

WIMBERLEY VALLEY WATERSHED ASSOCIATION: CLEAN RIVERS PROGRAM OVERVIEW

Guadalupe-Blanco River Basin Steering Committee Meeting
April 2022



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:

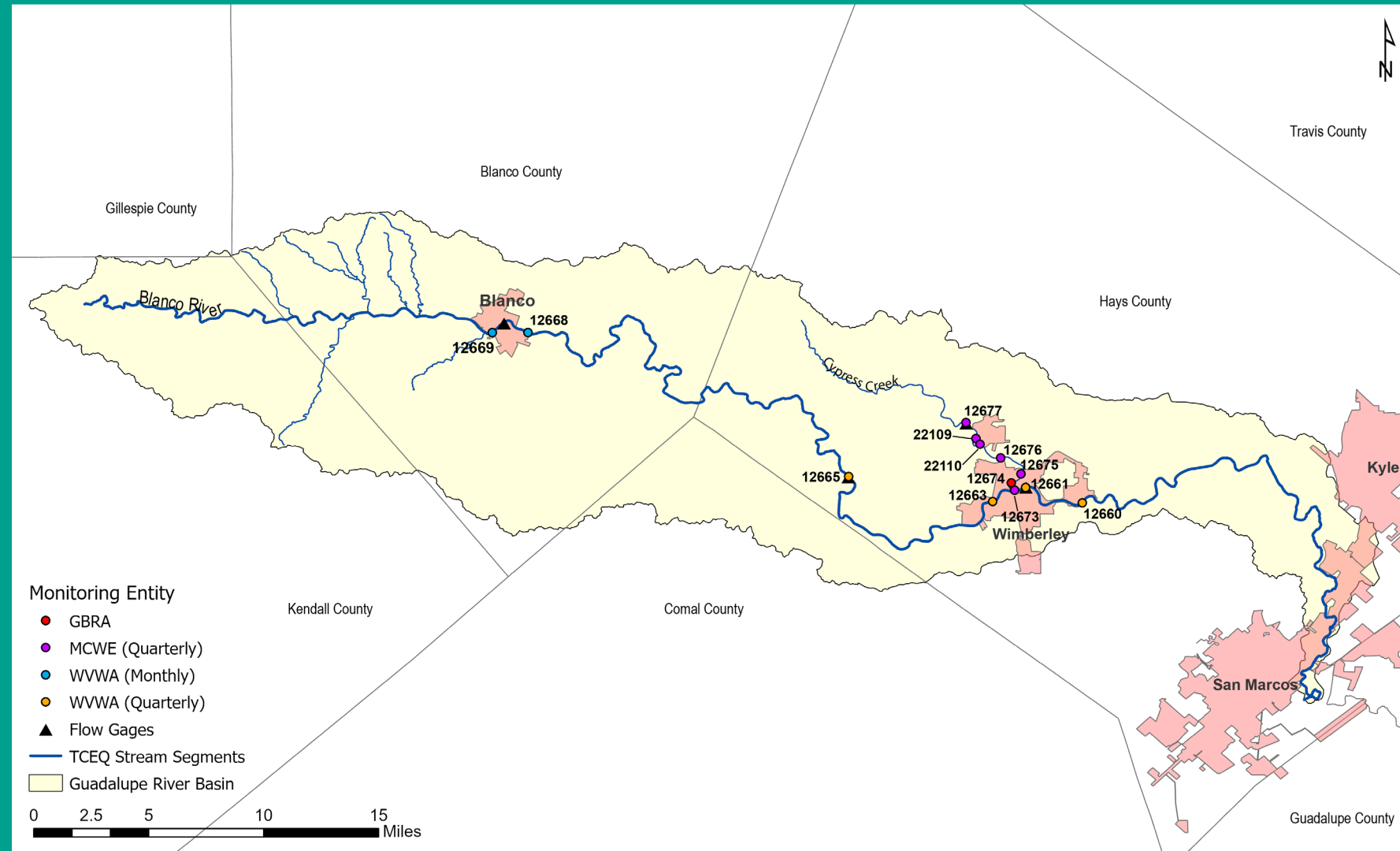
- The Meadows Center
- Wimberley Valley Watershed Association
- Hays-Trinity Groundwater Conservation District
- City of Wimberley
- City of Woodcreek



OUTLINE

Routine Water Quality Monitoring:

- Upper Blanco River (Segment 1813)
 - Monthly
 - Quarterly
- Cypress Creek (Segment 1815)
 - Quarterly



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

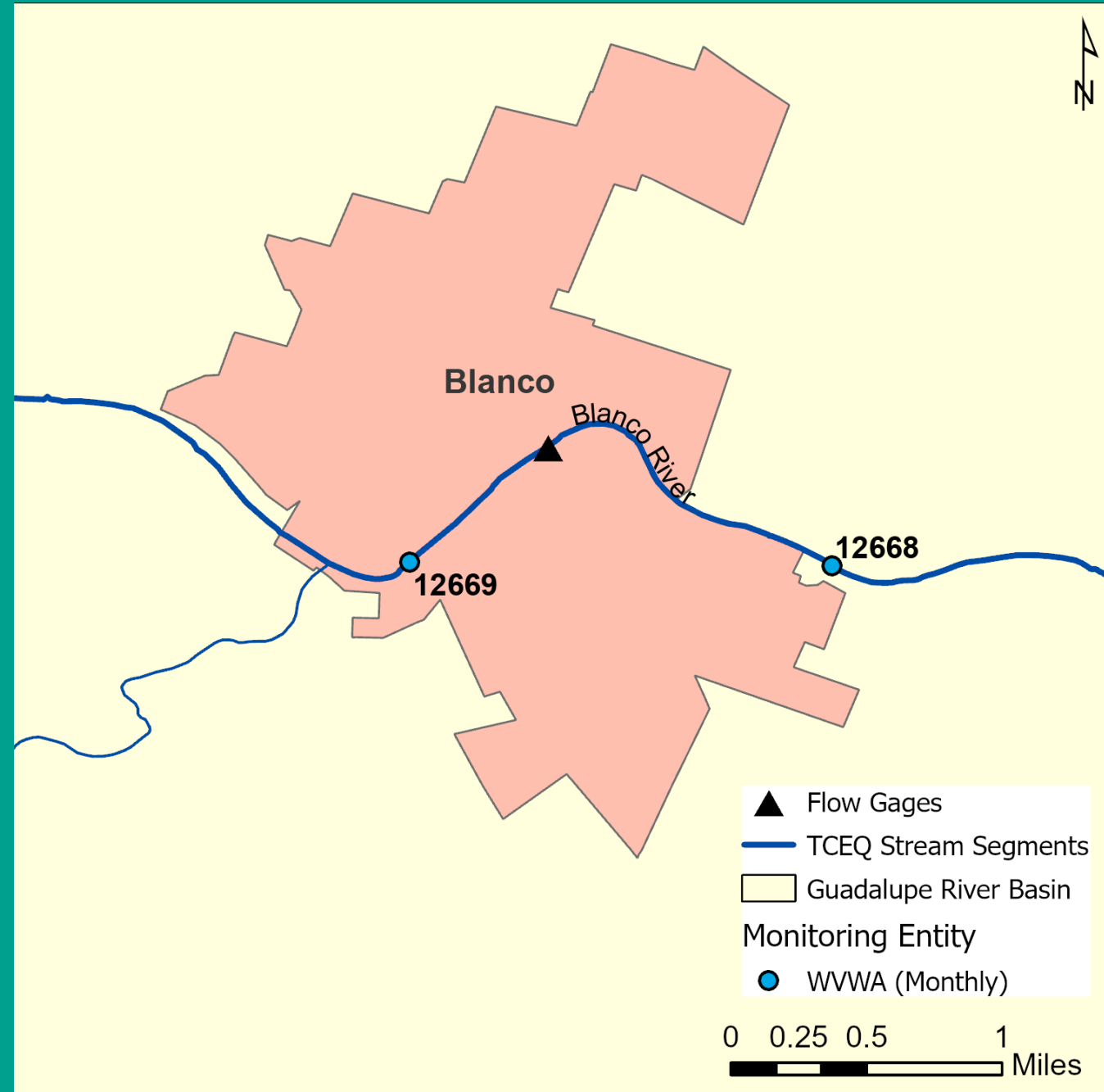
Parameters:

Field

Flow

Conventional

E. coli Bacteria

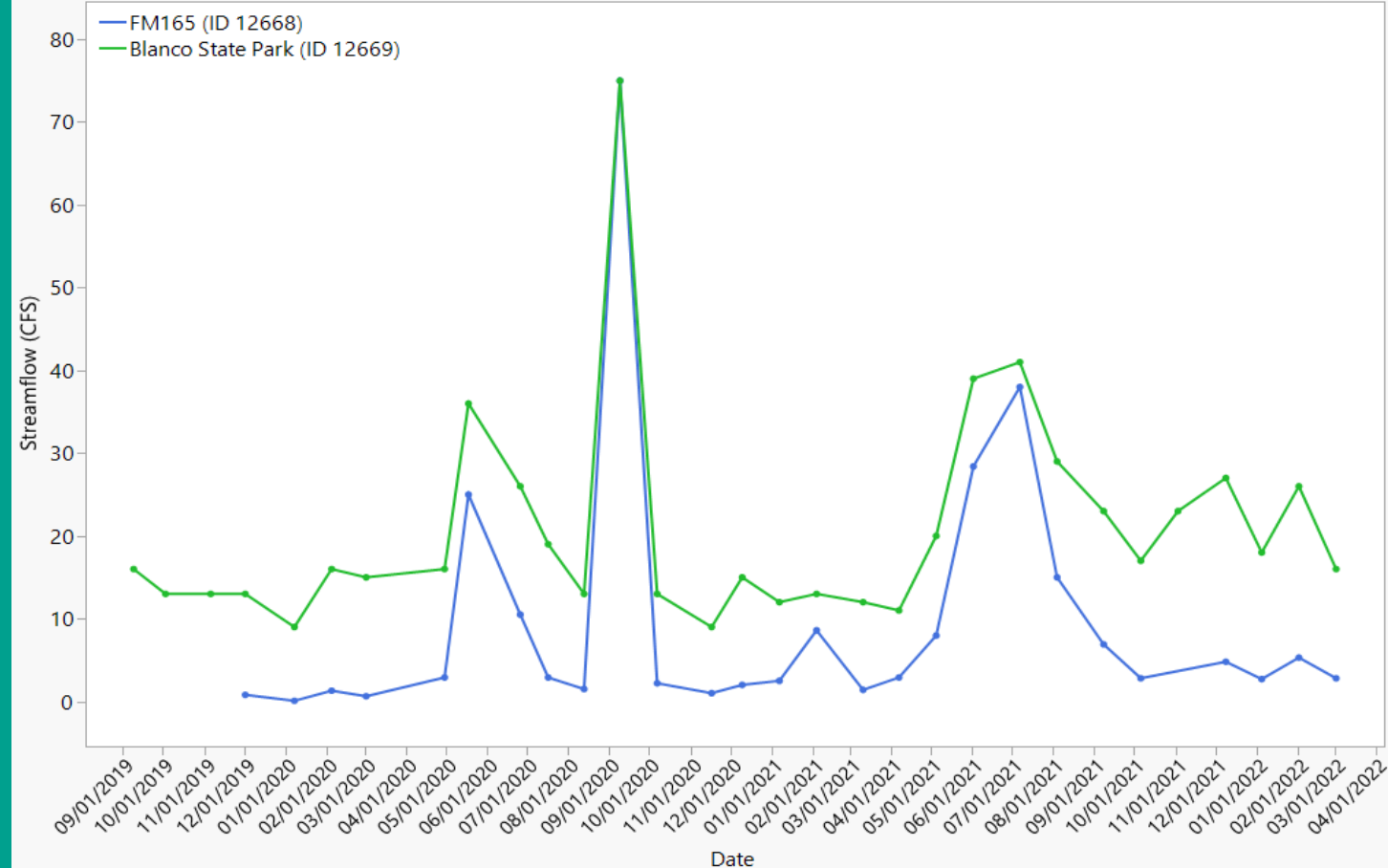


Upper Blanco River

Monthly Monitoring Results (Sep 2019 – Mar 2022)

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

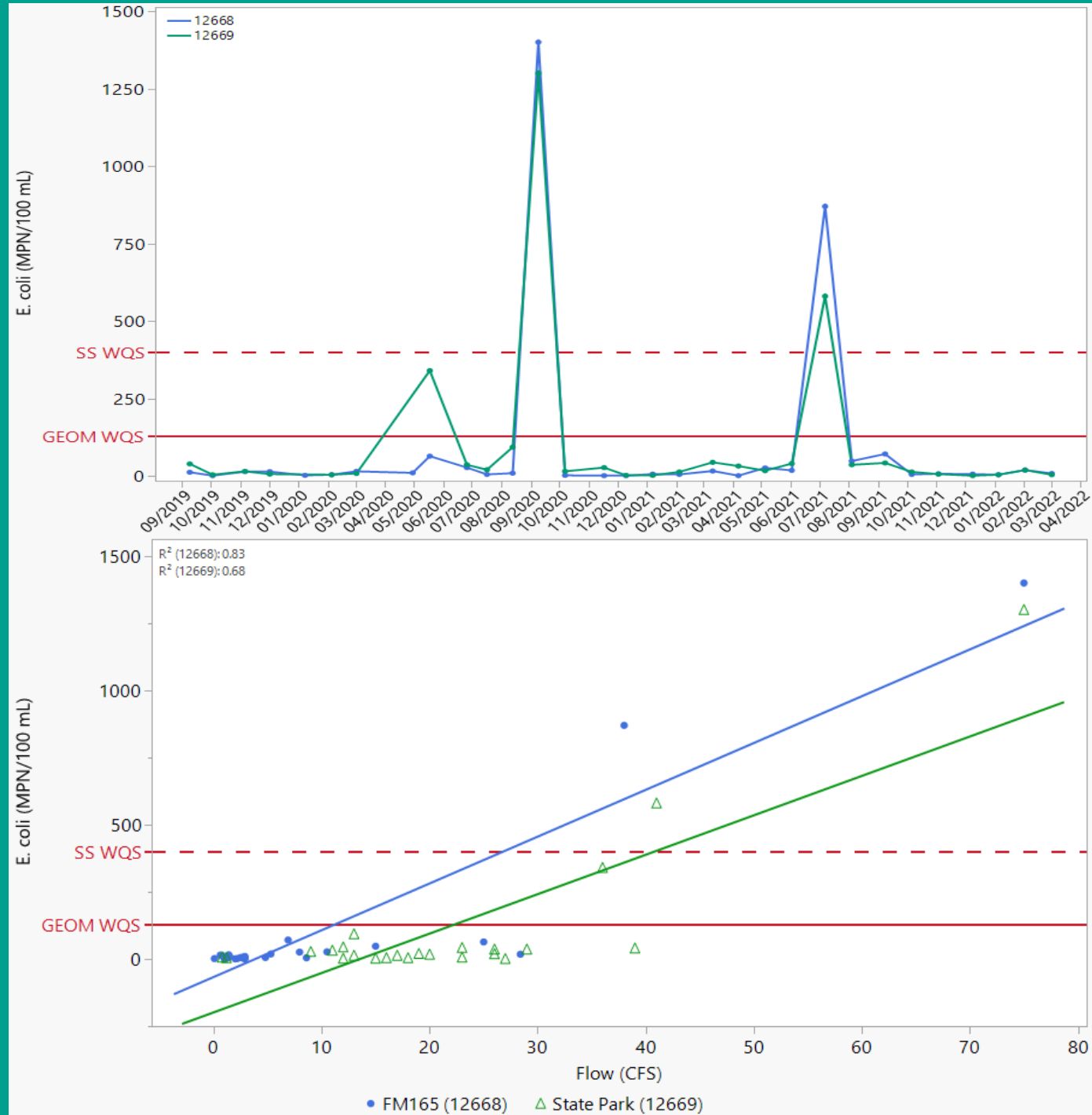


Upper Blanco River

Monthly Monitoring Results (Sep 2019 – Mar 2022)

E. Coli bacteria

- Single sample water quality standard (SS WQS) = 399 MPN/100mL
 - Exceeded in Sep 2020 and July 2021 at both sites
- Geometric mean water quality standard (GEOM WQS) = 126 MPN/100mL
 - 18.5 MPN/100 mL at State Park
 - 10.5 MPN/100 mL at FM165
- E. coli bacteria is highly correlated (FM165 $r^2=0.83$; State Park $r^2 = 0.68$) with flow at both sites

