creek Upstream	Delaware	SL104		0	11
NHPK7S	Paulins Kill	Memory Park	Delaware	SL105	06/29/2017	1	2
MSMC6S	Manor Creek	Manor Ck. (Brown prop.)	Delaware	SL107	04/26/2017	1	7
MSMC7S	Manor Creek	Manor Ck. (Derkin prop.)	Delaware	SL108	04/26/2017	1	7
BCWC10S	Broad Run	Watson Mill Rd crossing	Delaware	SL109		0	6
BCWC9S	Egypt Run	Egypt Run bridge	Delaware	SL110		0	6
PUPP2S	Pennypack Creek	Parkway location	Delaware	SL111	06/01/2017	1	5
PUPP3S	Pennypack Creek	Paper Mill Bridge	Delaware	SL112	06/01/2017	1	7
SHPK3S	UT east, Pickering Creek	Just downstream of Bryn Coed Lane	Delaware	SL113	06/08/2017	1	6
SHPK4S	UT west, Pickering Creek	20m upstream of UT East confluence	Delaware	SL114	06/08/2017	1	6
NHTB1S	Trout Brook	Confluence with Paulinskill	Delaware	SL115		0	0
NHPB1S	West Portal Brook	Woverton Rd	Delaware	SL116	06/14/2017	1	4
PUSR1S	Sandy Run	Roy-Chester Park	Delaware	SL117		0	0
PUWC1S	Wissahickon Creek	Moyer Blvd	Delaware	SL118	07/11/2017	1	0
ULAQ1S	Aquashicola Creek	Tittle Rd	Delaware	SL119		0	4
NHLP5S	Lopatcong	Morris Canal Greenway (Incline Plane 9 West) locat	Delaware	SL120		0	9
ULHC2S	Hunter Creek	Borger property, Downstream location	Delaware	SL121	04/26/2018	1	3
ULBC1S	Buckwha Creek	Creyer property, Downstream location	Delaware	SL122		0	3
PUJC2S	Jenkintown Creek	Osceola Ave	Delaware	SL123	08/31/2017	1	3
PUJC1S	Jenkintown Creek	Cadwalader Ave	Delaware	SL124	08/31/2017	1	3
BENNETTSRUN4	Bennetts Run in Brandywine	Downstream	Delaware	SL125	01/12/2018	1	2
BENNETTSRUN3	Bennetts Run in Brandywine	Upstream	Delaware	SL126	01/12/2018	1	2
BCRC8S	Bucktoe Creek	above WB RCC	Delaware	SL129	09/28/2017	1	2
BCRC7S	Red Clay, West Branch	Bucktoe Preserve	Delaware	SL130	09/28/2017	2	2
ULLL2S	Little Lehigh	Mill Brook Farms Rec Area	Delaware	SL131	10/03/2017	1	1
BCMC2S	Mill Creek	Hickory Hills Park	Delaware	SL132	10/04/2017	1	4
NHPK9S	Paulins Kill	Sussex Co. Community College	Delaware	SL133		0	0
PKMH2S	Mine Hole Brook	Foordemoore Rd crossing	Delaware	SL134		0	0
SHPK5S	Pickering Creek	Montgomery School	Delaware	SL135	10/16/2017	1	16
MSHO2S	Hosensack Creek	Hwy 29	Delaware	SL136	10/18/2017	1	3
PUCC2S	UT Cobbs Creek	McCall Golf and Country Club	Delaware	SL137	11/27/2017	1	4
SHPK6S	Pickering Creek	Phoenixville YMCA	Delaware	SL138		0	17
