Watershed Stories

Temperature Monitoring and Station Maintenance for Citizen Science

About Me

Robert Sarnoski

PA Master Naturalist working with:
Nolde Forest State Park (DCNR)
Angelica Creek Watershed Association (Berks Nature)
Tulpehocken Creek Watershed Association (Berks Nature)
Water Quality Volunteer Coalition (Lancaster Conservancy)
Donegal Trout Unlimited (Lancaster County)

Stillwater Run

Stream Survey / Data Collection

Alkalinity
Nitrates / Nitrites
Phosphates
Dissolved Oxygen
Temperature
EC / TDS / pH
Flow Rates Using NBO

Why Stillwater Run?

Analyze Monitor Model

Delaware High Resolution 3 km²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Stream Network Statistics

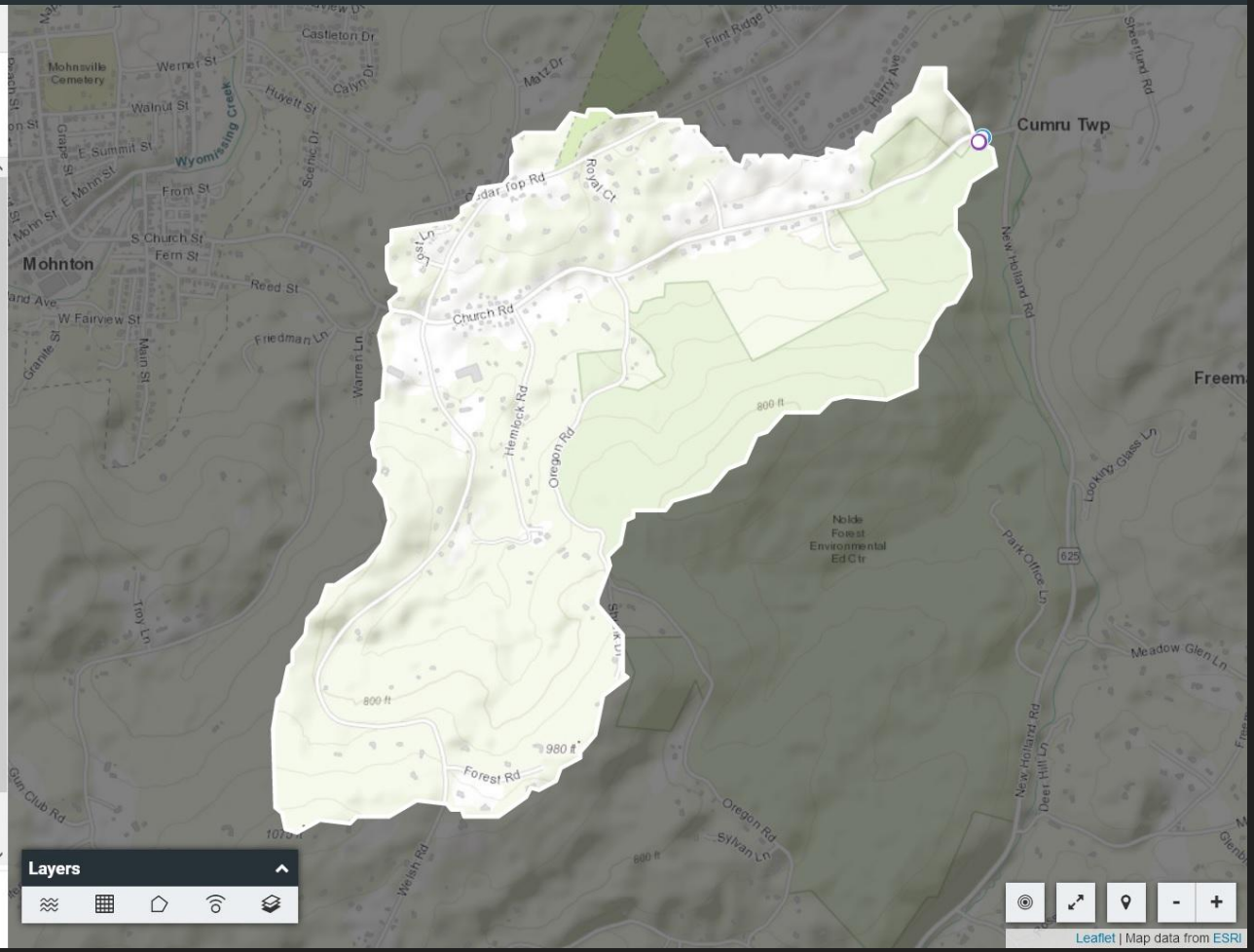
Related Layer: Continental US Medium Resolution Stream Network
Turn on
Source: NHDplusV2

Stream Order	Total Length (km)	Mean Channel Slope (%)
1st	3.03	3.59%
2nd	0.00	No Data
3rd	0.00	No Data
4th	0.00	No Data
5th	0.00	No Data
6th	0.00	No Data
7th	0.00	No Data
8th	0.00	No Data
9th	0.00	No Data
10th	0.00	No Data
Other	0.00	No Data
Combined	3.03	3.59%

Length in agricultural areas = 0.03 km
Length in non-agricultural areas = 3.00 km

