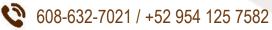


2009-2023 Potential Pathogens and Total Phosphorus FULL REPORT

Water Quality Monitoring (WQM) Program

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WQM Program Coordinator







DATA PARAMETERS INCLUDED IN THIS REPORT

This report shows lab data parameters on the sites of specific concern (see below: <u>ALL SITES LOCATION MAP</u>). Monthly baseline monitoring data is reported in the Surface Water Integrated System (<u>https://dnrx.wisconsin.gov/swims/login.jsp</u>) and can be seen on the Surface Water Data Viewer (https://dnrmaps.wi.gov/H5/?Viewer=SWDV).

Lab testing is run by Leuther Lab LLC, AgSource Lab and the Wisconsin State Lab of Hygiene (WSLH).

Lab data is sent every end of the season to the Laboratory Coordinator of the Wisconsin Department of Natural Resources (DNR).

Escherichia coli (E. coli):

- Pollution indicator of fecal pathogens (i.e., Salmonella and Cryptosporidium).
- Lives in warm blooded animal feces, and certain strains cause serious or even lethal digestive problems in humans.
- Human and hog feces carry over one million E. coli per gram.
- The safety standard for rivers is below 126 cfu/100mL. 750cfu/100ml requires a swimming advisory to be posted, and 1,000 cfu/100mL mandates closing of public beaches.
- 170,000 E. coli colony forming units (cfu) were found in 2019, over 1,300 the times the standard!

Total Phosphorus (TP):

- Pollution indicator nutrient.
- Low levels of TP (up to 0.075 mg/L) are naturally found in surface waters, but high amounts cause "eutrophication":

Excess algae and plant growth ⇒ Death and decomposition ⇒ Oxygen levels drop dramatically

- → Die-off of fish and other aquatic organisms
- The most widespread water pollutant in Wisconsin due to soil erosion, manure lagoons and septic systems, detergents and runoff from farmland or lawns.
- The highest TP result was seen in 2019: 4.22 mg/L. 56 times the standard!

Background (heterotrophic) bacteria:

- Depend on other organisms or decomposed organic matter to survive.
- Some of the parasitic species can cause cholera and tetanus; *E. coli* also belongs to this group.
- 91,000,000 cfu/100 mL background bacteria found in just one sample in 2019! Over 50,000/100mL is considered high background bacteria.

Staphylococcus aureus (S. aureus):

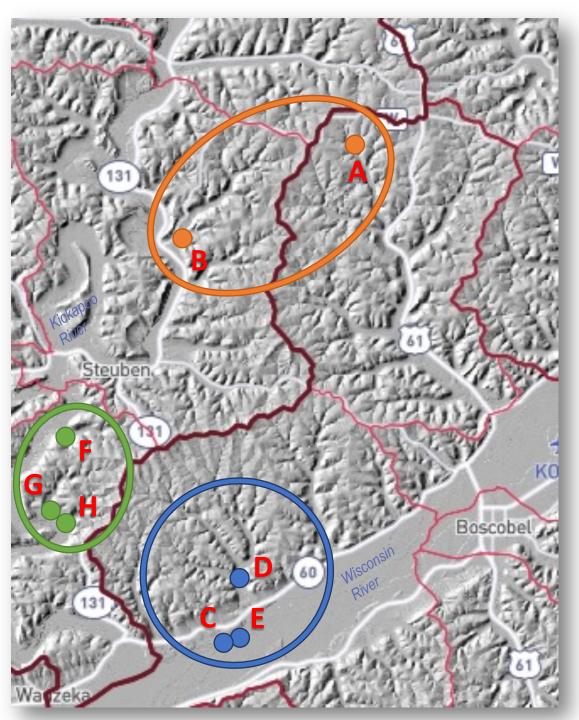
- Water quality and MRSA (Methicillin Resistant S. aureus) indicator bacteria.
- MRSA is a very dangerous and infectious bacteria that may seriously affect skin, respiratory system, blood, create toxicity shock, and more. It has been linked to pig and dairy CAFO's.

Precipitation: can create large pulses of water that move quickly over and through the ground, carrying nutrients and pathogens from manure sources, agricultural fields, lawns, septic systems, etc., into surrounding water bodies and groundwater. Nutrient runoff contributes to the eutrophication of aquatic ecosystems.

