

WIMBERLEY VALLEY WATERSHED ASSOCIATION: CLEAN RIVERS PROGRAM OVERVIEW

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Guadalupe-Blanco River Basin Steering Committee Meeting
July 29, 2021



THE MEADOWS CENTER
FOR WATER AND THE ENVIRONMENT

TEXAS STATE UNIVERSITY

Acknowledgements

Clean Rivers Program monitoring and analysis funding provided through a joint effort among:

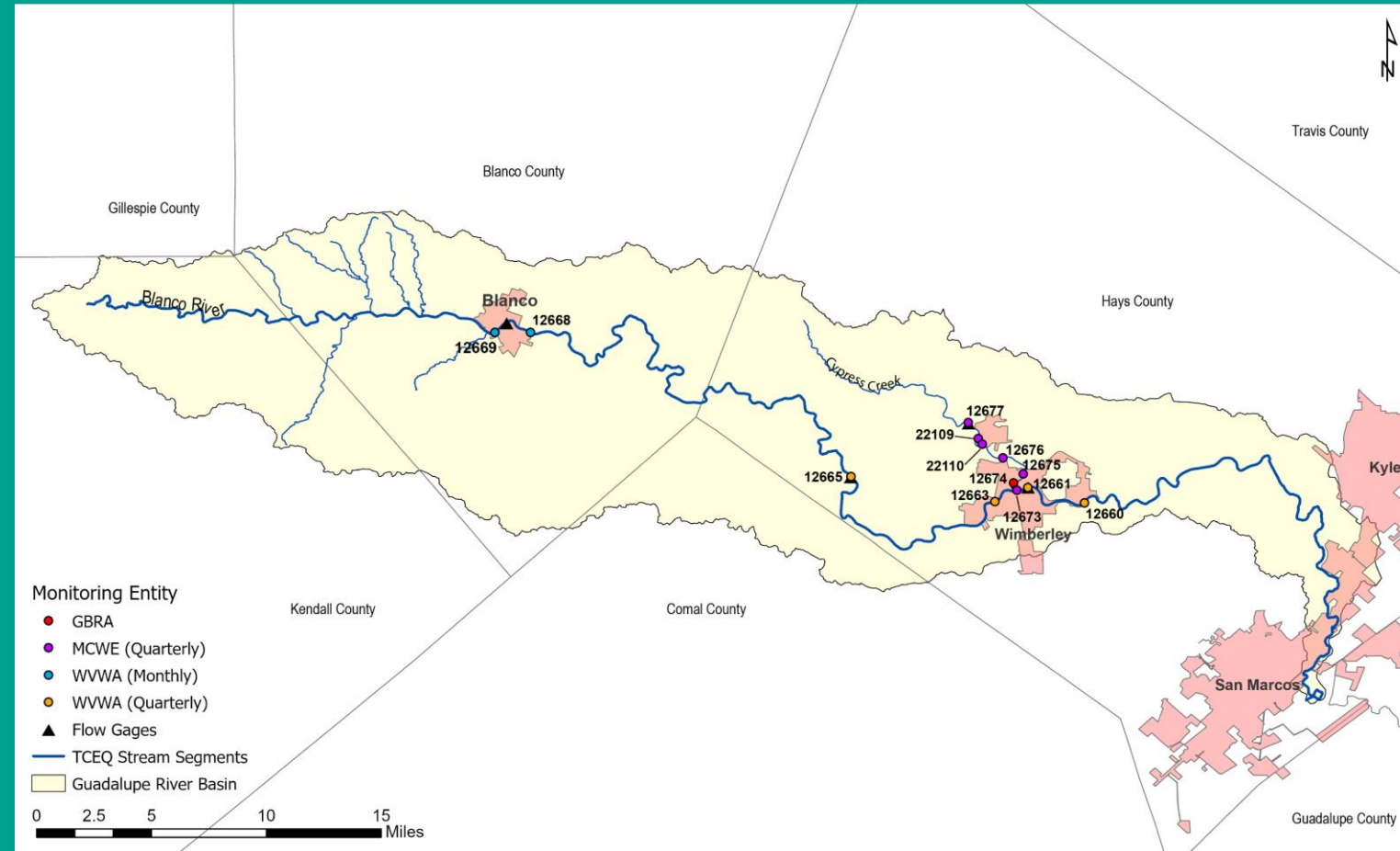
- The Meadows Center
- City of Woodcreek
- City of Wimberley
- Hays-Trinity GCD
- Wimberley Valley Watershed Association



OUTLINE

Routine Water Quality Monitoring:

- Upper Blanco River (Segment 1813)
 - Monthly
 - Quarterly
- Cypress Creek (Segment 1815)
 - Quarterly
- Cypress Creek Pilot Project
 - Biweekly bacteria and optical brightener sampling



Upper Blanco River

Monthly Monitoring

Purpose: To monitor water quality concerns resulting from wastewater treatment plant discharge.

Two locations:

12669 – Blanco River @ PR23

12668 – Blanco River @ FM165

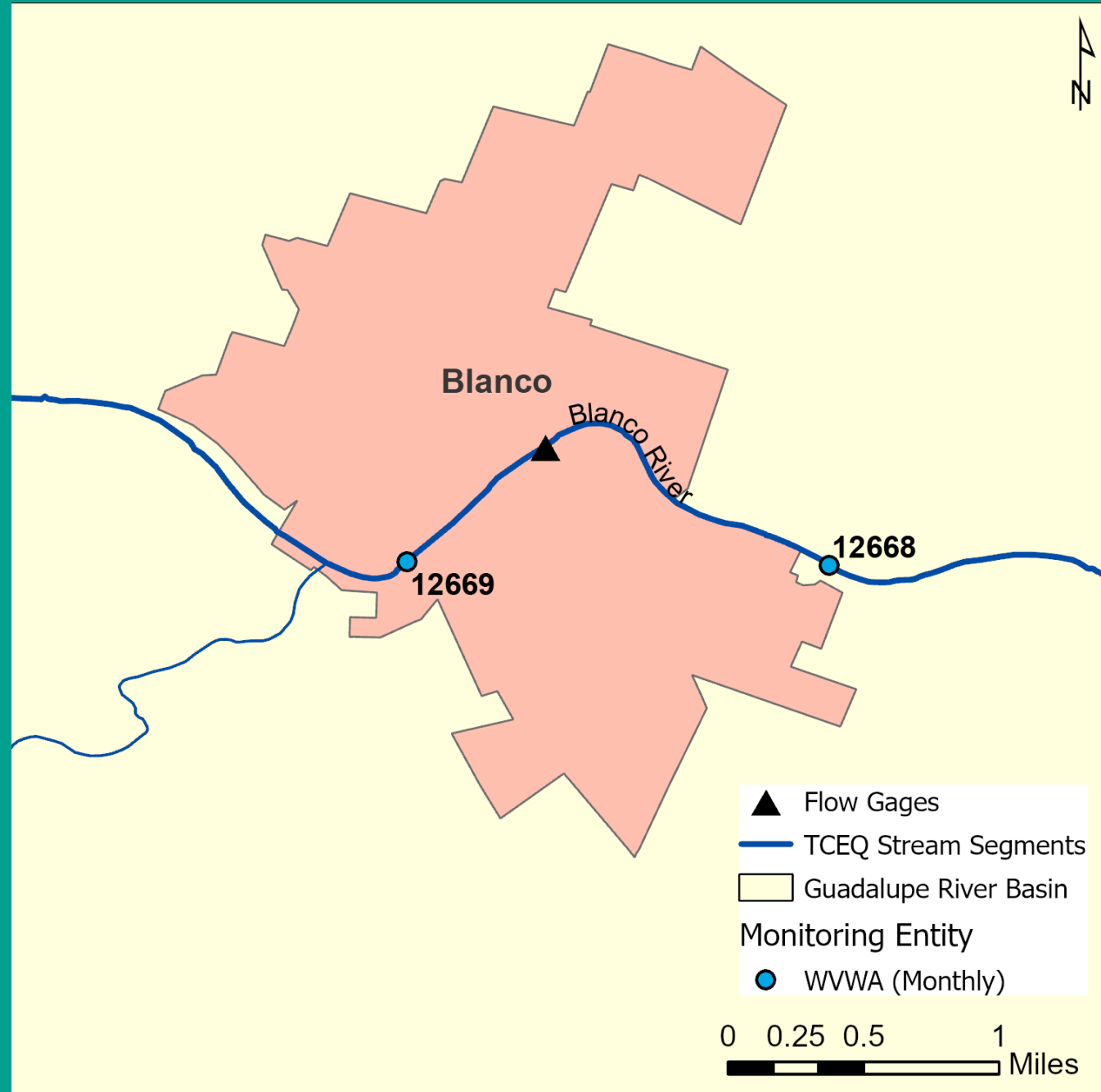
Parameters:

Field

Flow

Conventionals

E. coli Bacteria

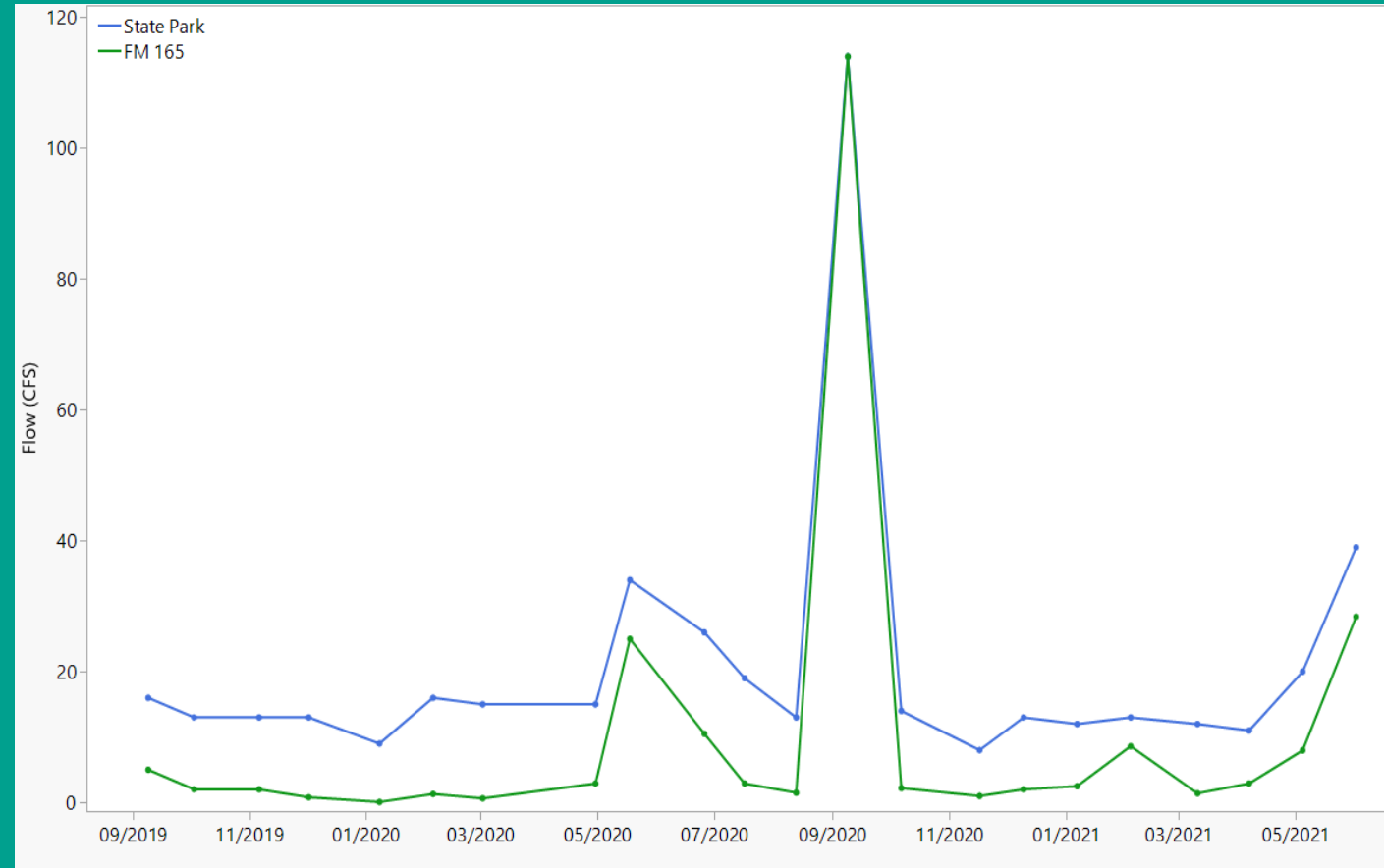
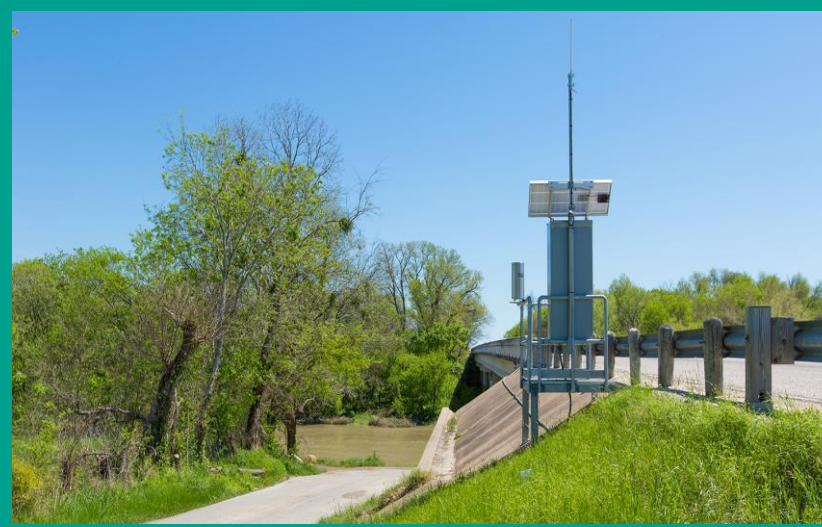


Upper Blanco River

Monthly Monitoring Results
(Sep 2019 – Jun 2021)

Streamflow (CFS)

- State Park Site (12669): Recorded from Lower Colorado River Authority gauge at HWY281
- FM 165 Site (12668): Measured by MCWE staff with a SonTek FlowTracker2
- Difference in measurements between sites demonstrates a losing reach

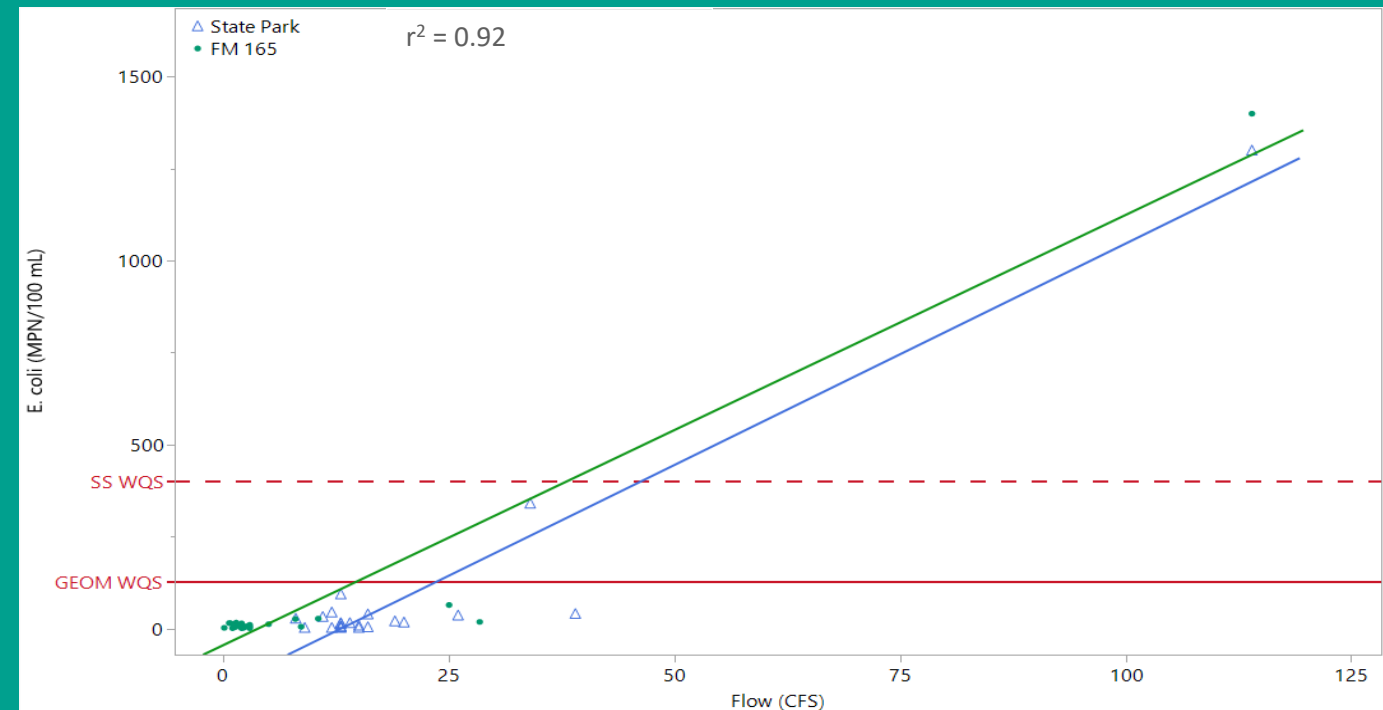
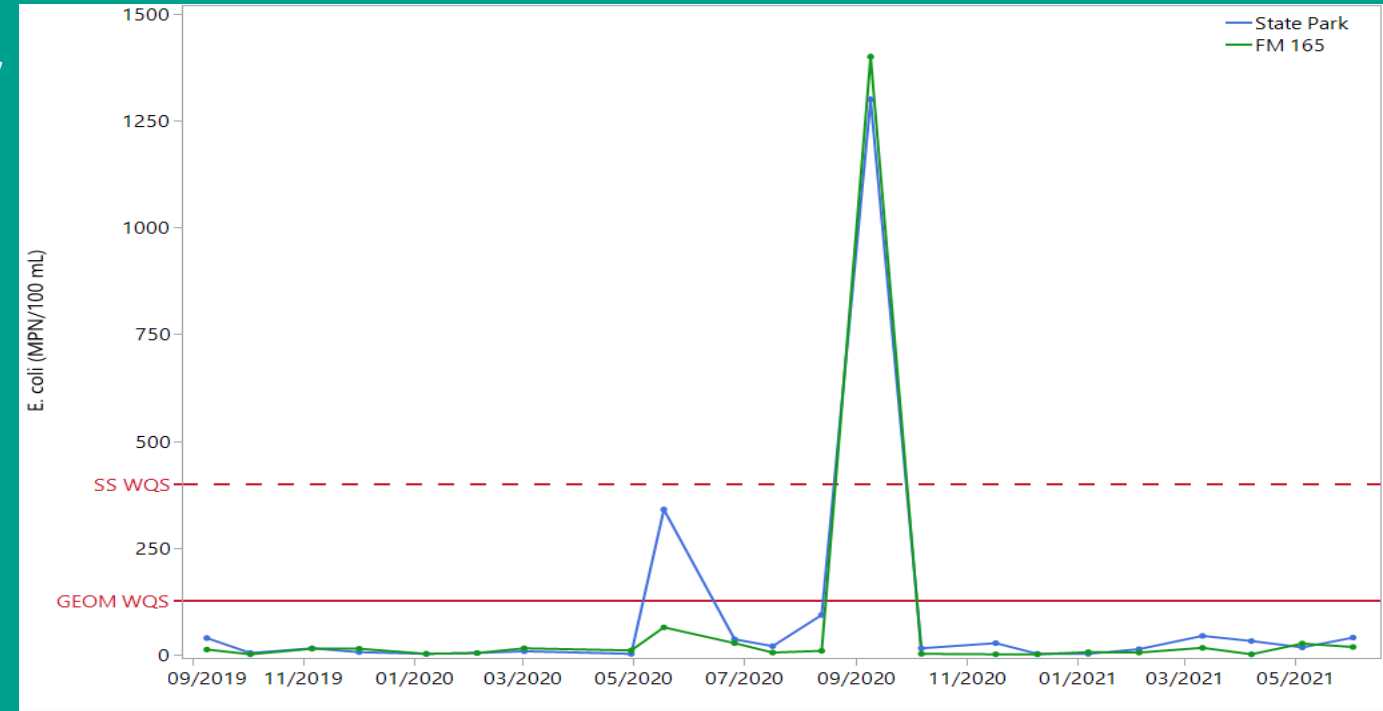


Upper Blanco River

Monthly Monitoring Results (Sep 2019 – Jun 2021)

E. Coli bacteria

- Single sample water quality standard (SS WQS) = 399 MPN/100mL
 - Exceeded in Sep 2020 at both sites
- Geometric mean water quality standard (GEOM WQS) = 126 MPN/100mL
 - 16.9 MPN/100 mL at State Park
 - 8.2 MPN/100 mL at FM165
- E. coli bacteria is highly correlated ($r^2=0.92$) with flow at both sites