BCRC9S	Red Clay, East Branch	Hwy 82 near confluence with W Br Red Clay	Delaware	SL148		0	0
BCMC3S	Marsh Creek	Moore's Rd	Delaware	SL149	03/15/2018	1	6
BCMC4S	Marsh Creek	Fairview Rd	Delaware	SL150	03/15/2018	1	3
PUNR1S	Naylors Run	Downstream, Drexel Garden Park	Delaware	SL151	03/19/2018	1	4
ULBC2S	Buckwha Creek	Christman property, Little Gap Rd, Upstream of ULB	Delaware	SL152	04/10/2018	1	2
ULHC3S	Hunter Creek	Strohl Valley Rd, Upstream of ULHC2S (SL121)	Delaware	SL153	04/10/2018	1	3
PKFH1S	Forest Hill Run	Fedelender property	Delaware	SL154	04/05/2018	1	1
PURC1S	Ridley Ck	Upstream of Ashbridge Lake, Ashbridge Preserve	Delaware	SL155	04/12/2018	1	10
PURC2S	Ridley Ck	Downstream of Ashbridge Lake, Ashbridge Preserve	Delaware	SL156	04/12/2018	1	11
BCMR1S	UT to Middle Run	Middle Run Natural Area	Delaware	SL157		0	0
PUPC2S	Primrose Ck, upstream	Upstream on school property	Delaware	SL158		0	0
PUPC3S	Primrose Ck, Delaware R conflu	Phillips Mill Community Assoction	Delaware	SL159		0	0
MSAC1S	Angelica Ck	Upstream, St Bernadine St	Delaware	SL167	05/08/2018	1	3
MSPR2S	Punches Run	Nolde State Forest	Delaware	SL168	05/08/2018	1	3
PKCV4S	Cherry Creek	pour point	Delaware	SL169	06/07/2018	1	5
KCCR1S	Chestnut Run	Woodstown High School	Delaware	SL170	05/29/2018	1	0
KCLR1S	Loper Run	upstream of Deerfield Bridgeton Pike	Delaware	SL171	05/22/2018	1	0
KCFB1S	Indian Field Br	downstream of S. Pearl St bridge crossing	Delaware	SL172	05/22/2018	1	0
MSMC17S	UT to Manor Creek	Josh Brown home, upstream	Delaware	SL173	06/05/2018	1	2
PKBH7S	Brodhead Creek	pour point	Delaware	SL174	06/07/2018	1	3
PKPC3S	Paradise Creek	pour point	Delaware	SL175	06/07/2018	1	3
PUSR2S	Schuylkill River	Bartrams Garden	Delaware	SL176		0	0
BCBR1S	Broad Run	Upstream of Somerset Lake	Delaware	SL177		0	0
NHML11S	UT to Musconetcong	Shurts Rd	Delaware	SL178	07/19/2018	1	4
NHLR1S	Lubbers Run	Hudson Farm	Delaware	SL179	08/09/2018	1	1
KCMR1S	UT to Muddy Run	Sheep Pen Rd	Delaware	SL188	08/28/2018	1	0
BCPC1S	UT to Pike Creek	Independence School	Delaware	SL189		0	0
BCPC2S	Pike Creek	Independence School	Delaware	SL190		0	0
MSSR2S	Schuylkill River	Towpath Park, Pottstown	Delaware	SL191		0	0
ULBC3S	Bushkill Ck	Bushkill Dr	Delaware	SL192		0	0

