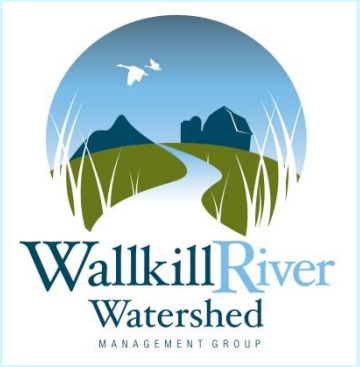
"Using continuous monitoring data to develop an Upper Paulins Kill characterization report for guiding watershed management and decision-making"



Kristine Rogers
Wallkill River Watershed Management Group

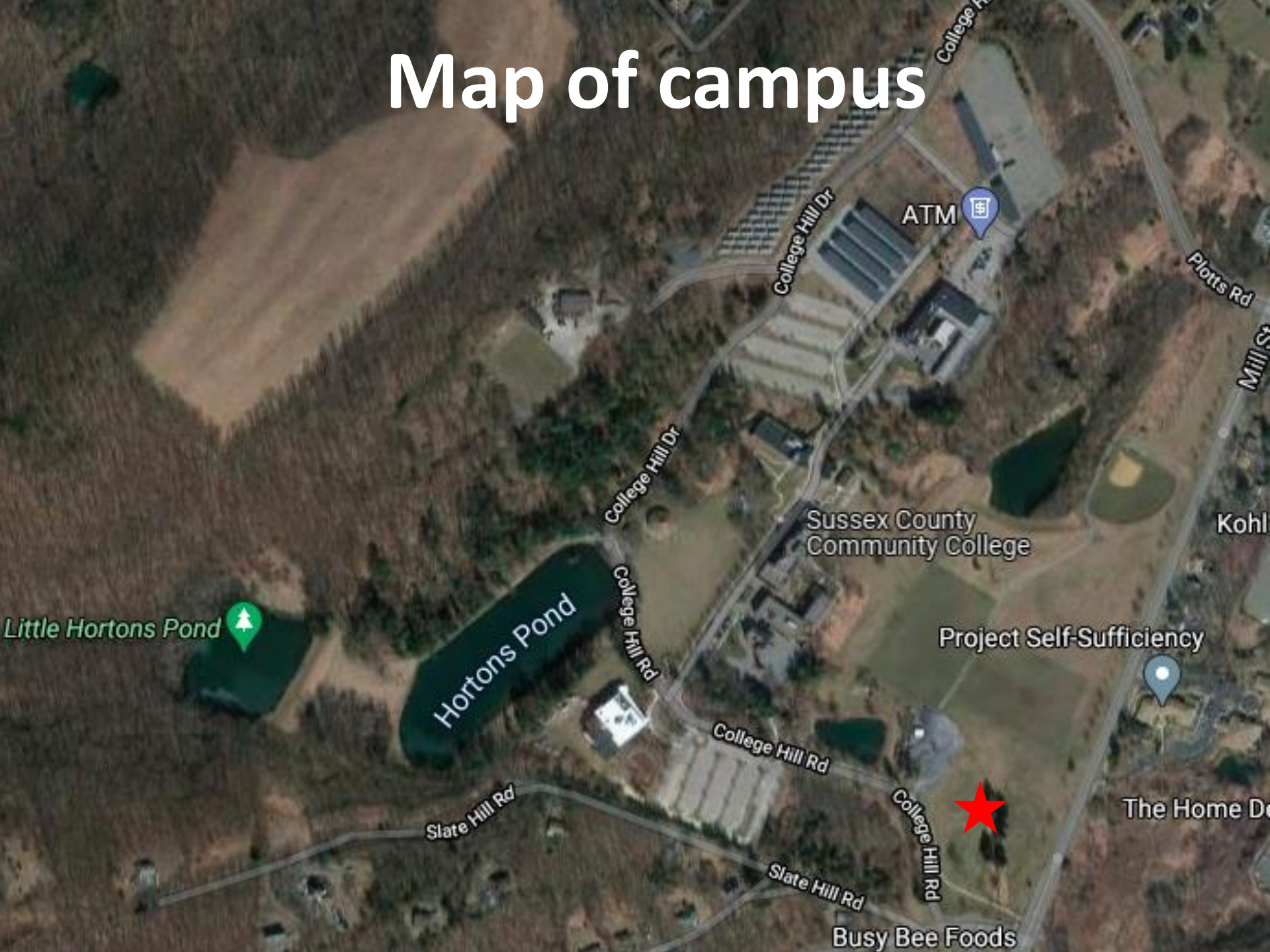
Juniper Leifer
Lopatcong Creek Initiative

