

# Water Quality in the Lower Rio Grande

Annual Water Quality Update and Basin Advisory  
Meeting

Lisa Torres, USBWC Texas Clean Rivers Program

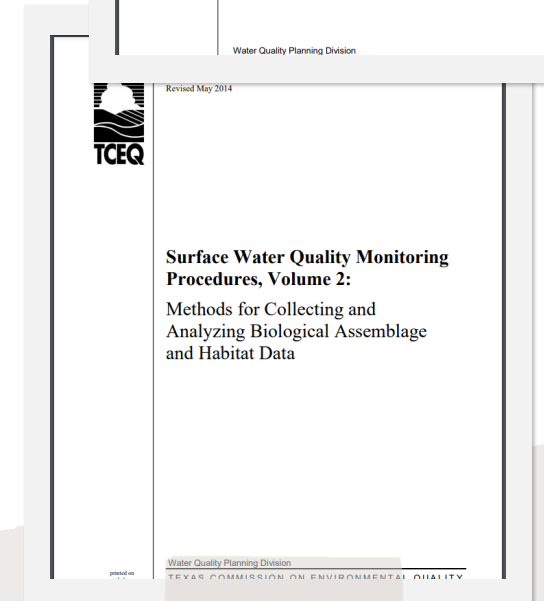
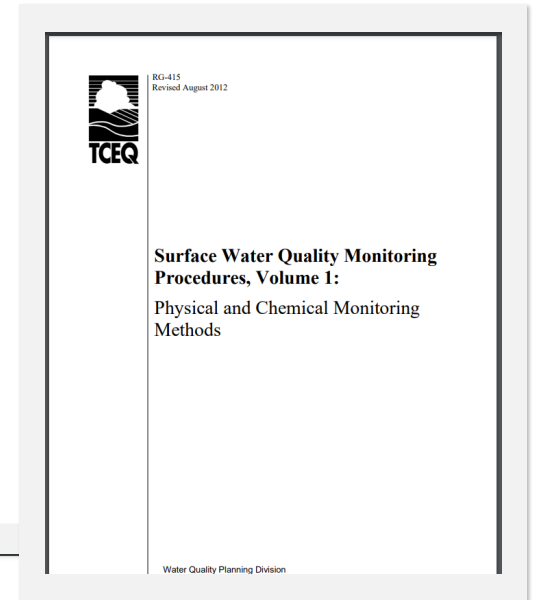
March 15, 2023



THE TEXAS  
**C**LEAN  
**R**IVERS  
PROGRAM

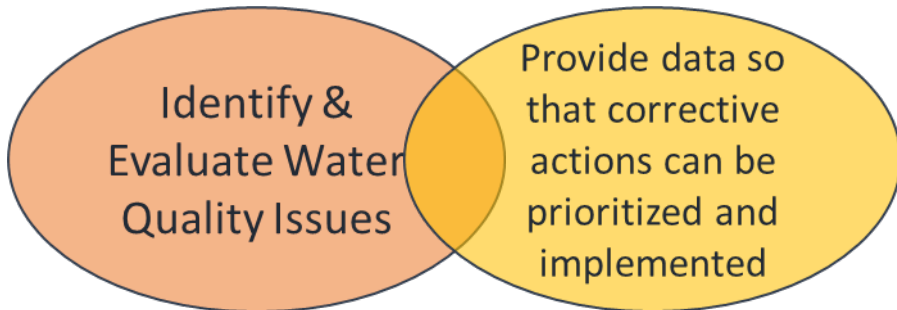
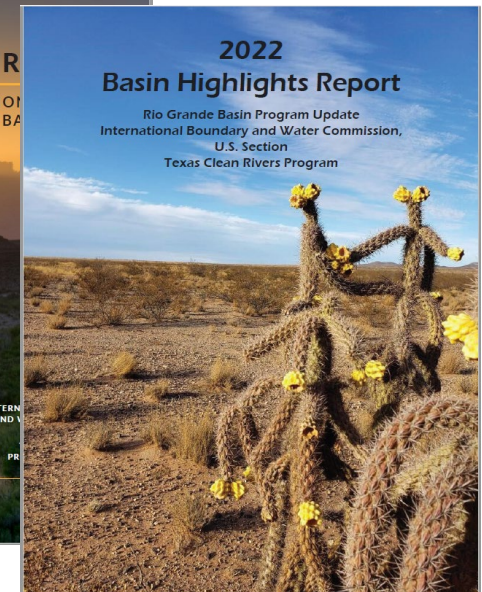
# IBWC Texas Clan Rivers Program