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Storm grab samples

- Storm grab samples analyzed at Stroud only for:
  - Total Suspended Solids
  - Chloride

- Storm grab sample results on Delaware Basin Sensor Stations online group – **Uploaded Files tab – Grab Sample Lab Results category**

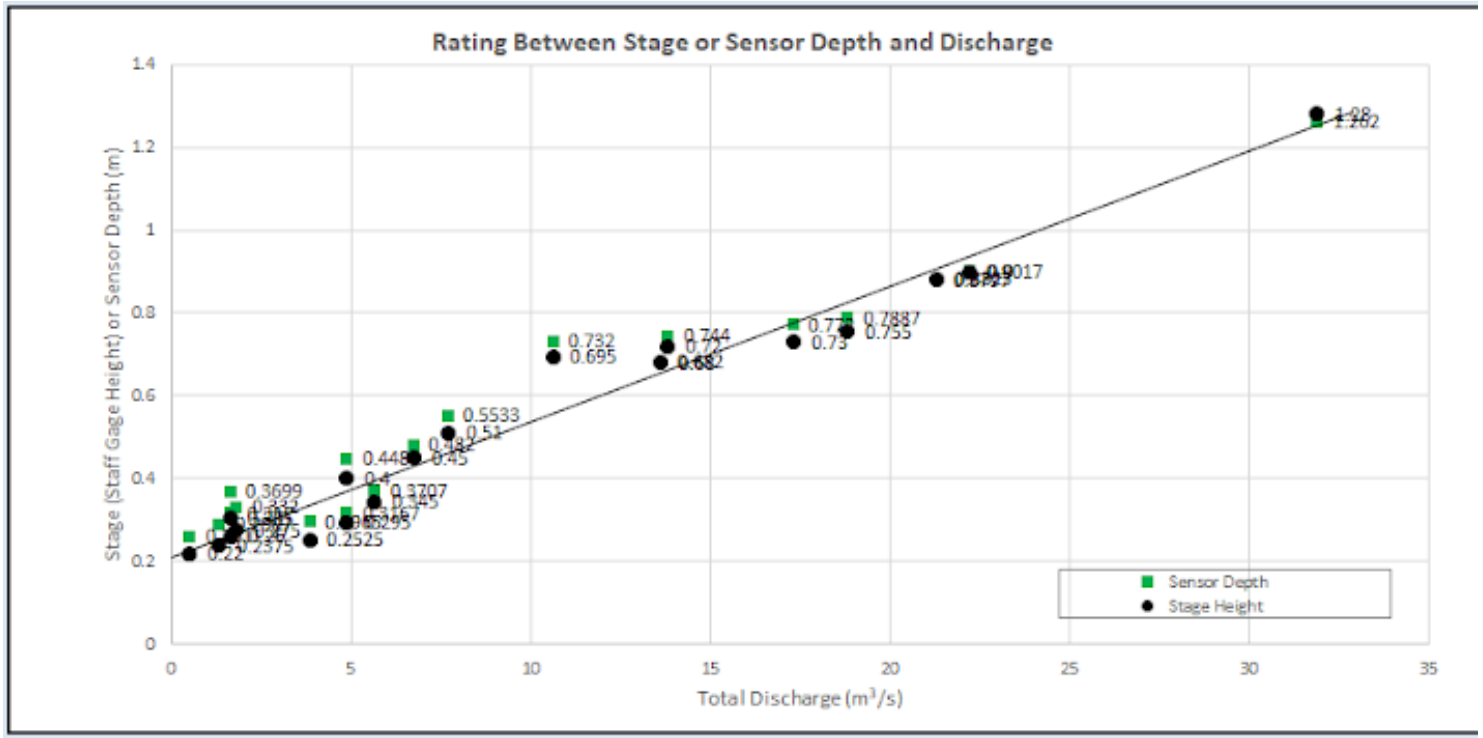
STROUD WATER RESEARCH CENTER

Developing rating curves across the Delaware Basin

- Stroud (Matt Gisondi and interns) to facilitate rating curve development this summer, *as time and storms allow*
  - Discharge and grab samples
  - Matt will be in touch with groups if he's in the area
    - Assistance welcomed, opportunity for on-site training
    - Spur of the moment because of the nature of storms and field sampling

STROUD WATER RESEARCH CENTER

Rating curves



Data from Ridley Creek at Ashbridge Preserve (PURC1S, SL155), Willistown Conservation Trust, Lauren McGrath