Paulins Kill Watershed

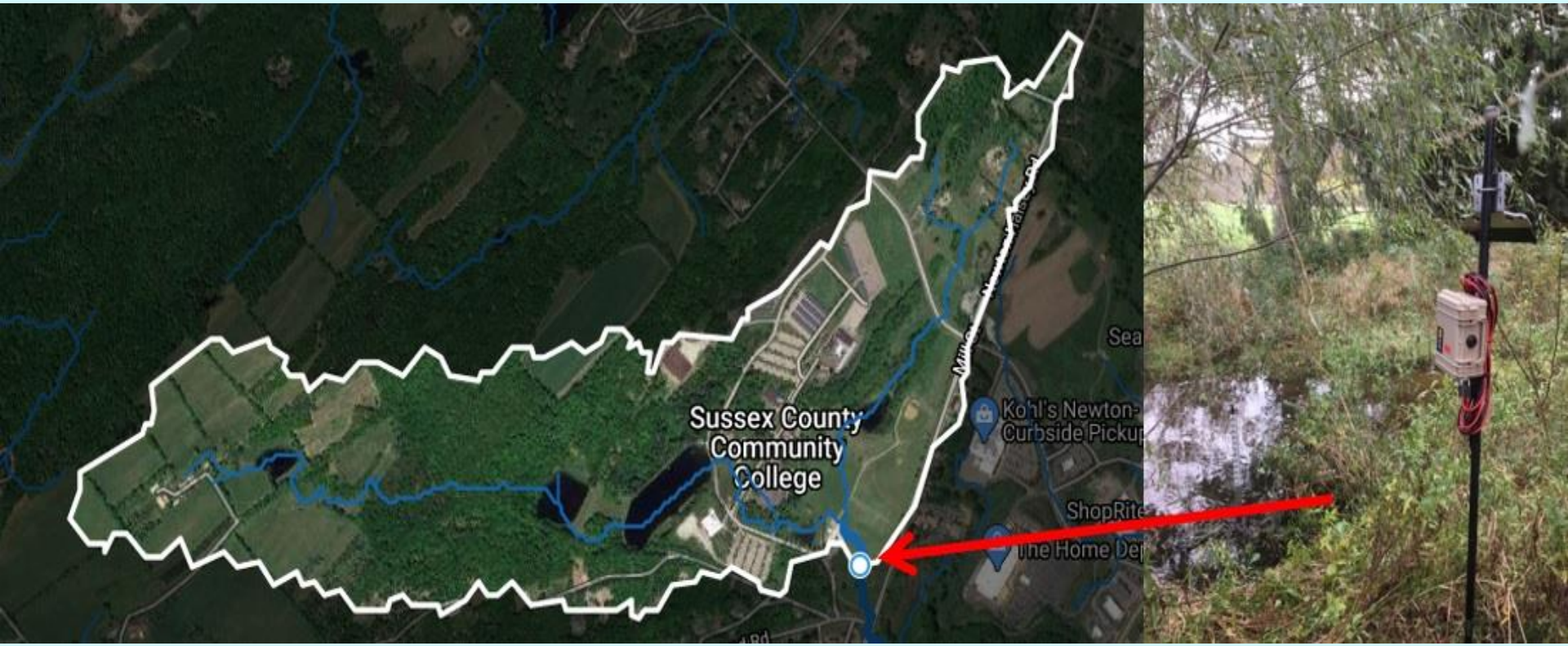
- Newton in Sussex County, NJ
- Headwaters of the Paulins Kill


Newton, NJ
Christ Church
United States Postal Service
Newton Fire Museum
Temporarily closed
Paint store
Mi Rancho Mexican Grill
Takeout · Delivery
Union Pl
Sussex County Historical Society
Temporarily closed
4Chicks Cafe Chicken & Waffles
Takeout
Trinity St
Union Pl
Laura A. Vander Bush, LSW
The Newton Theatre
Temporarily closed
Rite Aid
Drug store
Ave Care
Law office of MaryJean Ellis
St Joseph Community Center
Spring St
Sussex County Library - Dennis Branch
Telesearch Staffing Solutions
St Joseph Roman Catholic Church
Cedar St
Yard Care
G&S Deli
Takeout · Delivery
Halsted Street Middle School
Halsted St
Spring St
O'Reilly's Pub and Gr
Takeout
Maple Ave
Elm St
Walker St
Halsted St
Halsted St
Newton Laundr
Newton Pizza

