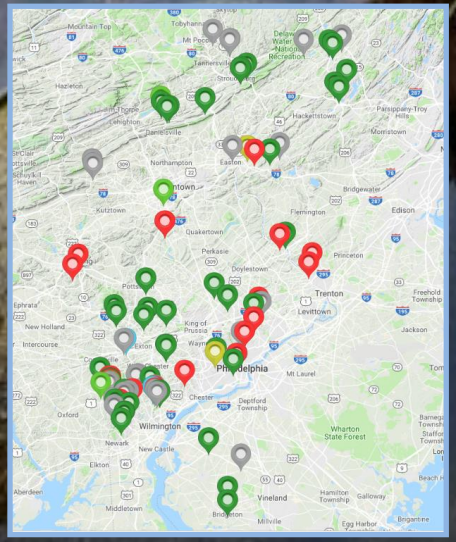
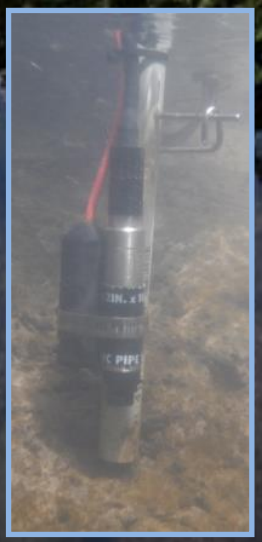
EnviroDIY Sensor Station Management Workshop

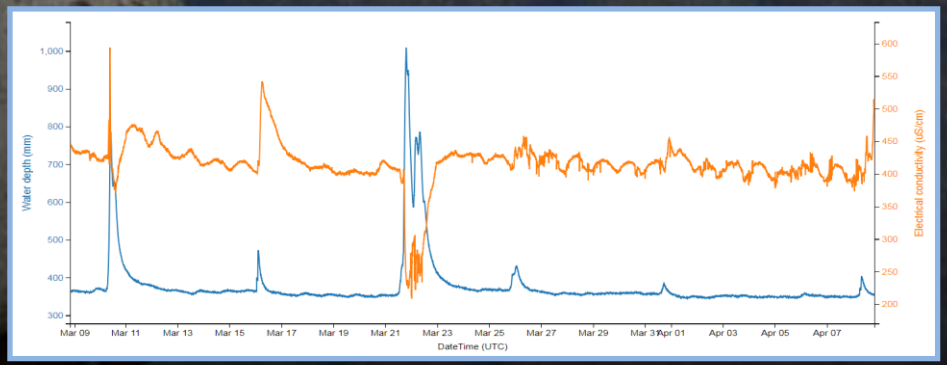
Maintenance and Quality Control

August 10, 2019 at Cherry Valley National Wildlife Refuge
(2138 Croasdale Road, Stroudsburg, PA, 18360)

Facilitators: David Bressler, Paul Wilson, Carol Armstrong, Christa Reeves, Levi Morris, Ben Laubach







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Agenda

- 8:45-9:15 – Welcome, refreshments, light breakfast
- 9:15-10:00 – Introduction and overview for the day
- 10:00-10:15 – Break and get ready to go to sites
- 10:15-12:15 – On-site training at two Cherry Creek sensor stations, break into two groups
- 12:15-1:00 – Lunch
- 1:00-1:45 – Online data entry
- 1:45-3:00 – Usage of Monitor My Watershed
- 3:00-3:30 – Overflow, discussions

***Everyone does everything, work in pairs**

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Intention for workshop

- **Overview of EnviroDIY sensor stations**
- **Instruction on basic Maintenance and QC**
  - Master Watershed Stewards – lunch and after – match with stations, define roles
- Data and meta-data
  - Online Field Visit Data sheet data entry
  - Usage of Monitor My Watershed
- Introduce resources, network, dialogue

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Stroud support

- **David Bressler**, Stroud – main contact
- **Shannon Hicks**, Stroud – high level technical support
- **Rachel Johnson**, Stroud – technical support, field assistance, small workshop facilitation, field assistance, 1:1 training
- **Matt Gisondi**, Stroud – mentoring, data analysis (rating curves, loads), field assistance, 1:1 training
- **Christa Reeves**, Stroud/Musconetcong WA – mentoring, regional assistance, northern Delaware Basin
- **Carol Armstrong** – PSU Master Watershed Stewards – mentoring, citizen science volunteer assistance, field maintenance and storm sampling, PSU Master Watershed Stewards mentor
- **George Seeds** – PSU Master Watershed Stewards – mentoring, 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), Stroud – original project designers

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Context

- Delaware River Watershed Initiative (DRWI), William Penn Foundation
- Citizen Science, Stroud Center facilitation of continuous monitoring using EnviroDIY Mayfly sensor stations
  - ~70 sensor stations deployed across Delaware River Basin
    - Stations owned by watershed groups and schools – grants and private purchase
    - Conductivity, Temperature, Depth (CTD) and Turbidity…and a few with Dissolved Oxygen
    - Solar powered
    - Logging data every 5 minutes
    - Some online, always log to microSD card on-site

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EnviroDIY stations in DRWI Context

- **Primary goal with sensor stations**: groups use them for their own purposes – Stroud supports these efforts
- **Secondary goal**: build basin-wide data set for broadscale analysis – by Stroud and anyone else (publicly available via Monitor My Watershed)

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EnviroDIY stations in DRWI Context

- Finished with first WPF grant on June 30, 2018 – 60 stations granted to watershed groups, schools, and universities in Delaware Basin
- Next round through 2020 – Stroud support
  - Some grants
  - Private sales
    - Only selling in Delaware Basin to groups that are interested in participating in the collaborative effort
    - Completing data sheets, doing QC, consulting w Stroud on issues, sharing data

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Context

- Opportunities for committed volunteers to get involved – Master Watershed Stewards and others
  - Stations take more time to maintain than a lot of groups realized
    - *Opportunity to make significant contributions to the integrity and viability of the data set
    - This is functional and logistical work, not outreach, not engagement

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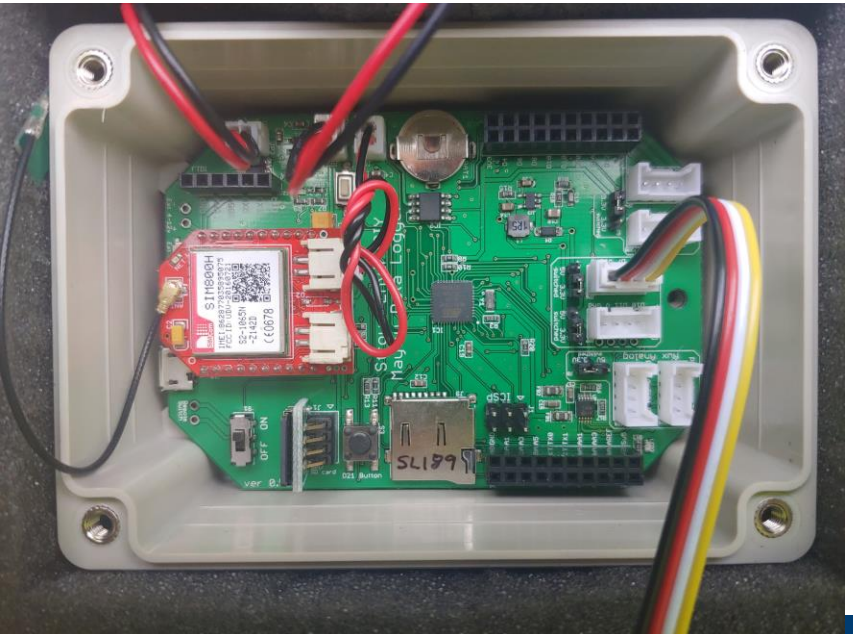


80
75
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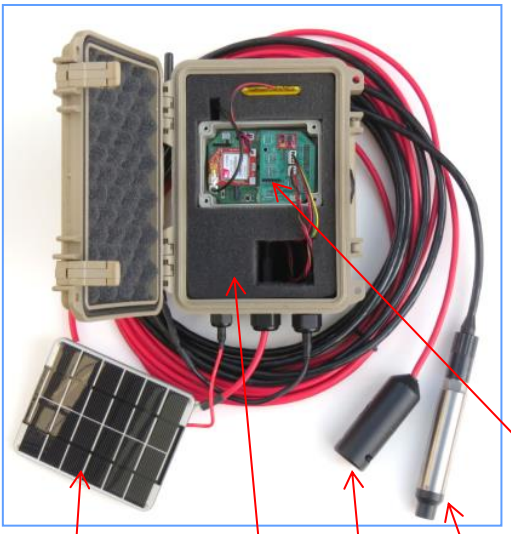
Overview



Solar panel

Logger box

Decagon CTD-10 sensor – Conductivity, Temperature, Depth

Mayfly data logger board

Campbell OBS-3+ Turbidity sensor

Full station – sensors and logger box with solar panel

Solar panel and logger box

Sensor bundle (sensors, hose clamp, PVC sheath, mounting pin)

Mounting pin – remove to take sensor bundle out of stream

Staff gauge – for on-site reference and use in developing hydrologic rating curves

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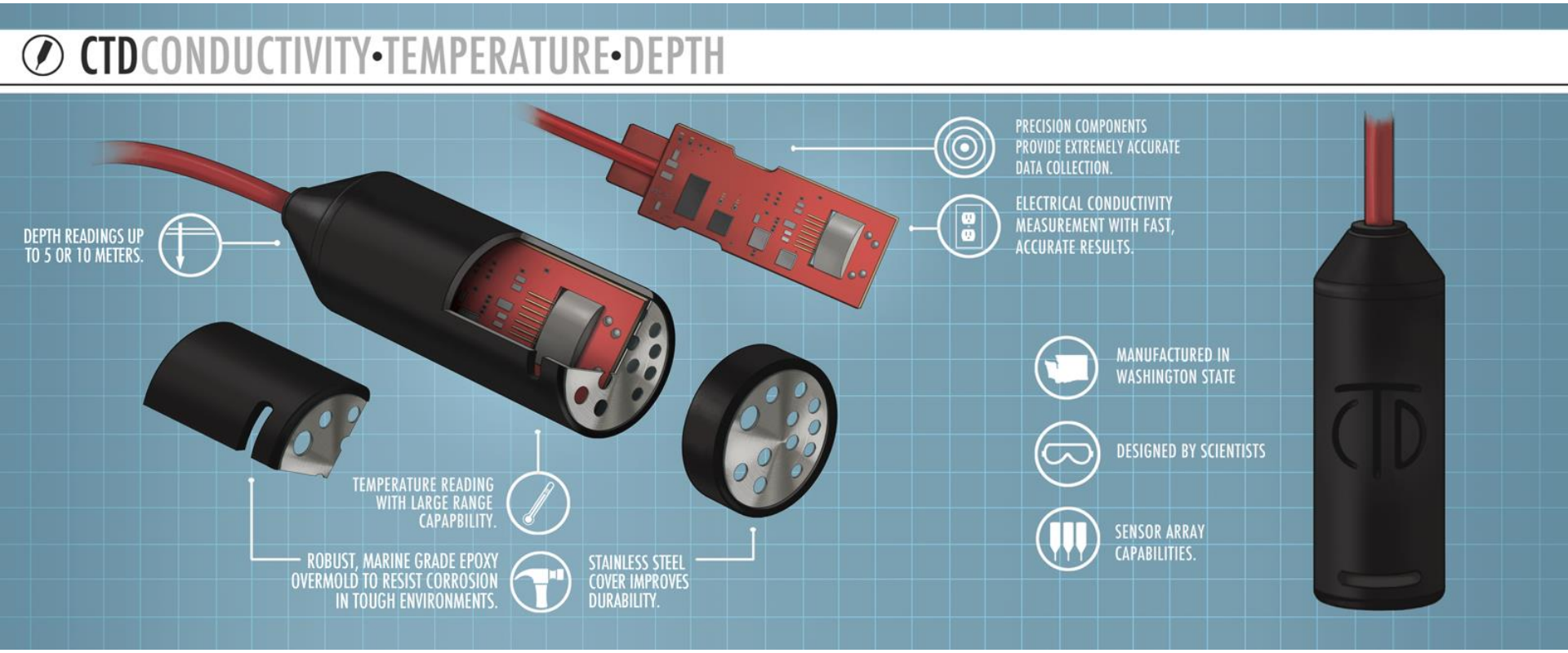
Overview

Decagon/ Meter Group CTD-10 Sensor Electrical Conductivity Temperature Depth
http://www.decagon.com/en/hydrology/water-level-temperature-electrical-conductivity/ctd-10-sensor-electrical-conductivity-temperature-depth/



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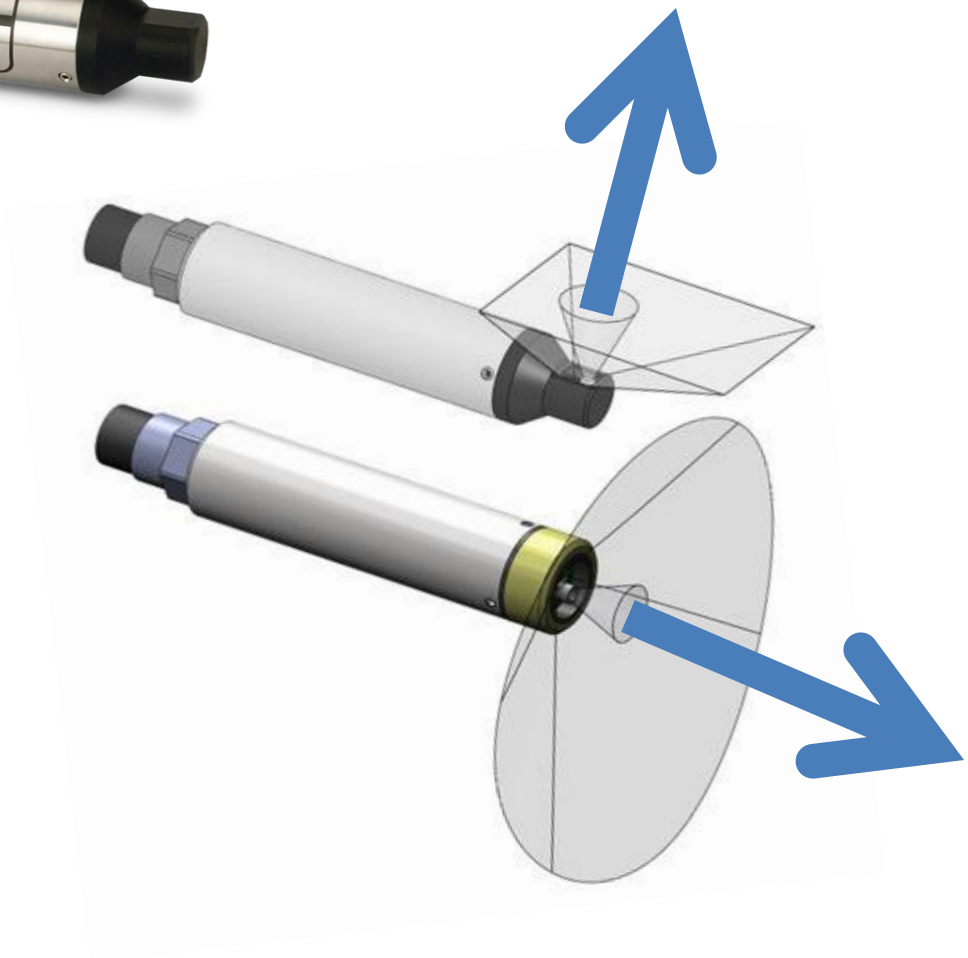
Overview

Campbell Scientific's OBS-3+ Turbidity Sensor
https://www.campbellsci.com/obs-3plus



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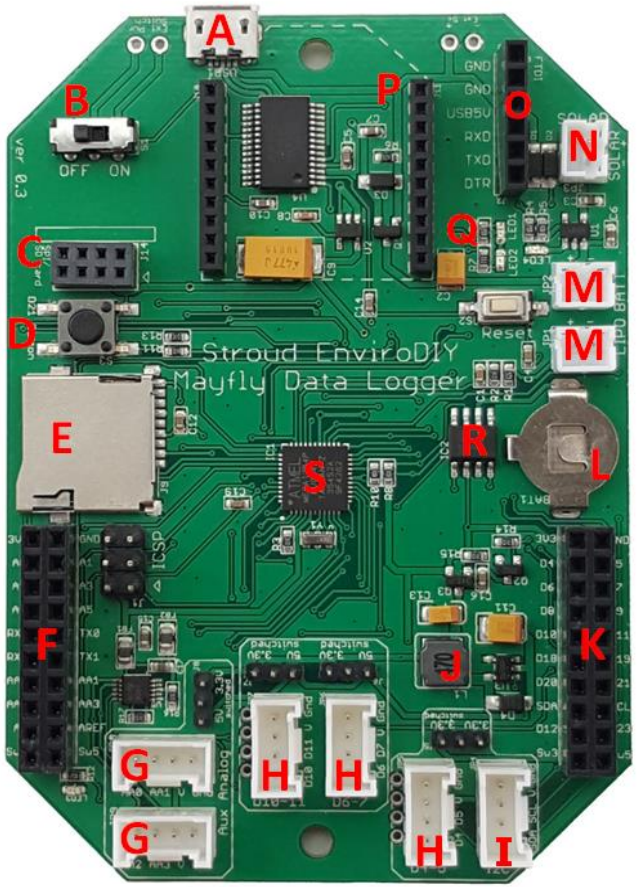
Overview



Features of the EnviroDIY Mayfly Data Logger

A	**MicroUSB port** – connect a standard MicroUSB cable to a computer for programming the Mayfly using the Arduino software
B	**Power switch** – turns the Mayfly board on and off
C	**microSD/SPI connector** – socket for vertical microSD memory card adapter board or other SPI devices
D	**Pushbutton** – connected to pin D21 for user-defined input
E	**microSD card socket** – socket for storing data on a standard microSD memory card
F	**Analog pin header** – access to the Mayfly's power, ground, & analog pins, and also the four Auxiliary 16-bit Analog-to-Digitial converter pins
G	**Auxiliary ADC Grove connectors** – pairs of Auxiliary Analog pins along with ground and power (3.3v or 5V)
H	**Digital pin Grove connectors** – pairs of digital pins along with ground and power (3.3v or 5v), for connecting sensors and Grove accessories
I	**I²C port Grove connector** – connection for any devices that use the I²C protocol
J	**5-volt boost converter** – generates 5v for powering external sensors
K	**Digital pin header** – access to the Mayfly's power, ground, & digital pins
L	**Clock battery** – socket for CR1220 lithium battery to keep clock chip (R) running when no other power is connected to Mayfly
M	**LiPo battery connectors** – JST socket for connecting LithiumPolymer (LiPo) rechargeable battery. Additional socket is for providing power to high-current peripheral devices
N	**Solar panel connector** – JST socket for connecting 6v solar panel for charging the LiPo battery
O	**FTDI programing header** – alternative port for programming board using an external FTDI adapter instead of using the Mayfly microUSB port
P	**Bee module socket** – connection port for various telemetry modules that use the Bee footprint (mesh radio, WiFi, cellular)
Q	**Red & Green LEDs** – LEDs for providing visual feedback, connected to pins D8 (green) and D9 (red)
R	**Real-time clock** – DS3231 clock module with on-board temperature sensor, retains the date and time after initial programming, requires battery (L)
S	**Processor** – ATmega1284p microprocessor

GPRSbee rev.6 cell wireless module
(2G cell module)

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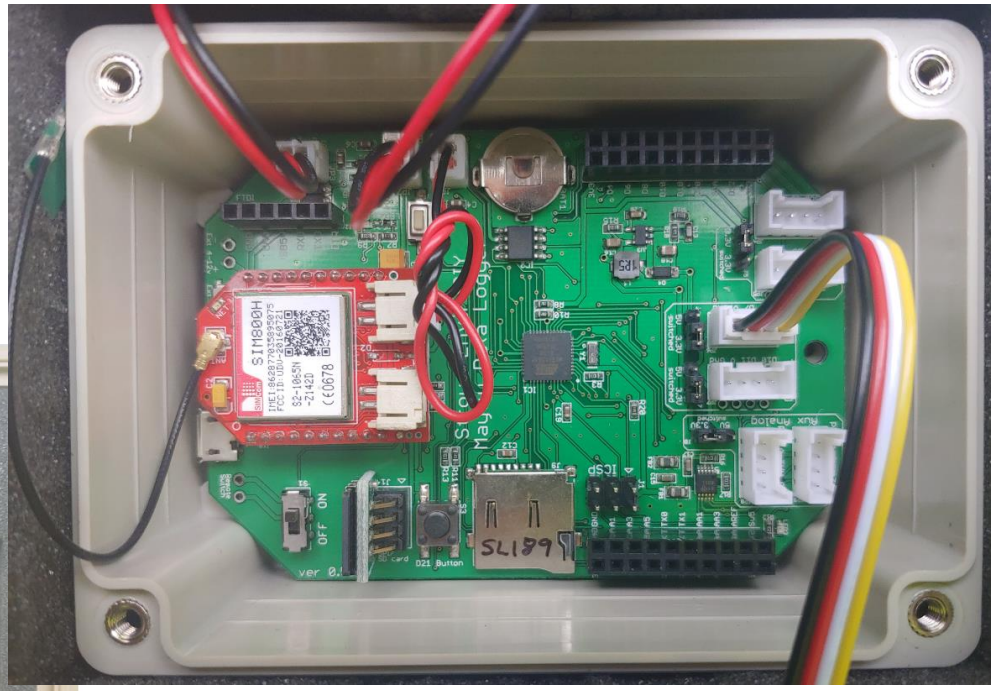
Overview