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ALL SITES LOCATION MAP

Crawford County



ZONE 1 (Scott & Haney Townships):

- A. Station A: #10044917 (Richland Creek), impaired*
- B. Station B: #10044132 (Shaw Hollow Creek-Kickapoo River - Taylor Ridge Rd. bridge)

ZONE 2 (Wauzeka Township):

- C. Station #10032119 (WI River Tributary, 0.5 mi SE of STH 60 and Knob Ln Intersection), impaired*
- D. Station #10032123 (Boydtown Creek)
- E. Station #10052569 (Unnamed 5035112 at Spring), impaired*

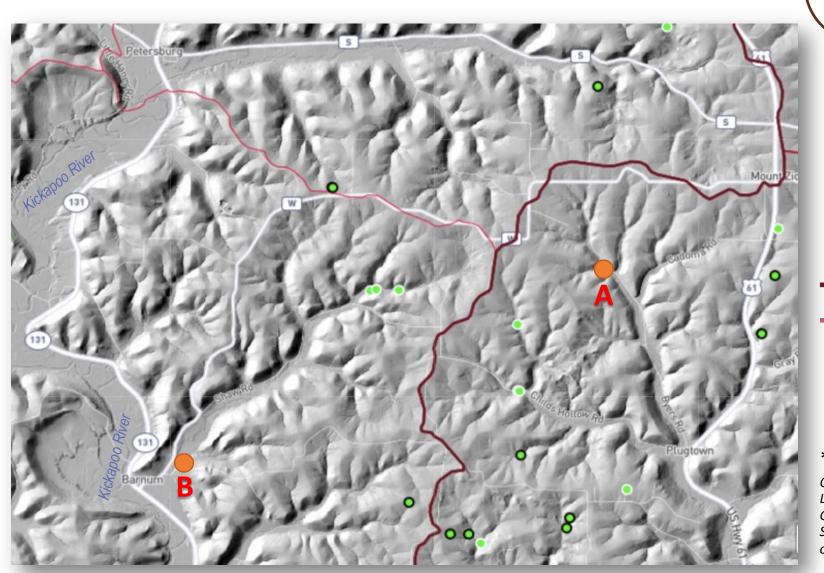
ZONE 3 (Marietta Township):

- F. Station #10052670 Unnamed (5034616)
- G. Station #10052671 Unnamed (5034666)
- H. Pending: Station #10052699 Spring to Kickapoo River

*Impaired (for high Total Phosphorus): Waters that do not meet WQS (Water Quality Standards) are placed on Wisconsin's Impaired Waters Listalso known as the 303(d) list-, under Section 303(d) of the CWA (Federal Clean Water Act).

