Briefing on Summer, 2025 Pine River Watershed Research

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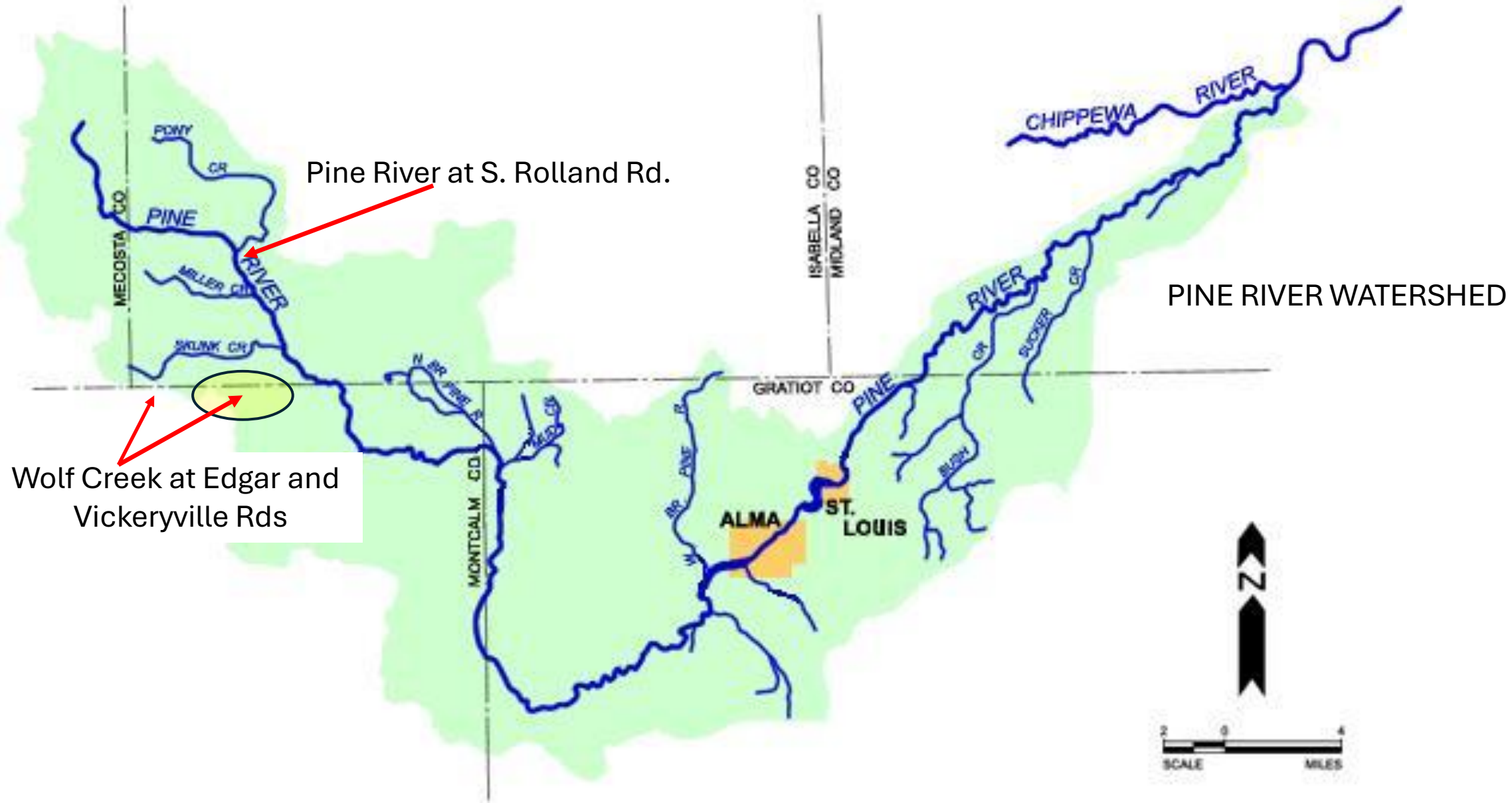
What We Did On Our Summer Vacation

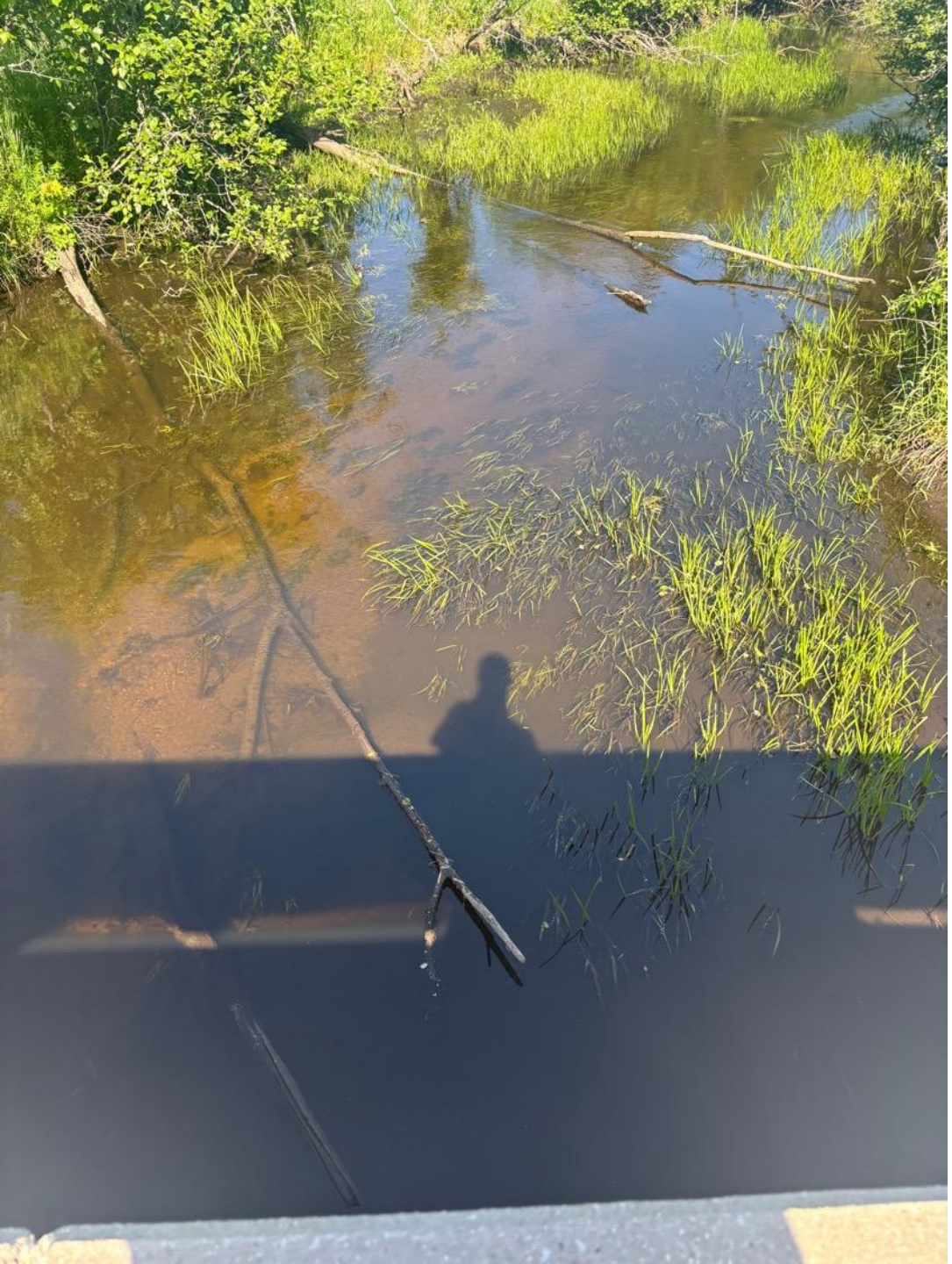
- Continued monitoring watershed
- Addressed possible point sources for St. Louis algal bloom
- Tried to find a “clean” representative sampling site in the watershed

Can We Find a Clean Site for Pine River Watershed?