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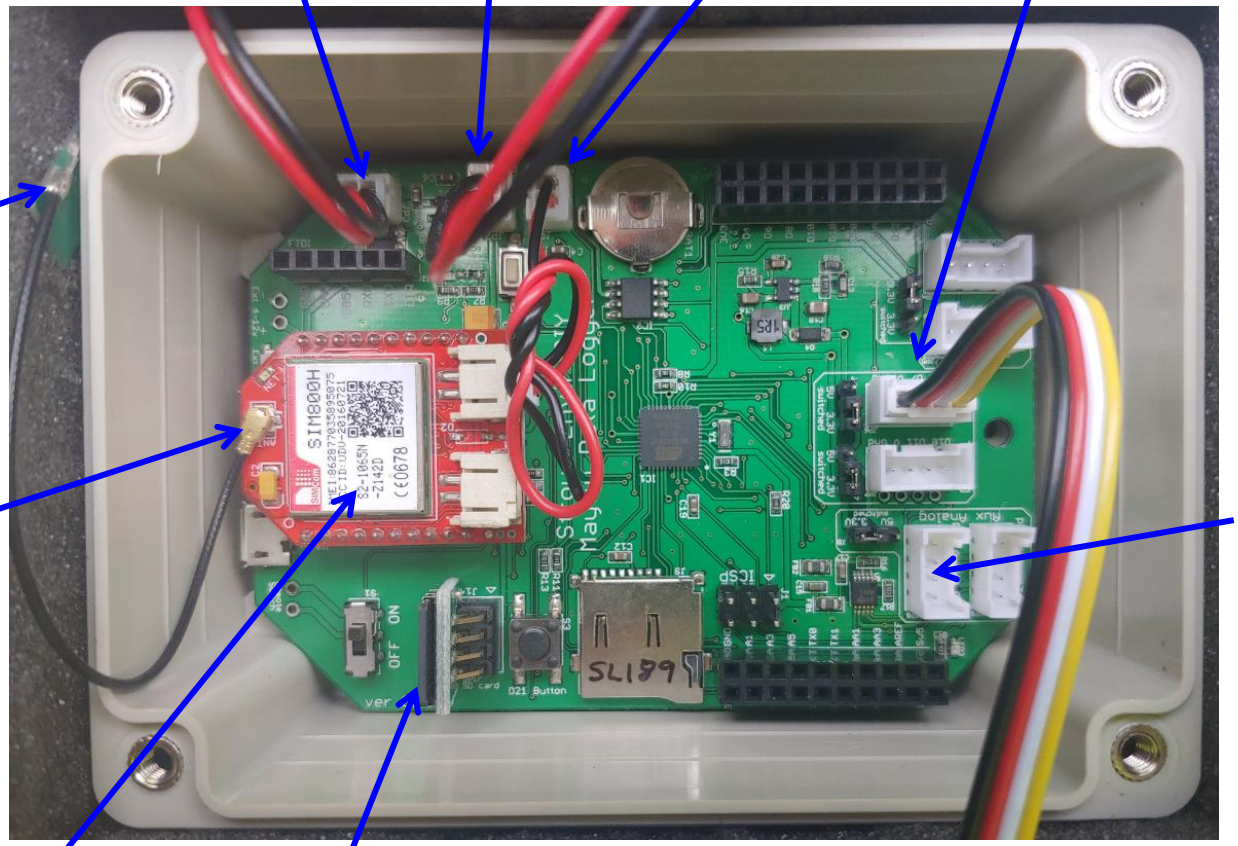
Overview



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Overview

Mayfly Data Logger

Meter Environment
Hydros 21 CTD sensor

	A	B	C	D	E	F	G	H	I	J
1	SL082 - Mayfly CTD & Turbidity Logger									
2	DateTime_EST	TZ-Offset	Loggertime	BoardTemp	Battery_V	CTD_Depth_mm	CTD_temp_DegC	CTD_cond_dS/m	Turb_low_NTU	Turb_high_NTU
3	10/19/2017 17:05	-5	561747900	15.5	3.56	77.3	14.6	229	55.2	56.6
4	10/19/2017 17:10	-5	561748200	15.5	3.67	78	14.5	229	57.8	59.4
5	10/19/2017 17:15	-5	561748500	15.5	3.71	77.3	14.4	229	54	55.3
6	10/19/2017 17:20	-5	561748800	15.5	3.78	76.7	14.3	230	54.3	55.8
7	10/19/2017 17:25	-5	561749100	15.3	3.81	77	14.3	230	55.2	56.6
8	10/19/2017 17:30	-5	561749400	15.3	3.84	77.7	14.2	230.3	49.9	51.2
9	10/19/2017 17:35	-5	561749700	15	3.87	77	14.2	229.3	56.1	57.7
10	10/19/2017 17:40	-5	561750000	15	3.9	79	14.1	231.3	54.7	56.3
11	10/19/2017 17:45	-5	561750300	14.8	3.91	78.7	14	229.3	53.6	55
12	10/19/2017 17:50	-5	561750600	14.8	3.93	77.7	14	229.3	52.9	54.4
13	10/19/2017 17:55	-5	561750900	14.5	3.93	78	14	229.7	51.9	53.3
14	10/19/2017 18:00	-5	561751200	14.3	3.93	77.3	13.9	231	55.3	56.7
15	10/19/2017 18:05	-5	561751500	14.3	3.94	77	13.9	229.7	54.9	56.4
16	10/19/2017 18:10	-5	561751800	14	3.94	77	13.7	229.7	57	58.5
17	10/19/2017 18:15	-5	561752100	14	3.96	78.3	13.7	230	54.9	56.2
18	10/19/2017 18:20	-5	561752400	13.8	3.96	76.3	13.6	229.3	53.2	54.7
19	10/19/2017 18:25	-5	561752700	13.8	3.96	77	13.6	229.3	53.2	54.6
20	10/19/2017 18:30	-5	561753000	13.5	3.96	77	13.6	230	51.9	53.2
21	10/19/2017 18:35	-5	561753300	13.5	3.97	77	13.5	228.7	51.3	52.6
22	10/19/2017 18:40	-5	561753600	13.3	3.97	77.7	13.5	229	52.6	54
23	10/19/2017 18:45	-5	561753900	13.3	3.97	78	13.4	230.3	49.5	50.8
24	10/19/2017 18:50	-5	561754200	13	3.97	78.3	13.4	229.7	49.4	50.7
25	10/19/2017 18:55	-5	561754500	13	3.97	76.3	13.3	229.7	52.5	53.8
26	10/19/2017 19:00	-5	561754800	12.8	3.97	77	13.3	229	46.8	48
27	10/19/2017 19:05	-5	561755100	12.8	3.97	77.7	13.3	228.3	46.4	47.6
28	10/19/2017 19:10	-5	561755400	12.5	3.97	77	13.2	230	45	46.1
29	10/19/2017 19:15	-5	561755700	12.5	3.97	78	13.2	230	47	48.1

Campbell OBS3+
Turbidity sensor

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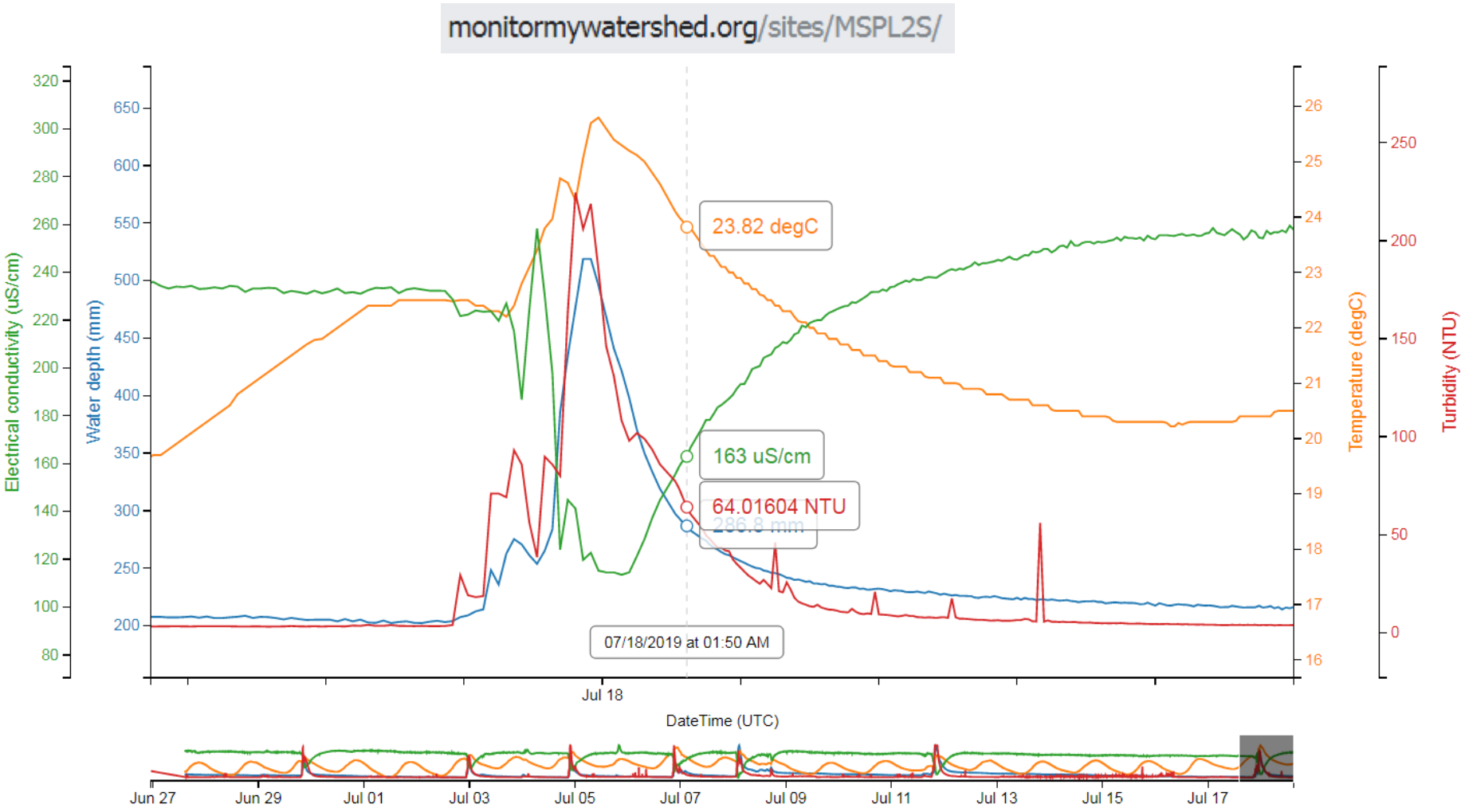
Continuous data

	A	B	C	D	E	F	G	H	I	J	K	L
1	DateTime	TimeOffset	DateTimeUTC	Decagon_CTD-10_**Depth**	Decagon_CTD-10_**Temp**	Decagon_CTD-10_**Cond**	Campbell_OBS3_**Turb**-1	Campbell_OBS3_**Turb**-2	EnviroDIY_Mayfly_Temp	EnviroDIY_Mayfly_**Batt**	Digi_Cellular_RSSI	Digi_Cellular_SignalPercent
251	8/7/2019 18:55	-5:00	8/7/2019 23:55	270	22.3	167	32.12892	32.9725	21.5	3.699	-69	71
252	8/7/2019 19:10	-5:00	8/8/2019 0:10	260.2	22.2	169.8	29.70875	30.40923	21.5	3.699	-69	71
253	8/7/2019 19:25	-5:00	8/8/2019 0:25	253.8	22.2	171.3	27.70976	28.3512	21.5	3.699	-45	109
254	8/7/2019 19:45	-5:00	8/8/2019 0:45	245.5	22.1	175.3	25.13705	25.65314	21.5	3.699	-45	109
255	8/7/2019 20:10	-5:00	8/8/2019 1:10	238.3	22	177.2	20.70443	21.00141	21.5	3.699	-45	109
256	8/7/2019 20:40	-5:00	8/8/2019 1:40	230.5	21.9	181.2	21.57225	21.92886	21.25	3.699	-45	109
257	8/7/2019 21:25	-5:00	8/8/2019 2:25	220.2	21.7	186.7	14.01436	13.9662	21	3.699	-45	109
258	8/8/2019 7:40	-5:00	8/8/2019 12:40	192.5	20.6	224.7	4.25569	3.6179	21.5	3.699	-69	71
259	8/8/2019 8:00	-5:00	8/8/2019 13:00	193.3	20.6	226	4.13347	3.49766	22	3.699	-81	51
260	8/8/2019 8:15	-5:00	8/8/2019 13:15	191.5	20.7	225	3.99551	3.35343	22.25	3.699	-81	51
261	8/8/2019 8:30	-5:00	8/8/2019 13:30	191.3	20.7	225.8	3.91749	3.28131	22.25	3.699	-81	51
262	8/8/2019 8:55	-5:00	8/8/2019 13:55	191.5	20.8	226.5	3.86323	3.22363	22.5	3.699	-45	109
263	8/8/2019 9:10	-5:00	8/8/2019 14:10	191.5	20.9	225	3.80446	3.16595	22.75	3.699	-69	71
264	8/8/2019 10:25	-5:00	8/8/2019 15:25	190.5	21.4	226.7	3.57159	2.93041	23.75	3.699	-69	71
265	8/8/2019 10:40	-5:00	8/8/2019 15:40	191.5	21.5	227	3.5501	2.89195	24.25	3.699	-69	71
266	8/8/2019 10:55	-5:00	8/8/2019 15:55	190.8	21.6	227.3	3.83024	3.17602	24.25	3.699	-81	51
267	8/8/2019 11:10	-5:00	8/8/2019 16:10	191	21.8	228.7	3.40657	2.74776	24.75	3.715	-69	71
268	8/8/2019 11:15	-5:00	8/8/2019 16:15	190	21.8	227.8	3.48005	2.81505	25	3.715	-69	71
269	8/8/2019 11:20	-5:00	8/8/2019 16:20	189.8	21.9	227.2	3.69035	3.04581	25	3.699	-45	109
270	8/8/2019 11:35	-5:00	8/8/2019 16:35	189.5	22	227.5	3.61113	2.96886	25.5	3.715	-69	71
271	8/8/2019 11:40	-5:00	8/8/2019 16:40	189.7	22.1	226.5	3.68707	3.05549	25.75	3.715	-45	109
272	8/8/2019 11:45	-5:00	8/8/2019 16:45	189.7	22.1	227.5	3.49705	2.83431	25.75	3.715	-69	71
273	8/8/2019 11:50	-5:00	8/8/2019 16:50	189.5	22.17	225.2	4.33779	3.71126	26	3.715	-69	71
274	8/8/2019 11:55	-5:00	8/8/2019 16:55	188.8	22.2	227.2	3.51507	2.85831	26.25	3.715	-69	71
275	8/8/2019 12:00	-5:00	8/8/2019 17:00	189.2	22.3	228.3	3.55575	2.90156	26.25	3.699	-69	71
276	8/8/2019 12:15	-5:00	8/8/2019 17:15	189.7	22.4	227.7	4.25791	3.65154	26.25	3.715	-45	109
277	8/8/2019 12:20	-5:00	8/8/2019 17:20	188.5	22.5	226.5	4.20698	3.59382	26.5	3.73	-45	109
278	8/8/2019 12:25	-5:00	8/8/2019 17:25	188.2	22.5	227	4.14251	3.53132	26.75	3.715	-45	109
279	8/8/2019 12:30	-5:00	8/8/2019 17:30	188.8	22.5	226.8	4.1346	3.5217	27	3.715	-81	51

Monitor My Watershed – main data portal



Un-named Tributary to Plum Run (MSPL2S, SL249)

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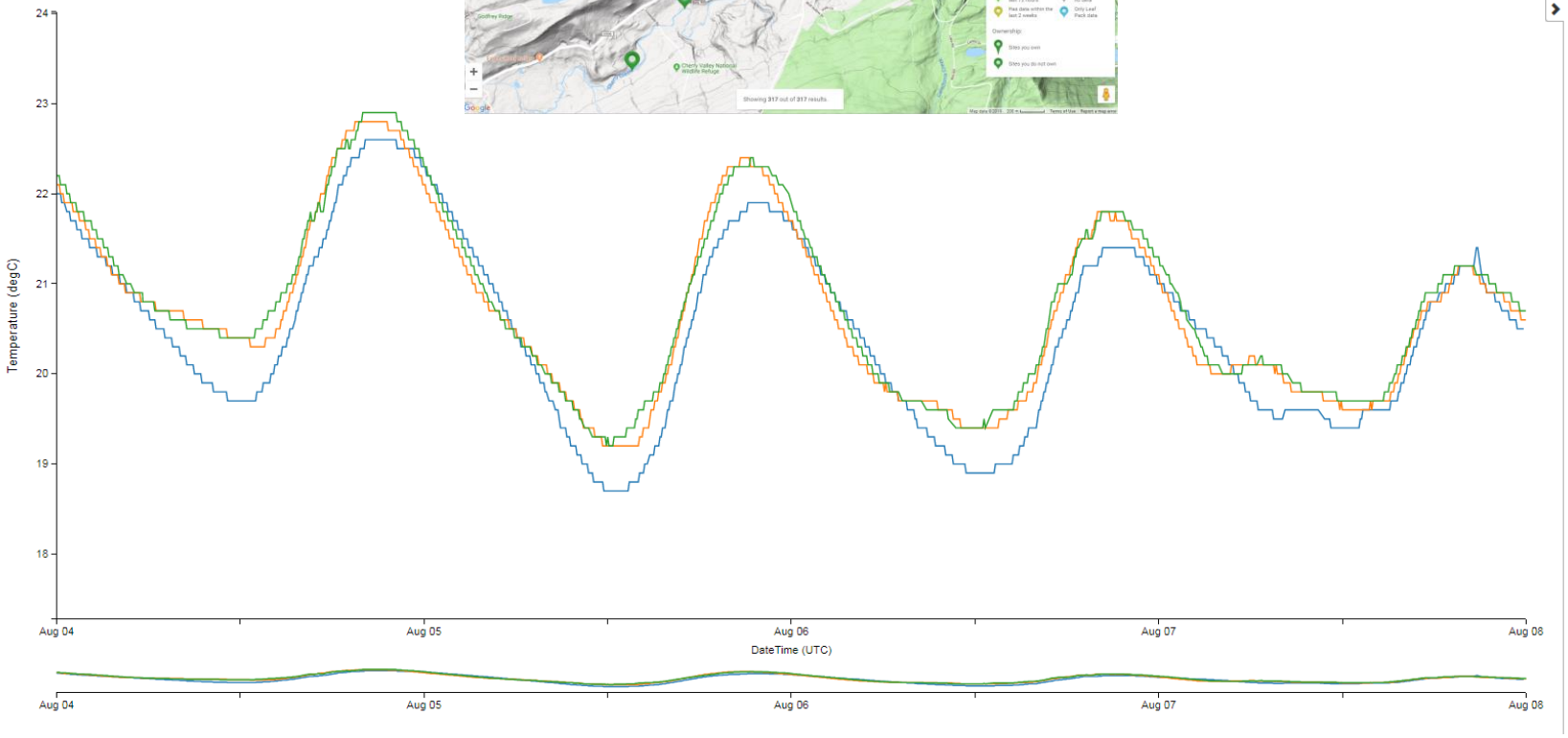

Plot Options

All | Last Month | Last Week

Begin Date 8/04/2019

End Date 8/08/2019

Visualization Time Series

Plot

Legend

Decagon_CTD-10_Temp: Temperature
PKCV4S: Cherry Creek at Pour Point
Raw Data

Decagon_CTD-10_Temp: Temperature
PKCV3S: Cherry Creek Upstream
Raw Data

Decagon_CTD-10_Temp: Temperature
PKCV2S: Cherry Creek Downstream
Raw Data

Summary Statistics

Arithmetic Mean	20.71
Geometric Mean	8.16
Maximum	22.80
Minimum	19.20
Standard Deviation	0.95
10%	19.60

Cherry Creek sites at Cherry Valley NWR and pour point

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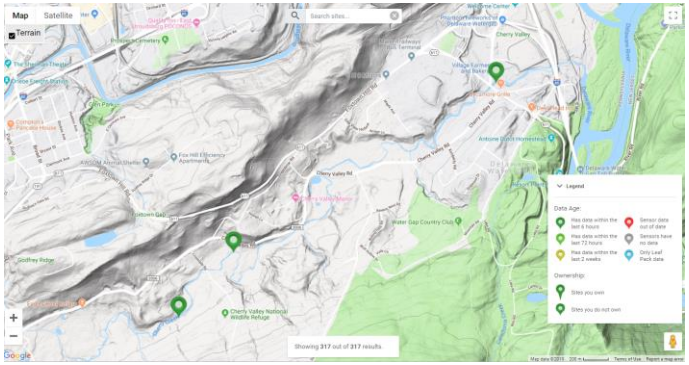

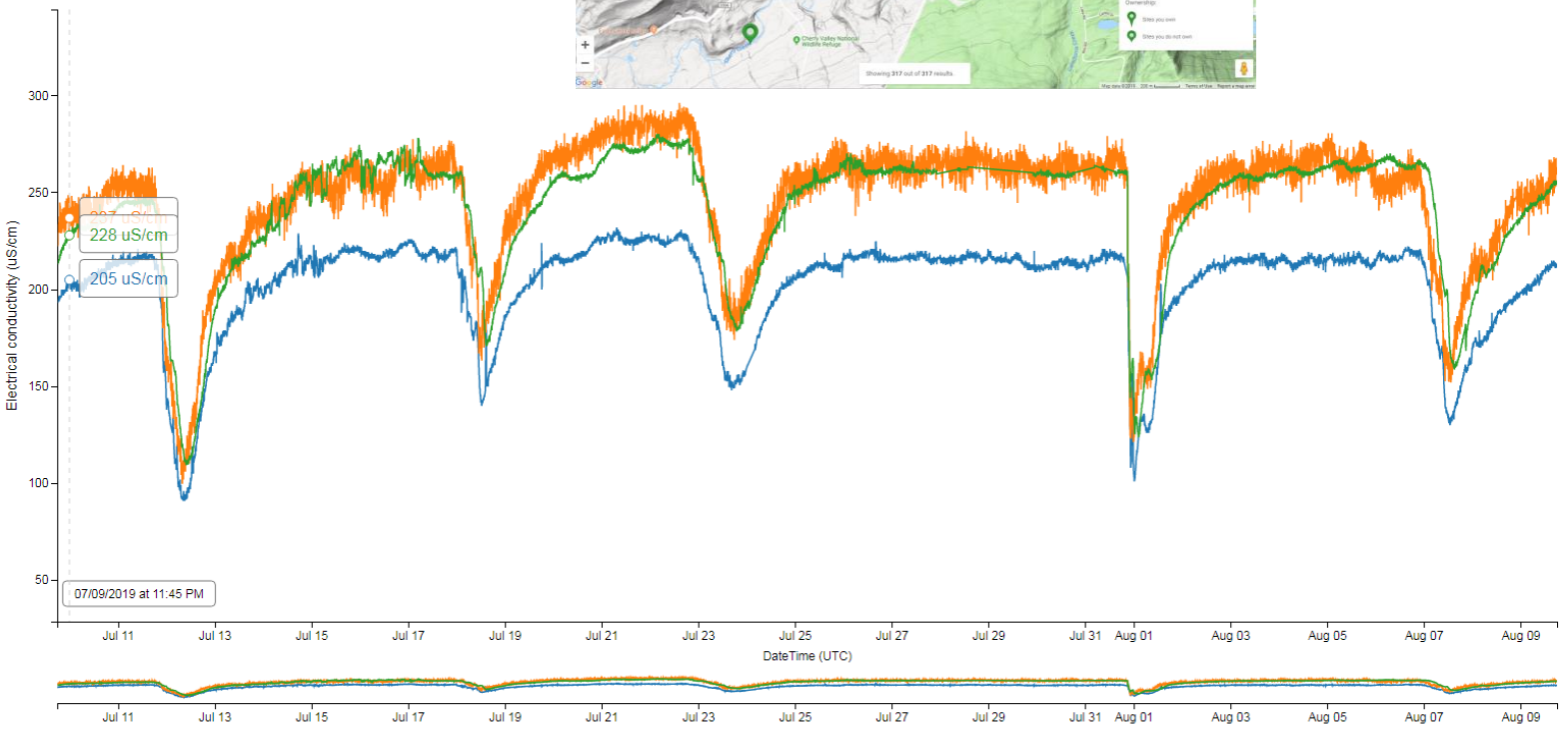

Plot Options

All | Last Month | Last Week

Begin Date 7/09/2019

End Date 8/09/2019

Visualization Time Series

Plot

Legend

- Decagon_CTD-10_Cond: Electrical conductivity
  PKCV2S: Cherry Creek Downstream
  Raw Data
- Decagon_CTD-10_Cond: Electrical conductivity
  PKCV3S: Cherry Creek Upstream
  Raw Data
- Decagon_CTD-10_Cond: Electrical conductivity
  PKCV4S: Cherry Creek at Pour Point
  Raw Data