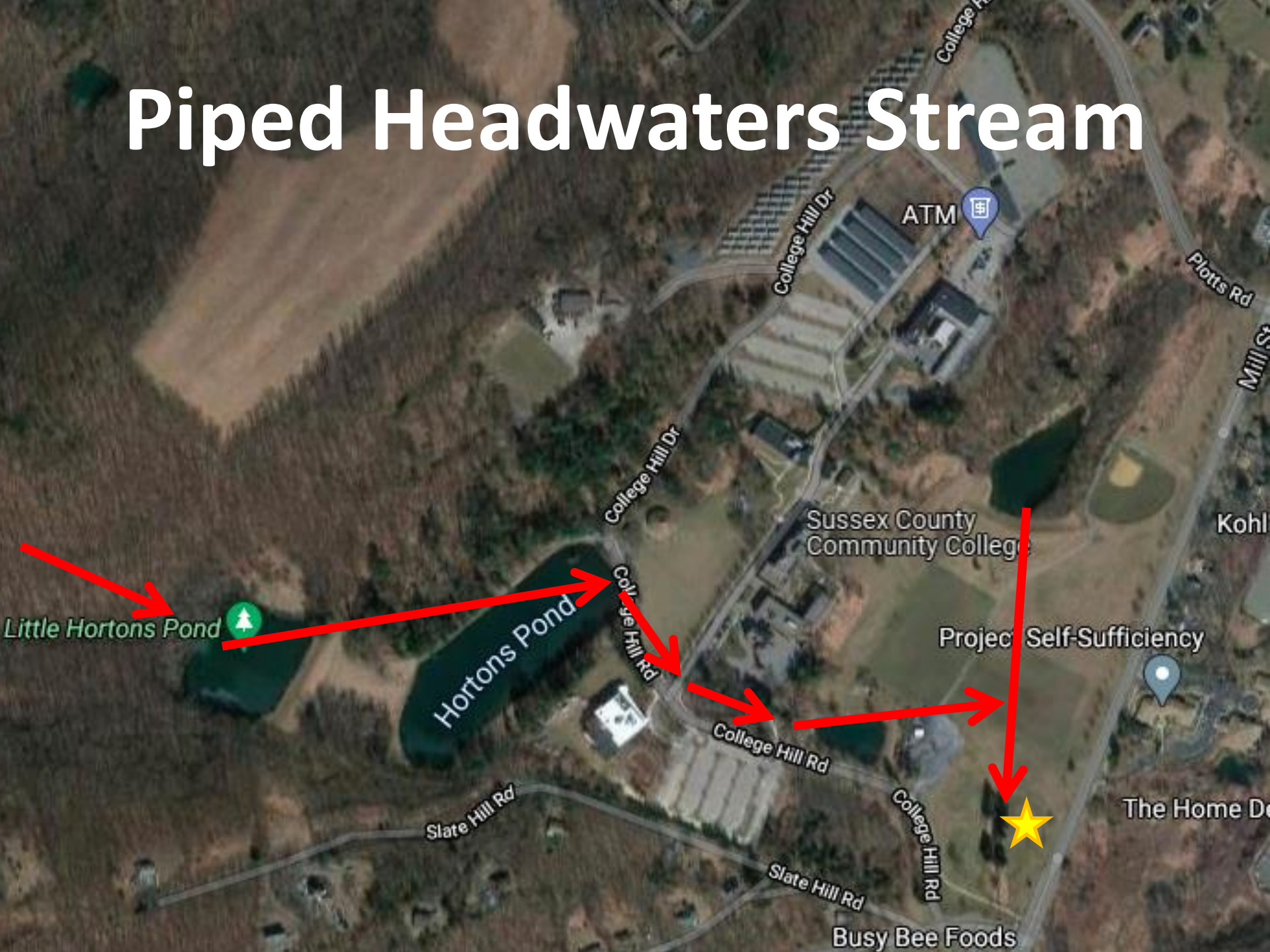
Map of campus



Sensor Location:
Sussex County Community College



Piped Headwaters Stream



Impacts in the Watershed

Lawns = pesticide and fertilizer runoff

Impacts in the Watershed

Lawns = pesticide and fertilizer runoff


Ponds = warm, stagnant water ⟶ elevated water temperature downstream

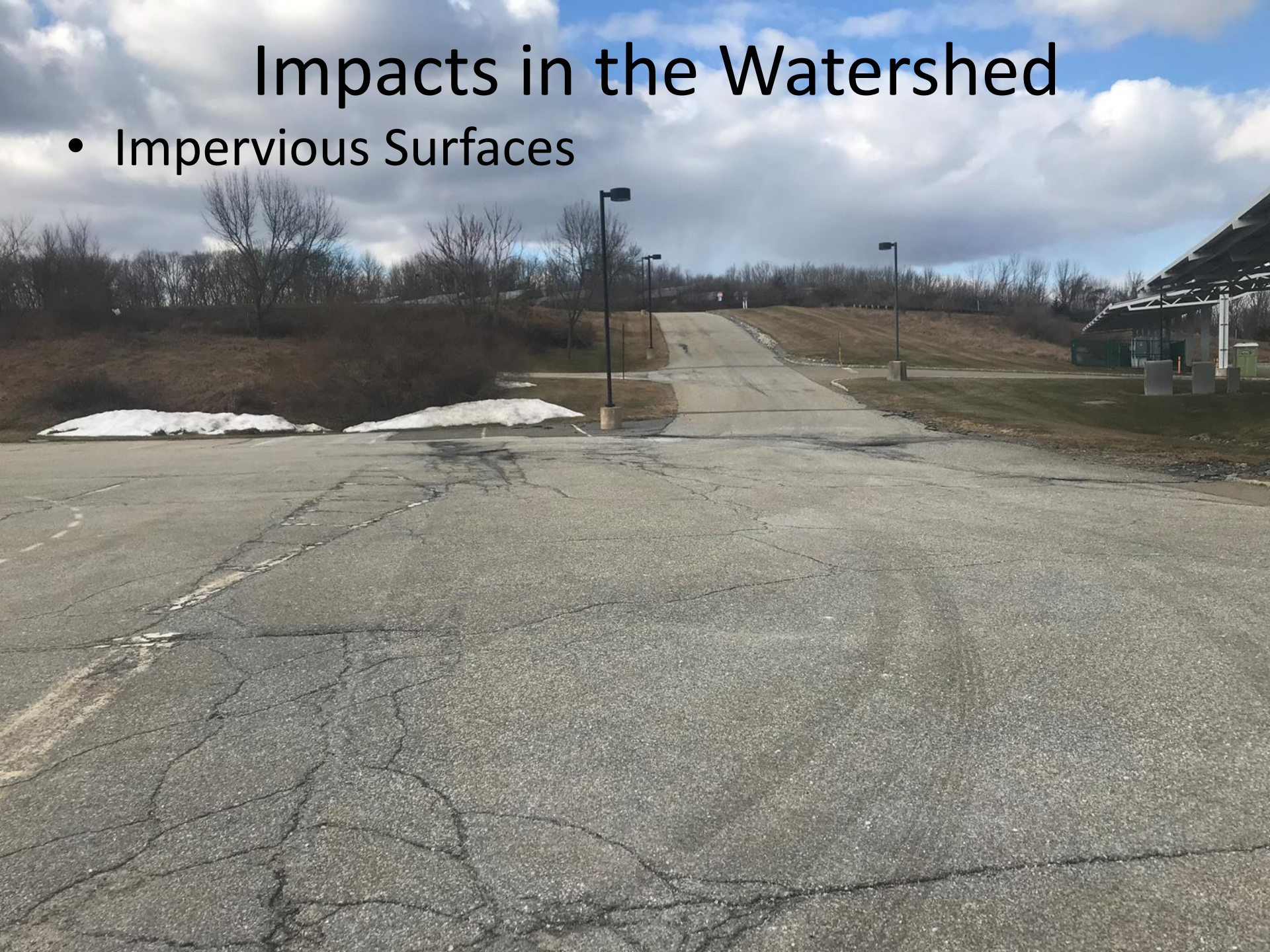

Ponds = warm, stagnant water

Impacts in the Watershed

Impervious surfaces = road salt runoff and warm water entering stream

Impacts in the Watershed

- Impervious Surfaces



Impacts in the Watershed

- Impervious Surfaces