Download this data

Change area



Analyze Monitor Model

Delaware High Resolution 20 km²

Streams Land Soil Terrain Climate Pt Sources Animals Water Qual

Delaware River Basin only: Calibrated GWLF-E (MapShed) model estimates

3 related layers

Source: Stream Reach Assessment Tool (SRAT)

1 of 2 →

Id	Area (ha)	Total N (kg/ha)	Total P (kg/ha)	Total SS (kg/ha)	Avg TN (mg/l)
2987	16.370	2.889	0.085	14.947	No Data
3006	10.700	8.556	0.550	667.367	1.057
3007	74.560	7.870	0.579	847.970	1.054
3008	231.870	7.471	0.487	391.971	1.034
3009	163.070	6.859	0.484	168.033	0.920
3010	272.350	4.220	0.259	88.414	0.767

Download this data

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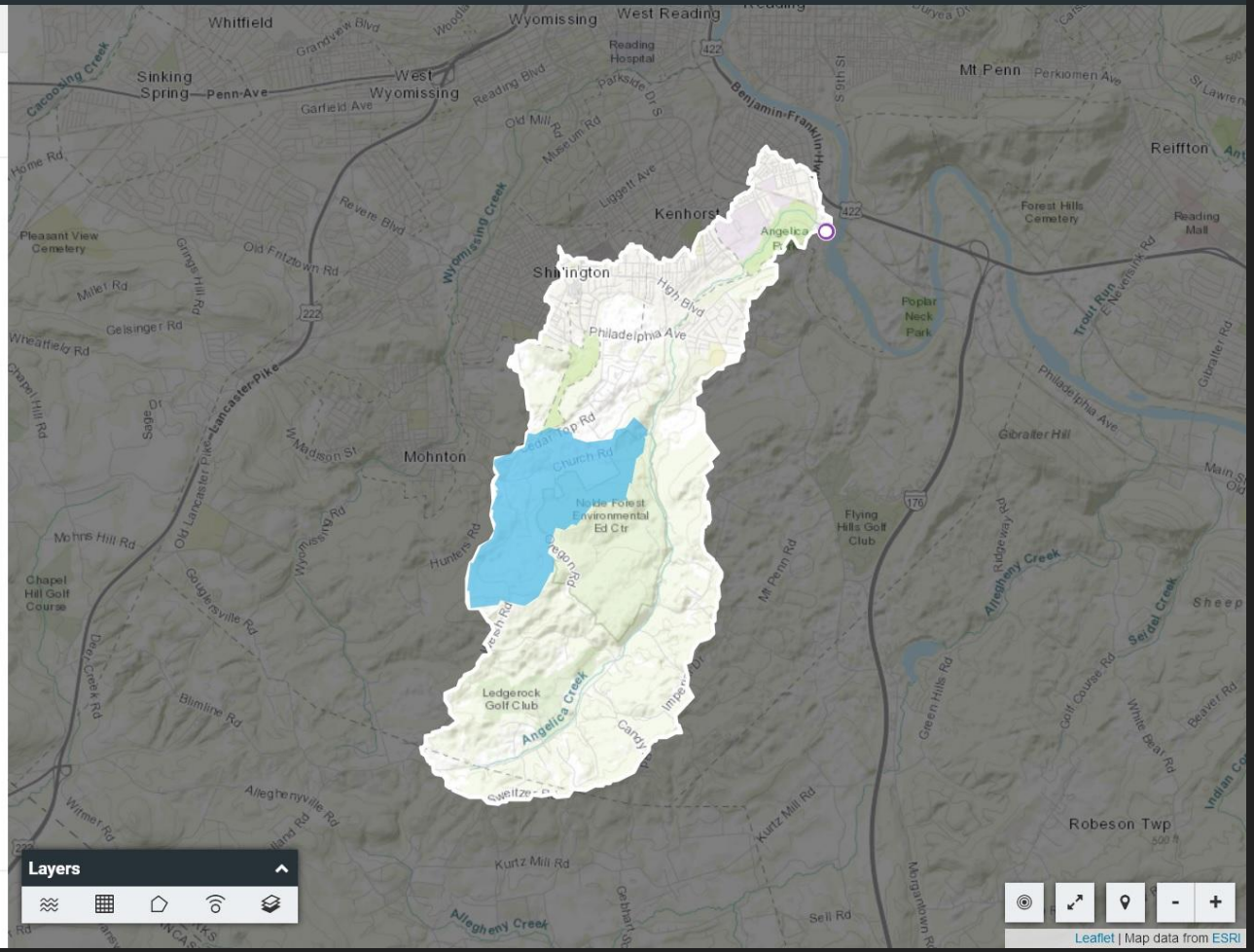

