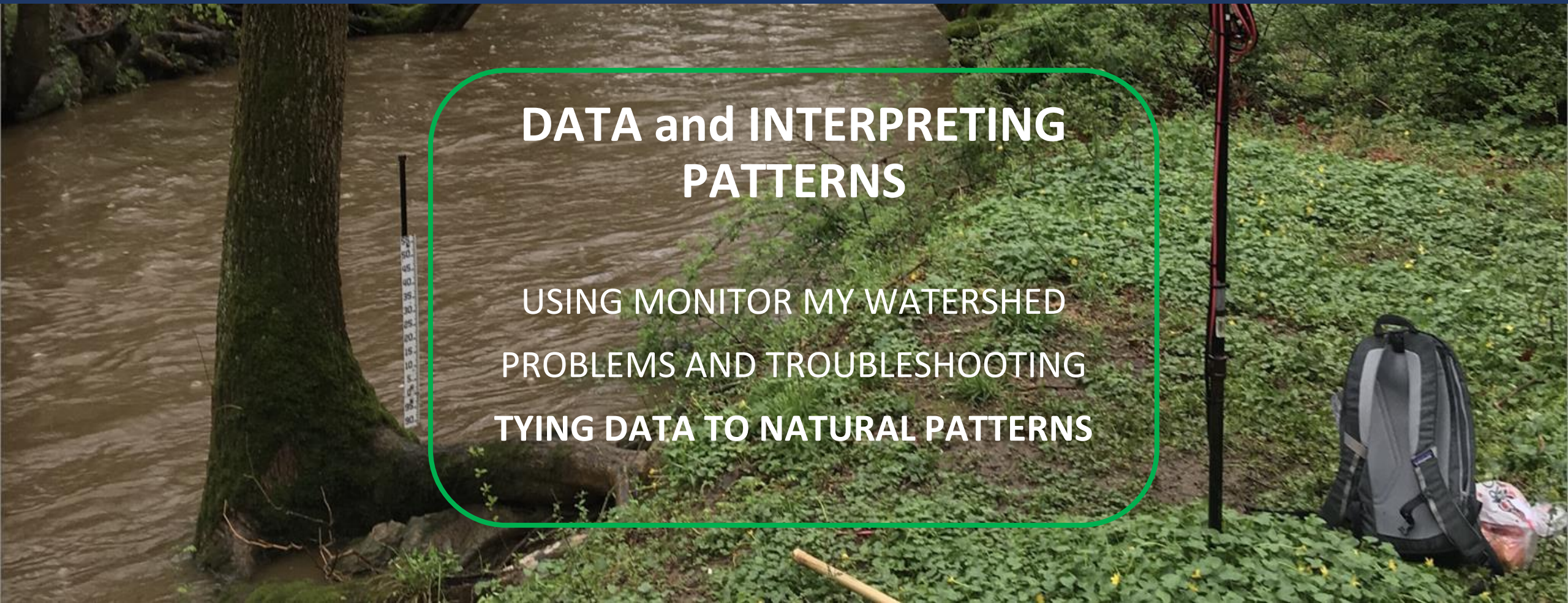
EnviroDIY Management Training Workshop
Berks Nature

March 9, 2024

Charlie Coulter and Carol Armstrong



DATA and INTERPRETING PATTERNS

USING MONITOR MY WATERSHED

PROBLEMS AND TROUBLESHOOTING

TYING DATA TO NATURAL PATTERNS

Stroud Center project personnel

Stroud Center team:

David Bressler

Community science facilitator

Christa Reeves

Northern DRB technician and collaborator

Shannon Hicks

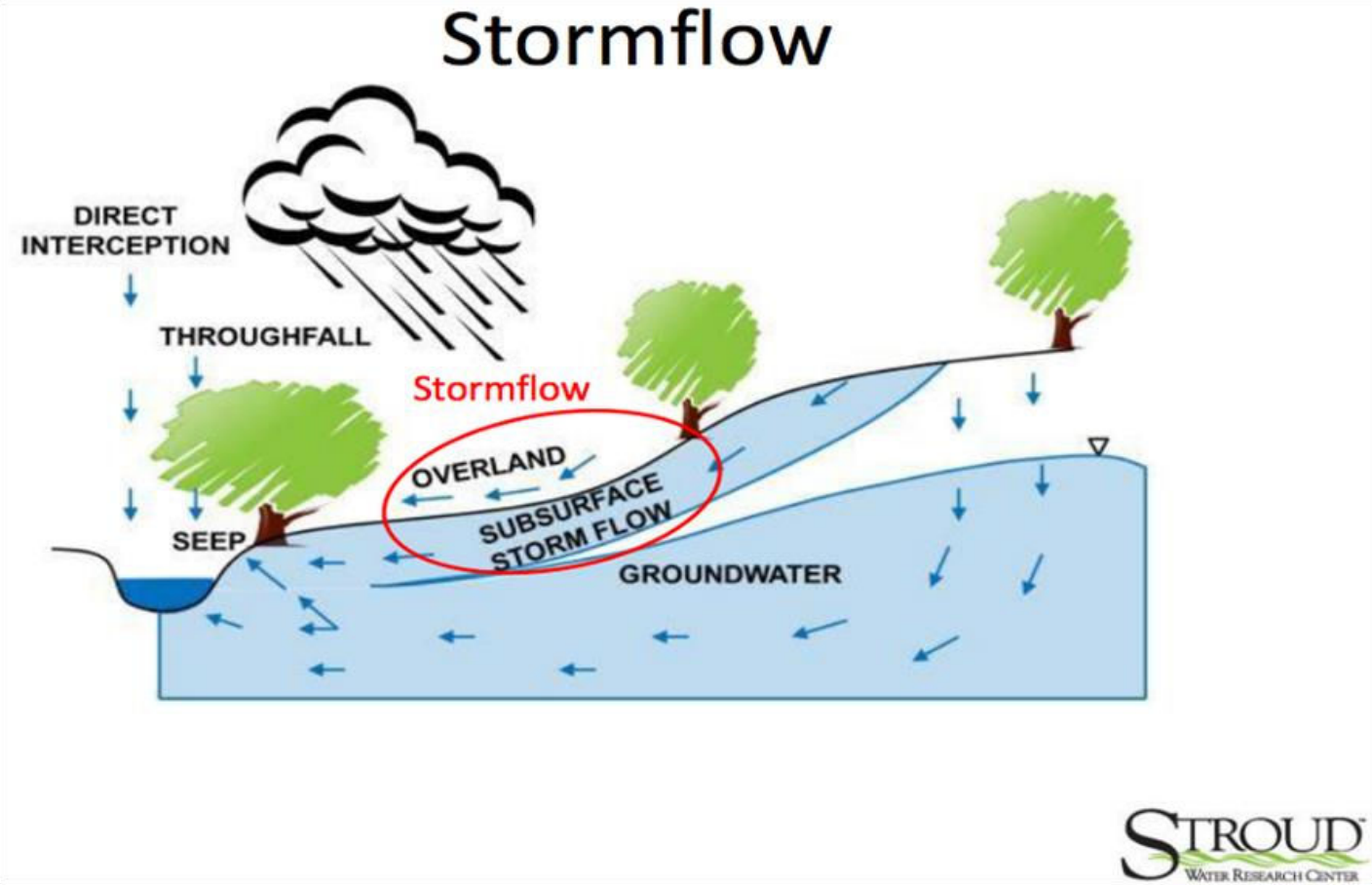
Research Engineer, Mayfly and EnviroDIY Inventor/Designer

