Alternative Check Dams for Polyacrylamide Dosing

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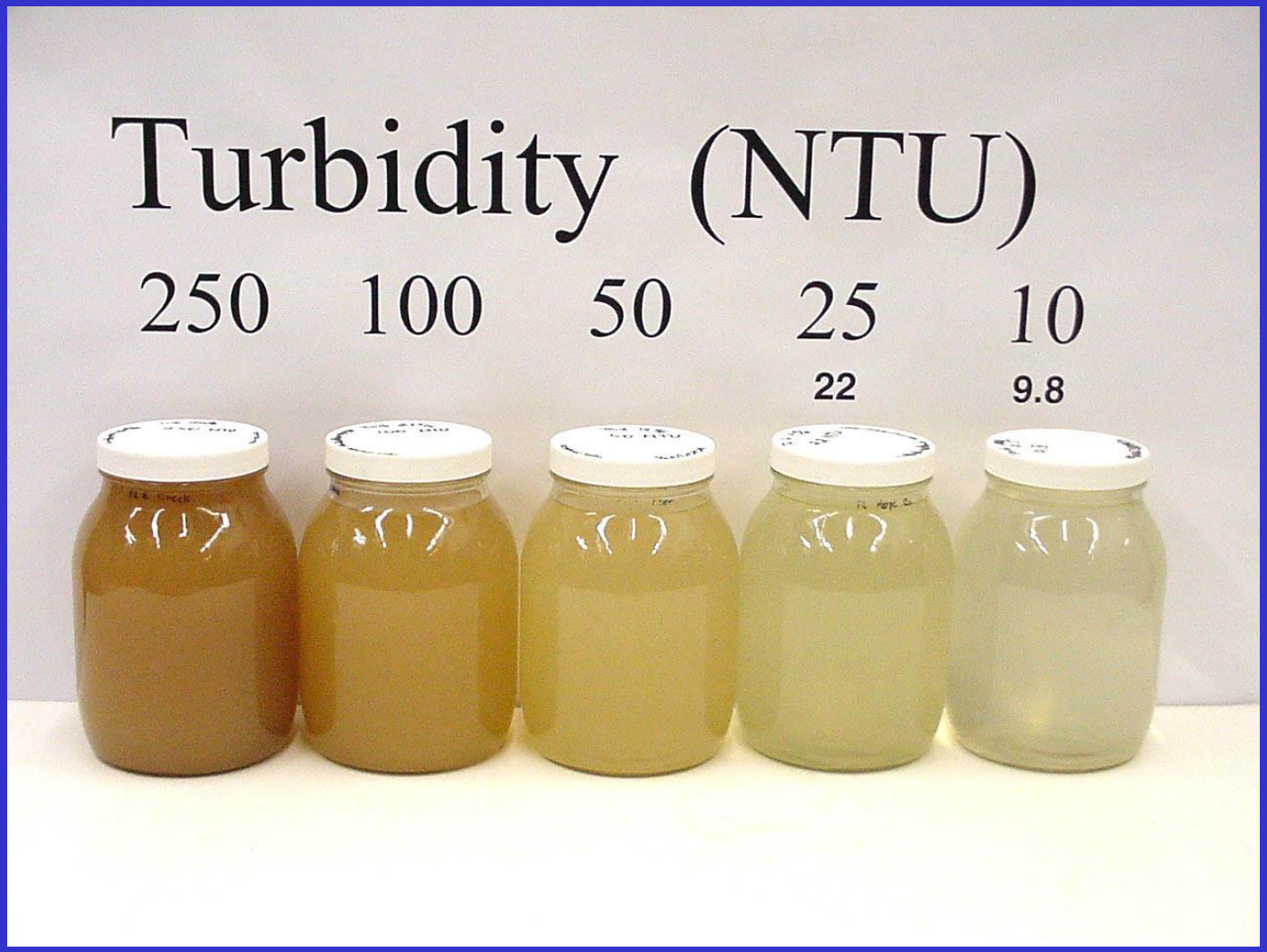
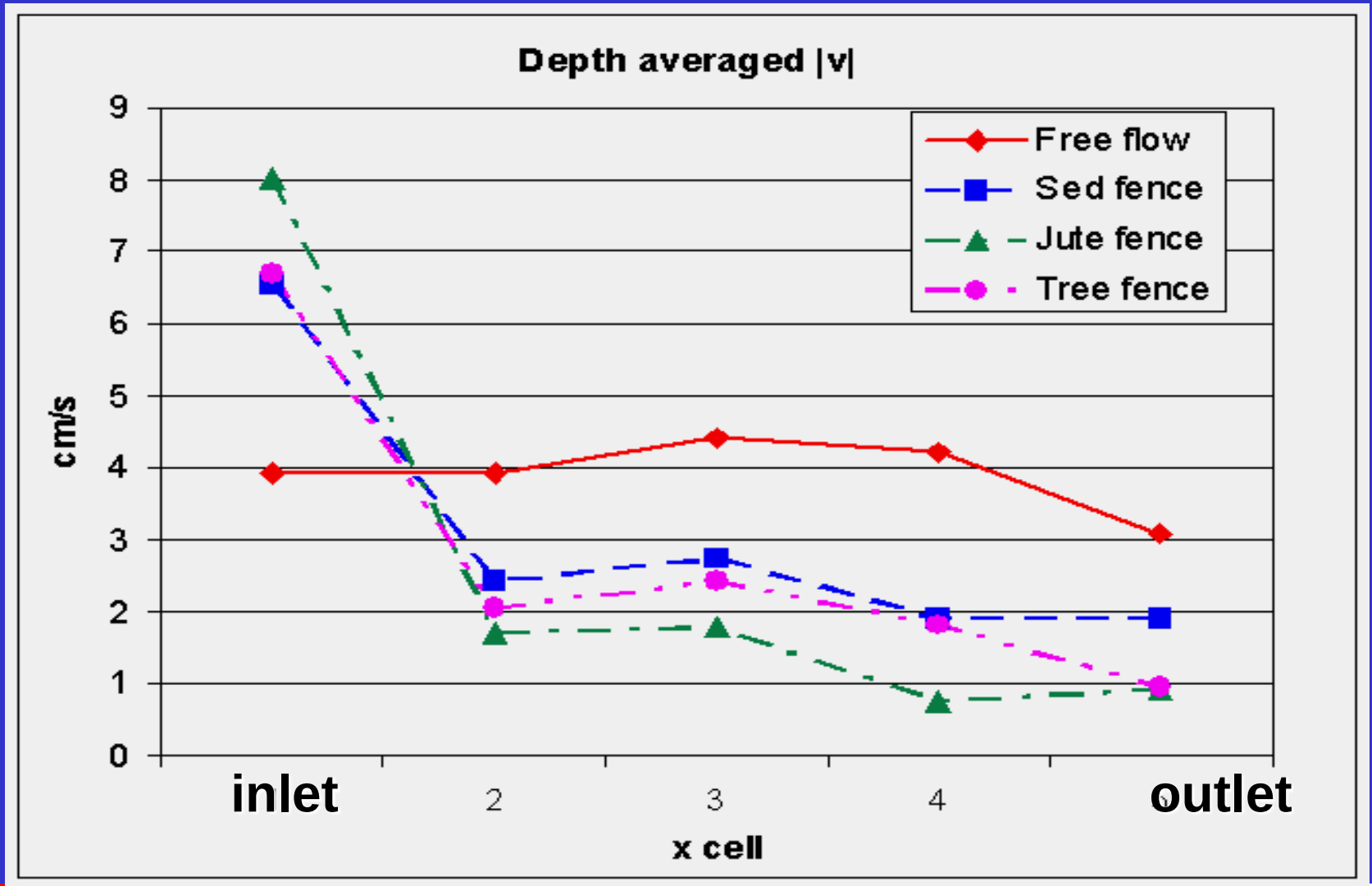
Sediment is the #1 pollutant
in NC waterways!

