

STREAM QUALITY ASSESSMENT OF SOUTHERN MANITOWOC COUNTY -SUMMER 2018-



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FACULTY ADVISORS: DR. REBECCA ABLER AND DR. RICHARD HEIN



Friends of Hika Bay
Calvin, Pine, Point, Fischer, Centerville Creeks

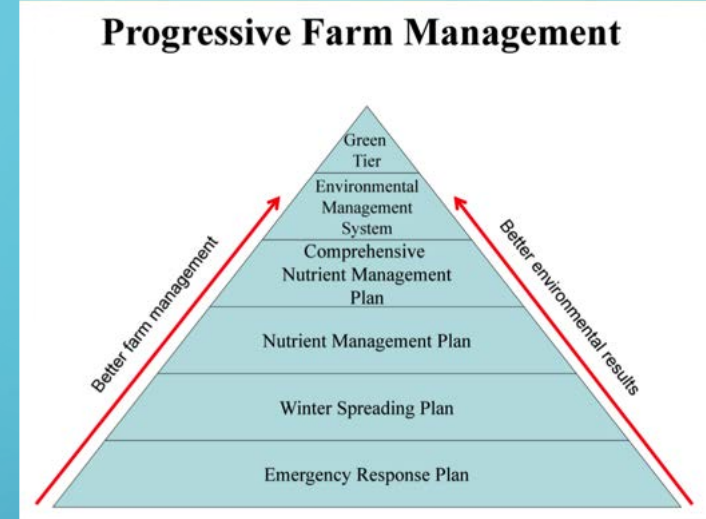


UNIVERSITY of WISCONSIN
GREEN BAY

Manitowoc
Campus



A Healthy Community



The Lakeshore Basin is
2650 square miles;

Includes over 300 miles of
Great Lakes shoreline;

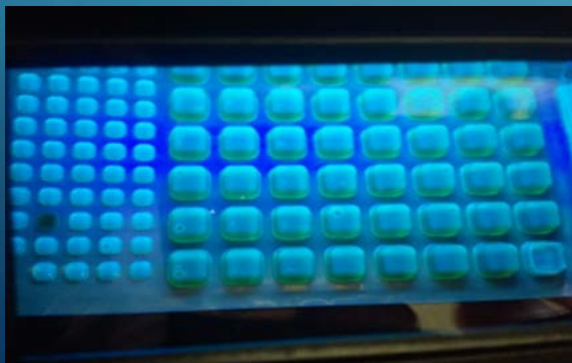
Contains several major
river systems – such as the
Ahnapee, Branch,
Kewaunee, Manitowoc, and
East and West Twin Rivers;

And is comprised of 193
miles of streams, 139 inland
lakes and countless
wetlands.



METHODS AND MATERIALS

- Weekly Summer Sampling + Rain Events (0.5"+)
- Physical Parameters
- Chemical Parameters
- Biological Parameters



TERMS

- **Phosphate**- Phosphorus is essential for growth and metabolic reaction in plants in animals, though it is detrimental in large amounts. Acceptable Range: 0.075 mg/L (<0.10 mg/L max)
- **Turbidity**- Particles in water (dissolved or suspended) which scatter light causing a cloudy/murky appearance. High turbidity negatively affects aquatic life. Acceptable Range: 1 to 5 NTU

TERMS CONTINUED

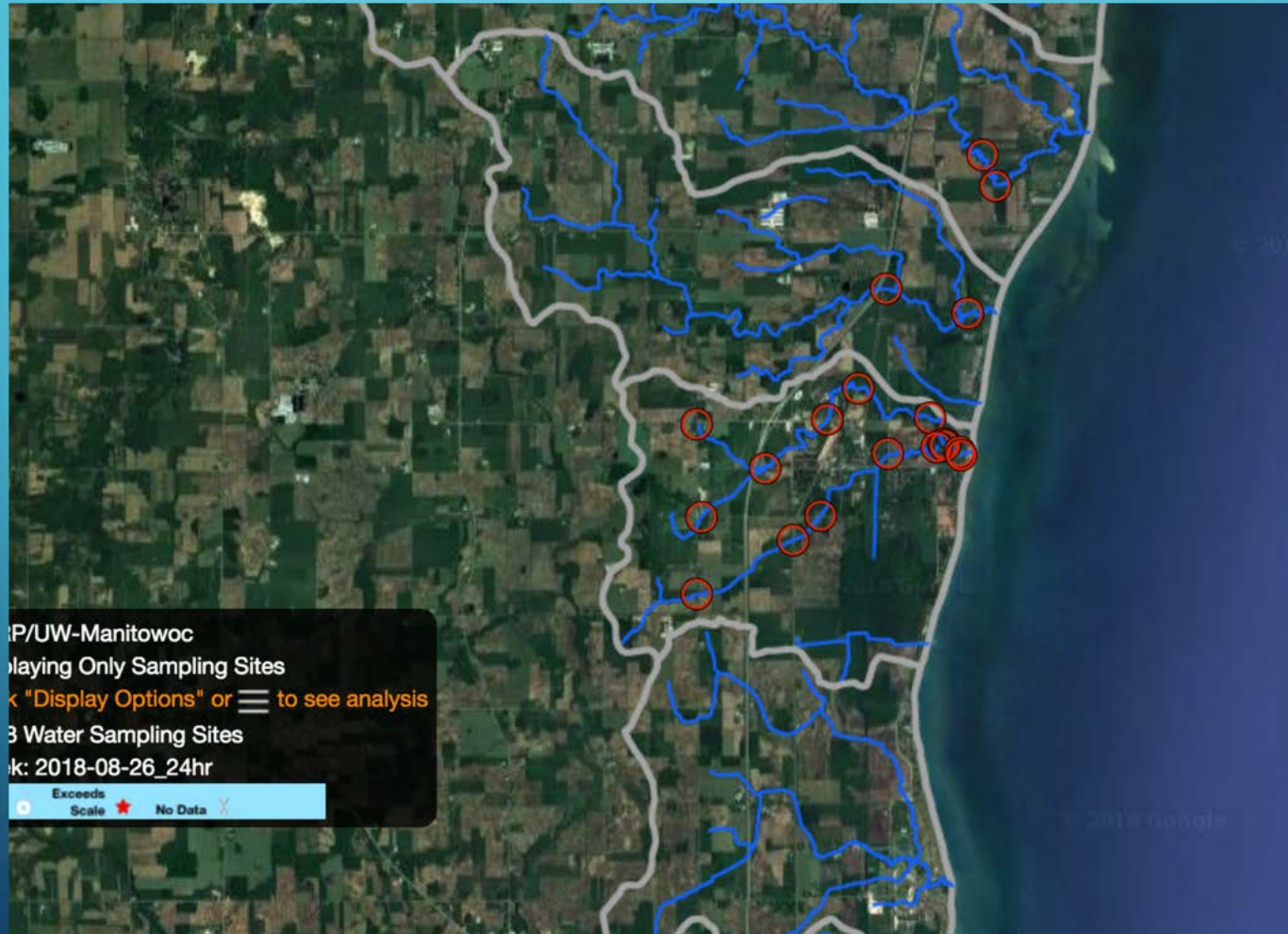
- **E. coli**- Bacteria found in the intestines of animals. The presence of E.Coli in water indicates recent fecal contamination. Advisory: >235 Closed: >1000
- **Rain Event**- An accumulation of 0.50 Inches or more within a 24 hour period.

Centerville Creek

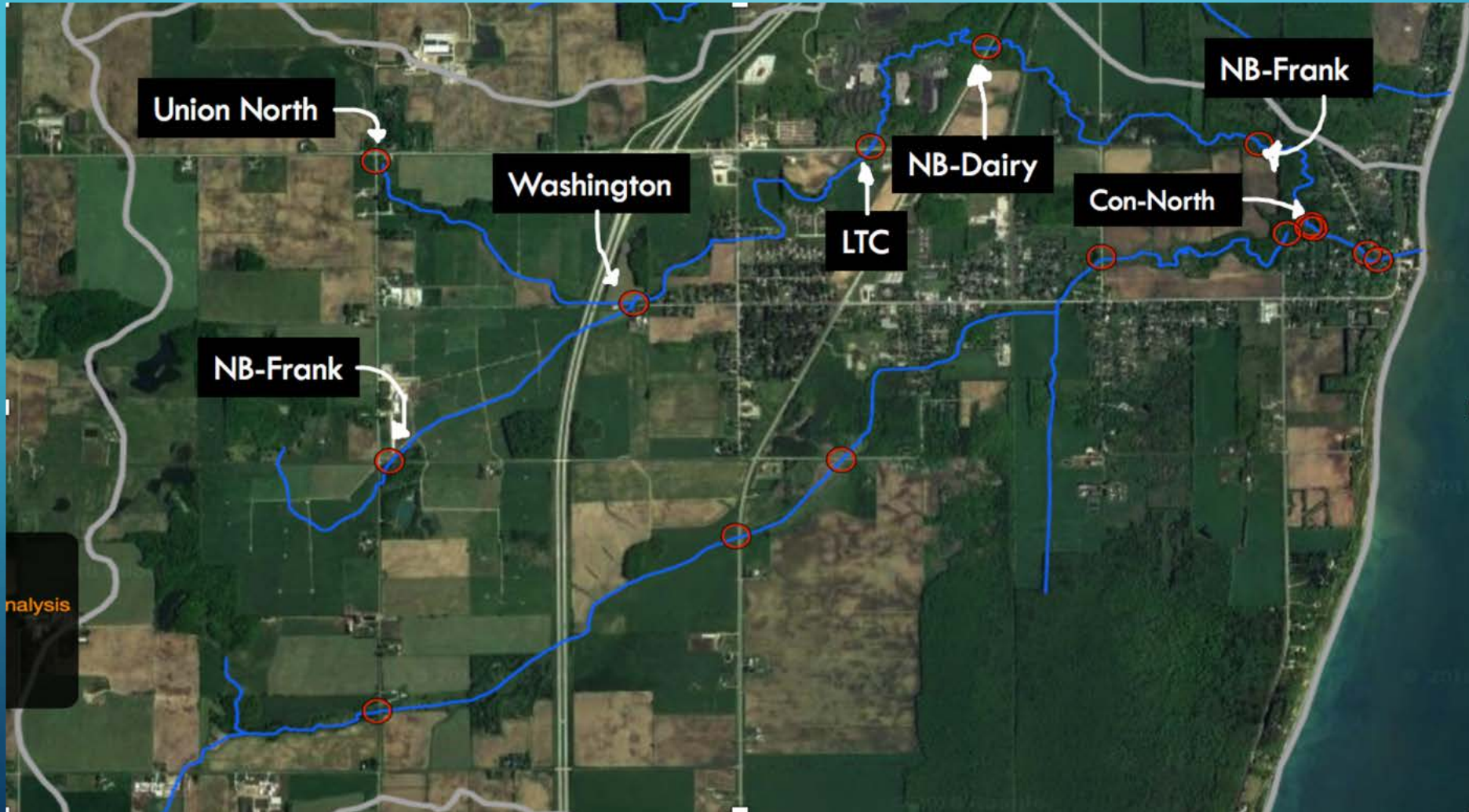
- North Branch
 - CE11, CE10, CE09, CE08, CE07, CE03-N, CE03
- South Branch
 - CE13, CE14, CE06, CE05, CE04, CE03-S, CE03
- Restoration Site
 - CE03, CE02, CE01

CE01	Centerville Flowage Dam
CE02	Centerville Flowage Midpoint
CE03	Centerville Flowage Confluence
CE04	Centerville South Branch Birch St.
CE05	Centerville South Branch Center Rd.
CE06	Centerville South Branch South Cleveland Rd.
CE07	Centerville North Branch Franklin Dr.
CE08	Centerville North Branch Dairyland Dr.
CE09	Centerville North Branch LTC
CE10	Centerville North Branch Washington Rd.
CE11	Centerville Union Road North
CE13	Centerville Union Road South
CE14	Centerville HWY-DL
CE03-N	Centerville Flowage Confluence--North
CE03-S	Centerville Flowage Confluence--South