Tying Data to:
Natural Patterns and Land Use Influences

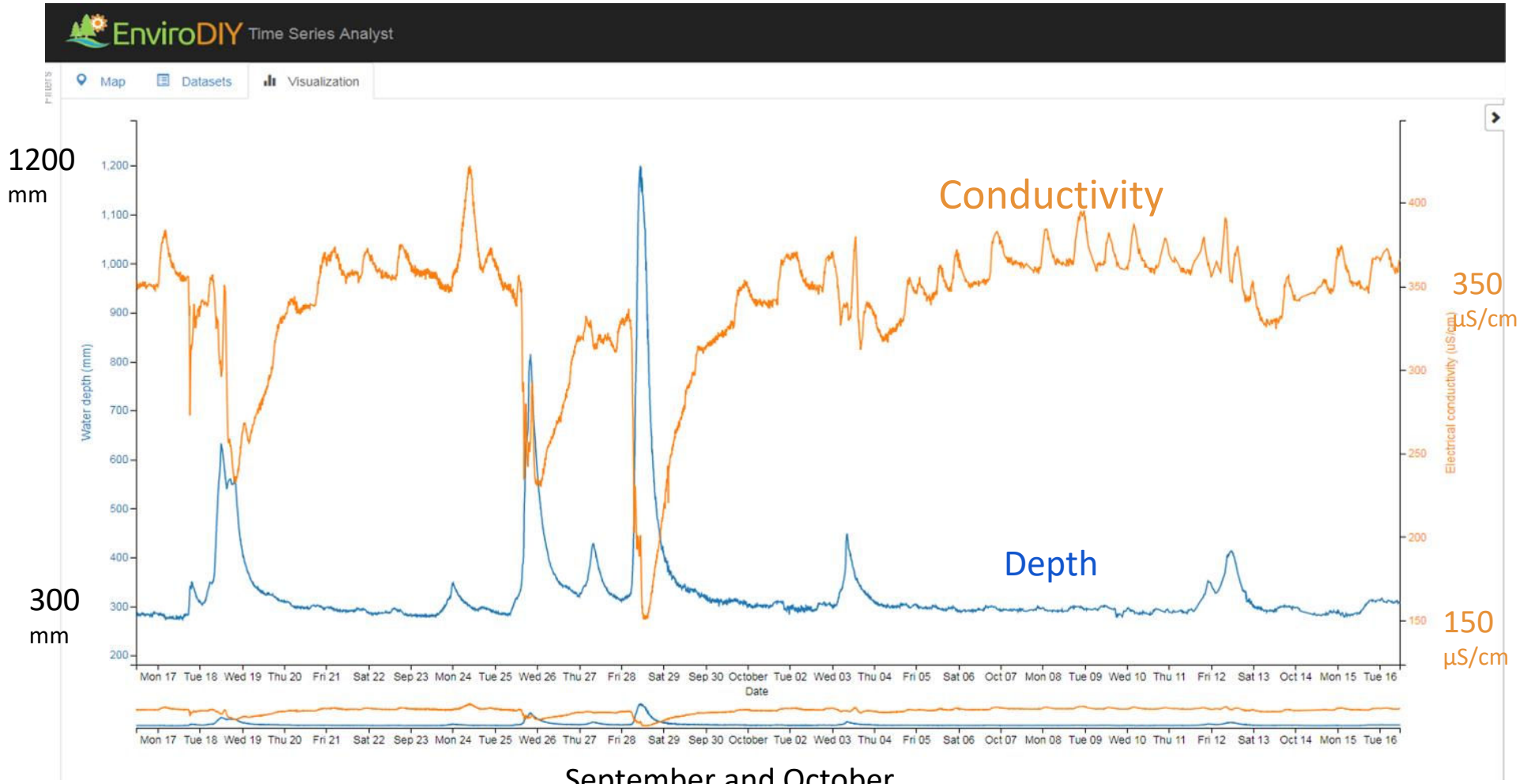
- Dilution
- Spikes and drops
- Seasonality
- Daily influences of heat and sun
- Impact of landscapes around a stream