Summary Statistics

Arithmetic Mean	203.27
Geometric Mean	39.53
Maximum	232.00
Minimum	91.00

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Recent data usage stories

- The Nature Conservancy, DE – identified illicit and previously unknown oil discharge to stormwater pipes at Concord Mall.
- Montgomery School ongoing investigation of unknown conductivity spikes into Pickering Creek.
- Willistown Conservation Trust identifying flood stage influence on pesticide applications.
- Lopatcong Creek Initiative investigating sources of turbidity spikes during baseflow.
- Primrose Creek Watershed Association tracking water loss due to quarry induced sinkholes.
- Musconetcong Watershed Association – data to comment on dam release issues in Musconetcong River
- Stroud Center analyzing conductivity and temperature data across Delaware Basin – linking to landscape patterns.
    - Possible peer-review publications

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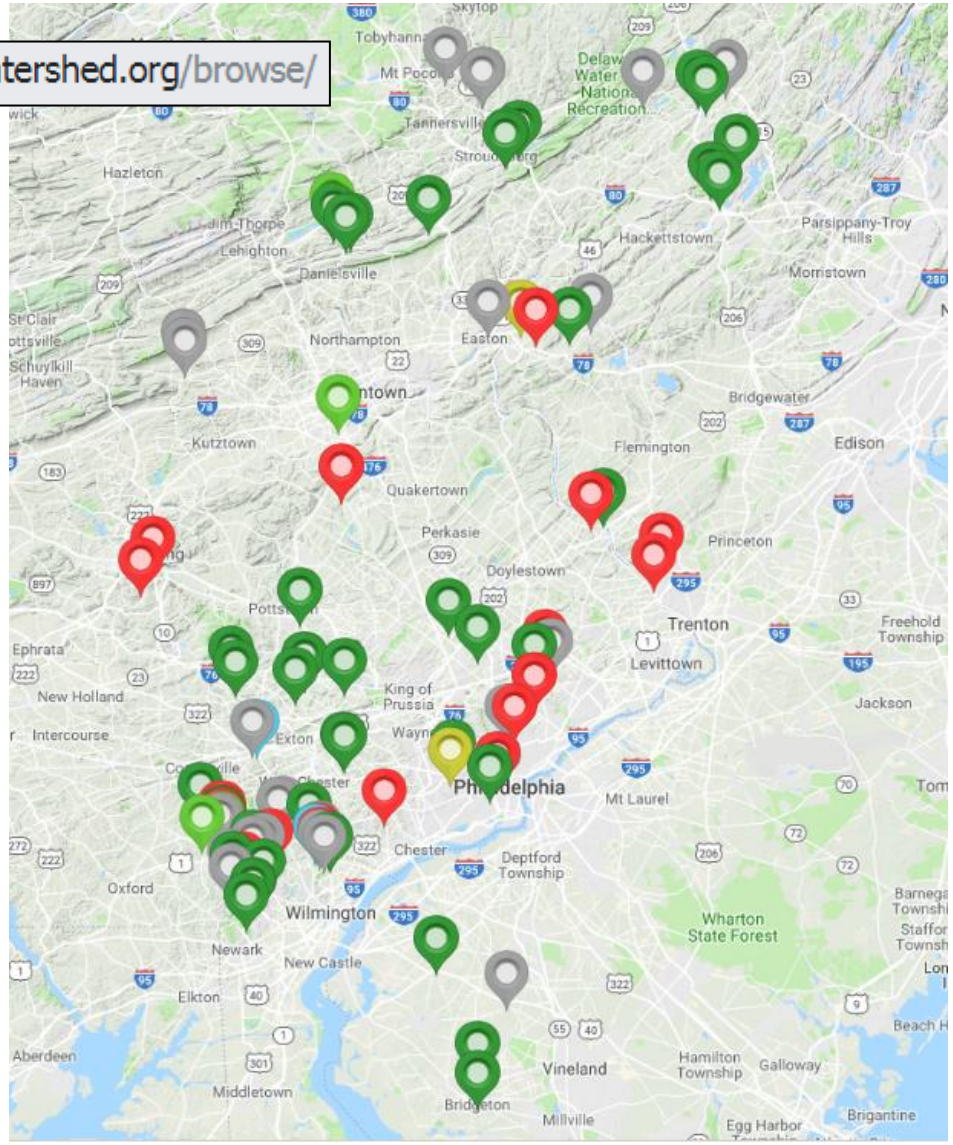
Distribution

monitormywatershed.org/browse/



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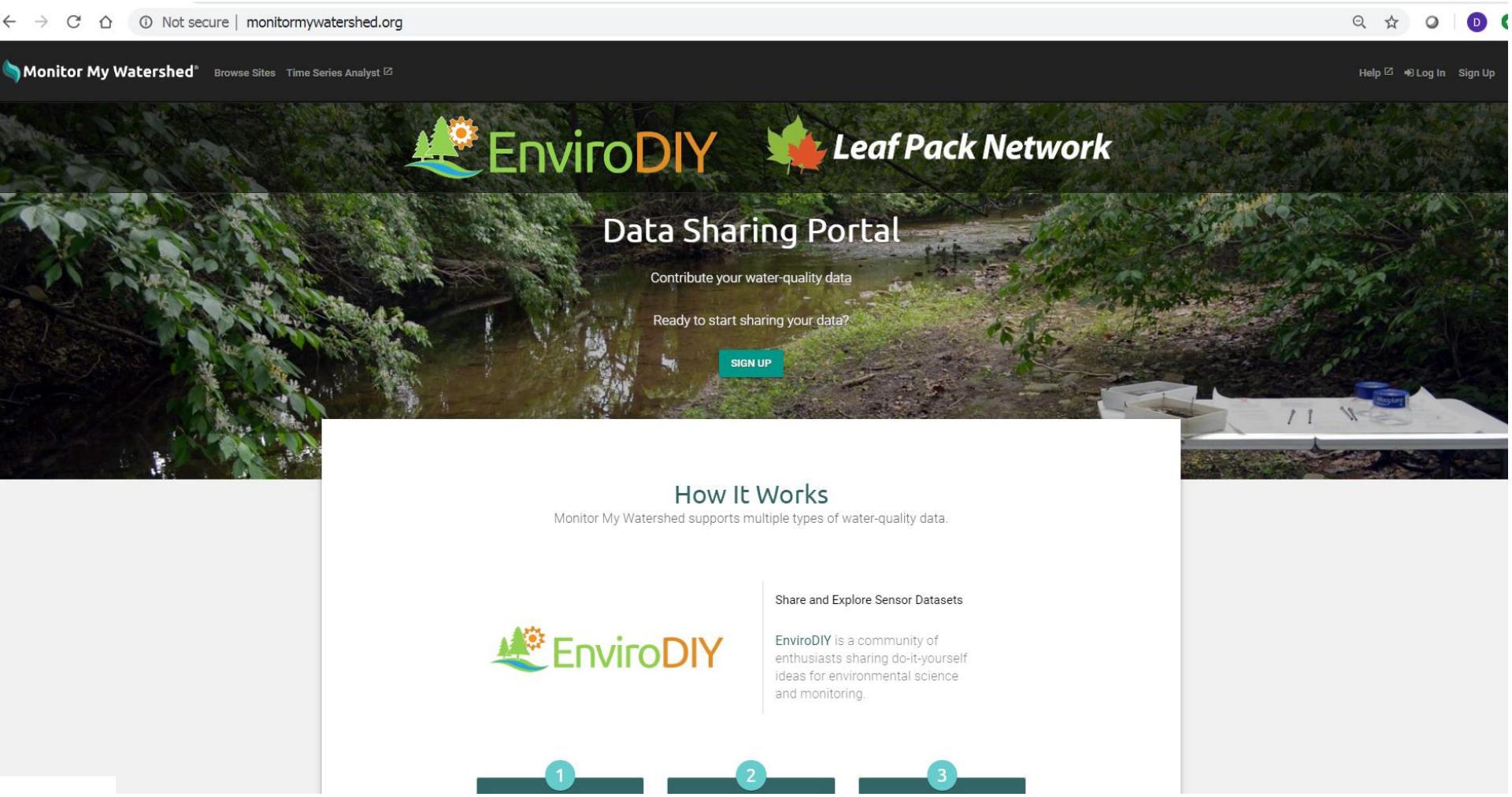

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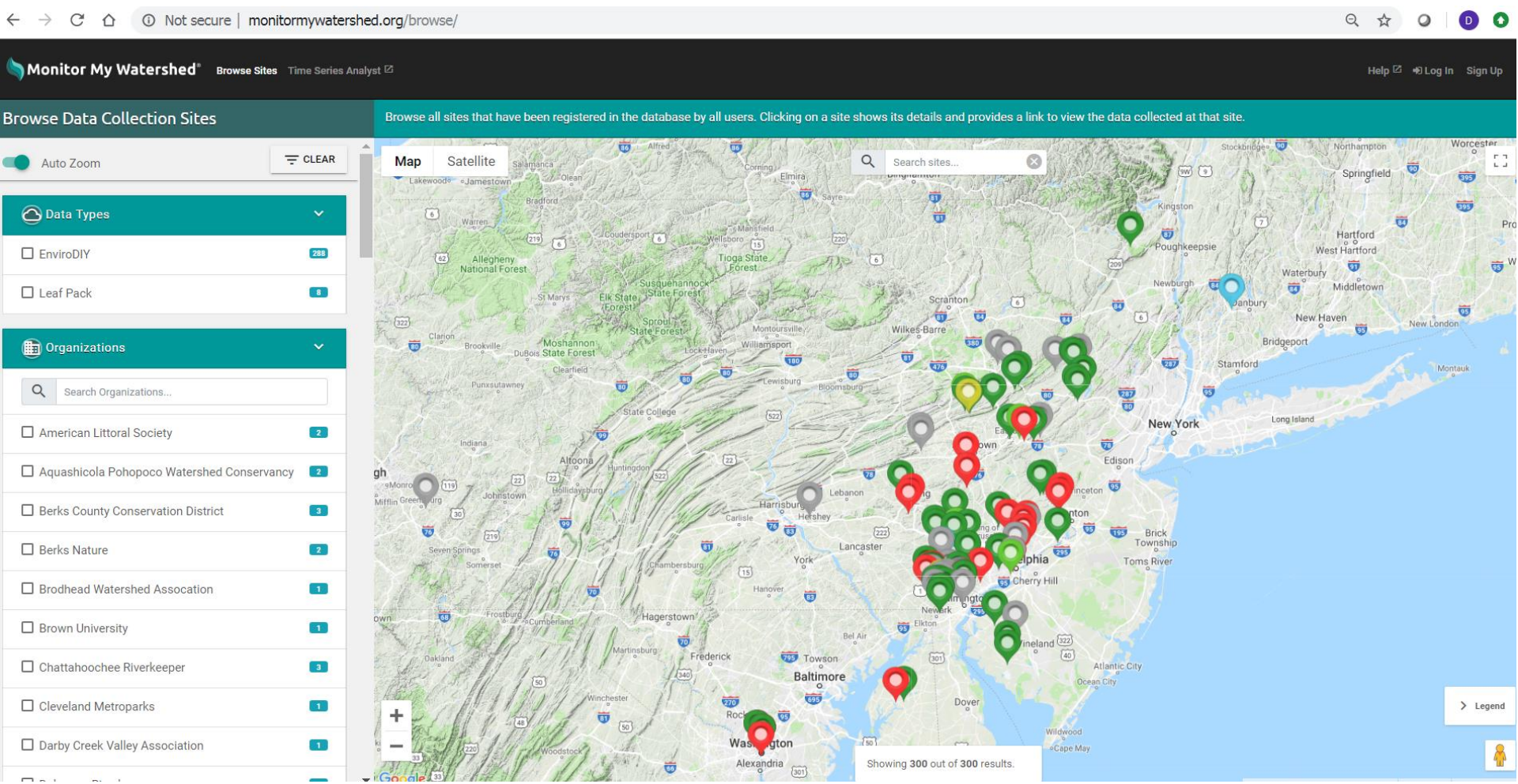

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Monitor My Watershed – main data portal

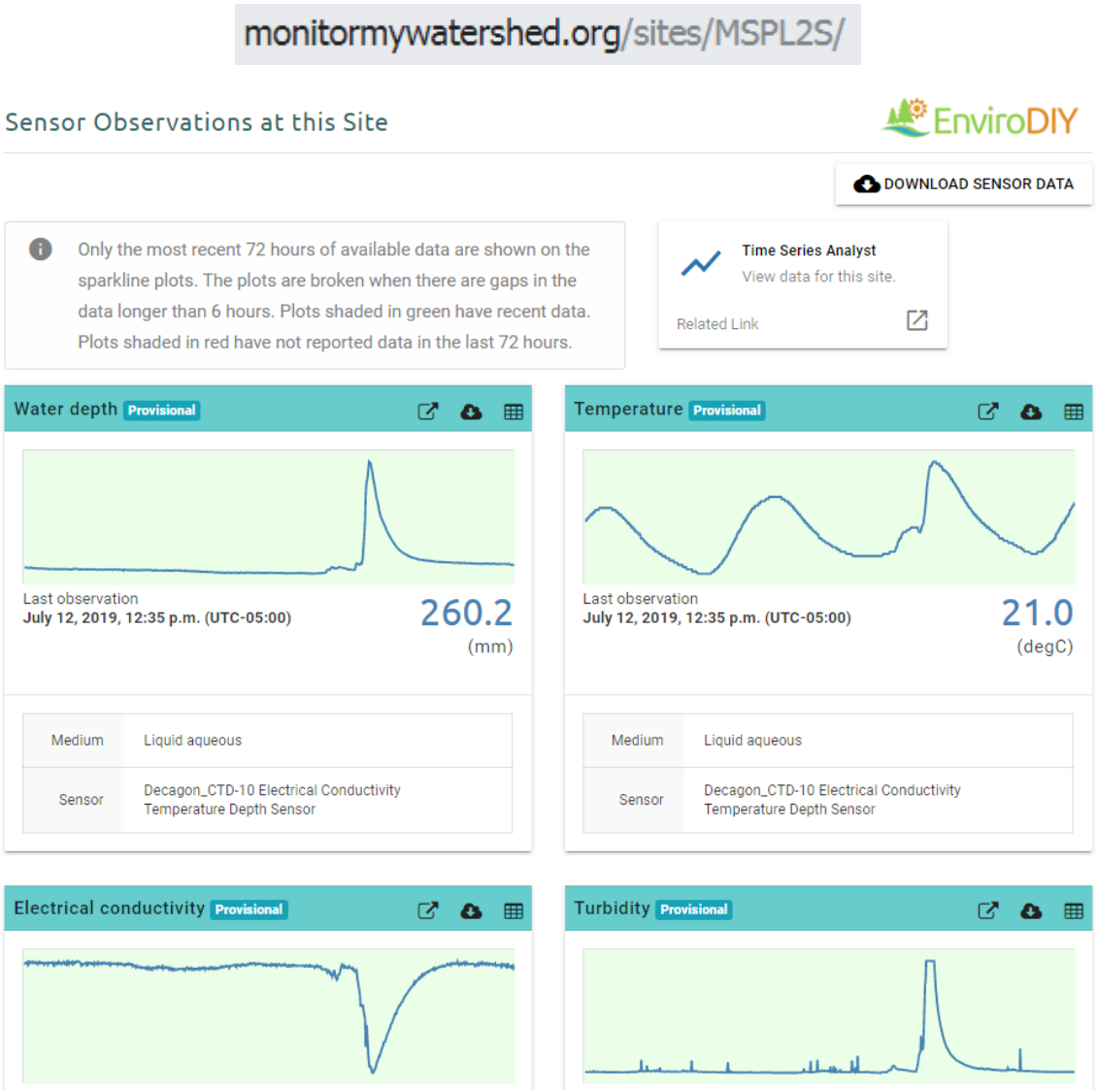
monitormywatershed.org/sites/MSPL2S/

Un-named Tributary to Plum Run (MSPL2S)

Deployment By	Karin Wulkowicz
Organization	Pennsylvania State University Extension - Master Watershed Steward Program
Registration Date	June 25, 2019, 8:52 p.m.
Deployment Date	June 26, 2019, 4 p.m.
Latitude	40.378635
Longitude	-76.012667
Elevation (m)	76.0
Elevation Datum	MSL
Site Type	Stream
Stream Name	-
Major Watershed	Delaware
Sub Basin	Plum Run
Closest Town	-
Notes	SL249 - Berks County Conservation District office

STROUD WATER RESEARCH CENTER

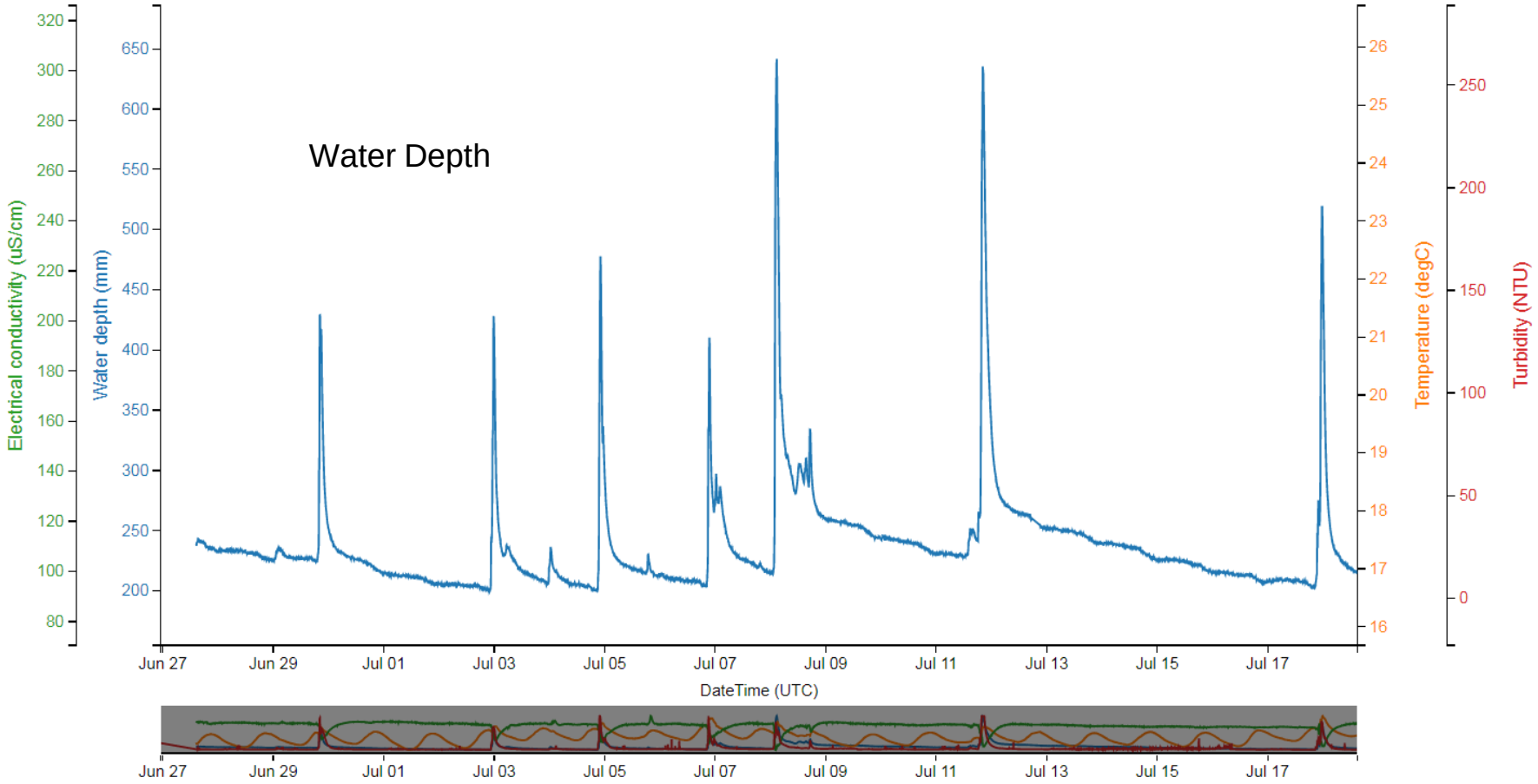
Monitor My Watershed – main data portal



STROUD WATER RESEARCH CENTER

Monitor My Watershed – main data portal

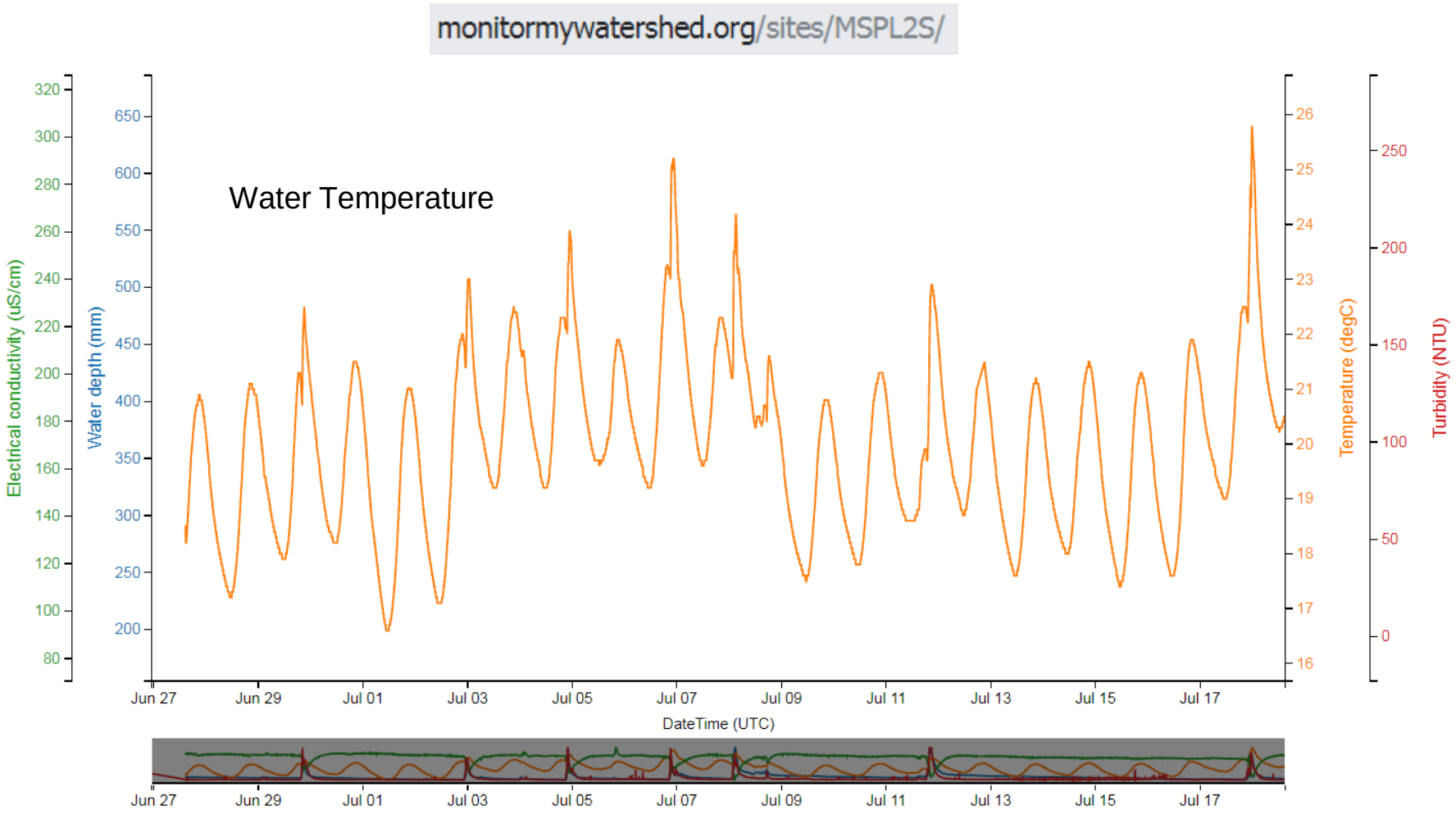
monitormywatershed.org/sites/MSPL2S/



Un-named Tributary to Plum Run (MSPL2S, SL249)