- Is there a site or sites anywhere in the watershed that represent water quality unimpacted by agricultural runoff?
- If not, do we have to conclude the entire watershed is impacted and impaired?
- We started with three sites:
  - Wolf Creek at Edgar Road
  - Wolf Creek at Vickeryville Road
  - Pine River at Rolland Road

UPSTREAM (CLEAN?) SITES





Pine River at S. Rolland:

Appeared less impacted compared with downstream sites by lack of surface algae, clarity of water and swift current. Typical sandy bottom and iron staining consistent with glacial till deposits (general glacial drift) in this region of the state.

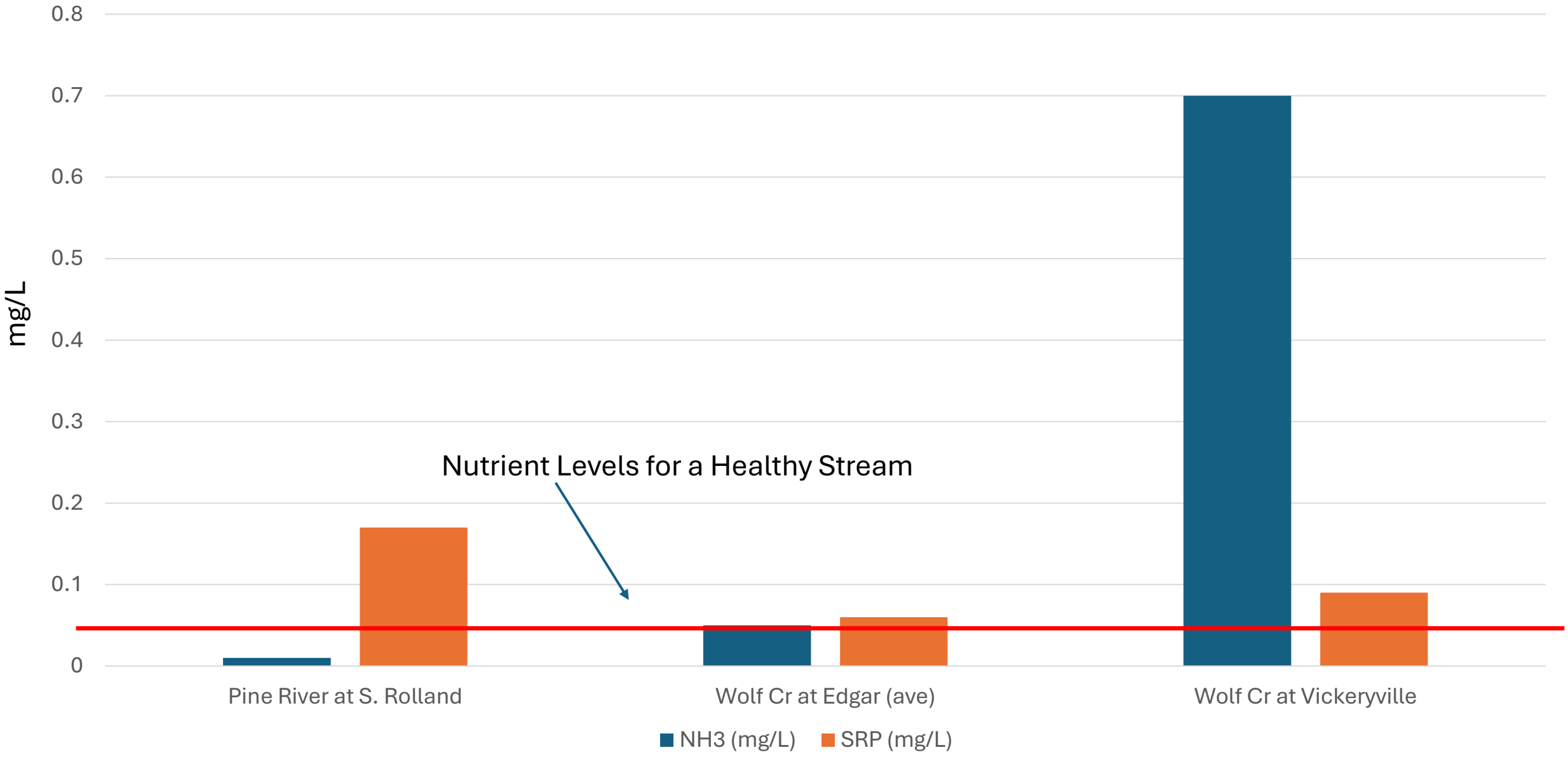
We did find a fairly large sheen on the surface coming from an input point (pipe?) on the north side of the stream. There is an Amish farm nearby with animals (visibly: 6-8 horses and 6-8 cows). The area around the site is generally forested and sparsely populated. Sheen on next slide.

Surface sheen. Most likely bacterial due to the fact that it fragmented and did not reform when it was broken. Also, no petroleum smell or other signs of petroleum source

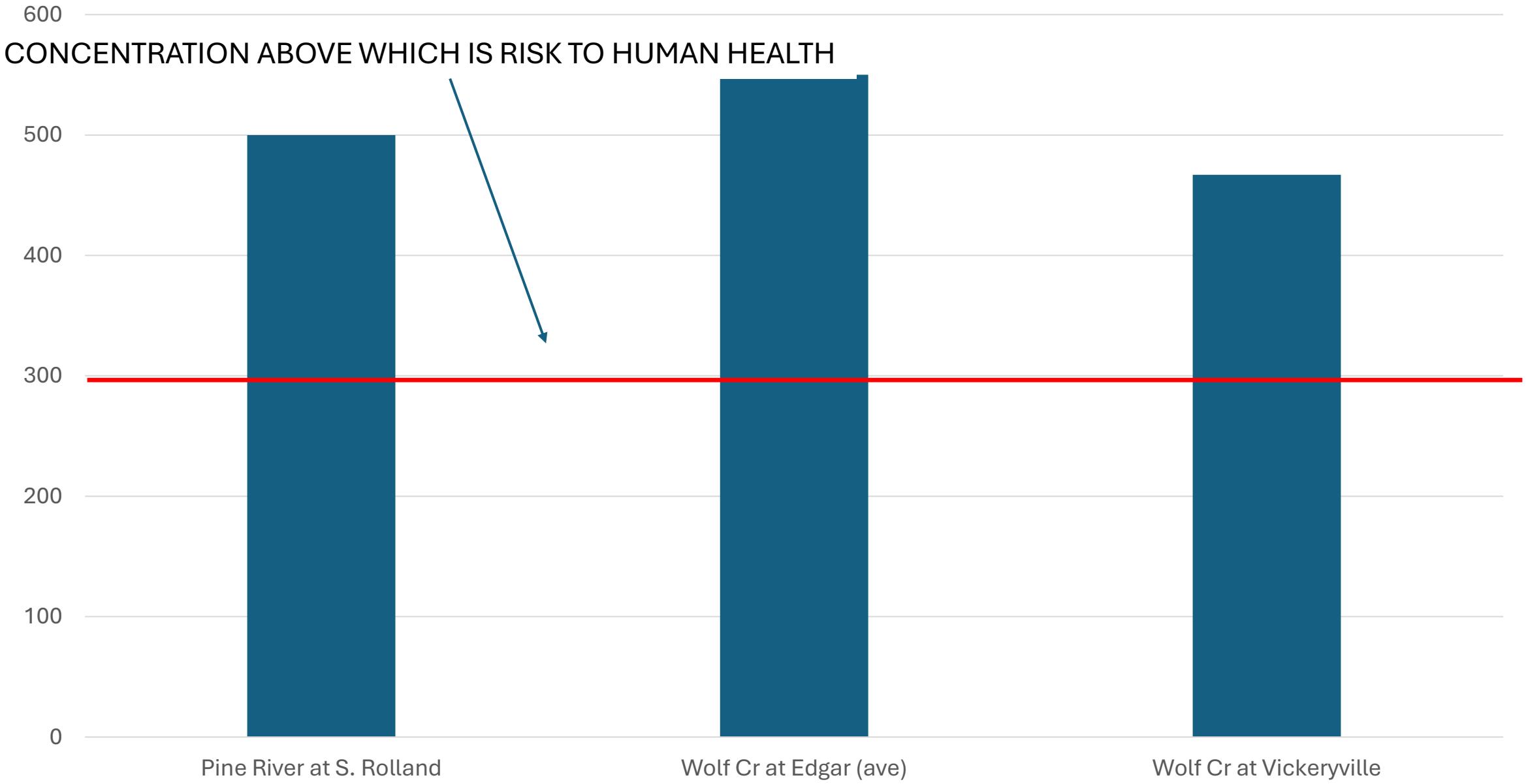
Wolf Creek at Edgar Road:

Appeared less impacted compared with downstream sites by lack of surface algae, swift current and rocky bottom. Area was forested and isolated. Few nearby farms and homes.