SCCC Water Quality Monitoring Sensor

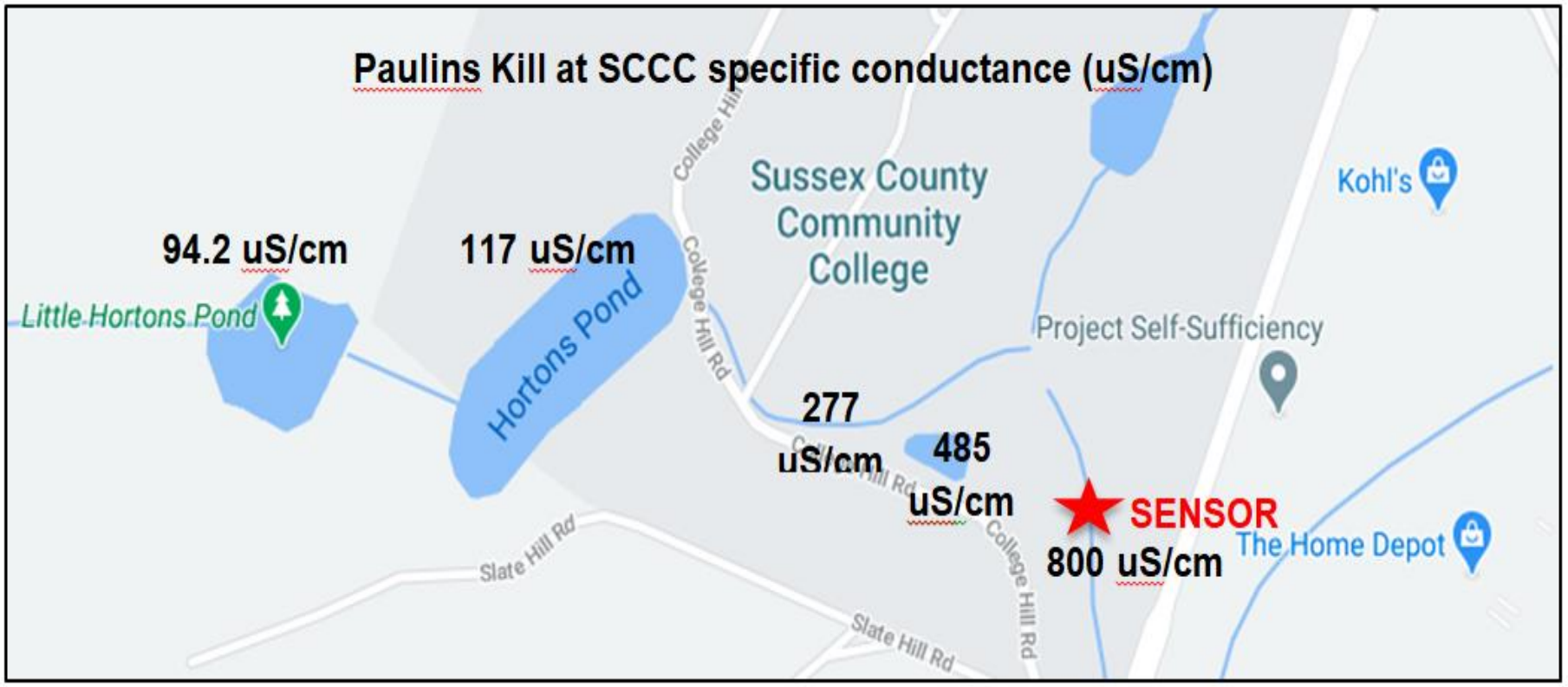
Trends in the Data: Elevated Conductivity

- Average conductivity for Jan 1, 2019 through June 30, 2020: **865 uS/cm**
  - Exceeds state and federal conductivity criteria of 100-500 uS/cm
- Conductivity **spikes in winter frequently exceeded 1000 uS/cm** and exceeded 4000 uS/cm on several occasions.
- Baseflow conductivity levels during the summer were over **800 uS/cm** for extended periods

Trends in the Data: Elevated Conductivity

- June 28, 2019 grab sample had chloride level of **234.8 mg/L**
- NJ state standard for chronic chloride level: **230 mg/L**