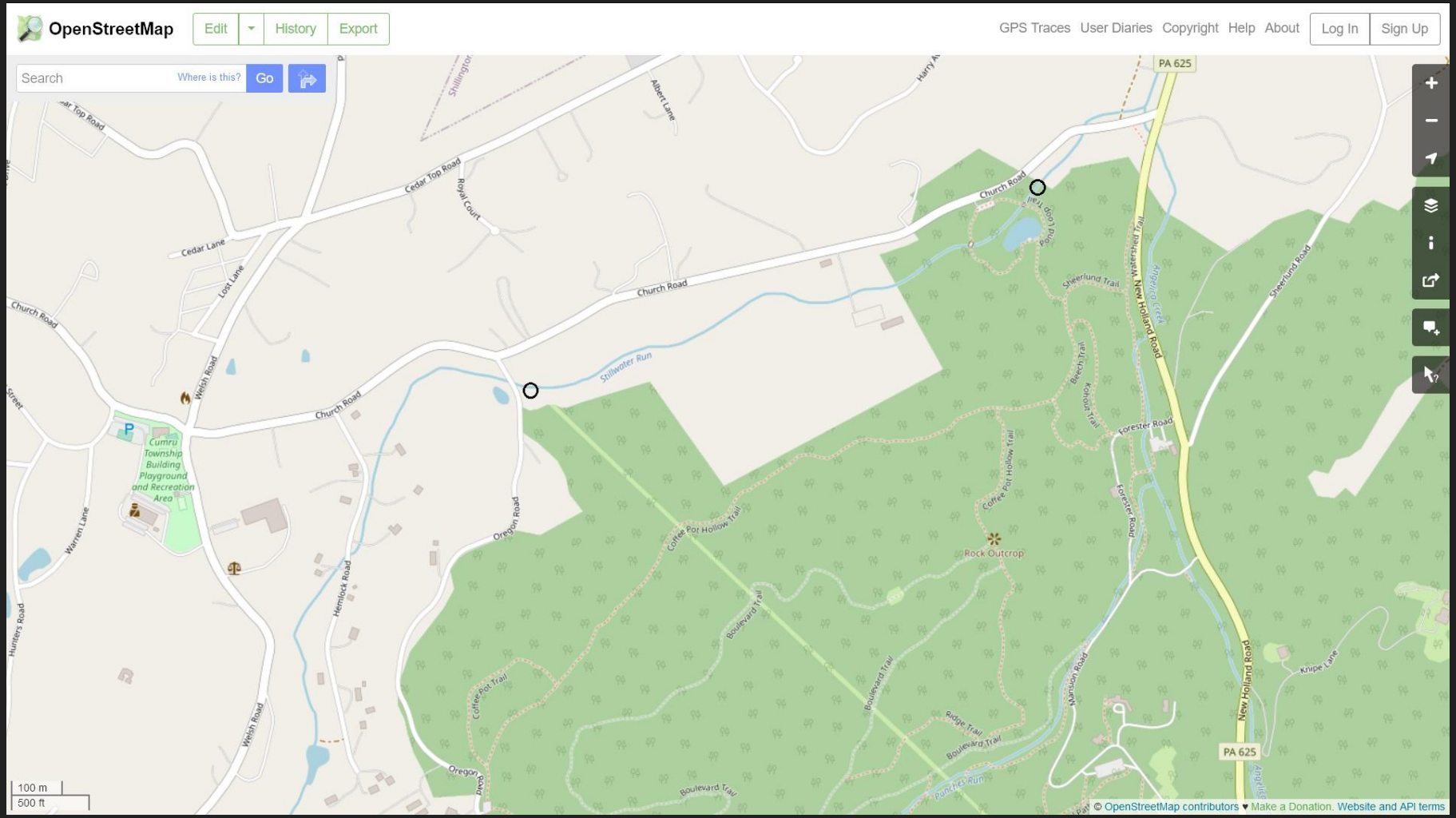
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Cedar Top Road
Cedar Lane
Lost Lane
Church Road
Royal Court
Albert Lane
Welsh Road
Stillwater Run
Cumru Township Building Playground and Recreation Area
Warren Lane
Hunters Road
Hemlock Road
Oregon Road
Coffee Pot Hollow Trail
Coffee Pot Trail
Boulevard Trail
Ridge Trail
Rock Outcrop
Forester Road
Sheerlund Trail
Beech Trail
Kohlrun Trail
Pond Loop Trail
Waterfall Trail
New Holland Road
Sheerlund Road
Nanlson Road
Knipe Lane
Punches Run
100 m
500 ft
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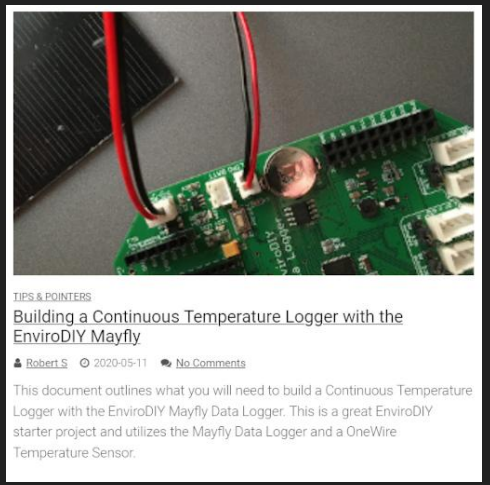
EnviroDIY

- Installed first Mayfly on Stillwater Run in February 2020
- EnviroDIY article on Continuous Temperature Logger May 2020
- Second Mayfly installed on Stillwater Run May 2020



TIPS & POINTERS

Building a Continuous Temperature Logger with the EnviroDIY Mayfly

Robert S 2020-05-11 No Comments

This document outlines what you will need to build a Continuous Temperature Logger with the EnviroDIY Mayfly Data Logger. This is a great EnviroDIY starter project and utilizes the Mayfly Data Logger and a OneWire Temperature Sensor.