Watershed boundary
Sub-watershed boundary

ZONE 1: Site location map



Watershed boundary

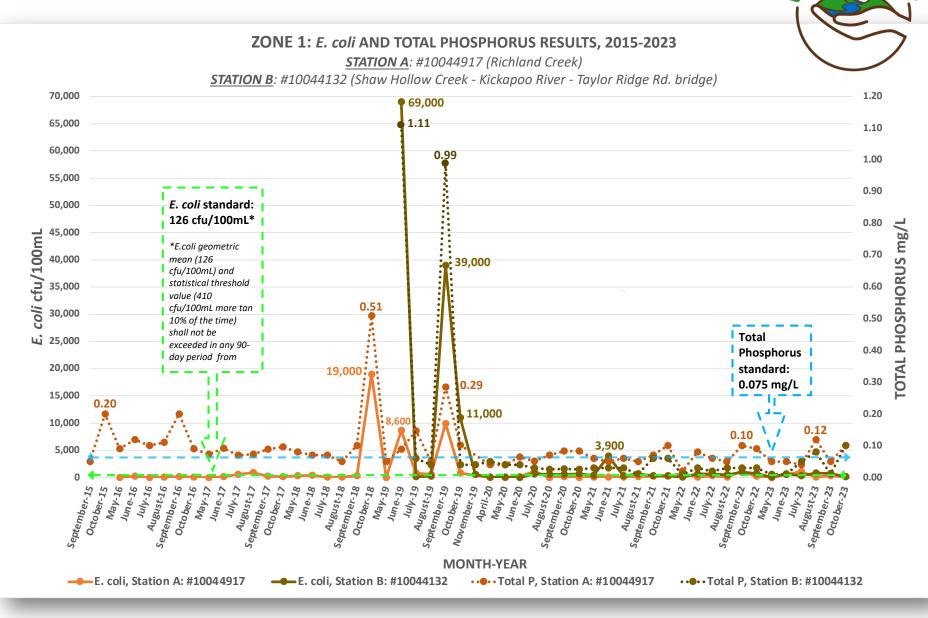
Sub-watershed boundary

Possible sinkhole*

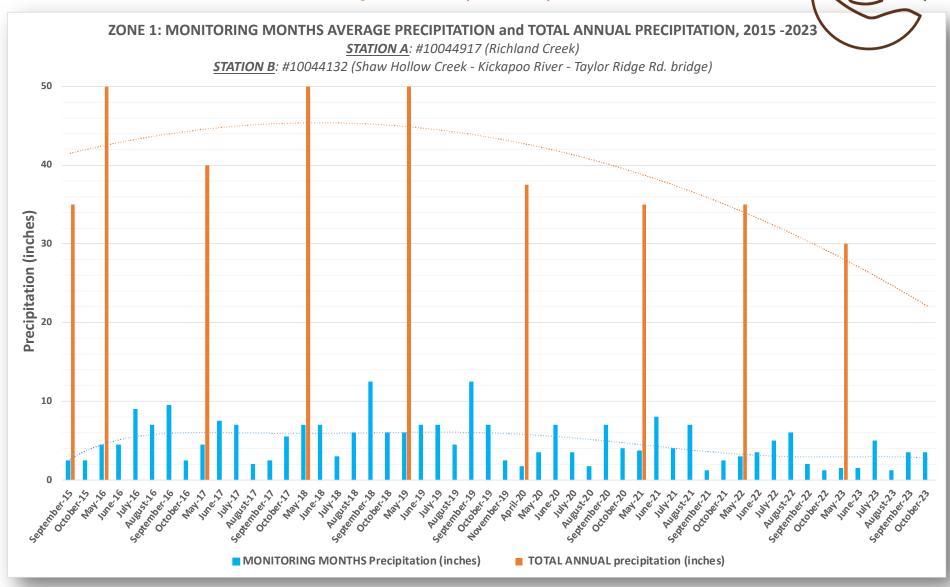
Probable sinkhole*

* As identified by CSP's Karst Landscapes and Groundwater Susceptibility Survey of Crawford Co.

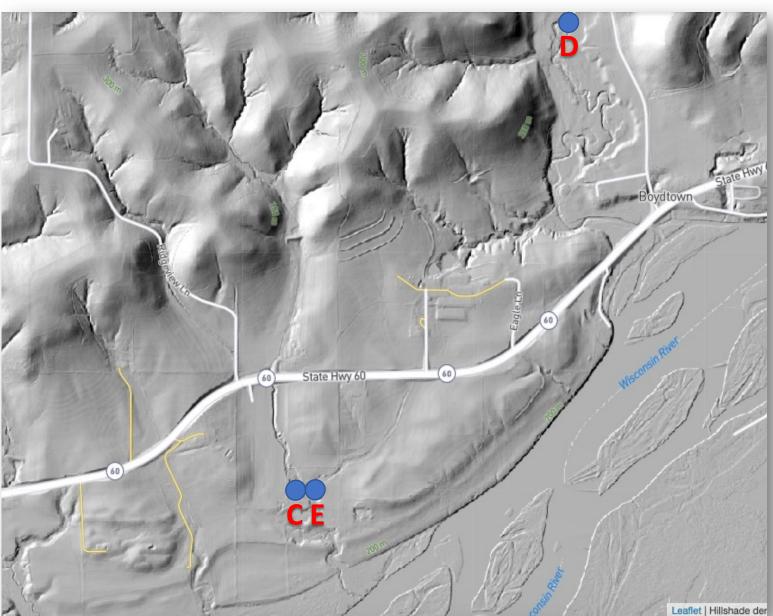
ZONE 1: *E. coli* & Total Phosphorus results, 2015 - 2023



ZONE 1: Monitoring Months Average Precipitation & **Total Annual Precipitation** (inches), 2015 - 2023