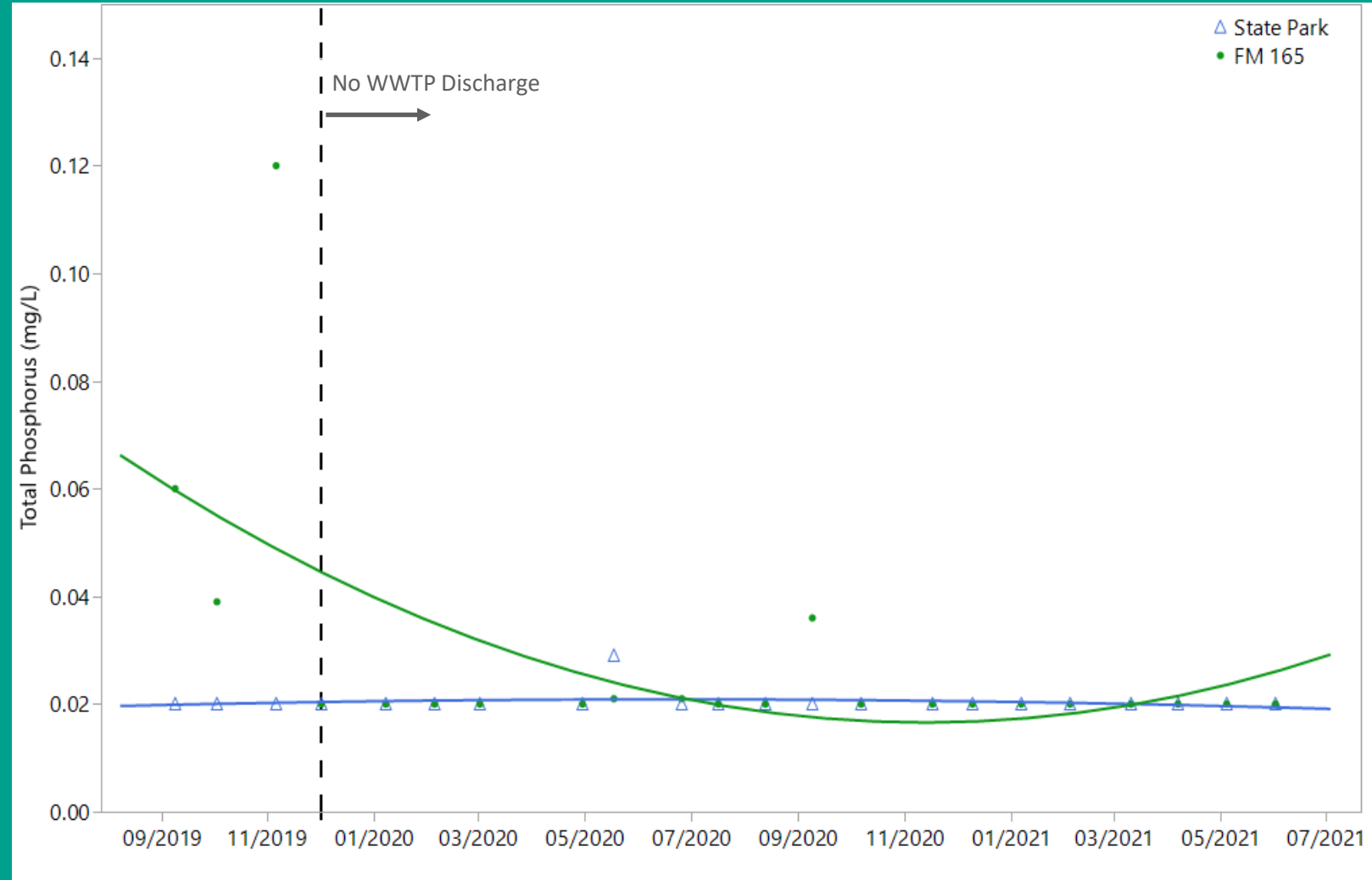


Upper Blanco River

Monthly Monitoring Results (Sep 2019 – Jun 2021)

Total Phosphorus (mg/L)

- Screening level = 0.69 mg/L
- All values below screening level
- Measured concentrations decreased when WWTP discharge ceased at FM165
- Measured concentrations remained consistent at State Park



Upper Blanco River

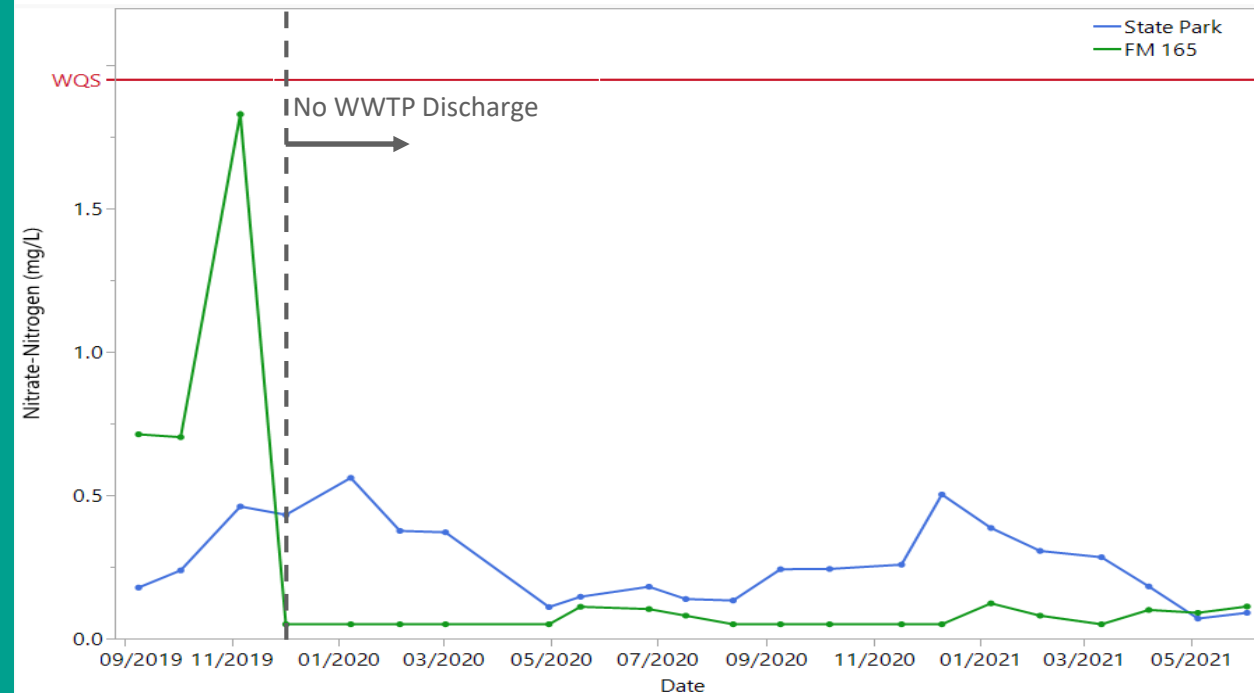
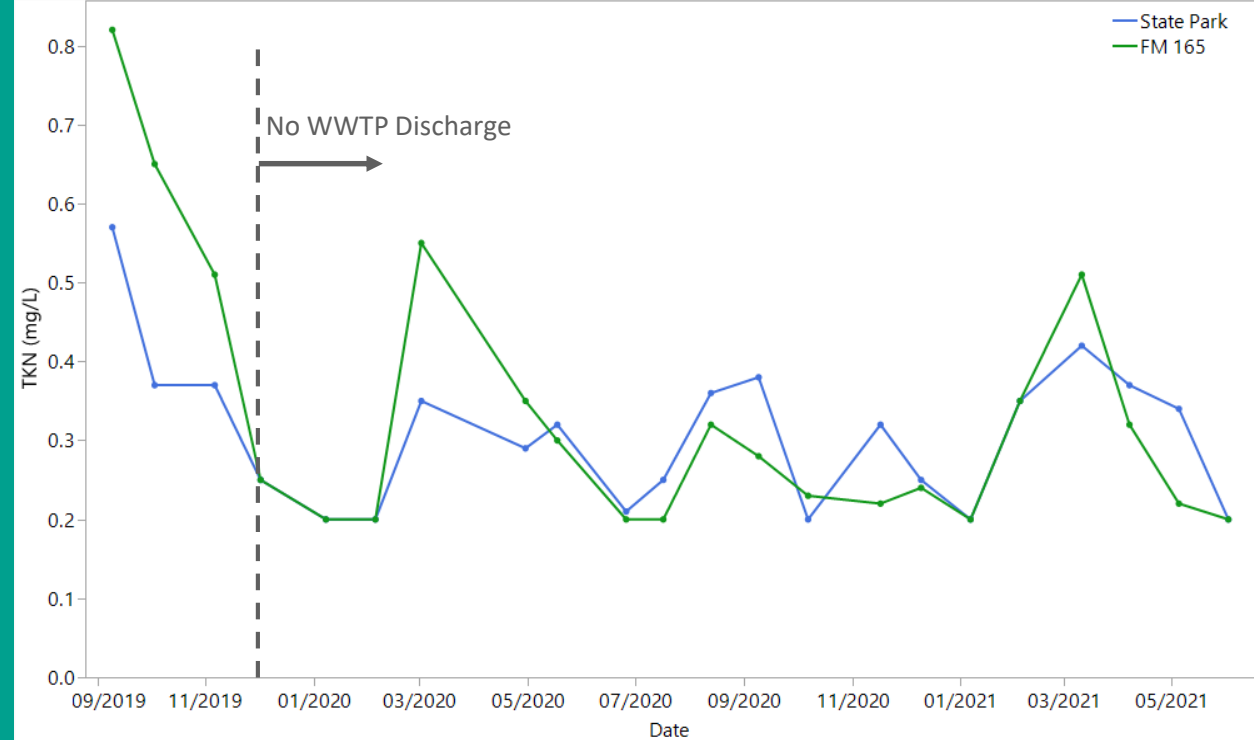
Monthly Monitoring Results (Sep 2019 – Jun 2021)

Total Kjeldal Nitrogen or TKN (mg/L)

- A measure of total organic nitrogen and ammonia
- Required regulatory parameter by wastewater treatment plants
- TKN consistently higher at FM165 than State Park before WWTP discharge ceased

Nitrate – Nitrogen (mg/L)

- A measure of inorganic nitrogen
- Sharp decline initially and consistently lower concentrations at FM165 after WWTP discharge ceased



Upper Blanco River

(@FM165)