Rating curves

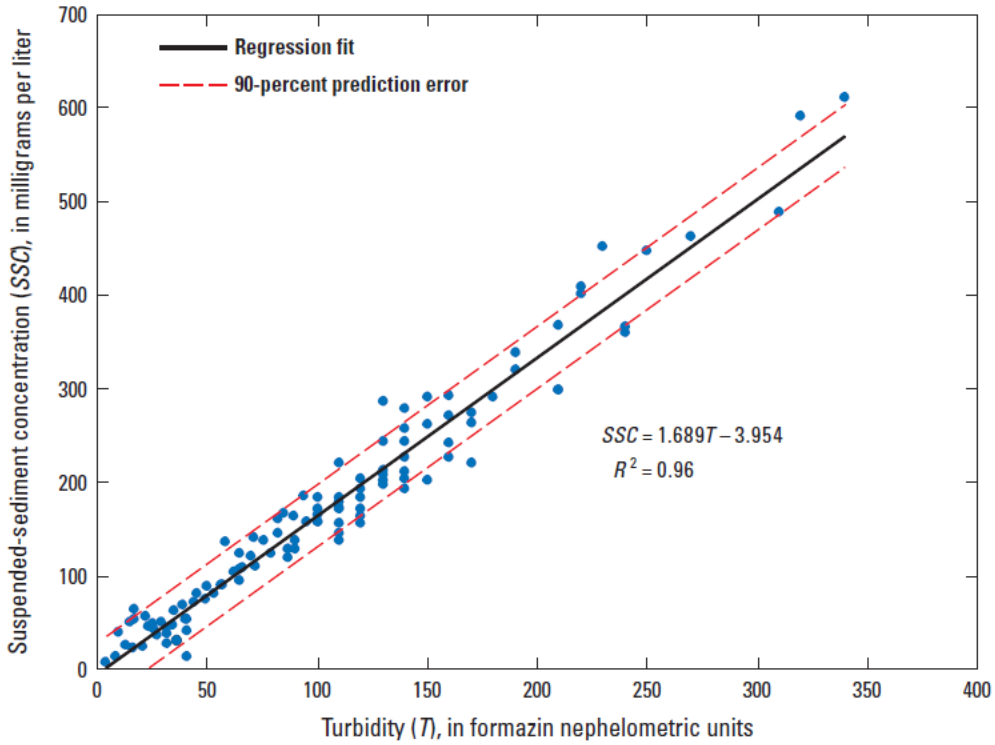


Figure 3. Regression relations of turbidity and suspended-sediment concentration for French Creek near Phoenixville, Pennsylvania.

Sloto, R.A., and Olson, L.E., Estimated suspended-sediment loads and yields in the French and Brandywine Creek Basins, Chester County, Pennsylvania, water years 2008–09: U.S. Geological Survey Scientific Investigations Report 2011–5109, 31 p.