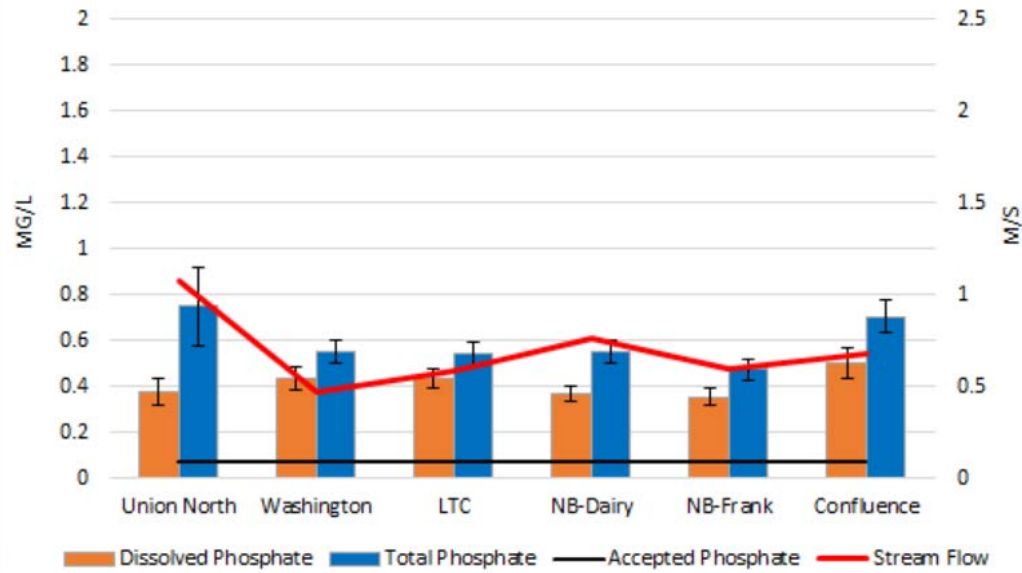
Centerville Creek



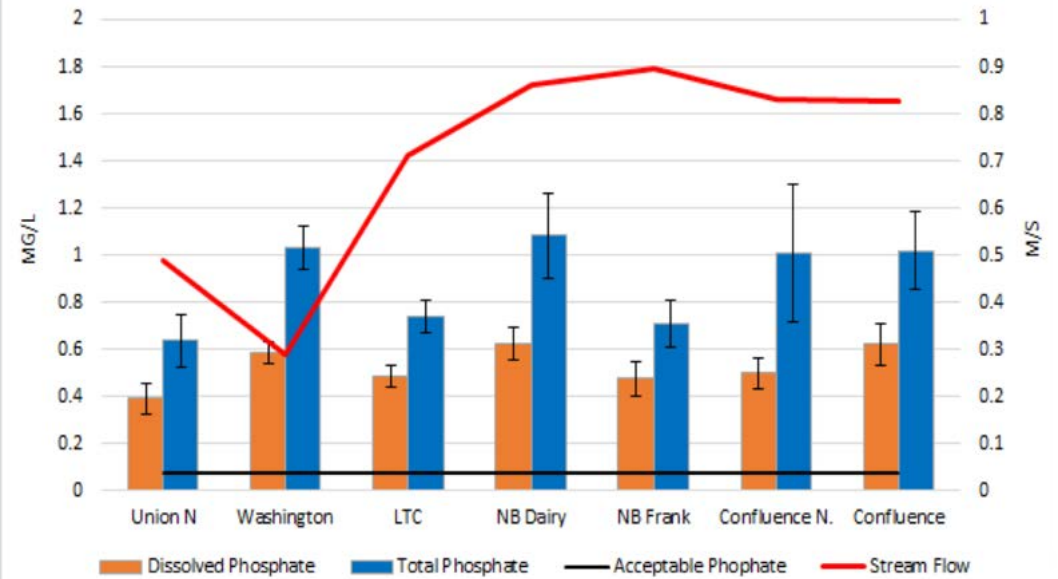
North Branch



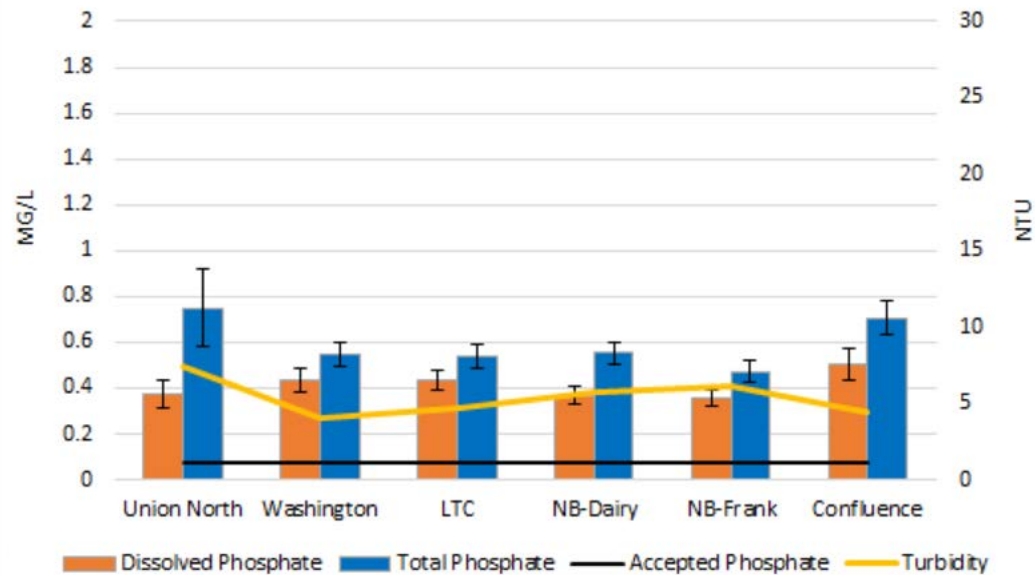
Centerville North Branch Flow 2017



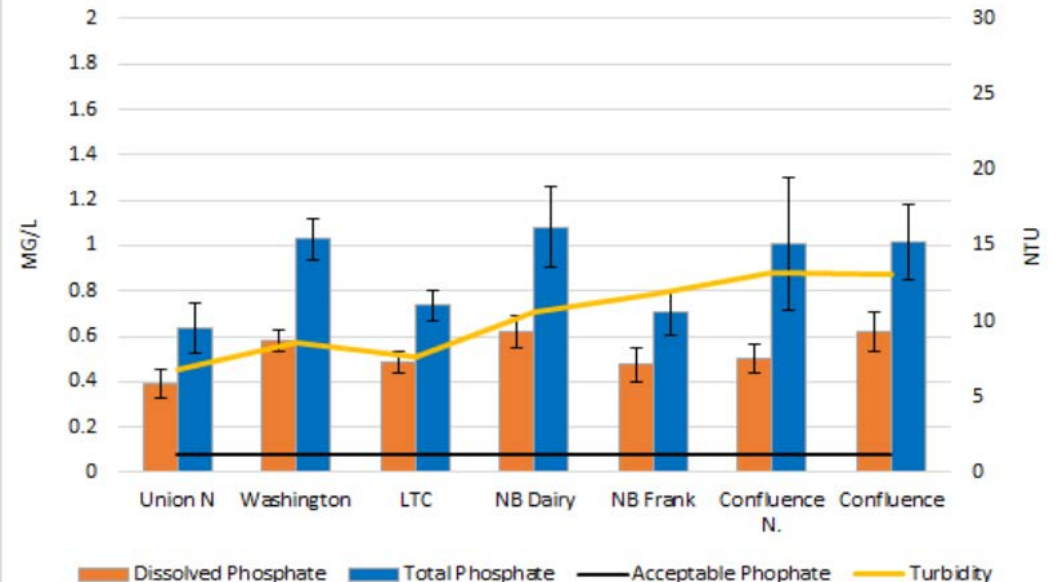
Centerville North Branch Flow 2018



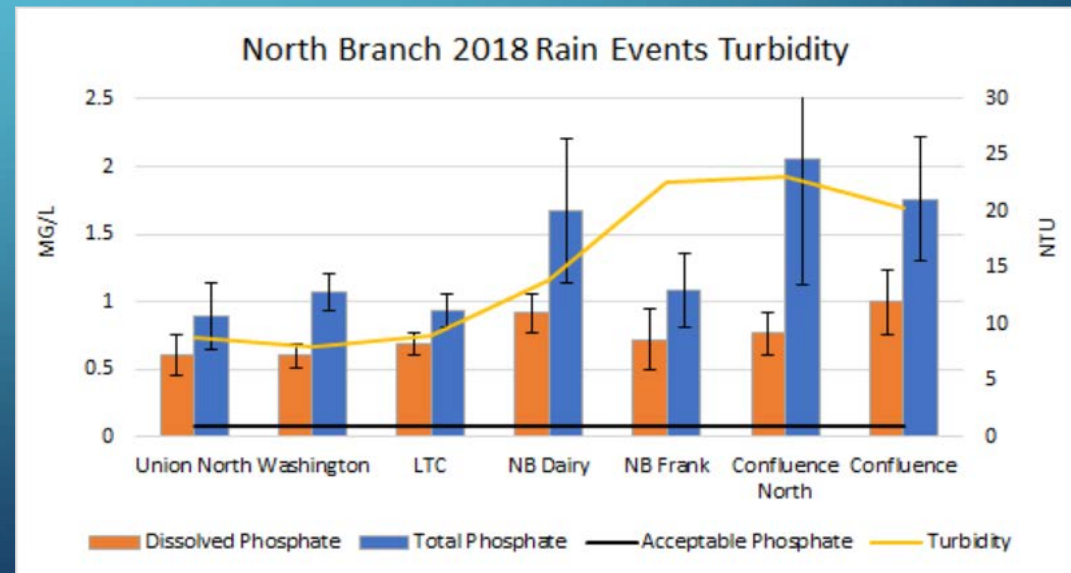
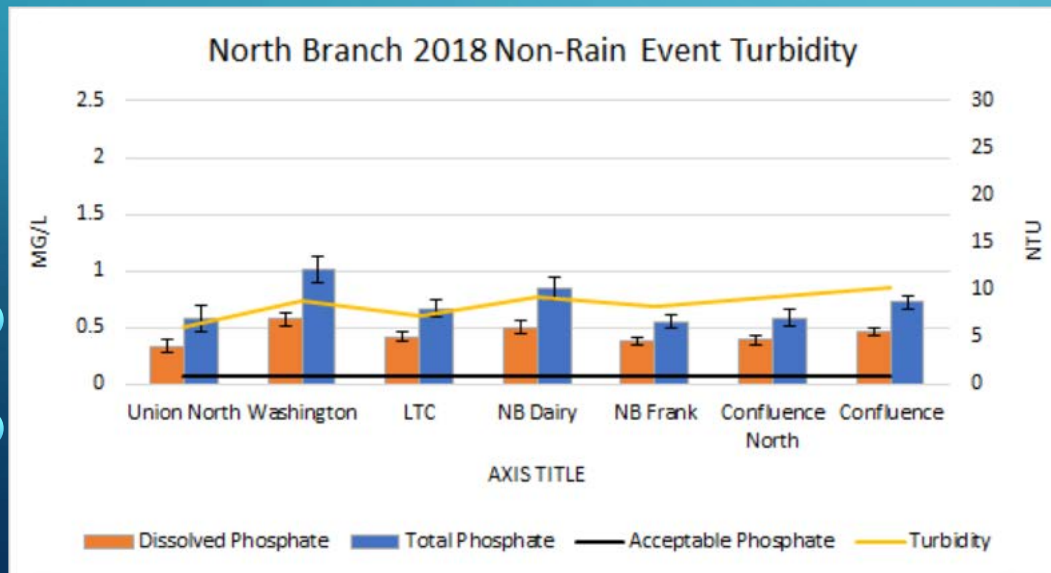
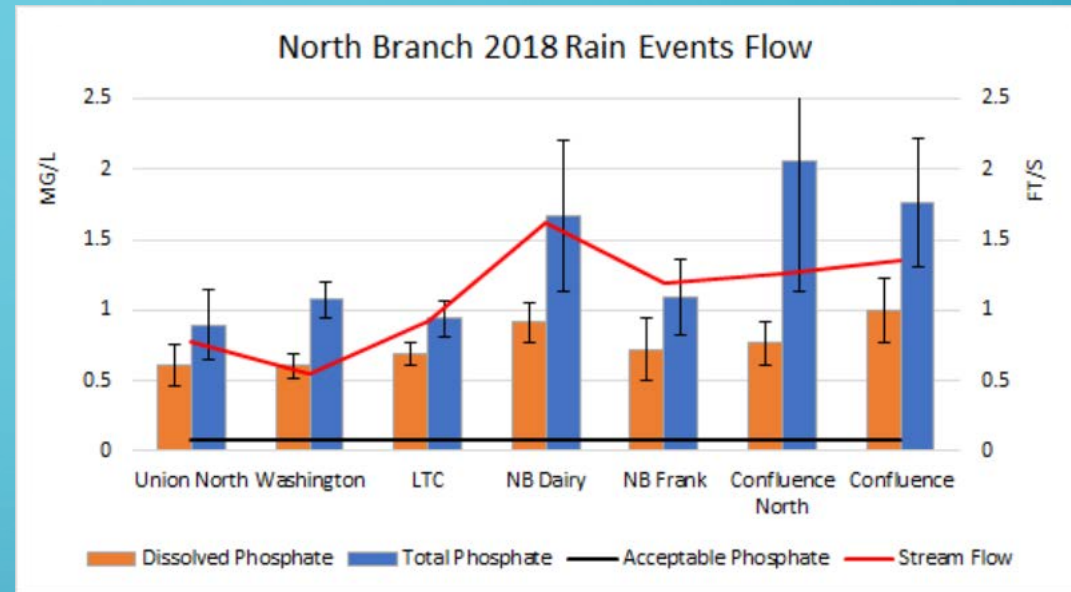
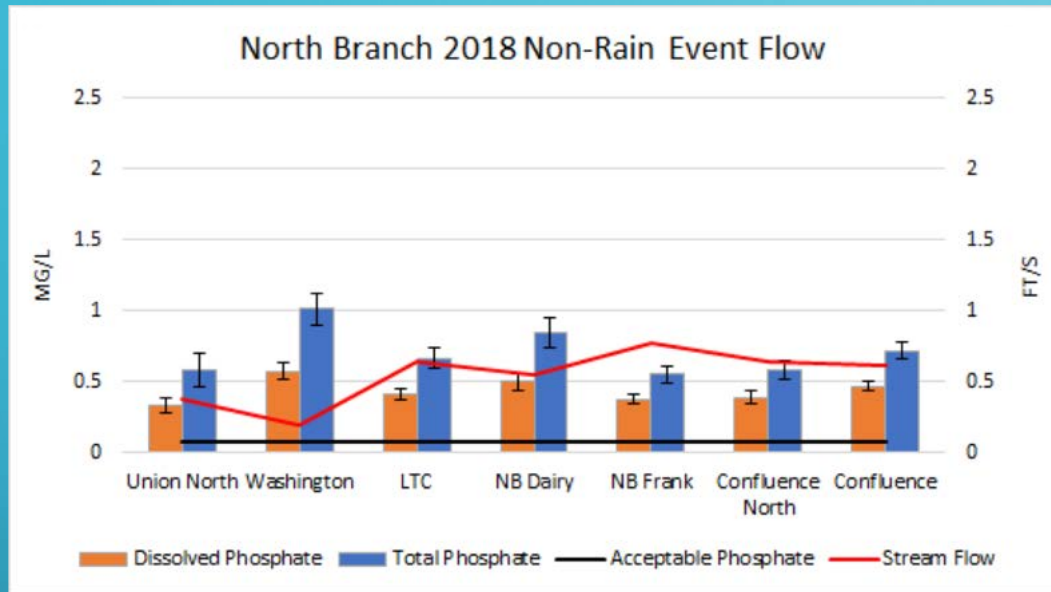
Centerville North Branch Turbidity 2017