EPA Rules and Regulations



Effects of Baffles: Velocity



Check dams should help prevent erosion and scour and promote grass growth!


We don’t want to create erosion!


Rock


Rock w/ coir


Coir logs


Excelsior wattles


Rock w/ Excelsior

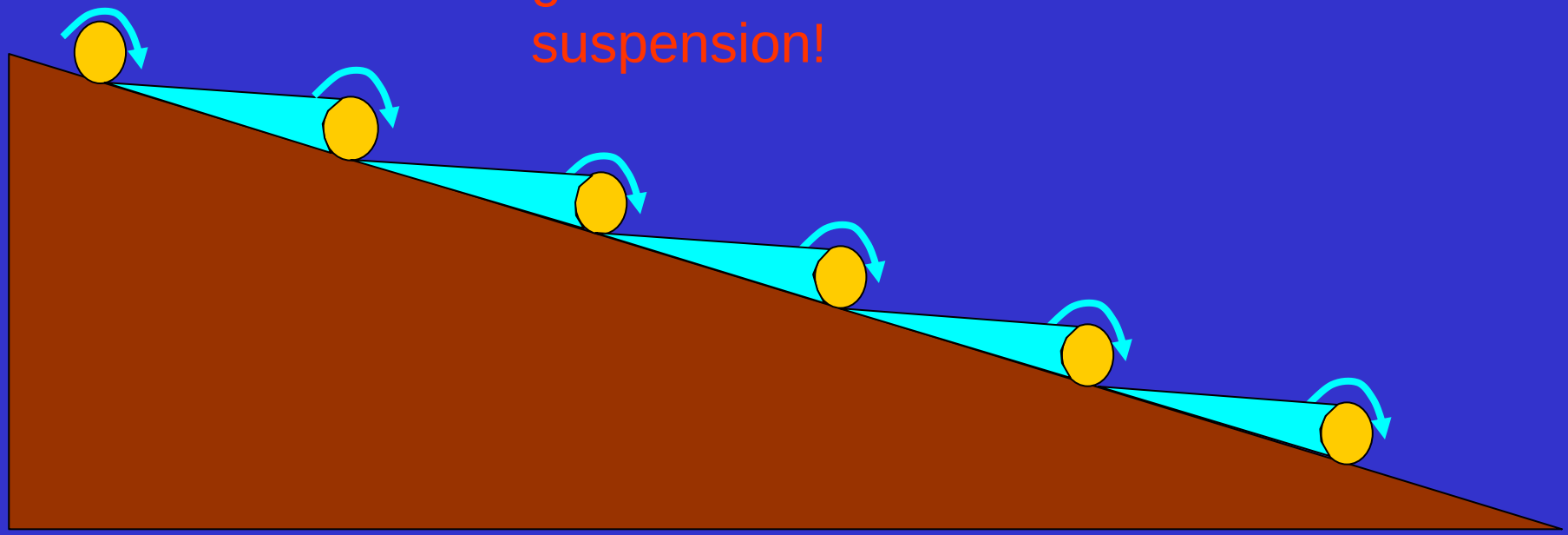
soil

- 4 minutes at each 0.5, 1.0, 2.0, 1.0, and 0.5 cfs
soil added at 6,000 mg/L
4 samples were collected in each bottle- 5 bottles total
3 consecutive runs
sediment depth and length was measured
LIDAR scan was taken