- State fee-funded program created in 1991
- IBWC integrated water quality program with TCEQ in 1998
- USIBWC collects ambient water quality for entire reach of the international portion of the Rio Grande
  - Samples are collected monthly or quarterly by IBWC, TCEQ Regional Offices, and volunteer groups
  - Samples and analysis were standardized to ensure data quality.



# What does CRP do?

- Monitoring sites on the Rio Grande
  - USIBWC – 74 sites
  - TCEQ – 36 sites
  - Duplicate – 9 sites
  - Total sites - 94
- Water Quality Monitoring
  - Routine Monitoring
  - Special Studies
- Water Quality Assessment and Reports
  - Annual Basin Highlights Report
  - Basin Summary Report (5- year report)
  - Watershed Characterizations

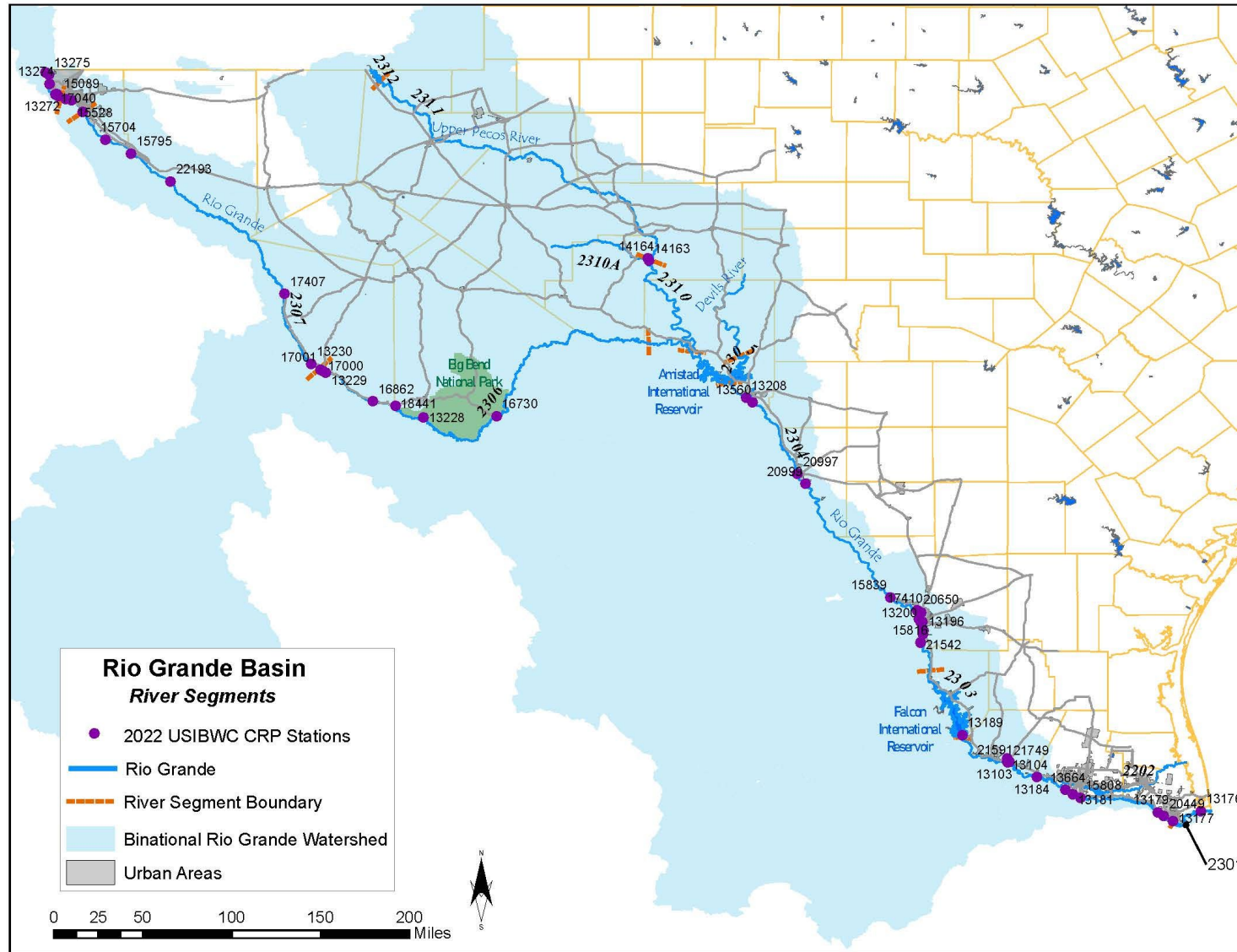


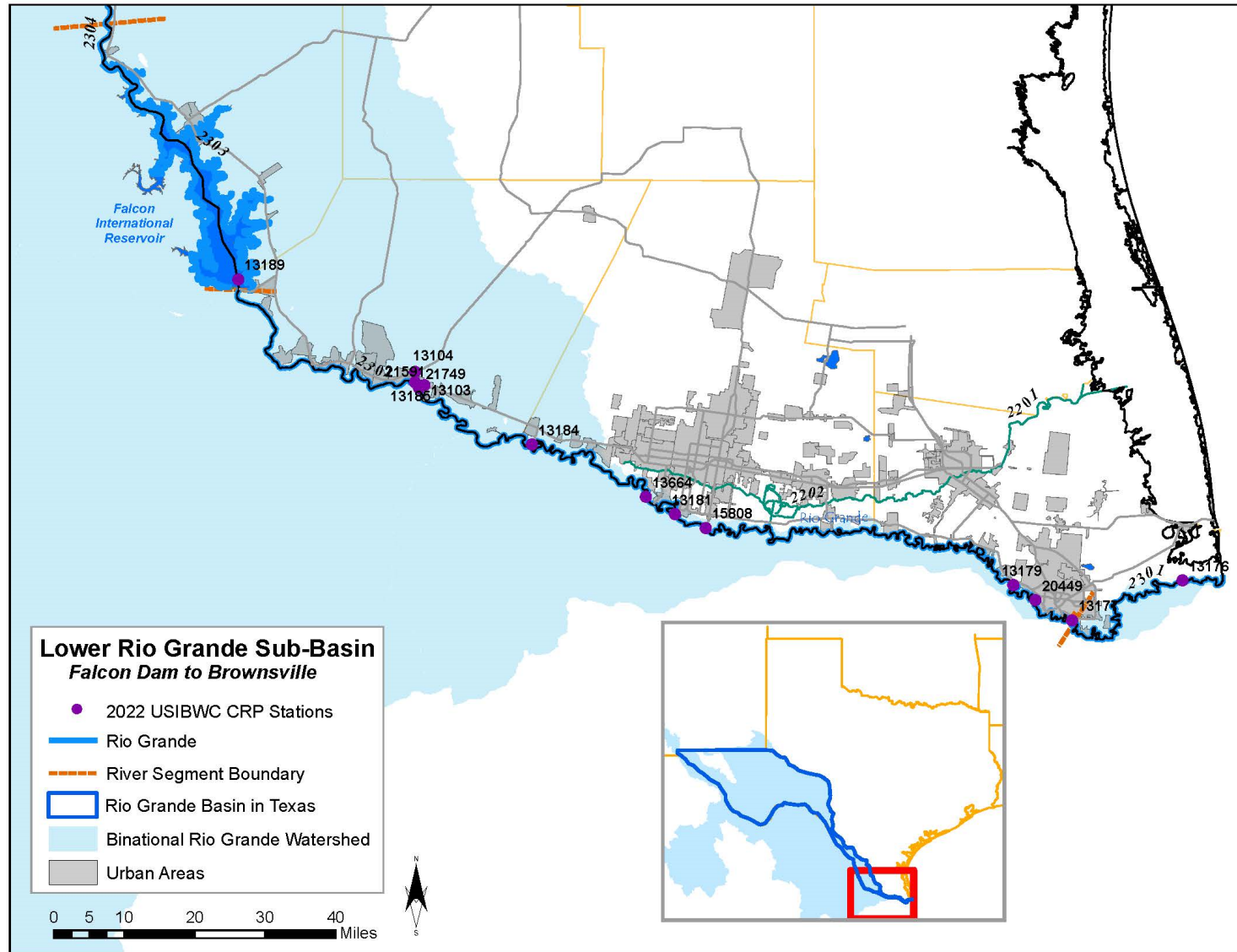


## Other CRP Activities

- Public Participation,
- Outreach
- Environmental Education







# Local Partnerships- Lower Rio Grande

Help monitor and collect water samples, and analyze water samples:

USIBWC Mercedes field office

USIBWC Falcon Dam field office