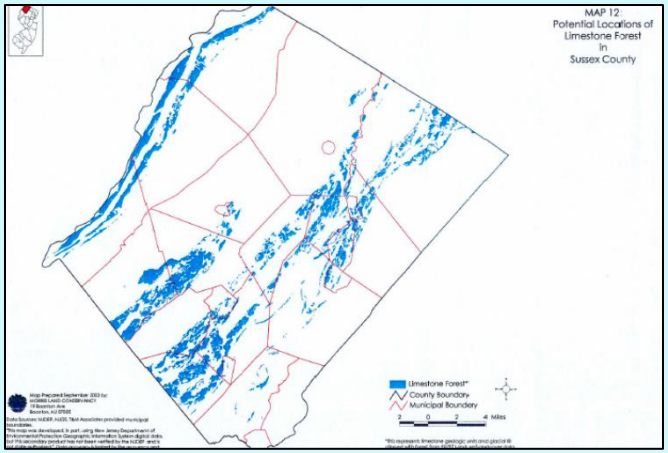
Parameters of Concern: Conductivity



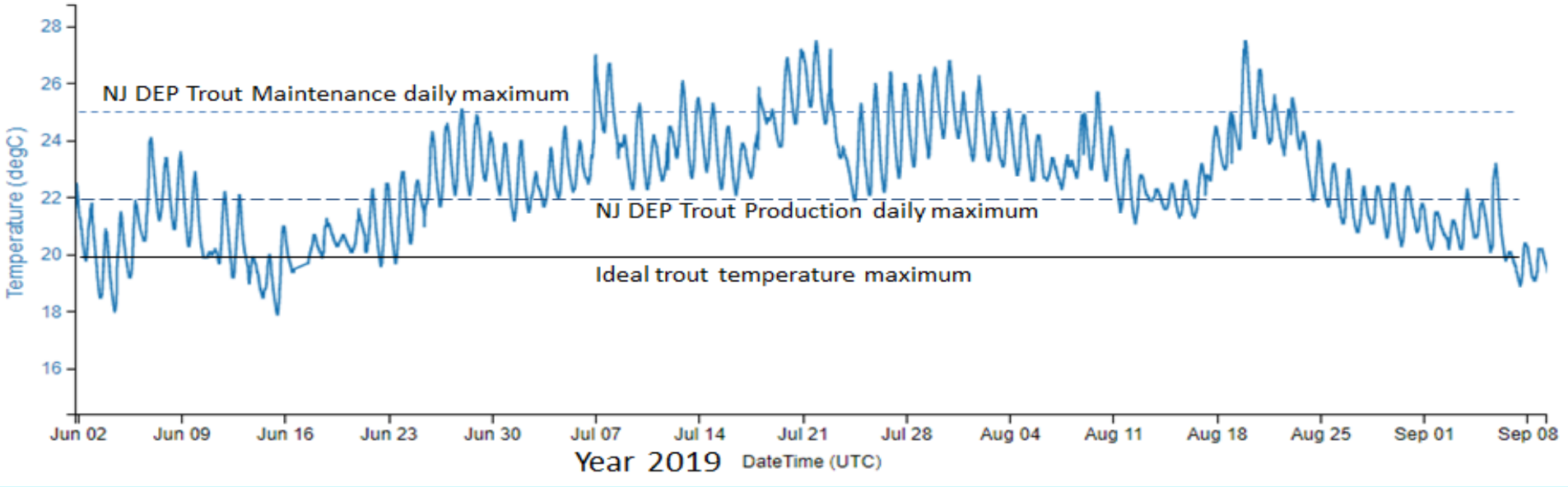
Specific Conductance (uS/cm) on 11/25/20

What's the Cause?

- Salt application?
- Residual salt in soil?
- Limestone in area?
- Crumbling infrastructure?



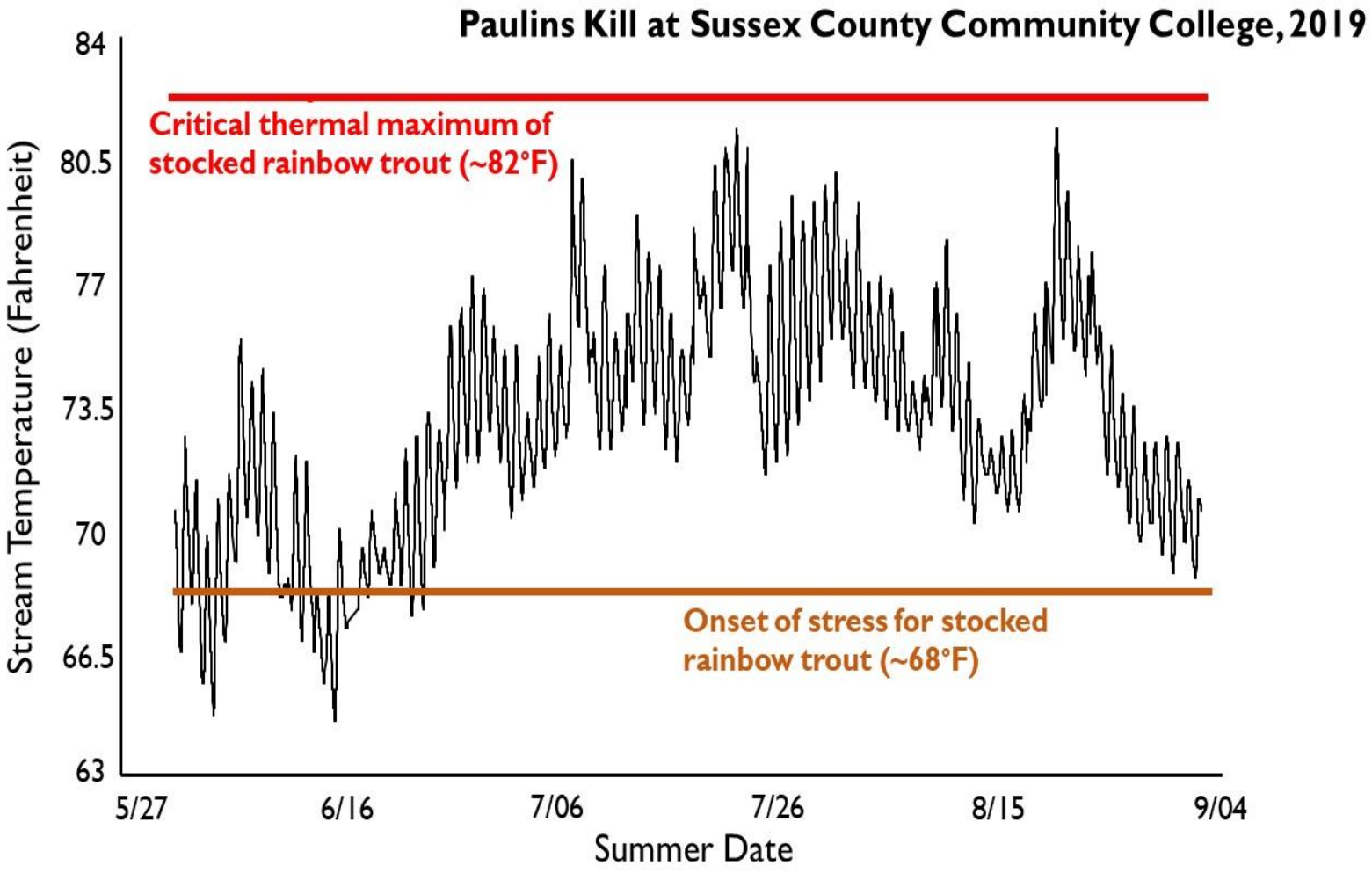
Trends in the Data: Elevated Temperature