Centerville North Branch Turbidity 2018

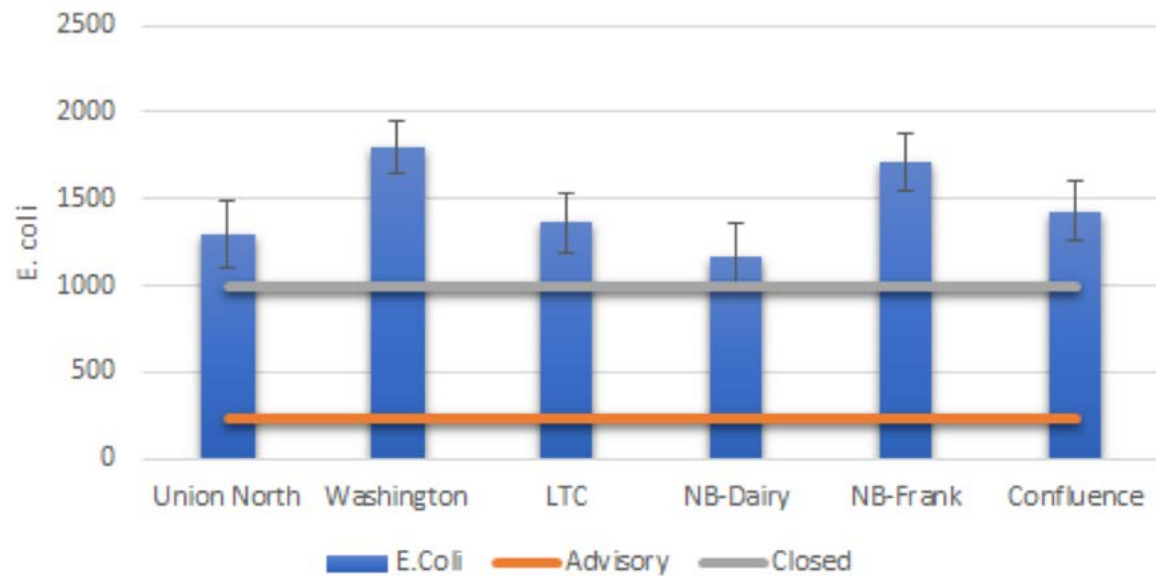


Rain Events v. Non-Rain Events 2018

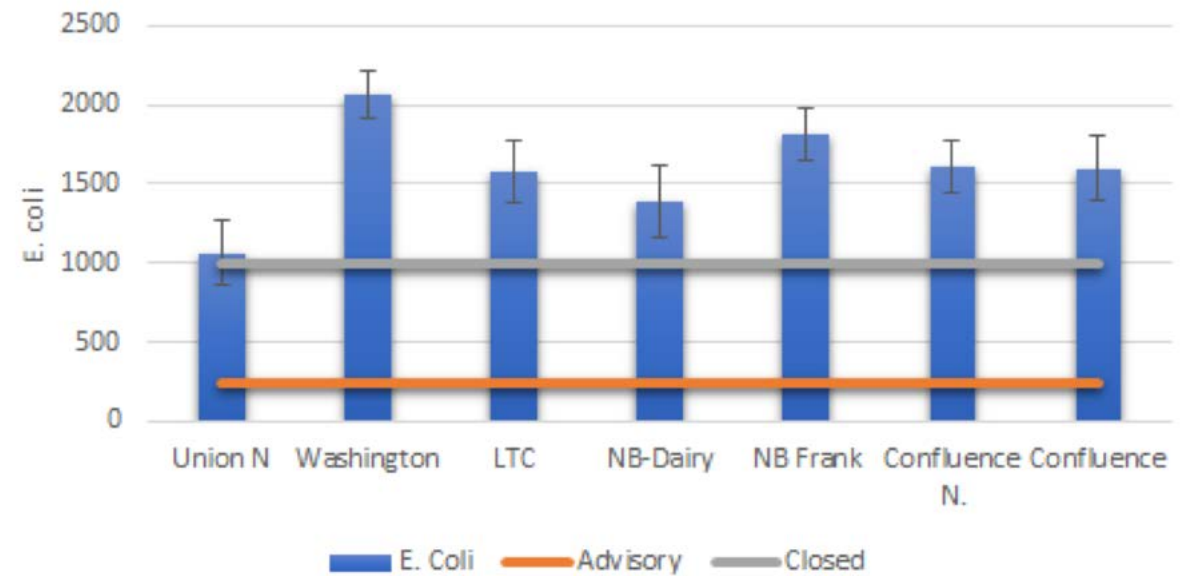


North Branch E. coli Levels

North Branch E. coli Total 2017

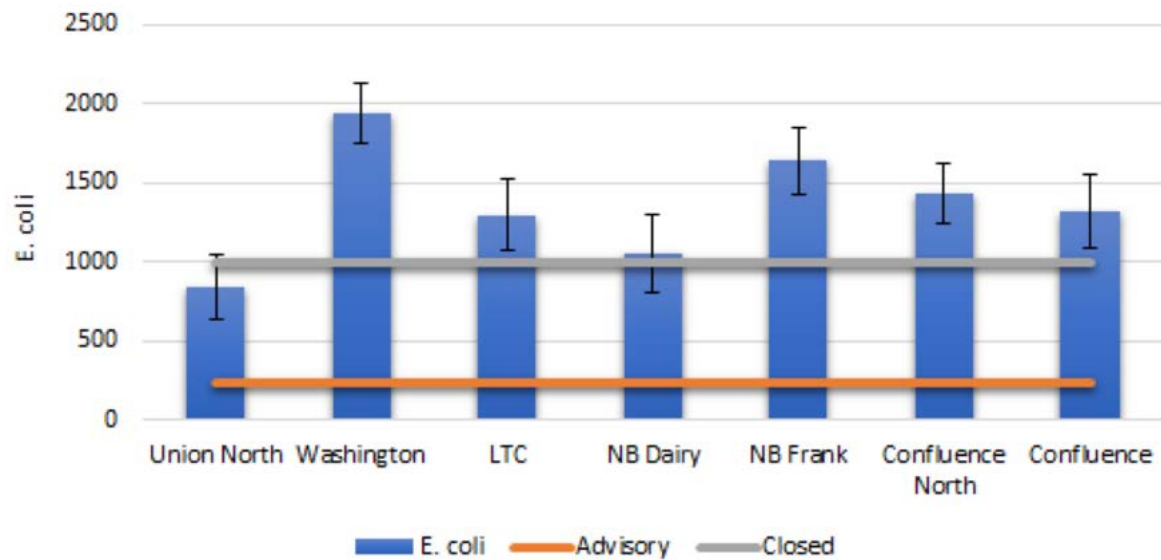


North Branch E. coli Total 2018

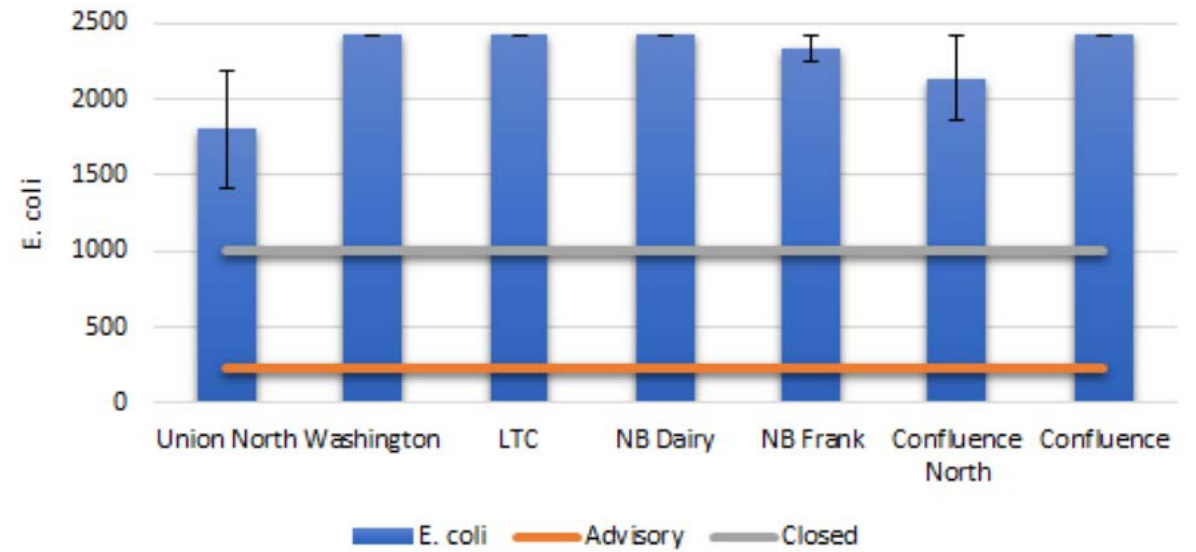


North Branch Rain v. Non-Rain Event E. coli

North Branch 2018 Non-Rain Event E. coli



North Branch 2018 Rain Events E. coli



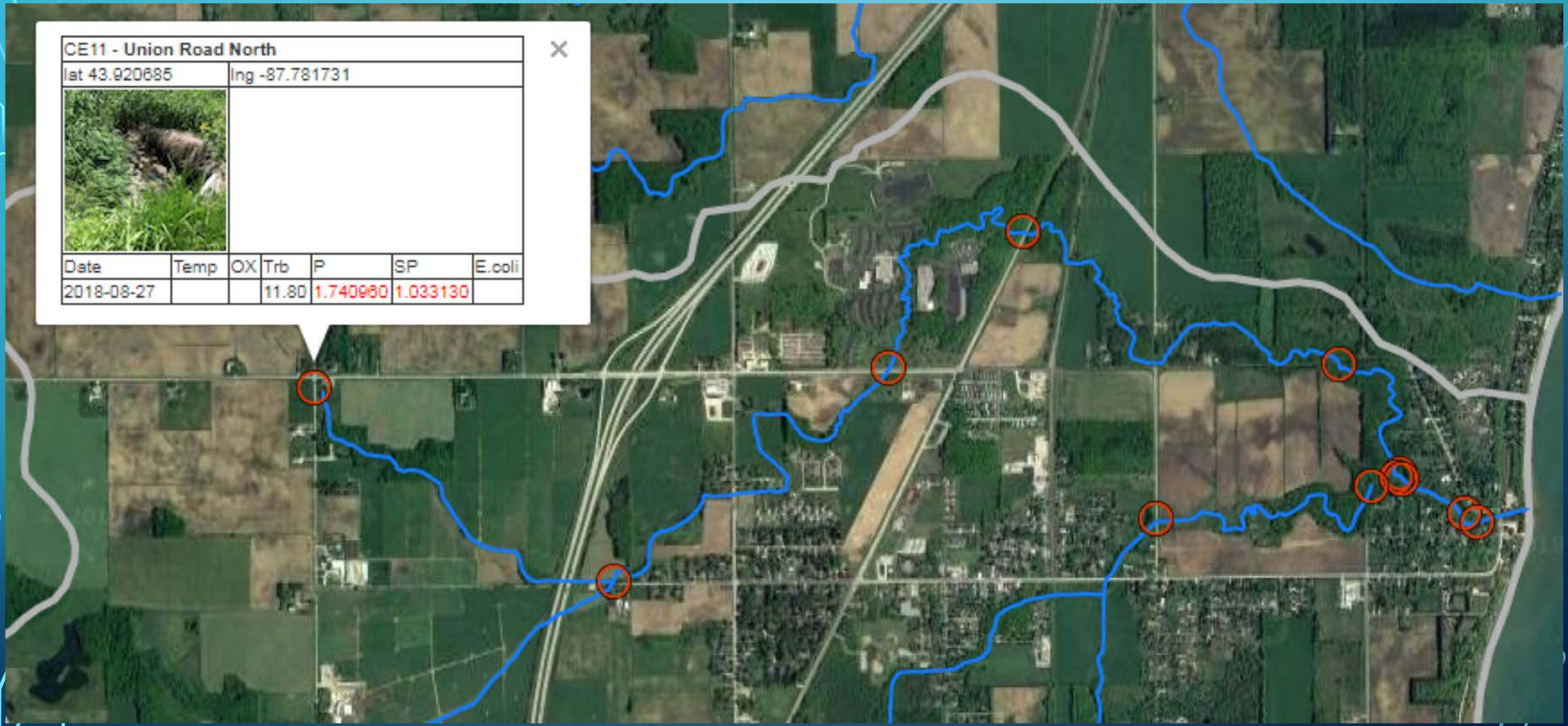
CE11 - Union Road North

lat 43.920685

lng -87.781731

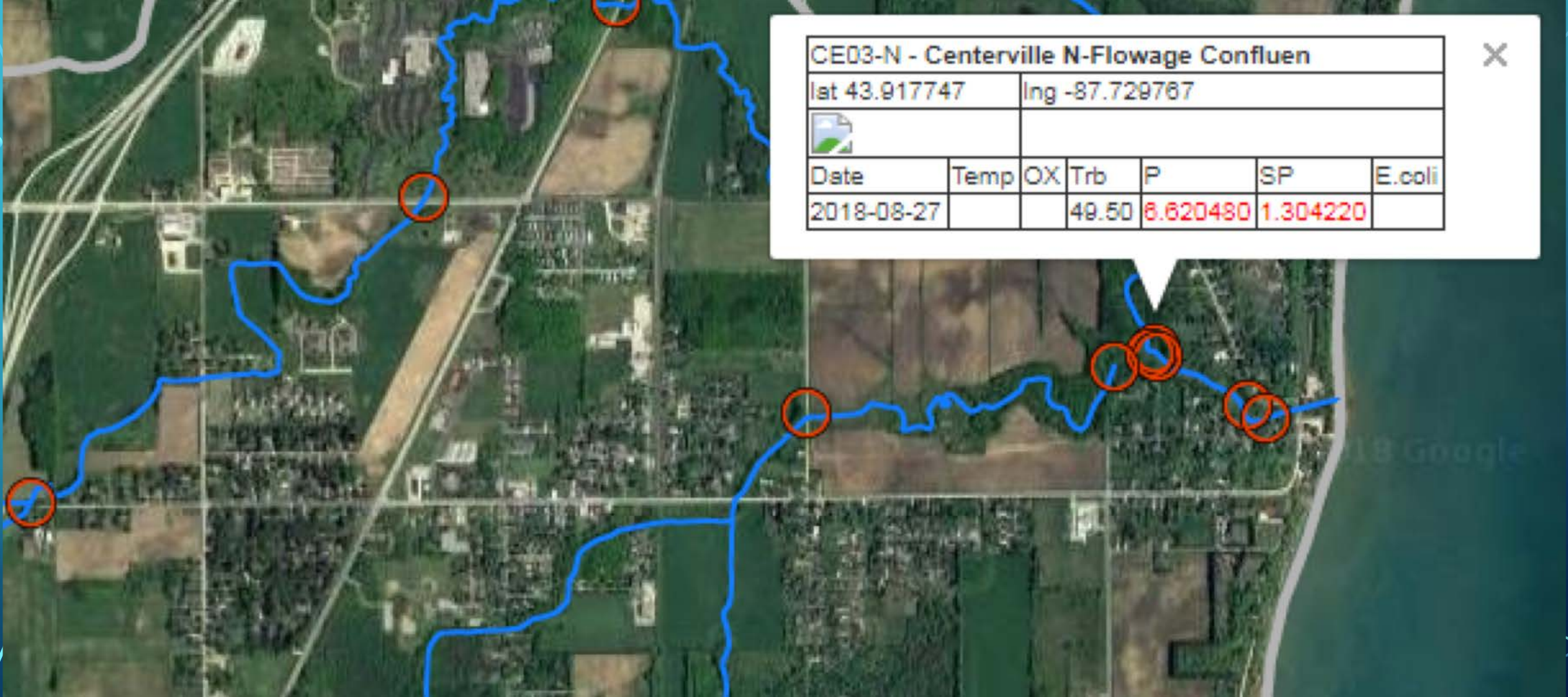


Date	Temp	OX	Trb	P	SP	E.coli
2018-08-27			11.80	1.740960	1.033130	



Union North





CE03-N - Centerville N-Flowage Confluen

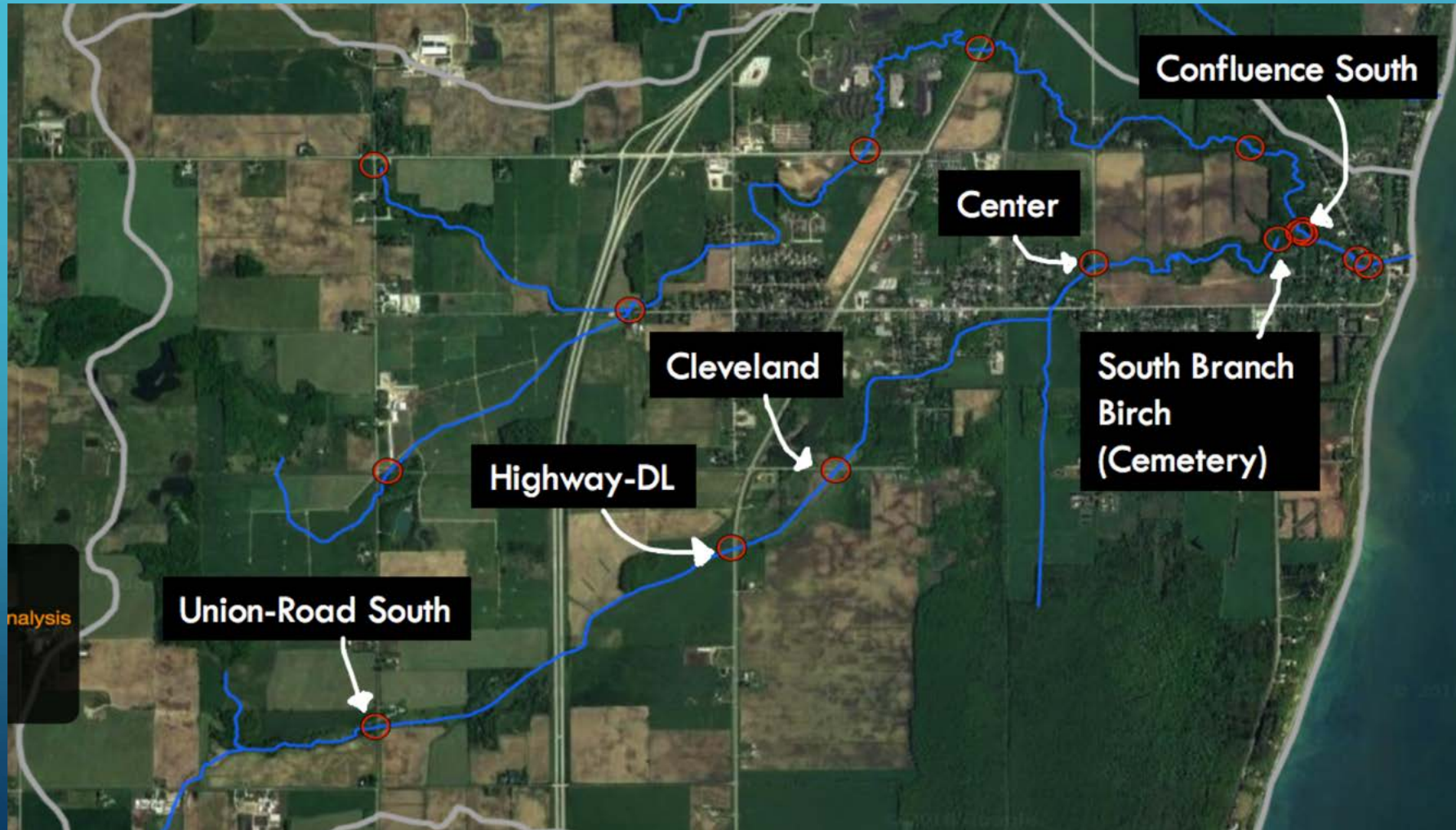
lat 43.917747 lng -87.729767

Date	Temp	OX	Trb	P	SP	E.coli
2018-08-27			49.50	8.620480	1.304220	

Confluence North

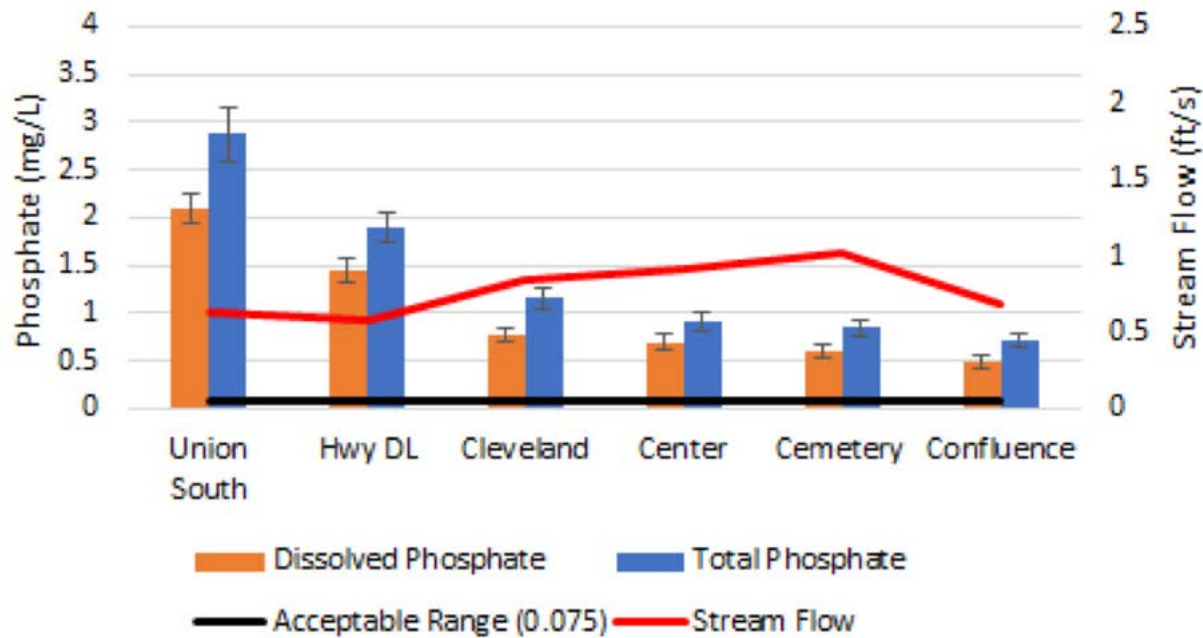


South Branch

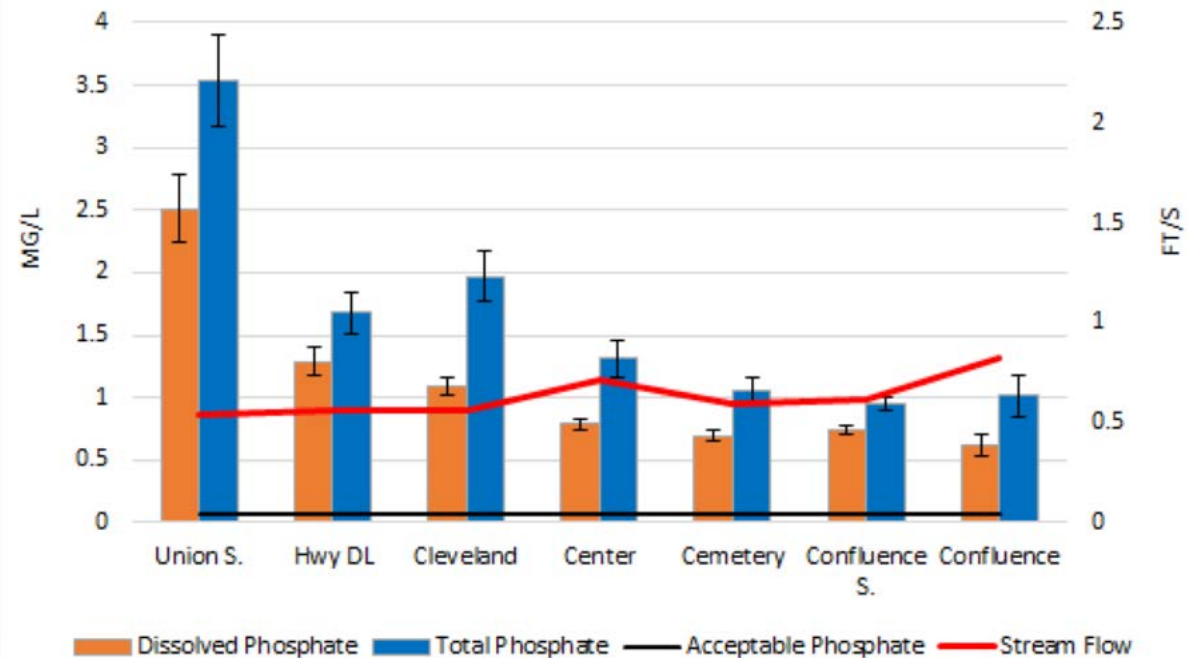


South Branch Flow

Centerville South Branch 2017 Flow