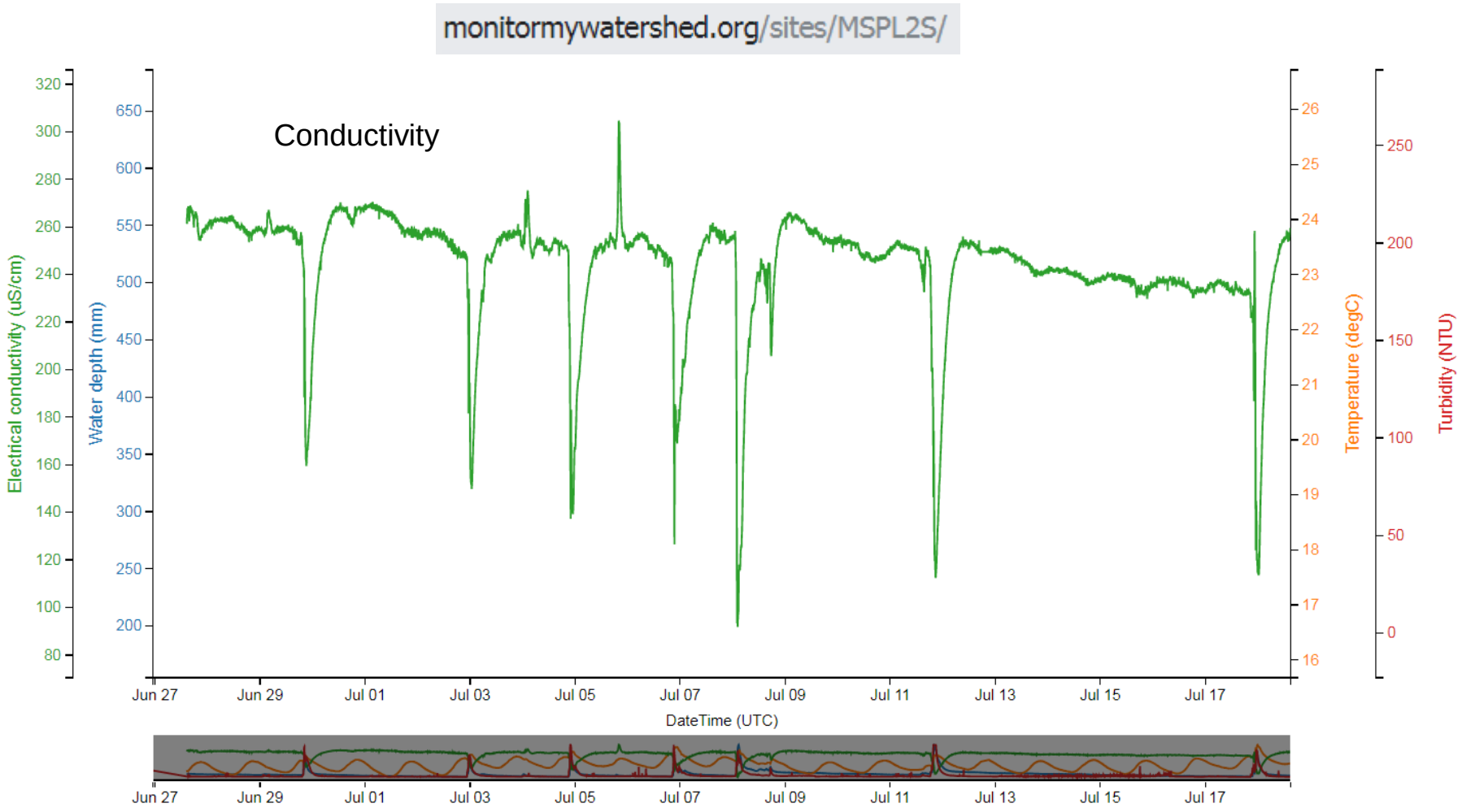
STROUD WATER RESEARCH CENTER

Monitor My Watershed – main data portal



STROUD WATER RESEARCH CENTER

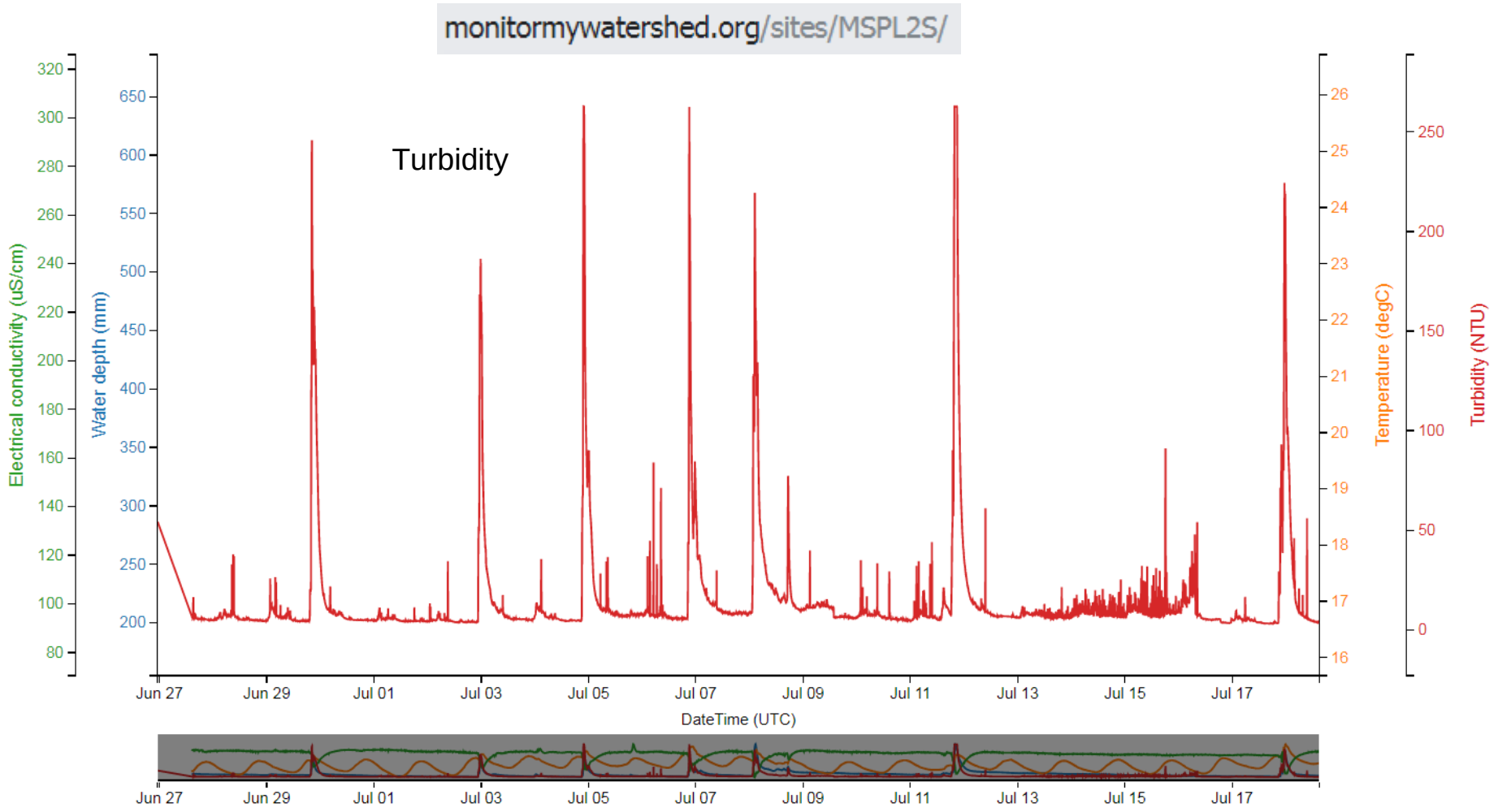
Monitor My Watershed – main data portal



Un-named Tributary to Plum Run (MSPL2S, SL249)

STROUD WATER RESEARCH CENTER

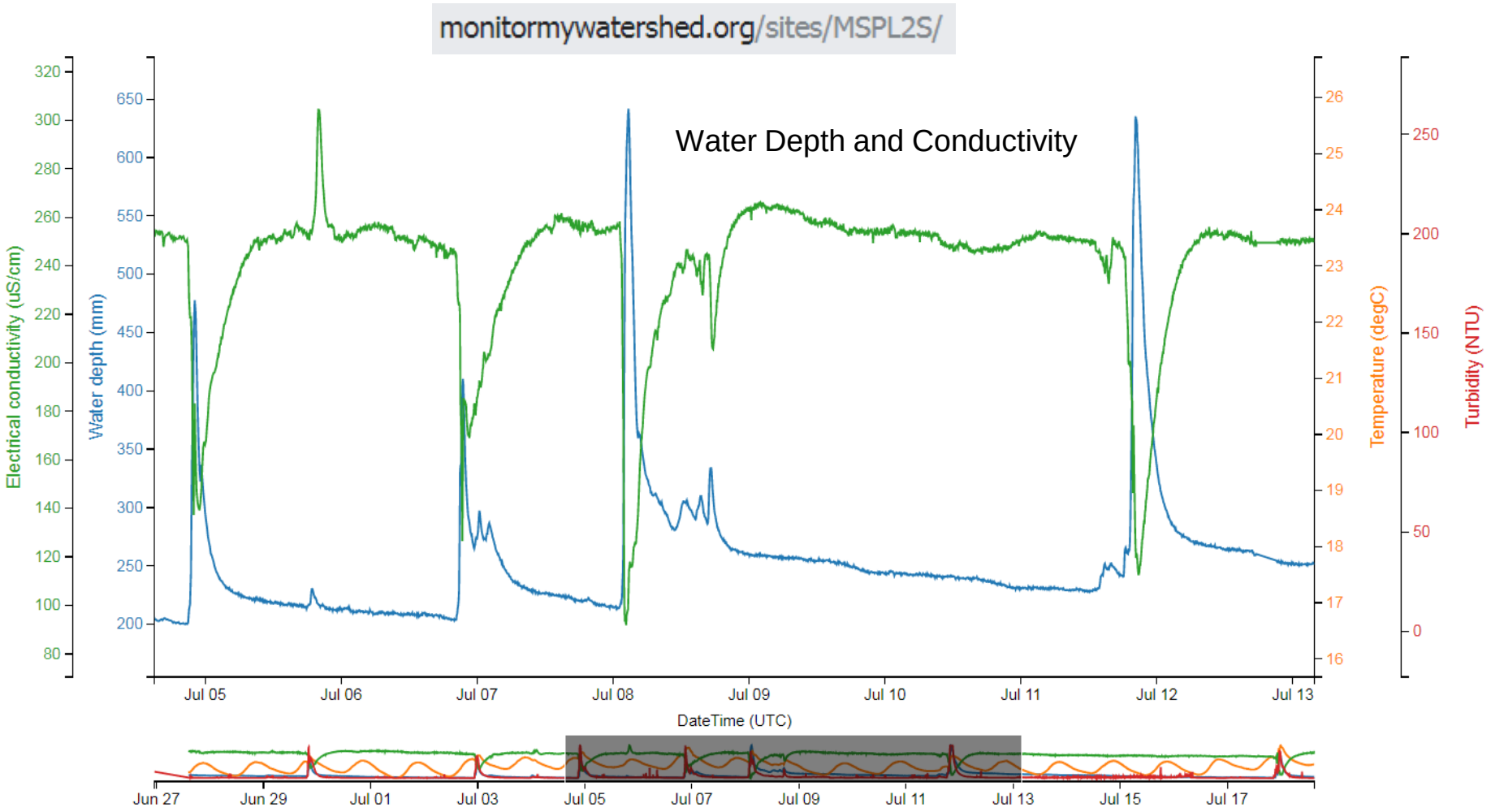
Monitor My Watershed – main data portal



Un-named Tributary to Plum Run (MSPL2S, SL249)

STROUD WATER RESEARCH CENTER

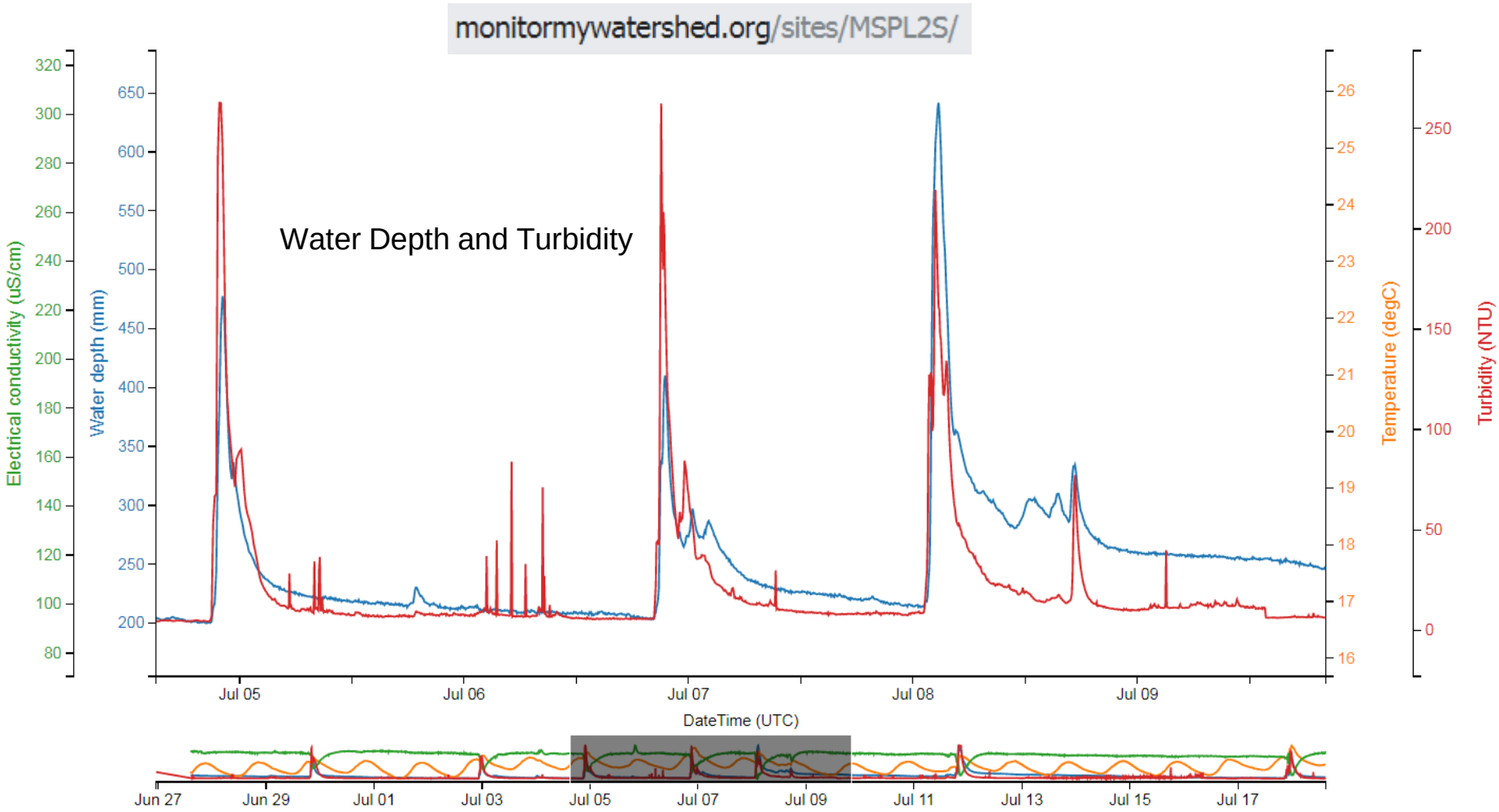
Monitor My Watershed – main data portal



Un-named Tributary to Plum Run (MSPL2S, SL249)

STROUD WATER RESEARCH CENTER

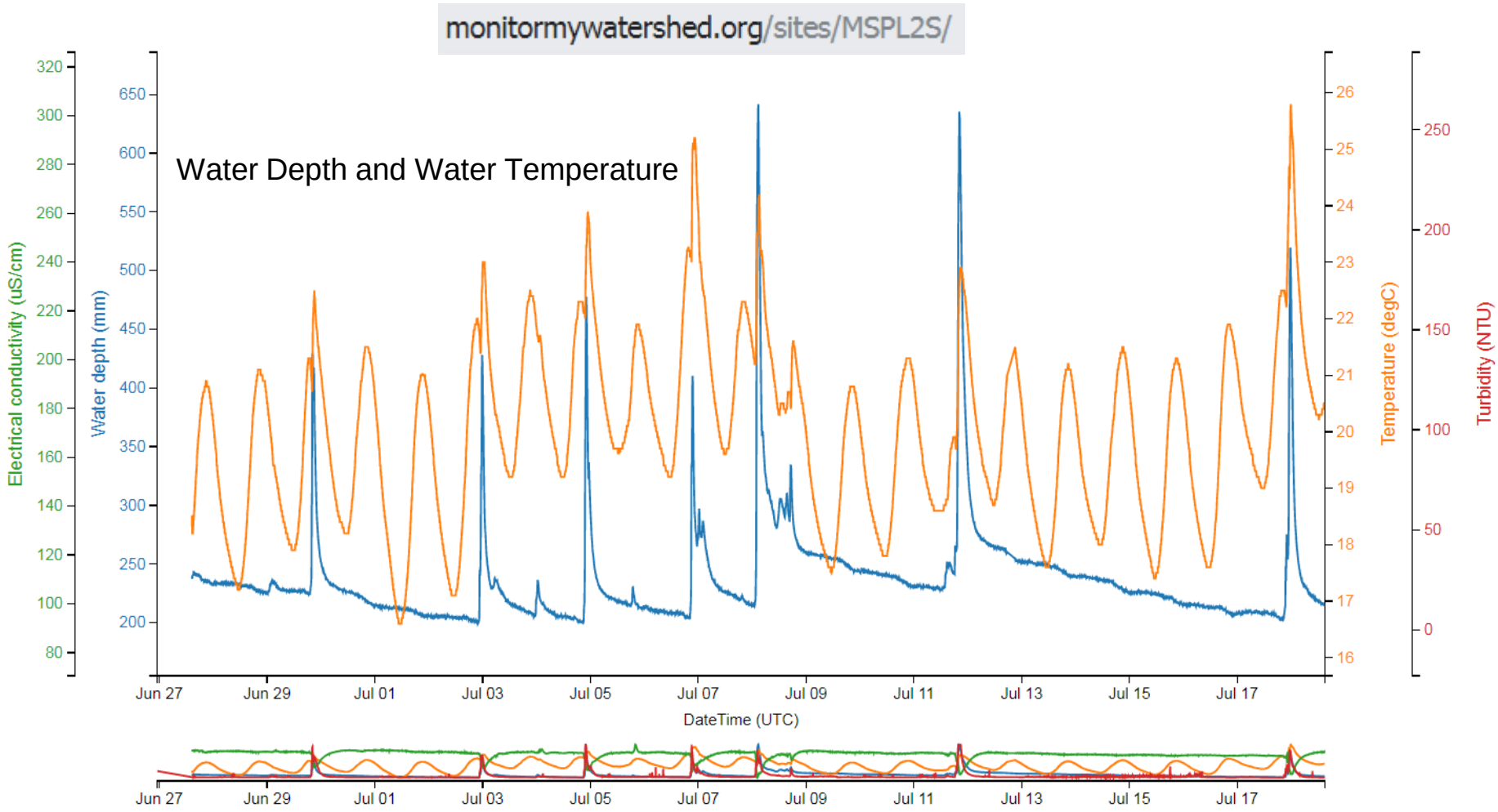
Monitor My Watershed – main data portal



Un-named Tributary to Plum Run (MSPL2S, SL249)