Changes in Depth during Precipitation Events

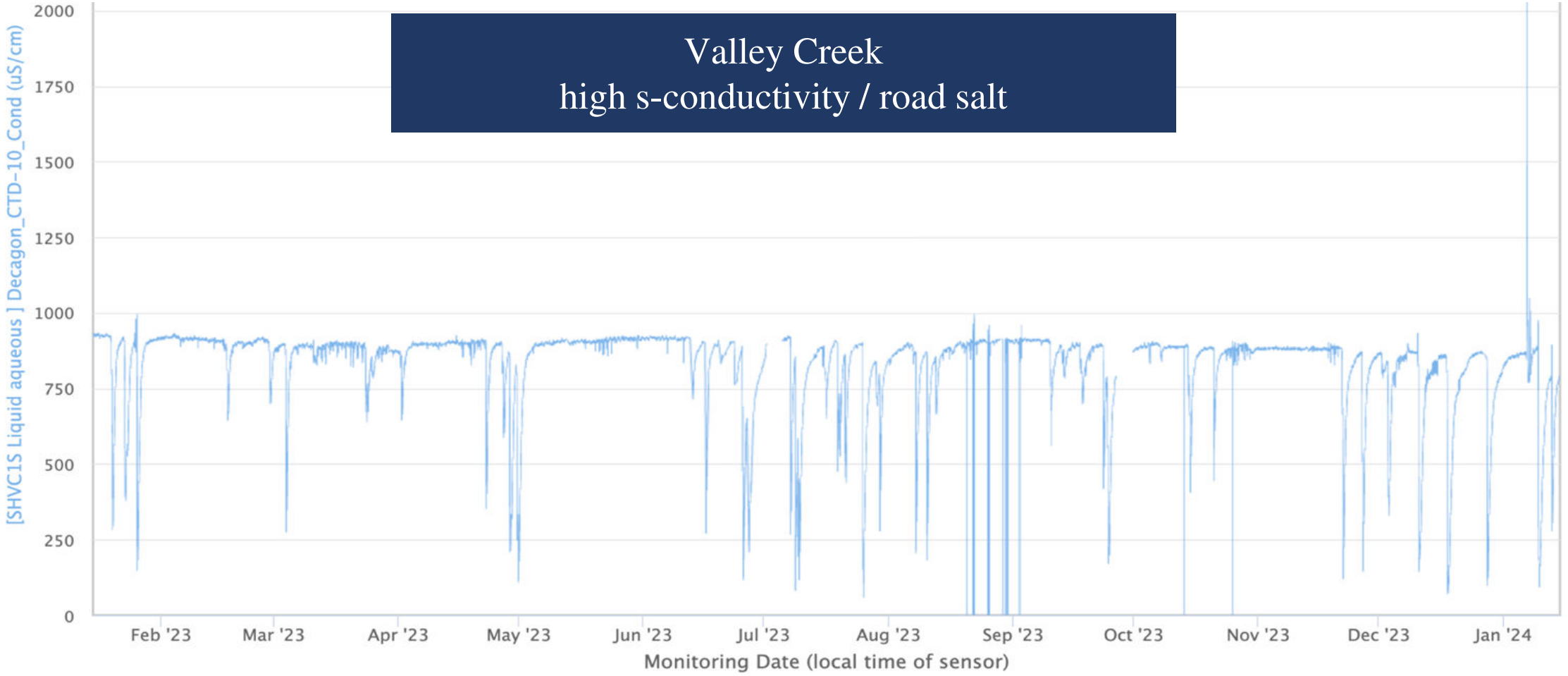
- Most streams in PA are perennial. What make a stream perennial?
- All of the precipitation that falls into a watershed flows into the streams in that watershed



Electrical conductivity measures the charges of dissolved ions in water

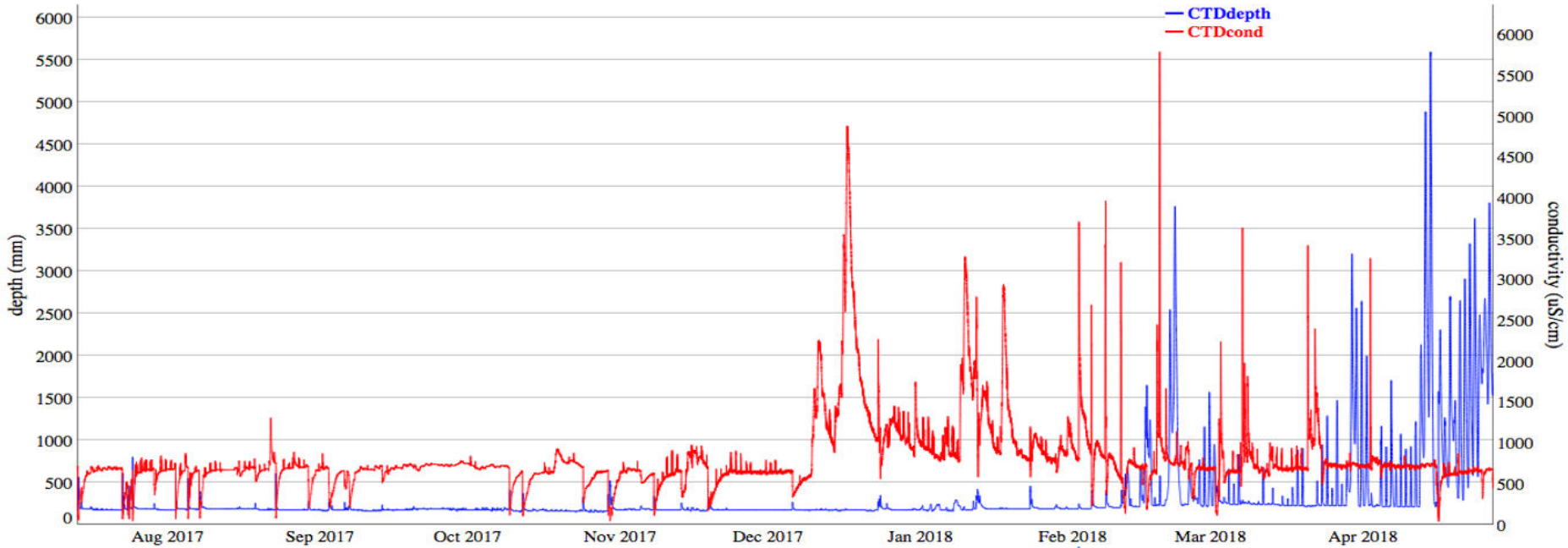


September and October

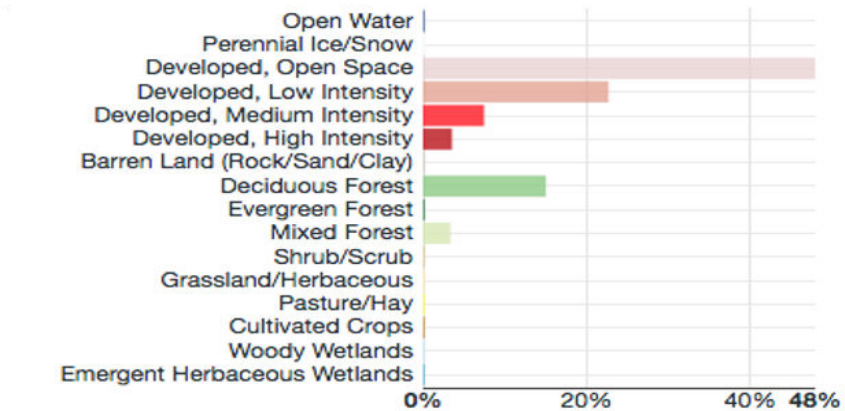


High conductivity during base flow indicates non-point source chloride contamination such as from groundwater, soil contamination, underlying soft geology, or mining discharges.