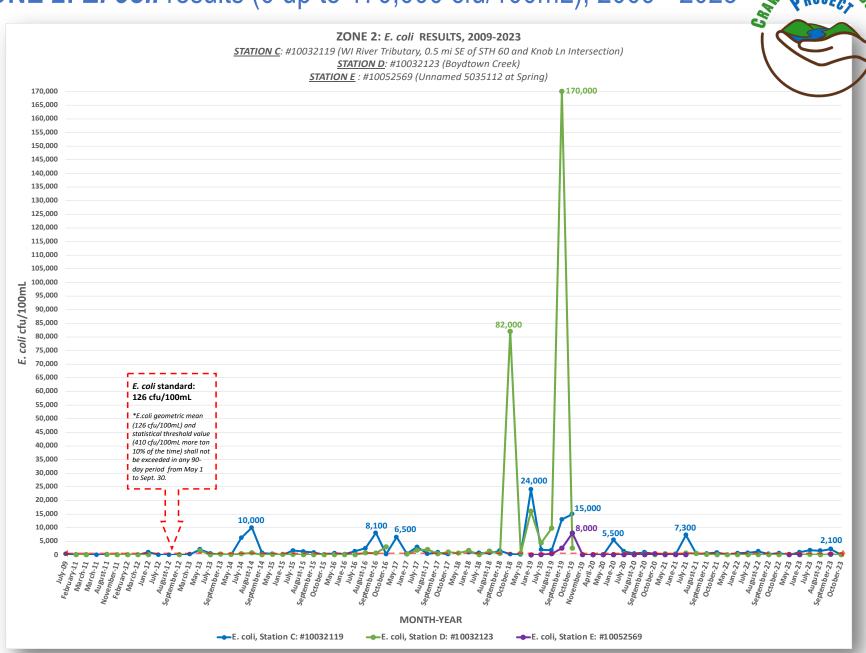


ZONE 2: Site location map



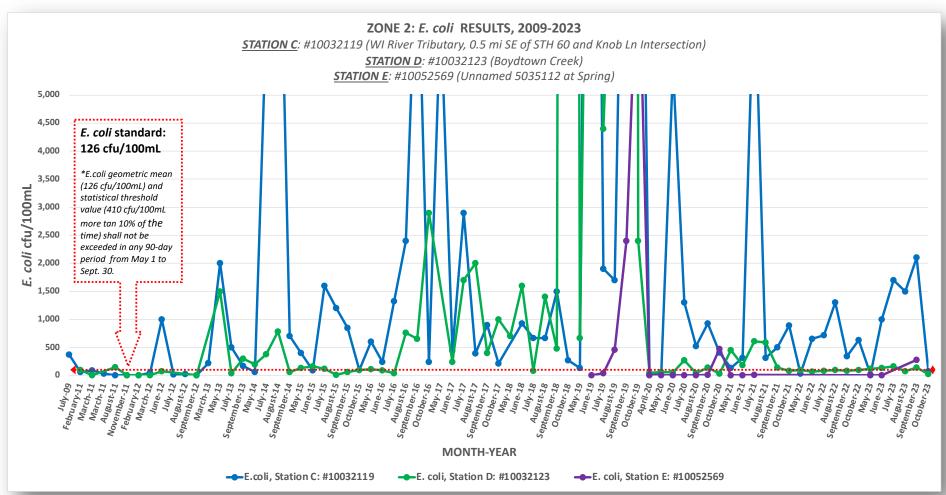


ZONE 2: *E. coli* results (0 up to 170,000 cfu/100mL), 2009 - 2023

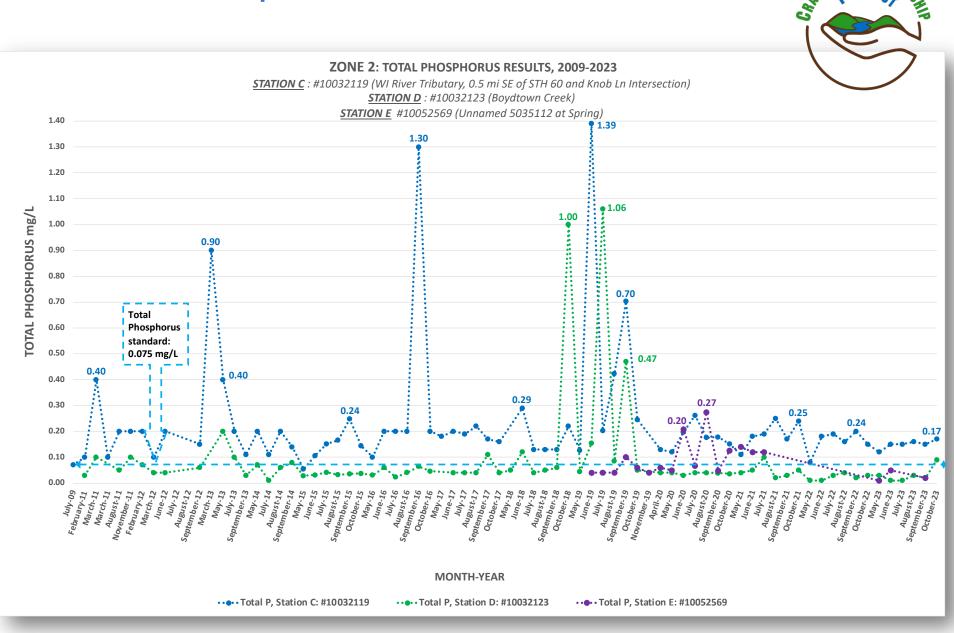


ZONE 2: *E. coli* results (0 up to 5,000 cfu/100mL), 2009 - 2023