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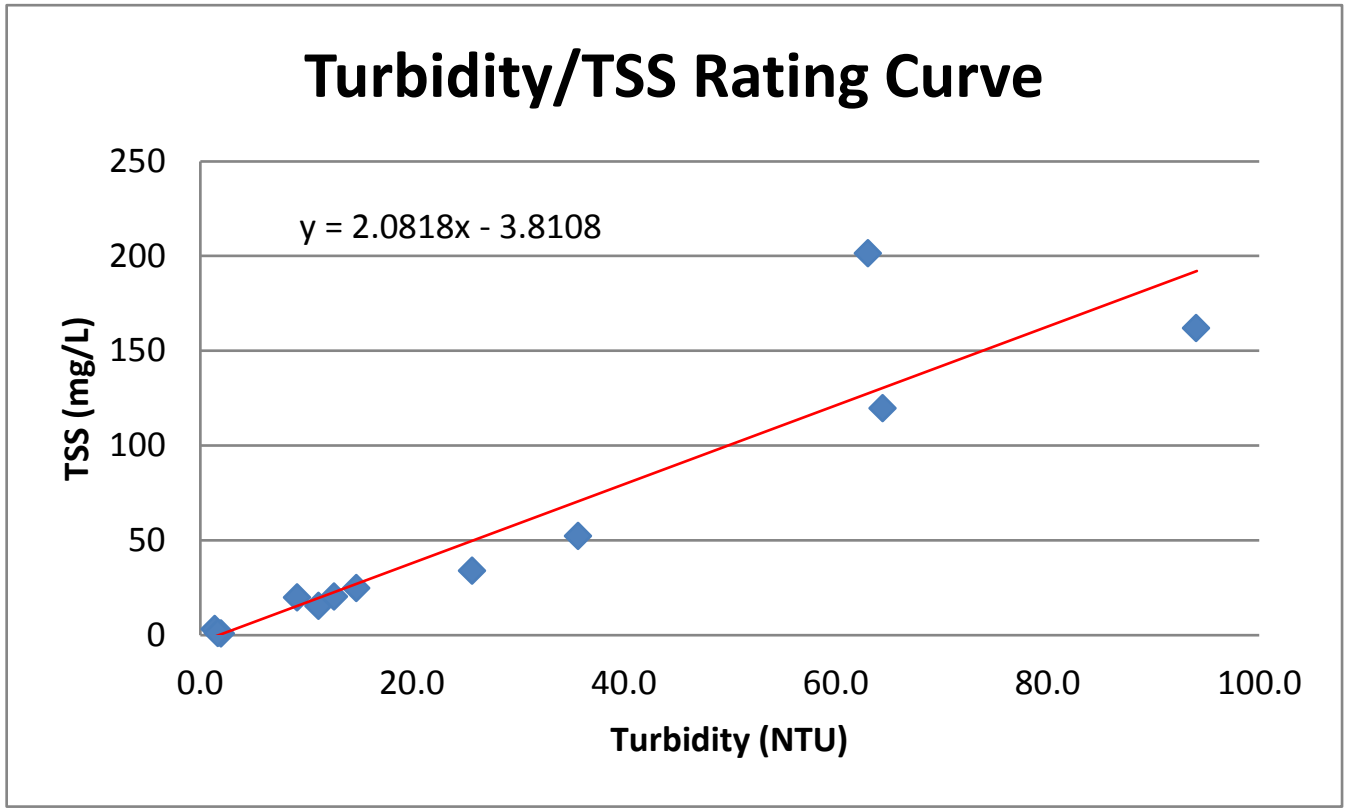
Rating curves



Data from Pickering Creek at Montgomery School (SHPK5S, SL135), Carol Armstrong, George Seeds, and David Kline (and students)