Salting of roads/driveways/parking lots is primary input for conductivity rises in winter

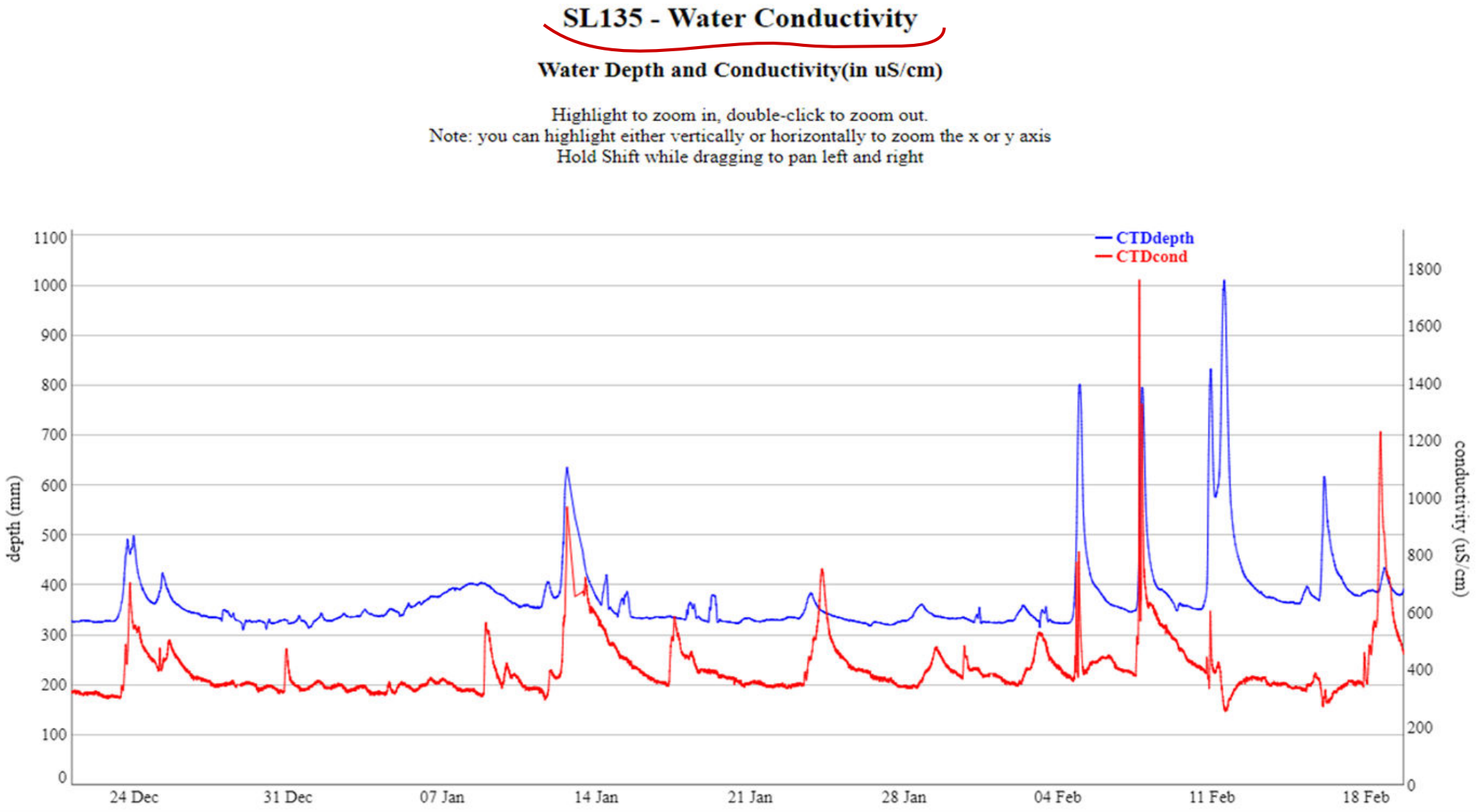


Cold months

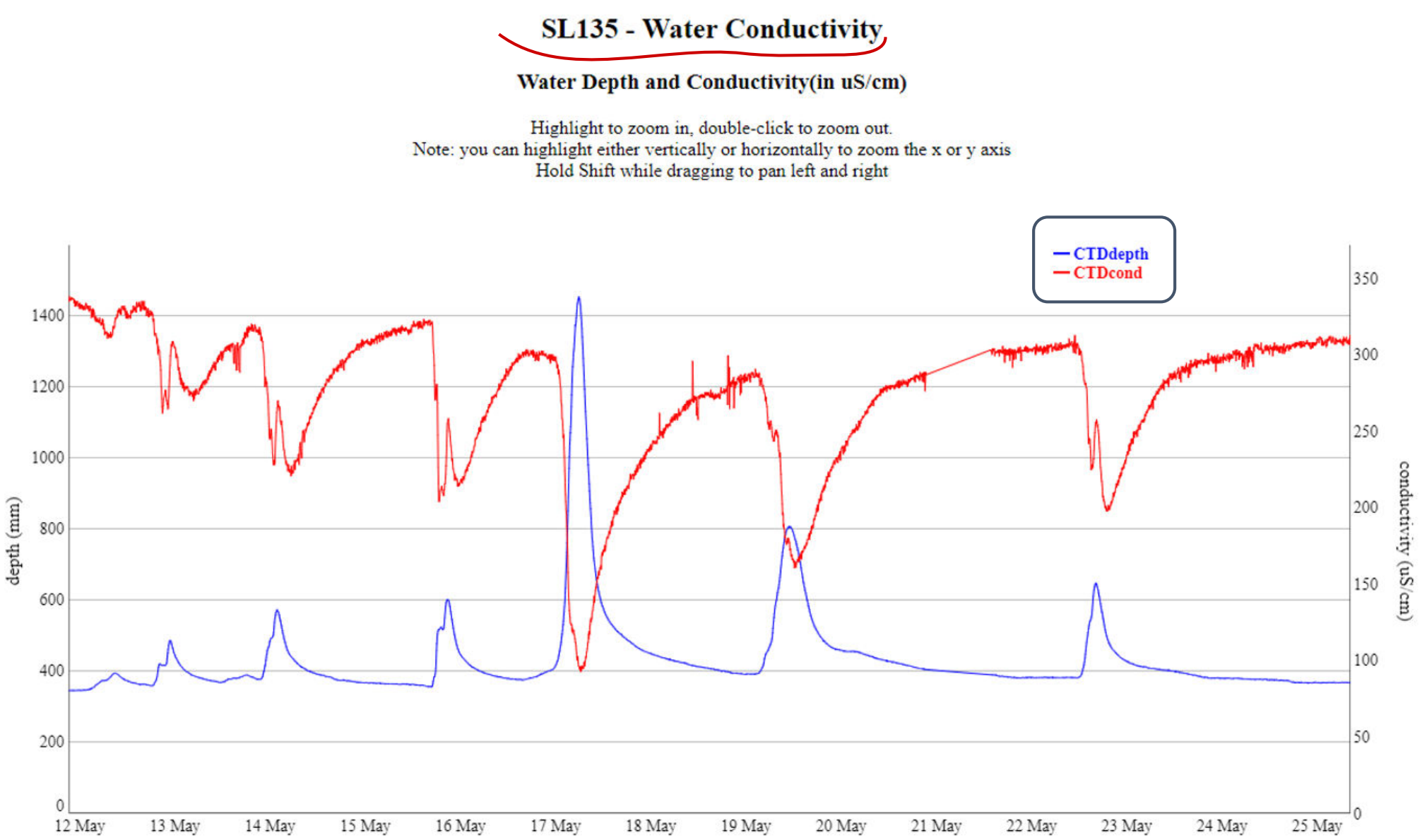


Housten Run, near Ambler

Seasonality - Winter Pattern



Seasonality - Summer Pattern



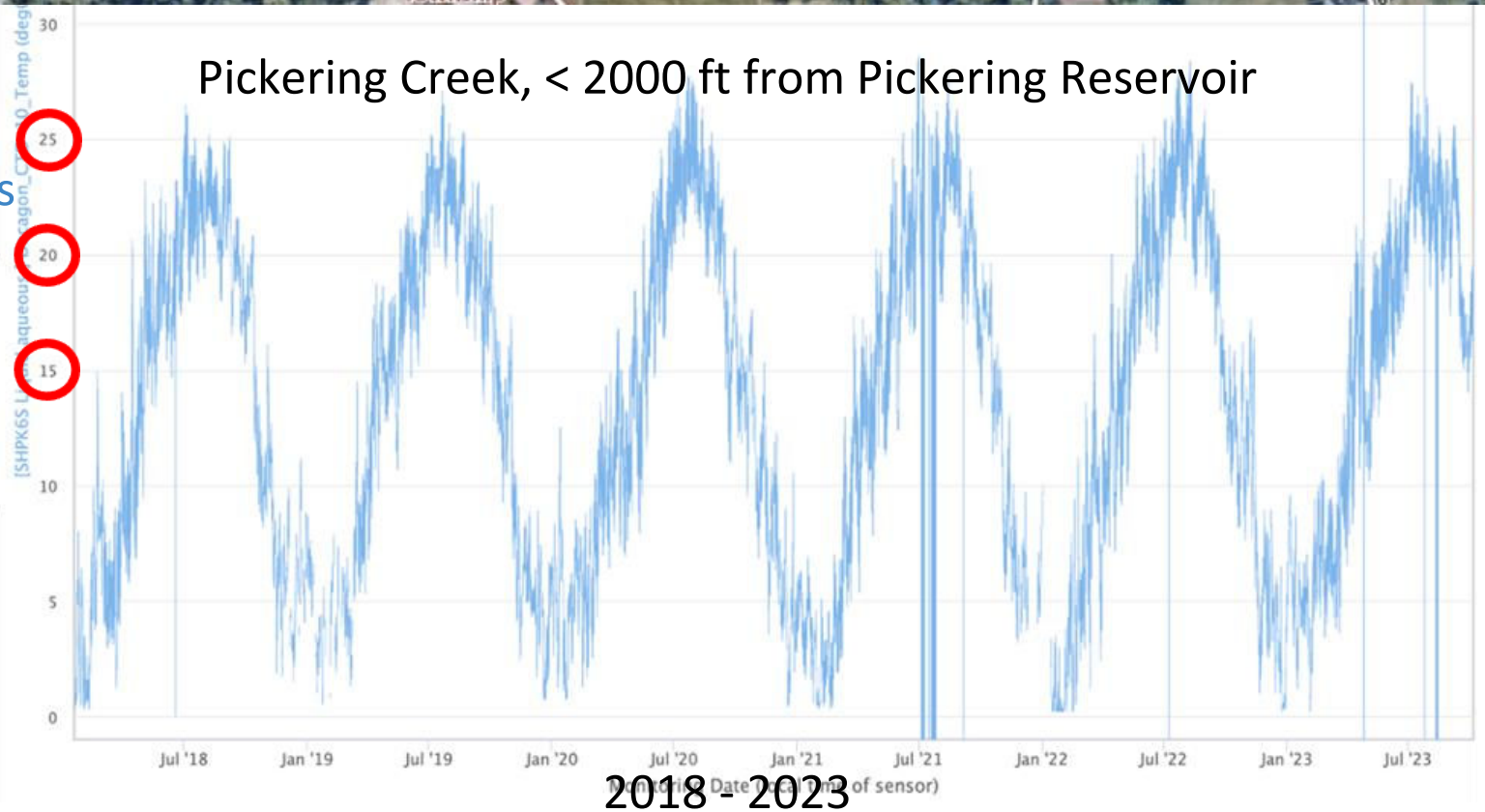