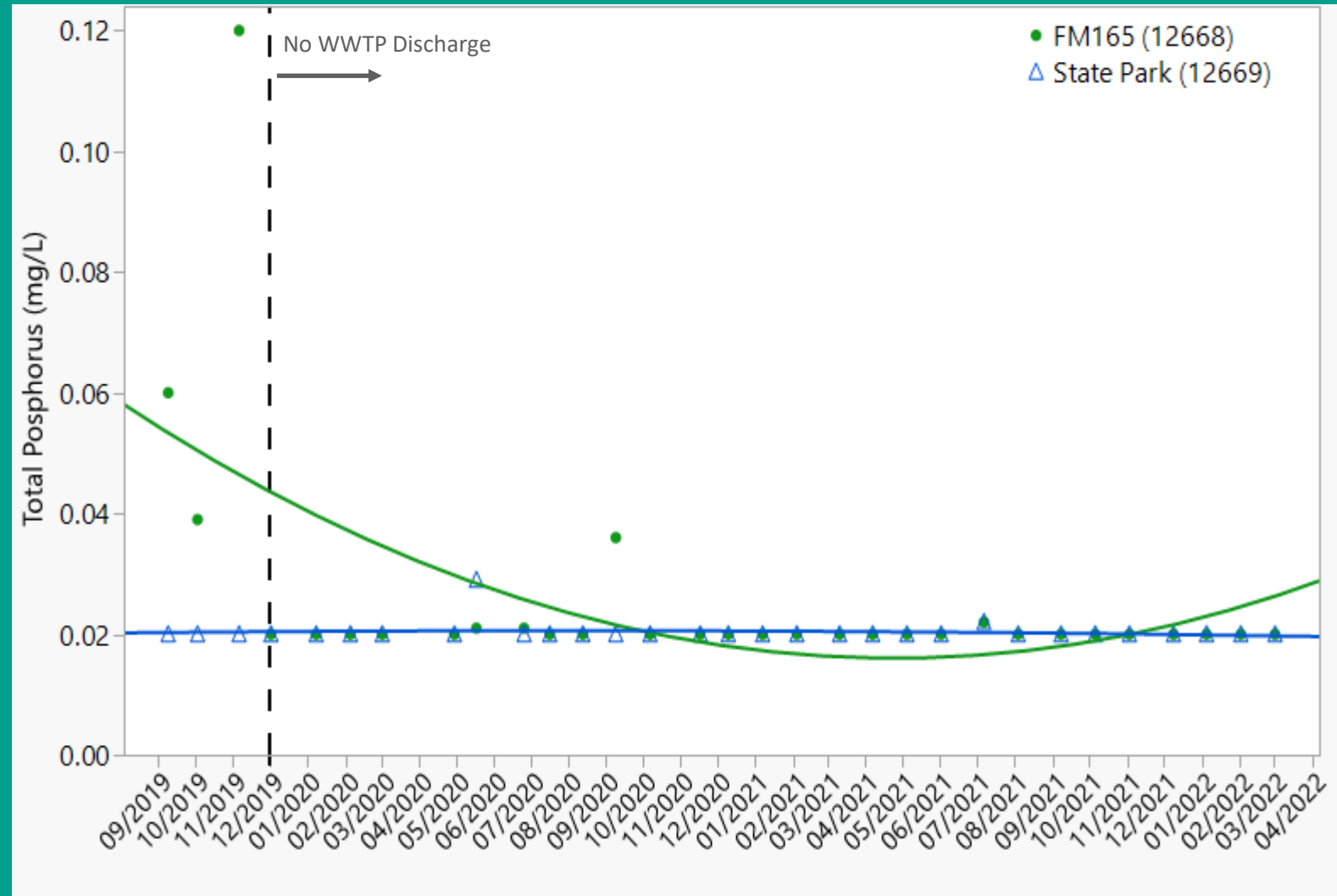


Upper Blanco River

Monthly Monitoring Results (Sep 2019 – Mar 2022)

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



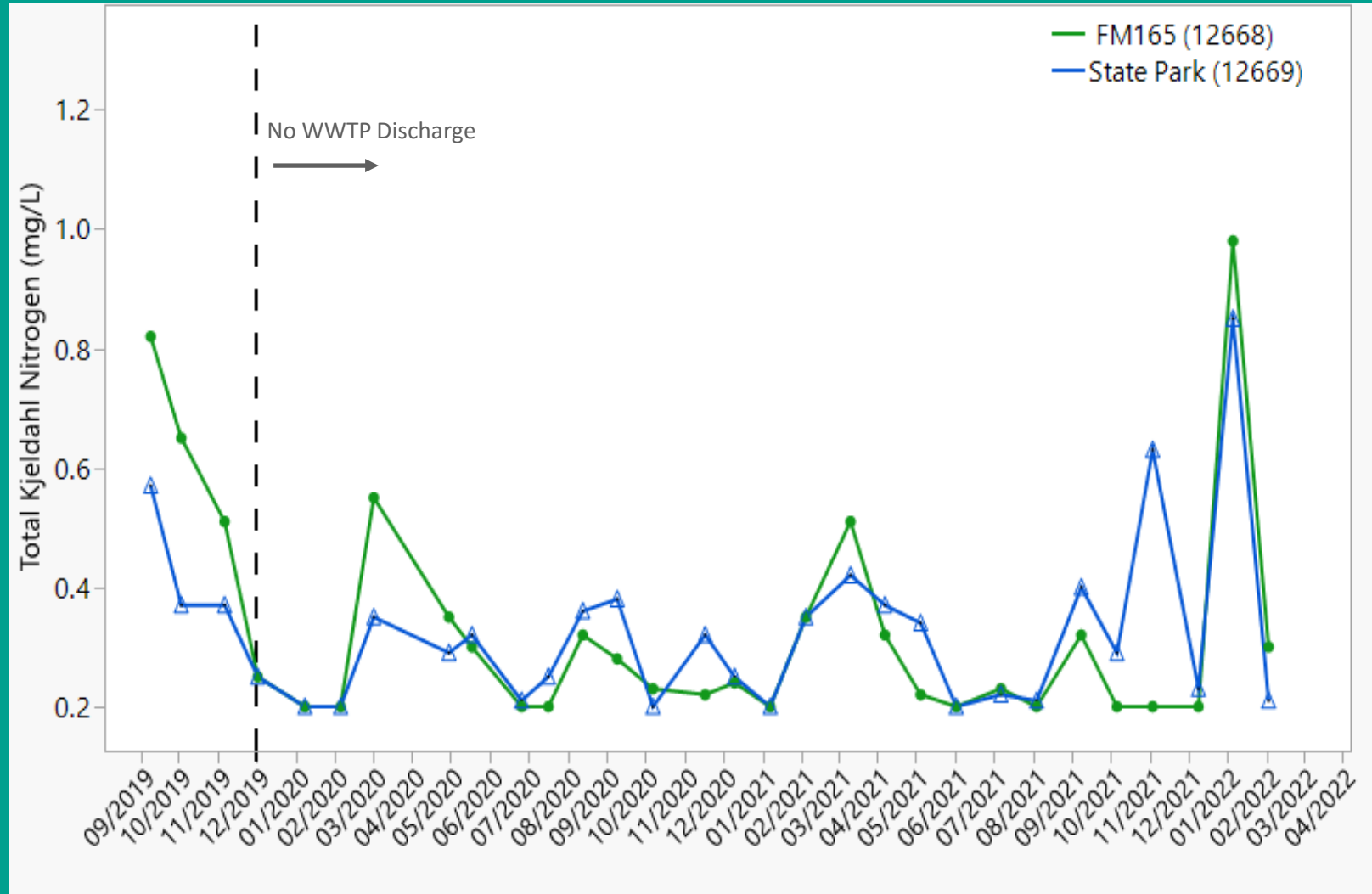
Upper Blanco River

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Monthly Monitoring Results (Sep 2019 – Feb 2022)

Total Kjeldal Nitrogen or TKN
(mg/L)

- A measure of total organic nitrogen and ammonia
- Required regulatory parameter by wastewater treatment plants
- TKN higher at FM165 before WWTP discharge ceased
- TKN values highest in January 2022 at both sites