Ideal BMP Spacing

- BMPs theoretically spaced such that flow goes from pool to pool…

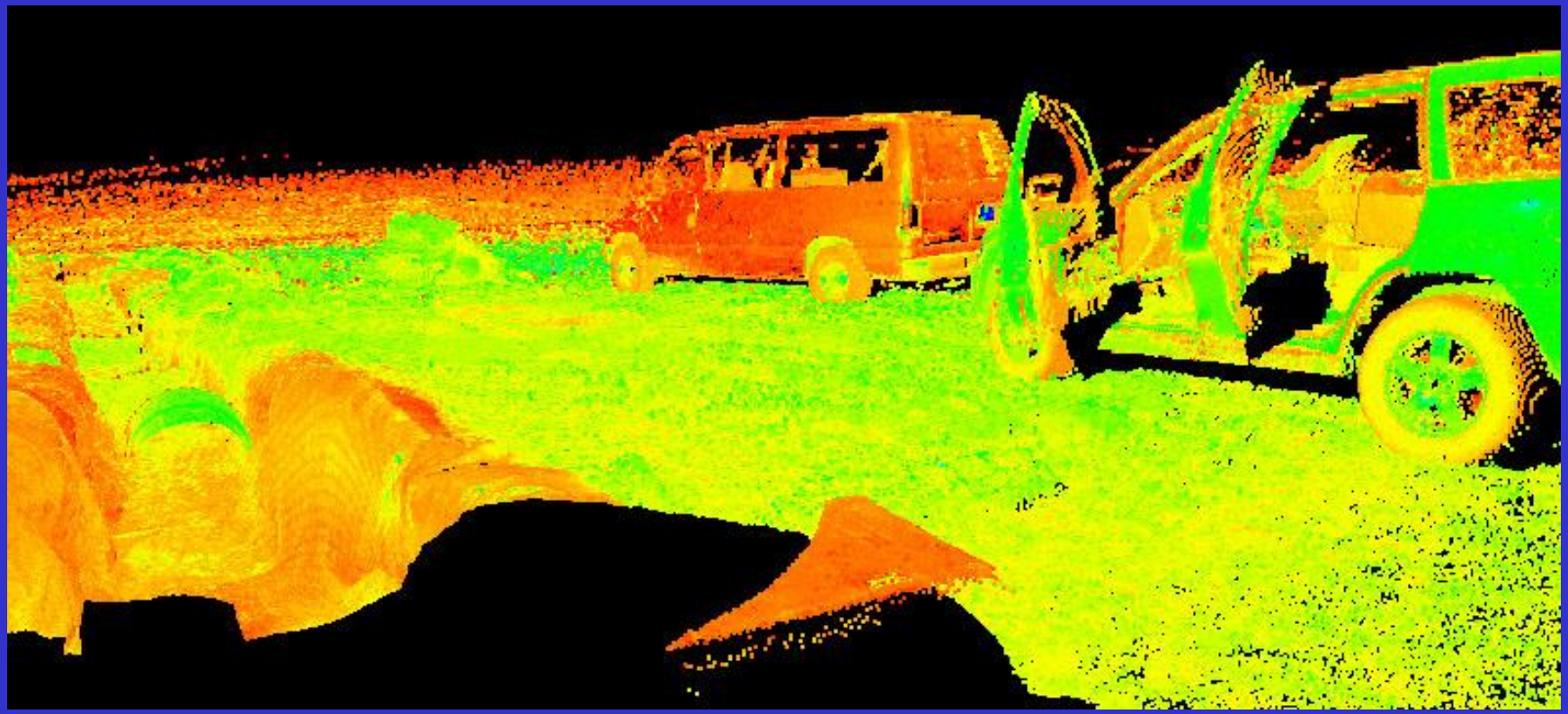
This slows water velocity down and gives more time for water to infiltrate into the ground and causes sediment to fall out of suspension!



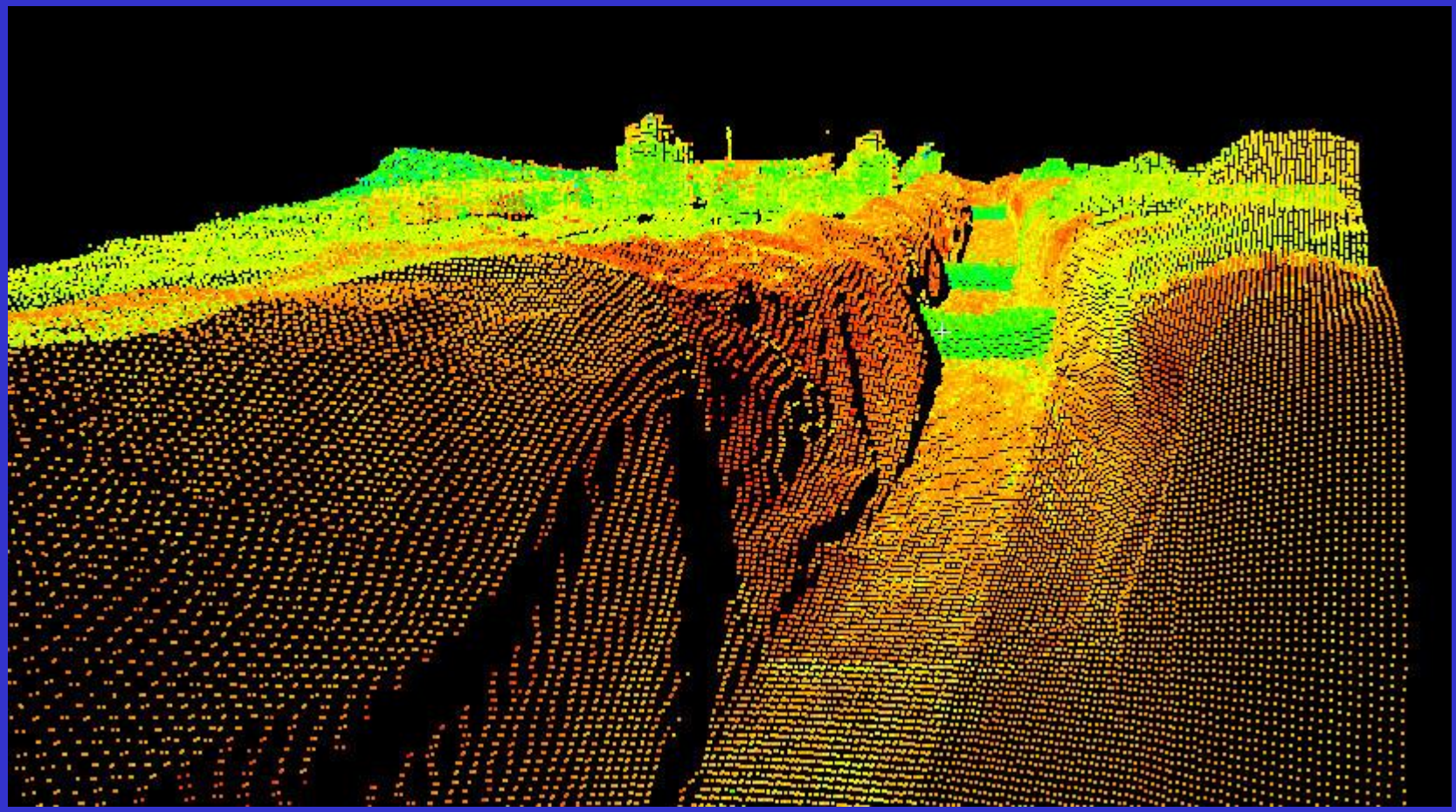
Ground-based LIDAR

- LIDAR – LIght Detection And Ranging
  - Uses reflected laser pulse to determine 2-way travel time
    - (X,Y,Z) coordinates from the scanner head
  - Records 50,000 points/second
  - 360 degree field of view