STROUD WATER RESEARCH CENTER

Monitor My Watershed – main data portal

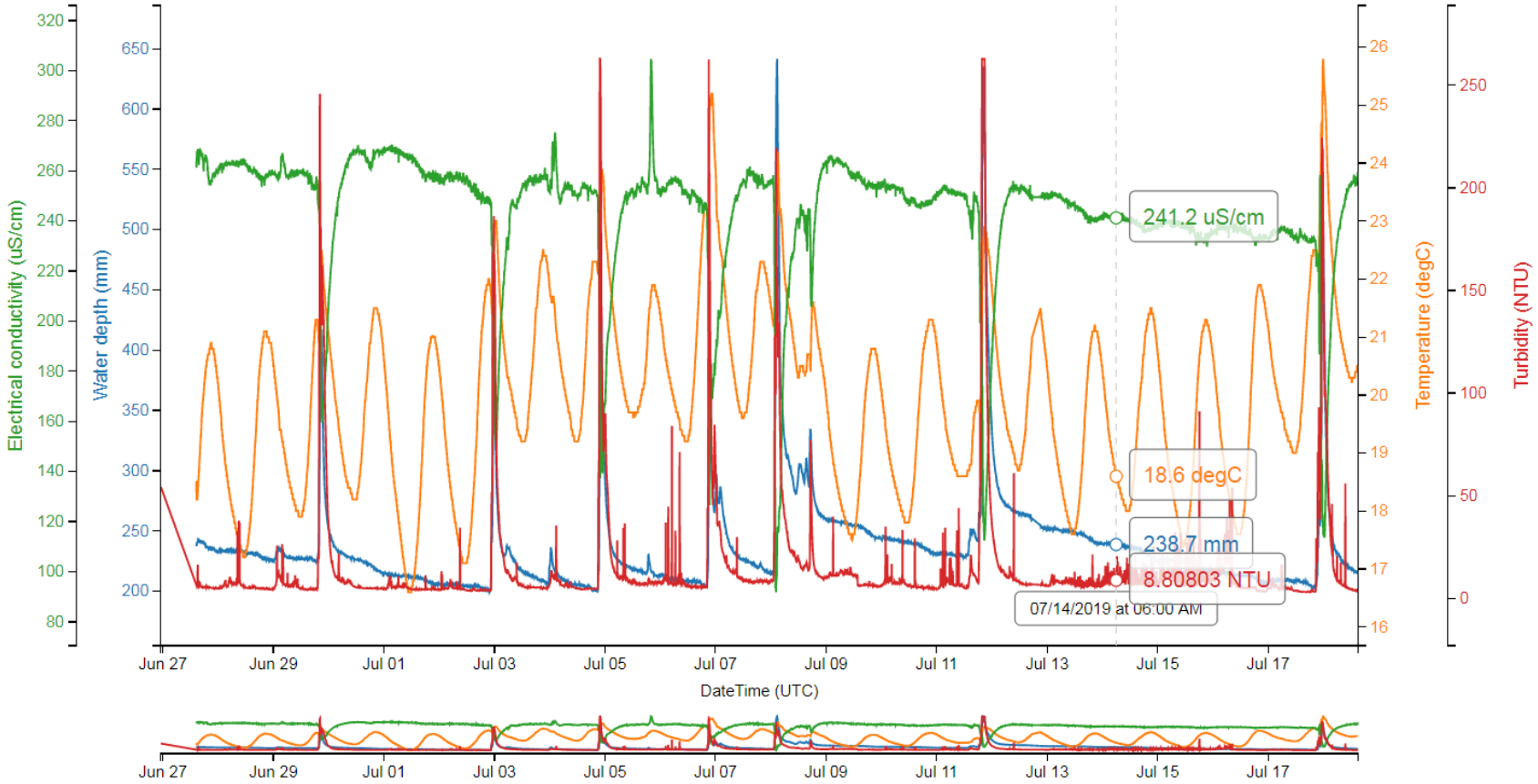


Un-named Tributary to Plum Run (MSPL2S, SL249)

STROUD WATER RESEARCH CENTER

Monitor My Watershed – main data portal

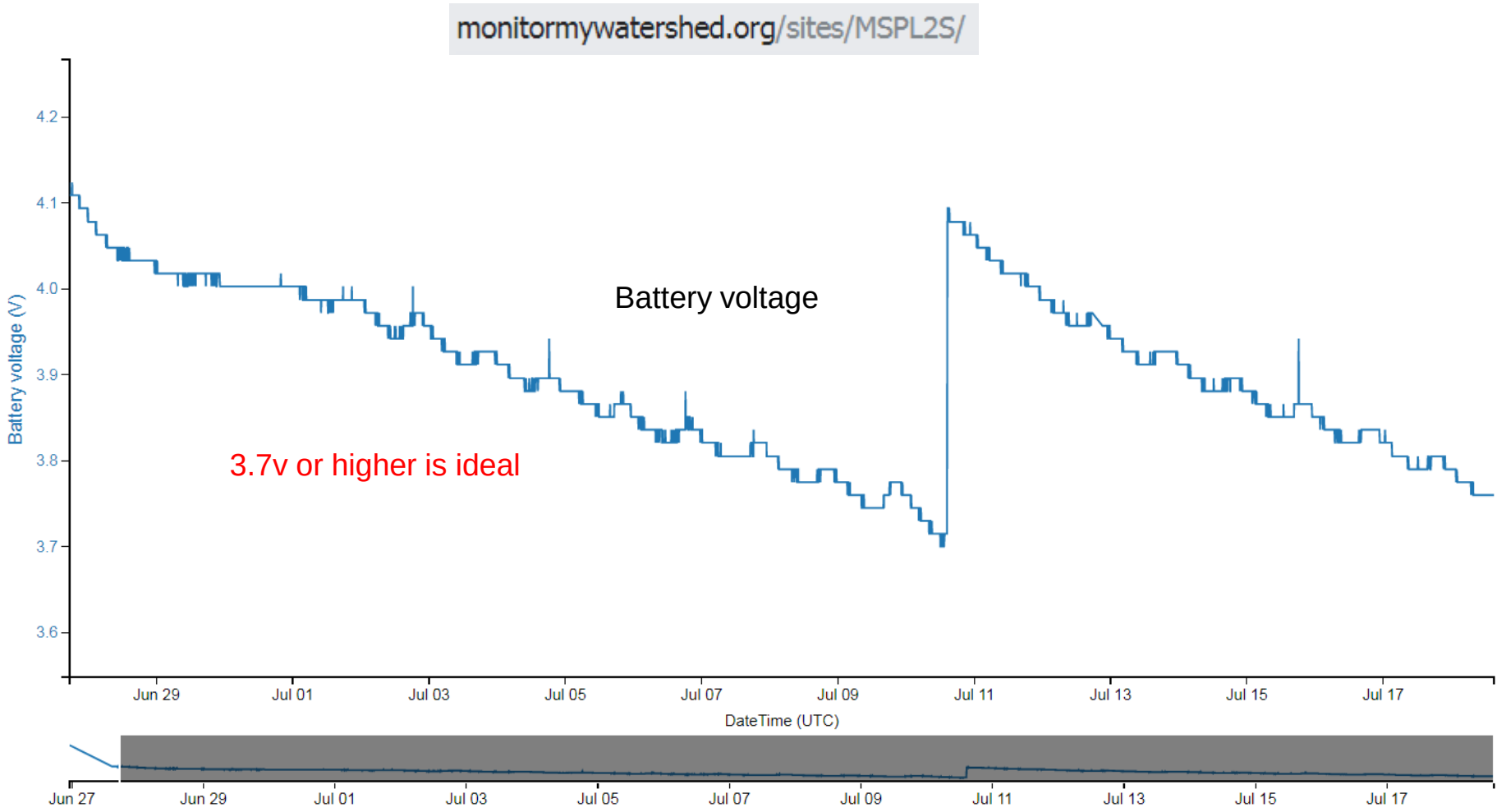
monitormywatershed.org/sites/MSPL2S/



Un-named Tributary to Plum Run (MSPL2S, SL249)

STROUD WATER RESEARCH CENTER

Monitor My Watershed – main data portal



Un-named Tributary to Plum Run (MSPL2S, SL249)

STROUD WATER RESEARCH CENTER

Drwisensors.dreamhosters.com – alternate data portal

drwisensors.dreamhosters.com/charts_main_SL191.php

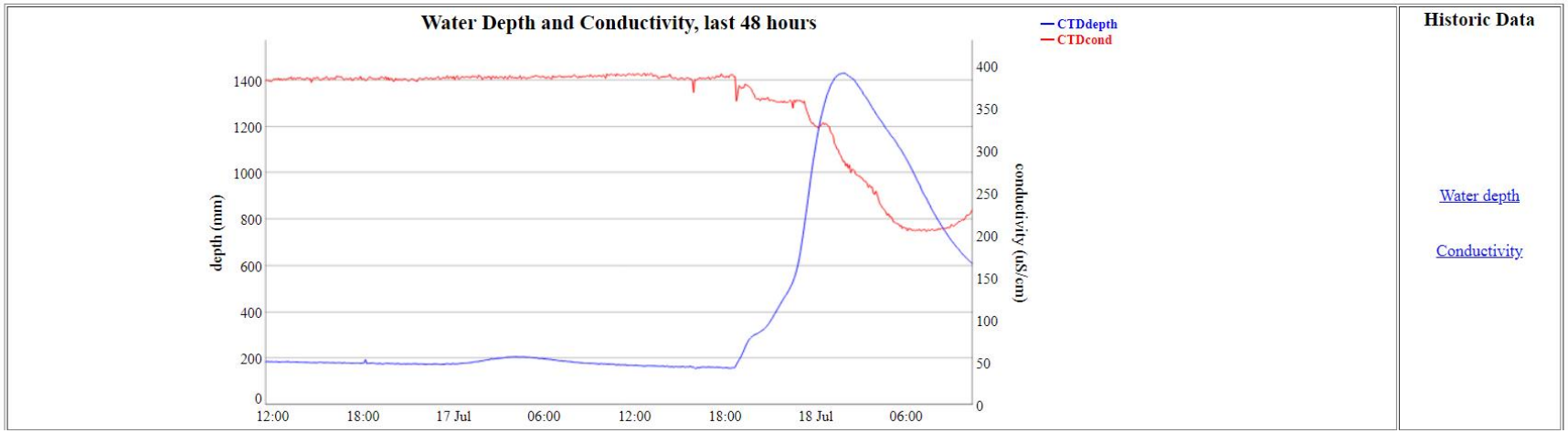
SL191 Turbidity/CTD Logger

This is data from logger SL191.
The logger is equipped with a Decagon CTD which measures water conductivity, temperature, and depth;
and a Campbell Scientific OBS3+ which measures turbidity in two ranges.

Show all data in the database as table or as CSV text
Get raw CSV text file

Latest readings:

At 2019-07-18 10:25:43 EST:
CTD Depth= 609.7mm, CTD Temp= 24.3 degreesC, CTD Conductivity= 231 uS/cm
Turbidity Low= 29.7 NTU, Turbidity High= 30.7 NTU, Board Temp= 27.5 degreesC; Battery= 4.06 volts



Historic Data

Water depth

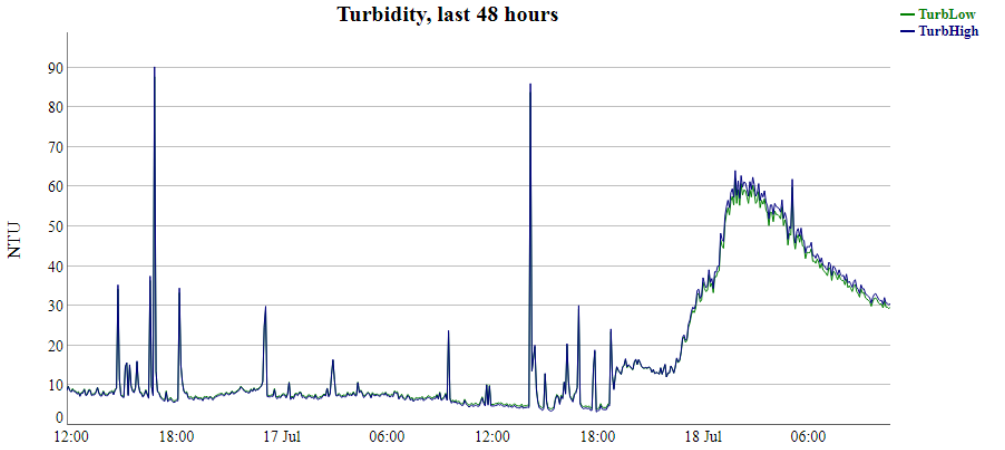
Conductivity

Schuylkill River at Towpath Park, Pottstown (MSSR2S, SL191)

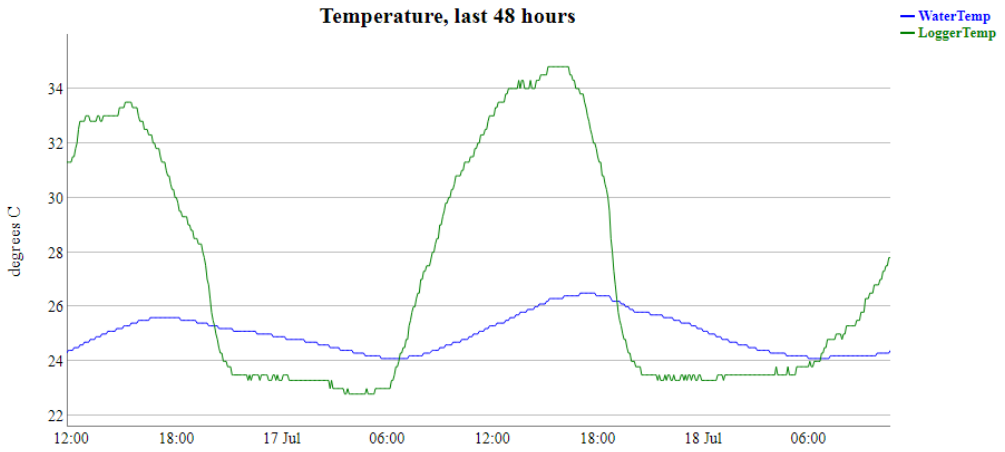
STROUD WATER RESEARCH CENTER

Drwisensors.dreamhosters.com – alternate data portal

drwisensors.dreamhosters.com/charts_main_SL191.php



Turbidity



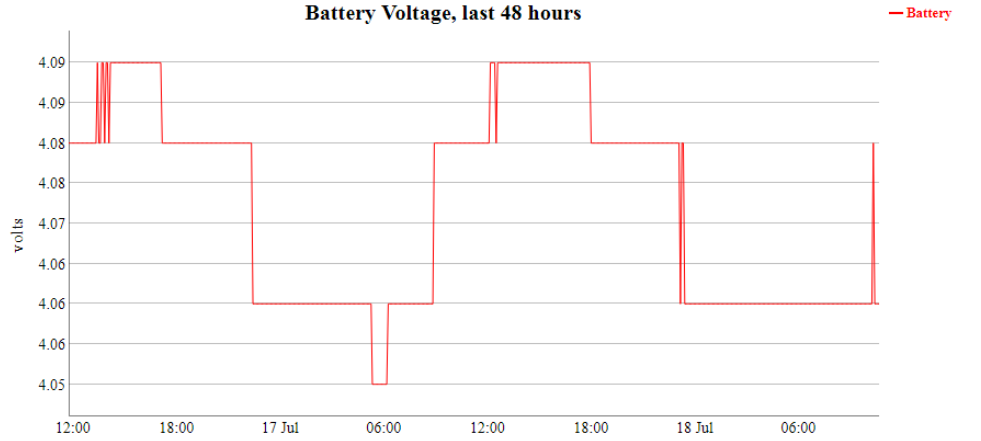
Temperatures

Schuylkill River at Towpath Park, Pottstown (MSSR2S, SL191)

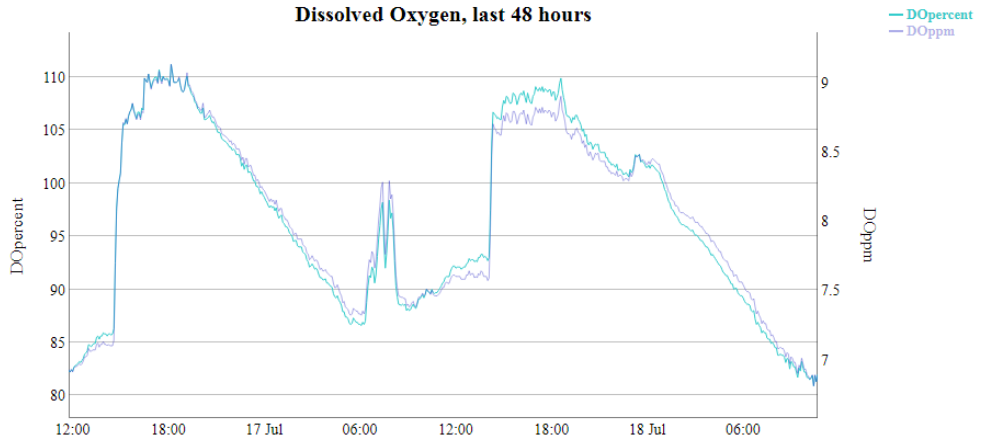
STROUD WATER RESEARCH CENTER

Drwisensors.dreamhosters.com – alternate data portal

drwisensors.dreamhosters.com/charts_main_SL191.php



Battery volts



Oxygen

Schuylkill River at Towpath Park, Pottstown (MSSR2S, SL191)

STROUD WATER RESEARCH CENTER

Resources

- **Data and data visualization**
  - Monitor My Watershed **(**http://monitormywatershed.org/)
  - http://drwisensors.dreamhosters.com/
- **Guidance**
  - **Maintenance Quick Guide**
  - **QC Quick Guide**
  - Field Visit Data Sheet tutorial
  - DRWI operation manual, https://docs.google.com/document/d/17iWKFOjD6tSFT6-a5mItXlgO8uhXjsA_voGDVRxEBTI/edit?usp=sharing
  - Comprehensive manual, https://www.envirodiy.org/mayfly-sensor-station-manual/
- **Other**
  - Delaware Basin Sensor Stations online group (private group via https://wikiwatershed.org/)
  - Presentations, videos, workshop materials: https://wikiwatershed.org/drwi/ (pass: drwi)
  - EnviroDIY (https://www.envirodiy.org/)

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Important Field Work

- **Maintenance –** ***every two weeks, at minimum once a month***
  - 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, or more frequently if needed***
  - Clean sensors
  - QC Depth
  - QC Chemistry
  - Swap SD cards (data download)
  - Enter data online - https://wikiwatershed.org/drwi/; pass: drwi

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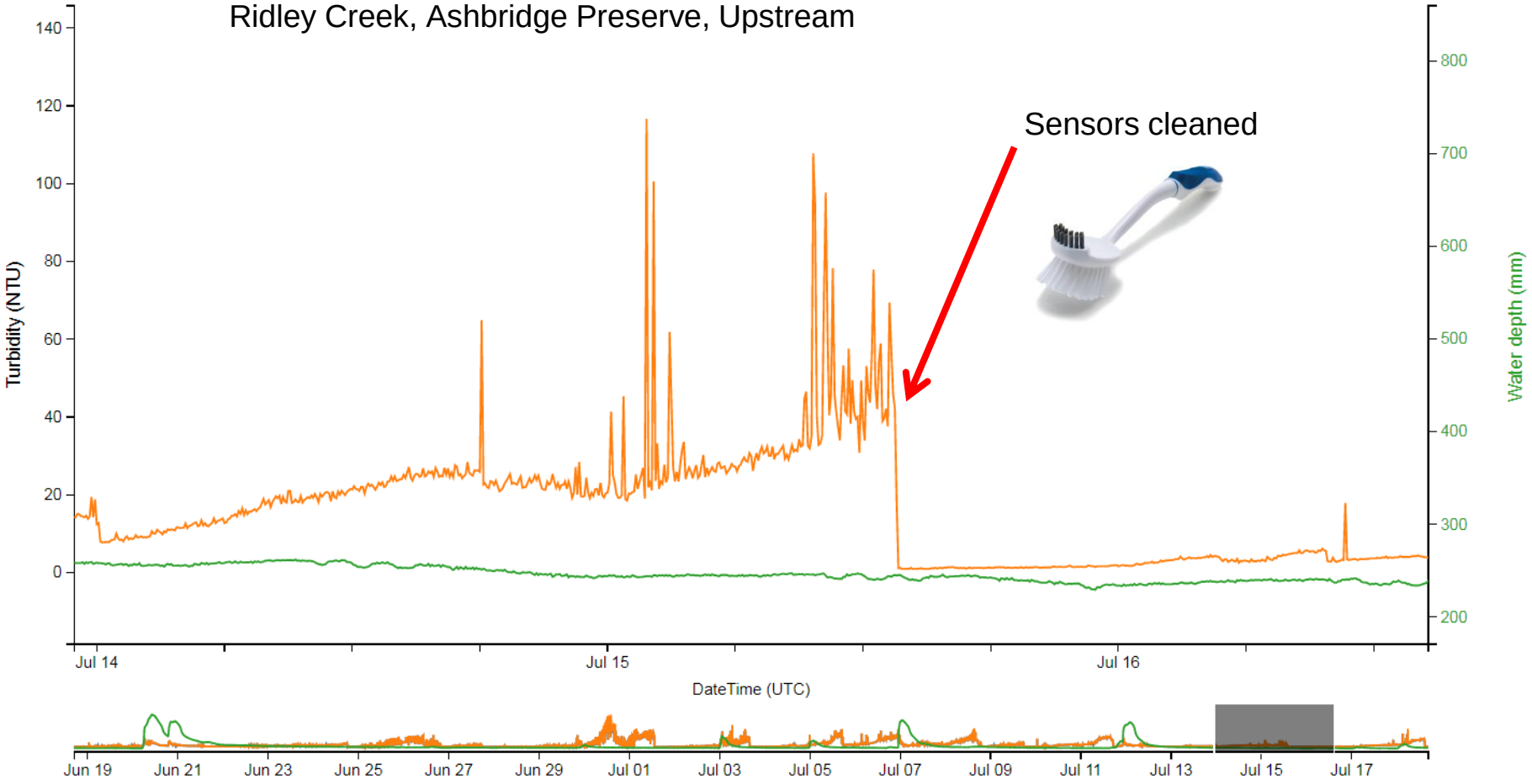
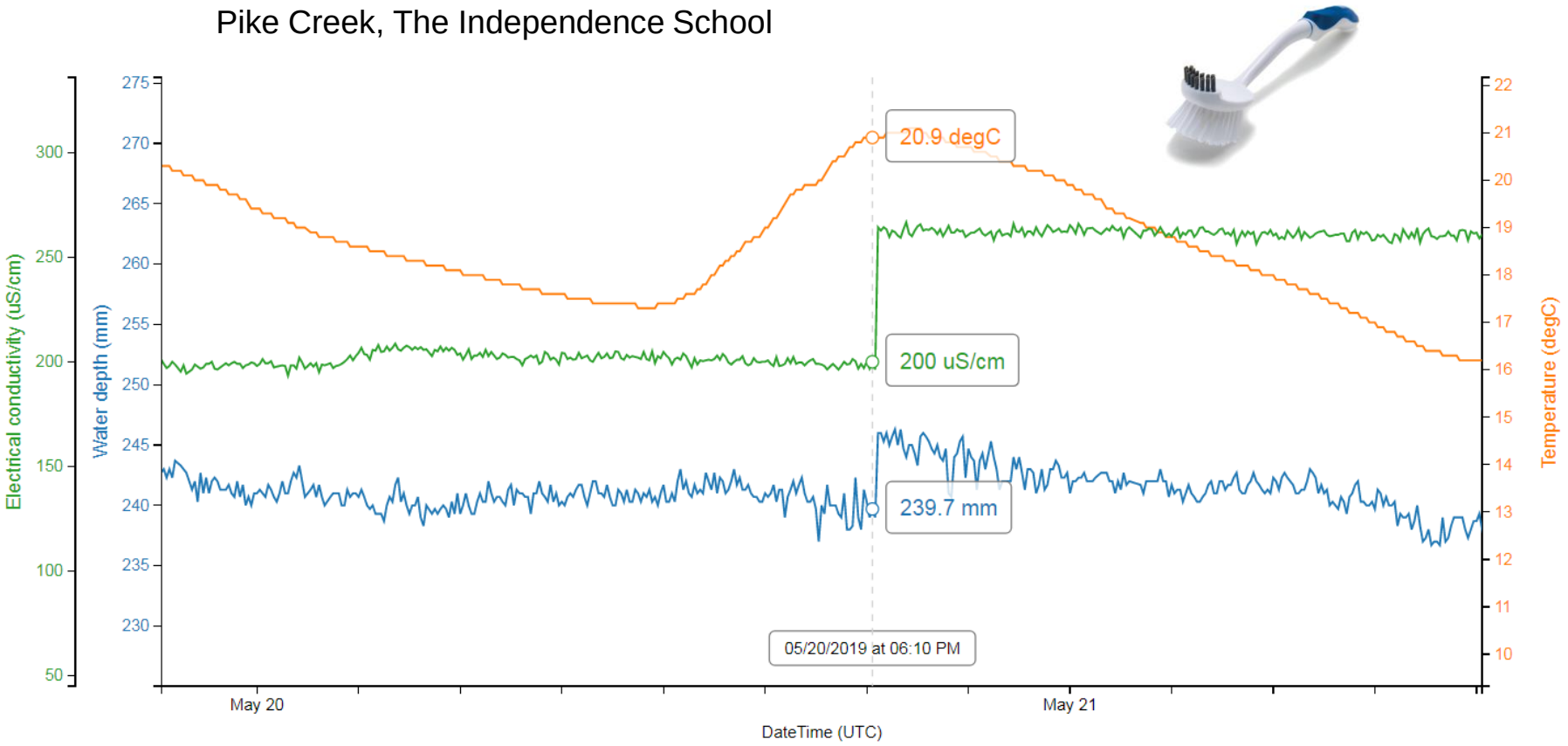
Importance of sensor cleaning and QC