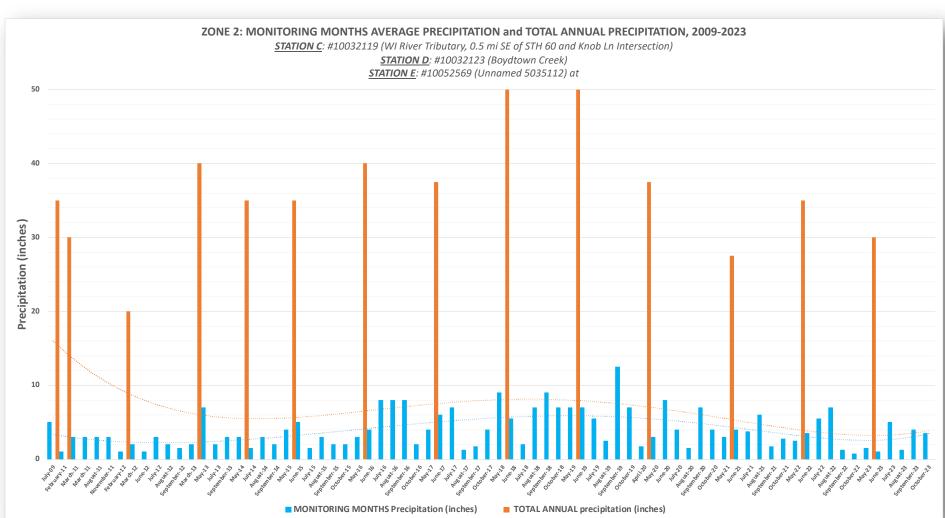


ZONE 2: Total Phosphorus results, 2009 - 2023

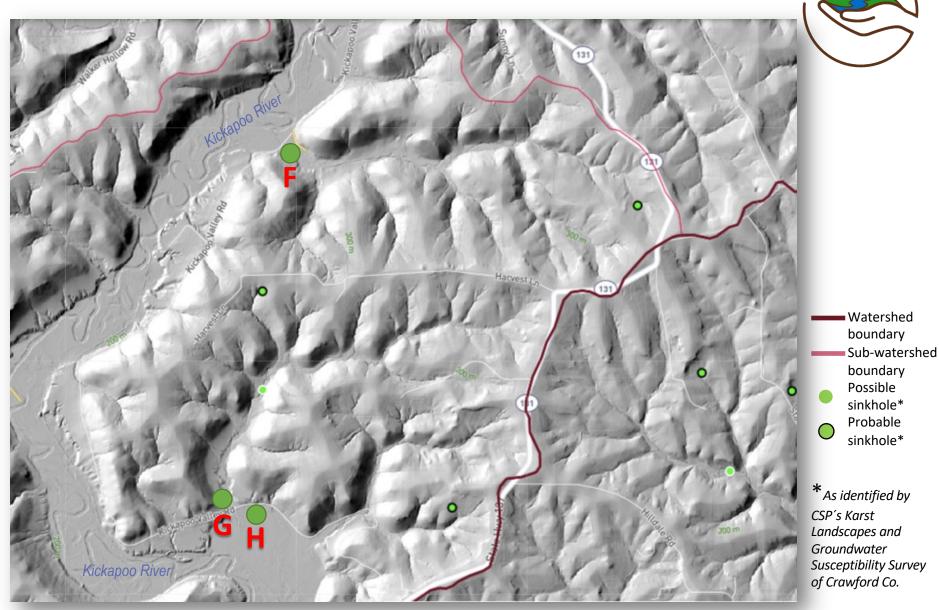


ZONE 2: Monitoring Months Average Precipitation & **Total Annual Precipitation** (inches), 2009 - 2023