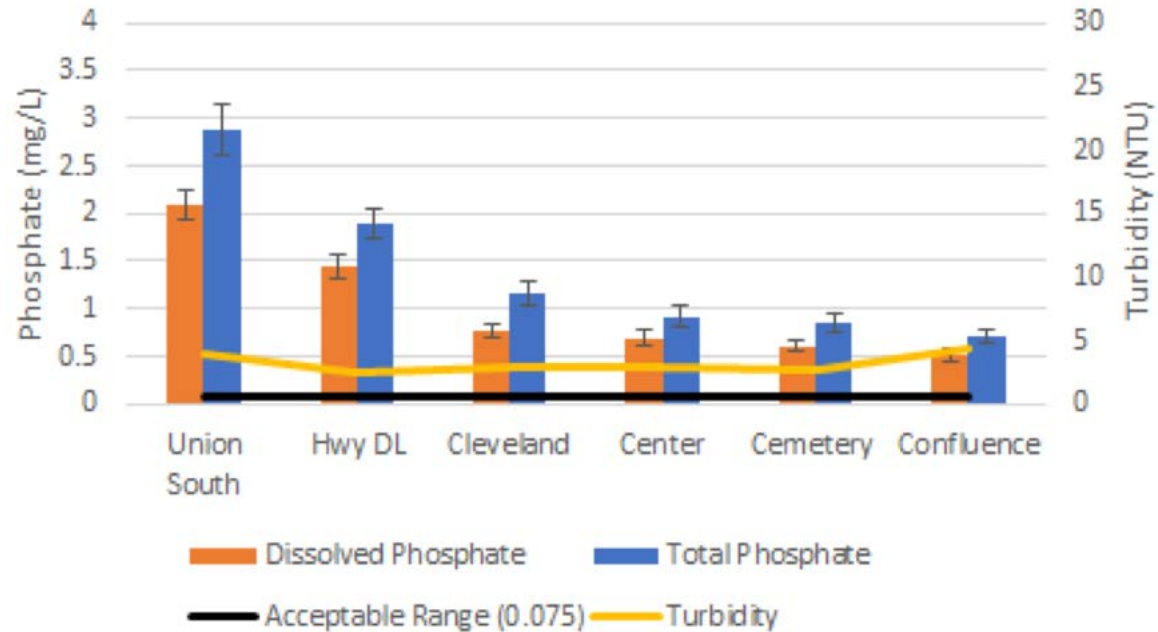


Centerville South Branch Flow 2018

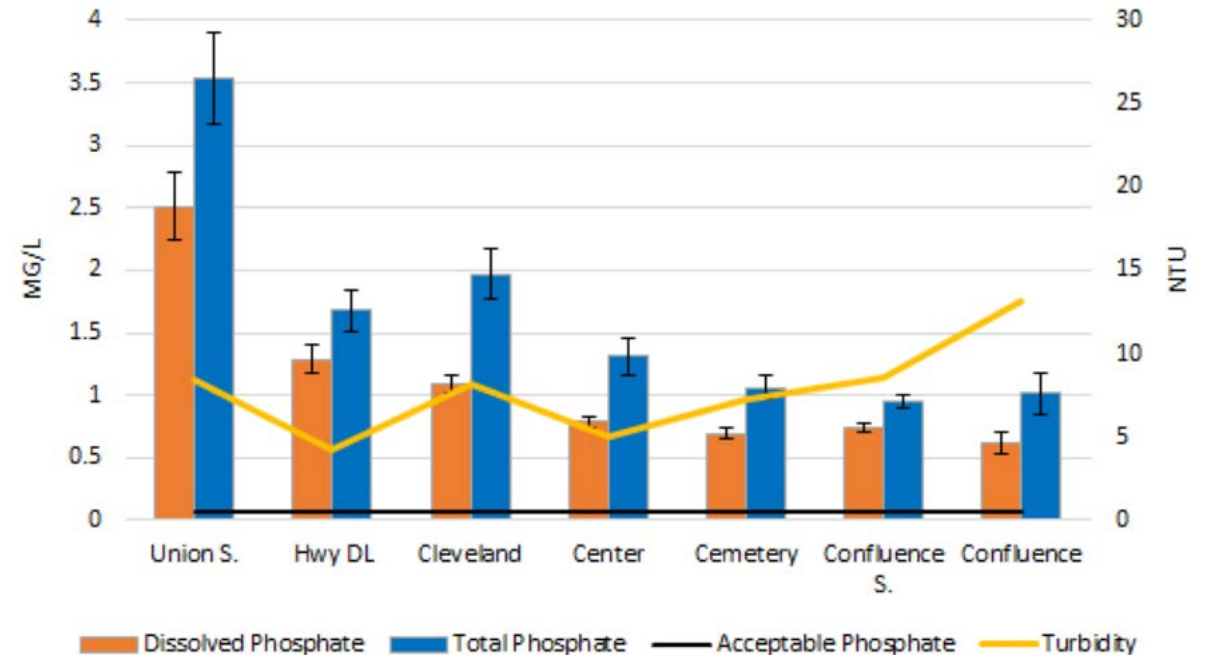


South Branch Turbidity

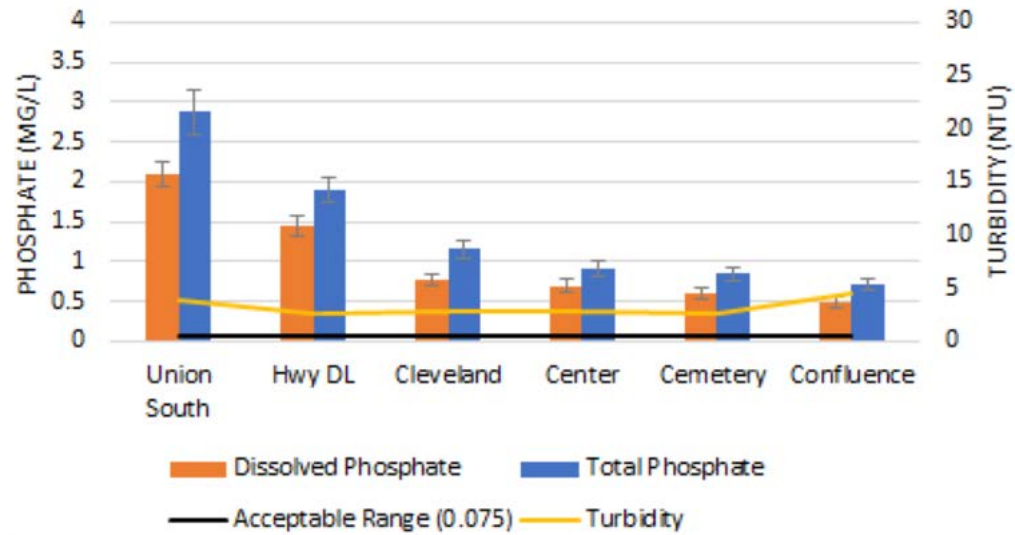
Centerville South Branch 2017 Turbidity



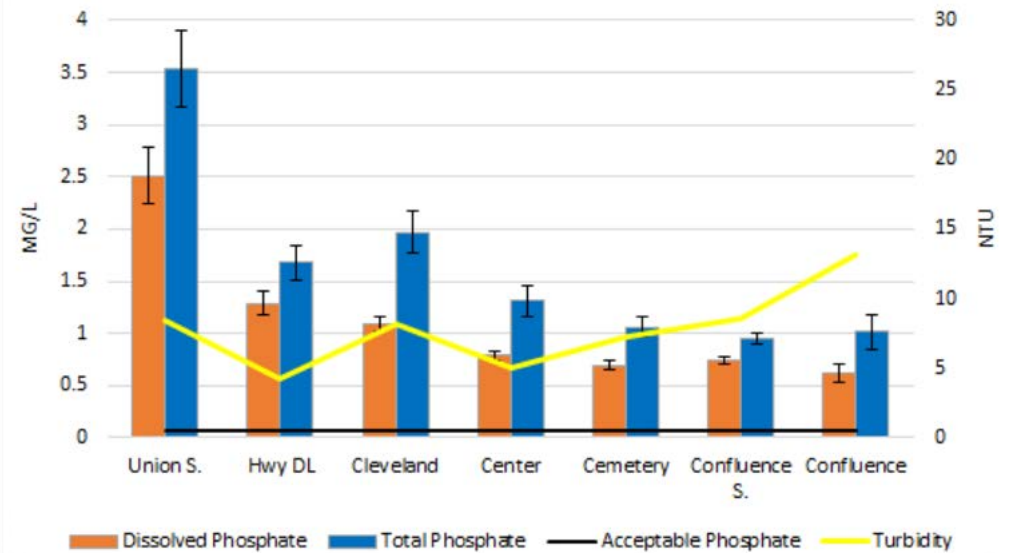
Centerville South Branch Turbidity 2018



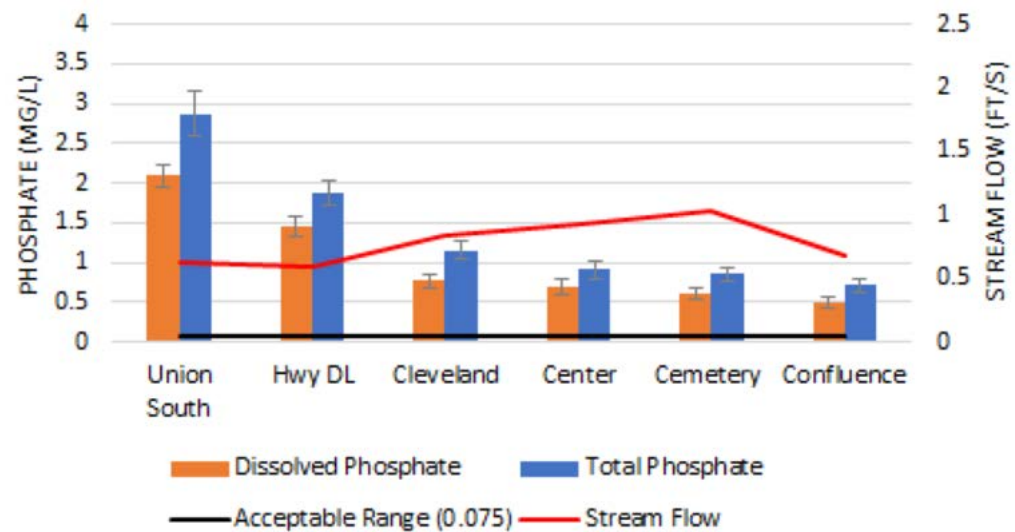
Centerville South Branch 2017 Turbidity



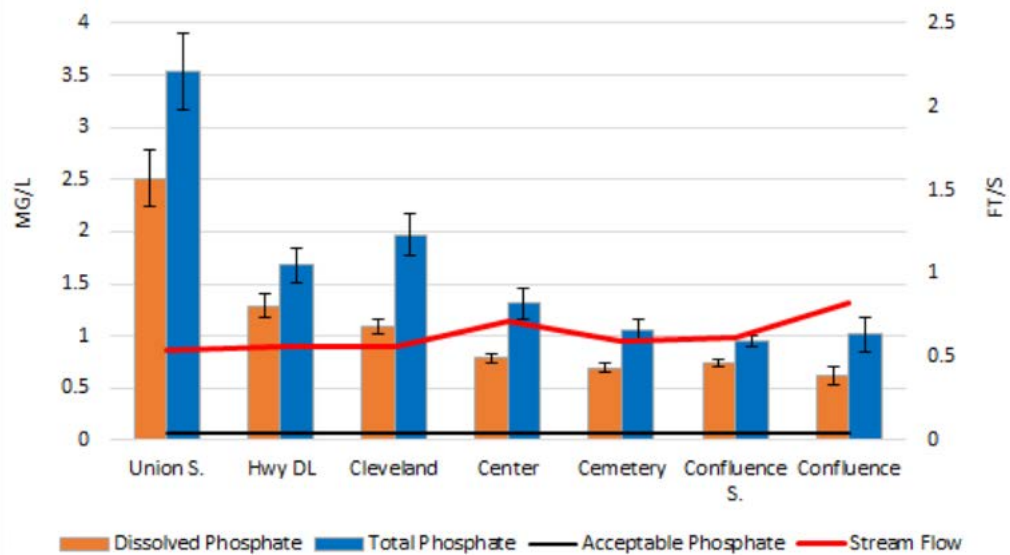
Centerville South Branch Turbidity 2018



Centerville South Branch 2017 Flow

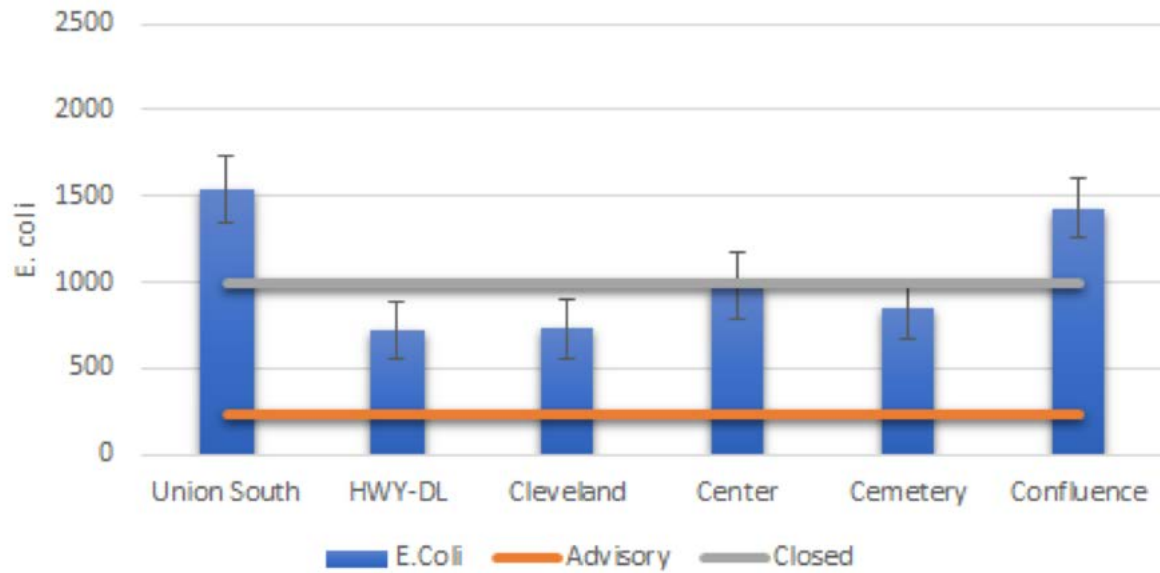


Centerville South Branch Flow 2018

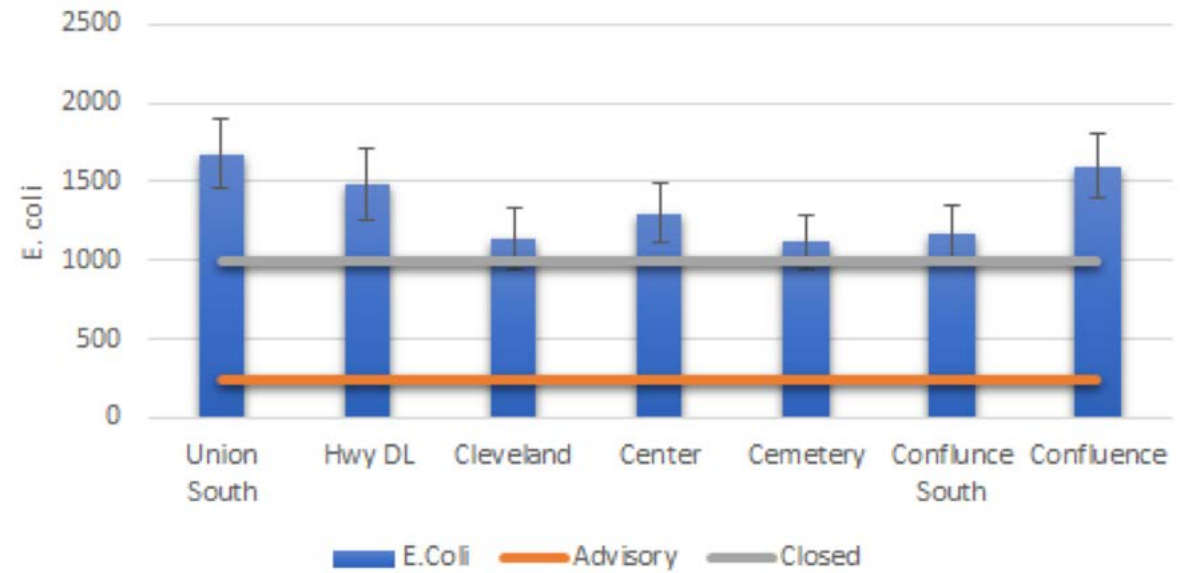


South Branch E.coli Levels

South Branch E. coli Total 2017

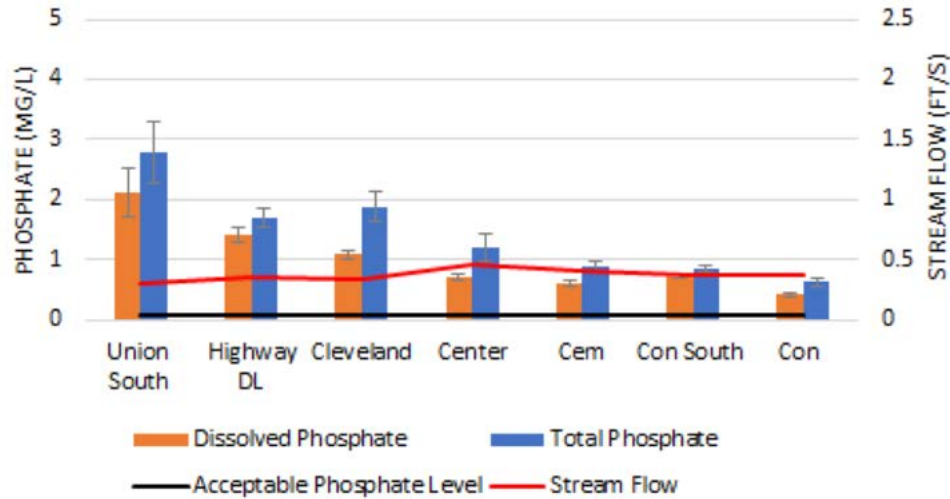


South Branch E. coli Total 2018

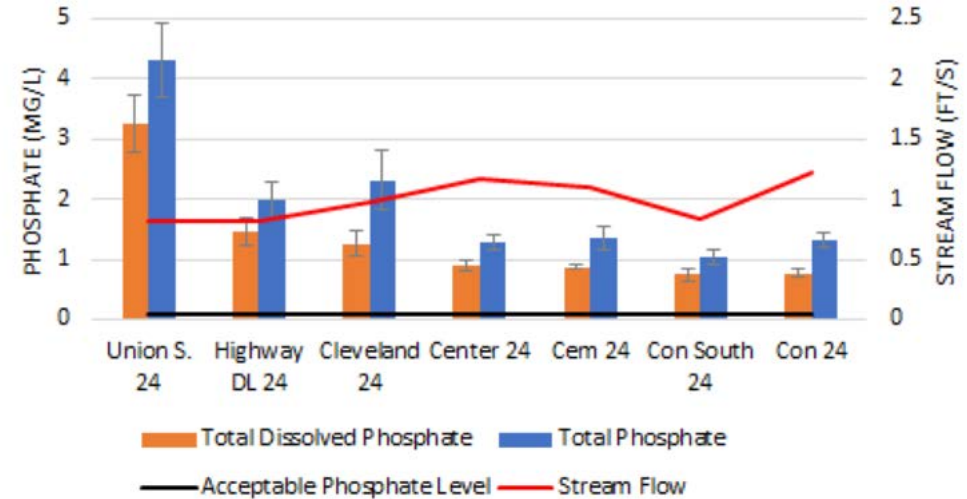


South Branch 24 Hour Rain Events vs Non-Rain Events

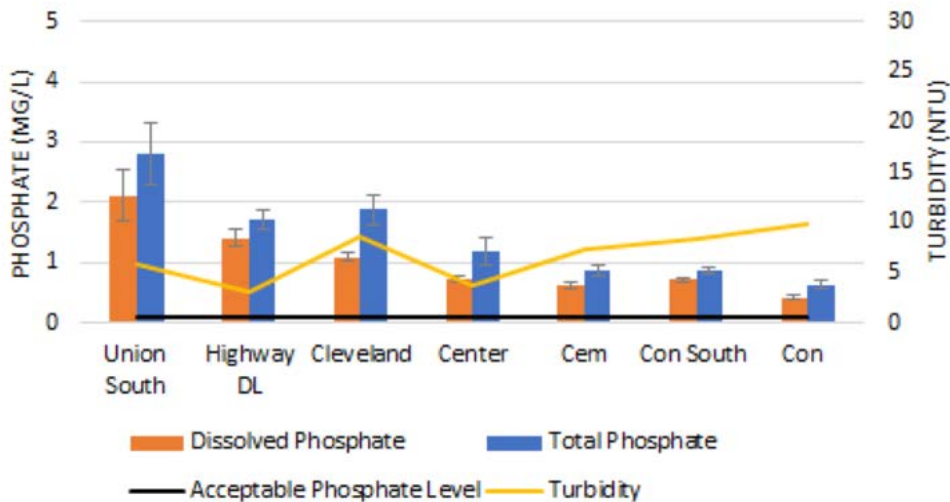
South Branch 2018 Non-Rain Event Flow



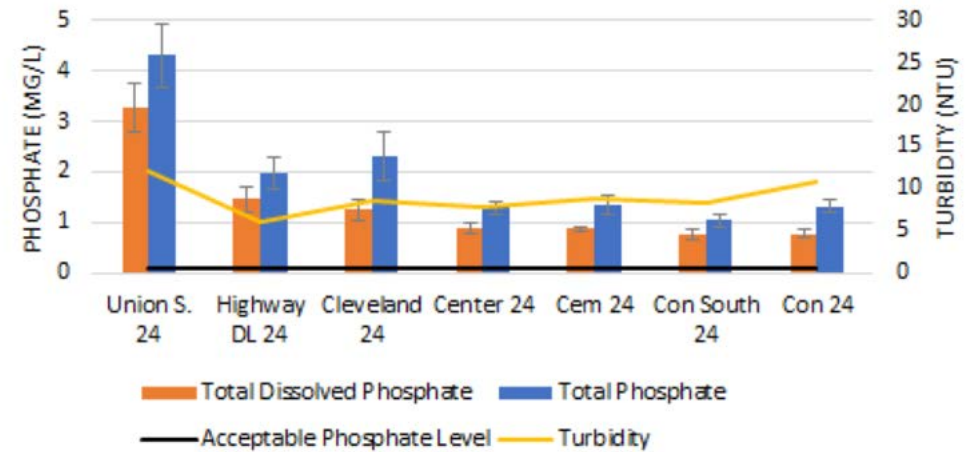
South Branch 24 Hour Rain Event 2018 Flow