STROUD WATER RESEARCH CENTER

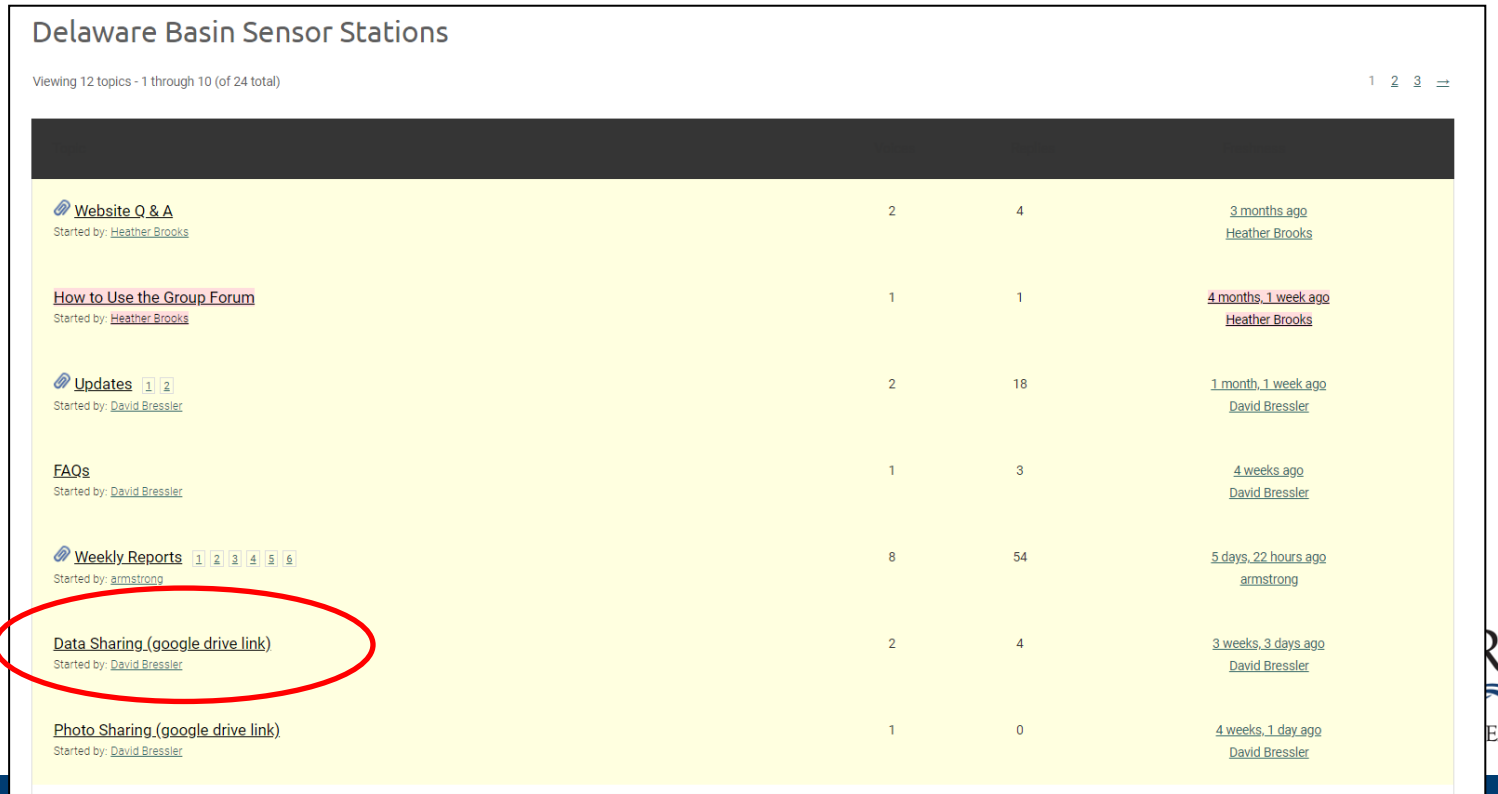
Stroud field support and resources

- Shannon Hicks, Rachel Johnson, and Matt Gisondi available for field support
  - Station troubleshooting
  - Staff gauge fixes/modifications/replacements
  - Sensor replacements
    - *Stroud has resources to replace sensors for free in some situations (communicate with Stroud)
    - Sensor manufacturer warranty 1 year

STROUD WATER RESEARCH CENTER

Data sharing

- Stroud compiling SD card data
  - Google drive link shared via email and included on Delaware Basin Sensor Stations online group forum
  - SD card data most complete
  - This will continue to serve as a basin-wide SD card data repository



Delaware Basin Sensor Stations

Viewing 12 topics - 1 through 10 (of 24 total)

1 2 3 →

Website Q & A Started by: Heather Brooks	2	4	3 months ago Heather Brooks
How to Use the Group Forum Started by: Heather Brooks	1	1	4 months, 1 week ago Heather Brooks
Updates 1 2 Started by: David Bressler	2	18	1 month, 1 week ago David Bressler
FAQs Started by: David Bressler	1	3	4 weeks ago David Bressler
Weekly Reports 1 2 3 4 5 6 Started by: armstrong	8	54	5 days, 22 hours ago armstrong
Data Sharing (google drive link) Started by: David Bressler	2	4	3 weeks, 3 days ago David Bressler
Photo Sharing (google drive link) Started by: David Bressler	1	0	4 weeks, 1 day ago David Bressler