Scanning Site (SECREF)

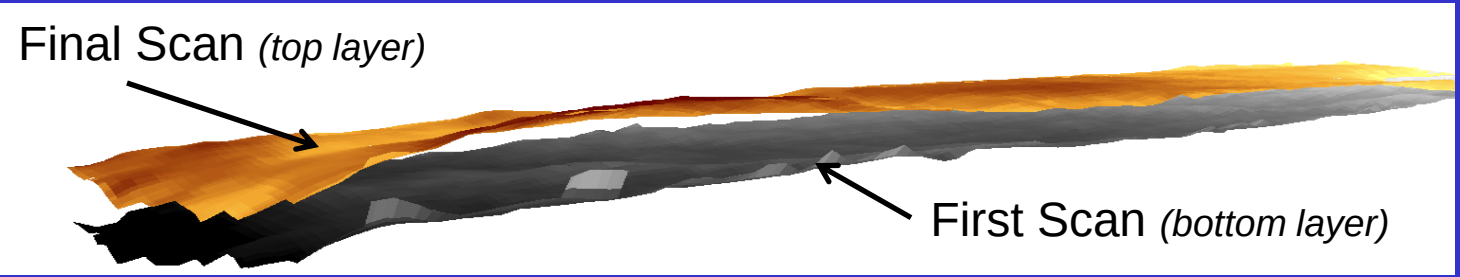


LIDAR Data (Down Channel)



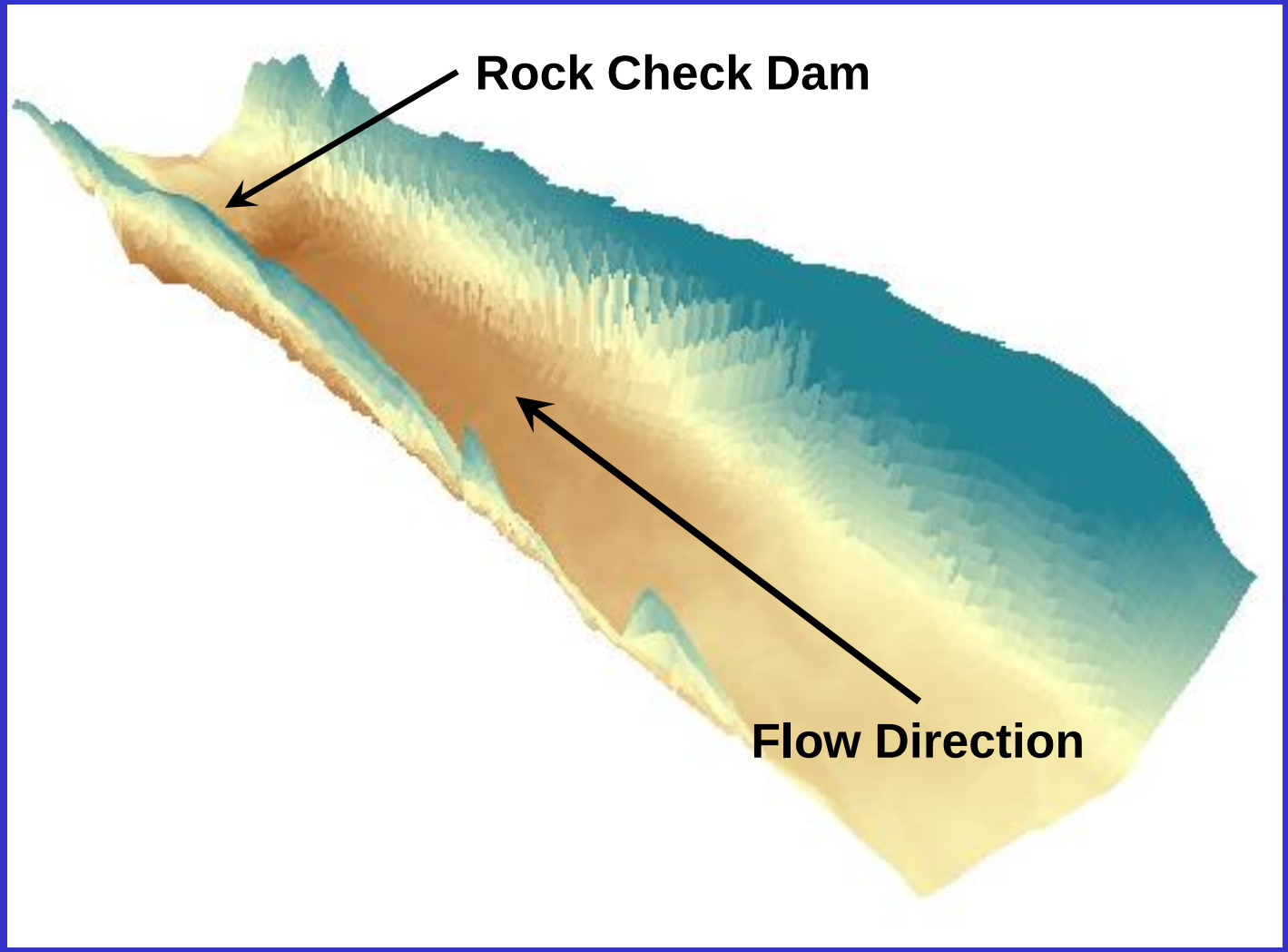
Methodology

- Take LIDAR scans before and after test
- Interpolate points to 3-D surfaces
- Calculate the difference in the 2 surfaces
  - Reveals total volume and spatial distribution of sediment captured within the basin