South Branch 2018 Non-Rain Event Turbidity

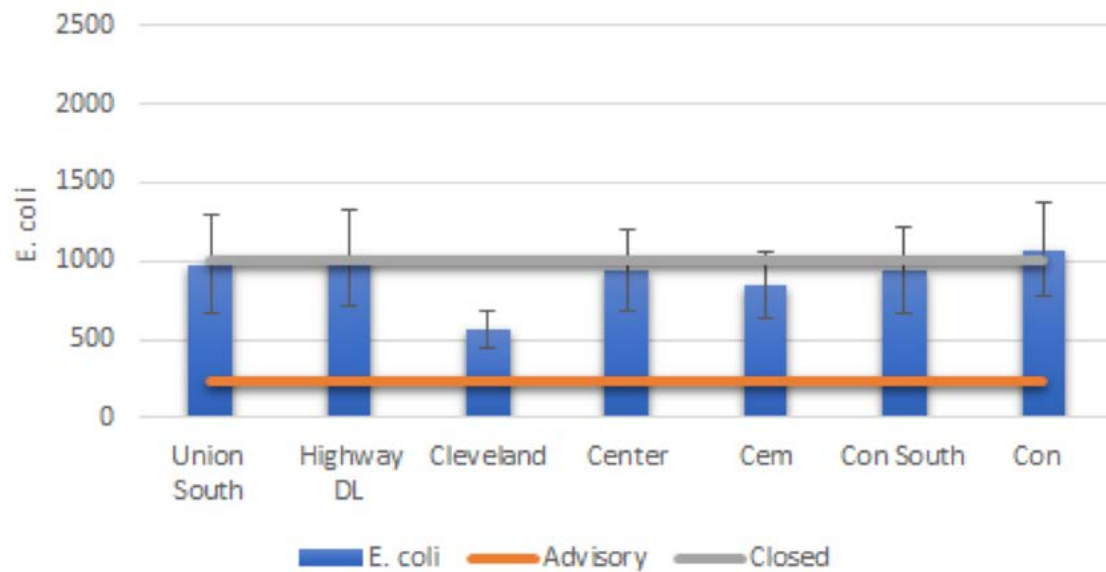


South Branch 24 Hour Rain Event 2018 Turbidity

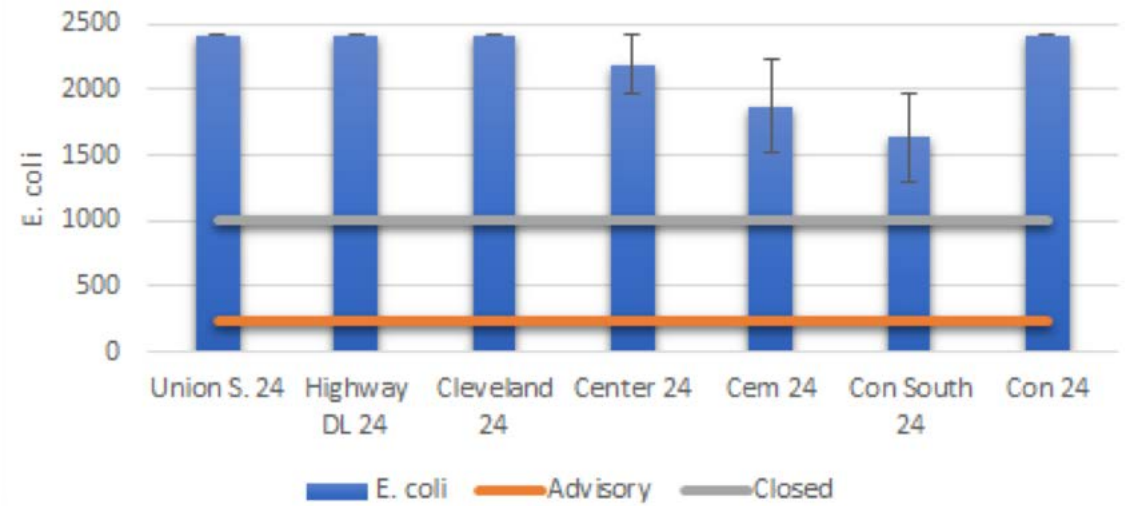


South Branch Rain Event E. coli

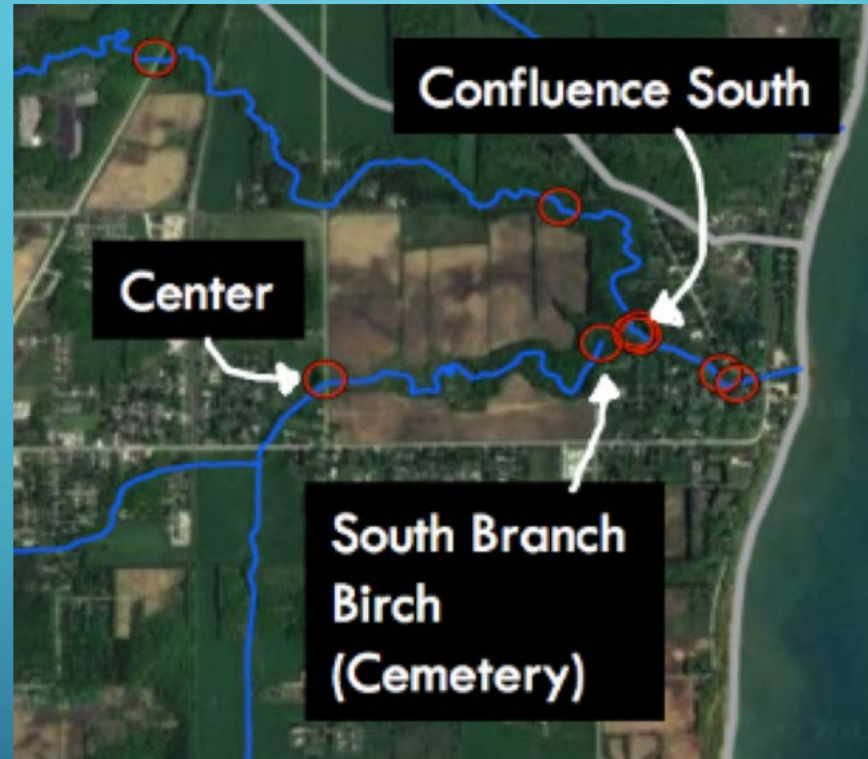
South Branch Non-Rain Events 2018 E. coli



South Branch 24 Hour Rain Events 2018 E.coli



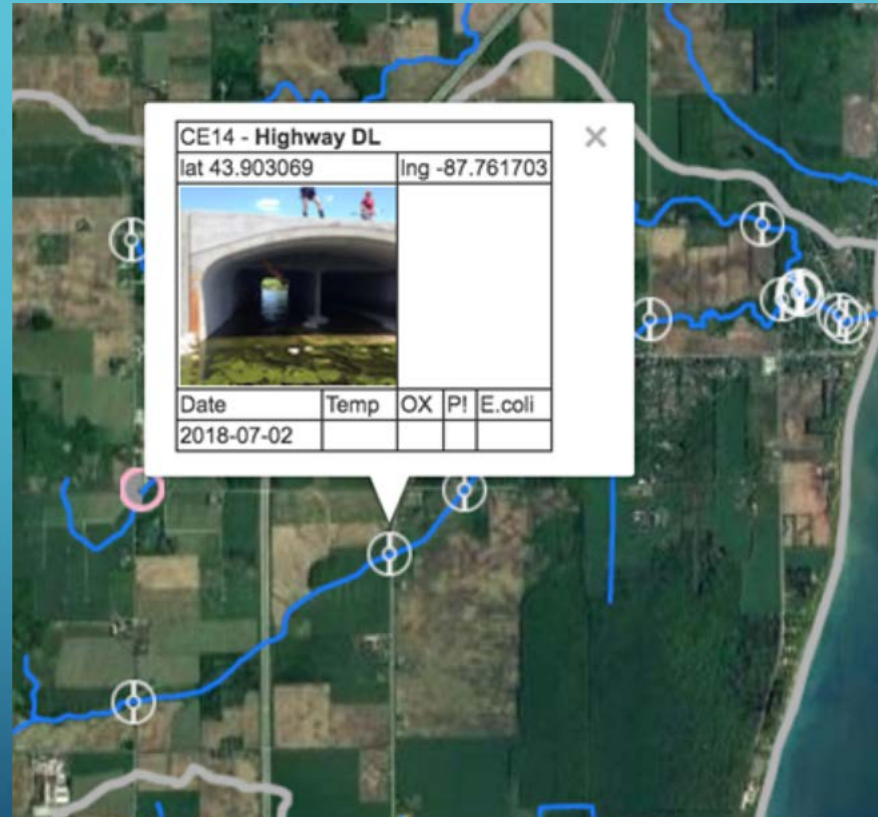
Confluence South



Confluence South



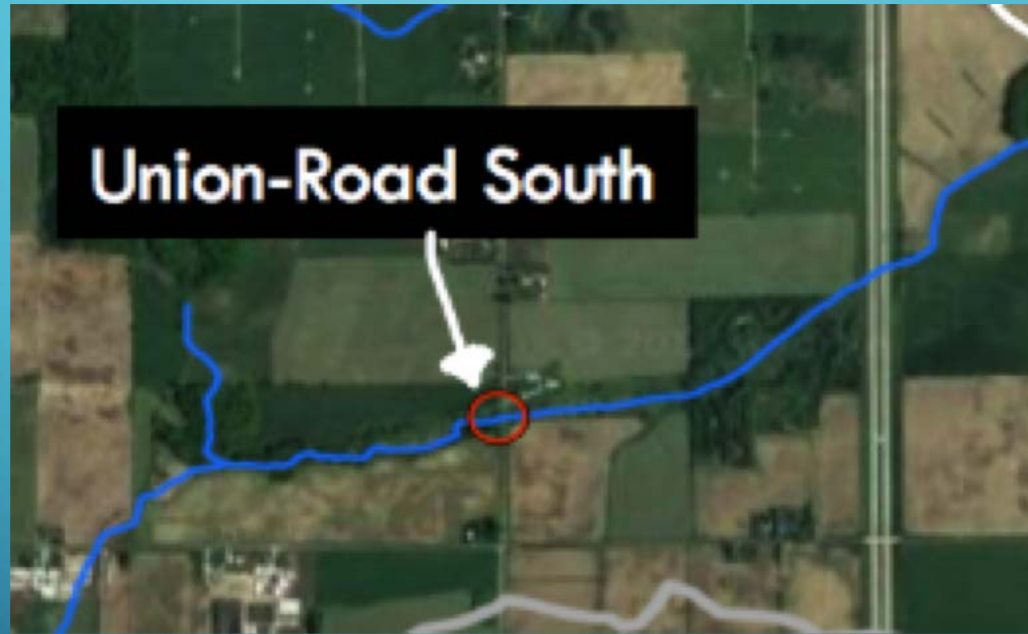
Highway DL



Highway DL



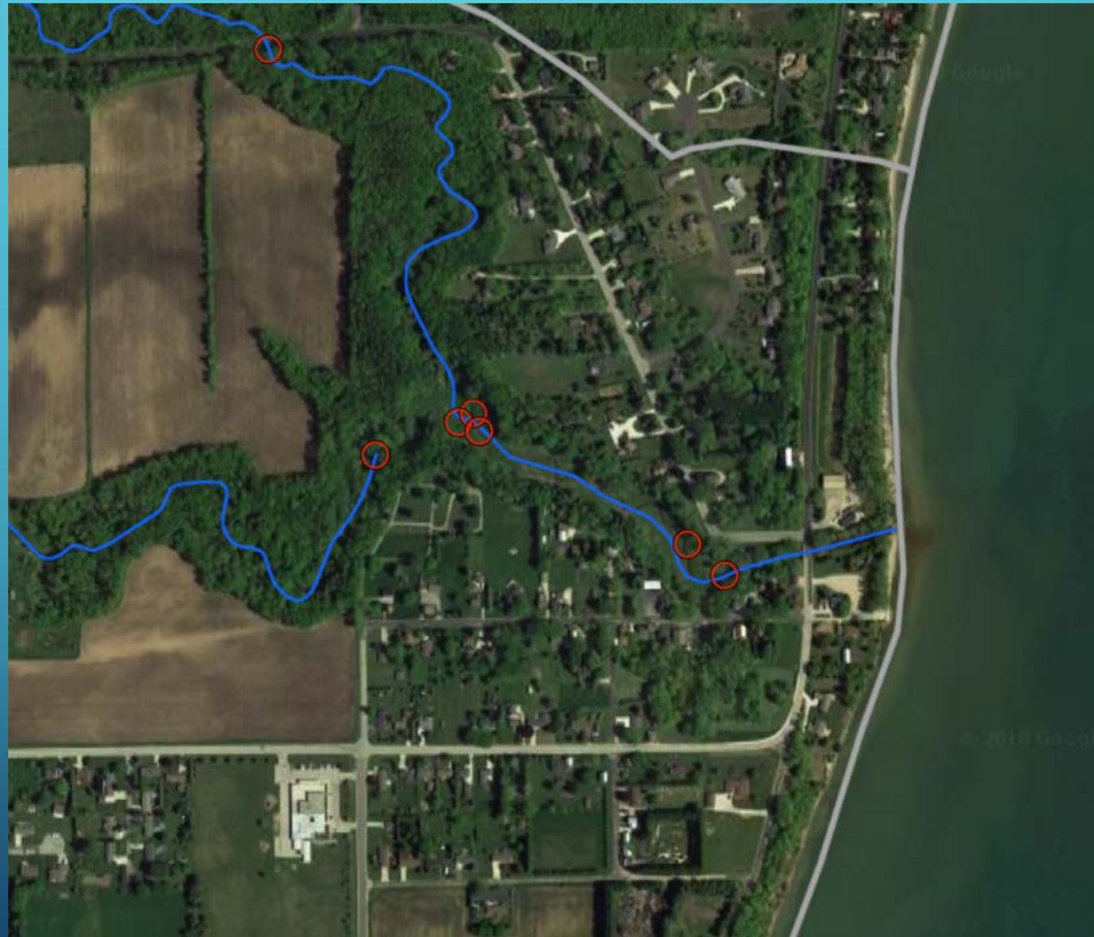
Union South



Union South



Restoration Map



Stream Restoration

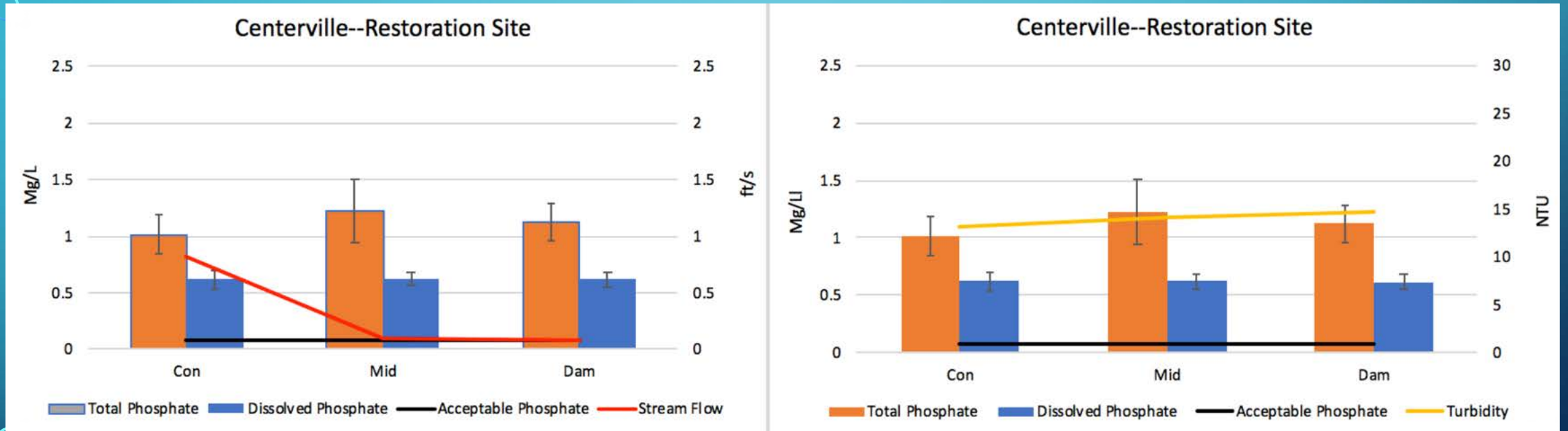


Restoration Area

- Why Restore?
- Centerville Creek Restoration project
- Impact

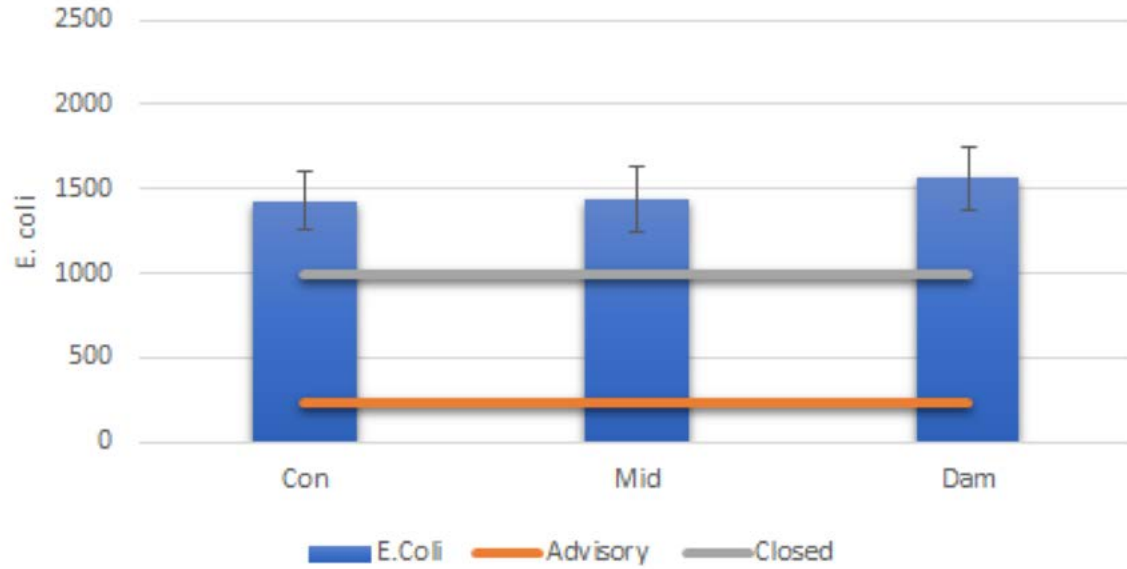


Restoration Area (Summary)