Potentially Clean Sites in PR Watershed - Initial Attempt (Nutrient Concentration)



E. COLI CONCENTRATIONS FOR POTENTIALLY CLEAN SITES IN PINE RIVER WATERSHED



Conclusions

- Pine River at S. Rolland does not appear to be a good candidate for an unimpacted area of the watershed. Concentrations are high as are *E. coli*.
- Wolf Creek sites do not appear much better
- More work needs to be done

Site That May be Clean????

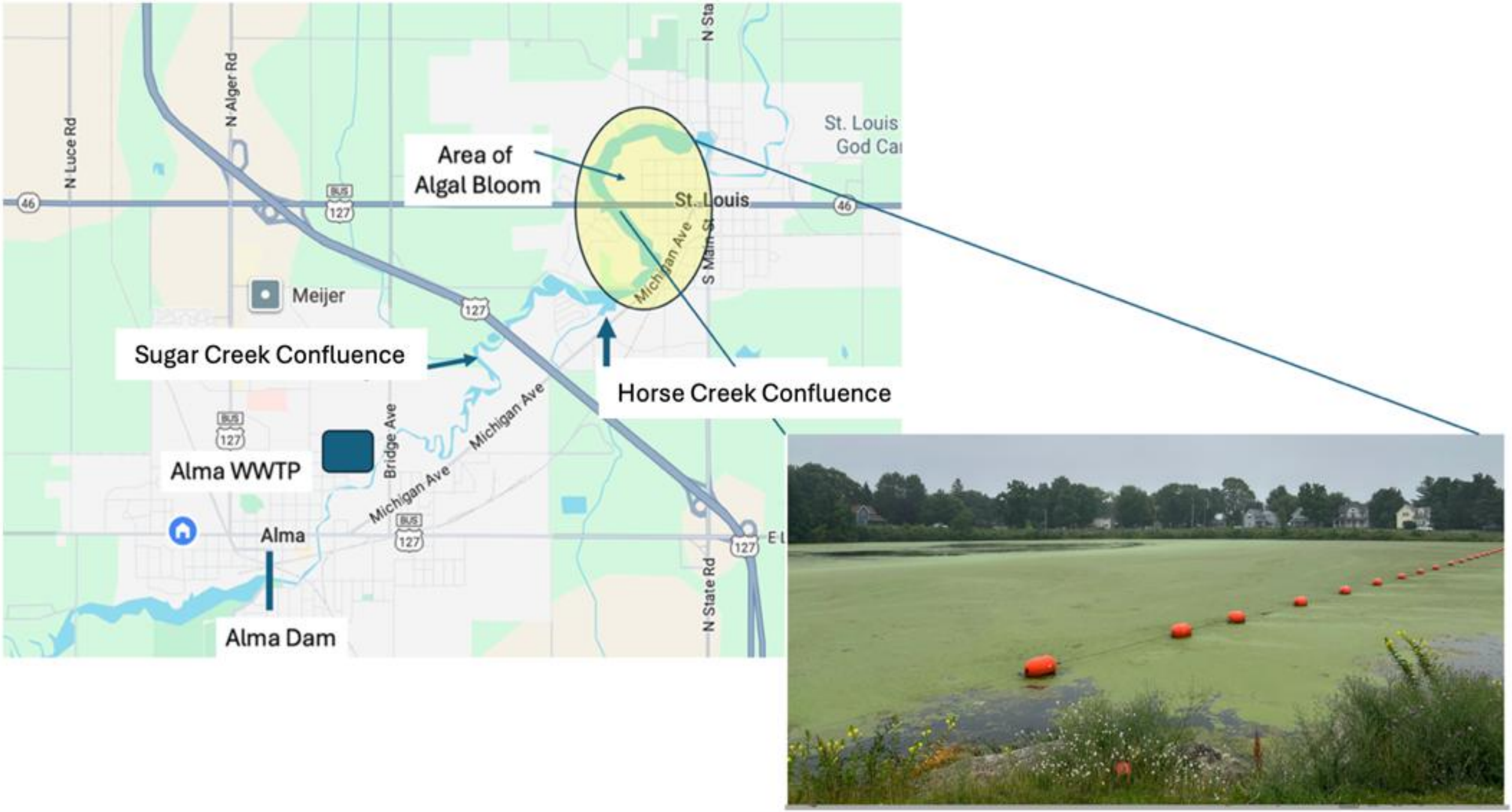
- Bush Creek?

What's Causing St. Louis' Algal Bloom

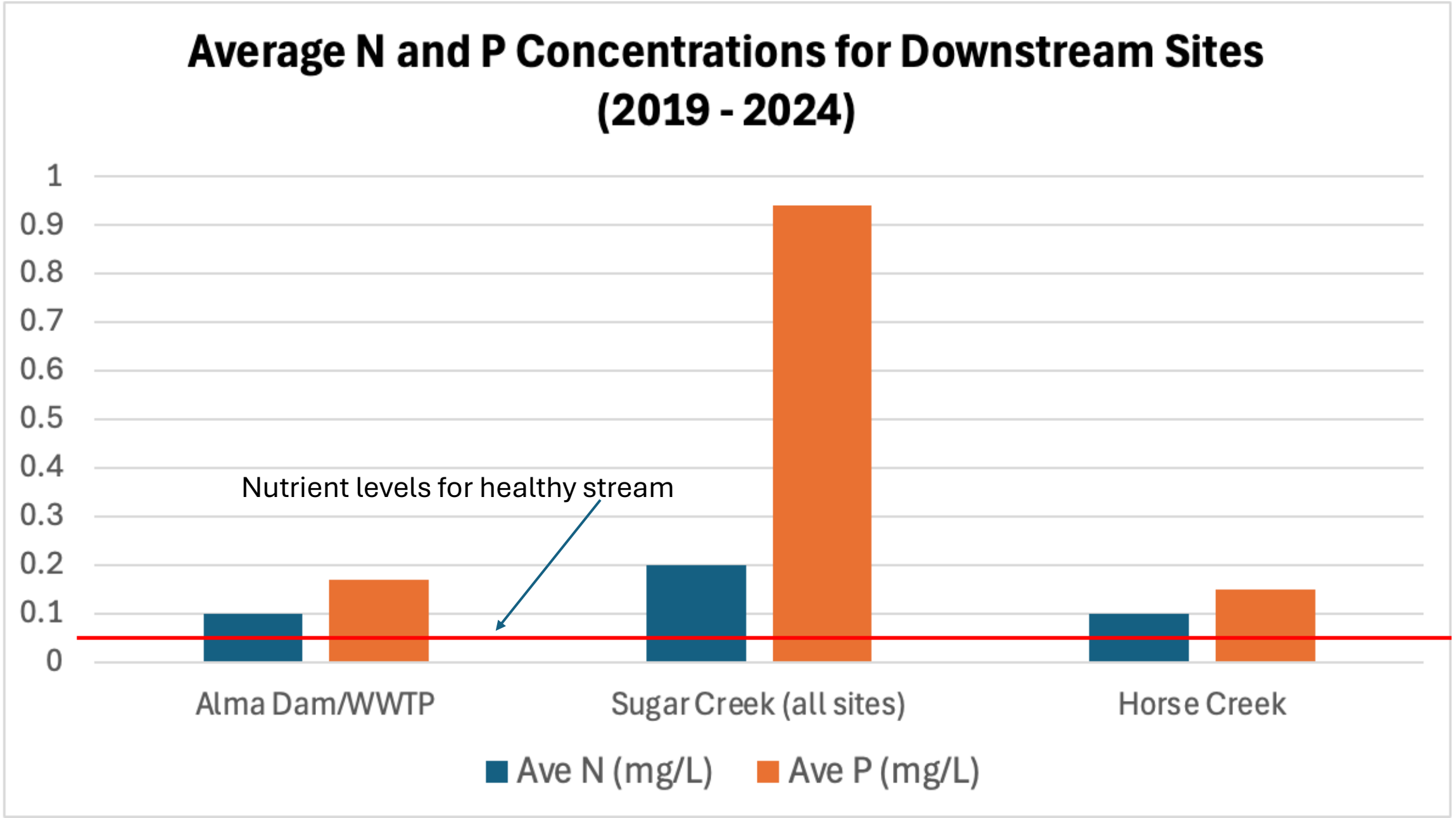
- 2025 was worst year as far as extent and persistence of algae and aquatic vegetation – beginning at fishing derby!
- We are able to narrow down two potential inputs
- A little more work needs to be done to be sure