Seasonality - Temperature

Pickering Creek, < 2000 ft from Pickering Reservoir

Temperature - celcius

Coldwater fish (trout)

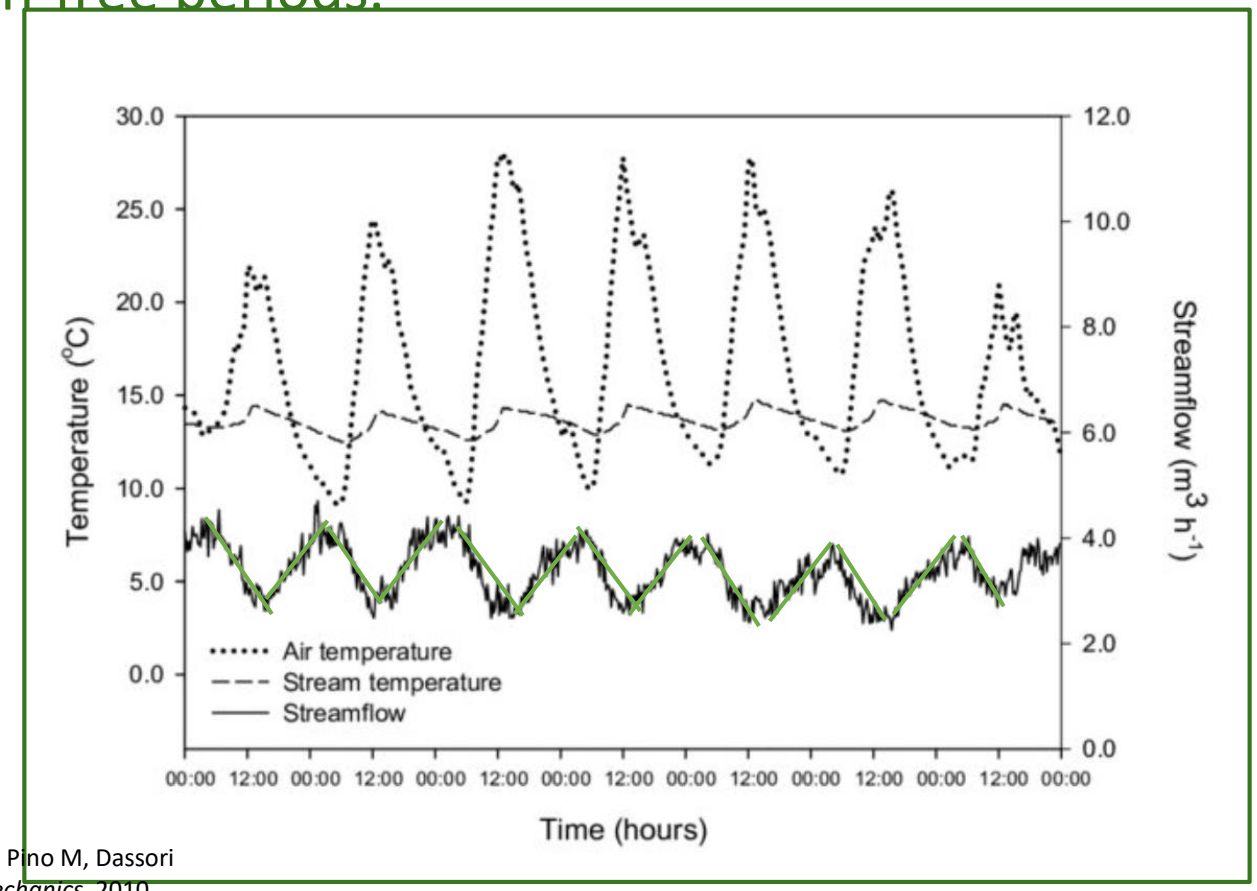
Optimal growth: **13–16 °C**
Stress responses initiated: **20 °C**
Upper Incipient Lethal Temperature: **24 °C**