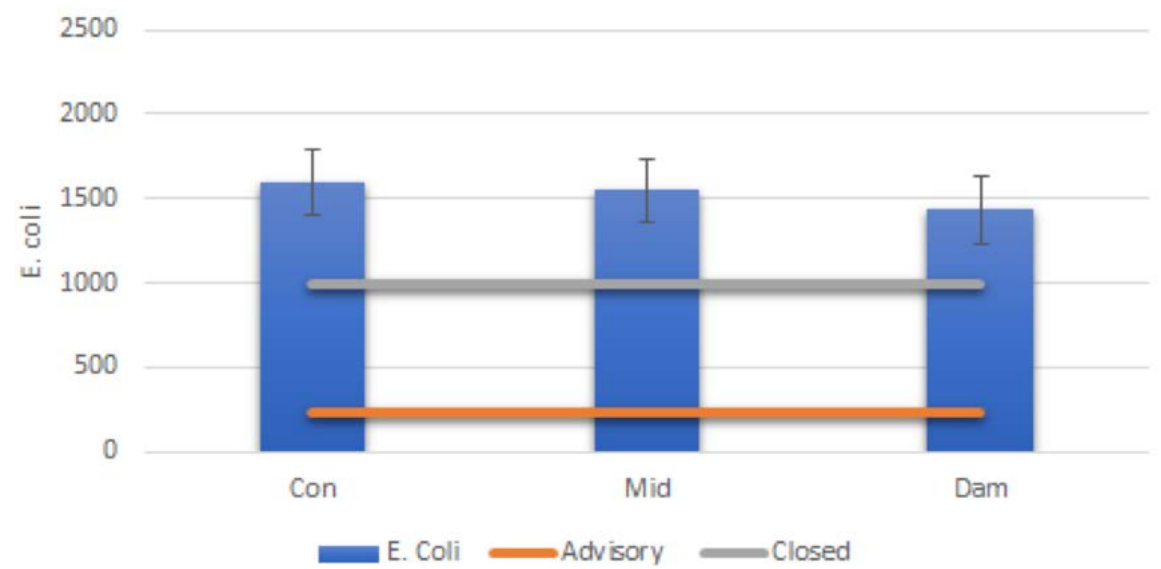


Restoration Area E. coli

Restoration E. coli Total 2017

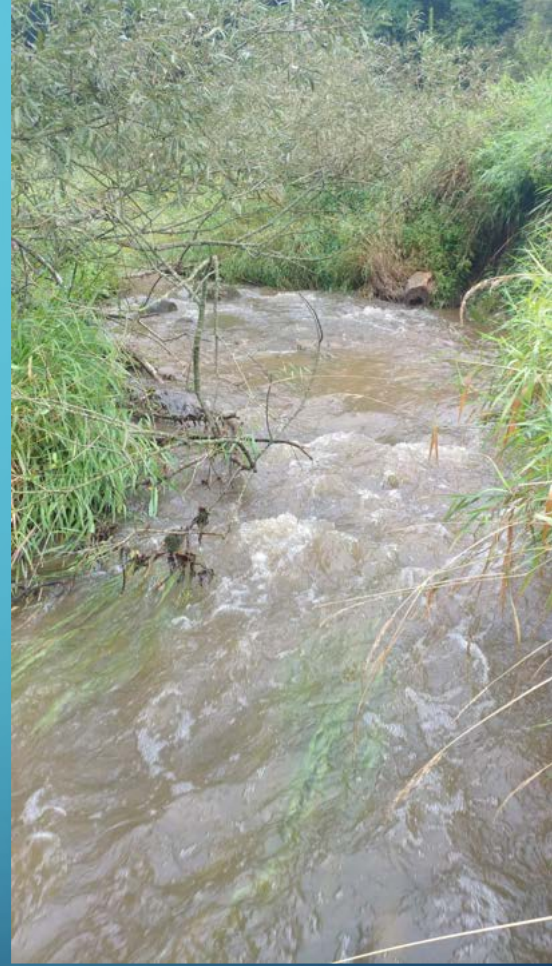


Restoration E. coli Total 2018

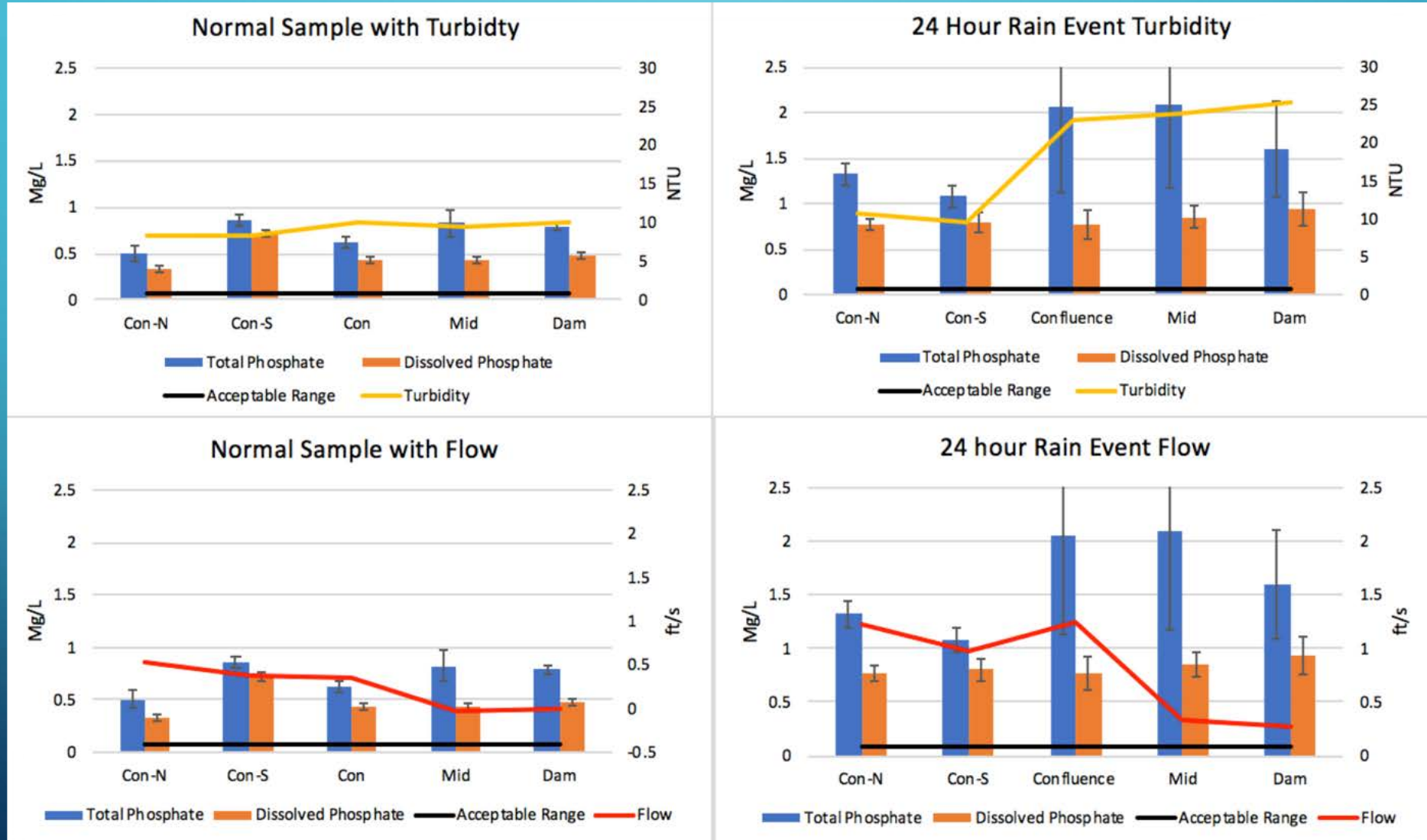


Impact of Rain Events & Runoff

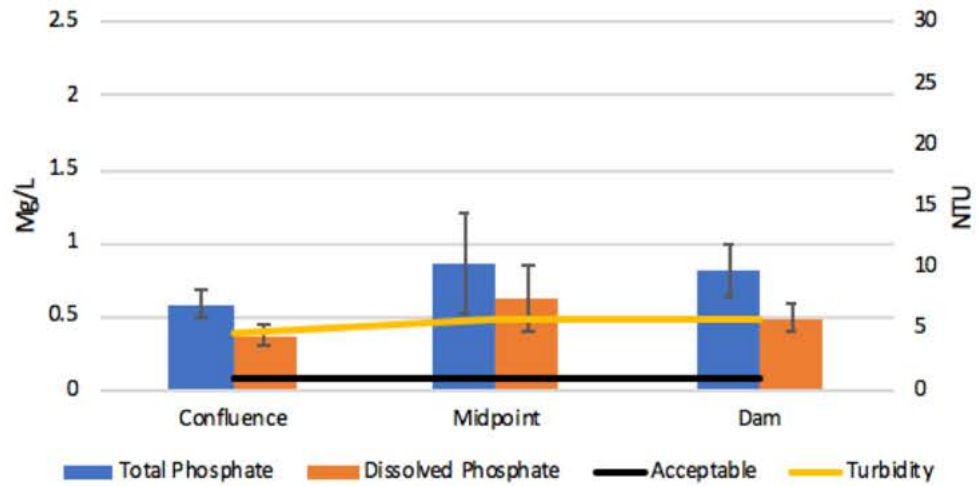
- Surface Runoff
- Subsurface drainage (tile lines/septic systems)
- In stream erosion
- Hester Dendys(macroinvertebrate study)



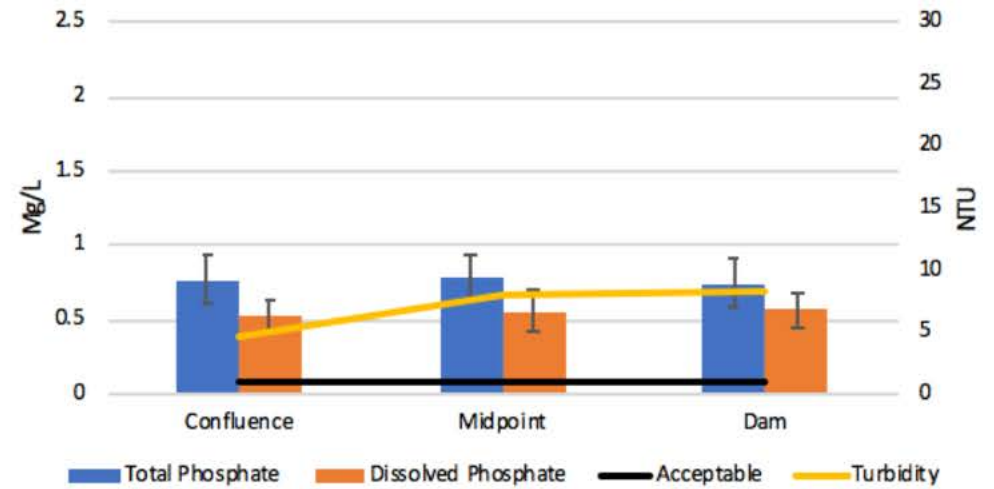
Rain Impact On Stream Quality Flow Comparison