UTRGV- Edinburg

Brownsville PUB

USGS

TCEQ Harlingen

TCEQ Continuous WQ Monitoring

# Data Collected

- Routine parameters
  - Field data (pH, DO, EC, Temp)
  - Conventional (nutrients, salts, BOD, TDS)
  - Bacteria
- Non-routine
  - organics in sediment
  - metals in water and sediment

**DHL Analytical, Inc.** Date: 29-Apr-22

Client Sample ID: 20997  
 Project: USIBWC Clean Rivers Program Lab ID: 2204100-01  
 Project No: Alternat ID: Rio Grande at Main Street Boat  
 Lab Order: 2204100 Collection Date: 04/11/22 10:40 AM  
 Matrix: AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
<b>TOTAL RECOVERABLE METALS - ICP-MS</b>							
Calcium	76.3	1.00	3.00		mg/L	10	04/21/22 11:05 AM
Magnesium	19.2	0.100	0.300		mg/L	1	04/21/22 10:45 AM
Potassium	4.10	0.100	0.300		mg/L	1	04/21/22 10:45 AM
Sodium	86.2	1.00	3.00		mg/L	10	04/21/22 11:05 AM
<b>HARDNESS</b>							
Hardness, Total	270	M2340 B	2.00		mg/L CaCO3	1	04/21/22
<b>BOD</b>							
Biochemical Oxygen Demand	1.00	M5210 B	1.00		mg/L	1	04/13/22 07:45 AM
<b>E. COLI IN WATER</b>							
E. coli	18.1	M9223B	1.0	1.0	MPN/100ml	1	04/12/22 04:18 PM