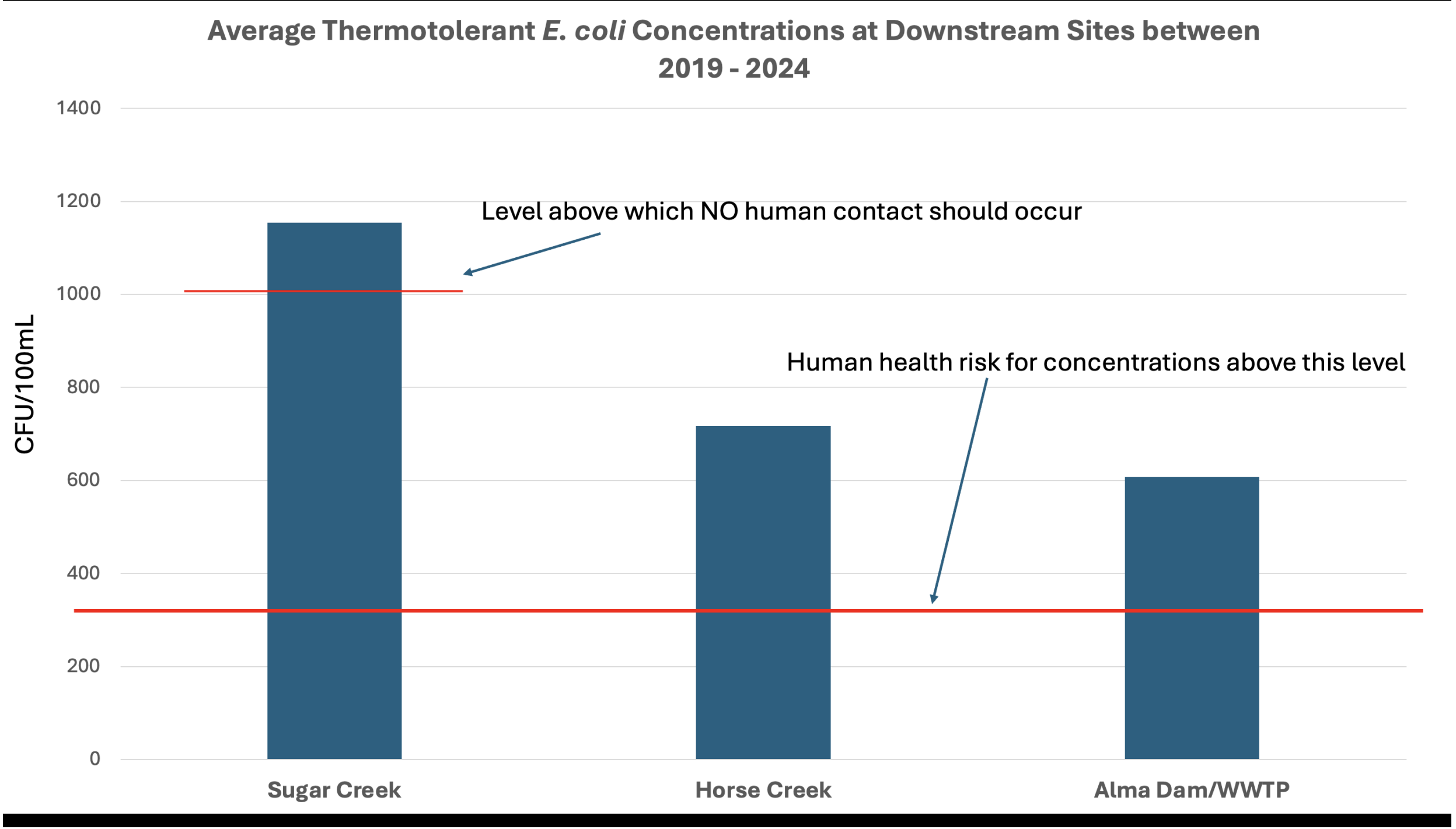
Recap From Last Year

- Only 4 potential input sites that could contribute to algal blooms
  - N and P coming over Alma Dam
  - Sugar Creek inputs
  - Horse Creek inputs
  - Alma Wastewater Treatment Plant discharge


Area of
Algal Bloom
St. Louis
Meijer
Sugar Creek Confluence
Horse Creek Confluence
Alma WWTP
Alma
Alma Dam
N Luce Rd
N Alger Rd
N State Rd
S Main St
Michigan Ave
Bridge Ave
46
127
BUS

Which Downstream Sites Have the Most Impact?