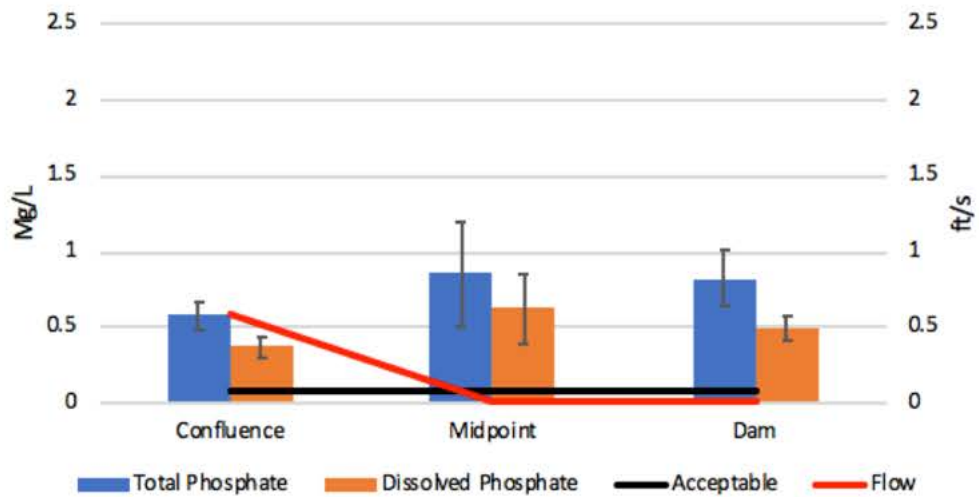
2017 Regular Sampling Turbidity



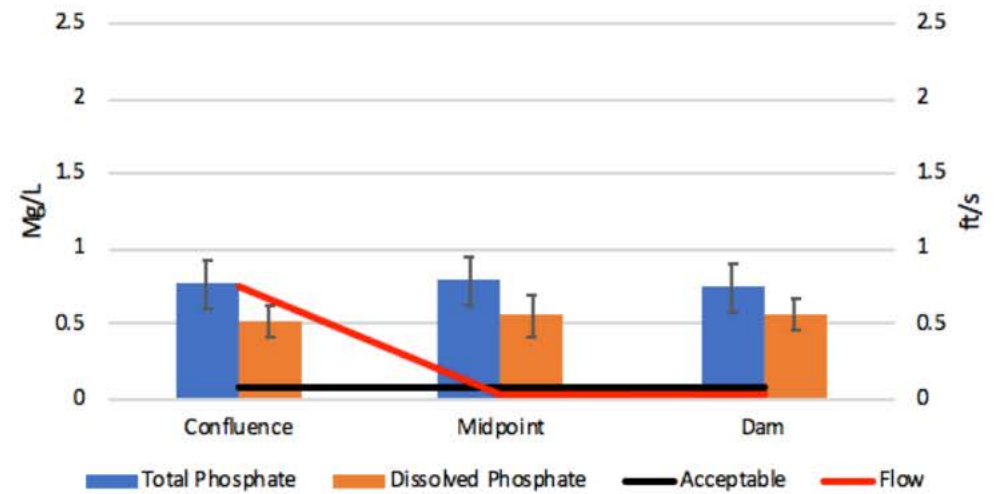
2017 Rain Events Turbidity



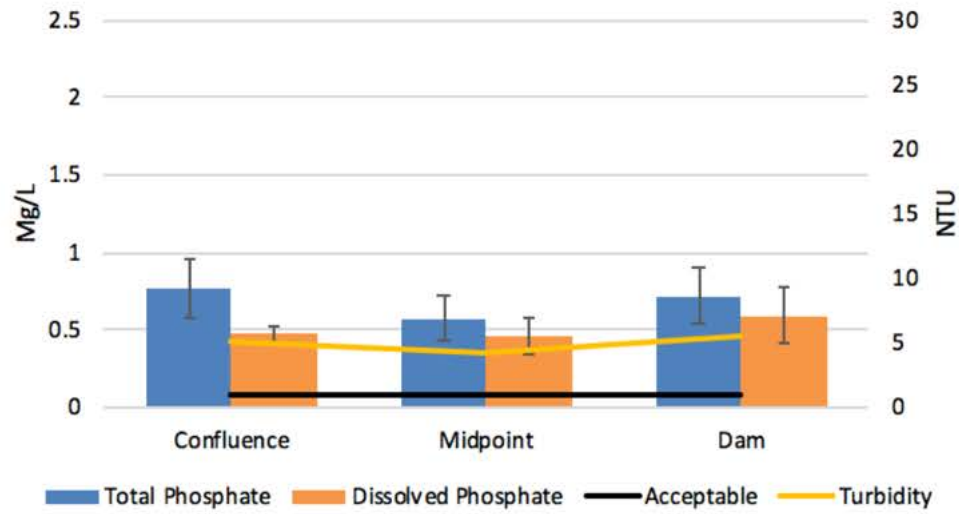
2017 Regular Sampling Flow



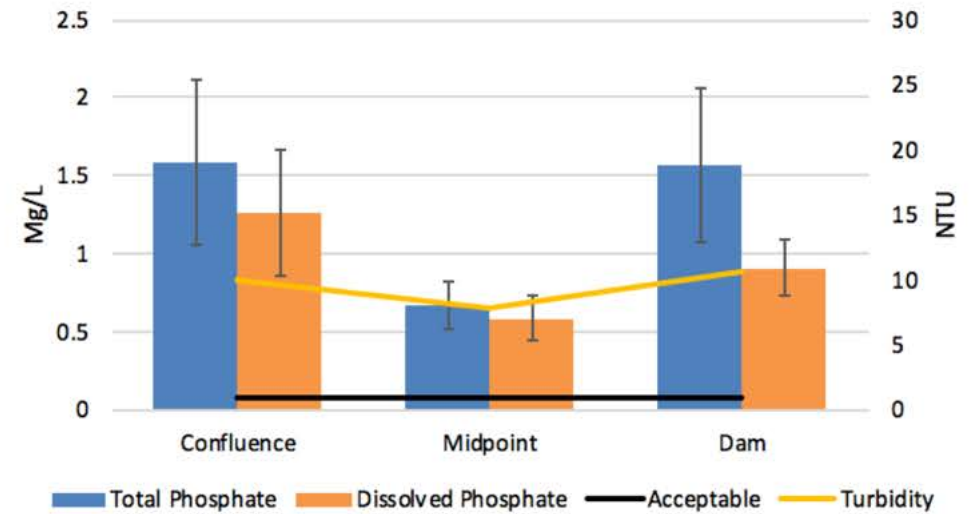
2017 Rain Events Flow



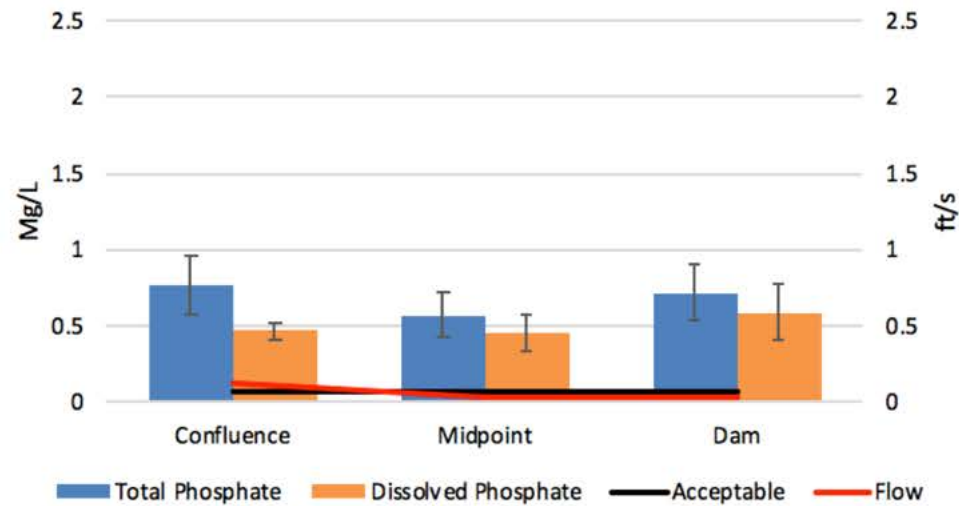
2016 Regular Sampling Turbidity



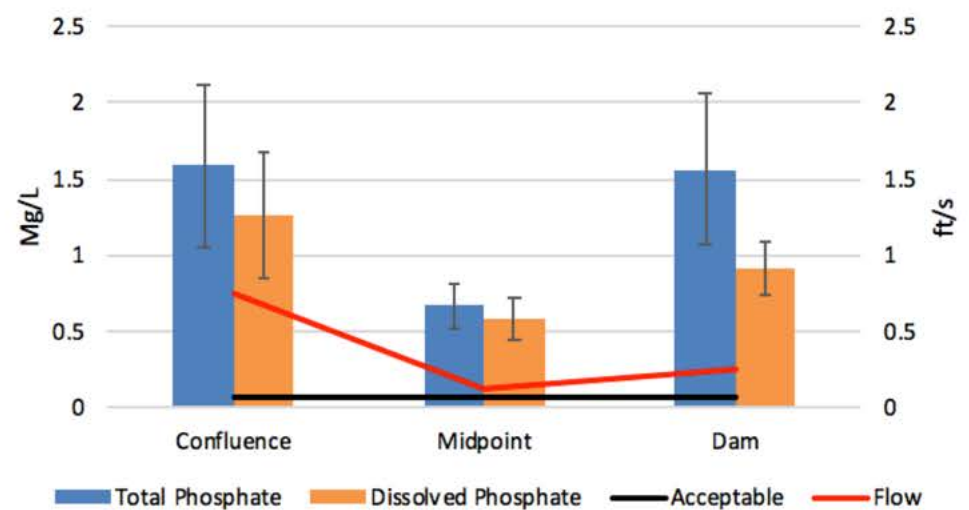
2016 Rain Event Turbidity



2016 Regular Sampling

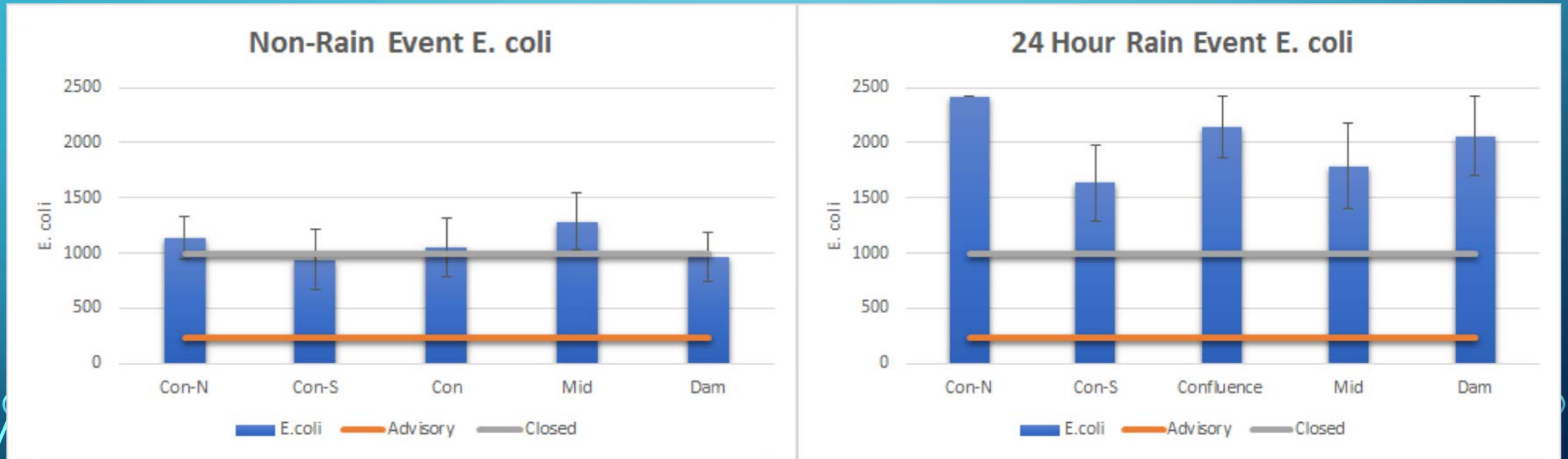


2016 Rain Event Flow

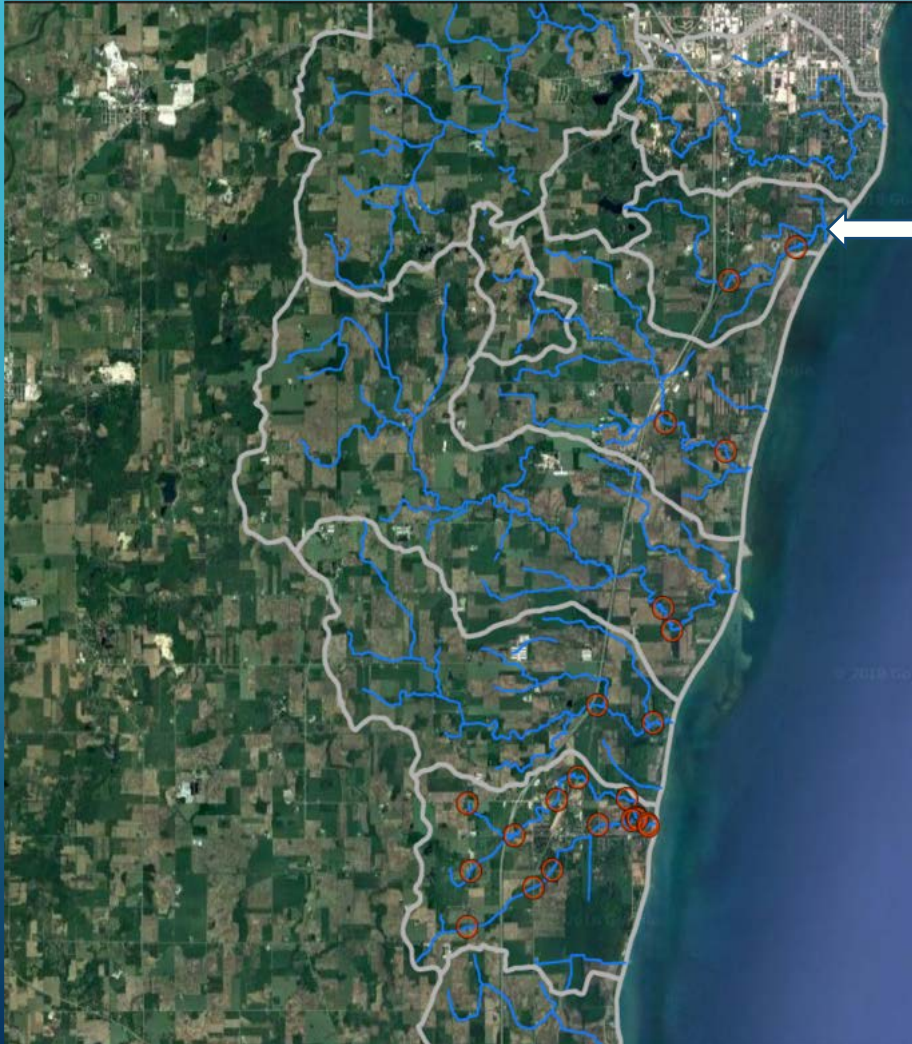


Rain Impact on Streams (2018)

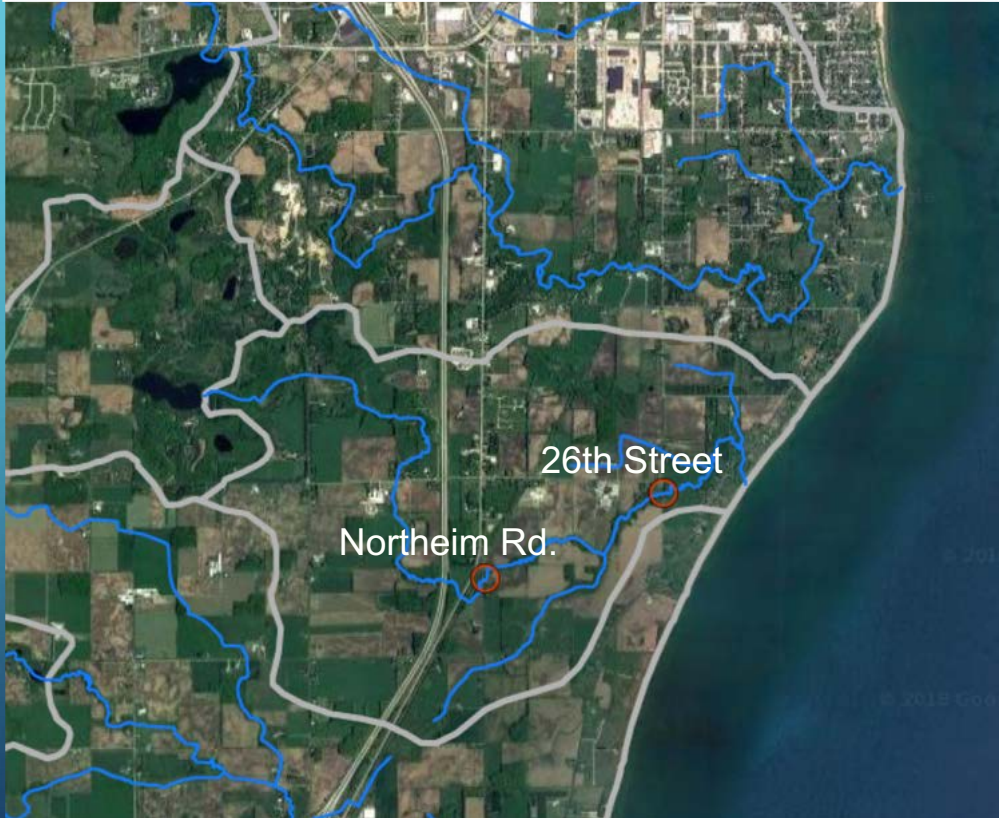
E. coli Comparison



Calvin Creek

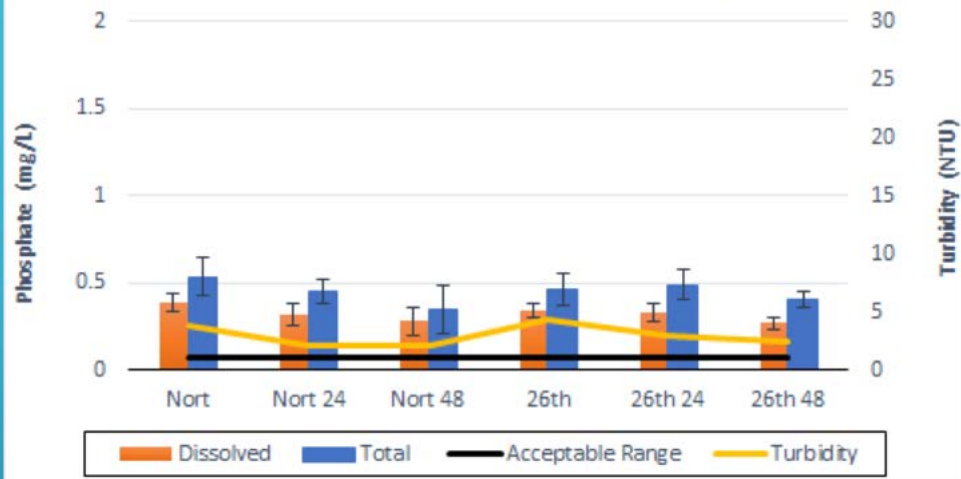


CA02	Calvin Creek South 26th St.
CA03	Calvin Creek Northeim Rd.

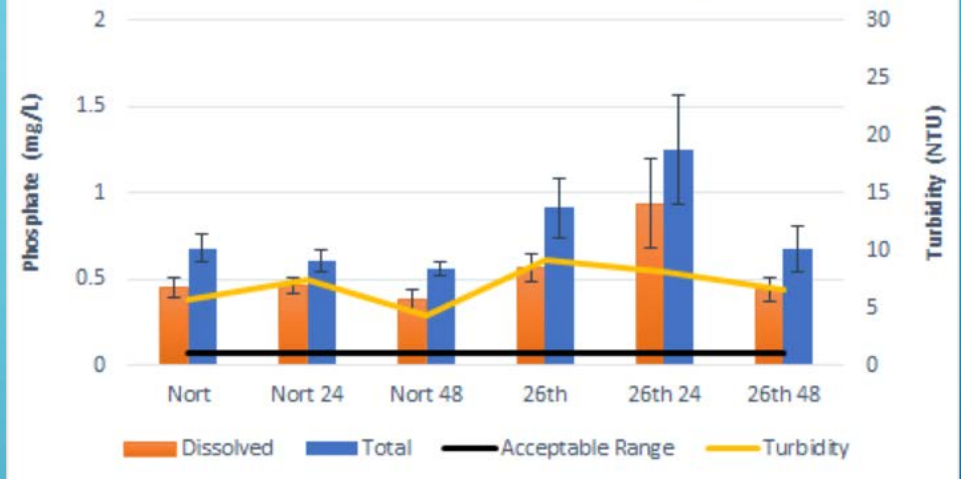


Calvin Creek Turbidity and Flow Rate

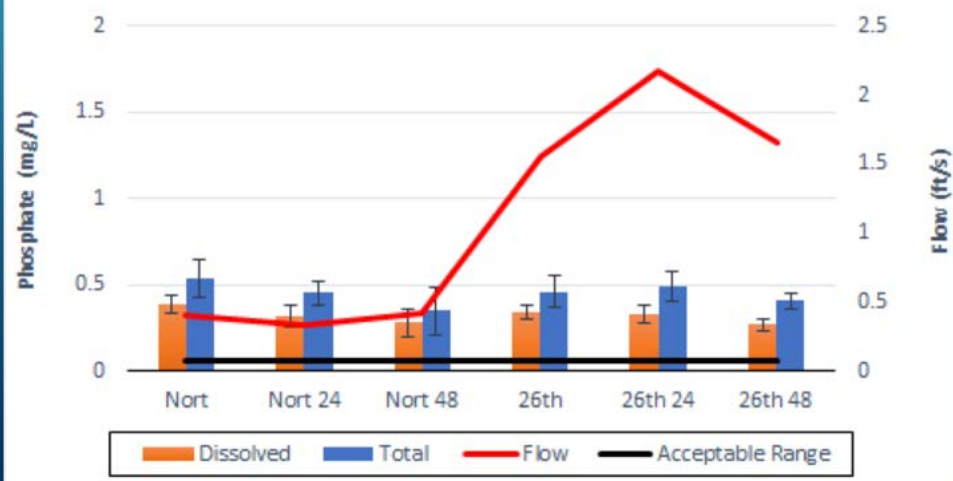
Calvin Creek 2017 Turbidity



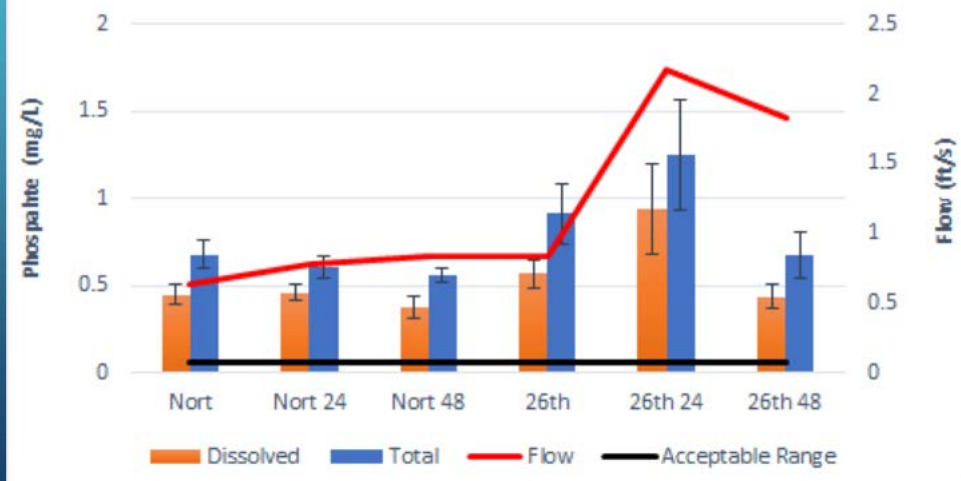
Calvin Creek 2018 Turbidity



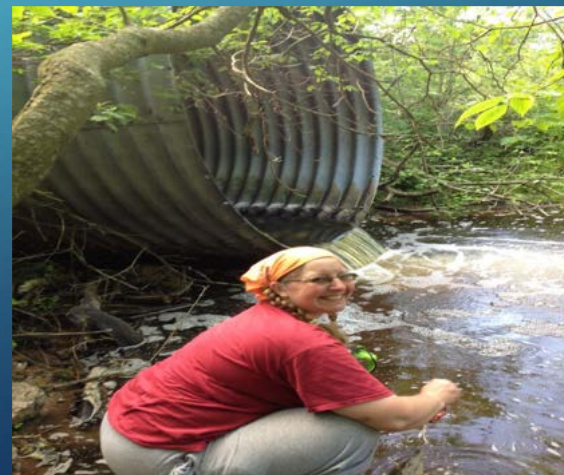
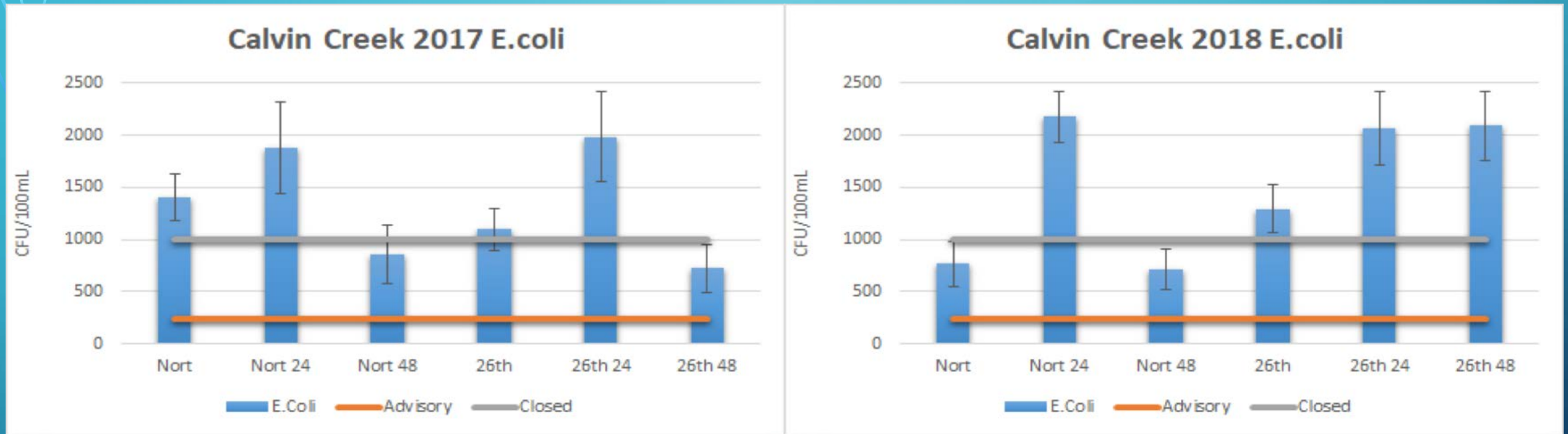
Calvin Creek 2017 Flow