E. coli Hold Time	29.6		0	0	Hours	1	04/12/22 04:18 PM
<b>ANIONS BY IC METHOD - WATER</b>							
Chloride	97.6	E300	3.00	10.0	mg/L	10	04/12/22 04:18 PM
Fluoride	0.766		0.100	0.400	mg/L	1	04/12/22 05:26 PM
Sulfate	176		10.0	30.0	mg/L	10	04/12/22 04:18 PM
Nitrogen, Nitrate-Nitrite	0.252		0.0500	0.0500	mg/L	1	04/12/22 05:26 PM
<b>ALKALINITY</b>							
Alkalinity, Total (As CaCO3)	135	M2320 B	20.0	20.0	mg/L @ pH 4.51	1	04/12/22 06:14 PM
<b>AMMONIA AQUEOUS</b>							
Ammonia-N (As N)	<0.100	M4500-NH3-D	0.100	0.100	mg/L	1	04/19/22 01:00 PM
<b>CHLOROPHYLL</b>							
Chlorophyll	<2.66	E446.0	2.66	2.66	µg/L	1	04/26/22 11:15 AM
<b>DISSOLVED SILICA</b>							
Silica	13.4	HACH 8185	1.00	1.00	mg/L	1	04/13/22 04:23 PM
<b>TOTAL DISSOLVED SOLIDS</b>							
Total Dissolved Solids (Residue, Filterable)	570	M2540C	10.0	10.0	mg/L	1	04/12/22 05:15 PM
<b>TOTAL ORGANIC CARBON</b>							
Total Organic Carbon	3.09	MS310C	0.300	1.00	mg/L	1	04/20/22 08:24 PM
<b>TOTAL PHOSPHORUS</b>							
Total Phosphorus (As P)	0.0810	M4500-P E	0.0500	0.0500	mg/L	1	04/20/22 02:08 PM