2018 - 2023

Diurnal Rhythms

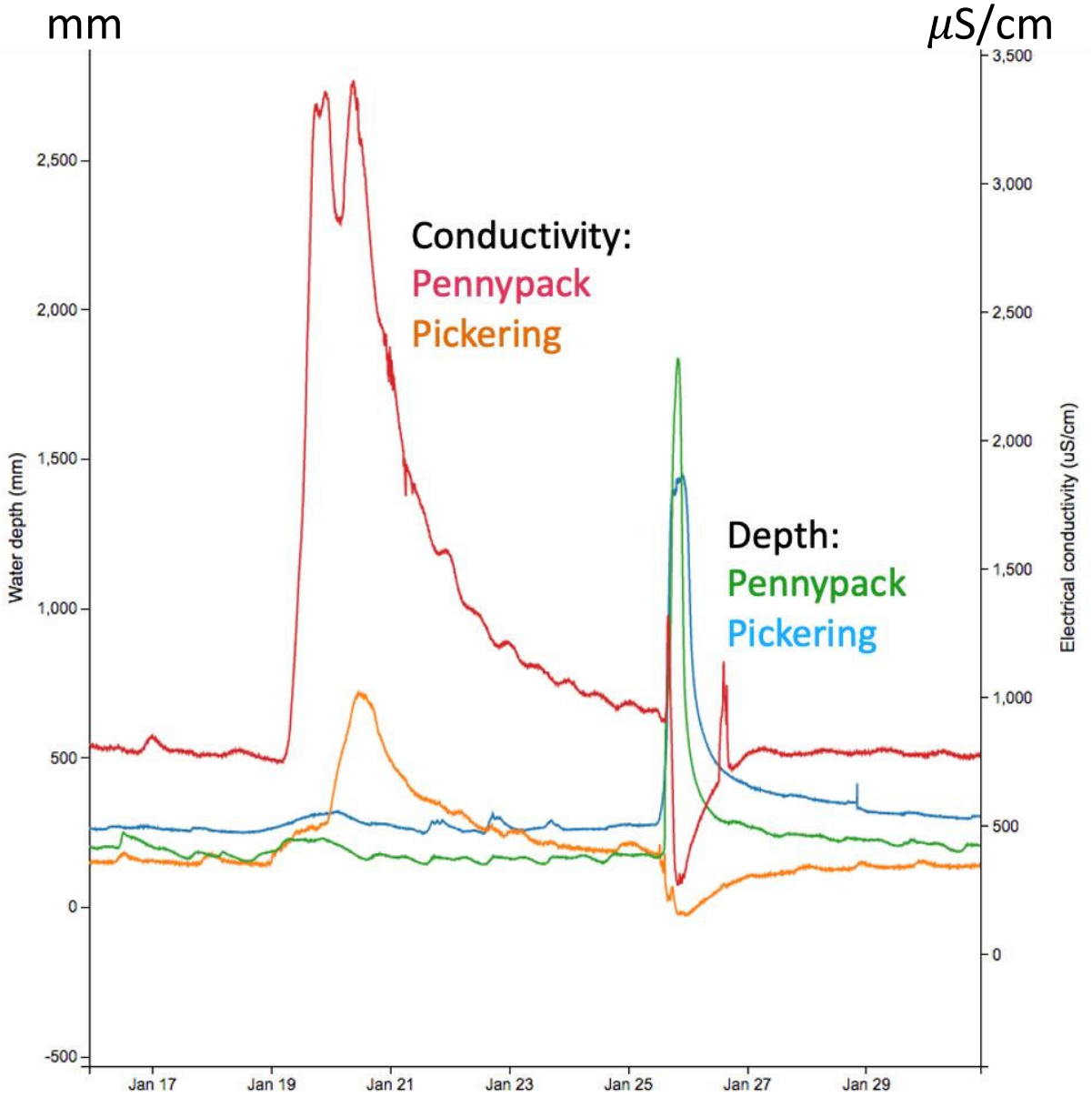
Streamflow/depth variations from **evapotranspiration/tree sap flow** in summer months can be seen in forested streams during baseflow, i.e., precipitation-free periods.