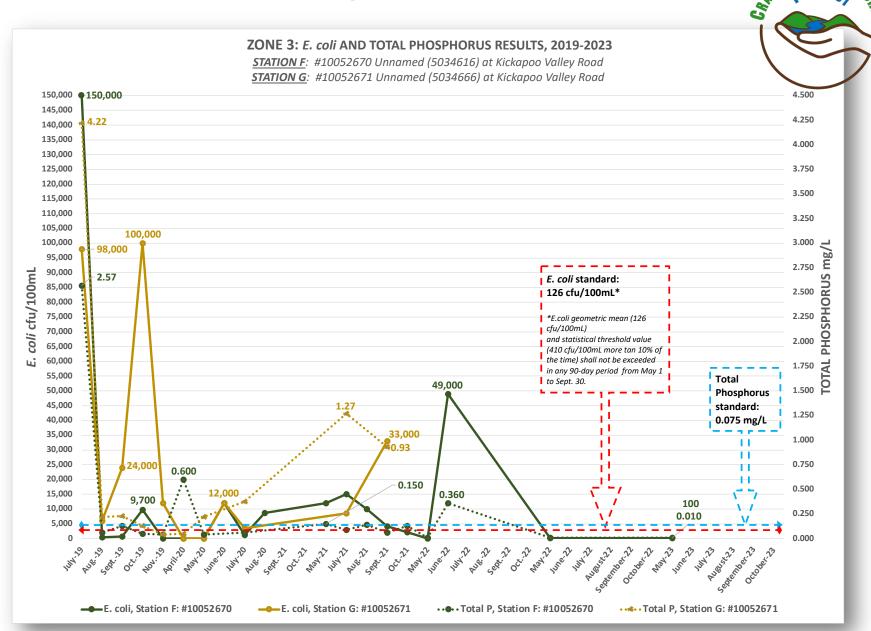




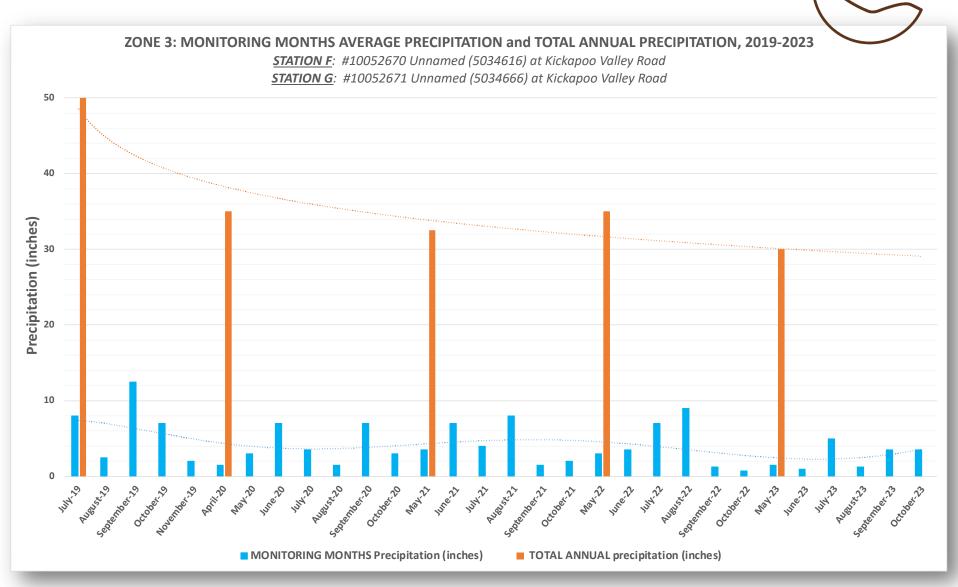
ZONE 3: Site location map



ZONE 3: *E. coli* and **Total Phosphorus** results, 2019 - 2023

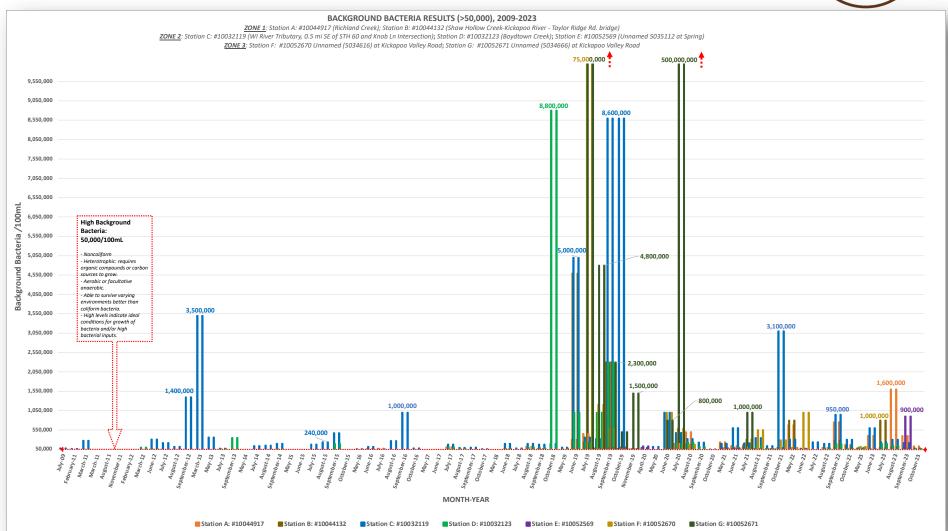


ZONE 3: Monitoring Months Average Precipitation & **Total Annual Precipitation** (inches), 2019 - 2023



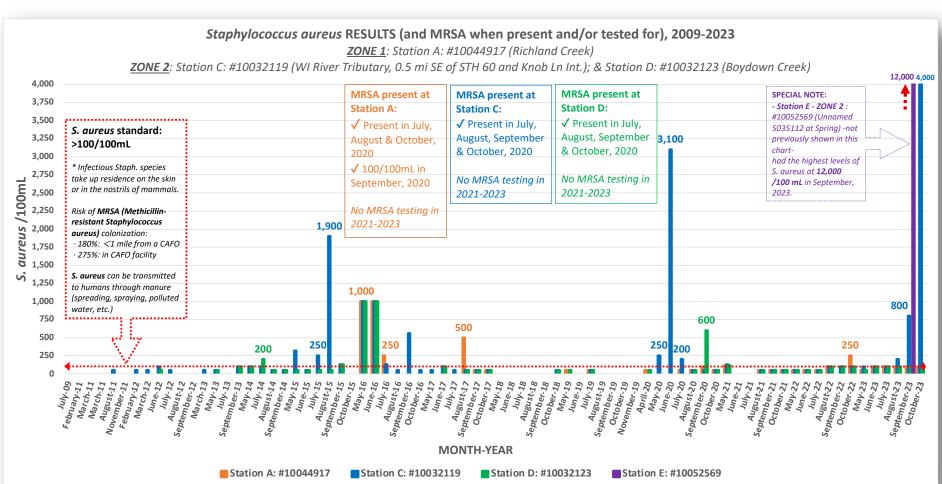
ZONES 1-3: Background Bacteria results (>50,000/100mL), 2009 - 2023





ZONES 1&2: *Staphylococcus Aureus* (& MRSA when present and/or tested for), 2009 - 2023





SOME REFERENCES



- CSP Surface Water Monitoring Program
- The Phosphorus Rule
- Water Condition Lists
- Water Condition Viewer
- Impaired Water Search
- CSP Regional Karst Geology Viewer
- <u>Livestock-Associated Methicillin and Multidrug Resistant Staphylococcus</u> aureus Is Present among Industrial, Not Antibiotic-Free Livestock Operation Workers in North Carolina



WATER QUALITY MONITORING (WQM) PROGRAM TIMELINE 2008 - 2018

CSP and VSN^[1], through WAV Program^[2], start monitoring health impacts, air emissions and water quality near proposed CAFO's^[3] in Crawford Co. and Vernon Co.

CSP expands monitoring of water quality near feeder pig CAFO near Wauzeka, Crawford Co. Wauzeka with SRWN^[4], WI Sierra Club, DNR, VSN, WAV program, and local water monitors to begin formulating a statewide water quality and CAFO monitoring program

CSP sponsored

CSP starts
monitoring
creeks near fracsand mine sites
in the area for
chemicals,
breaches, and
turbidity of the
water.

CSP was funded and awarded by the WCBM Partnership Program^[5] for monitoring sand mine operations along the WI River near Bridgeport and Boscobel sand mines.