3-D View of Before and After Surface

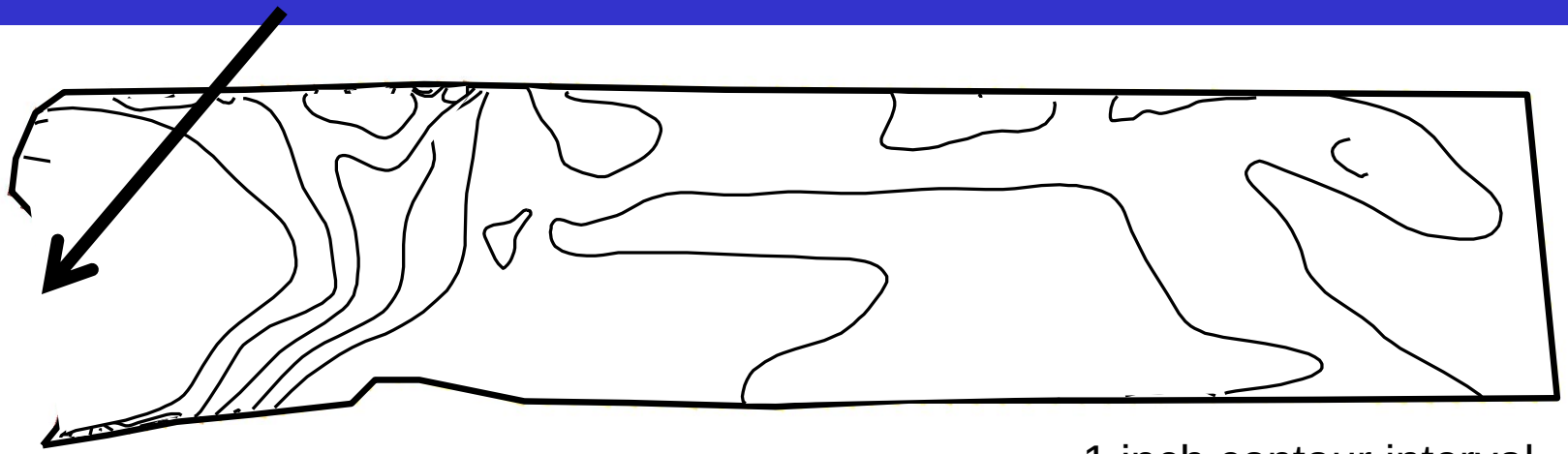
3D Channel



Coir3 Sediment Depth

- Sediment In Front of First Coir Check Dam

Coir Location



Method Comparison

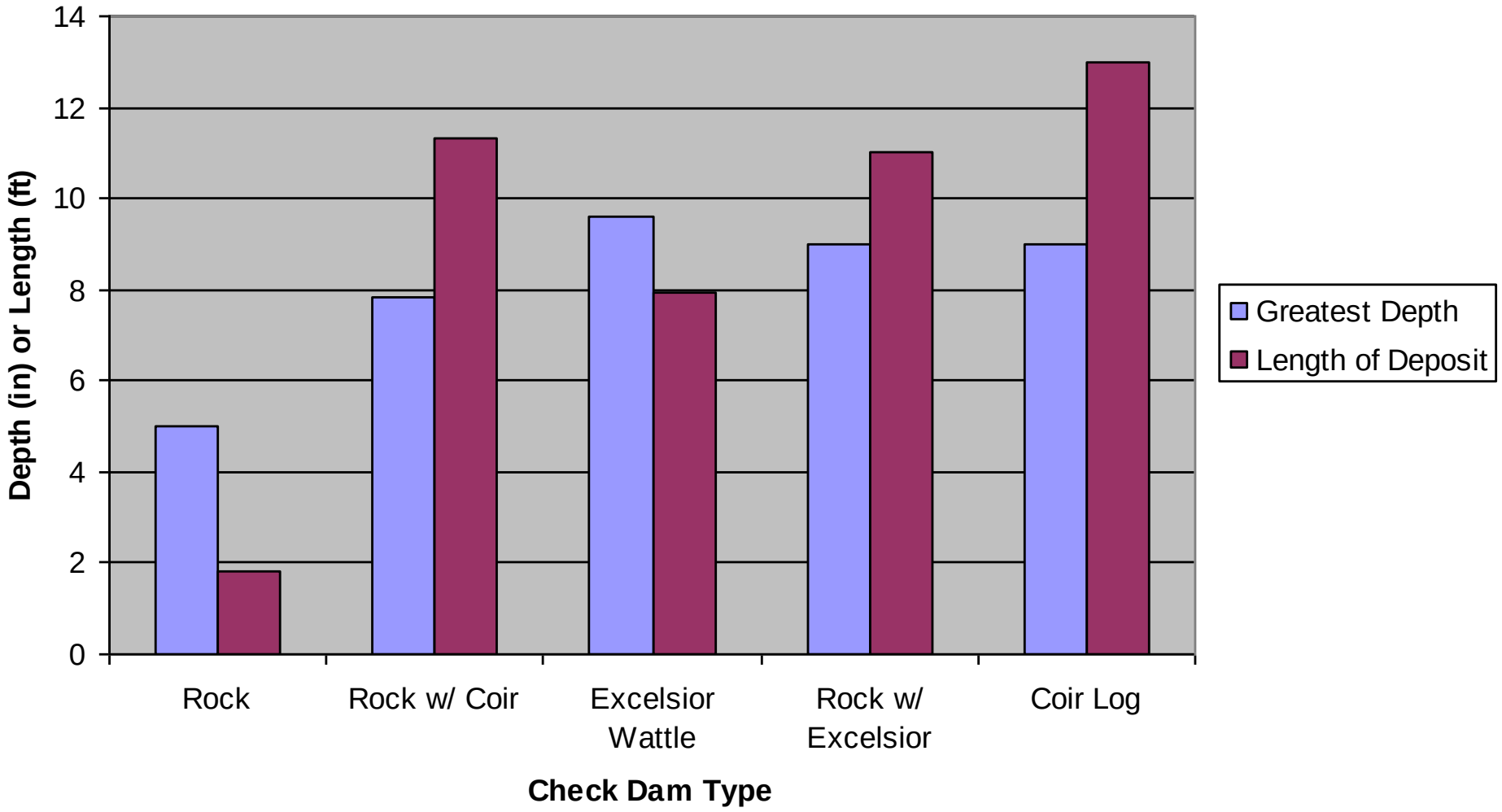
In Front of First Trap

RUN NAME	max depth(in)	Volume (m3)	Volume (ft3)
Coir3	11.19	0.130	**4.58**
RC2	7.88	0.230	**8.12**
RC3	8.01	0.220	**7.77**
RX1	9.69	0.183	**6.46**
X2	8.80	0.053	**1.87**