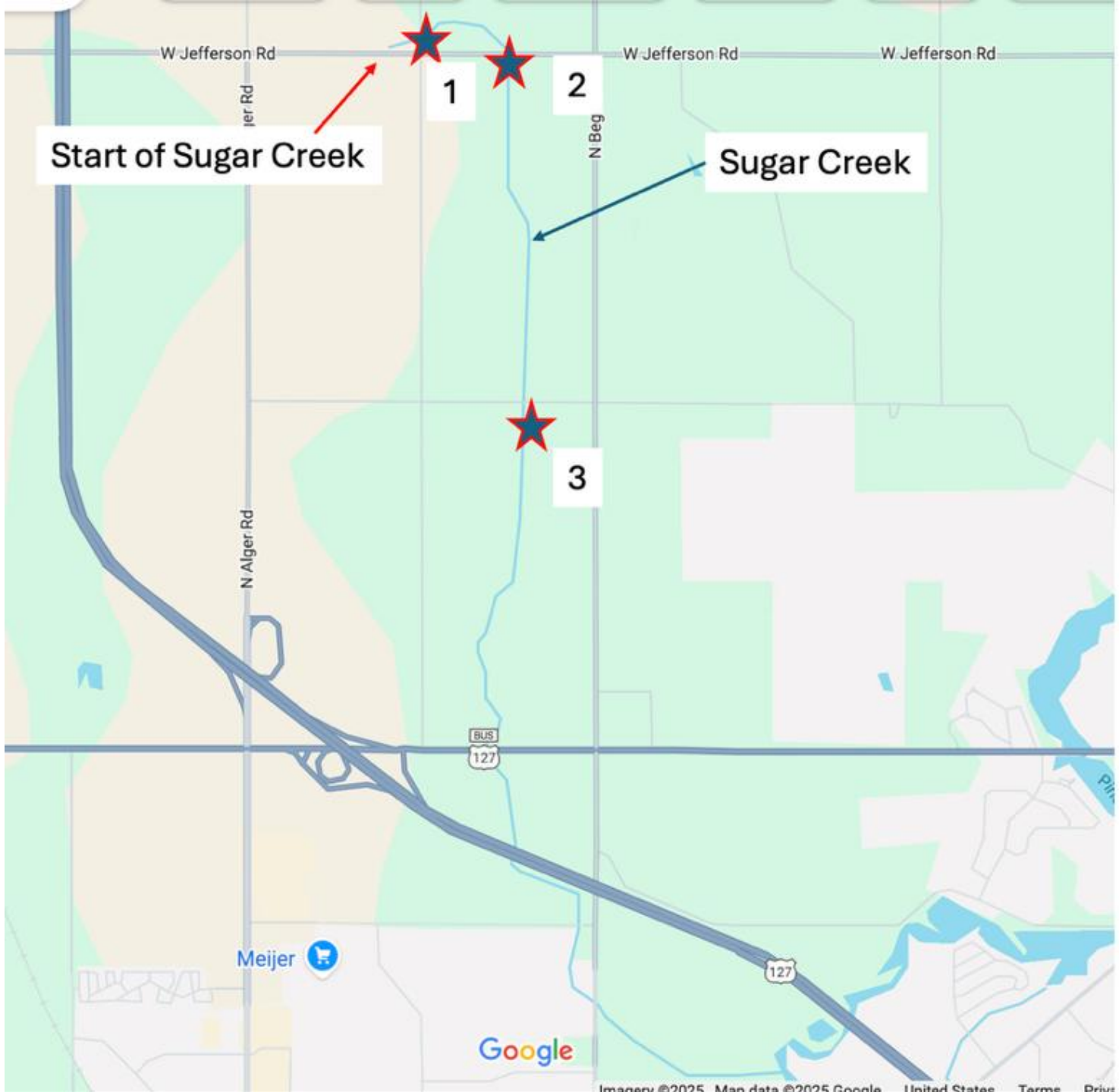

Average Thermotolerant E. coli Concentrations at Downstream Sites between 2019 - 2024
1400
1200
1000
800
600
400
200
0
CFU/100mL
Level above which NO human contact should occur
Human health risk for concentrations above this level
Sugar Creek
Horse Creek
Alma Dam/WWTP

Conclusions of Findings From 2024…

- Sugar Creek is the dominant source for N and P (chemicals that cause algal growth)

- Sugar Creek produces a lot of *E. coli* indicating that the input is most likely animals (waste from livestock or people)

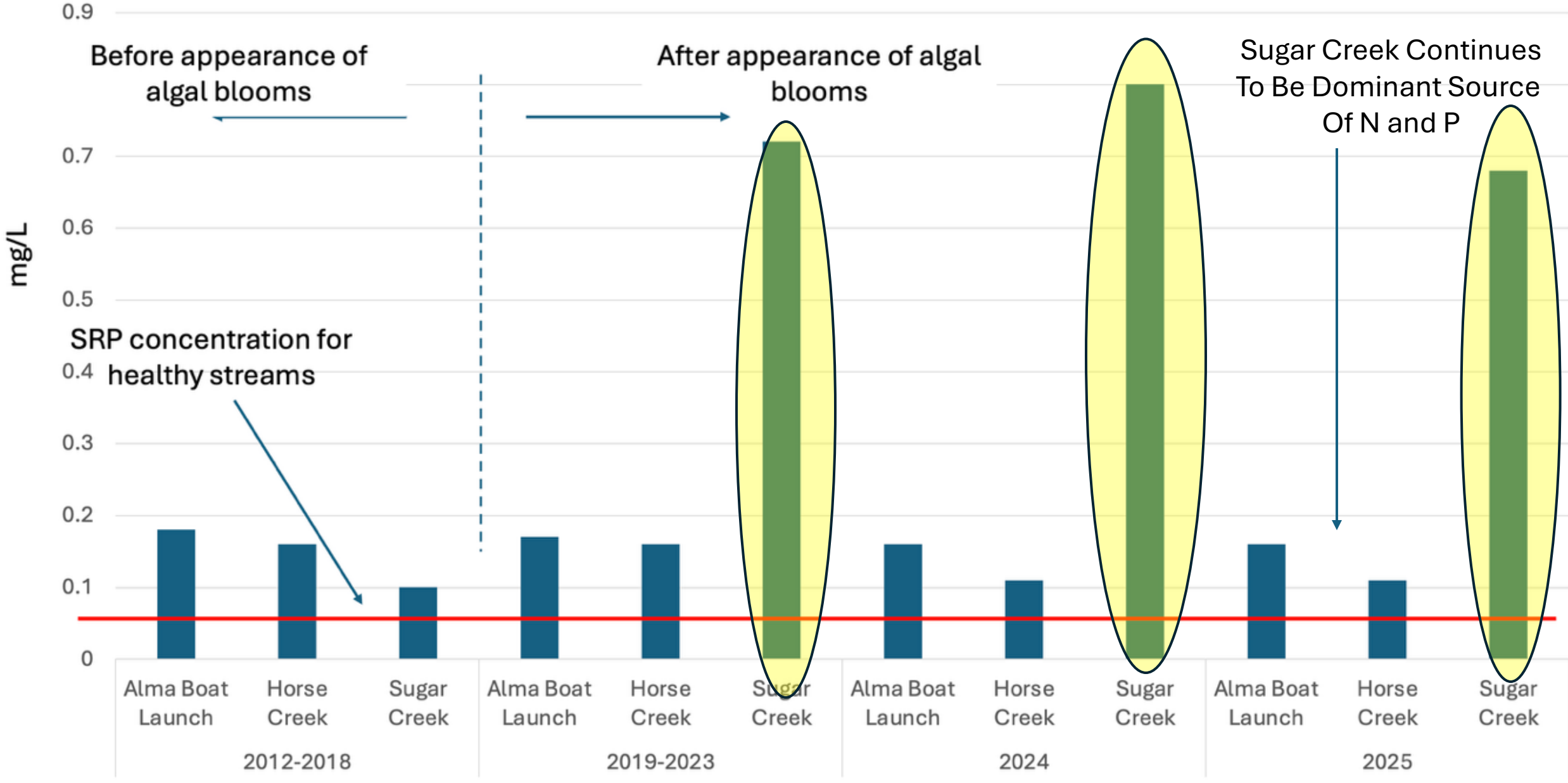
What About 2025?



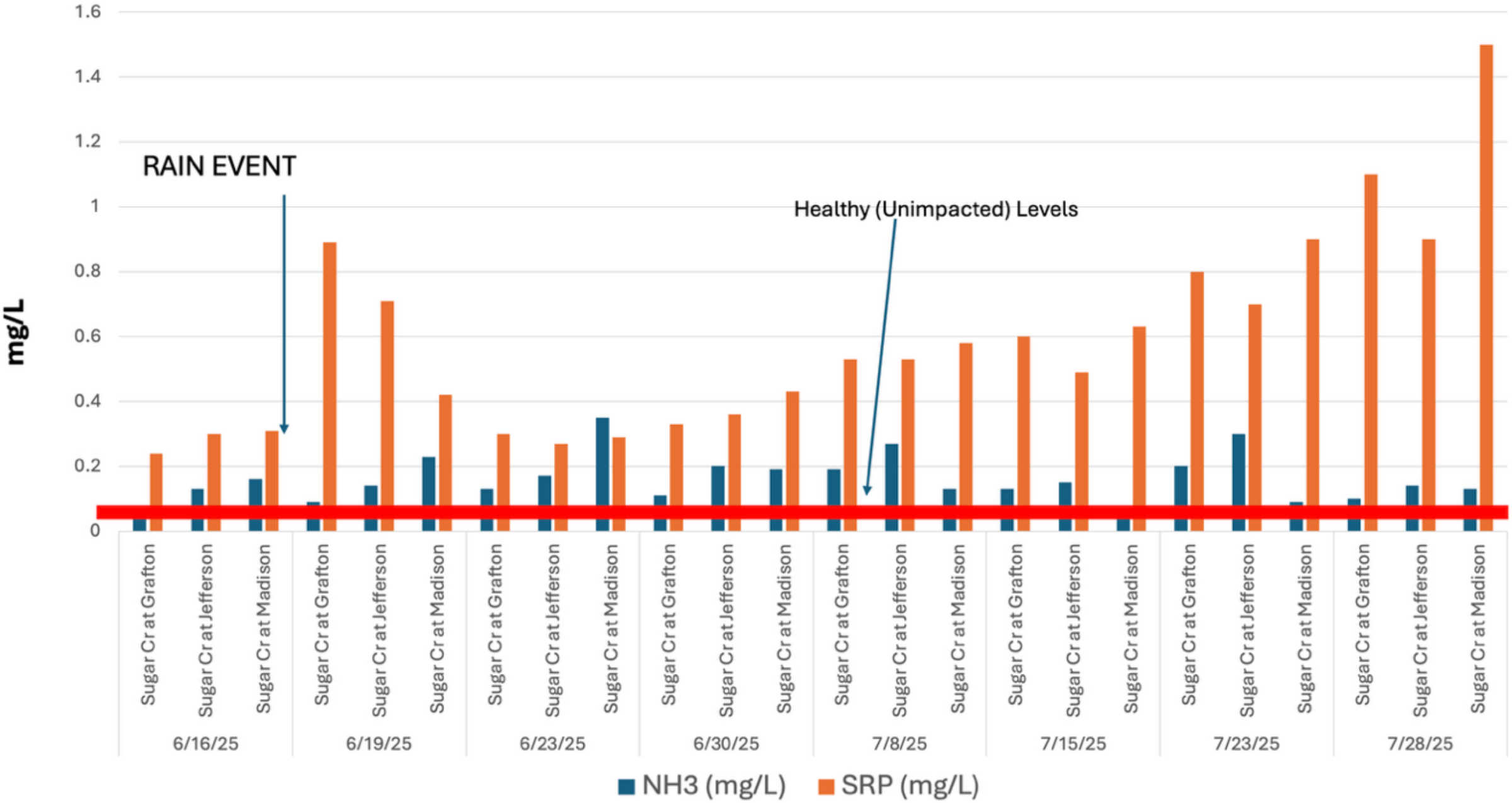
Sampling Sites:

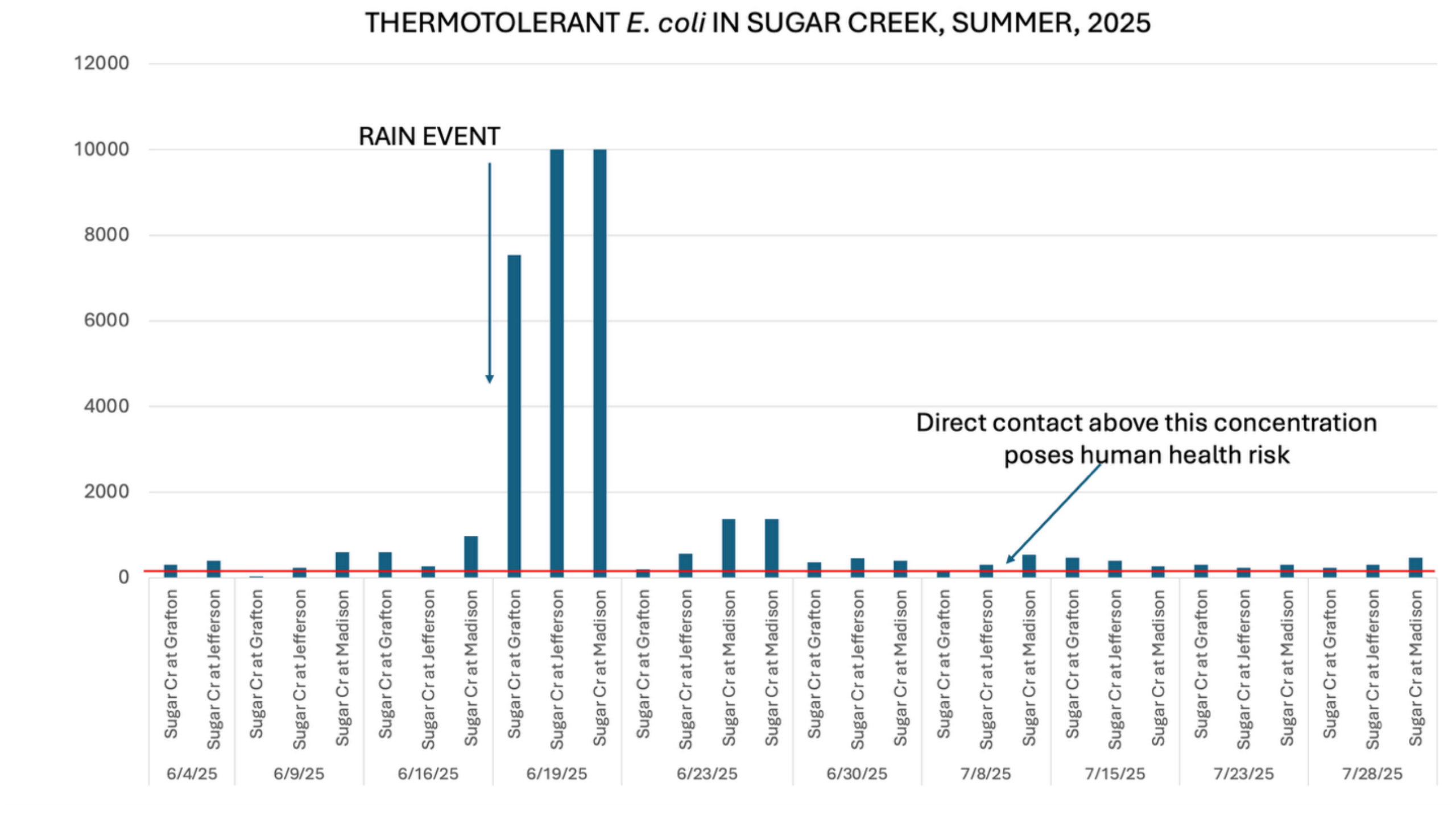
1. Sugar Cr at Grafton
2. Sugar Cr at Jefferson
3. Sugar Cr at Madison