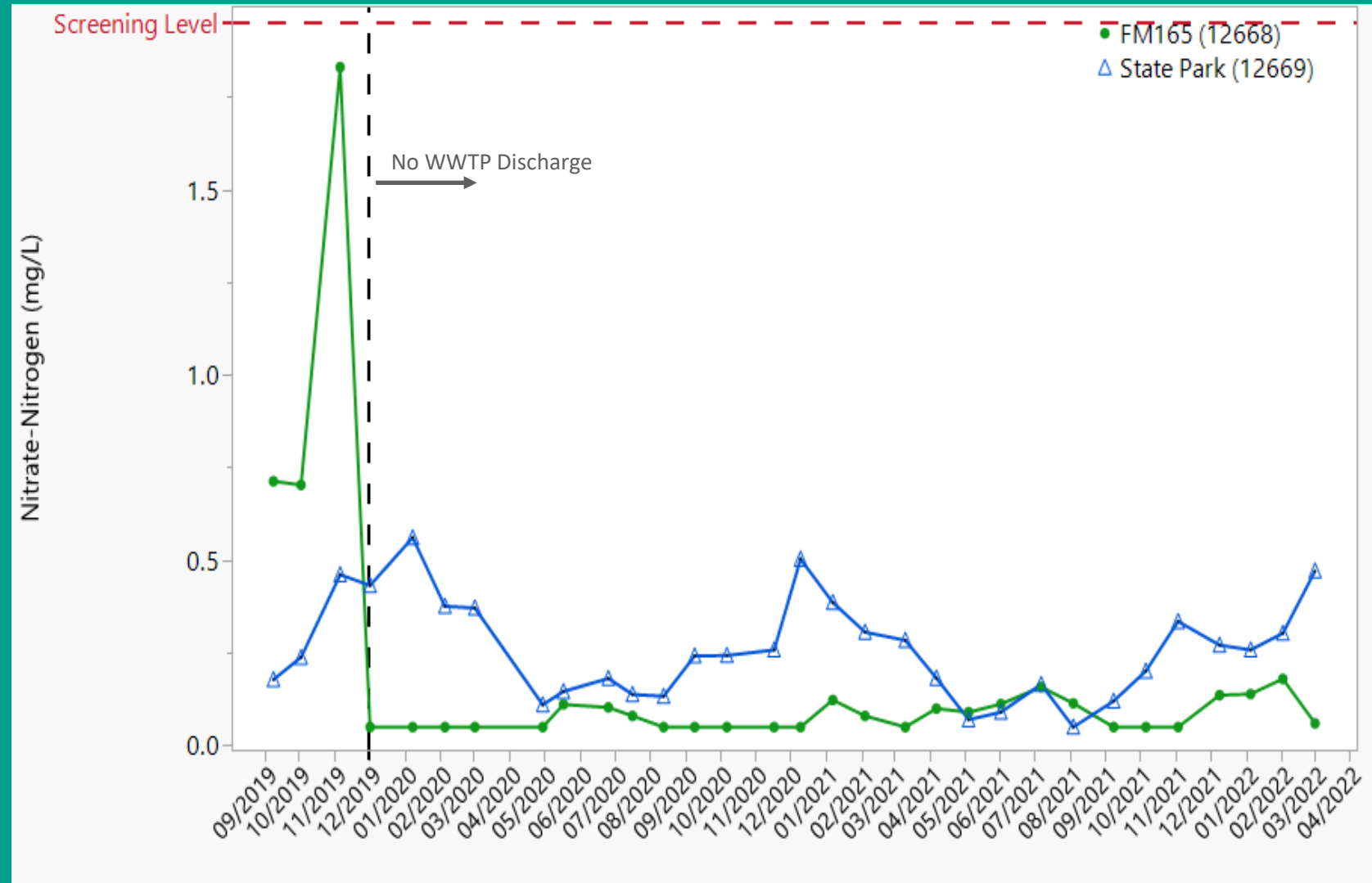
Upper Blanco River

Monthly Monitoring Results (Sep 2019 – Mar 2022)

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Nitrate – Nitrogen (mg/L)

- A measure of inorganic nitrogen
- Sharp decline initially and consistently lower concentrations at FM165 after WWTP discharge ceased
- Nitrate peaks winter/early spring each year at State Park site



Upper Blanco River

(@FM165)



Jan 8, 2020



Mar 2, 2022



Jul 7, 2021

Upper Blanco River

Quarterly Monitoring

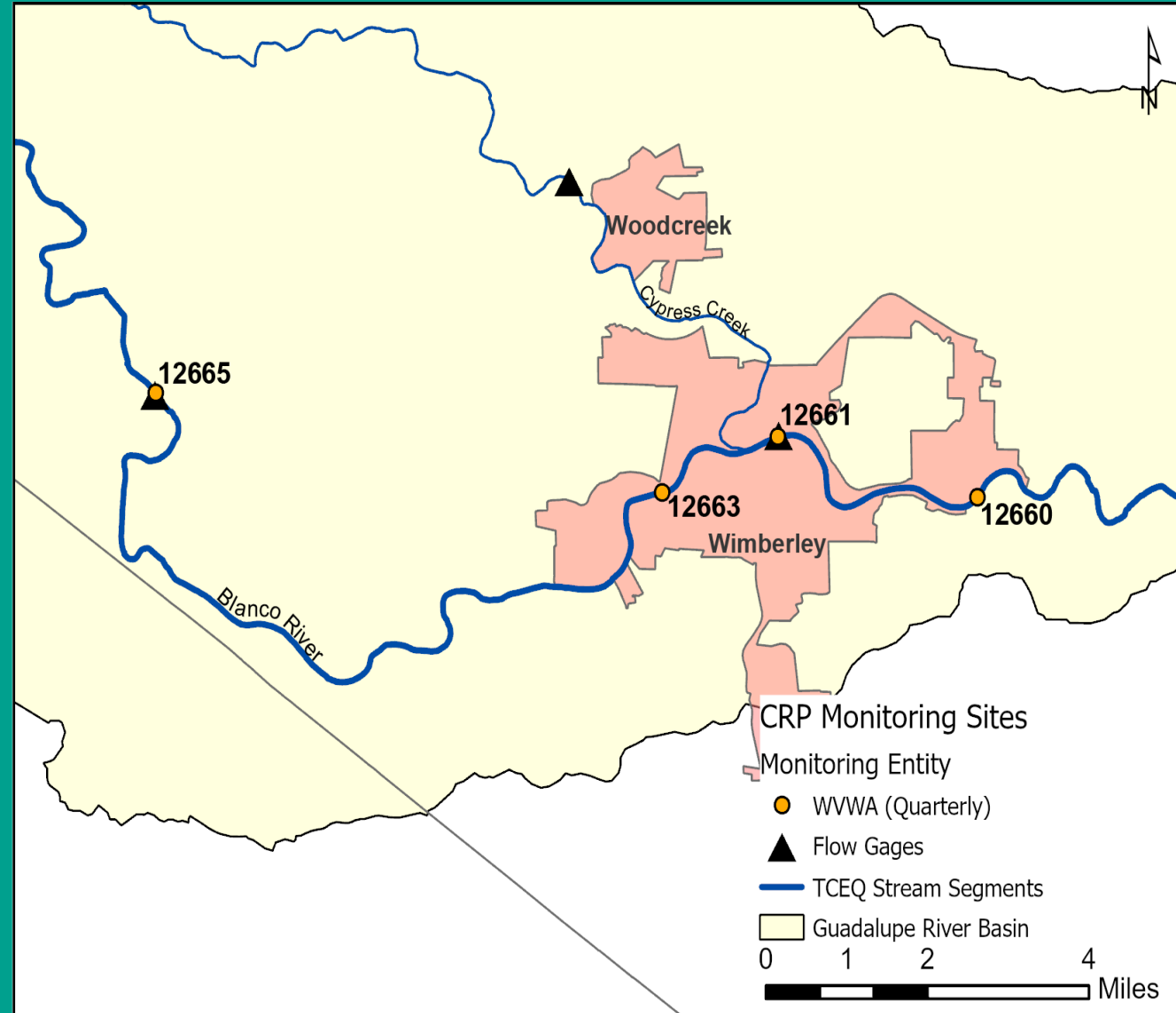
Purpose: To collect water quality data for assessment in the Texas Integrated Report.

Four sites:

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

Parameters:

Field
Flow
Conventional
Bacteria

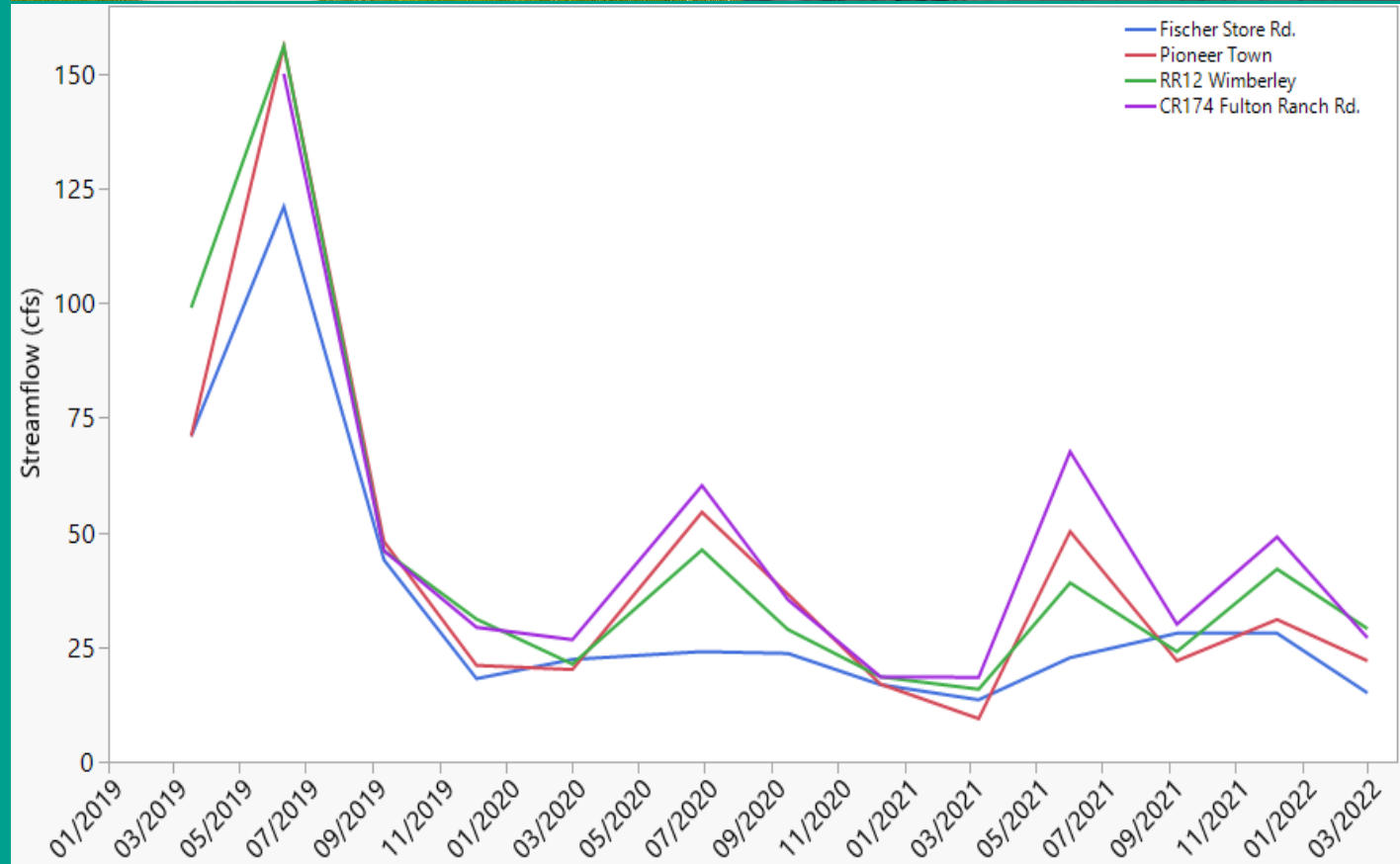


Upper Blanco River

Quarterly Monitoring Results
(Mar 2019 – Mar 2022)

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



Upper Blanco River

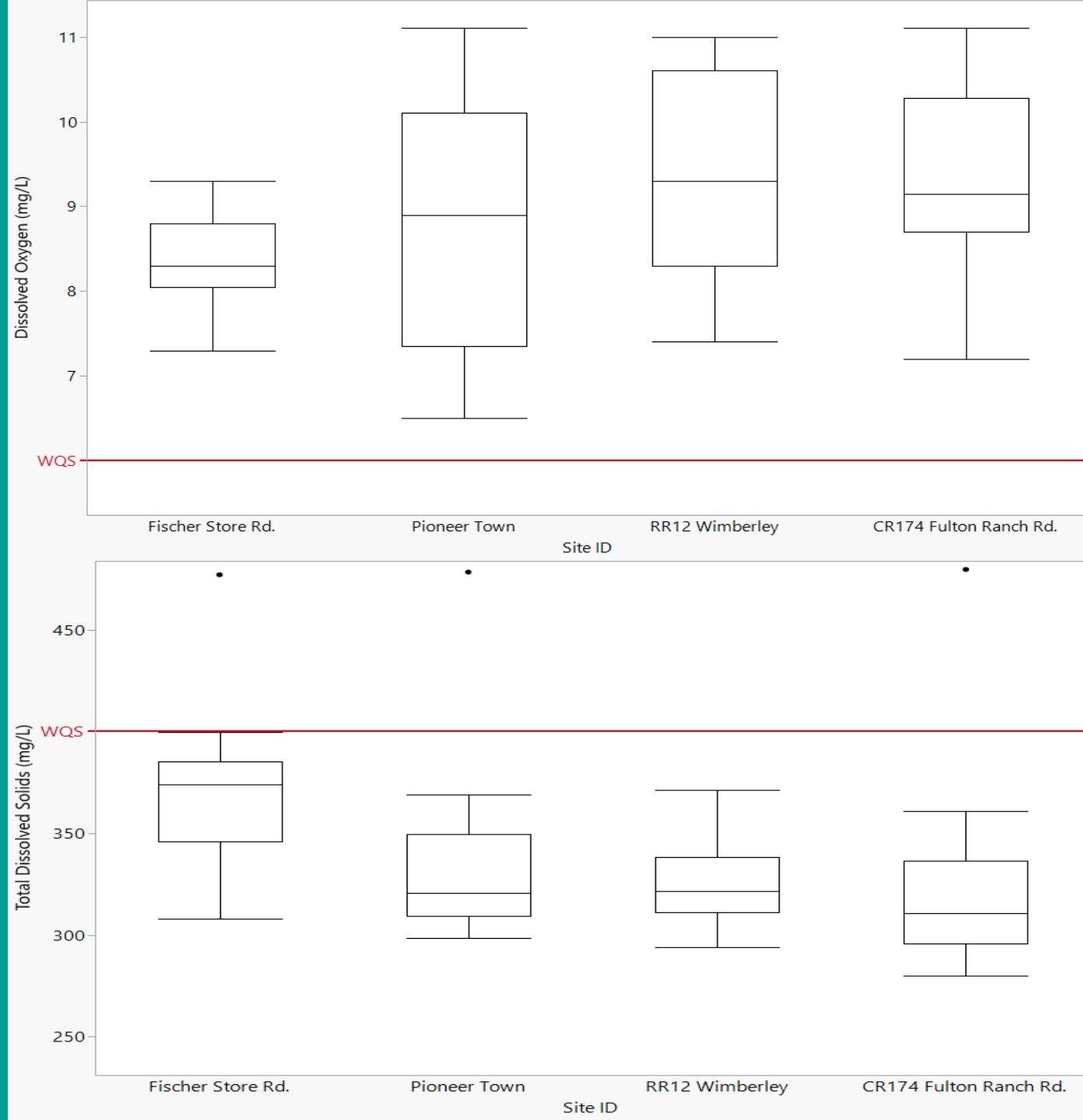
Quarterly Monitoring Results
(Mar 2019 – Mar 2022, n=13)

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



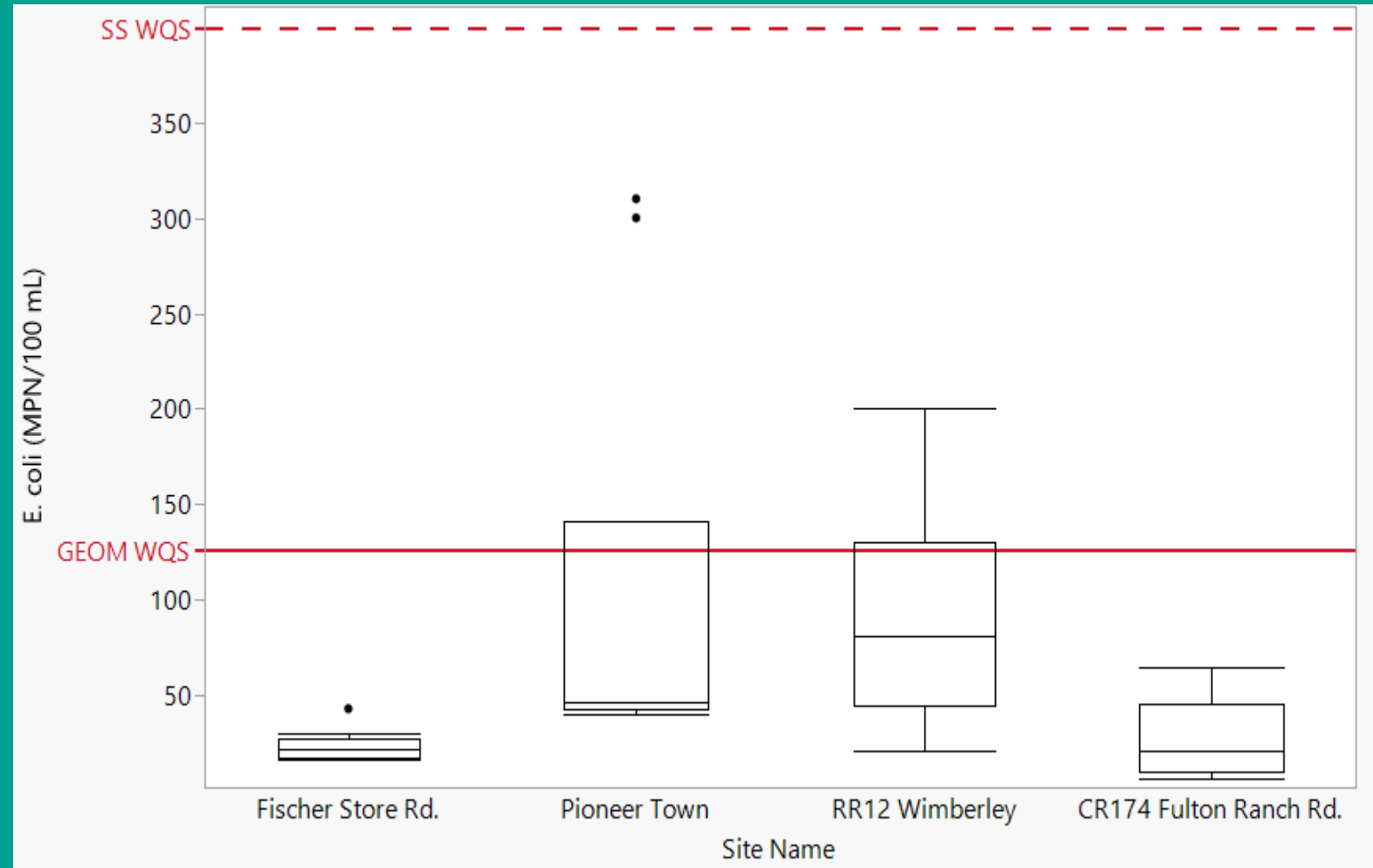
Upper Blanco River

Quarterly Monitoring Results (Mar 2019 – Mar 2022)