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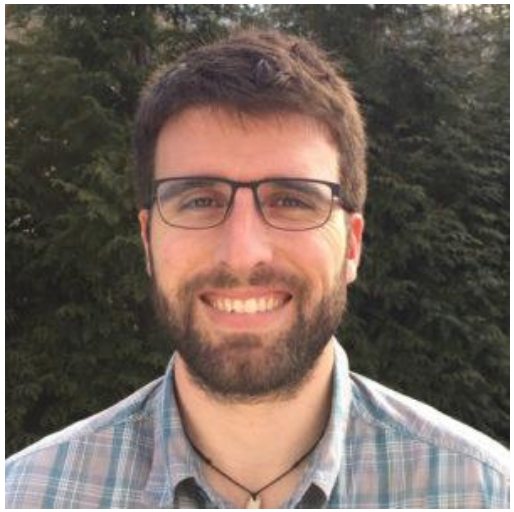
Stroud data analysis (re data sharing)

- Bressler meeting with Stroud data folks next week to start the process
  - To start - temperature and conductivity, basin-wide analysis



Marc Peipoch, PhD
Assistant Research Scientist

Diana Oviedo-Vargas, PhD
Assistant Research Scientist

Melanie Arnold
Data Analyst

STROUD WATER RESEARCH CENTER

Stroud data analysis

- Ideas to start:
  - Average annual, monthly, and seasonal for all sites; and box/whisk plots
  - Avg and box/whisk plots by stream order
  - Avg and box/whisk plots by land use categories, e.g., dom forest, dom ag, dom urb
  - Scatterplots max (and/or 75th or 90th) versus %lulc; avg and/or med vs lulc
  - Daily, monthly, seasonal site ranges
  - Temp changes due to summer storm flushes - diff between urb, ag, forest; diff between stream size
  - Extended conductivity elevations beyond winter