SRP AVERAGES BY YEAR COMPARING SUGAR CREEK TO OTHER POTENTIAL SOURCES CAUSING ALGAL BLOOM

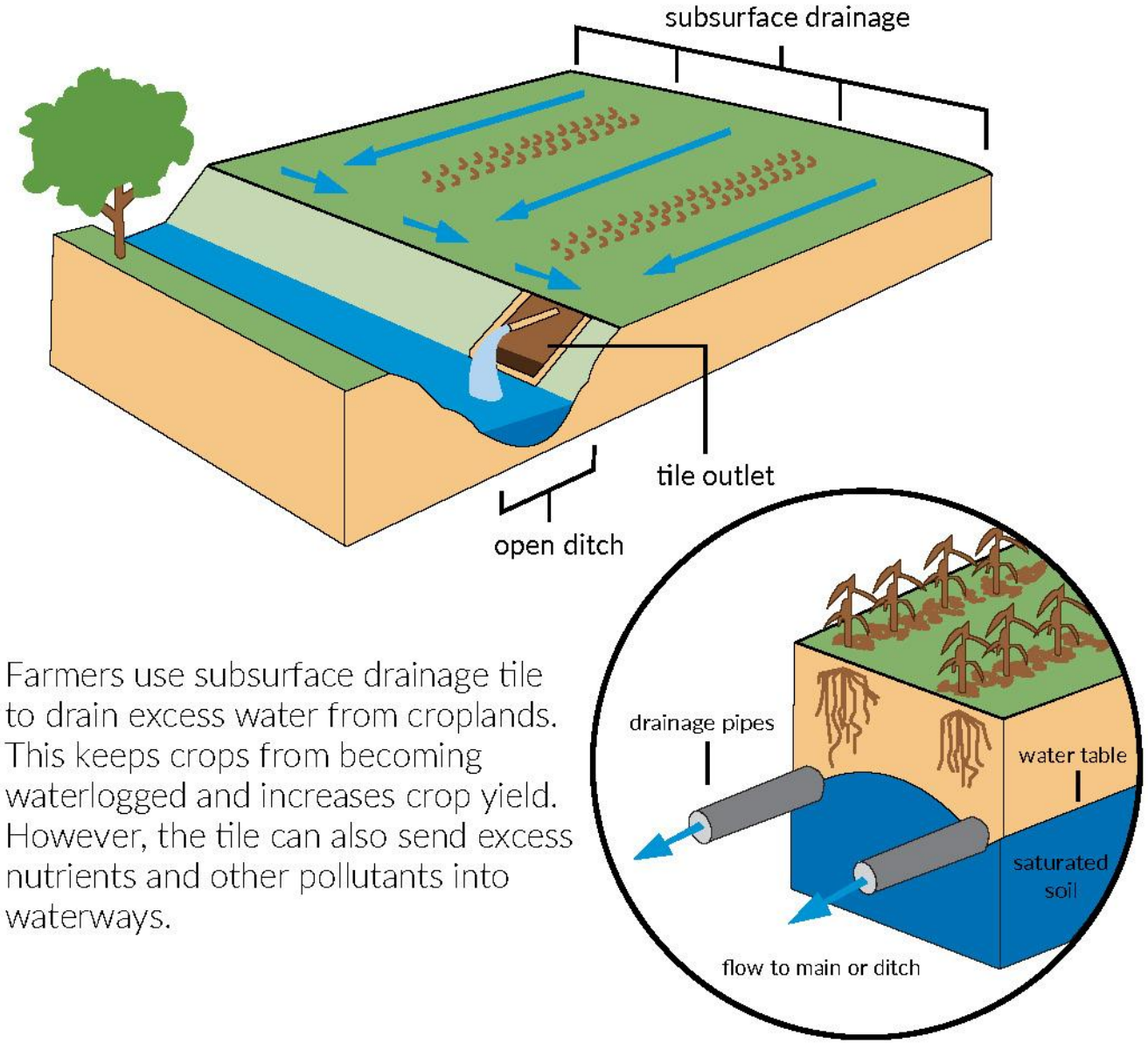


NUTRIENT DATA FOR SUGAR CREEK, SUMMER, 2025




THERMOTOLERANT E. coli IN SUGAR CREEK, SUMMER, 2025
12000
10000
8000
6000
4000
2000
0
RAIN EVENT
Direct contact above this concentration poses human health risk
Sugar Cr at Grafton
Sugar Cr at Jefferson
Sugar Cr at Madison
6/4/25
6/9/25
6/16/25
6/19/25
6/23/25
6/30/25
7/8/25
7/15/25
7/23/25
7/28/25

How drainage tile works



Farmers use subsurface drainage tile to drain excess water from croplands. This keeps crops from becoming waterlogged and increases crop yield. However, the tile can also send excess nutrients and other pollutants into waterways.