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 measured in more urbanized areas

Station Name	Number of Samples	Geometric Mean (MPN/100 mL)
Fischer Store Rd.	13	22.1
Pioneer Town	13	72.2
RR12	13	74.4
CR174	12	21.0

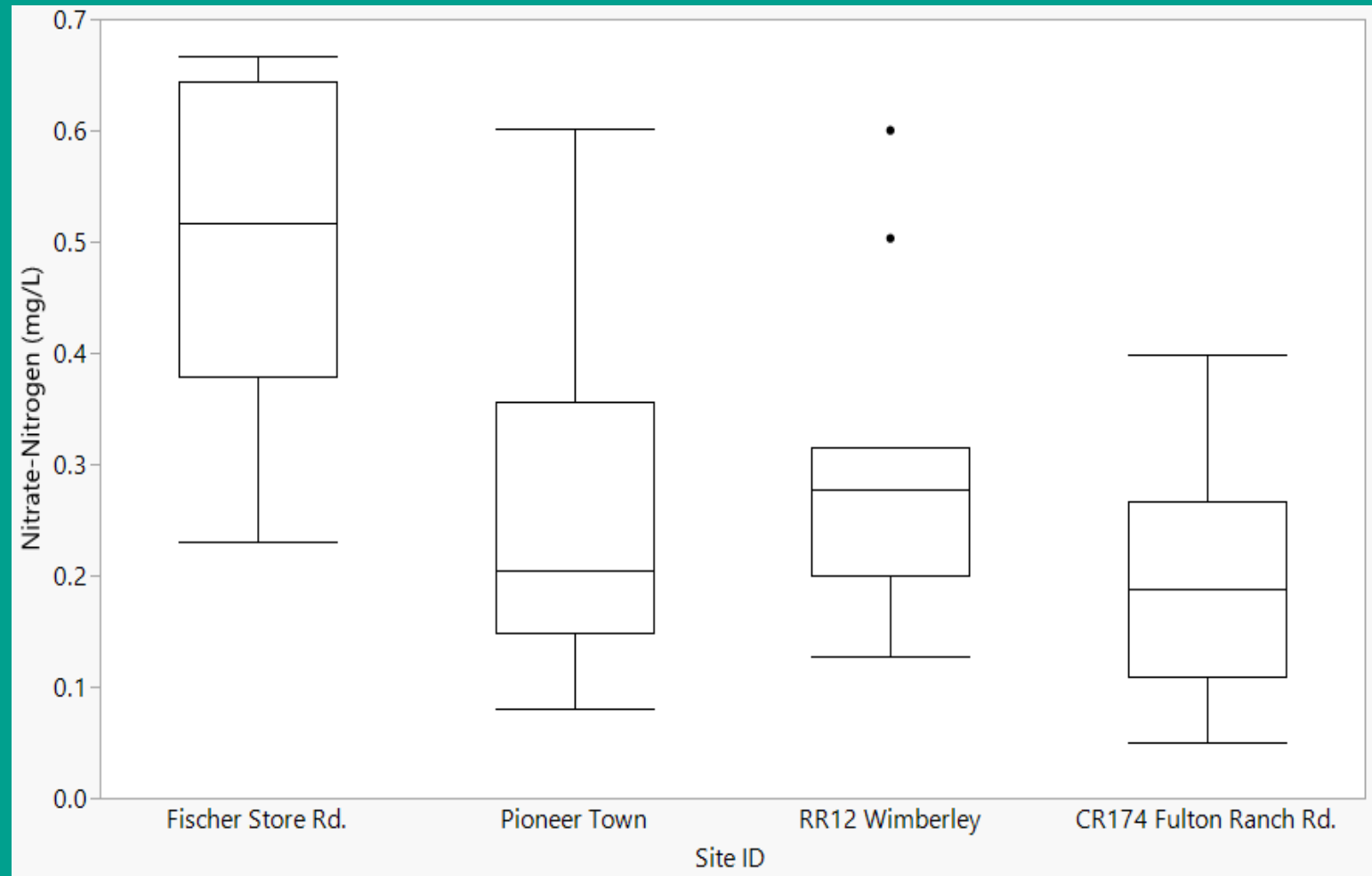


Upper Blanco River

Quarterly Monitoring Results
(Mar 2019 – Mar 2022, n=13)

Nutrients

- Nitrate-Nitrogen (mg/L)
 - All values below screening level (1.95 mg/L)
- All phosphorus measurements below laboratory detection limit (<0.02 mg/L) at all stations
- Most (99%) ammonia measurements below laboratory detection limit (<0.01 mg/L)



Cypress Creek

Quarterly Monitoring

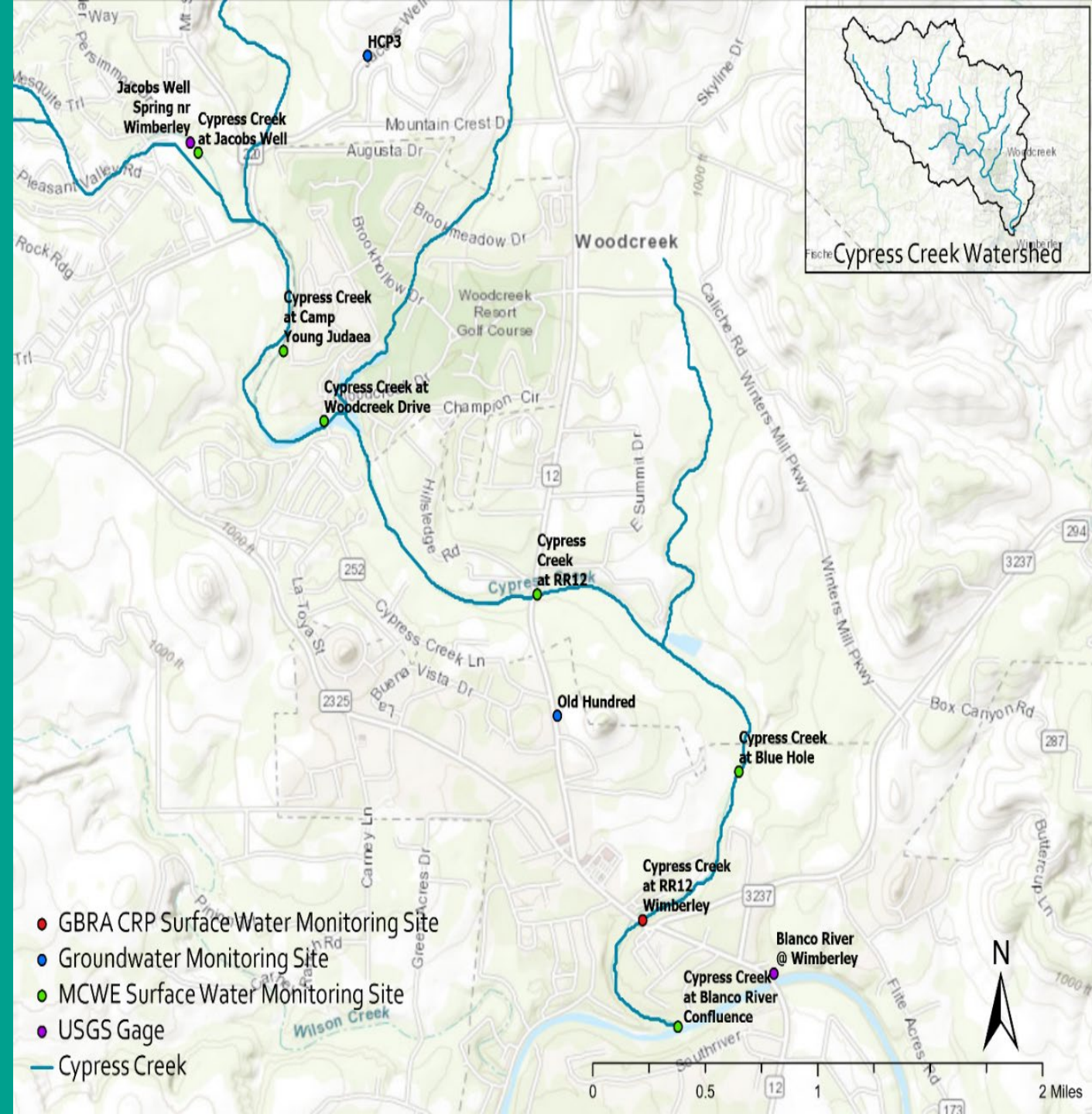
Purpose: To collect water quality data in support of the WPP.