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Upper Blanco River

Quarterly Monitoring

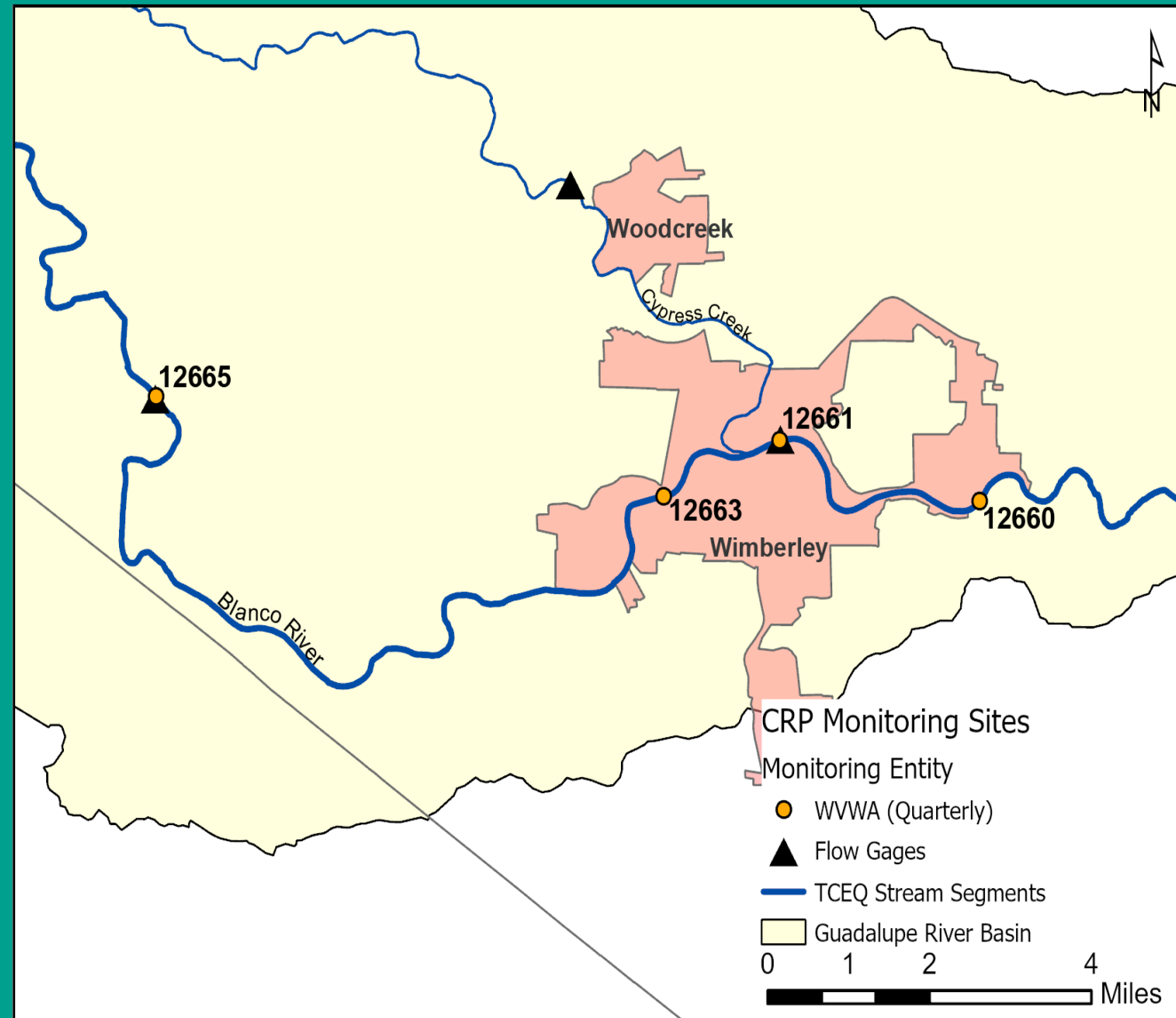
Purpose: To collect water quality data for assessment in the Texas Integrated Report.

Four sites:

- 12665 – Blanco @ Fischer Store Rd.
- 12663 – Blanco @ Pioneer Town
- 12661 – Blanco @ RR12
- 12660 – Blanco @ CR174

Parameters:

Field
Flow
Conventional
Bacteria

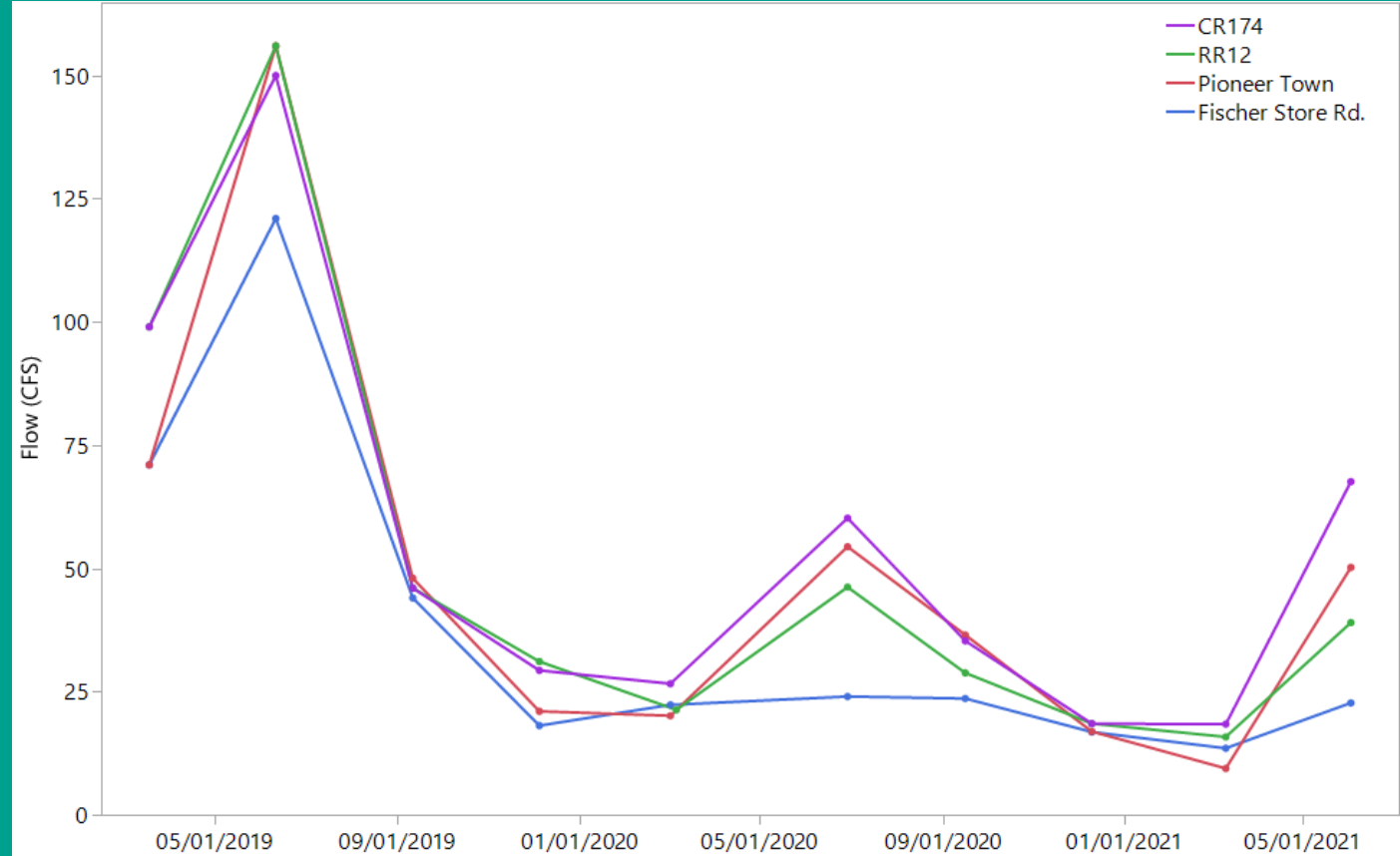
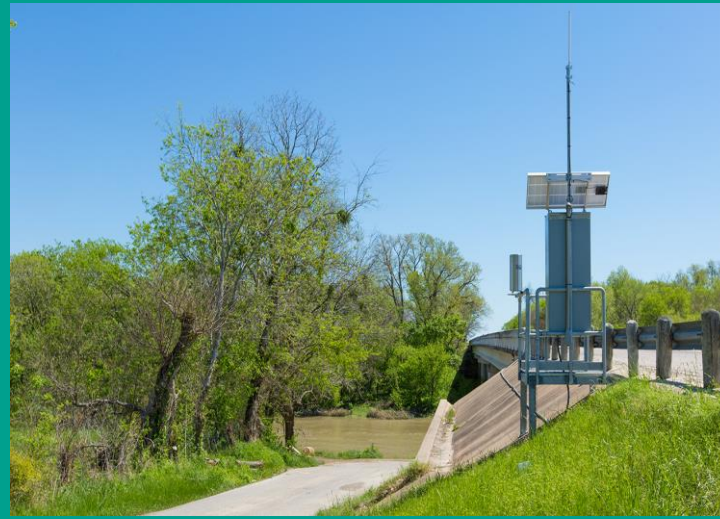


Upper Blanco River

Monthly Monitoring Results
(Sep 2019 – Jun 2021)

Streamflow (CFS)

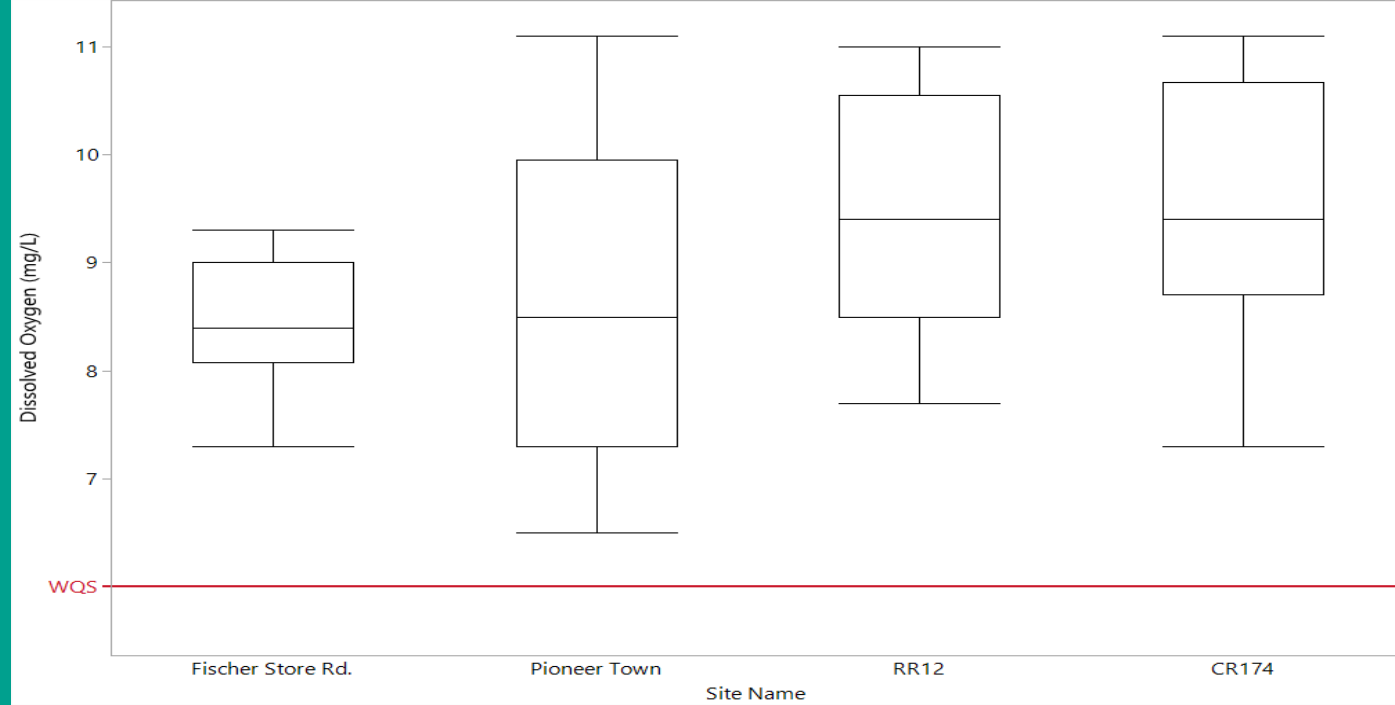
- Fischer Store Rd and RR12 Sites: Recorded from USGS gauges
- Pioneer Town and CR 174 Sites: Measured by MCWE staff with a SonTek FlowTracker2
- Difference in measurements among sites demonstrates a gaining reach