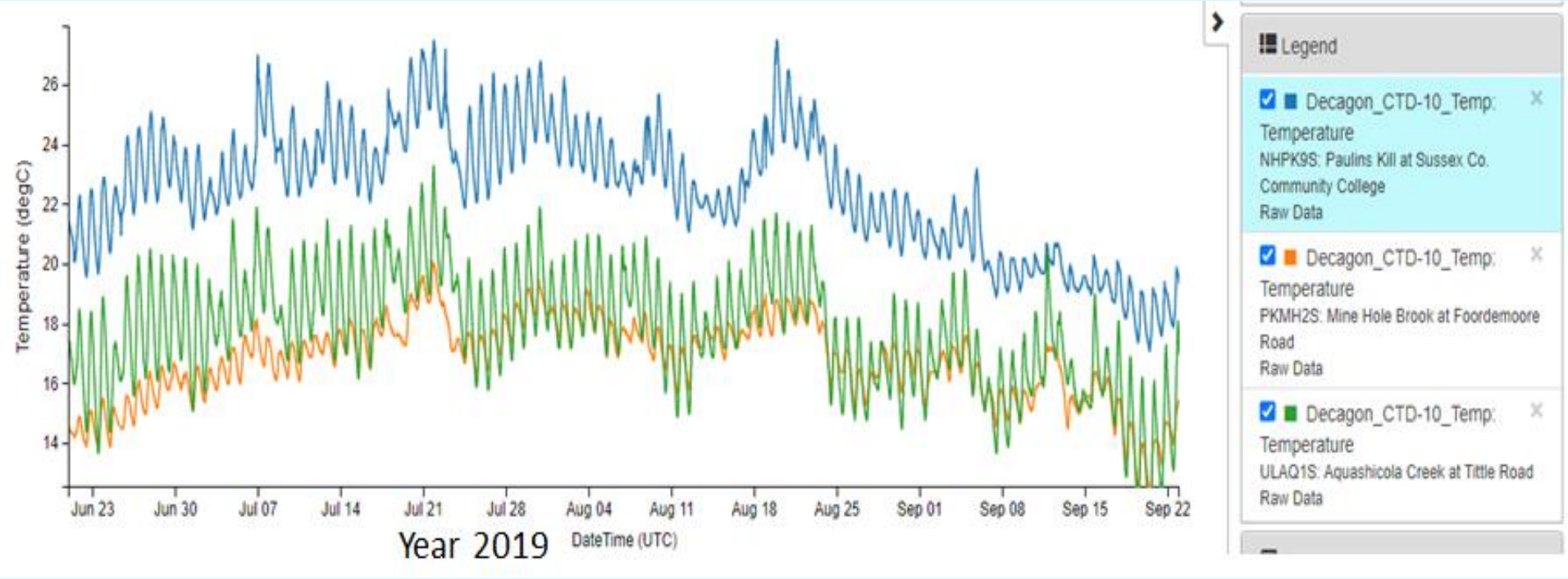
<u>Summer 2019 Data</u>:

- Average summer water temperature was 22.6 deg C (72.7 deg F), which is above NJ DEP *daily* maximum temperature criteria.
- Stream exceeded NJ state criteria for Trout Maintenance (25deg C daily maximum) on several occasions
- Stream exceeded Trout Production (22 deg C daily max) criteria continuously (day and night) during the summer of 2019