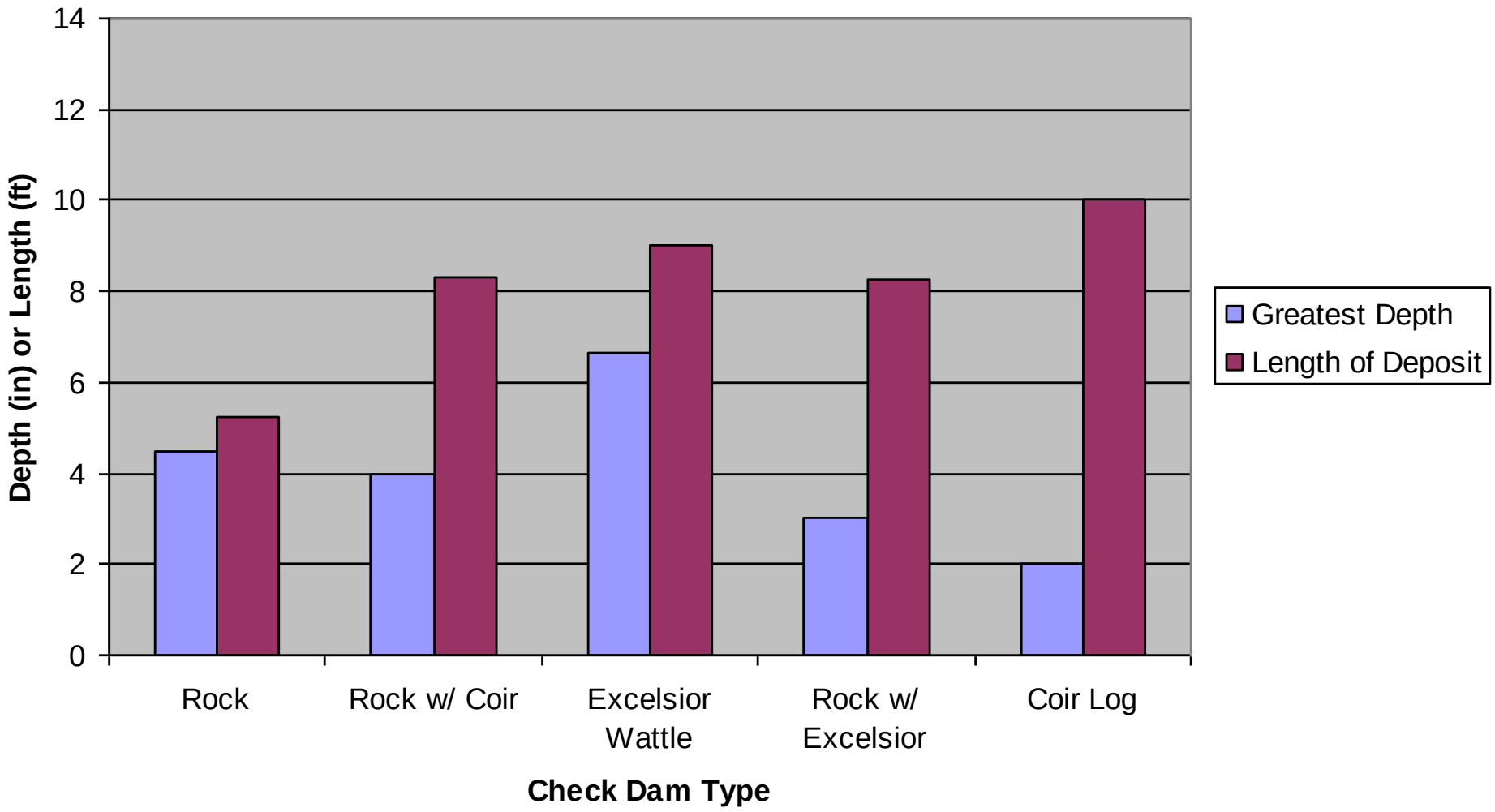
In Front of Second Trap

RUN NAME	max depth(in)	Volume (m3)	Volume (ft3)
Coir3	3.52	0.038	1.35
RC2	4.56	0.015	0.52
RC3	4.47	0.032	1.13
RX1	3.11	0.017	0.61
X2	6.15	0.049	1.72