Upper Blanco River

Quarterly Monitoring Results (Mar 2019 – Jun 2021, n=10)

- Dissolved Oxygen (mg/L)
 - All sites above the water quality standard
- Total Dissolved Solids (mg/L) (converted from specific conductance)
 - All sites met the water quality standard
 - Decreasing values from upstream to downstream



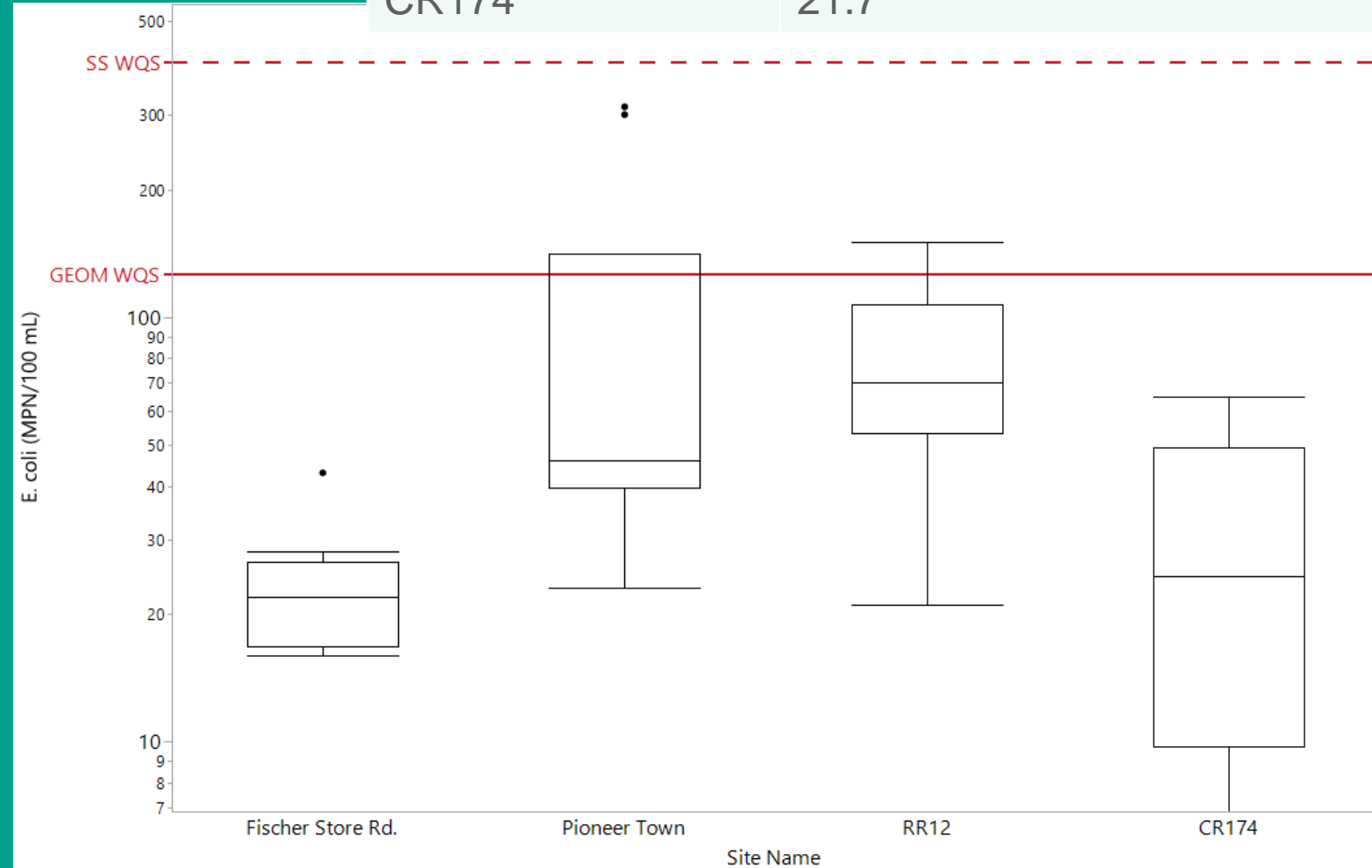
Upper Blanco River

Quarterly Monitoring Results
(Mar 2019 – Jun 2021, n=10)

E. coli bacteria

- Geometric means for all stations below WQS (126 MPN/100 mL)
- No stations had single sample values greater than the WQS (399 MPN/100 mL)
- Higher colony counts in urbanized areas
- No correlation with flow.

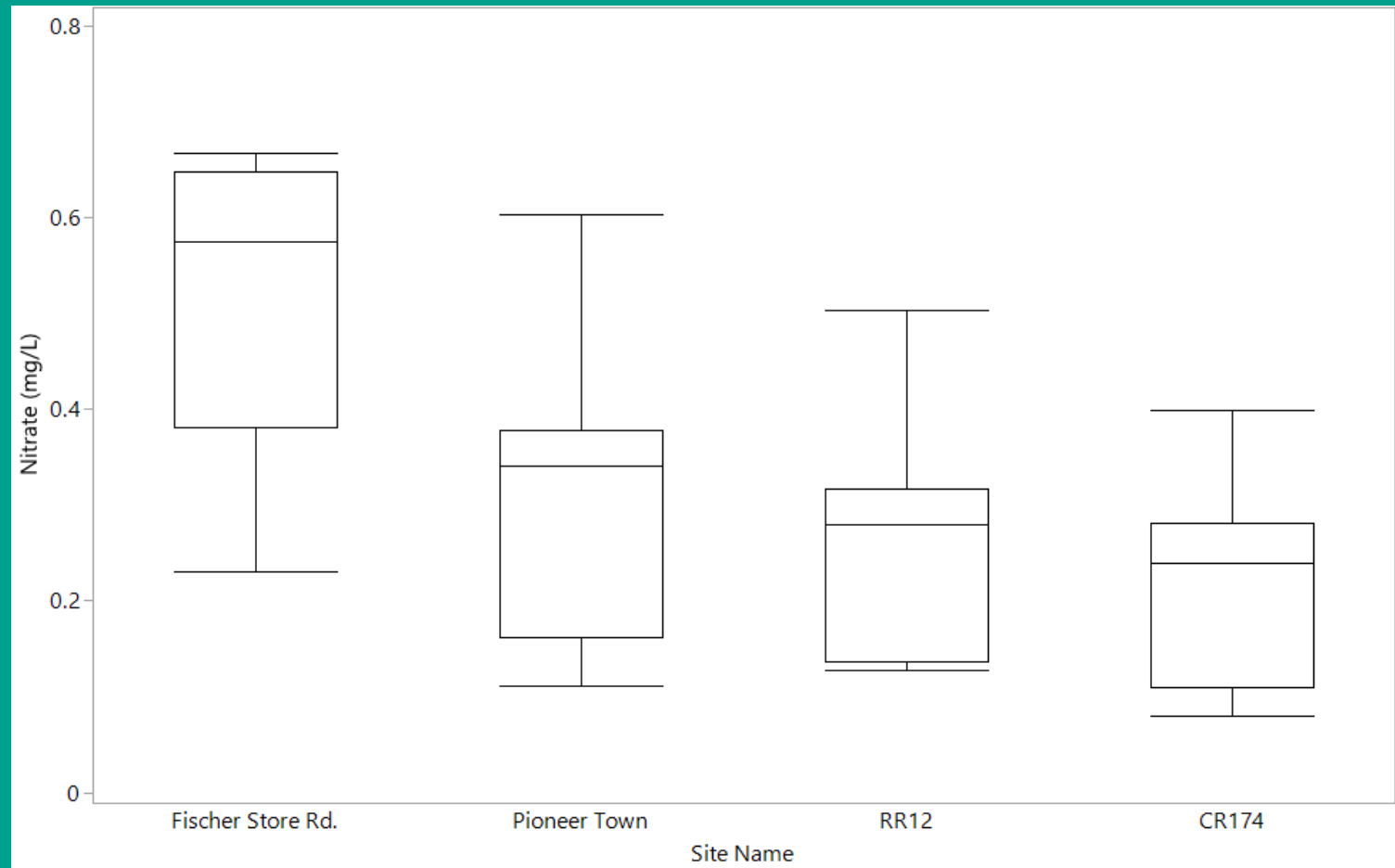
Station Name	Geometric Mean (MPN/100 mL)
Fischer Store Rd.	22.3
Pioneer Town	68.4
RR12	69.5
CR174	21.7



Upper Blanco River

Quarterly Monitoring Results
(Mar 2019 – Jun 2021, n=10)

- Nitrate-Nitrogen (mg/L)
 - All values below WQS (1.95 mg/L)
- All phosphorus measurements below laboratory detection limit (<0.02 mg/L) at all stations
- Most (98%) ammonia measurements below laboratory detection limit (<0.01 mg/L)