Parameters of Concern: Temperature



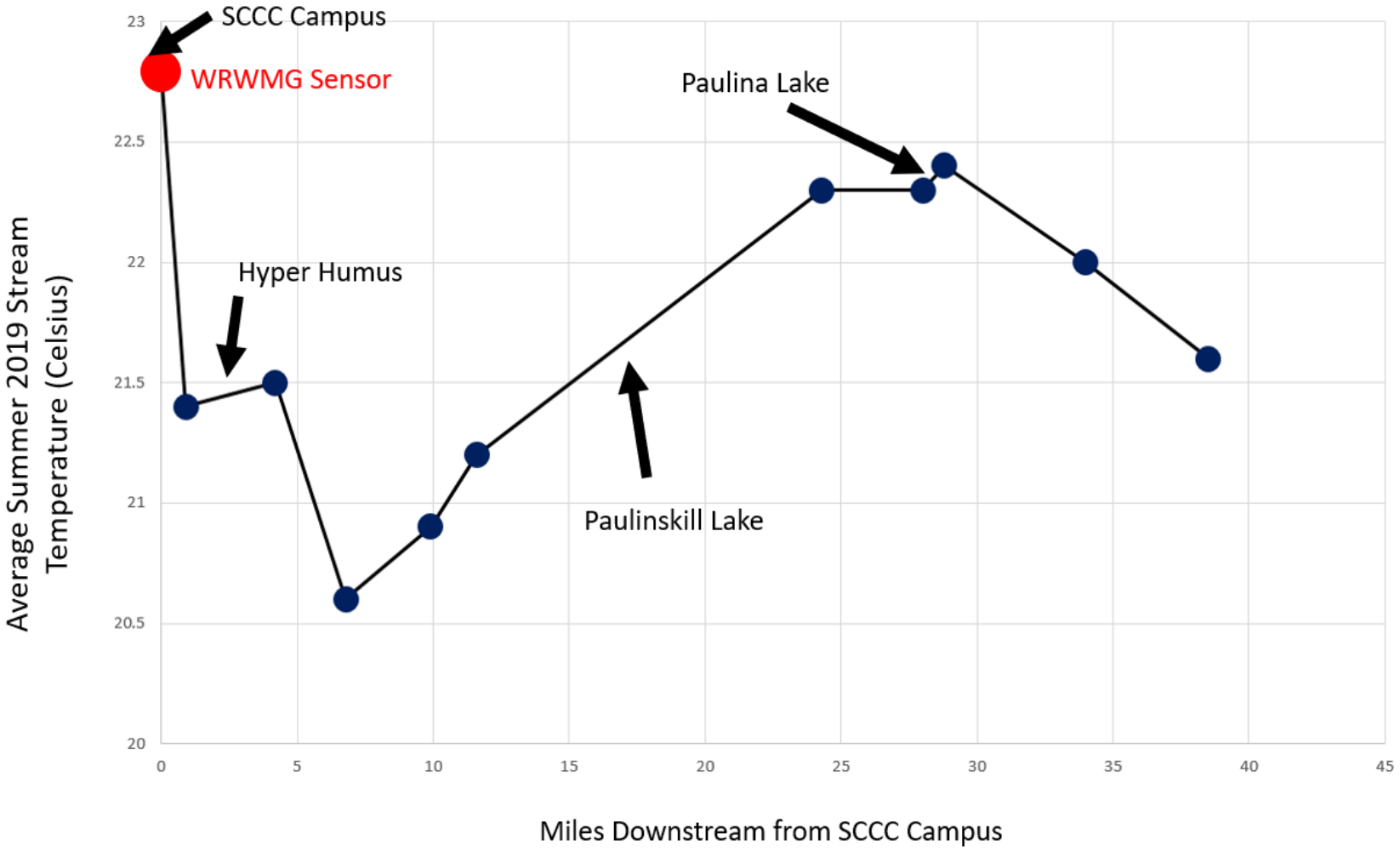
Comparison to Reference Streams



<u>Reference streams</u>:

Mine Hole Brook and Aquashicola Creek

Parameters of Concern: Temperature



Establishment of the Executive Summary

- Responded to EnviroDIY survey---requested more help interpreting our data
- Dave produced 25 page watershed characterization report

Paulins Kill at Sussex County Community College – Informal assessment of EnviroDIY monitoring station data including temperature, conductivity, and depth

Prepared by David Bressler (Stroud Water Research Center) for Kristine Rogers (Wallkill River Watershed Management Group)

July 1, 2020

The following is a draft assessment of the continuous conductivity, temperature, and depth data collected using an EnviroDIY monitoring station located on the Paulins Kill headwaters on the campus of Sussex County Community College (Latitude 41.06602, Longitude -74.75547; http://monitormywatershed.org/sites/NHPK9S/). The position of the station represents drainage from a large portion of the community college campus, as well as ball fields and residential areas on the east side of the upstream watershed (Figure 1).

- Developing an executive summary of data to be shared with local stakeholders

Paulins Kill
Water Quality Report
2020

This report is the product of an ongoing study conducted by Stroud Water Research Center and Wallkill River Watershed Management Group with funding from the William Penn Foundation as part of the Delaware River Watershed Initiative. Its purpose is to inform regional stakeholders of any existing water quality trends that represent a threat to the Paulins Kill River and its surrounding community. The recommendations provided should be used to address and prevent further degradation and to inform decisions on future stormwater management and planning in the area affected.

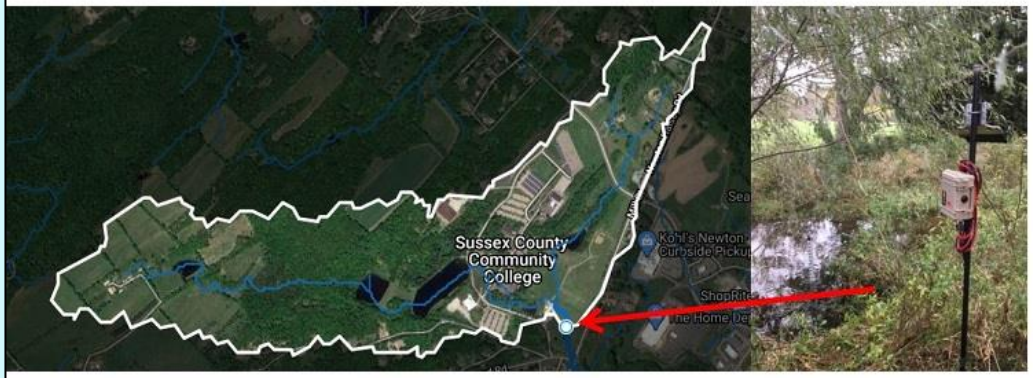


Figure 1. Site location of EnviroDIY monitoring station on Paulins Kill at Sussex County Community College and watershed boundary upstream of station.