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:

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

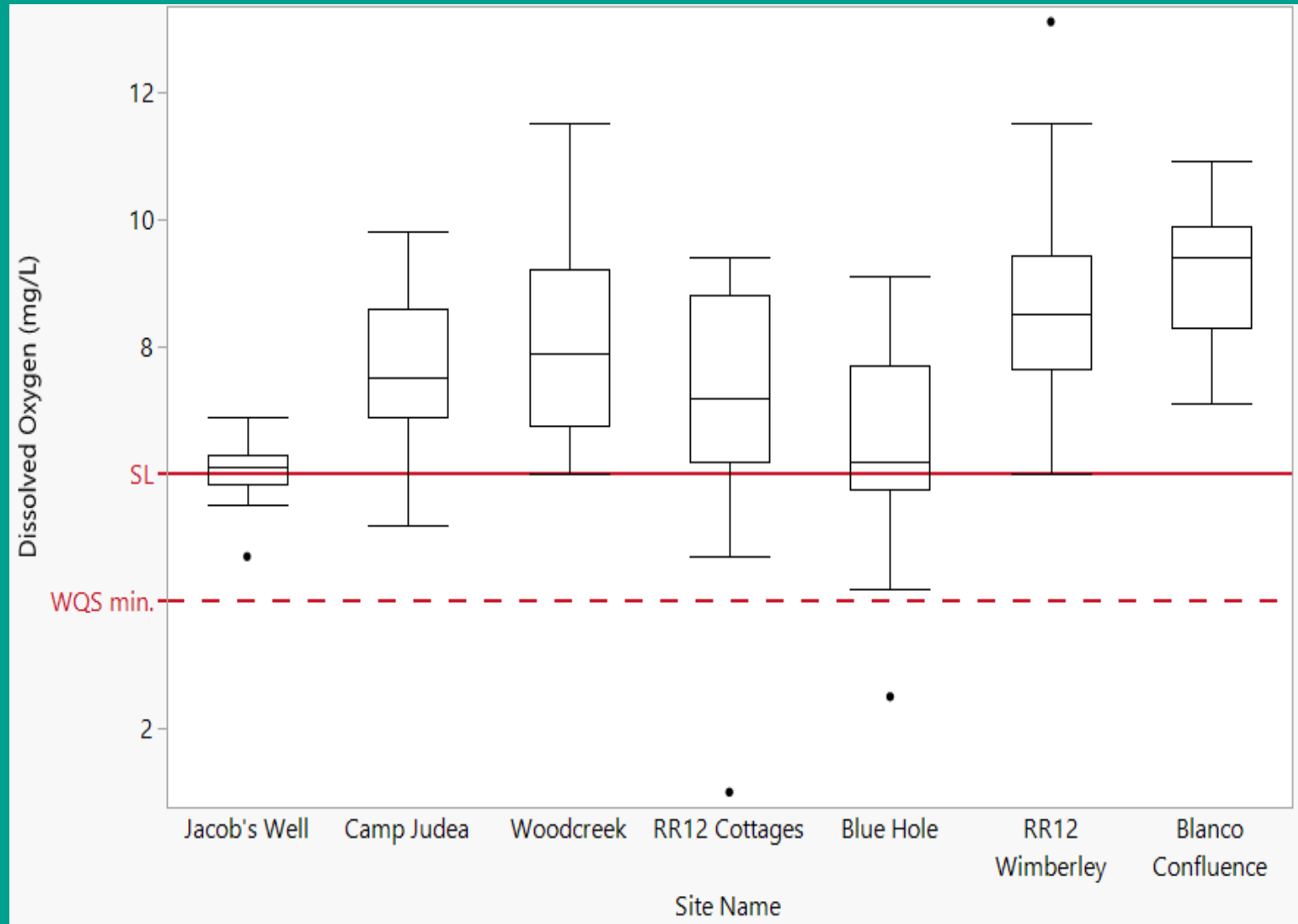


Cypress Creek

Quarterly Monitoring Results (Sep. 2016 – Mar 2022)

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 in August 2018 below WQS min.
 - RR12 Cottages
 - Blue Hole



Cypress Creek

24HR Sonde Deployments

Cypress Creek at Blanco Confluence (12673)

- Jun 2016-Apr 2022
- n=7
- One sample below WQS for both criteria

Cypress Creek at Blue Hole (12675)

- Jun 2016-Mar 2022
- n=10
- Five samples below WQS for average dissolved oxygen
- Two samples below WQS for minimum dissolved oxygen

*Period of record for 2024 IR will be Dec 2015 – Nov 2022.



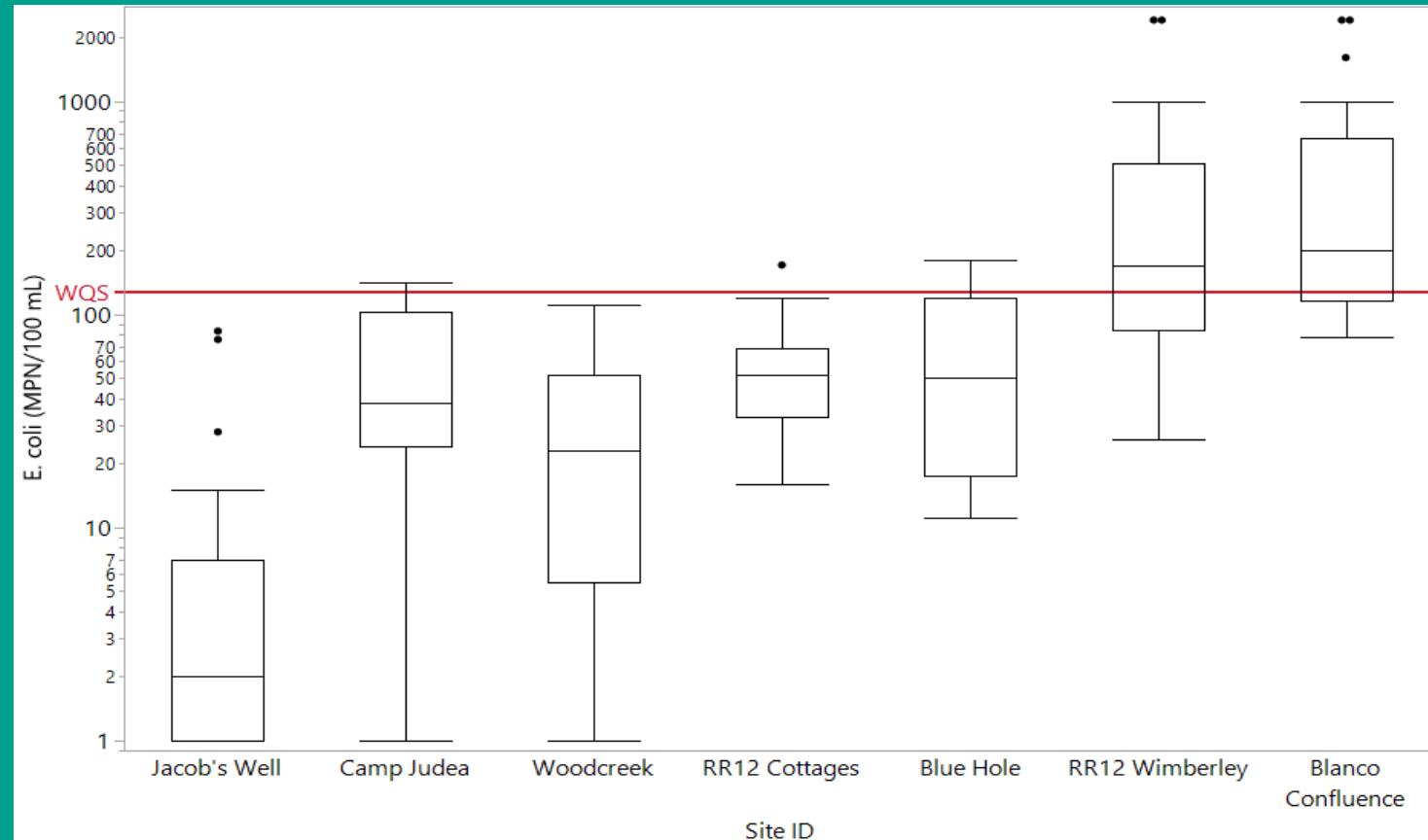
Cypress Creek

Quarterly Monitoring Results (Sep. 2016 - Mar 2022)

- E. coli (MPN/100 mL)
 - WQS is 126 MPN/100 mL
- Geometric mean for all sites combined is 49.2 MPN/100 mL
- Geometric mean above WQS at two sites
 - RR12 Wimberley
 - Blanco River Confluence

*Period of record for monitoring data at GBRA site is Aug 2016 – May 2021.