**This pattern of variability must be checked against possible sensor malfunction.

Cuevas JC, Calvo M, Little C, Pino M, Dassori P. J *Hydrology and Hydromechanics*, 2010

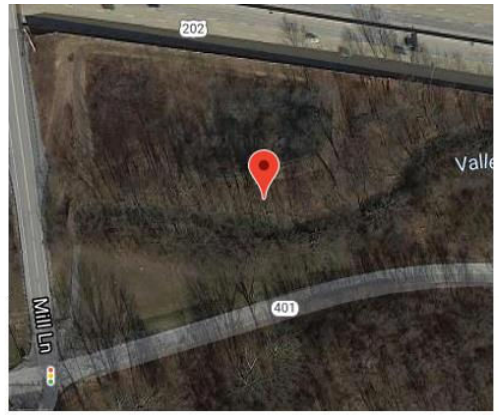
Impacts of Landscape on Depth and Conductivity

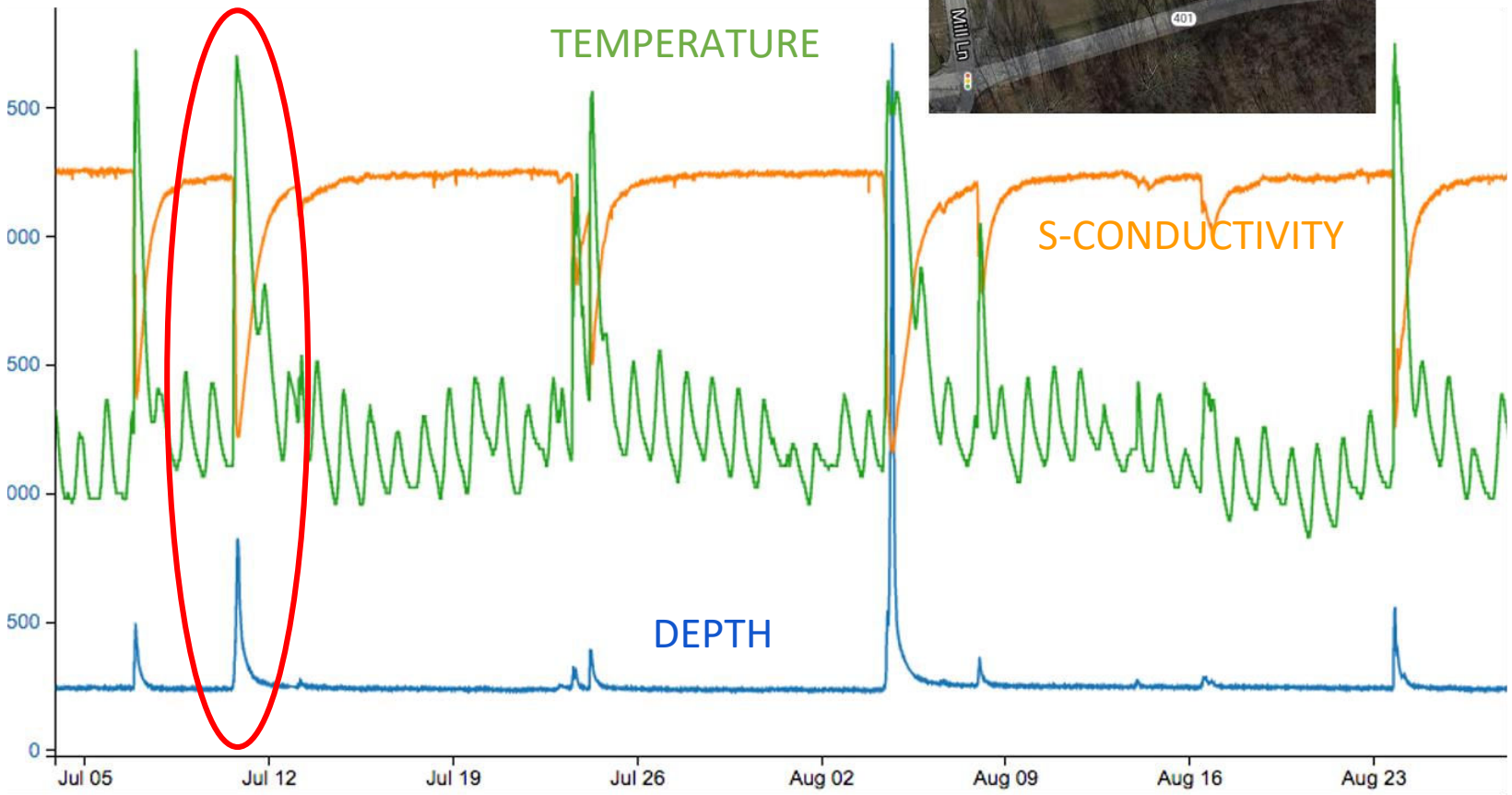


Spikes in Temperature in Urban Settings During Rain Events

- ➔ Air temperatures vs cold groundwater-fed streams
- ➔ Short and intense rainstorms preceded by full or partial sun.

Valley Creek, East Whiteland

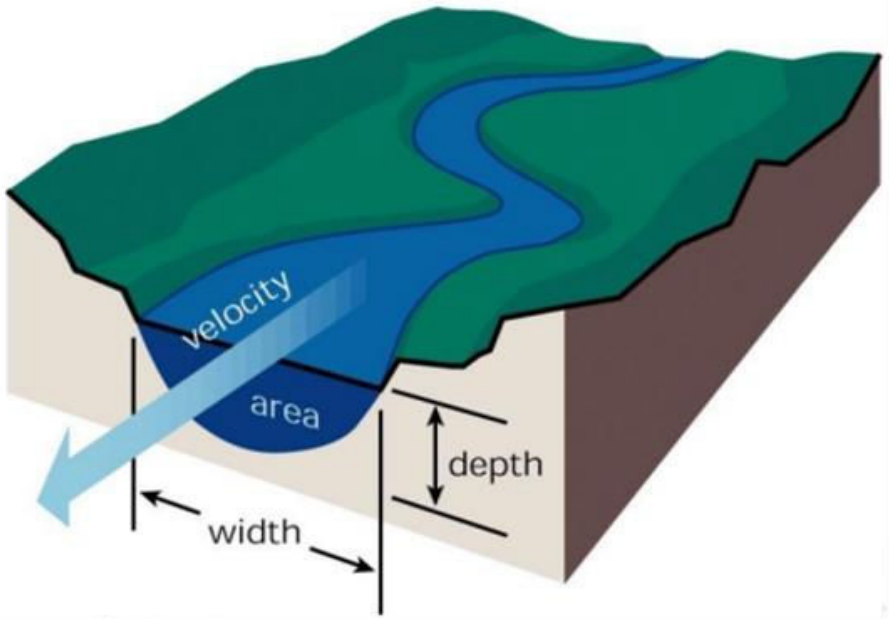




Stream Discharge - How Much and How Fast

$Q = A * v$

- Q = discharge, m^3/s
- A = x-sectional area (m^2) = Depth * Width
- v = velocity (m/s)



Melinda Daniel, Stroud Water Research Center

Discharge Rating Curves

STROUD WATER RESEARCH CENTER
www.stroudcenter.org

Stream Discharge Data

Measurement by (Name(s)):