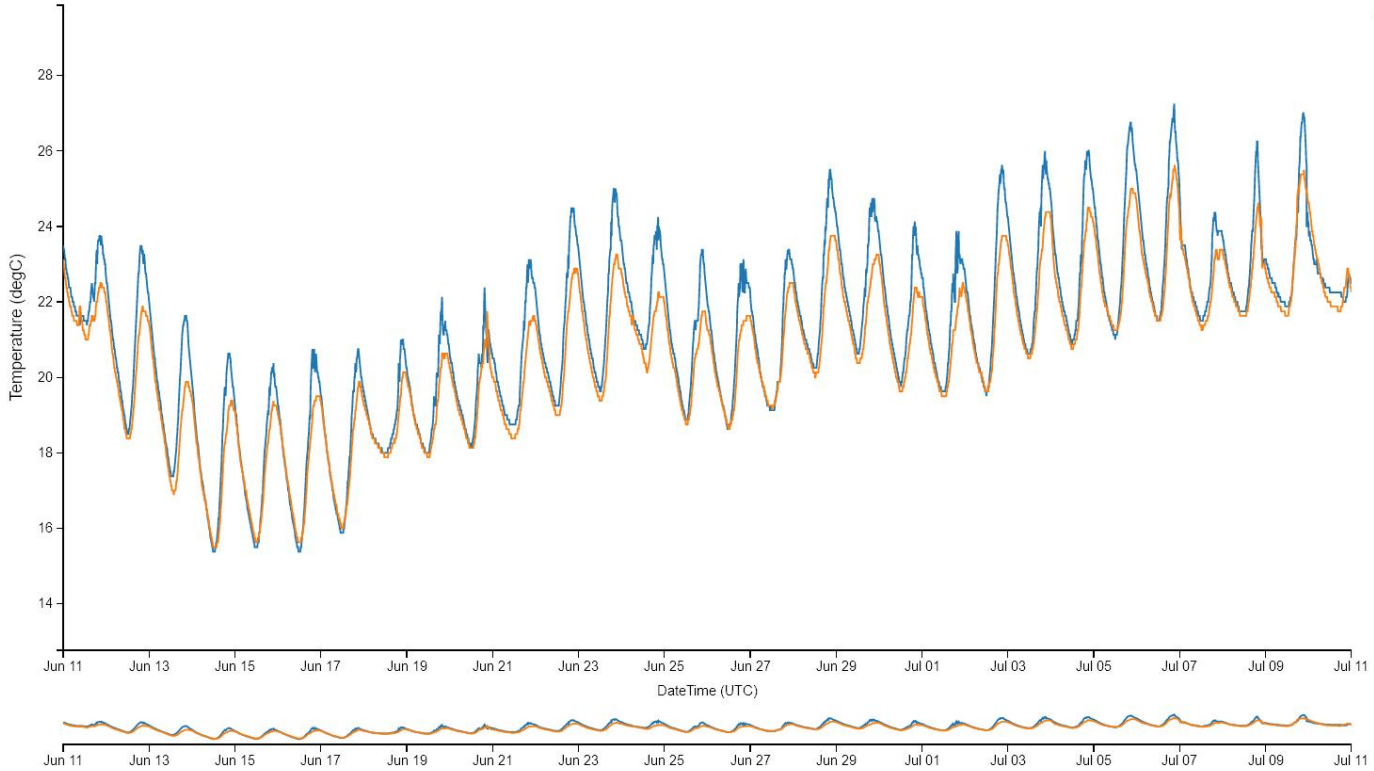
Stillwater Run @ Oregon Road (STLWTR1)

Stillwater Run @ the North Pond (STLWTR2)

Monitor My Watershed® Time Series Analyst

Filters

Map | Datasets | Visualization



Plot Options

All | Last Month | Last Week

Begin Date 6/11/2020

End Date 7/11/2020

Visualization Time Series

Plot

Legend

Maxim_DS18B20_Temp: Temperature
STLWTR2: Stillwater Run at the North Pond
Raw Data