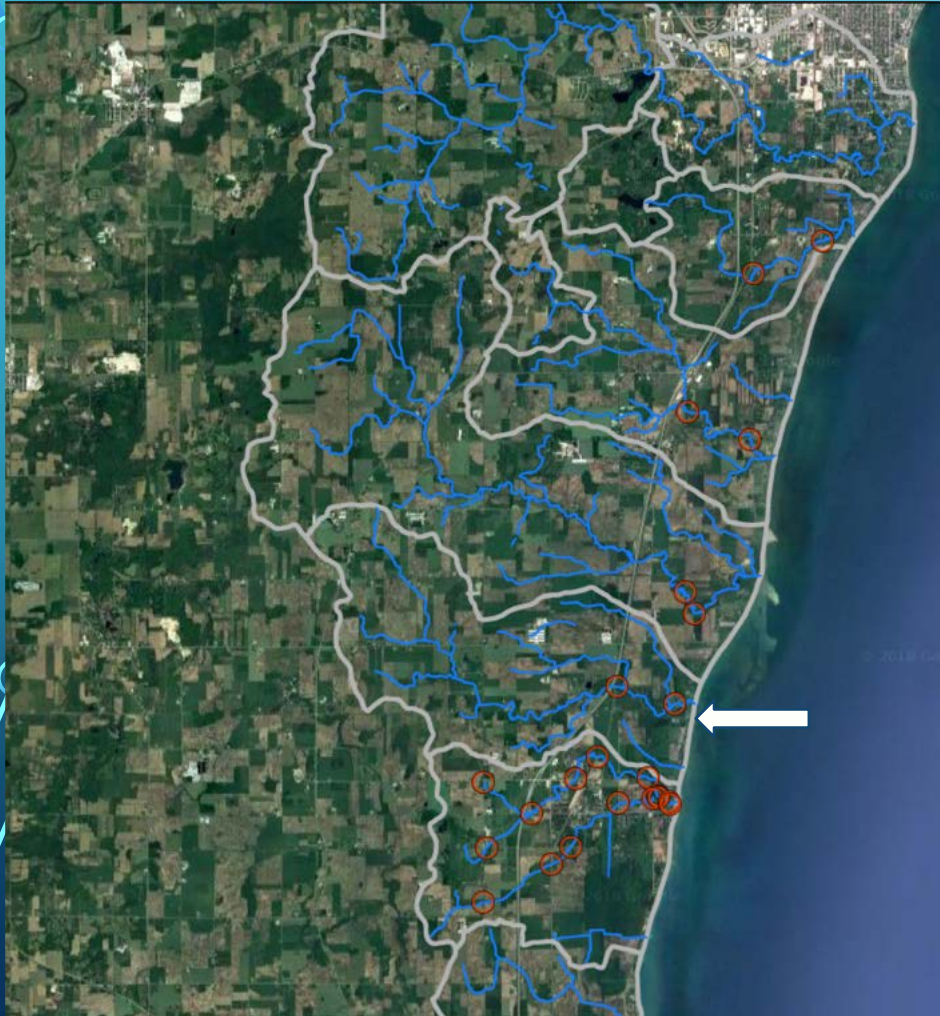
Calvin Creek 2018 Flow Rate



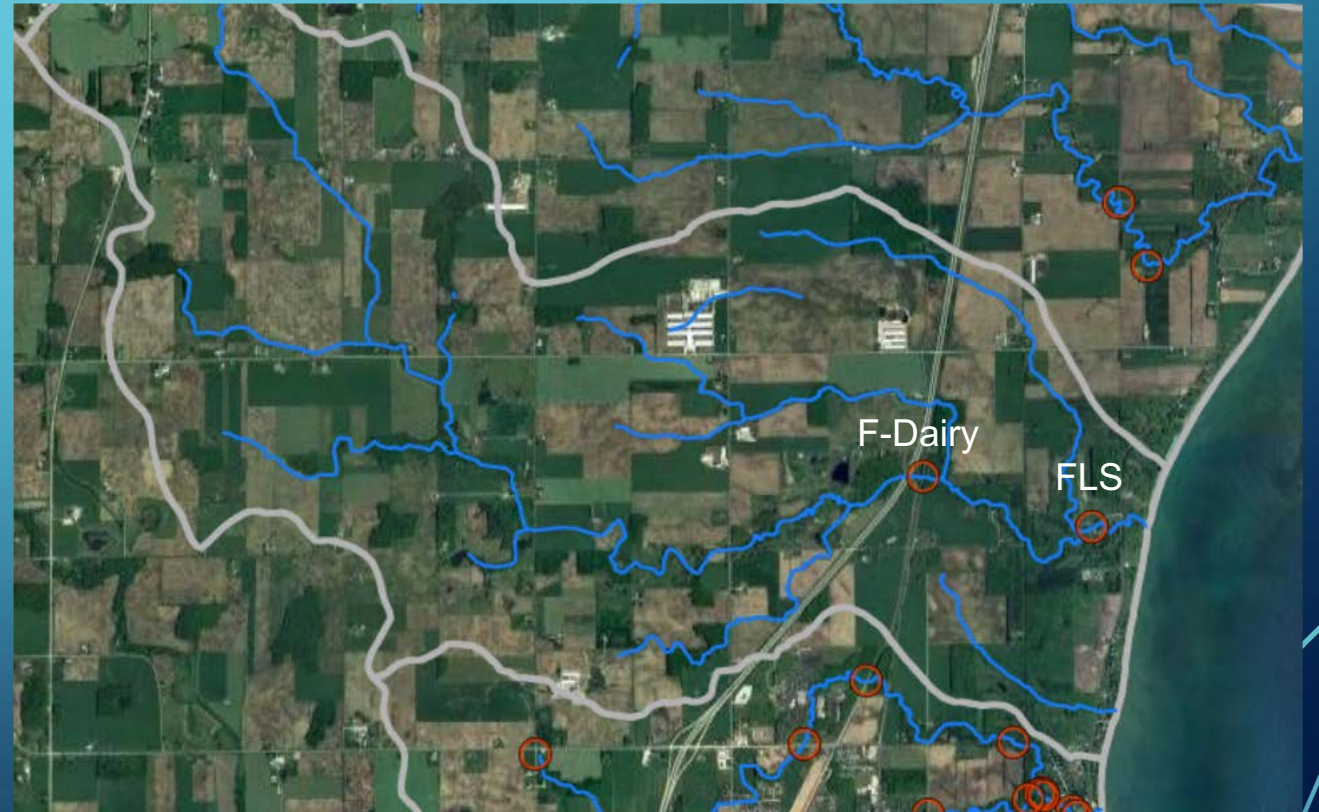
Calvin Creek E.coli Levels



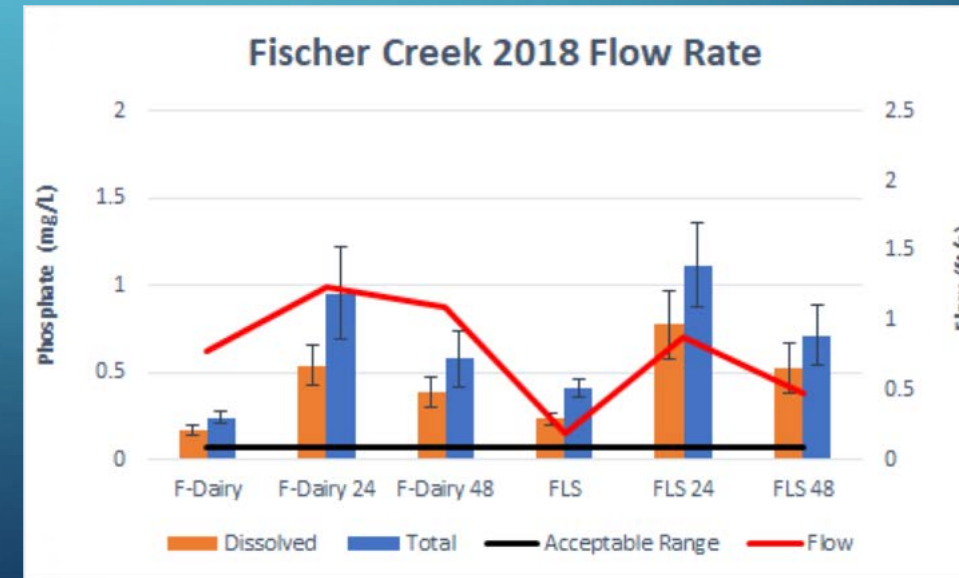
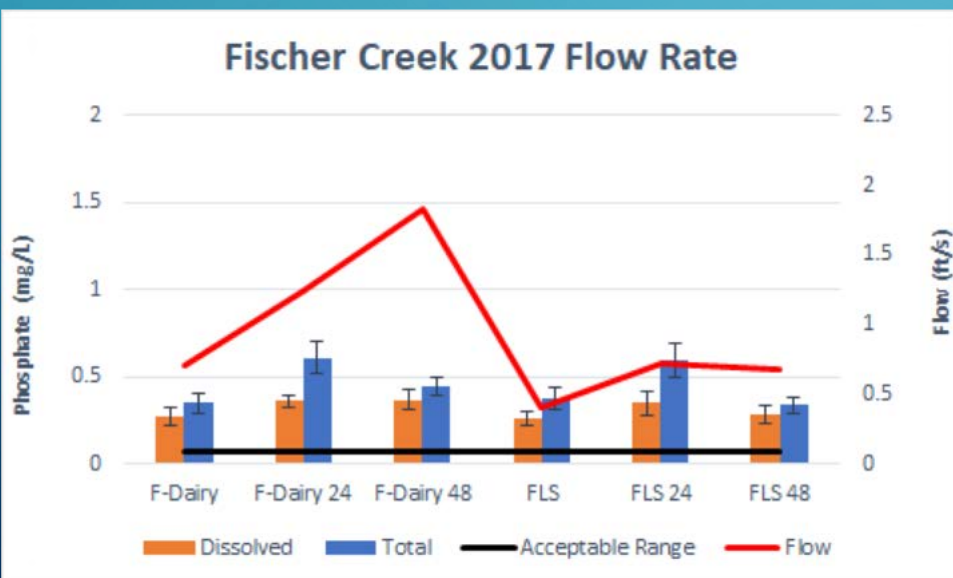
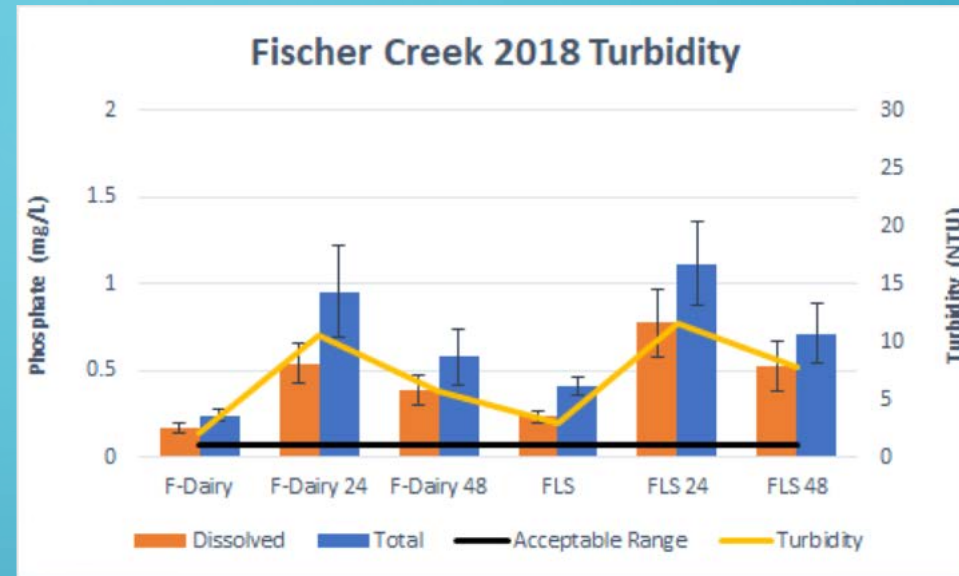
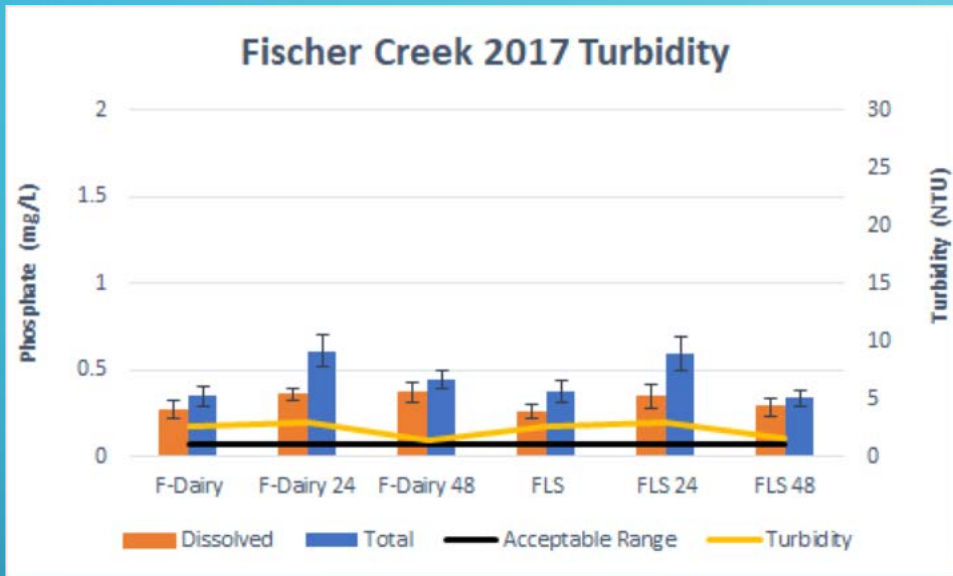
Fischer Creek



FI02	Fischer Creek LS
FI03	Fischer Creek Dairyland Dr.

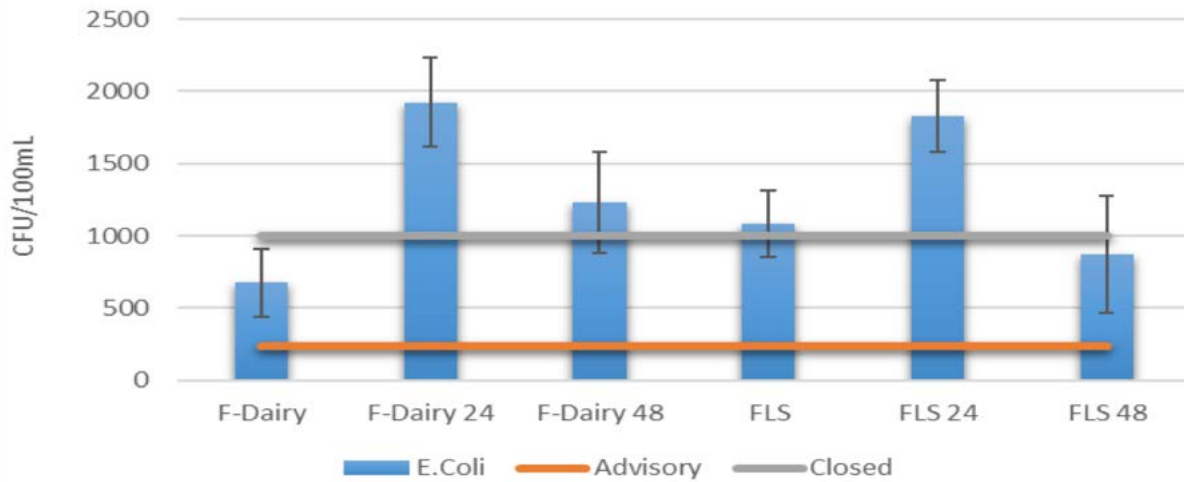


Fischer Creek Turbidity and Flow Rate

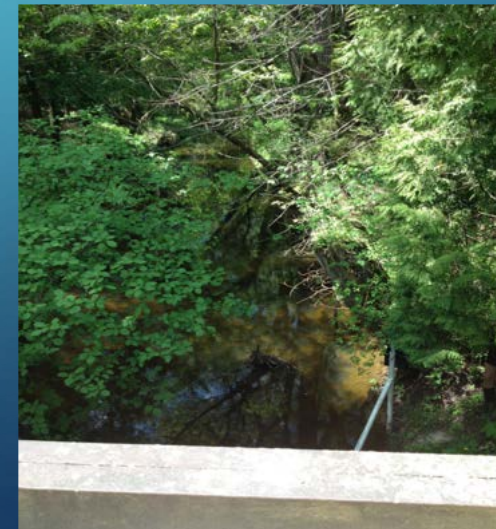
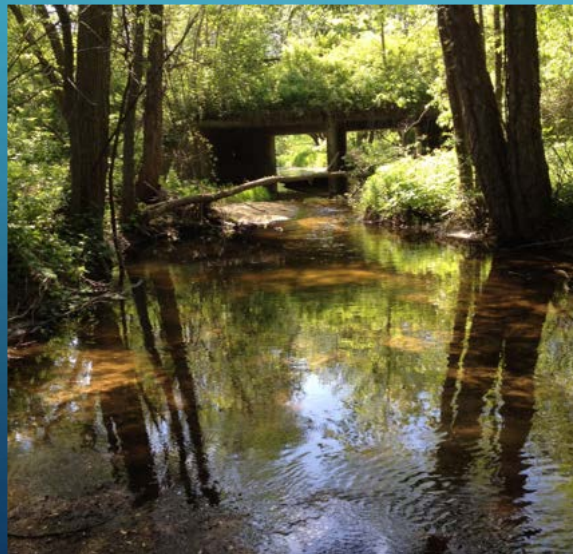
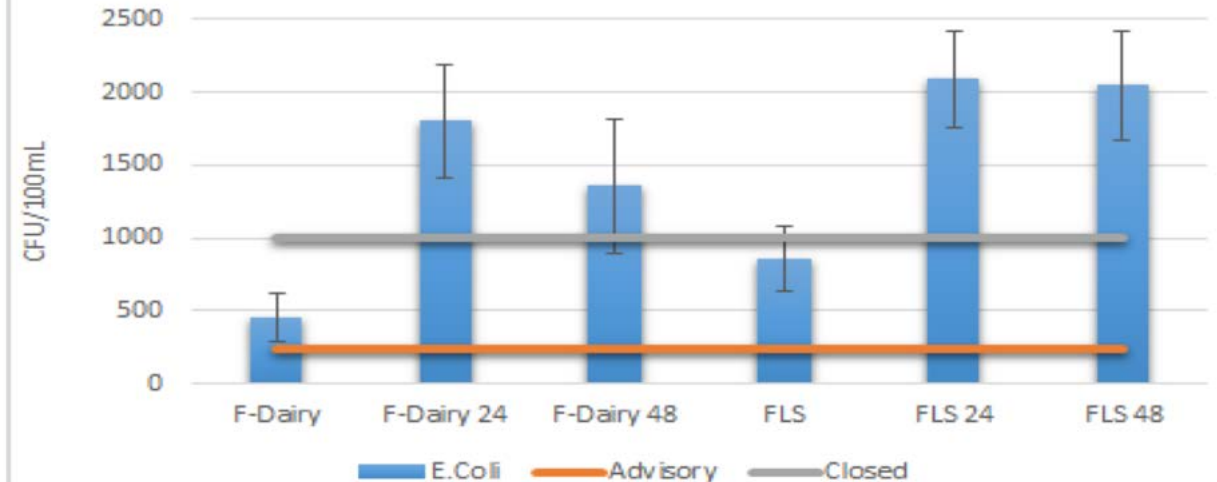


Fischer Creek E.coli Levels

Fischer Creek 2017 E.coli



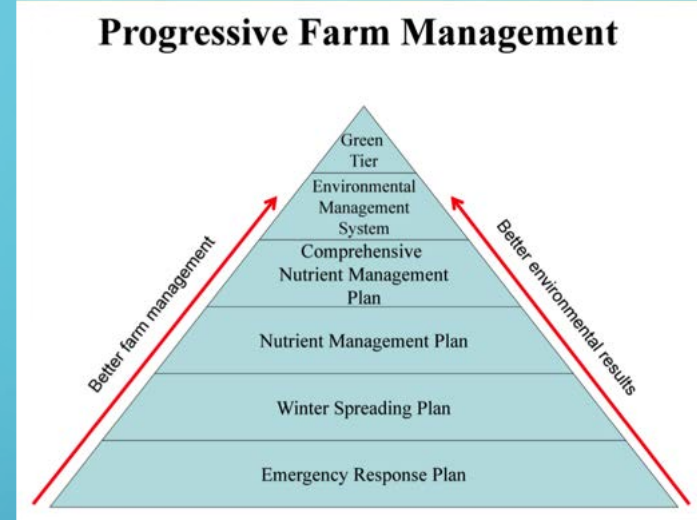
Fischer Creek 2018 E.coli



Summary of 2018 Stream Data Collected

- Water systems are always changing
 - Need for continuation of monitoring
- Problematic areas beginning to present themselves
- Indication restoration area is working

Moving Forward



QUESTIONS, COMMENTS, & CONCERNS