Site ID: SHPK6S	Stream Name: Pickering	Location: Phoenixville YMCA	GPS (Lat/Long):
Date: 3-2-2018	Staff Gage Height at start (m): .695	Velocity Meter Type:	Notes:
Start Time: 10:39 AM [ ] PM [ ]	Staff Gage Height at end (m): .695	Serial Number:	
StopTime: 10:44 AM [x] PM [ ]	Sensor-Reported Water Depth (mm): 732	Calibration Date:	
Time Zone: EST [x] EDT [ ]			

CROSS SECTION AND VELOCITY

When safely wadable, take a wetted cross section measurement, recording the distance along the measuring tape (tagline) and the water depth across the stream. The tagline should be strung between the bank pins. If a velocity meter is available, record the water velocity at each interval. Make note of the REW/LEW (right/left edge of water) and RPIN/LPIN (right/left bank pin). Right and left are determined when facing downstream. If wadable, whether using flow meter or neutrally buoyant object, always record Points to Note, Distance Along Tagline, and Water Depth. If not wadable, use predicted wetted area (from StagetoAreaPredictor spreadsheet) and measure velocity using Neutrally Buoyant Object section OR take at least one velocity measurement using flow meter from bank (better option).

Point	Points to Note LPIN/RPIN LEW/REW	Distance Along Tagline (m)	Water Depth (m)	Velocity (m/s) (Using Flow Meter)	Comments

NEUTRALLY BUOYANT OBJECT

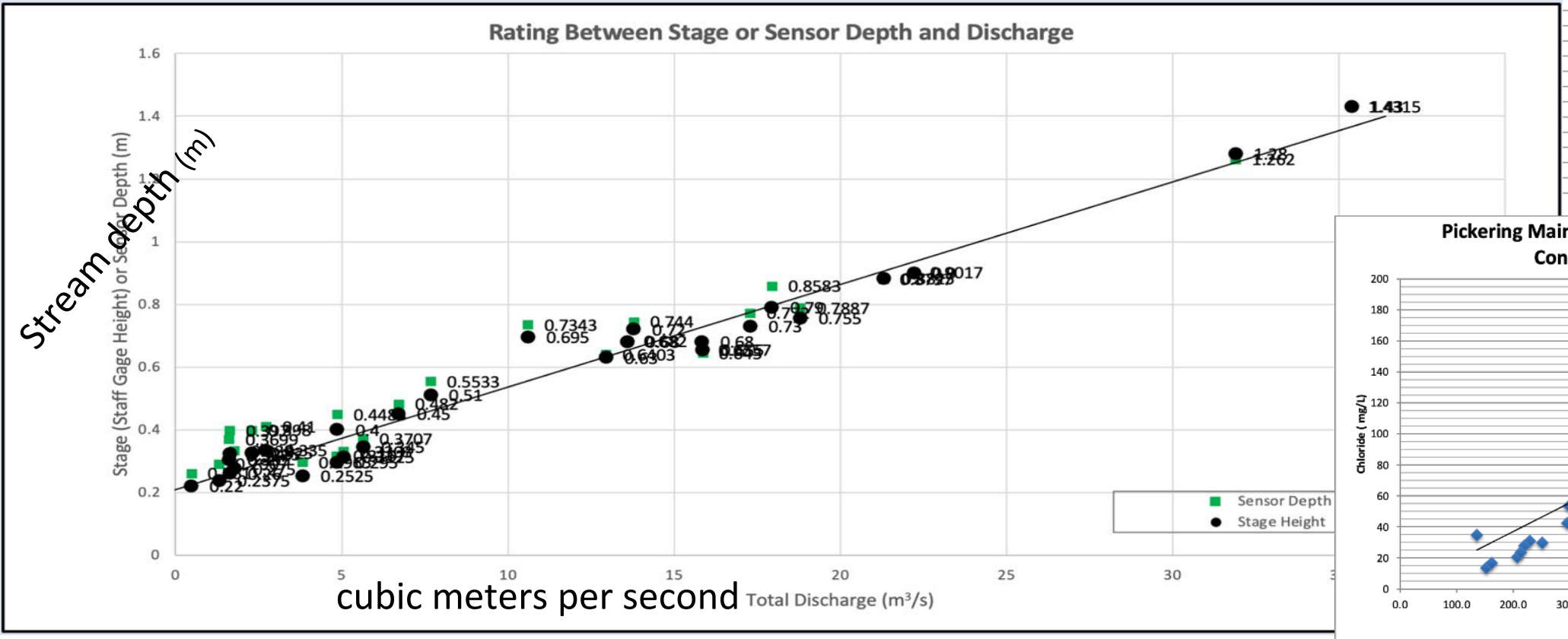
Float object through main path of the stream. The measured transect should be halfway between the start and stop point. The total distance should be enough to ensure a travel time of >5 seconds.

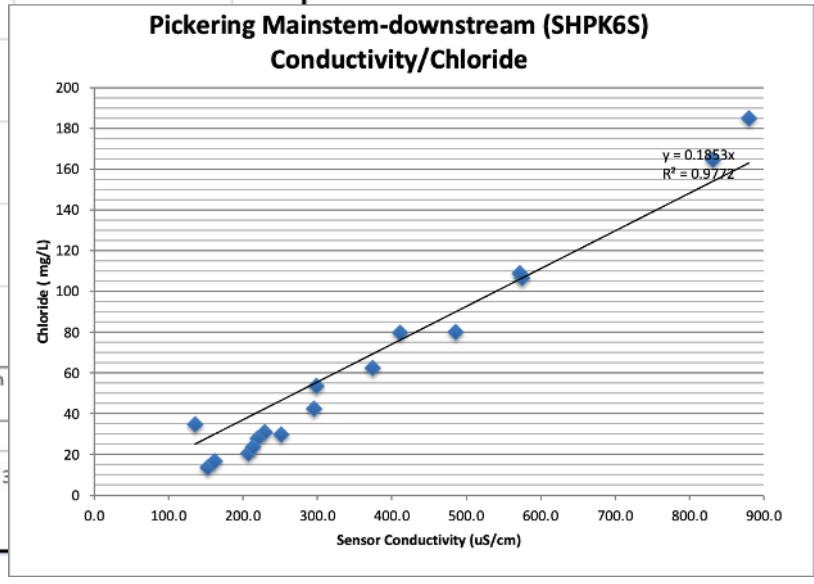
TOTAL Travel Distance (m): 7.32 m (24 ft)

Start-to-Transect Distance (m): 3.66 m (12 ft)

Transect-to-End Distance (m): 3.66 (12 ft)

	Travel Time (seconds) (record at least 5)
1	7.65
2	8.23
3	7.26
4	7.08
5	7.42
6	
7	
8	
9	
10	





Sherri Mason's studies showed that human activity is an influence beyond land use.

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