Maxim_DS18B20_Temp: Temperature
STLWTR1: Stillwater Run at Oregon Road
Raw Data

Summary Statistics

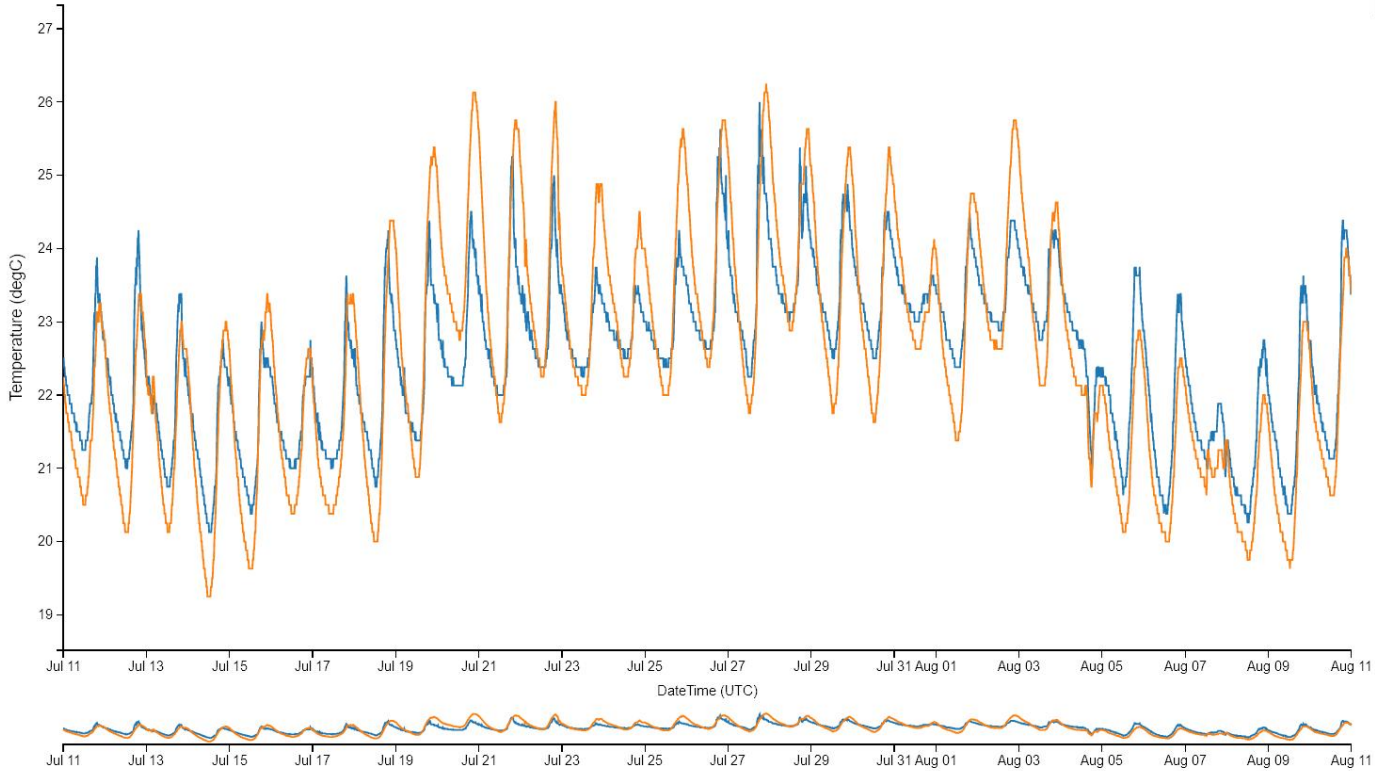
Arithmetic Mean	21.18
Geometric Mean	8.26
Maximum	27.25
Minimum	15.38
Standard Deviation	2.32

stillwater Highlight All Match Case Match Diacritics Whole Words 2 of 3 matches

Monitor My Watershed® Time Series Analyst

Filters

Map | Datasets | Visualization



Plot Options

All | Last Month | Last Week

Begin Date 7/11/2020

End Date 8/11/2020

Visualization Time Series

Plot

Legend

- Maxim_DS18B20_Temp: Temperature
  STLWTR2: Stillwater Run at the North Pond
  Raw Data
- Maxim_DS18B20_Temp: Temperature
  STLWTR1: Stillwater Run at Oregon Road
  Raw Data

Summary Statistics

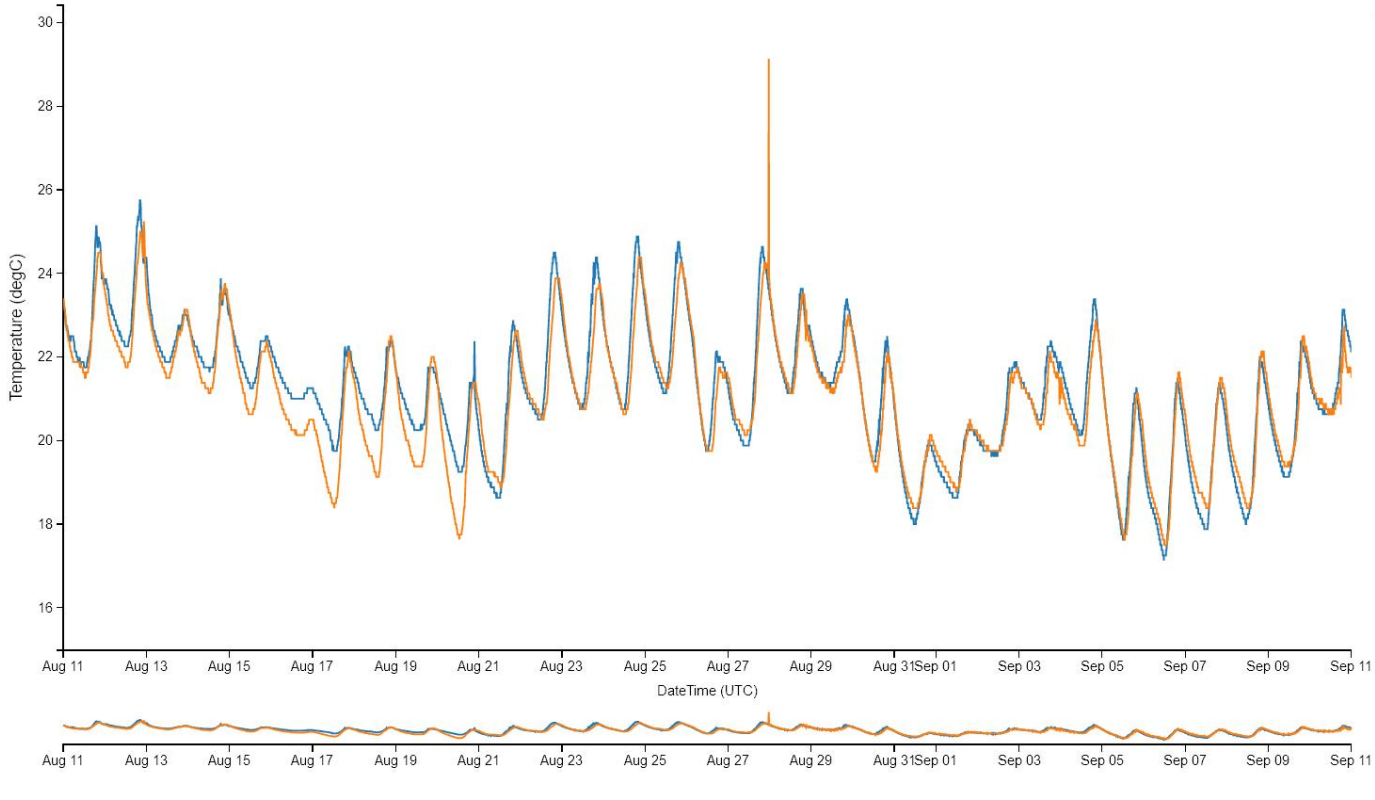
Arithmetic Mean	22.53
Geometric Mean	8.66
Maximum	26.00
Minimum	20.13
Standard Deviation	1.08