Qualifiers: \* Value exceeds TCLP Maximum Concentration Level  
 DF Dilution Factor  
 J Analyte detected between MDL and RL  
 ND Not Detected at the Method Detection Limit  
 S Spike Recovery outside control limits  
 C Sample Result or QC discussed in the Case Narrative  
 E TPH pattern not Gas or Diesel Range Pattern  
 MDL Method Detection Limit  
 RL Reporting Limit  
 N Parameter not NELAP certified

UNITED STATES INTERNATIONAL BOUNDARY AND WATER COMMISSION  
 TEXAS CLEAN RIVERS PROGRAM  
 RIO GRANDE BASIN

FIELD DATA REPORTING FORM

B TAG# SET# Albert Covos COLLECTOR(printed)

1 7 4 0 7 2 3 0 7 I B I B R T  
 TCEQ STATION ID SEGMENT SEQUENCE SC1 SC2 PC

Station Description: Rio Grande Upstream of Candelaria 0.5 km upstream of Capote Creek Confluence

GRAB SAMPLE  
 DATE: 04/11/22 10:40 AM TIME: 10:40 AM SAMPLE DEPTH: 0.13 M

00010	NA	WATER TEMP (deg C only)	89835	1	FLOW MEASUREMENT METHOD 1-Gage 2-Electric 3-Mechanical 4-Weir/flume 5-Doppler
00020	8	AIR TEMP (deg C only)	74059	NA	ESTIMATED FLOW (cfs)
00400	NA	pH (SU)	89861	2.1	STREAM WIDTH (meters)
00300	NA	D.O. (mg/L)	82903	0.386	WATER DEPTH (meters)
00094	NA	SPECIFIC CONDUCTANCE (µS/cm)	31616	NA	FECAL COLIFORM (CFU/100 ml)
00078	0.17	SECCHI DISK (meters)	31699	NA	E. coli (MPN/100 ml)
72653	> 7	DAYS SINCE LAST SIGNIFICANT PRECIPITATION	89996	2	WEATHER 1-clear 2-cloudy 3-overcast 4-rain
01351	3	FLOW SEVERITY 1-no flow 2-low 3-normal 4-flood 5-high 6-dry	82978	NA	Turbidity (NTU)
			89965	3	WIND INTENSITY 1-calm 2-light 3-moderate 4-strong
00061	106.64	INSTANTANEOUS FLOW (cfs)	89010	1	WIND DIRECTION 1-north 2-south 3-east 4-west 5-NE 6-SE 7-NW 8-SW
89864		MAXIMUM POOL WIDTH AT TIME OF SAMPLING (meters) *Drought Only*	89969		POOL LENGTH (meters) *Drought Only*
89866		MAXIMUM POOL DEPTH AT TIME OF SAMPLING (meters) *Drought Only*	89970		% POOL COVERAGE IN 500 METER REACH *Drought Only*