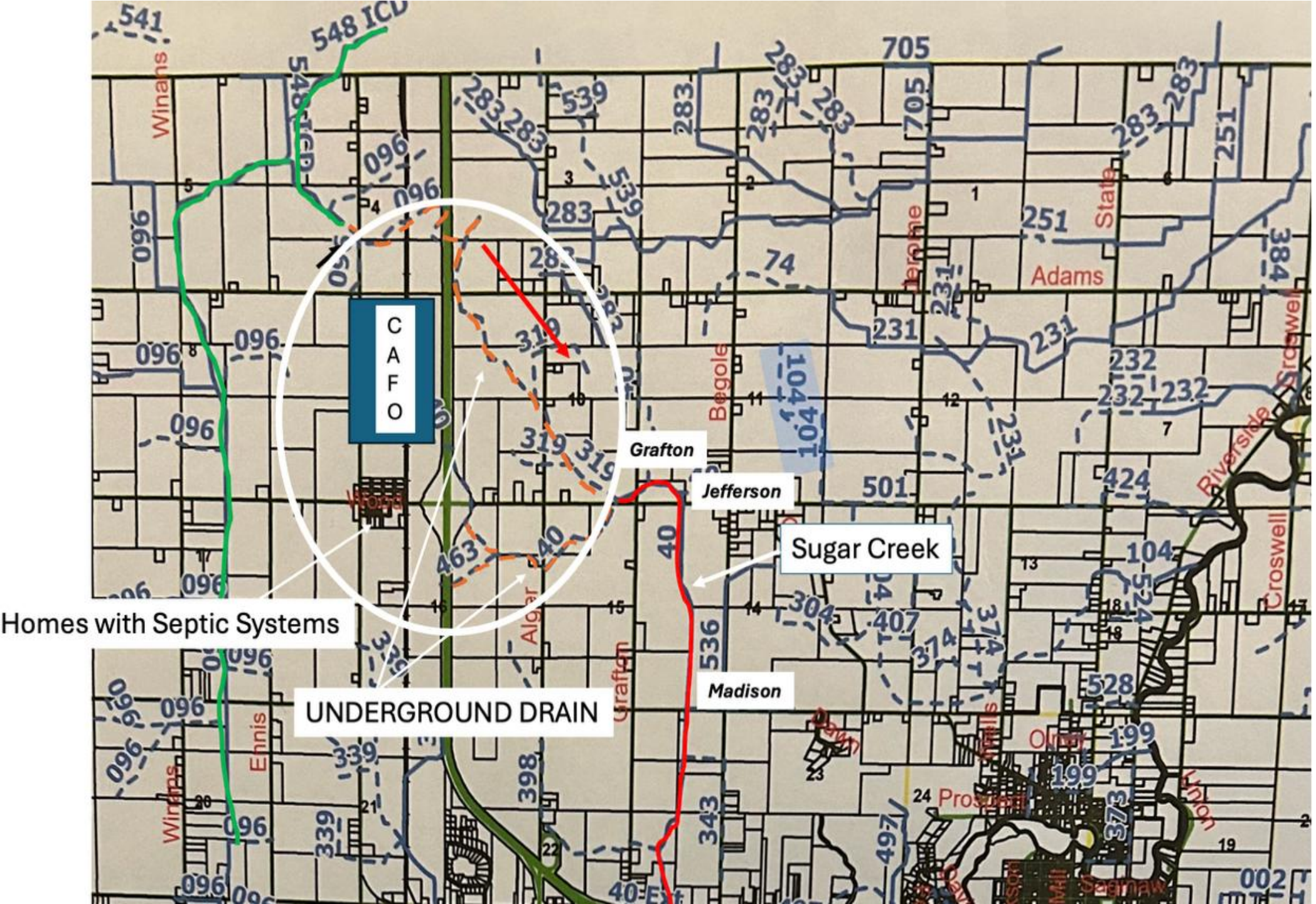
Source: Missourian reporting

JOY MAZUR/Missourian

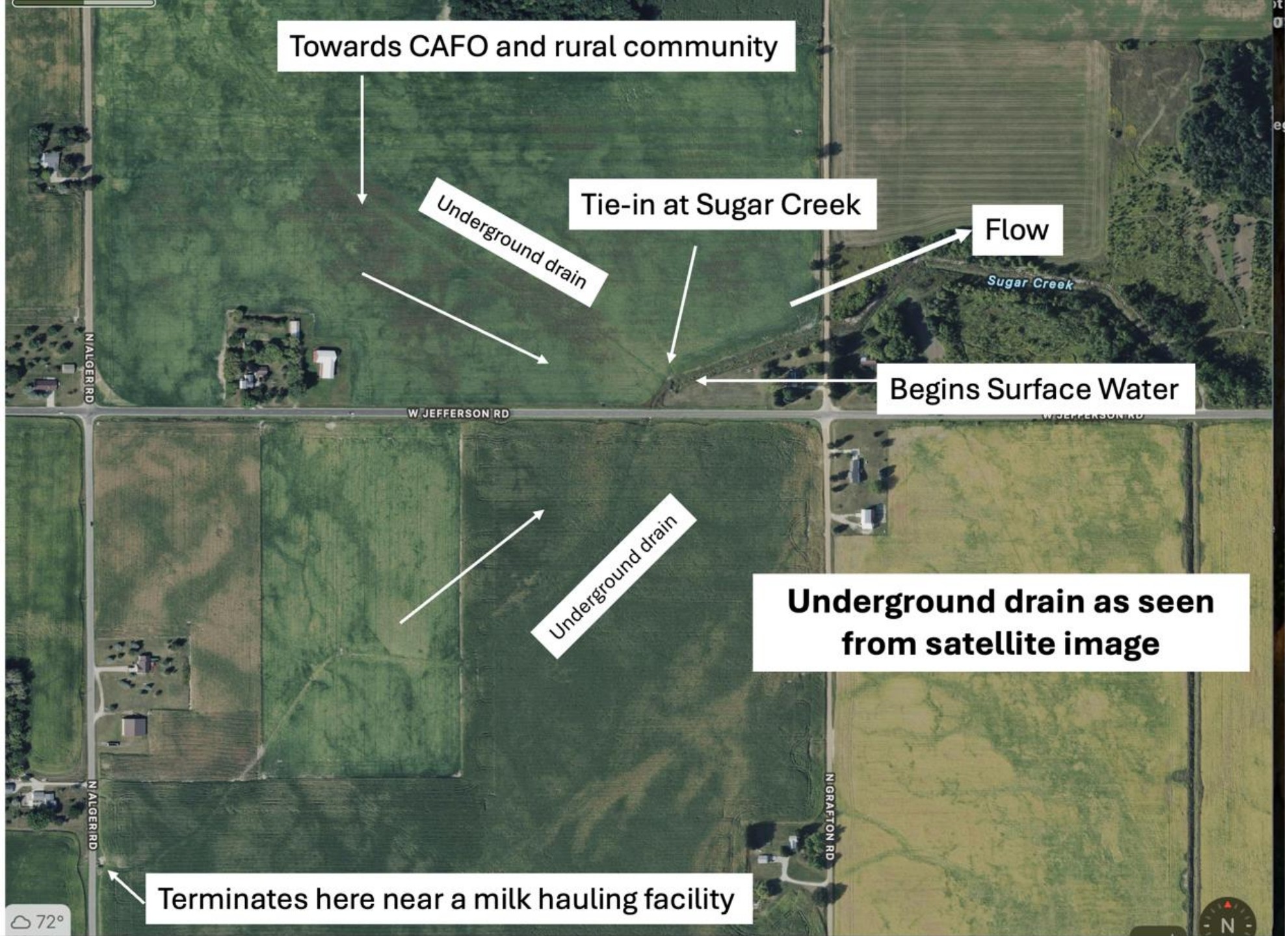
Conclusions…

- Sugar Creek shows high levels of N and P (possibly causing algae in PR) and *E. coli* even though there are no obvious sources right at the headwaters

- There must be some other source that is feeding into the start of the creek

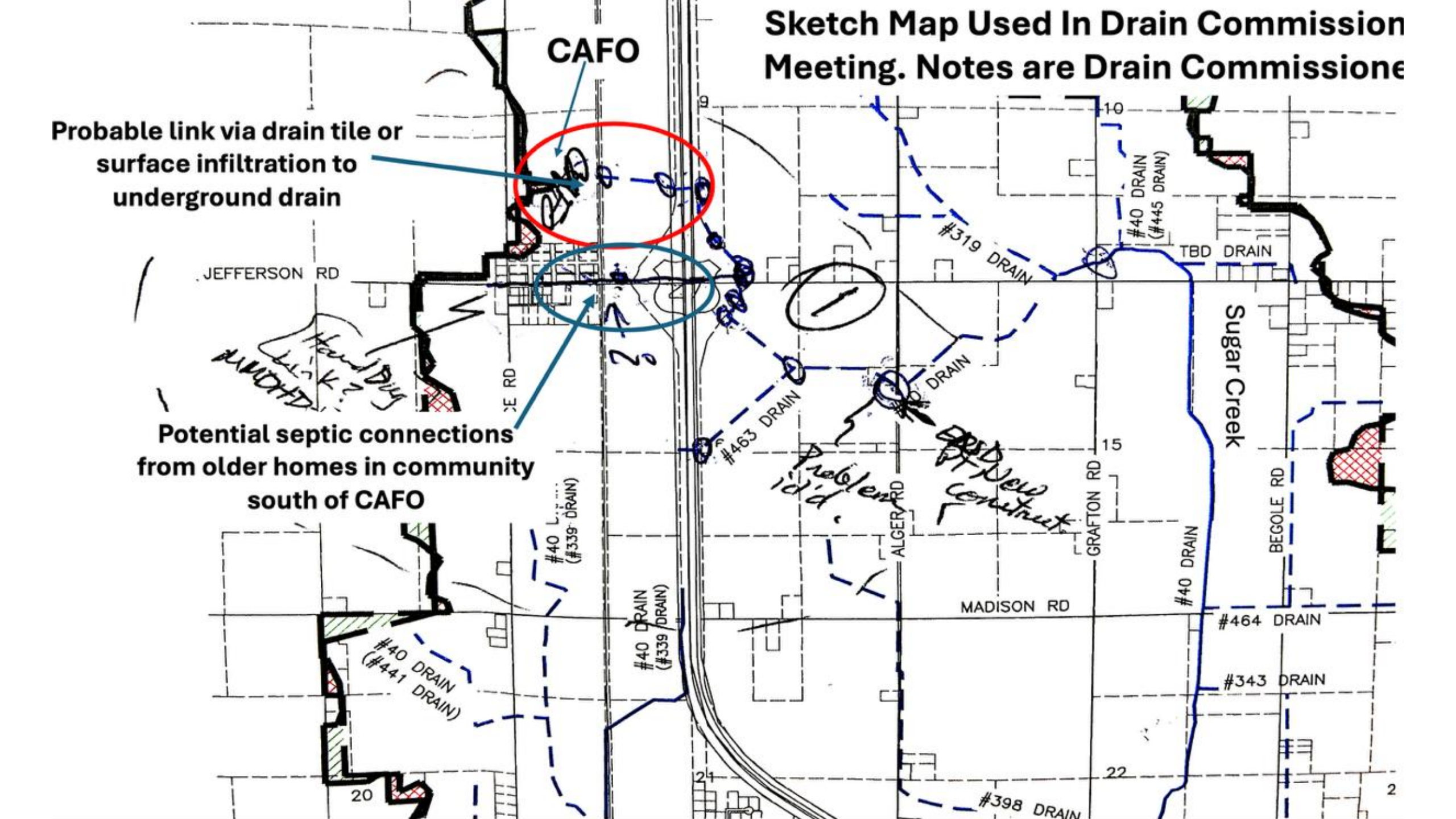


There appears to be an underground drain that feeds directly into Sugar Creek.


Towards CAFO and rural community
Underground drain
Tie-in at Sugar Creek
Flow
Sugar Creek
Begins Surface Water
N ALGER RD
W JEFFERSON RD
Underground drain
Underground drain as seen from satellite image
N ALGER RD
N GRAFTON RD
Terminates here near a milk hauling facility
72°
N

Meeting With the Gratiot County Drain Commissioner

- Bernie Barnes (Drain Commissioner) agreed that the underground drain may be impacting Sugar Creek
- Bernie suggests possible sources could be home septic systems in Forest Hills or incident CAFO runoff
- More research needs to be done to see which if either of these are significant inputss


Sketch Map Used In Drain Commission Meeting. Notes are Drain Commissione
CAFO
Probable link via drain tile or surface infiltration to underground drain
Potential septic connections from older homes in community south of CAFO
JEFFERSON RD
#319 DRAIN
#40 DRAIN (#445 DRAIN)
TBD DRAIN
#463 DRAIN
Sugar Creek
ALGER RD
GRAFTON RD
BEGOLE RD
MADISON RD
#40 DRAIN
#464 DRAIN
#343 DRAIN
#40 DRAIN (#339 DRAIN)
#40 DRAIN (#441 DRAIN)
#398 DRAIN
9
10
15
20
21
22

Next Steps…

- Summer: 2026
  - Do more sampling on Bush Creek – is this a clean site?
  - Work with the Drain Commissioner to get samples from the underground drain
  - Possibly working with Mid Michigan District Health Department on surveying septic systems in Forest Hill

THANK YOU!!!!!

- Healthy Pine River Group

FOR ALL YOUR YEARS OF SUPPORT!

QUESTIONS?