stillwater Highlight All Match Case Match Diacritics Whole Words 2 of 3 matches

Monitor My Watershed® Time Series Analyst

Filters

Map | Datasets | Visualization



Plot Options

All | Last Month | Last Week

Begin Date 8/11/2020

End Date 9/11/2020

Visualization: Time Series

Plot

Legend

- Maxim_DS18B20_Temp: Temperature
  STLWTR2: Stillwater Run at the North Pond
  Raw Data
- Maxim_DS18B20_Temp: Temperature
  STLWTR1: Stillwater Run at Oregon Road
  Raw Data

Summary Statistics

Arithmetic Mean	21.02
Geometric Mean	8.24
Maximum	25.75
Minimum	17.13
Standard Deviation	1.58

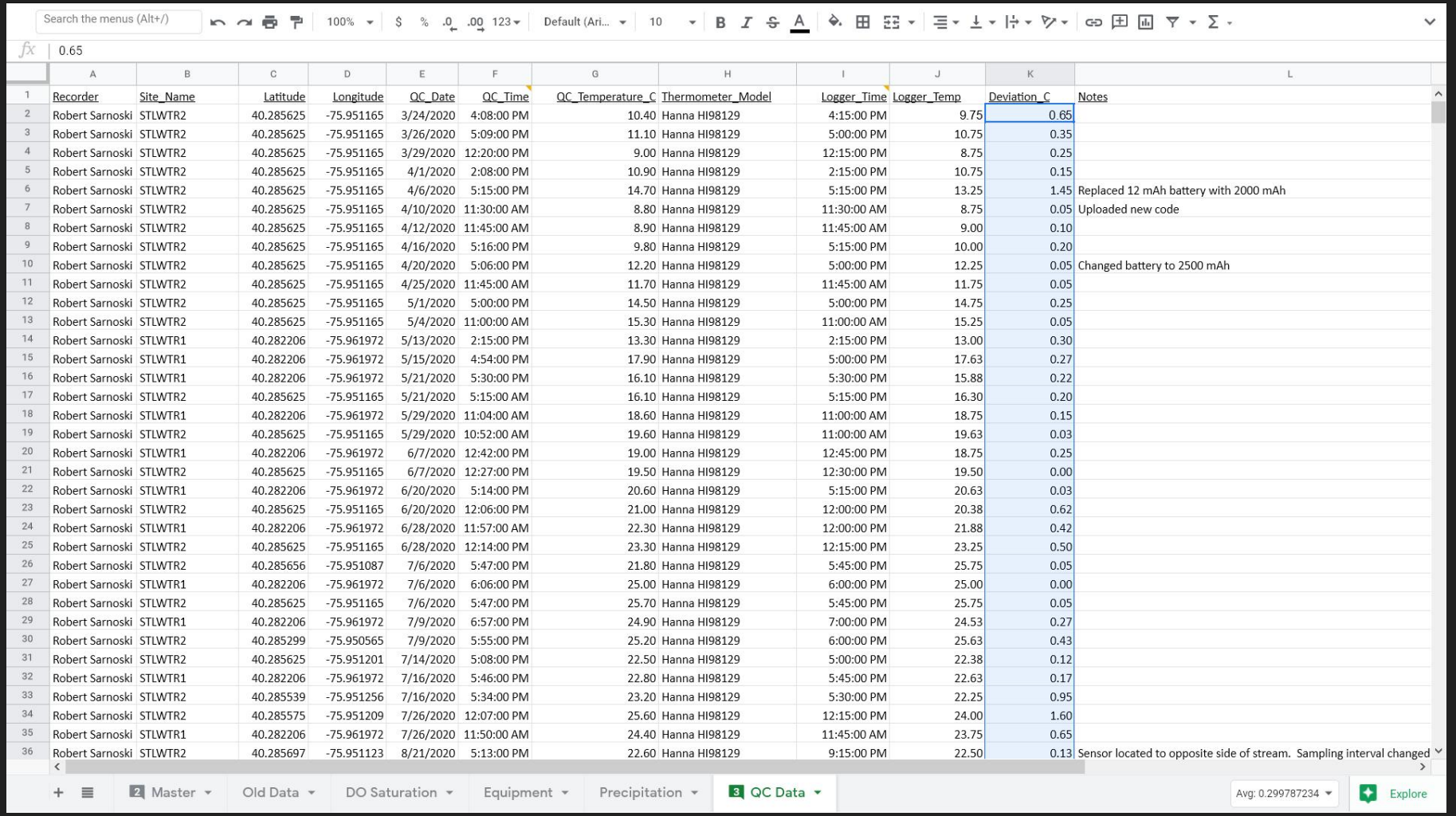
stillwater Highlight All Match Case Match Diacritics Whole Words 2 of 3 matches