Cypress Creek

Quarterly Monitoring

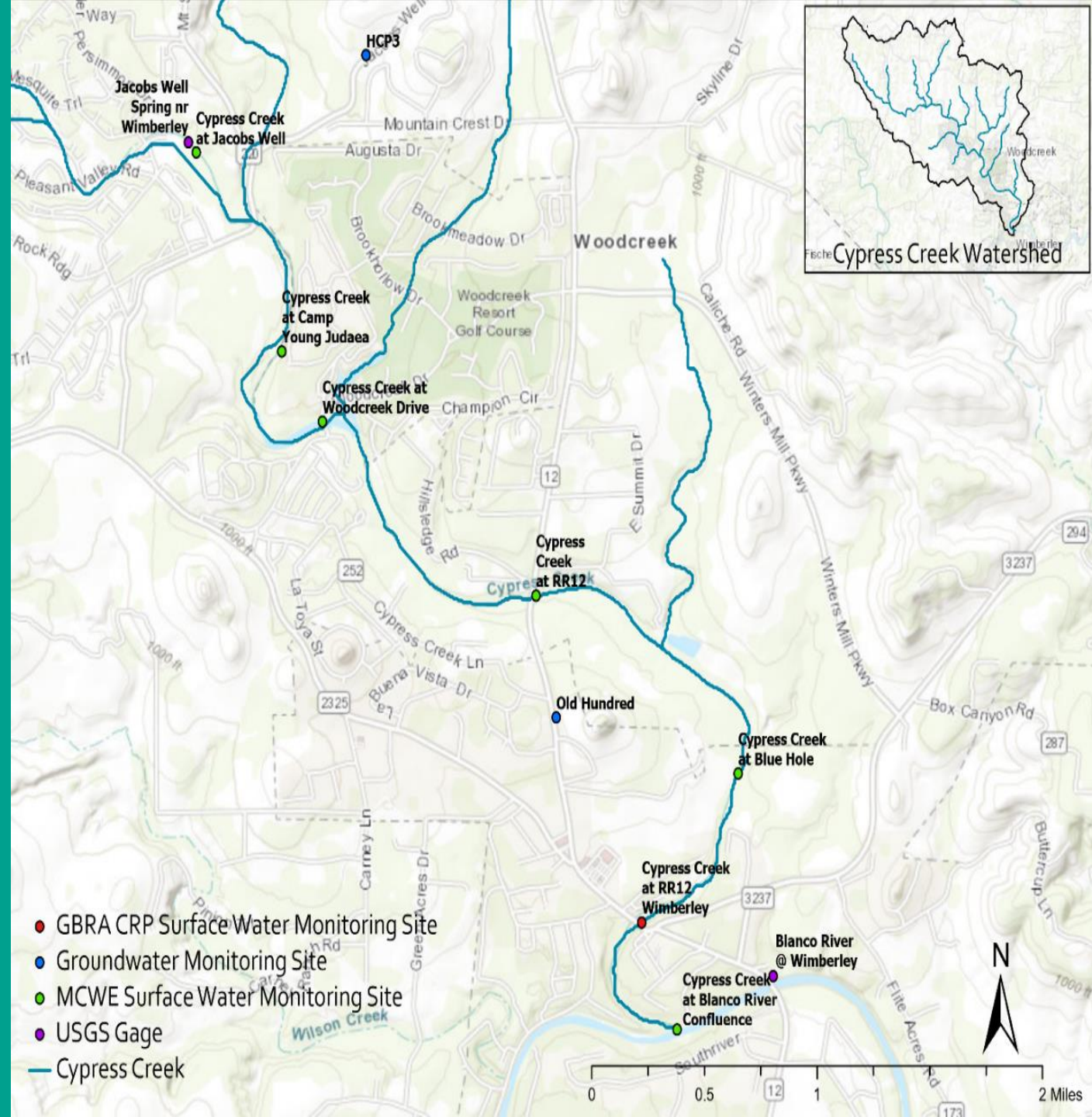
Purpose: To collect water quality data in support of the WPP.

Seven sites:

- 12677 – CC @ Jacob's Well
- 22109 – CC @ Camp Young Judea
- 22110 – CC @ Woodcreek Dr.
- 12676 – CC @ RR12
- 12675 – CC @ Blue Hole*
- 12674 – CC @ *FM12 in Wimberley*
- 12673 – CC @ Blanco Riv. Confluence*

Parameters:

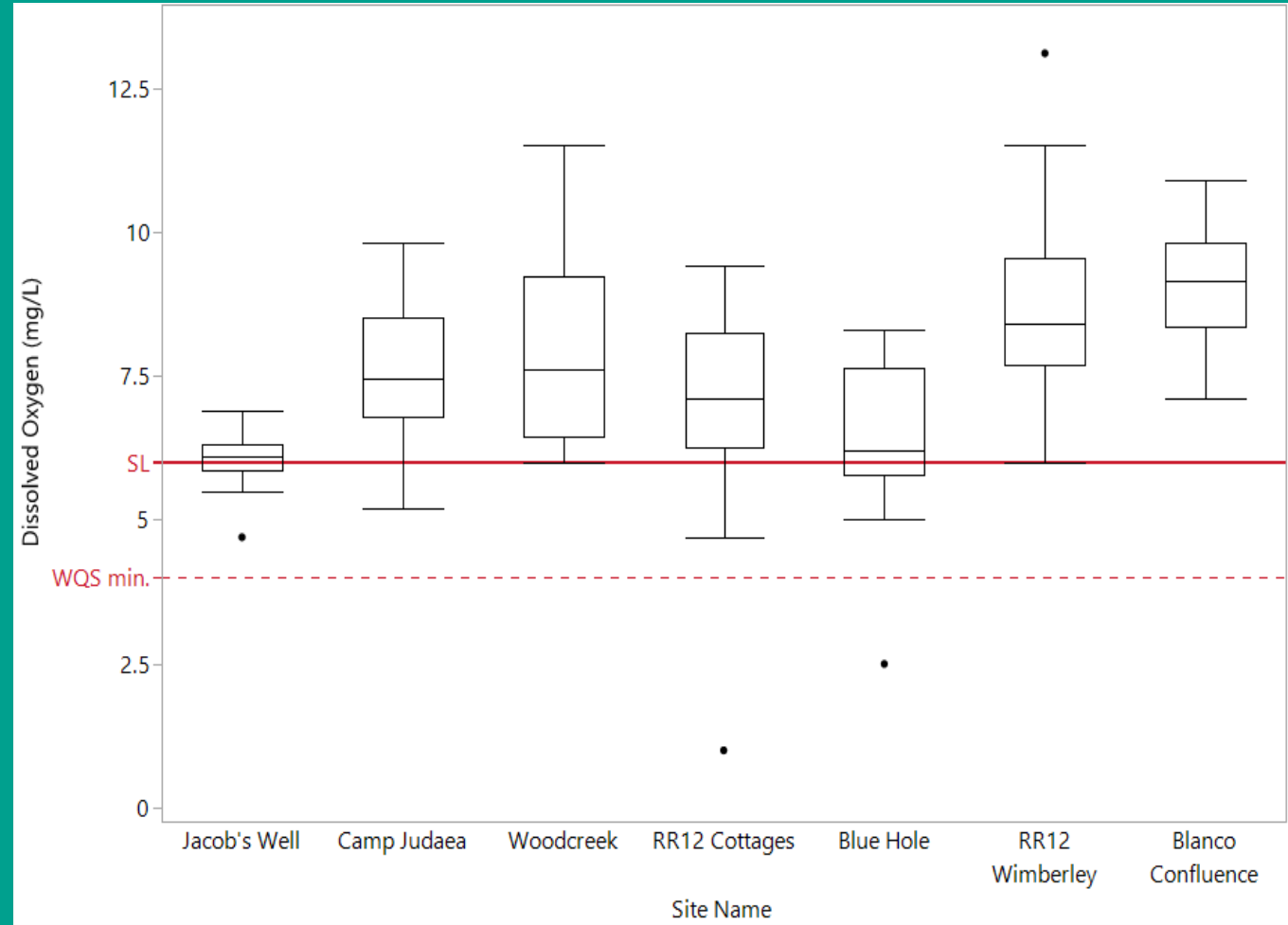
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|----------------|-------------------------|
| Field | Flow |
| Conventional | <i>E. coli</i> Bacteria |
| 24-hour DO (*) | Groundwater wells |



Cypress Creek

Quarterly Monitoring Results (Sep. 2016 - Jun 2021)

- Dissolved Oxygen (mg/L) - Grab
 - Water Quality Standard
 - 6.0 mg/L grab screening level (SL)
 - 4.0 mg/L grab minimum (WQS min)
 - Grab – two events below WQS min.
 - RR12 Cottages
 - Blue Hole