CSP
encounters the
highest
Phosphorus
(TP)^[6] levels so
far;
noticeable
algae
overgrowth; and
antibiotic^[7]
resistant
bacteria in
Wauzeka
streams.

CSP expands
the Water
Quality
Monitoring
Program to
include a
watershed of an
expanding large
dairy farm in
Town of Haney,
Crawford Co.

Richland Volunteers Stewardship Ellen Brooks Project in their and Dave MQW Hackett win the around an WI WAV expanding dairy Stream CAFO along the **Monitoring** WI River. Award for Adult CSP and VSN Volunteers start working category. together in WQM trainings.

Volunteers
Debbie and Bill
Hiller win the
WI WAV
Stream
Monitoring
Award.
CSP found the
highest E.coli
levels^[8] so far;
and antibiotic
resistant
bacteria in
Wauzeka
stream.

2008

2009

2011

throughout WI state.

2012

2013

2014

2015

2016

2017

CSP supported

2018

Station #10032119 (near Wauzeka, meets WI River)

Boydtown creek, Station #10032123 (near Wauzeka, meets WI River)

Richland creek, Station #10044917 (near Wauzeka, meets WI River)

- [1] Crawford Stewardship Project (CSP); Valley Stewardship Network (VSN)
- [2] Water Action Volunteers (WAV), coordinated through a partnership between the University of Wisconsin Cooperative Extension and the WI Department of Natural Resources (DNR)
- [3] Concentrated animal feeding operation (CAFO)
- [4] Sustain Rural Wisconsin Network (SRWN)
- [5] Wisconsin Citizen Based Monitoring Partnership Program (WCBM)
- [6] Total Phosphorus (TP) = 1.3 mg/L and E.coli = 10,000 cfu/100 mL (Station #10032119); Total Phosphorus standard: 0.075 mg/L
- [7] Chloramphenicol: an antibiotic banned or restricted in U.S. meat. Can cause plasmatic anemia in humans.
- [8] E. coli = 82,000 cfu/100 mL (Station #10032123) and 19,000 cfu/100 mL (Station #10044917); E. coli standard: 126 cfu/mL

tation # 10052569

Station # 10044132

Stations # 10052670 & 10052671



WATER QUALITY MONITORING (WQM) PROGRAM TIMELINE 2019 - 2023

Four more sites of concern were added into the WQM Program.

Results reached new records of *E. coli* and Phosphorus (TP) levels^[9] . Results
reached new
records of
backgroud
bacteria^[10],
Staphylococcus
aureus (S.
aureus) and
MRSA
(Methicillinresistant S.
aureus)

levels^[11]

A group of students completes their 1st WQM season at one site next to the North Crawford District School. The Swamp Project People achieves the 1st water quality restoration assessment of Myrtle Lake at Soldiers Grove.

The WI WAV Stream Monitoring Award in the "Adult Volunteer" category was given to CSP volunteers, Kathy (also a former CSP Board member and staff) & Paul Byrne.

Results reached new records of *S. aureus* and Fungi levels^[12].

2019 2020 2021 2022 2023

Sites of concern:

- 1. Station #10032119 (Wauzeka Twp., meets WI River)
- 2. Boydtown creek, Station #10032123 (Wauzeka Twp., meets WI River)
- 3. Richland creek, Station #10044917 (Wauzeka Twp., meets WI River)
- 4. Spring, Station #10052569 (Wauzeka Twp., meets WI River)
- 5. Shaw Hollow creek, Station # 10044132 (Haney Twp., meets Kickapoo River)
- 6. Station #10052670 (Marietta Twp., meets Kickapoo River)
- 7. Station #10052671 (Marietta Twp., meets Kickapoo River)

^[9] E. coli = 170,000 = cfu/100 mL (Station #10032123); and, Total Phosphorus (TP) = 4.22 mg/L (Station # 10052671)

^[10] Background Bacteria = 500,000,000/100 mL (Station # 10052671); High Background Bacteria: 50,000/100mL

^[11] S. aureus = 3,100/100 mL (Station #10032119); and, MRSA = 100/100 mL (Station #10044917); S. aureus and MRSA standard: <100/100mL

^[12] S. aureus = 800/100 mL, and Fungi = >20,000/100 mL (Station #10032119); S. aureus = 12,000/100 mL, and Fungi = 36,000/100 mL (Station #10052569)