Quality Control & Maintenance

- Second and Fourth Sunday of the Month (Approximately every two weeks)
- Sensor and solar panel cleaned
- Check cables for damage
- Temperature recorded right before changing SD card.
- Check for moisture inside logger
- Clear vegetation as needed

Seeed Studio One Wire Temperature Sensor

- Maxim DS18B20 Sensor
- Waterproof
- Grove Compatible
- Accepts 3.0V to 5.5V Power Supply
- Temperature Range: -55°C to +125°C
- Accuracy: ±0.5°C(-10°C to +85°C)



Search the menus (Alt+/)

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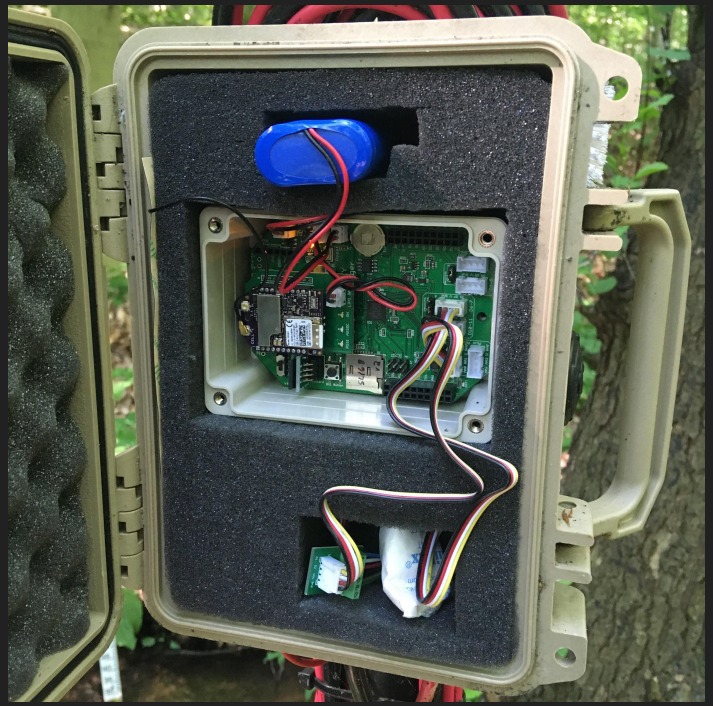
0.65