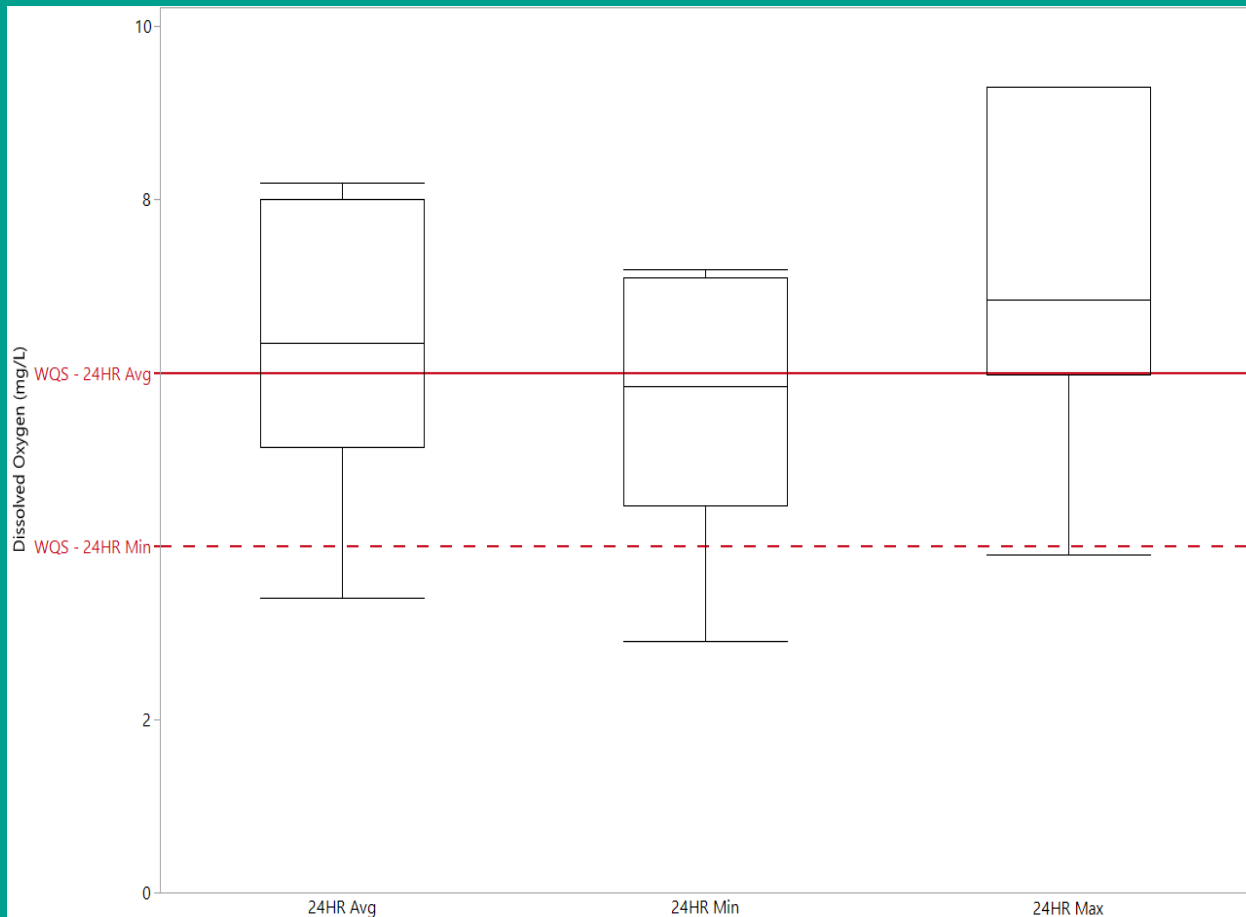


Cypress Creek

24HR Sonde Deployments

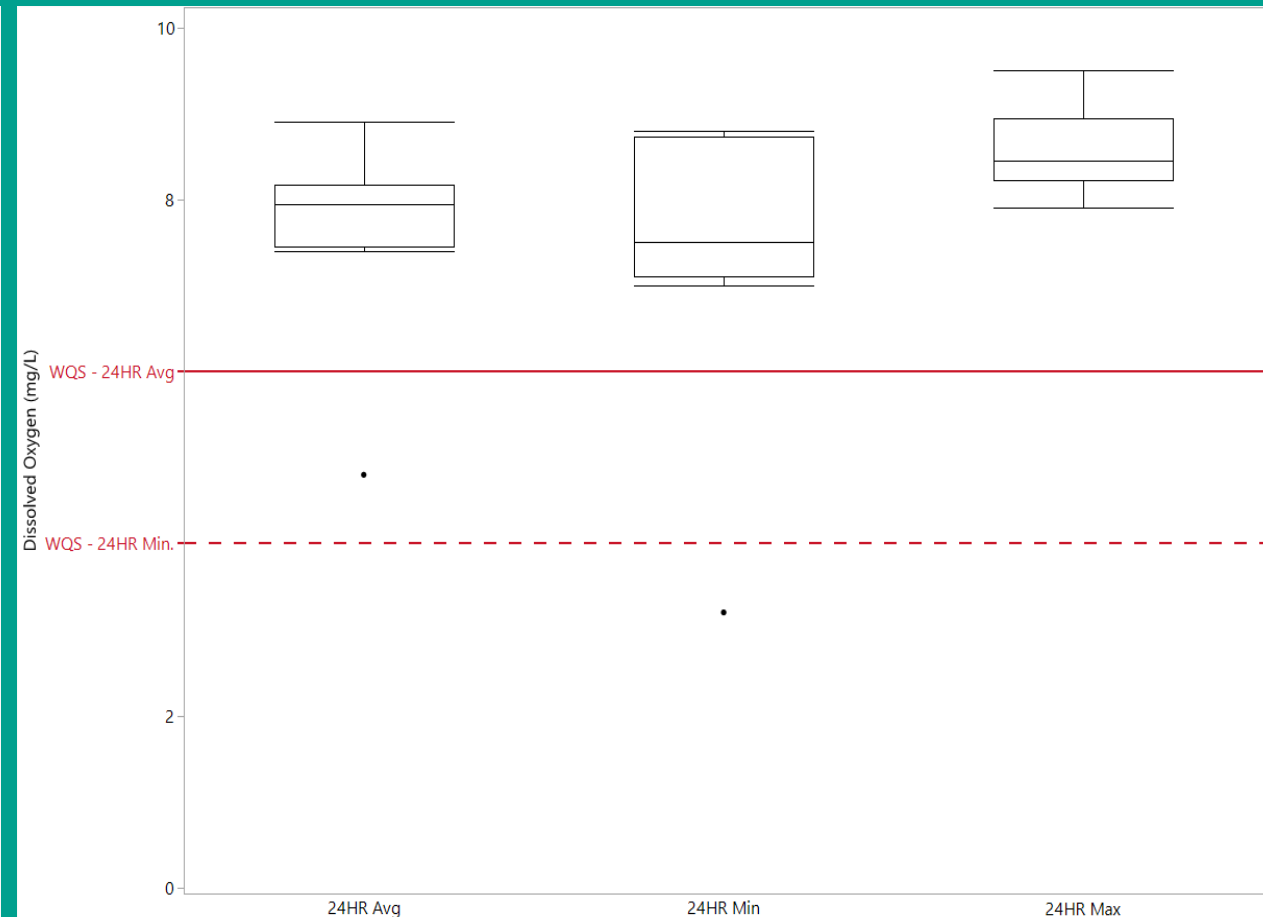
Cypress Creek at Blue Hole (12675)

- Jun 2016-Oct 2020
- n=10



Cypress Creek at Blanco Confluence (12673)

- Apr 2017-Oct 2020
- n=8

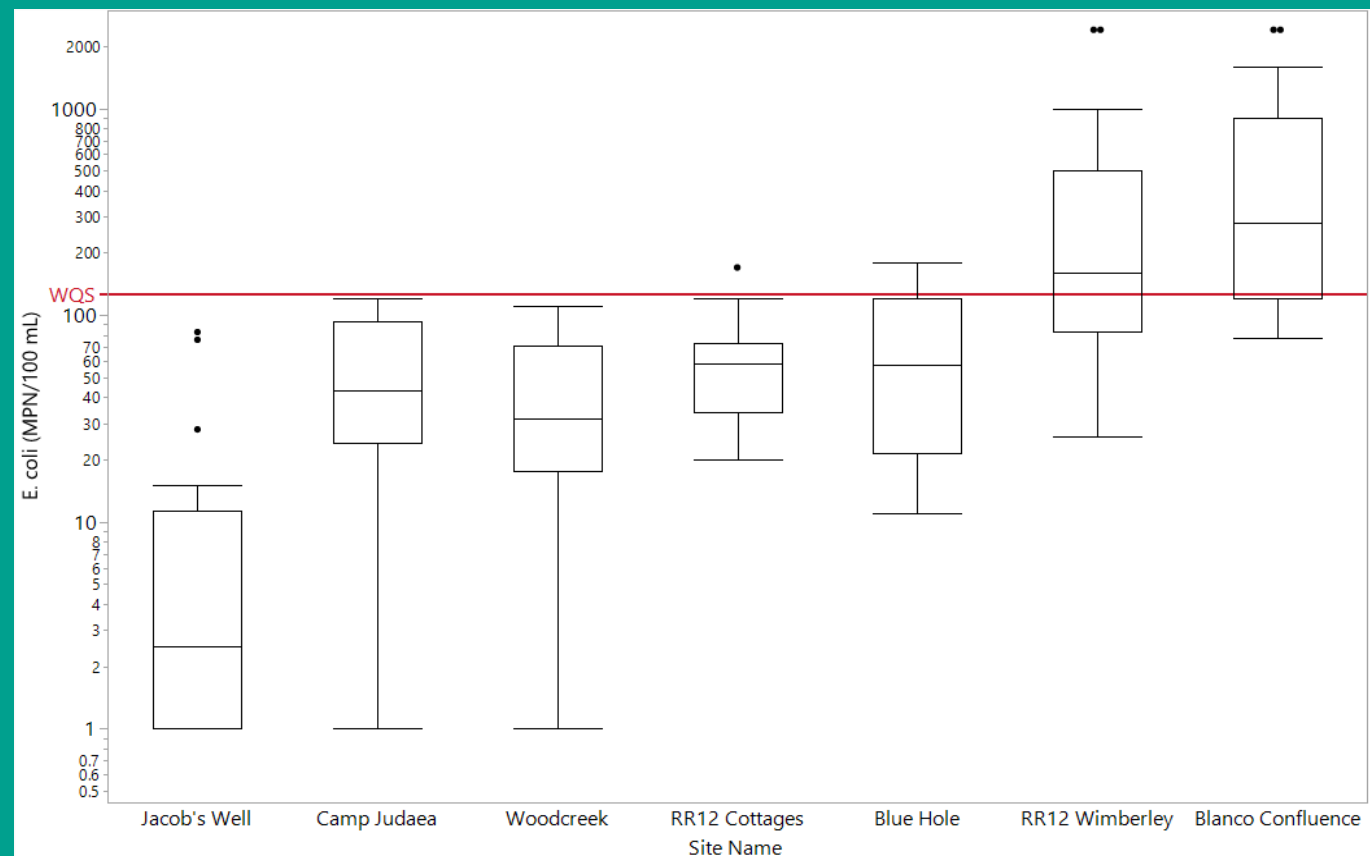


Cypress Creek

Quarterly Monitoring Results (Sep. 2016 - Jun 2021)

- E. coli (MPN/100 mL)
 - WQS is 126 MPN/100 mL
- Geometric mean for all sites combined is 55.2 MPN/100 mL
- Geometric mean above WQS at two sites
 - RR12 Wimberley
 - Blanco River Confluence

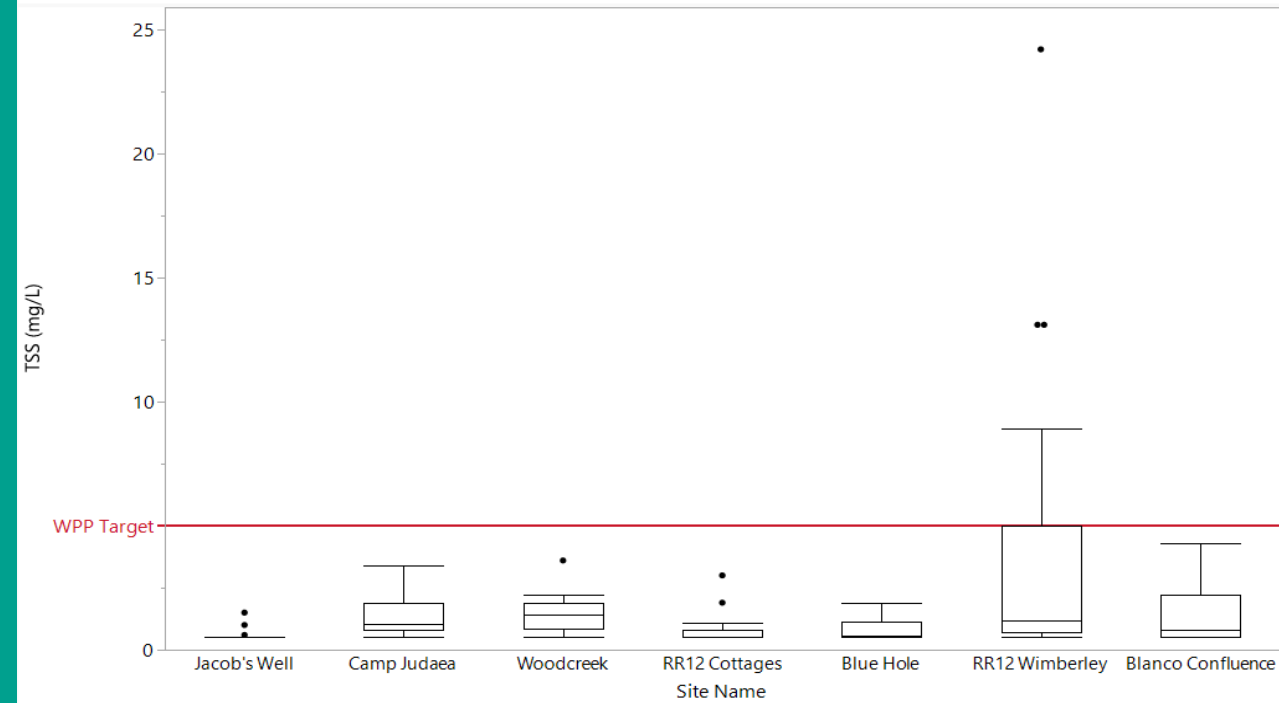
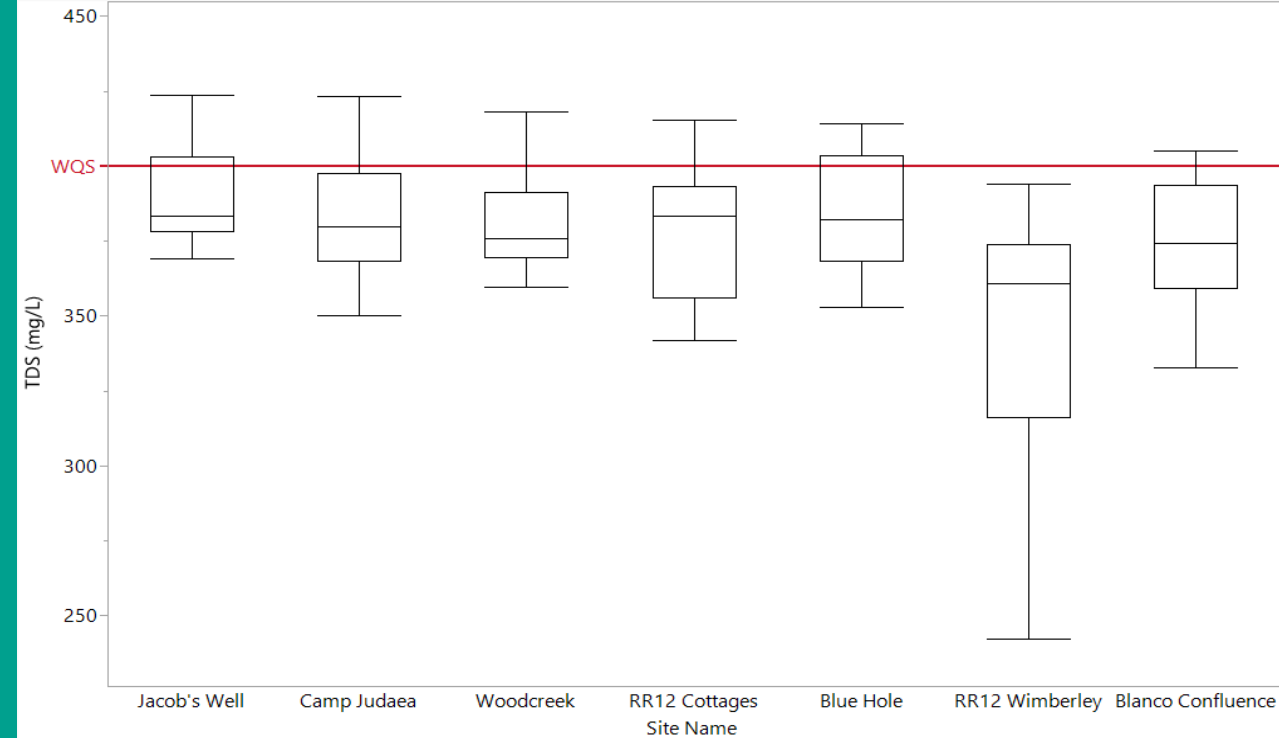
Station Name	No. Samples	Geometric Mean (MPN/100 mL)
Jacob's Well	18	3.7
Camp Judea	10	34.6
Woodcreek Dr.	10	23.6
RR12 Cottages	18	52.9
Blue Hole	18	52.5
RR12 Wimberley	25	194.9
Blanco Confluence	18	330.0