Station Name	No. Samples	Geometric Mean (MPN/100 mL)
Jacob's Well	21	3.3
Camp Judea	13	34.4
Woodcreek Dr.	13	17.7
RR12 Cottages	21	48.6
Blue Hole	21	45.7
*RR12 Wimberley	28	203.7
Blanco Confluence	21	285.7



Cypress Creek

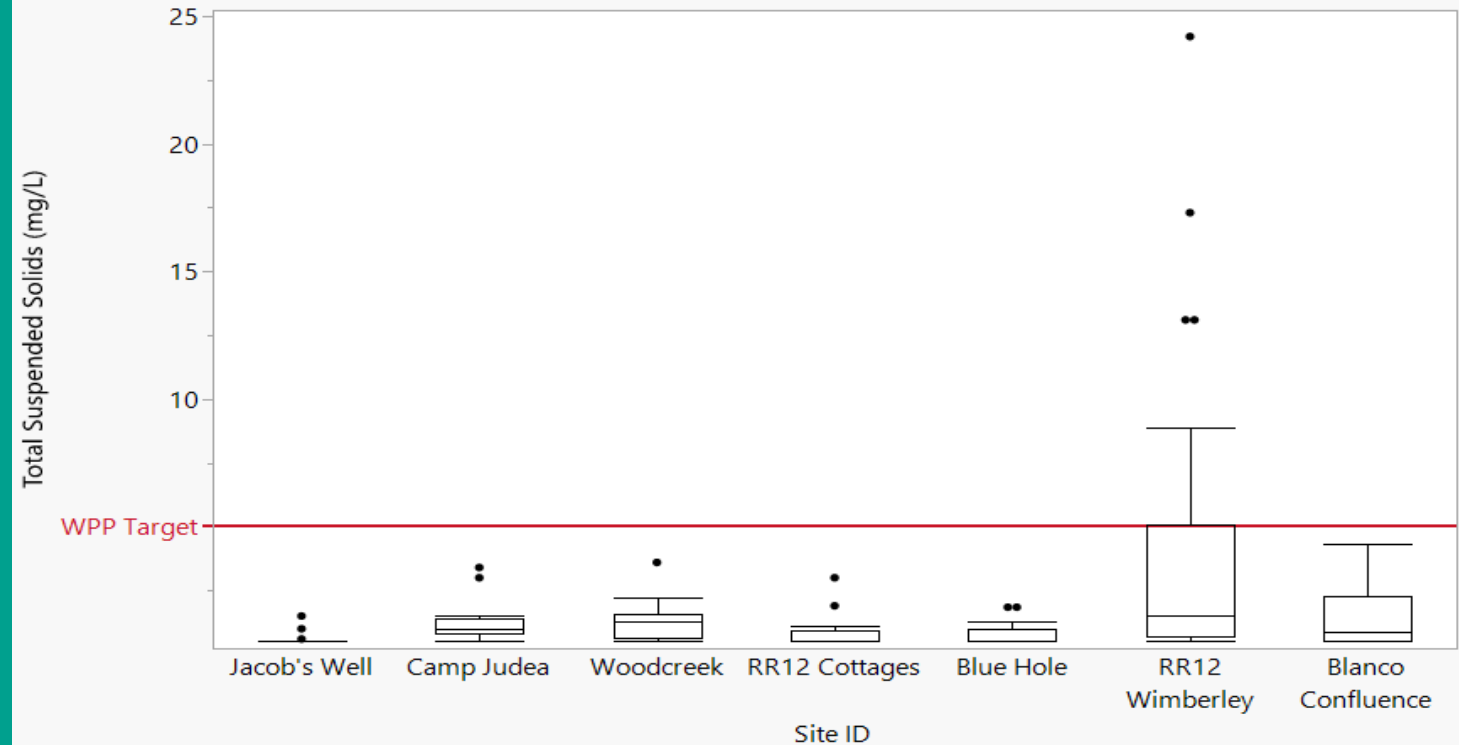
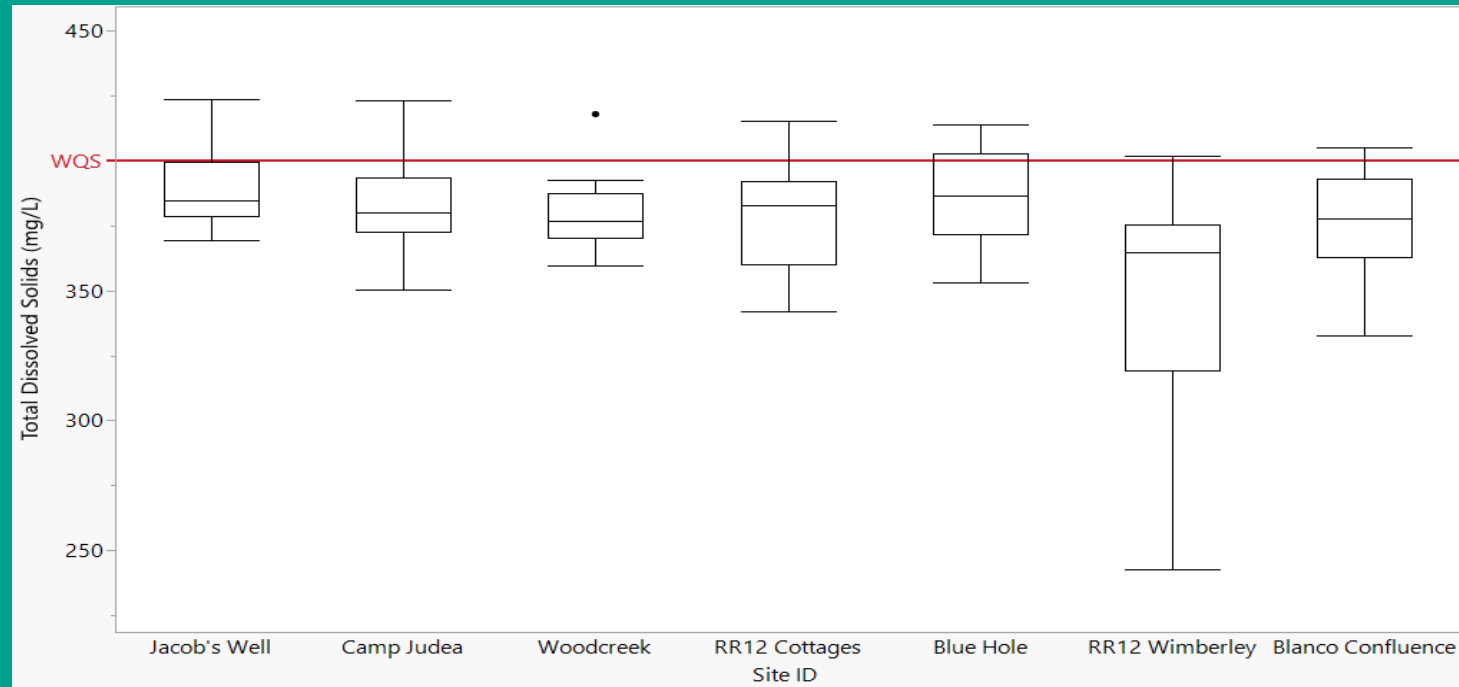
Quarterly Monitoring Results (Sep. 2016-Mar 2022)

Total Dissolved Solids (TDS)

- Calculated from Specific Conductance
- WQS is 400 mg/L
- WQS exceeded at all sites

Total Suspended Solids (TSS)

- WPP Target is 5.0 mg/L
- Values above WPP Target at RR12 Wimberley



Conclusions

Upper Blanco River – Monthly Monitoring

- *E. coli* bacteria below WQS
- *E. coli* bacteria correlated with streamflow
- Evidence of organic nitrogen cycling
- Phosphorus and inorganic nitrogen declined after WWTP discharge ceased but spikes annually in winter/early spring

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
- 303d List impairments
 - Dissolved Oxygen (2020, not assessed in 2022 because data not temporally representative)
 - Fish and Macrobenthic Communities (2020 and 2022)

Contact

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