STROUD WATER RESEARCH CENTER

Importance of sensor cleaning and QC

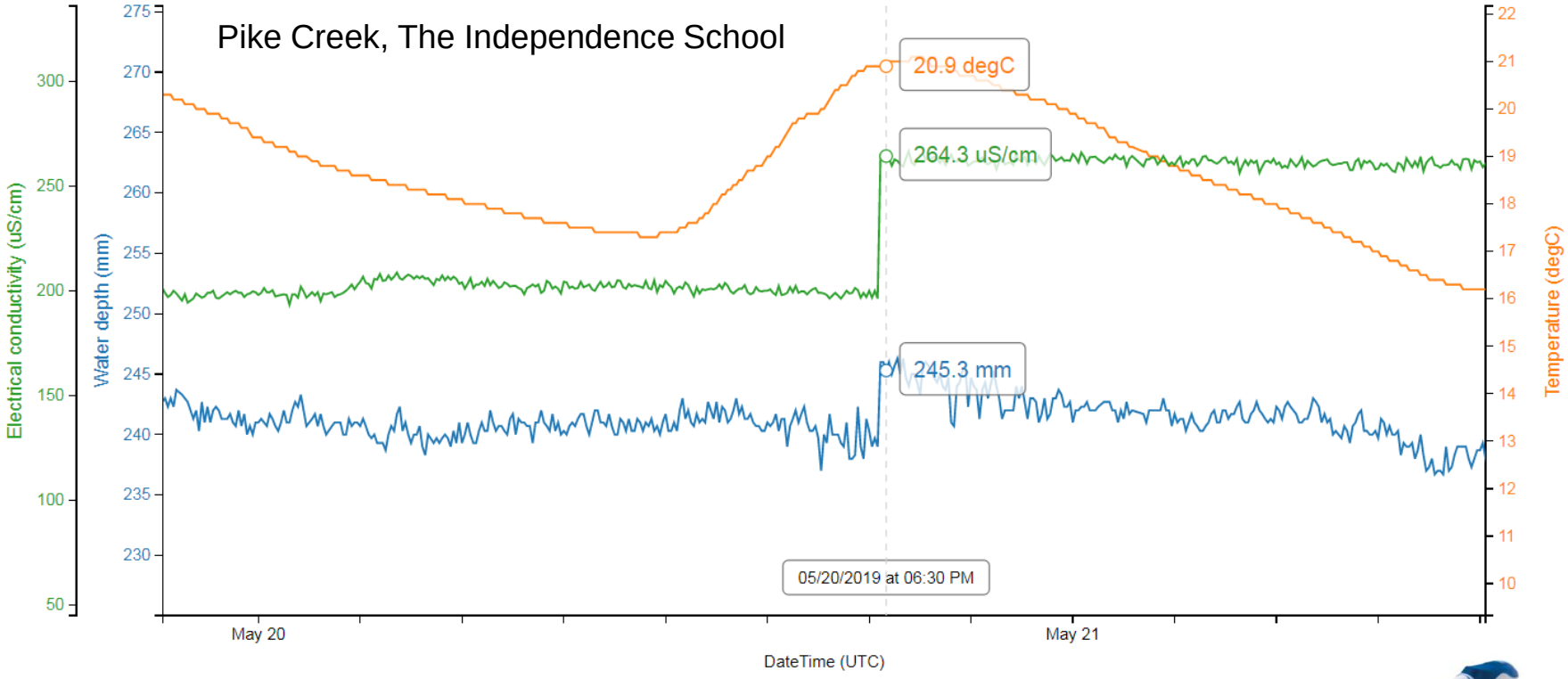
Pike Creek, The Independence School



Conductivity, temperature and depth readings *before* cleaning

STROUD WATER RESEARCH CENTER

Importance of sensor cleaning and QC

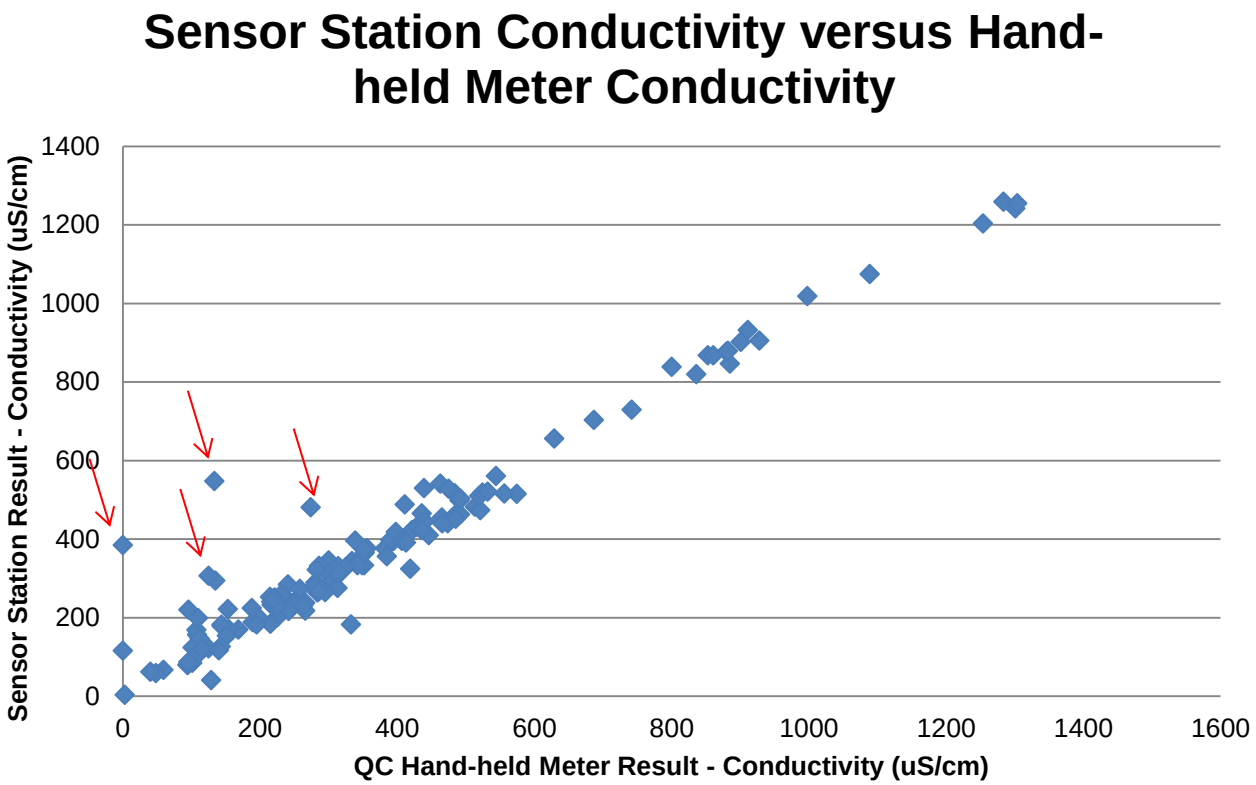


Conductivity, temperature and depth readings *after* cleaning

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

STROUD WATER RESEARCH CENTER

Importance of sensor cleaning and QC



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Quick Guides

- Review the Quick Guides
  - Maintenance Quick Guide
  - Quality Control Quick Guide

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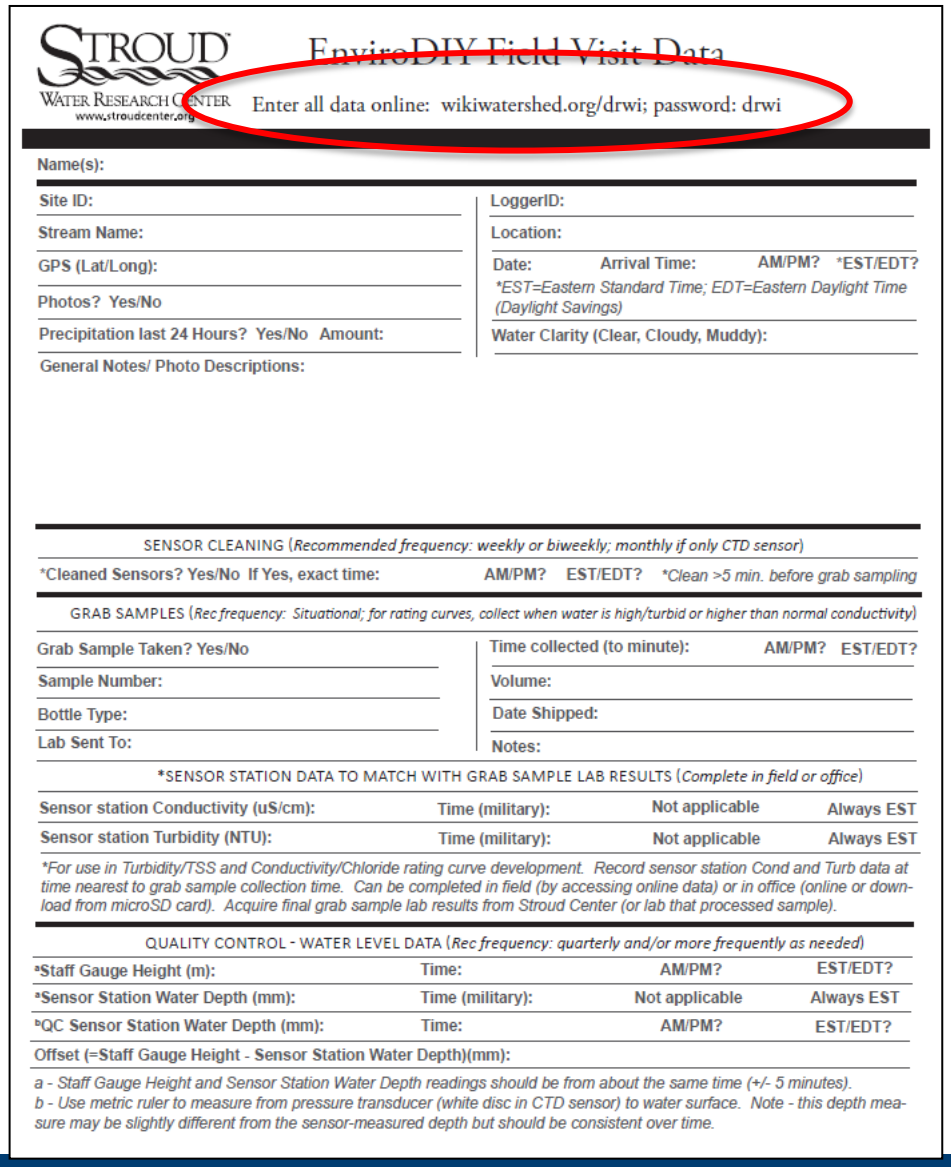
Data entry: Wikiwatershed.org/drwi



STROUD WATER RESEARCH CENTER
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?
Photos? Yes/No	*EST=Eastern Standard Time; EDT=Eastern Daylight Time (Daylight Savings)
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*)

*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*)

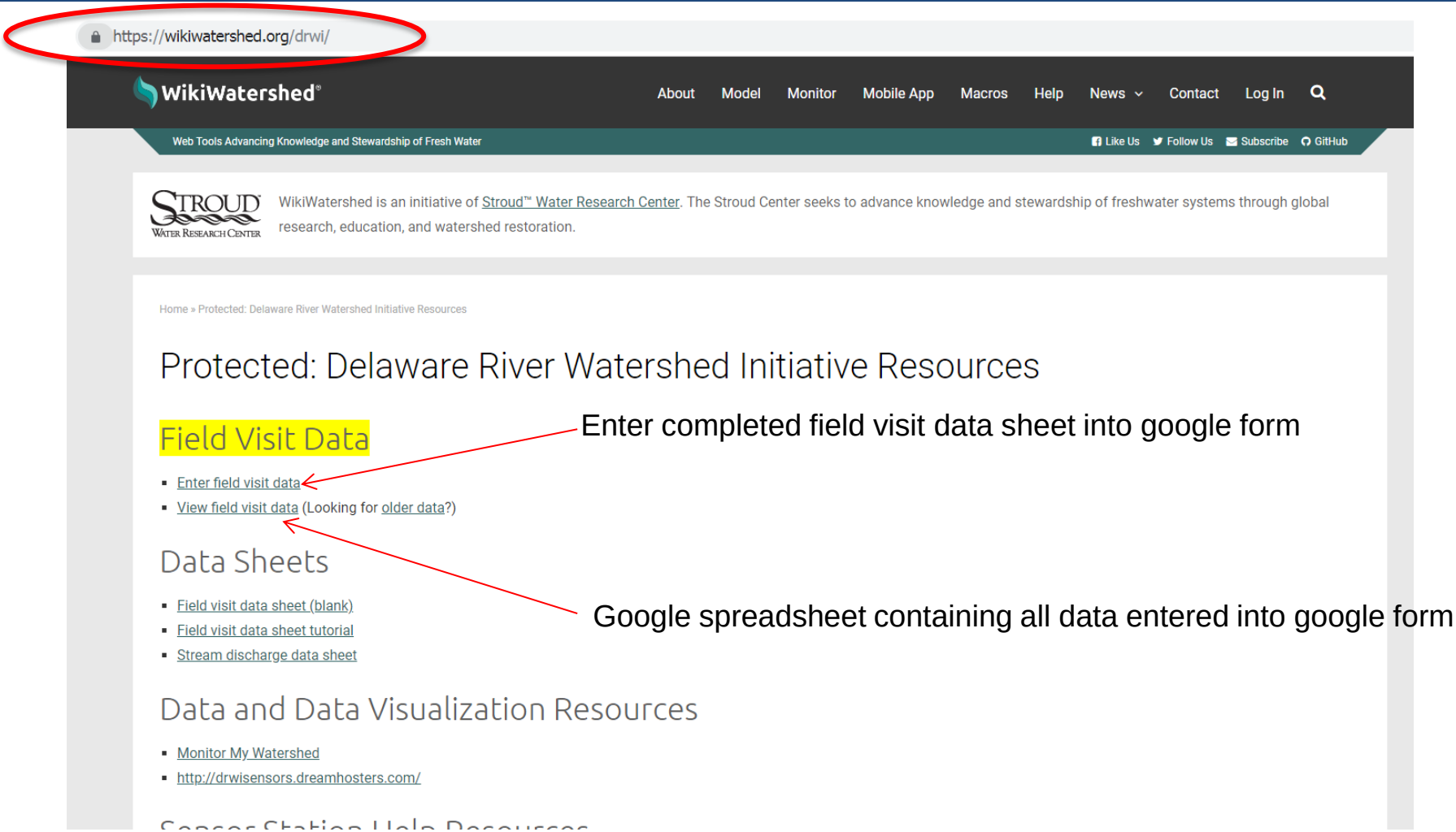
[a]Staff Gauge Height (m):	Time:	AM/PM?	EST/EDT?
[a]Sensor Station Water Depth (mm):	Time (military):	Not applicable	Always EST
[b]QC Sensor Station Water Depth (mm):	Time:	AM/PM?	EST/EDT?

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.