Cypress Creek

Quarterly Monitoring Results (Sep. 2016-Jul 2021)

- Total Dissolved Solids (TDS)
 - Calculated from Specific Conductance
 - WQS is 400 mg/L
 - WQS exceeded at all sites except RR12 Wimberley
- Total Suspended Solids (TSS)
 - WPP Target is 5.0 mg/L
 - Values above WPP Target at RR12 Wimberley



Cypress Creek Pilot Project: E. coli and Optical Brighteners

Objectives:

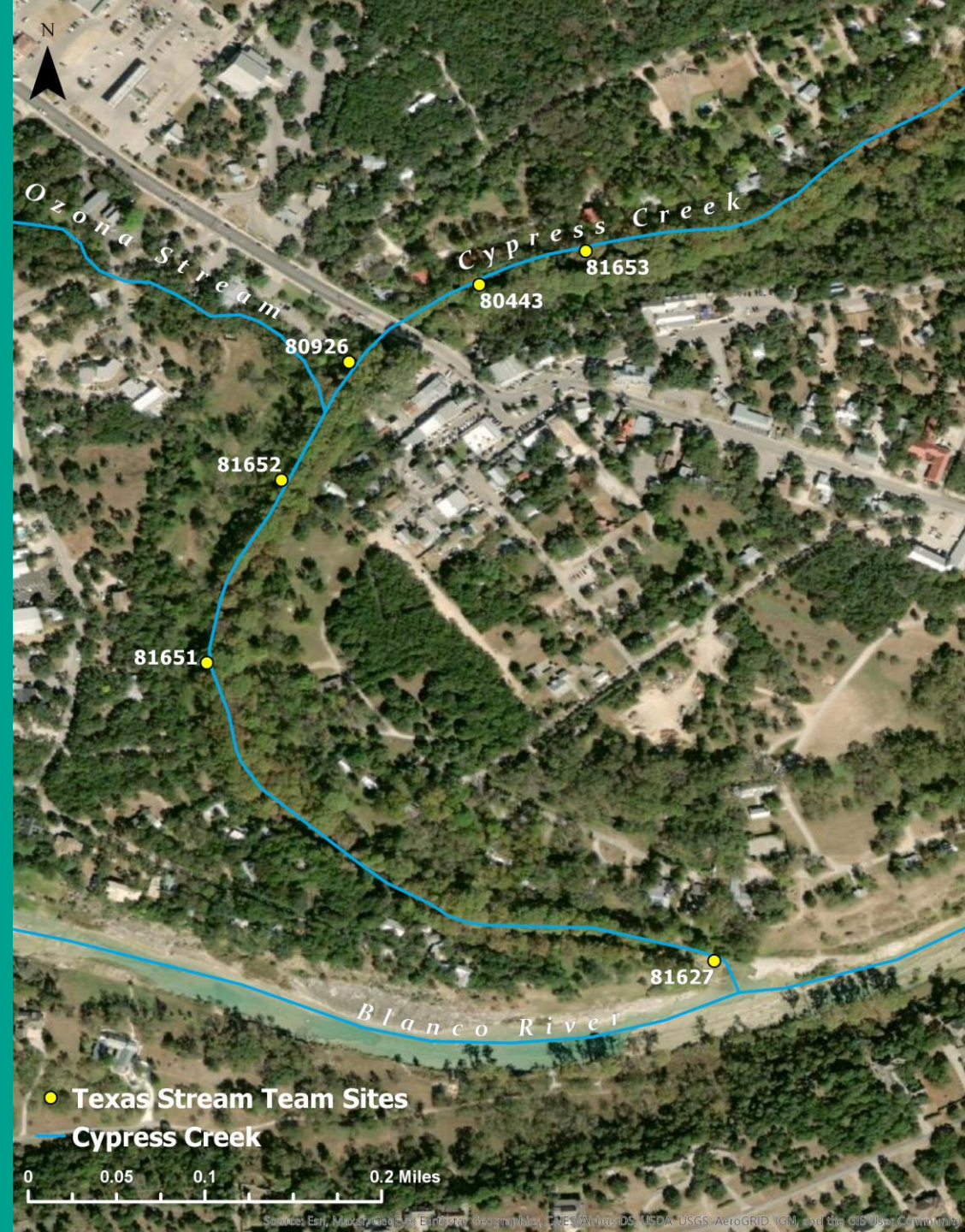
- Conduct intensive *E. coli* monitoring to discern potential sources of bacteria.
- Conduct bi-weekly (Sunday and Thursday) *E. coli* monitoring during different times of the week.
- Conduct optical brightener (OB) “tamplimg” monitoring, concurrent with *E. coli* monitoring, as a pollution screening tool to detect OBs (i.e., presence/absence) associated with wastewater contamination.

Project length:

- 13 weeks, June 24, 2021 – September 19, 2021

Sampling frequency:

- Six sites
- Twice a week (Sunday and Thursday mornings)



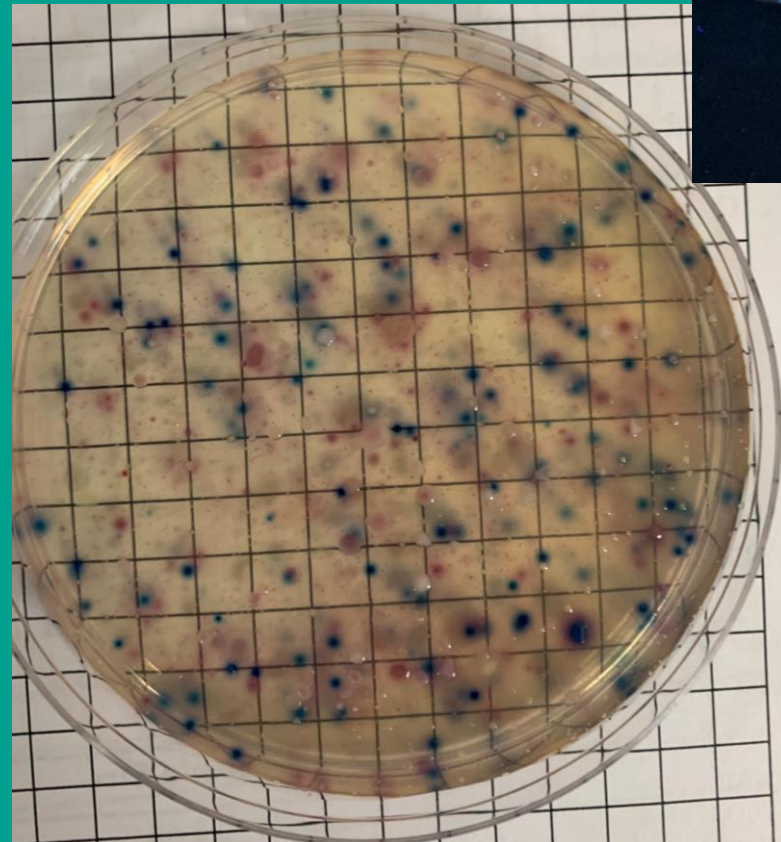
Cypress Creek

Pilot Project: E. coli and Optical Brighteners



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TEXAS STREAM TEAM



Conclusions

Upper Blanco River – Monthly Monitoring

- *E. coli* bacteria correlated with flow
- Evidence of organic nitrogen cycling
- Phosphorus and inorganic nitrogen declined after WWTP discharge ceased

Upper Blanco River – Quarterly Monitoring

- Water quality standards met for *e. coli*, nutrients, and dissolved oxygen

Cypress Creek

- Dissolved oxygen grab and 24-hour WQS exceeded
- *E. coli* bacteria geometric means exceeded WQS at two downstream sites
- 2020 Integrated Report – 303d List impairments
 - Dissolved Oxygen
 - Fish and Macrobenthic Communities

Stay tuned for results of the Cypress Creek Pilot Project!

Contact

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<https://www.youtube.com/watch?v=Lqj2RL764oI>