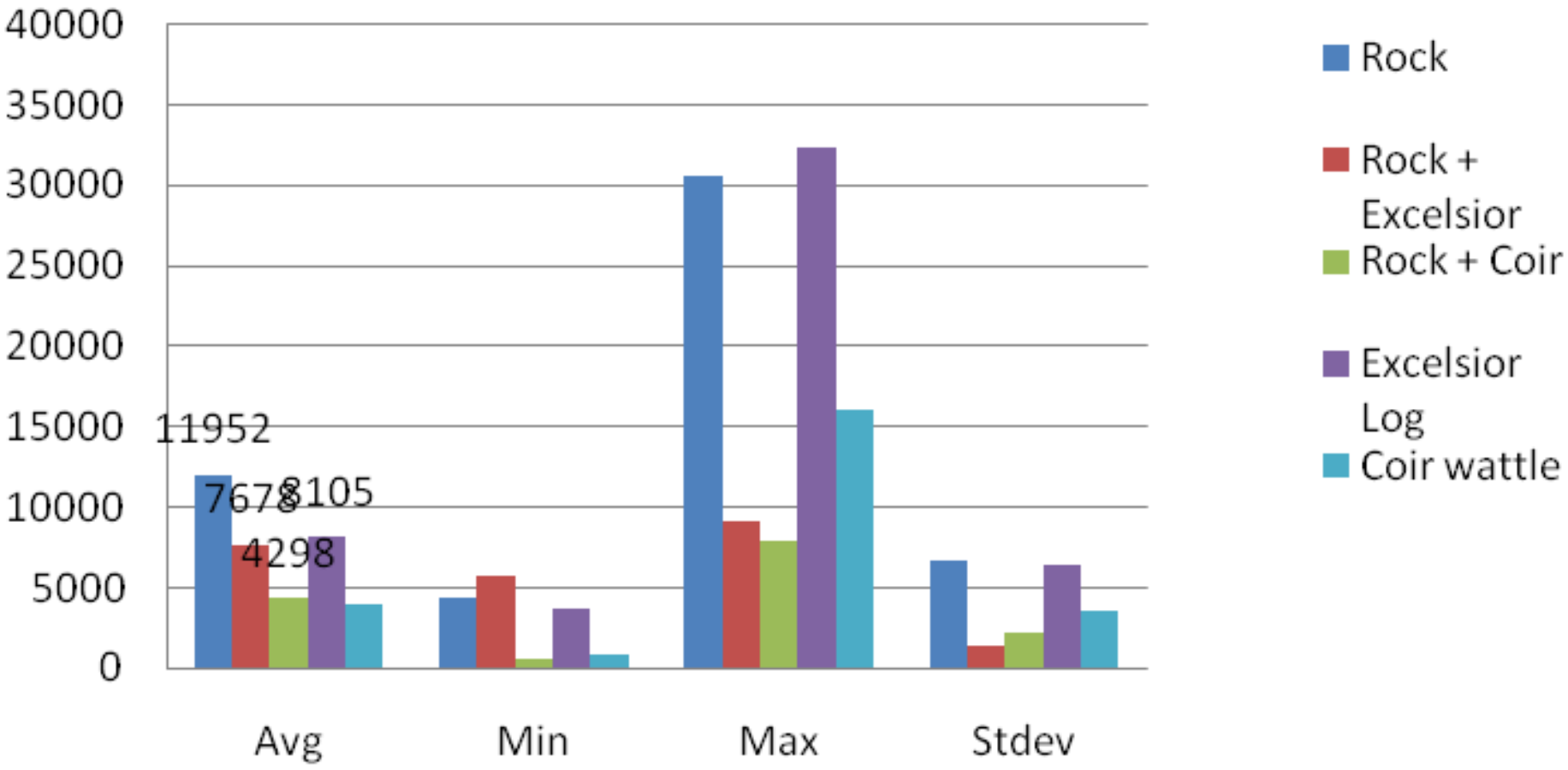
Behind first check dam



Behind second check dam



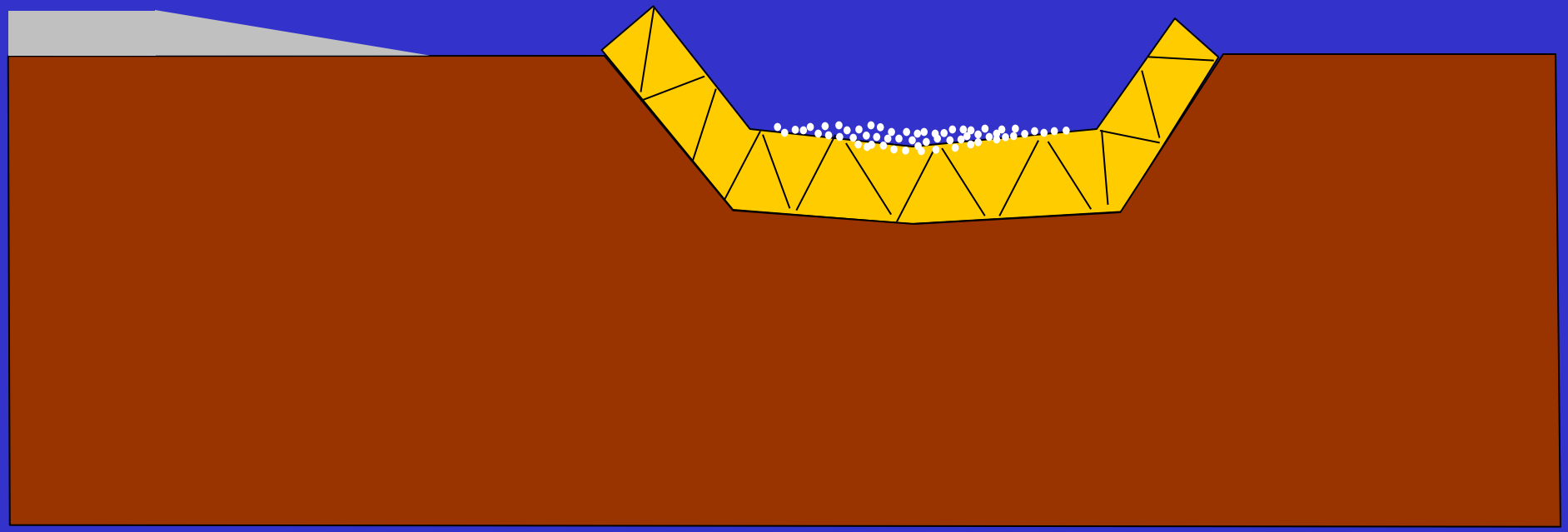
Total Suspended Solids



Introduction of PAM

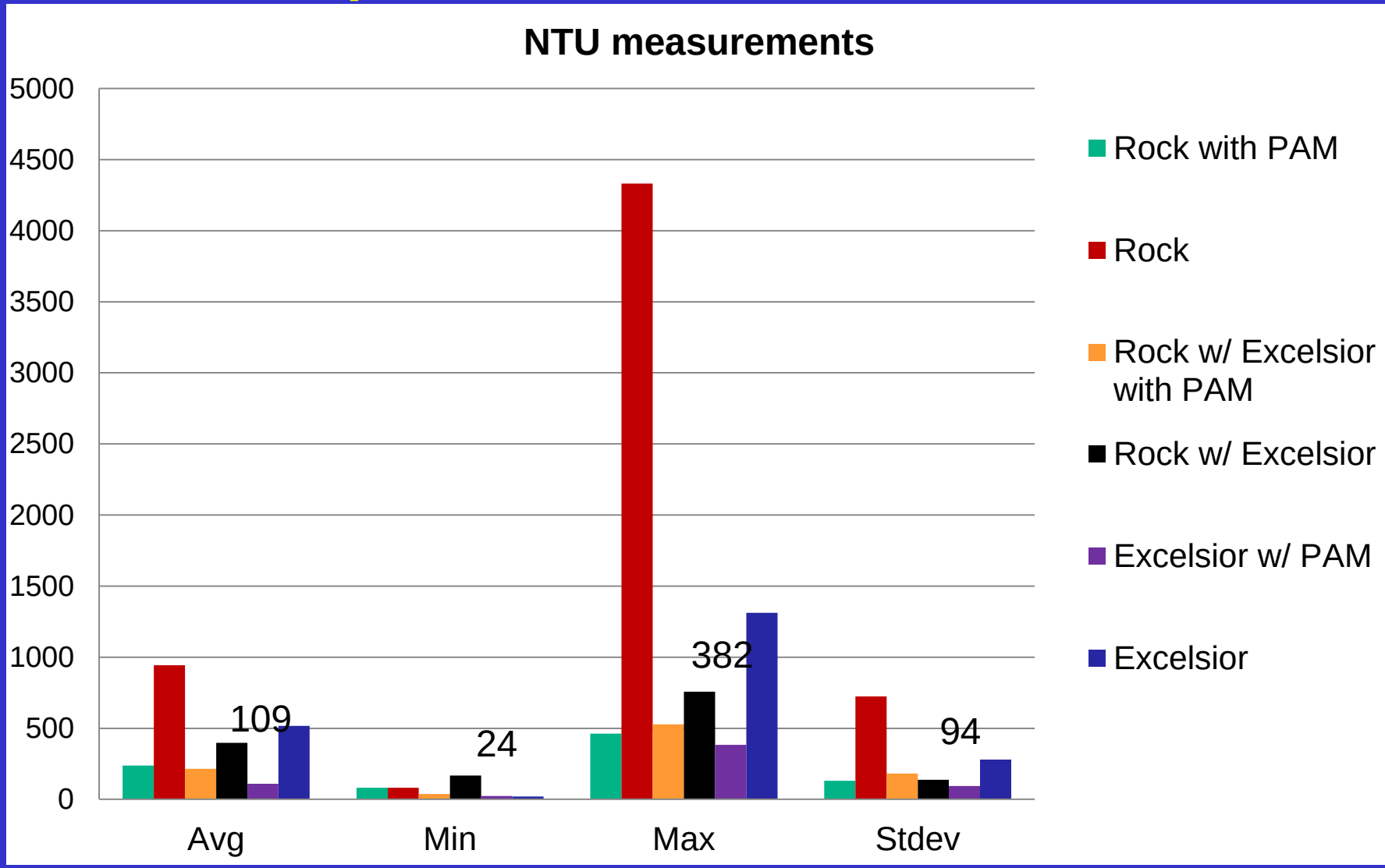
- Rock with PAM
- Rock with Excelsior wrap with PAM