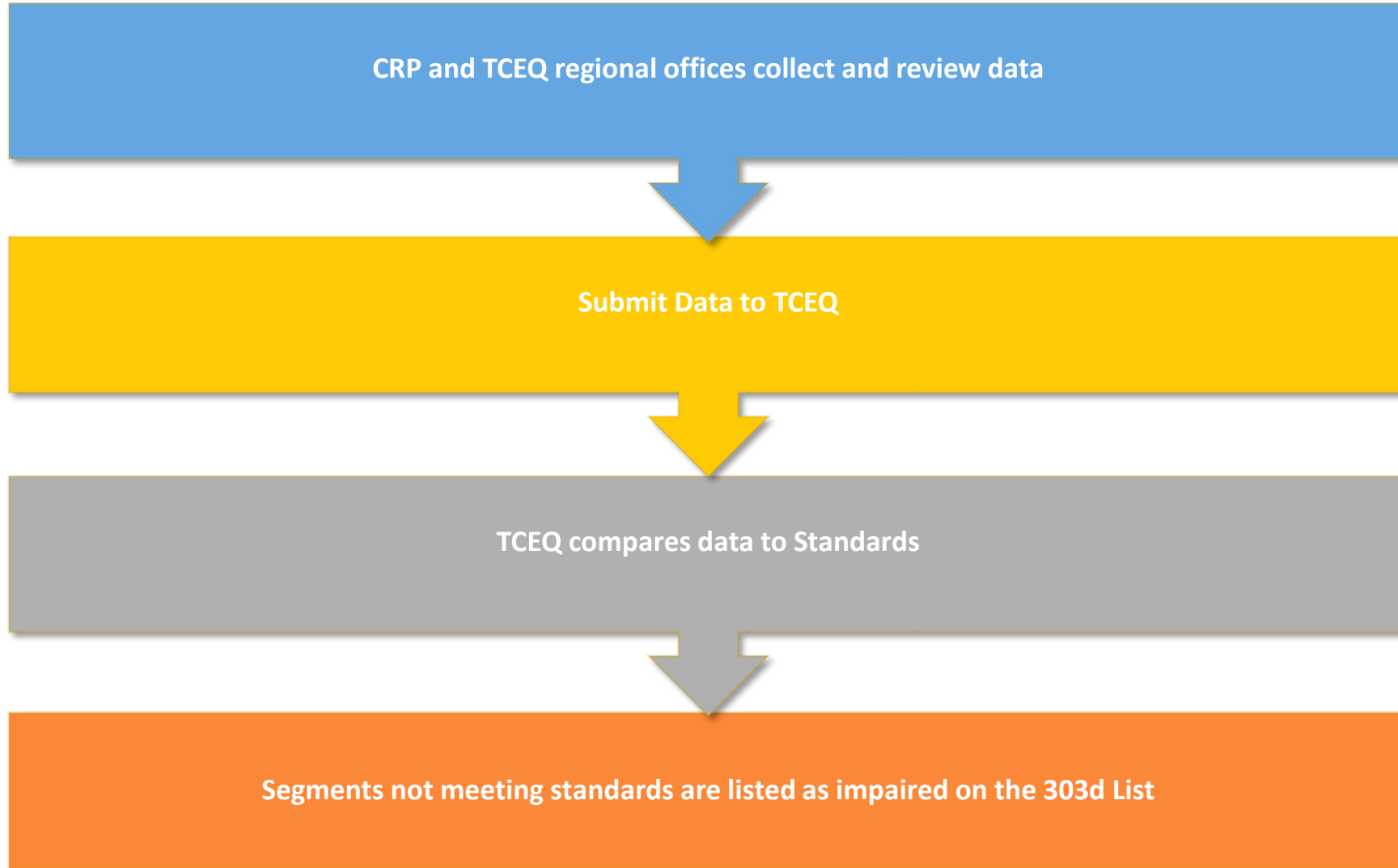
\*Drought conditions occur when flowing water is absent and only pools remain - See guidance document for more information

Measurement Comments and Field Observations:  
 With wind

Signature of Collector: Albert Covos  
 Rev. 02/19/2019



# What happens to the data?



# Texas Surface Water Quality Standard – Lower Rio Grande


- PCR – Primary Contact Recreation
- E – Excellent
- H – High
- PS – Public Supply

Rio Grande Basin Designated Uses and Numeric Criteria

Segment No.	Rio Grande Basin Segment Names	Recreation Use	Aquatic Life Use	Domestic Water Supply Use	Other Uses	Cl <sup>-1</sup> (mg/L)	SO <sub>4</sub> <sup>-2</sup> (mg/L)	TDS (mg/L)	Dissolved Oxygen (mg/L)	pH Range (SU)	Indicator Bacteria <sup>1</sup> #/100 mL	Temperature (degrees F)
2301	Rio Grande Tidal	PCR1	E						5.0	6.5-9.0	35	95
2302	Rio Grande Below Falcon Reservoir	PCR1	H	PS		270	350	880	5.0	6.5-9.0	126	90
2303	International Falcon Reservoir	PCR1	H	PS		200	300	1,000	5.0	6.5-9.0	126	93

# Integrated Report and 303d List

IMPAIRMENTS → does not meet water quality standards



CONCERNS → close to not meeting water quality standards, or have high values of parameters for which there are no standards