	A	B	C	D	E	F	G	H	I	J	K	L
1	Recorder	Site_Name	Latitude	Longitude	QC_Date	QC_Time	QC_Temperature_C	Thermometer_Model	Logger_Time	Logger_Temp	Deviation_C	Notes
2	Robert Sarnoski	STLWTR2	40.285625	-75.951165	3/24/2020	4:08:00 PM	10.40	Hanna HI98129	4:15:00 PM	9.75	0.65	
3	Robert Sarnoski	STLWTR2	40.285625	-75.951165	3/26/2020	5:09:00 PM	11.10	Hanna HI98129	5:00:00 PM	10.75	0.35	
4	Robert Sarnoski	STLWTR2	40.285625	-75.951165	3/29/2020	12:20:00 PM	9.00	Hanna HI98129	12:15:00 PM	8.75	0.25	
5	Robert Sarnoski	STLWTR2	40.285625	-75.951165	4/1/2020	2:08:00 PM	10.90	Hanna HI98129	2:15:00 PM	10.75	0.15	
6	Robert Sarnoski	STLWTR2	40.285625	-75.951165	4/6/2020	5:15:00 PM	14.70	Hanna HI98129	5:15:00 PM	13.25	1.45	Replaced 12 mAh battery with 2000 mAh
7	Robert Sarnoski	STLWTR2	40.285625	-75.951165	4/10/2020	11:30:00 AM	8.80	Hanna HI98129	11:30:00 AM	8.75	0.05	Uploaded new code
8	Robert Sarnoski	STLWTR2	40.285625	-75.951165	4/12/2020	11:45:00 AM	8.90	Hanna HI98129	11:45:00 AM	9.00	0.10	
9	Robert Sarnoski	STLWTR2	40.285625	-75.951165	4/16/2020	5:16:00 PM	9.80	Hanna HI98129	5:15:00 PM	10.00	0.20	
10	Robert Sarnoski	STLWTR2	40.285625	-75.951165	4/20/2020	5:06:00 PM	12.20	Hanna HI98129	5:00:00 PM	12.25	0.05	Changed battery to 2500 mAh
11	Robert Sarnoski	STLWTR2	40.285625	-75.951165	4/25/2020	11:45:00 AM	11.70	Hanna HI98129	11:45:00 AM	11.75	0.05	
12	Robert Sarnoski	STLWTR2	40.285625	-75.951165	5/1/2020	5:00:00 PM	14.50	Hanna HI98129	5:00:00 PM	14.75	0.25	
13	Robert Sarnoski	STLWTR2	40.285625	-75.951165	5/4/2020	11:00:00 AM	15.30	Hanna HI98129	11:00:00 AM	15.25	0.05	
14	Robert Sarnoski	STLWTR1	40.282206	-75.961972	5/13/2020	2:15:00 PM	13.30	Hanna HI98129	2:15:00 PM	13.00	0.30	
15	Robert Sarnoski	STLWTR1	40.282206	-75.961972	5/15/2020	4:54:00 PM	17.90	Hanna HI98129	5:00:00 PM	17.63	0.27	
16	Robert Sarnoski	STLWTR1	40.282206	-75.961972	5/21/2020	5:30:00 PM	16.10	Hanna HI98129	5:30:00 PM	15.88	0.22	
17	Robert Sarnoski	STLWTR2	40.285625	-75.951165	5/21/2020	5:15:00 AM	16.10	Hanna HI98129	5:15:00 PM	16.30	0.20	
18	Robert Sarnoski	STLWTR1	40.282206	-75.961972	5/29/2020	11:04:00 AM	18.60	Hanna HI98129	11:00:00 AM	18.75	0.15	
19	Robert Sarnoski	STLWTR2	40.285625	-75.951165	5/29/2020	10:52:00 AM	19.60	Hanna HI98129	11:00:00 AM	19.63	0.03	
20	Robert Sarnoski	STLWTR1	40.282206	-75.961972	6/7/2020	12:42:00 PM	19.00	Hanna HI98129	12:45:00 PM	18.75	0.25	
21	Robert Sarnoski	STLWTR2	40.285625	-75.951165	6/7/2020	12:27:00 PM	19.50	Hanna HI98129	12:30:00 PM	19.50	0.00	
22	Robert Sarnoski	STLWTR1	40.282206	-75.961972	6/20/2020	5:14:00 PM	20.60	Hanna HI98129	5:15:00 PM	20.63	0.03	
23	Robert Sarnoski	STLWTR2	40.285625	-75.951165	6/20/2020	12:06:00 PM	21.00	Hanna HI98129	12:00:00 PM	20.38	0.62	
24	Robert Sarnoski	STLWTR1	40.282206	-75.961972	6/28/2020	11:57:00 AM	22.30	Hanna HI98129	12:00:00 PM	21.88	0.42	
25	Robert Sarnoski	STLWTR2	40.285625	-75.951165	6/28/2020	12:14:00 PM	23.30	Hanna HI98129	12:15:00 PM	23.25	0.50	
26	Robert Sarnoski	STLWTR2	40.285656	-75.951087	7/6/2020	5:47:00 PM	21.80	Hanna HI98129	5:45:00 PM	25.75	0.05	
27	Robert Sarnoski	STLWTR1	40.282206	-75.961972	7/6/2020	6:06:00 PM	25.00	Hanna HI98129	6:00:00 PM	25.00	0.00	
28	Robert Sarnoski	STLWTR2	40.285625	-75.951165	7/6/2020	5:47:00 PM	25.70	Hanna HI98129	5:45:00 PM	25.75	0.05	
29	Robert Sarnoski	STLWTR1	40.282206	-75.961972	7/9/2020	6:57:00 PM	24.90	Hanna HI98129	7:00:00 PM	24.53	0.27	
30	Robert Sarnoski	STLWTR2	40.285299	-75.950565	7/9/2020	5:55:00 PM	25.20	Hanna HI98129	6:00:00 PM	25.63	0.43	
31	Robert Sarnoski	STLWTR2	40.285625	-75.951201	7/14/2020	5:08:00 PM	22.50	Hanna HI98129	5:00:00 PM	22.38	0.12	
32	Robert Sarnoski	STLWTR1	40.282206	-75.961972	7/16/2020	5:46:00 PM	22.80	Hanna HI98129	5:45:00 PM	22.63	0.17	
33	Robert Sarnoski	STLWTR2	40.285539	-75.951256	7/16/2020	5:34:00 PM	23.20	Hanna HI98129	5:30:00 PM	22.25	0.95	
34	Robert Sarnoski	STLWTR2	40.285575	-75.951209	7/26/2020	12:07:00 PM	25.60	Hanna HI98129	12:15:00 PM	24.00	1.60	
35	Robert Sarnoski	STLWTR1	40.282206	-75.961972	7/26/2020	11:50:00 AM	24.40	Hanna HI98129	11:45:00 AM	23.75	0.65	
36	Robert Sarnoski	STLWTR2	40.285697	-75.951123	8/21/2020	5:13:00 PM	22.60	Hanna HI98129	9:15:00 PM	22.50	0.13	Sensor located to opposite side of stream. Sampling interval changed

Master | Old Data | DO Saturation | Equipment | Precipitation | QC Data

Avg: 0.299787234 Explore

Station Maintenance



Questions & Comments?