- **We can discuss this today if folks have ideas, requests, questions…**

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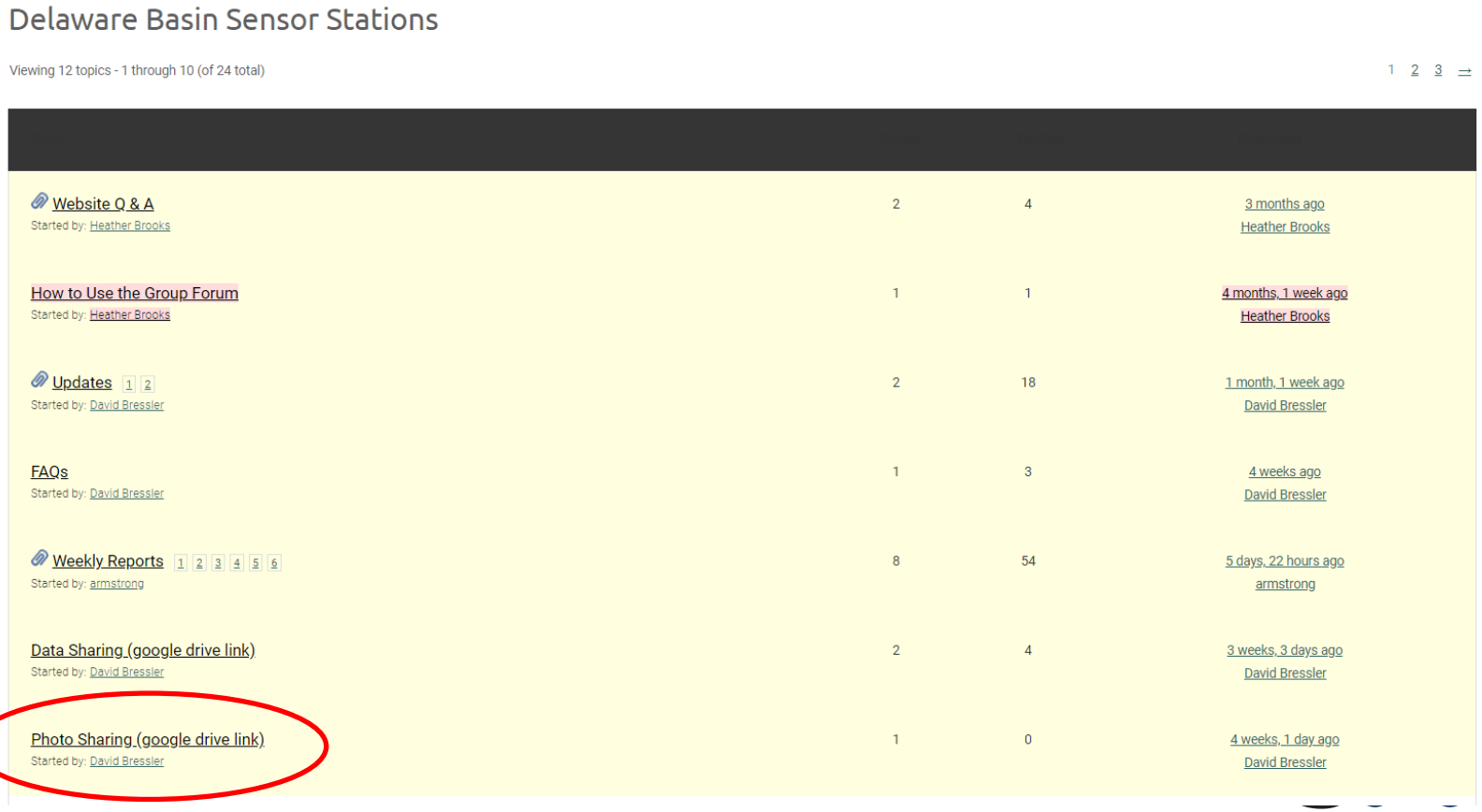
Photo Sharing

- Google drive link located in Delaware Basin Sensor Stations online group forum



Delaware Basin Sensor Stations

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Today as a pilot – larger version winter 2020?

- Presentation format as a template/pilot for possible larger gathering Jan-Feb 2020
  - Opportunity to present to larger audience
  - Invitations to people outside DRWI
  - Invitations to folks not working with stations
  - Share on Basecamp, EnviroDIY.org, CUASHI, Michigan TU and others working with EnviroDIY and other technologies

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Upcoming workshops, 2019

- June 7 – Watershed 201, Measuring Discharge and TSS, setting up an inexpensive TSS lab, Willistown Conservation Trust
  - Host/facilitator: Lauren McGrath and Stroud
- July TBD – PSU Master Watershed Stewards Sensor Station Maintenance and QC training, Berks Ag Center
  - Host/facilitator: Karin Wulkowicz (Berks Co PSU Master Watershed Steward Coordinator) and Stroud
- Aug 9 – Sensor Station Management Workshop, Cherry Valley National Wildlife Refuge
  - Host/facilitator: Paul Wilson, Jim Vogt(? Monroe Co MWSteward Coordinator) and Stroud
- Sept 17-18, Standard Introduction to EnviroDIY Workshop, Stroud Water Research Center
  - Host/facilitator: Stroud
- Sept 24-25, Watershed 101, Watershed Ecology and Monitoring, Stroud Water Research Center
  - Host/facilitator: Stroud
- **Possibly today discuss other possible workshops for 2019**

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Future user group gatherings

- **Today possibly discuss:**
  - Hosts
  - Themes
  - Timing/scheduling

- Cumulative meeting notes – google doc (Gisondi taking notes today)

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