STROUD WATER RESEARCH CENTER

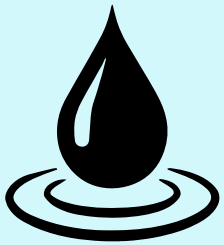
Wallkill River Watershed

WILLIAM PENN FOUNDATION

Components of the Executive Summary

- Introduction: watershed context and map
- Results/Potential causes of impairments
- Concerning data trends
  - Elevated conductivity
    - Human health concerns
    - Impact to fish, macroinvertebrates, and amphibians
    - Graphs of data
  - Elevated temperature
    - Impact to trout populations and downstream recreation
    - Graphs of data
- Recommendations for Stakeholders

So what?



- Executive summary informs locals about data being collected
- With knowledge of water quality impairments, they will be more likely to implement proposed changes.

How is the data is being used?

- Recommendations for specific stakeholders
- Communicating with the community college administration
  - Change of practices
  - Installation of porous parking lots, rain gardens, and trees on campus

Sussex County Community College Administration: Enhanced Long-Term Planning

- Assess alternative methods for road/parking lot de-icing in the winter
- Determine opportunities to reduce quantities of salt applied in the winter
- Evaluate whether ponded areas are necessary or if they could be removed to reduce stream warming
- Find stream reaches where riparian buffers can be expanded
- Analyze piped sections of the stream that could be "daylighted" and restored to a more natural channel shape and pattern

Local Environmental Organizations:

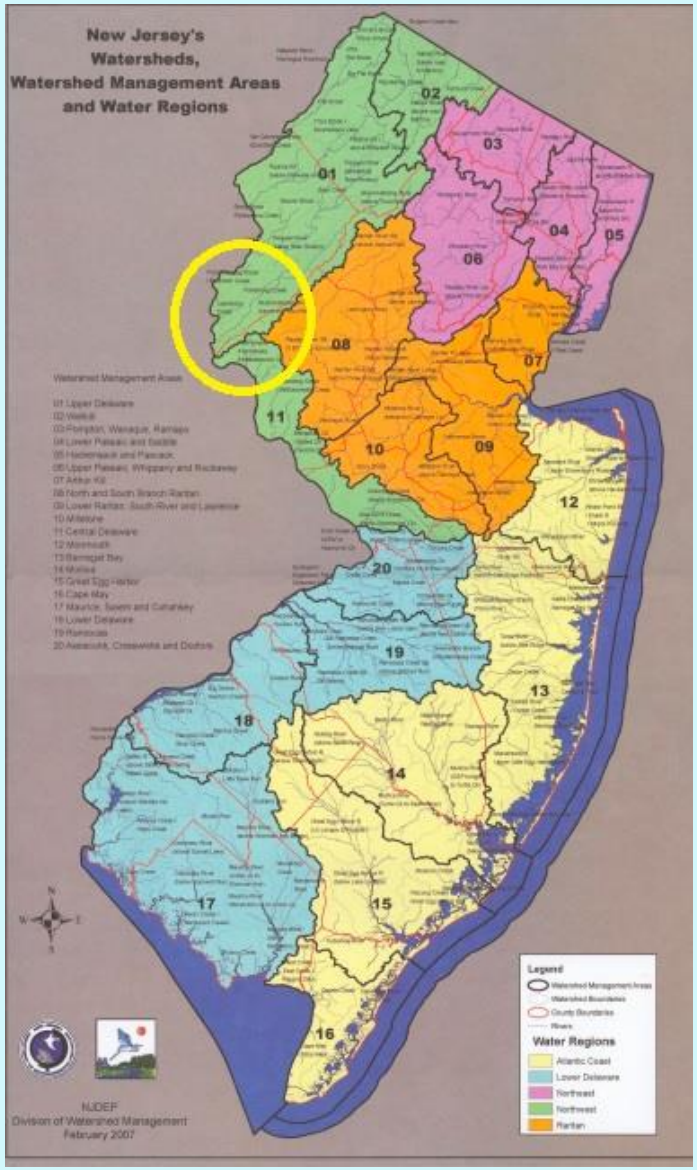
- Conduct additional water quality monitoring in the headwaters of the watershed to confirm observed trends in the data
- Work with local landowners to install green infrastructure and re-establish riparian forested buffers in the upper portions of the watershed, especially in Newton
- Install best management practices that will benefit fish passage
- Conduct educational outreach efforts to inform the general public about the high conductivity and temperature readings that have been observed
- Evaluate how elevated temperature in this headwaters region may inhibit downstream efforts to cool the stream and support trout habitat

Newton Municipal Officials:

- Evaluate whether stronger ordinances should be enacted for stormwater management
- Consider establishing stormwater utilities that could fund a municipal stormwater management program with the collected user fees

Replication = Greater Results

- Process being repeated in Lopatcong Creek Watershed
- Once finalized, executive summary template will be shared via WikiWatershed.



Discussion