STROUD WATER RESEARCH CENTER

Data entry: Wikiwatershed.org/drwi



Enter completed field visit data sheet into google form

Google spreadsheet containing all data entered into google form

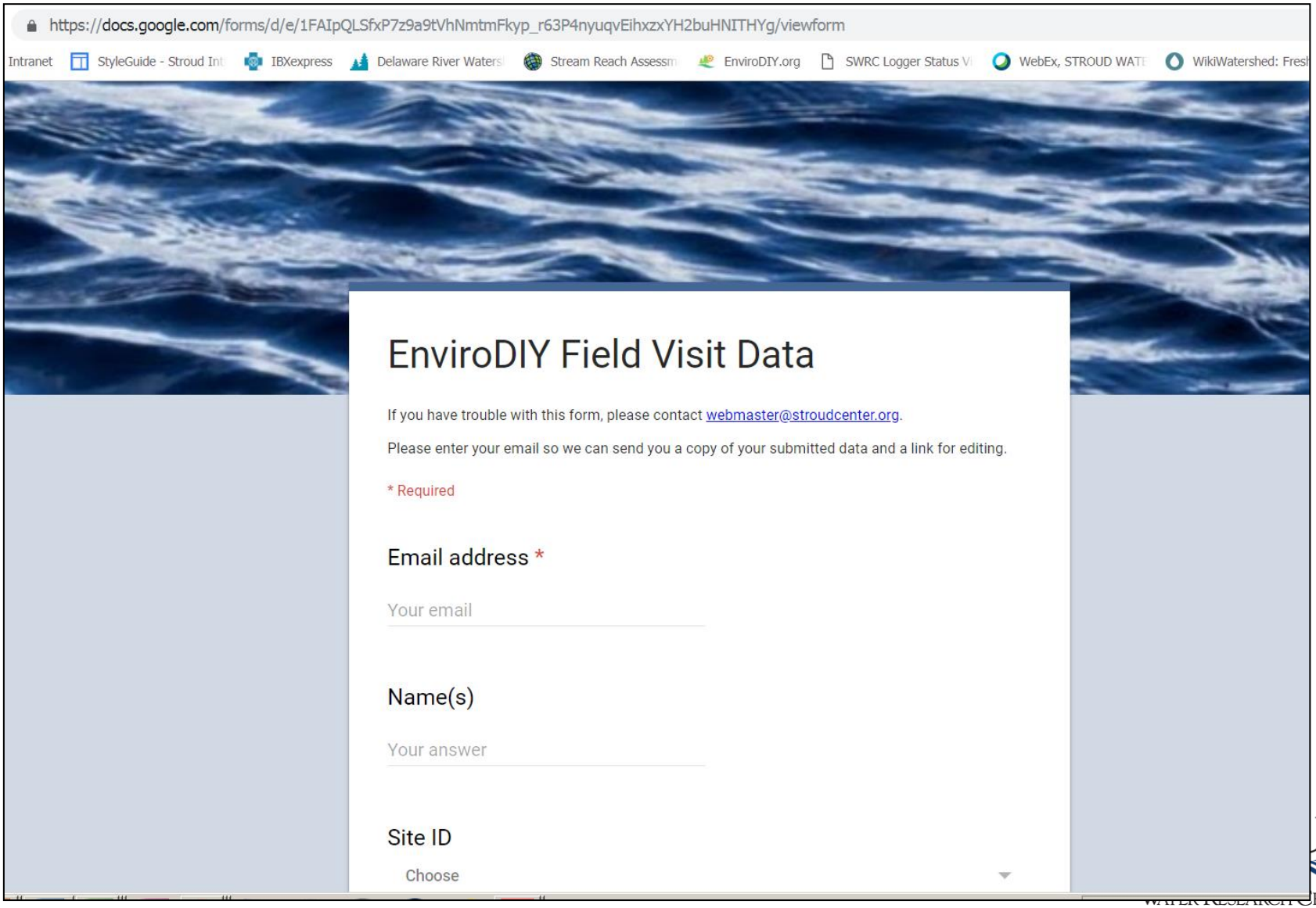
STROUD WATER RESEARCH CENTER

Data entry: Wikiwatershed.org/drwi

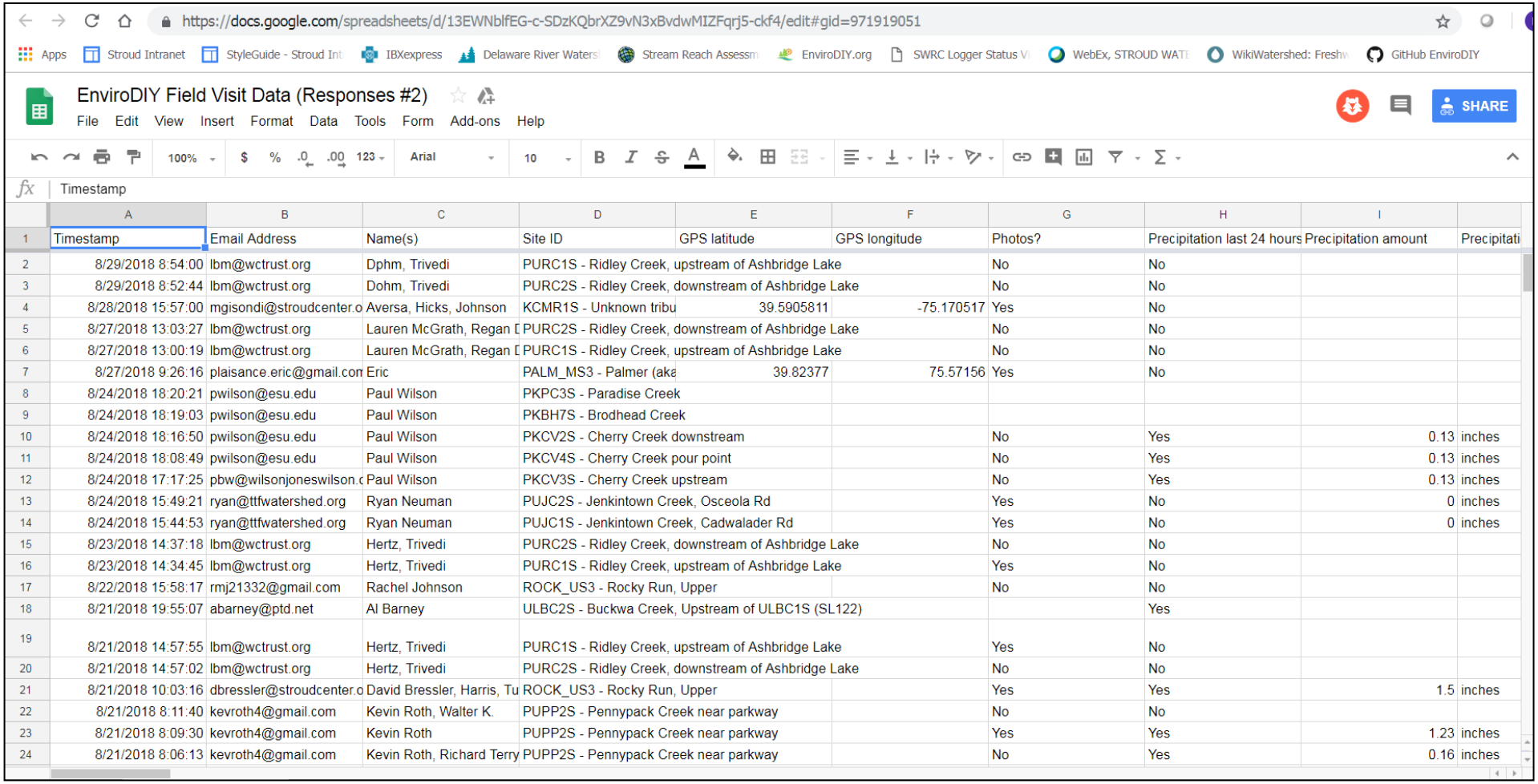
- TEST CHERRY VALLEY - PKCV2S, Cherry Creek Downstream
- TEST CHERRY VALLEY - PKCV3S, Cherry Creek Upstream

STROUD WATER RESEARCH CENTER

Wikiwatershed.org/drwi – google form



Wikiwatershed.org/drwi – google summary spreadsheet



https://docs.google.com/spreadsheets/d/13EWNblfEG-c-SDzKQbrXZ9vN3xBvdwMIZFqrj5-ckf4/edit#gid=971919051

Apps | Stroud Intranet | StyleGuide - Stroud Int | IBXexpress | Delaware River Waters | Stream Reach Assessm | EnviroDIY.org | SWRC Logger Status Vi | WebEx, STROUD WATE | WikiWatershed: Freshw | GitHub EnviroDIY

EnviroDIY Field Visit Data (Responses #2)

File Edit View Insert Format Data Tools Form Add-ons Help

SHARE

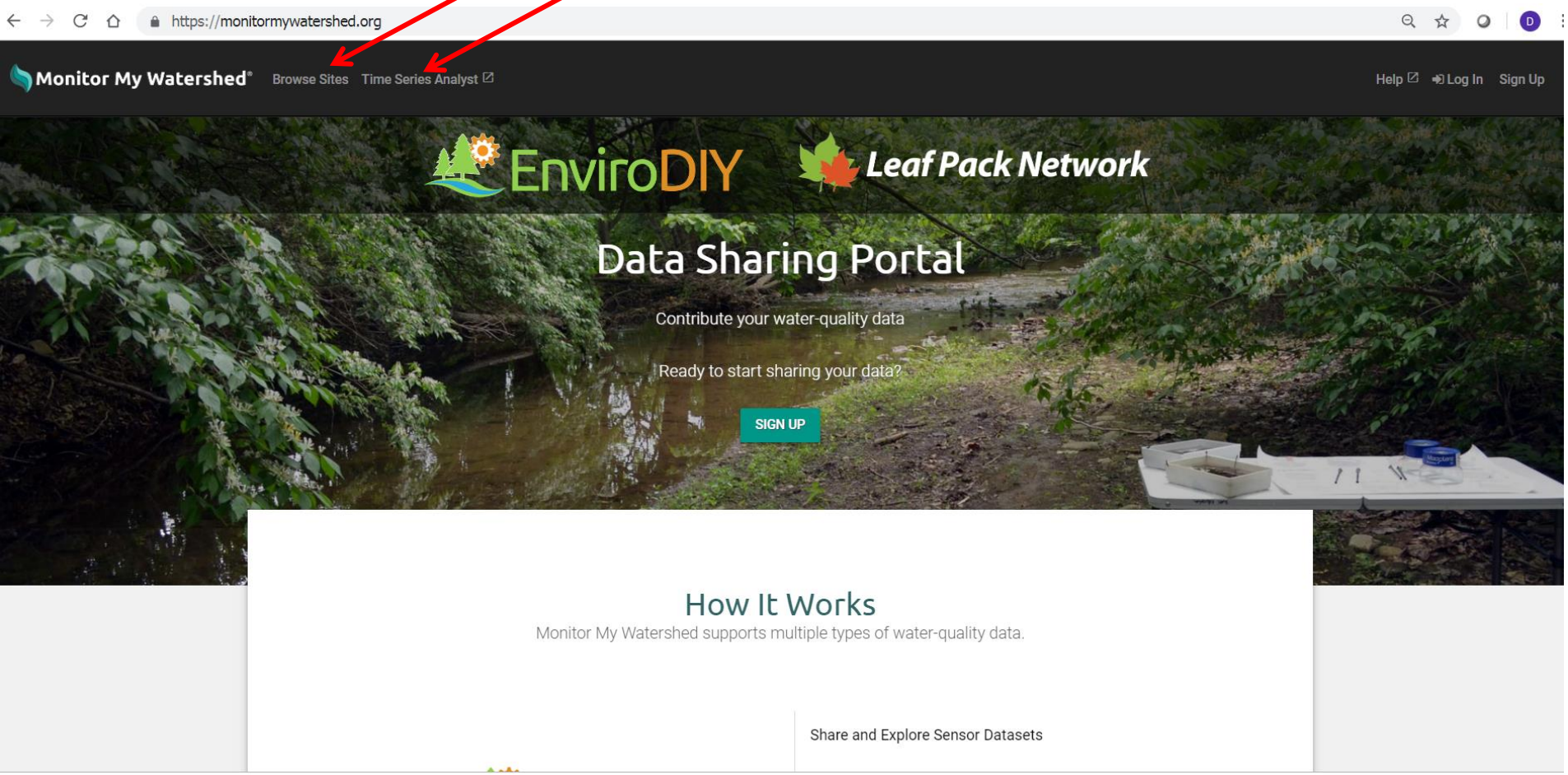
Timestamp

	A	B	C	D	E	F	G	H	I	
1	Timestamp	Email Address	Name(s)	Site ID	GPS latitude	GPS longitude	Photos?	Precipitation last 24 hours	Precipitation amount	Precipitati
2	8/29/2018 8:54:00	lbm@wctrust.org	Dphm, Trivedi	PURC1S - Ridley Creek, upstream of Ashbridge Lake			No	No		
3	8/29/2018 8:52:44	lbm@wctrust.org	Dohm, Trivedi	PURC2S - Ridley Creek, downstream of Ashbridge Lake			No	No		
4	8/28/2018 15:57:00	mgisondi@stroudcenter.o	Aversa, Hicks, Johnson	KCMR1S - Unknown tribu	39.5905811	-75.170517	Yes	No		
5	8/27/2018 13:03:27	lbm@wctrust.org	Lauren McGrath, Regan [	PURC2S - Ridley Creek, downstream of Ashbridge Lake			No	No		
6	8/27/2018 13:00:19	lbm@wctrust.org	Lauren McGrath, Regan [	PURC1S - Ridley Creek, upstream of Ashbridge Lake			No	No		
7	8/27/2018 9:26:16	plaisance.eric@gmail.com	Eric	PALM_MS3 - Palmer (aka	39.82377	75.57156	Yes	No		
8	8/24/2018 18:20:21	pwilson@esu.edu	Paul Wilson	PKPC3S - Paradise Creek						
9	8/24/2018 18:19:03	pwilson@esu.edu	Paul Wilson	PKBH7S - Brodhead Creek						
10	8/24/2018 18:16:50	pwilson@esu.edu	Paul Wilson	PKCV2S - Cherry Creek downstream			No	Yes	0.13	inches
11	8/24/2018 18:08:49	pwilson@esu.edu	Paul Wilson	PKCV4S - Cherry Creek pour point			No	Yes	0.13	inches
12	8/24/2018 17:17:25	pbw@wilsonjoneswilson.c	Paul Wilson	PKCV3S - Cherry Creek upstream			No	Yes	0.13	inches
13	8/24/2018 15:49:21	ryan@ttfwatershed.org	Ryan Neuman	PUJC2S - Jenkintown Creek, Osceola Rd			Yes	No	0	inches
14	8/24/2018 15:44:53	ryan@ttfwatershed.org	Ryan Neuman	PUJC1S - Jenkintown Creek, Cadwalader Rd			Yes	No	0	inches
15	8/23/2018 14:37:18	lbm@wctrust.org	Hertz, Trivedi	PURC2S - Ridley Creek, downstream of Ashbridge Lake			No	No		
16	8/23/2018 14:34:45	lbm@wctrust.org	Hertz, Trivedi	PURC1S - Ridley Creek, upstream of Ashbridge Lake			Yes	No		
17	8/22/2018 15:58:17	rmj21332@gmail.com	Rachel Johnson	ROCK_US3 - Rocky Run, Upper			No	No		
18	8/21/2018 19:55:07	abarney@ptd.net	Al Barney	ULBC2S - Buckwa Creek, Upstream of ULBC1S (SL122)				Yes		
19	8/21/2018 14:57:55	lbm@wctrust.org	Hertz, Trivedi	PURC1S - Ridley Creek, upstream of Ashbridge Lake			Yes	No		
20	8/21/2018 14:57:02	lbm@wctrust.org	Hertz, Trivedi	PURC2S - Ridley Creek, downstream of Ashbridge Lake			No	No		
21	8/21/2018 10:03:16	dbressler@stroudcenter.o	David Bressler, Harris, Tu	ROCK_US3 - Rocky Run, Upper			Yes	Yes	1.5	inches
22	8/21/2018 8:11:40	kevroth4@gmail.com	Kevin Roth, Walter K.	PUPP2S - Pennypack Creek near parkway			No	No		
23	8/21/2018 8:09:30	kevroth4@gmail.com	Kevin Roth	PUPP2S - Pennypack Creek near parkway			Yes	Yes	1.23	inches
24	8/21/2018 8:06:13	kevroth4@gmail.com	Kevin Roth, Richard Terry	PUPP2S - Pennypack Creek near parkway			No	Yes	0.16	inches

STROUD WATER RESEARCH CENTER

Monitor My Watershed

Access data via either of these

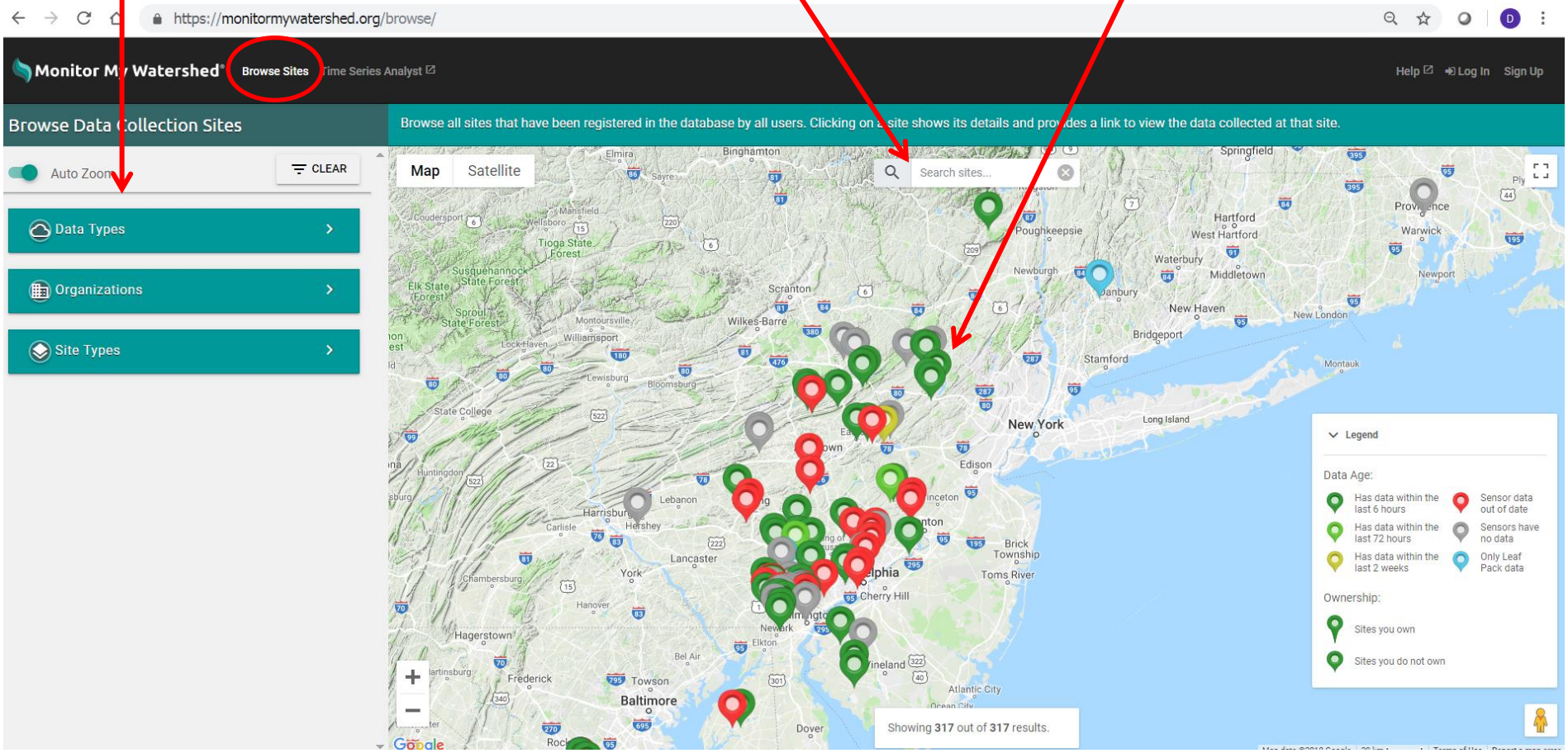


Monitor My Watershed

Search via data types, organizations (station owner), or site type on a site to access that site's data

Or Search for sites based on stream name, SiteID, etc.

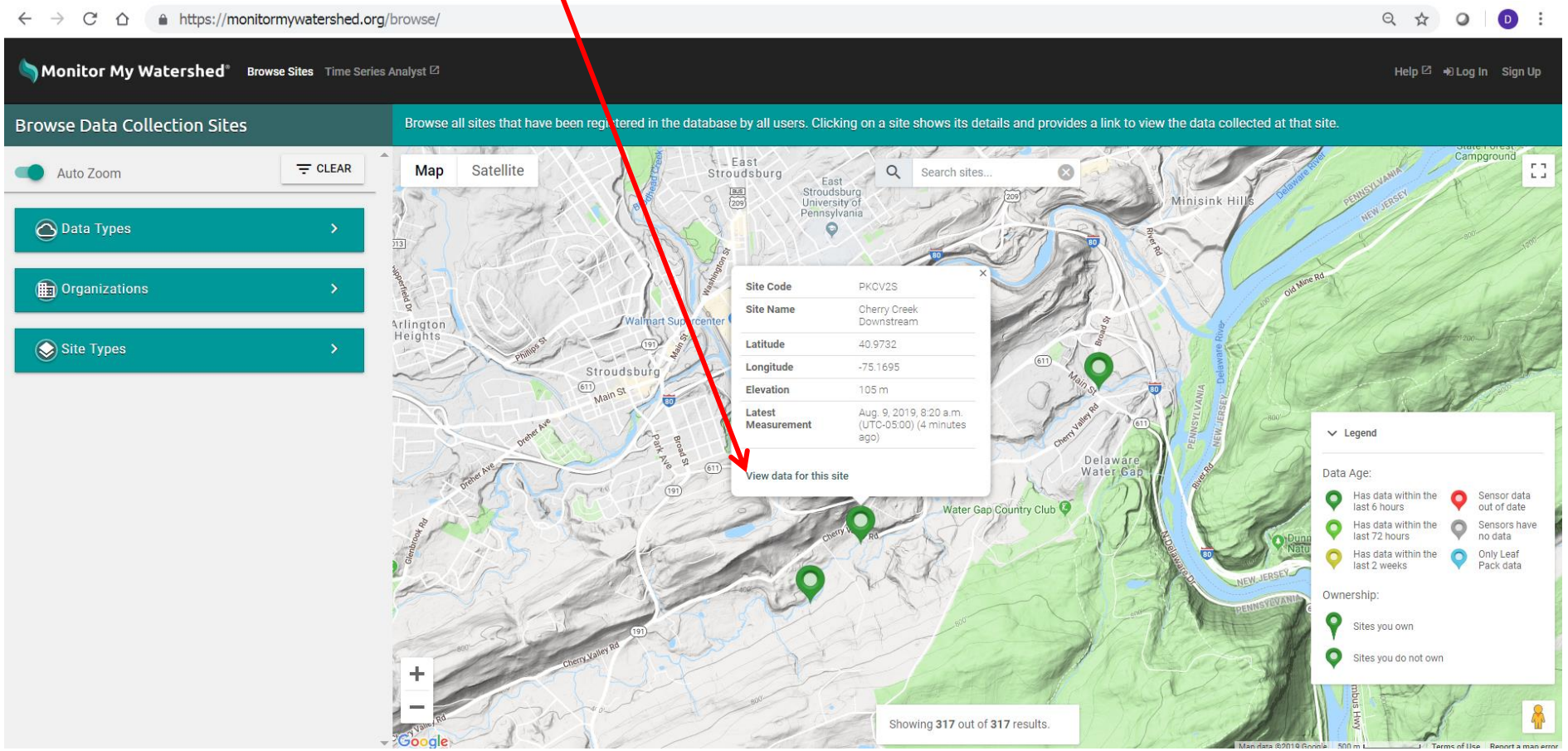
Or Click on a site to access that site's data



Monitor My Watershed

Click on a site marker to access basic site info.

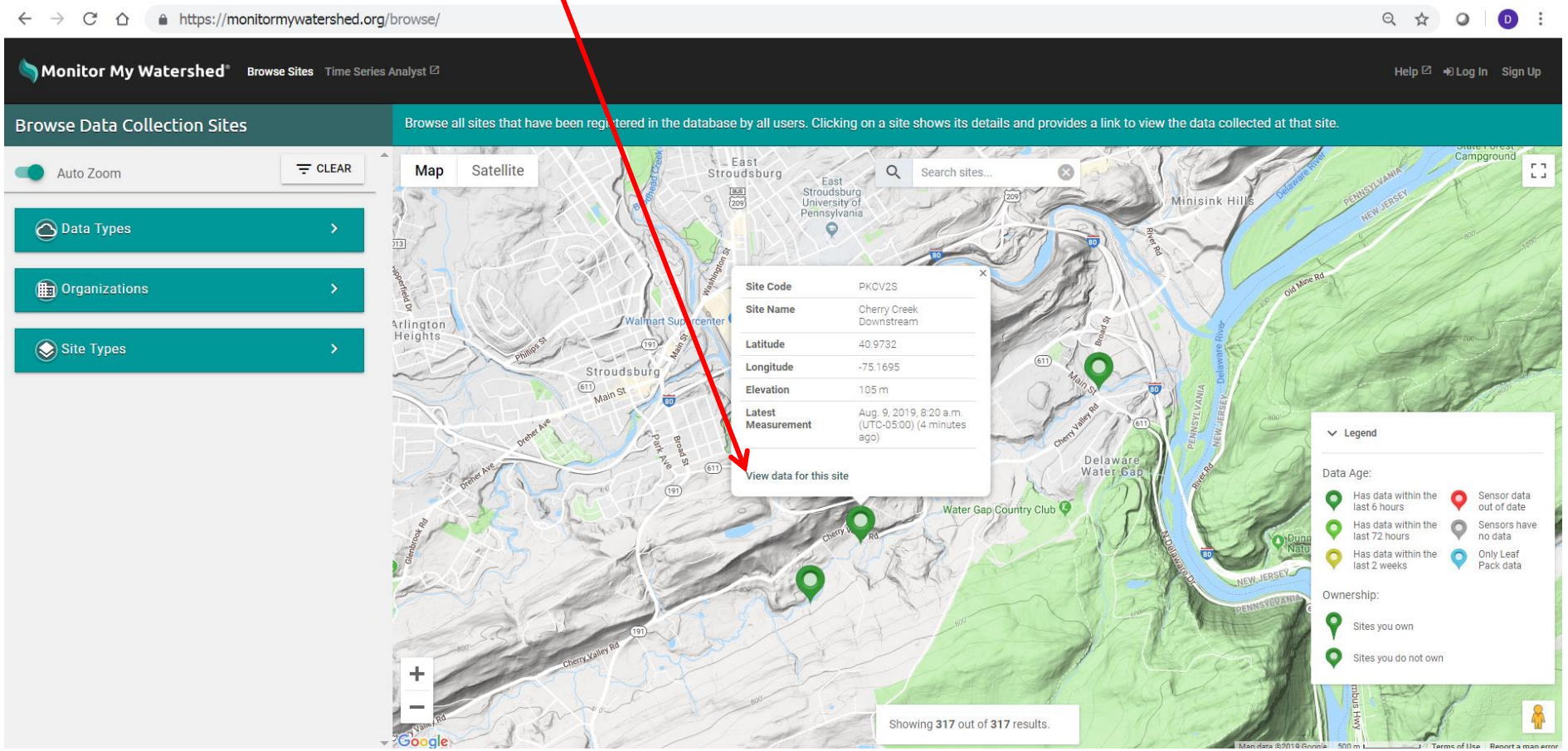
Click on “View data for this site” to access data



Monitor My Watershed

Click on a site marker to access basic site info.