- Excelsior wattle with PAM

Sprinkle 60 grams of APS 705 PAM over the check dam where the water is going to flow over.

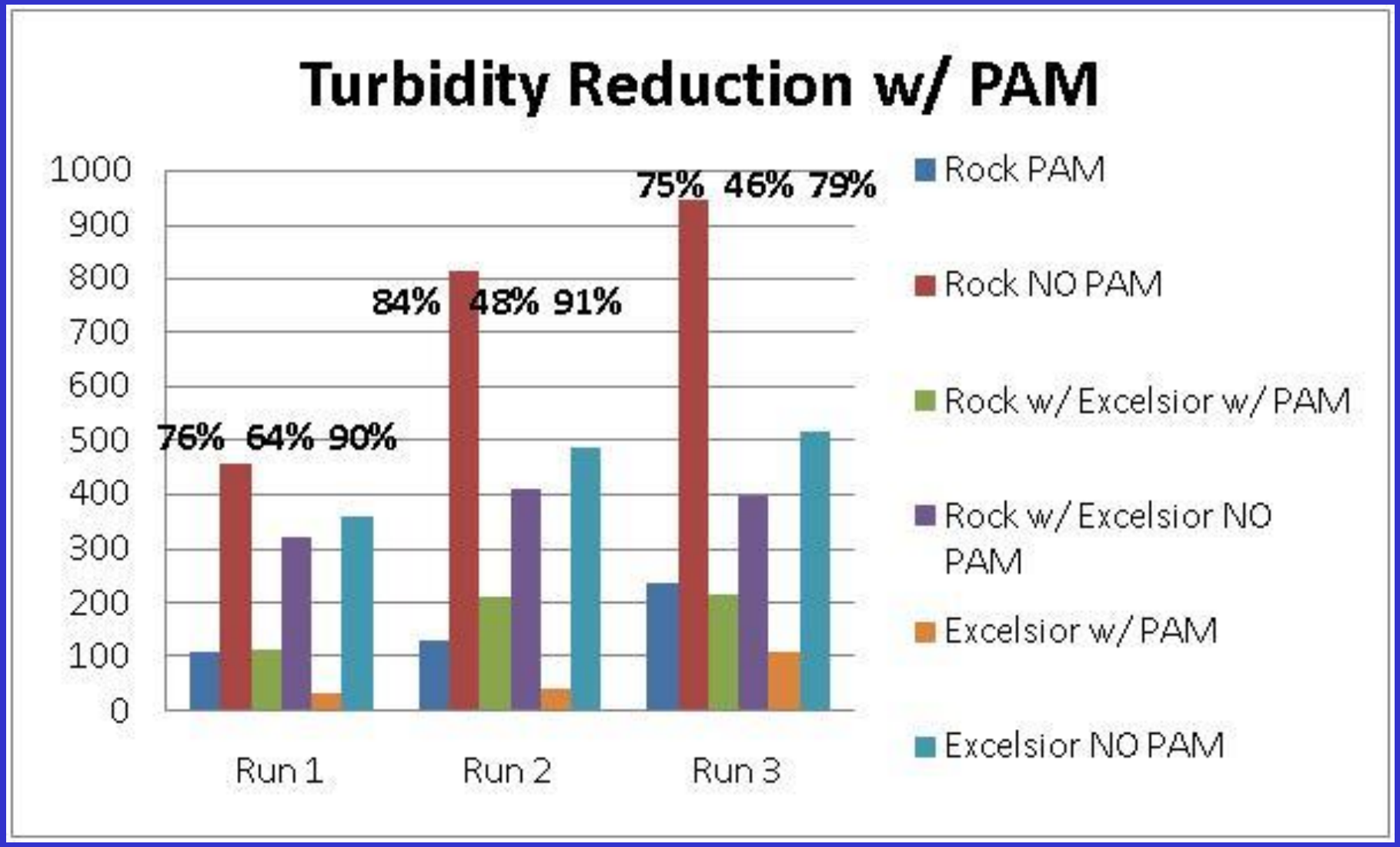



Flocs sticking to rocks

Comparison of Treatments



Comparison of Treatments




There is a rainbow on our horizon!