Click on “View data for this site” to access data



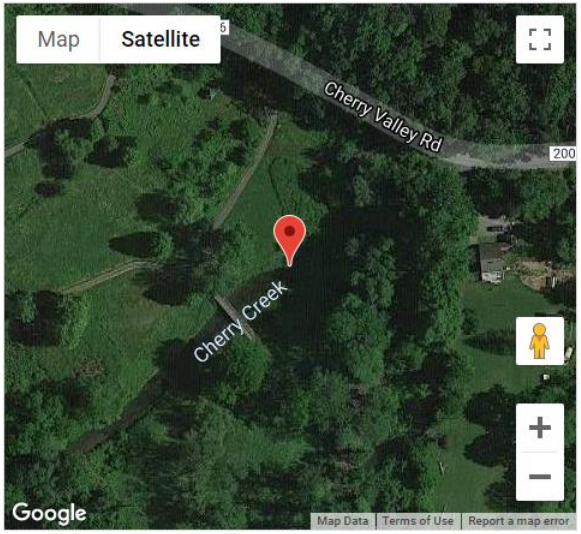
Monitor My Watershed

https://monitormywatershed.org/sites/PKCV2S/

Watershed® Browse Sites Time Series Analyst

Cherry Creek Downstream (PKCV2S)

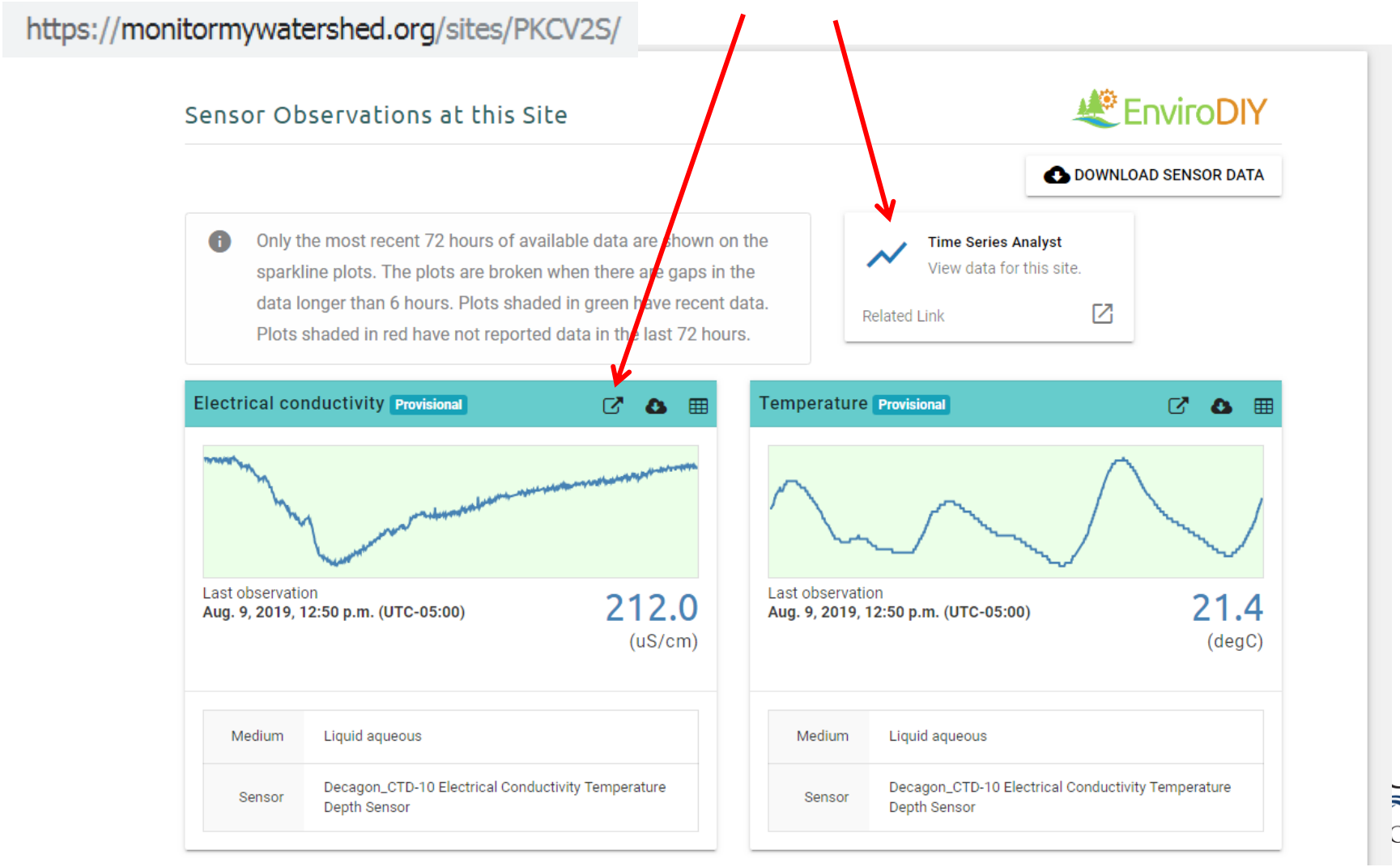
Deployment By	Paul Wilson
Organization	East Stroudsburg University
Registration Date	April 3, 2017, 9:50 p.m.
Deployment Date	May 4, 2017, 1:35 p.m.
Latitude	40.9732
Longitude	-75.1695
Elevation (m)	105.0
Elevation Datum	-
Site Type	Stream
Stream Name	Cherry Creek
Major Watershed	-
Sub Basin	-



WATER RESEARCH CENTER

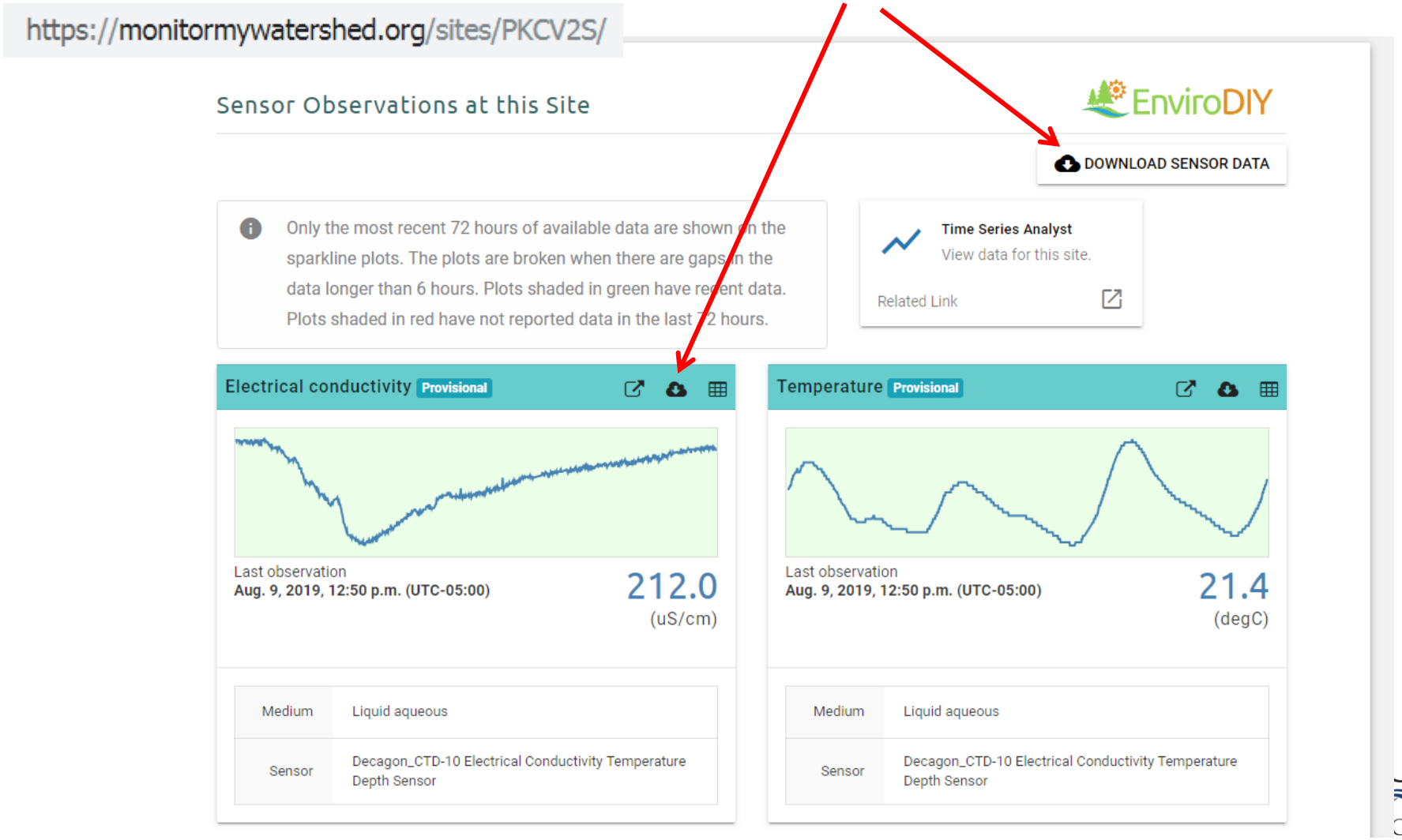
Monitor My Watershed

Time Series Analyst (TSA) – visualize (graph) data, single parameter and all parameters



Monitor My Watershed

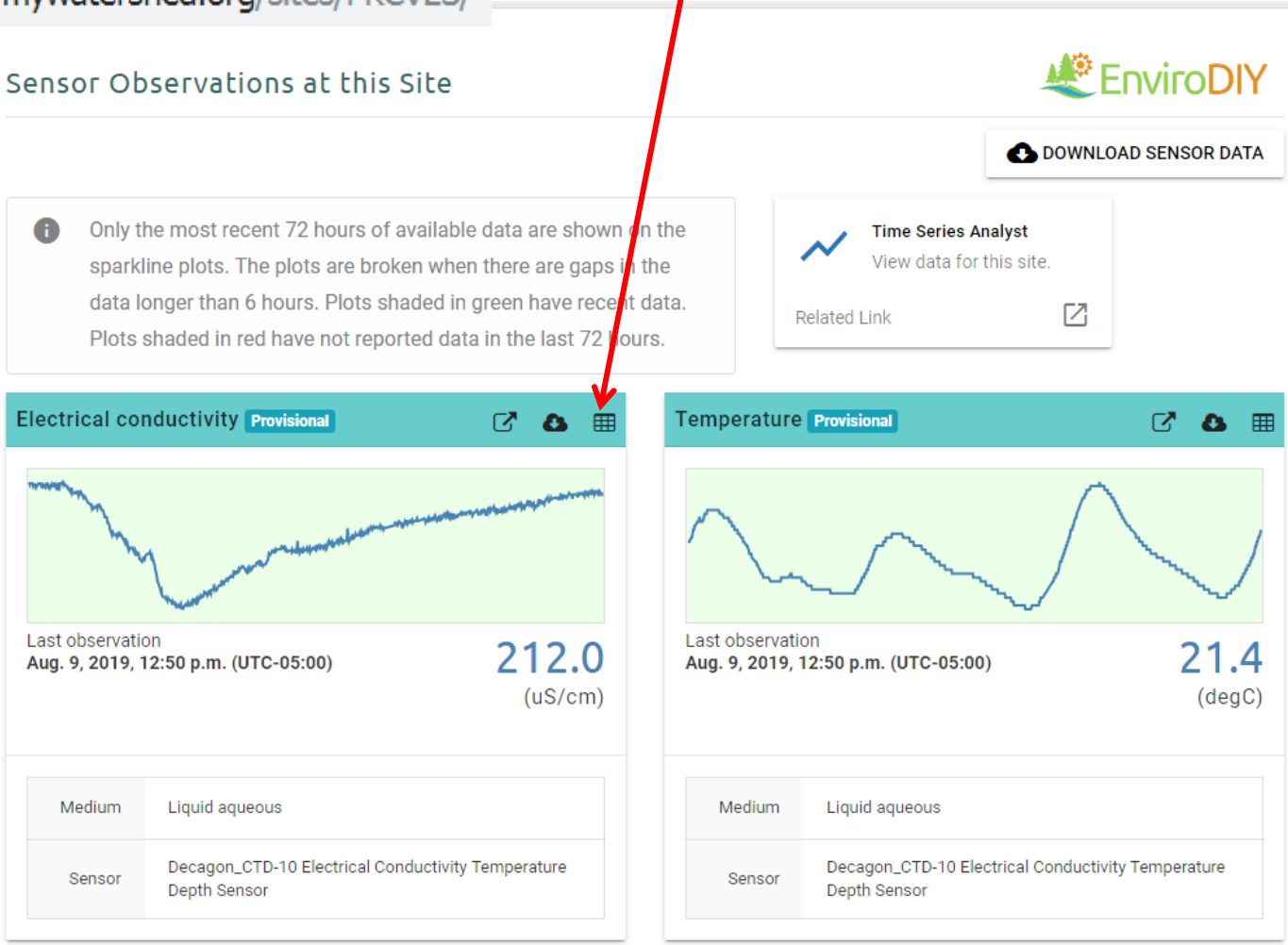
Data files (Excel) – single parameter and all parameters



Monitor My Watershed

72hr recent data table

https://monitormywatershed.org/sites/PKCV2S/

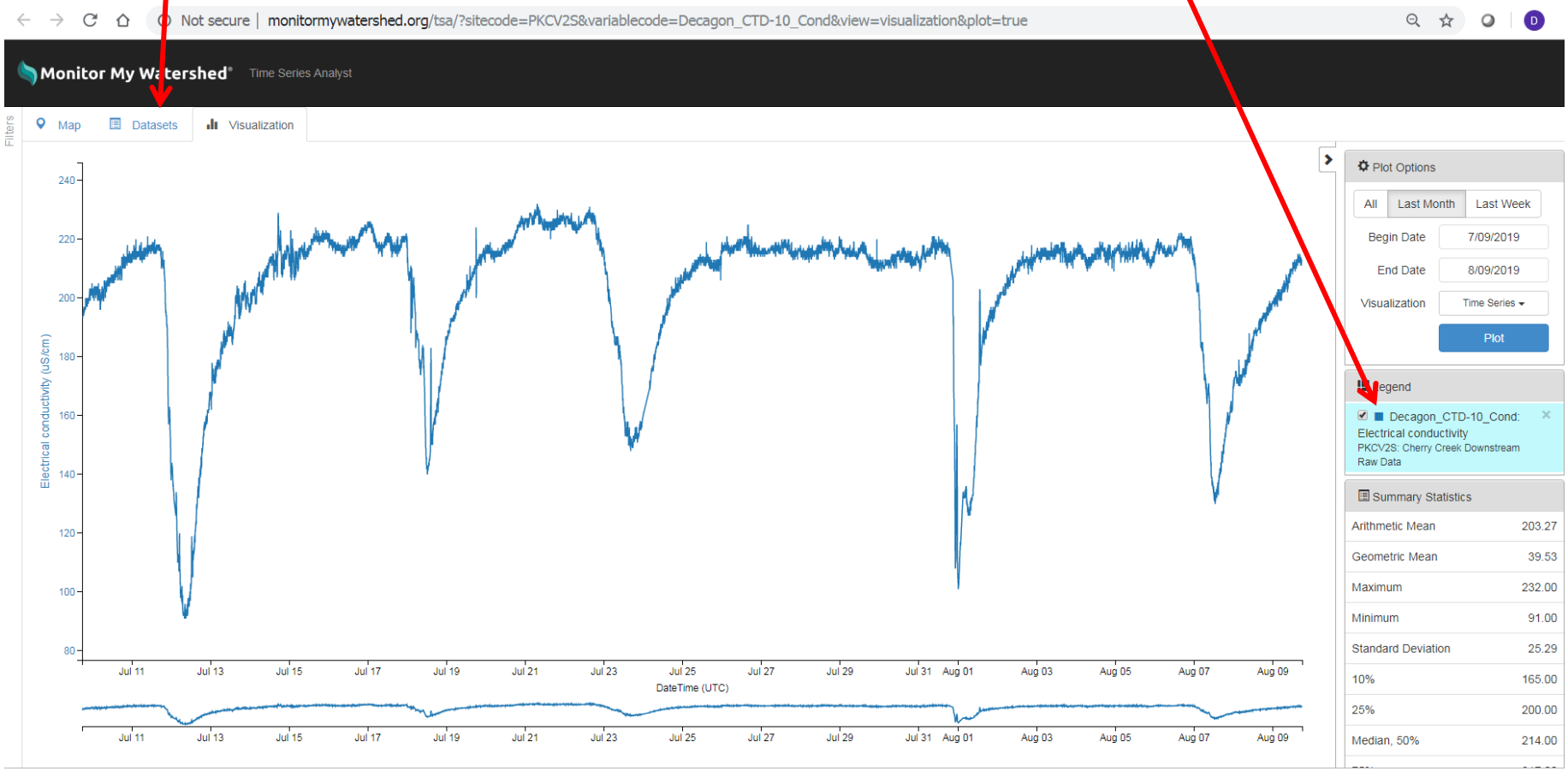


JD Center

Monitor My Watershed

Add in additional parameters from this site and/or others

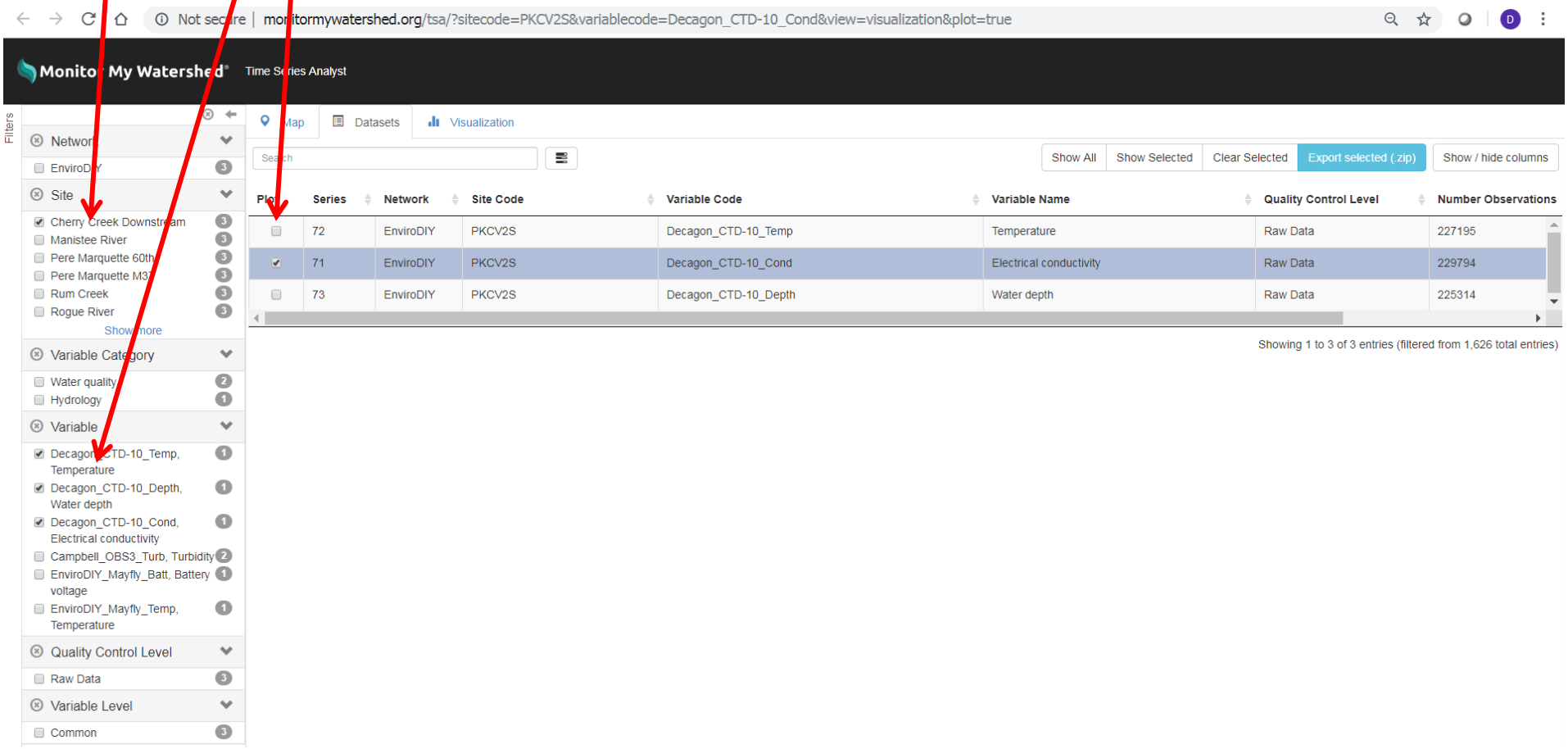
Single parameter visualization



Monitor My Watershed

Add additional sites

Add additional parameters – need to click them on at both spots



Monitor My Watershed

Graph multiple parameters from one site

Monitor My Watershed

Graph multiple parameters from one site

Monitor My Watershed

Graph parameter from multiple sites

Monitor My Watershed

Use cursor to zoom in on selected time ranges

Monitor My Watershed

Select data range using tabs or by typing in date ranges

Thanks!





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