# Impairments and concerns

2022 Texas Integrated Report - Water Bodies with Concerns for Use Attainment and Screening Levels				
Segment ID	Segment Name	AU ID	Parameters	Level of Concern
2301	Rio Grande Tidal	2301_01	Bacteria in water (Recreation Use)	CN
		2301_02		CN
		2301_01	Chlorophyll-a in water	CS
		2301_02		CS
		2301_01	Depressed dissolved oxygen in water	CS
		2301_02	Nitrate in water	CS
2302	Rio Grande Below Falcon Reservoir	2302_07	Ammonia in water	CS
		2302_01	Chlorophyll-a in water	CS
		2302_02		CS
		2302_03		CS
		2302_04		CS
		2302_05		CS
		2302_06		CS
		2302_01	Depressed dissolved oxygen in water	CS
2302_06	pH	CN		
2302A	Arroyo Los Olmos	2302A_01	Chlorophyll-a in water	CS
		2302A_01	Depressed dissolved oxygen in water	CS
2303	International Falcon Reservoir	2303_05	Ambient toxicity in water	CS
		2303_04	Fish kill in water	CN

2302	Rio Grande Below Falcon Reservoir	2302_03	Bacteria in water (Recreation Use)	5c
2302A	Arroyo Los Olmos	2302A_01	Bacteria in water (Recreation Use)	5b
			Depressed dissolved oxygen in water	5c

Category 5 Impairments which may be suitable for development of a TMDL (303d List)

Category 5b: A review of the standards for the water body will be conducted before a management strategy is selected.

Category 5c: Additional data and information will be collected or evaluated before a management strategy is selected.

- NS - Non Support.
- CN - Concern for near-nonattainment of the TSWQS based on numeric criteria.
- CS - Concern for water quality based on screening levels.

Full 2022 Integrated report:

[https://www.tceq.texas.gov/waterquality/assessment/305\\_303.html](https://www.tceq.texas.gov/waterquality/assessment/305_303.html)

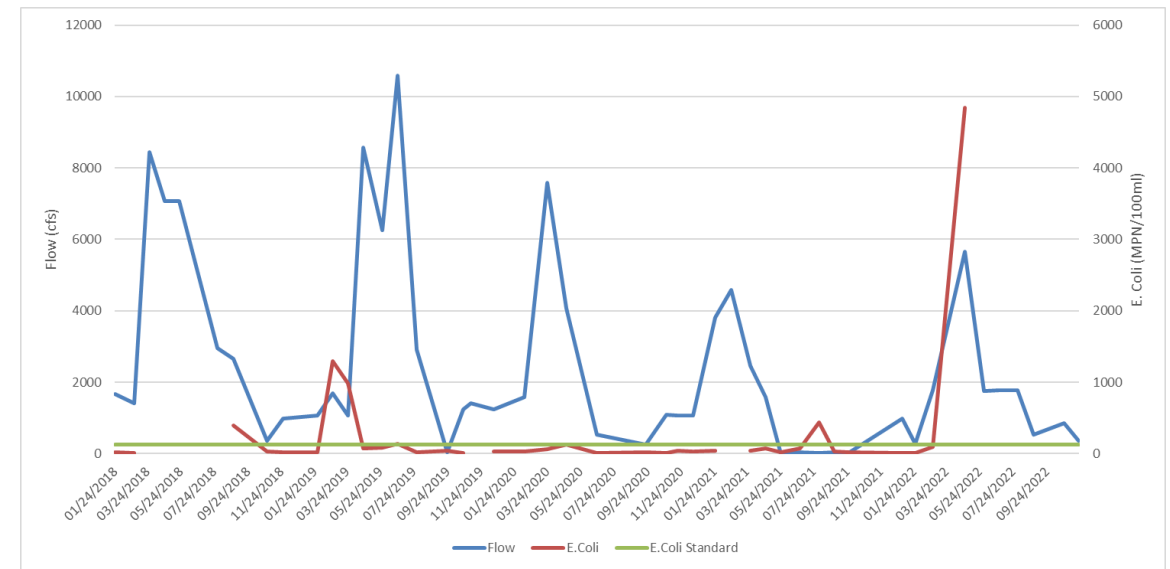
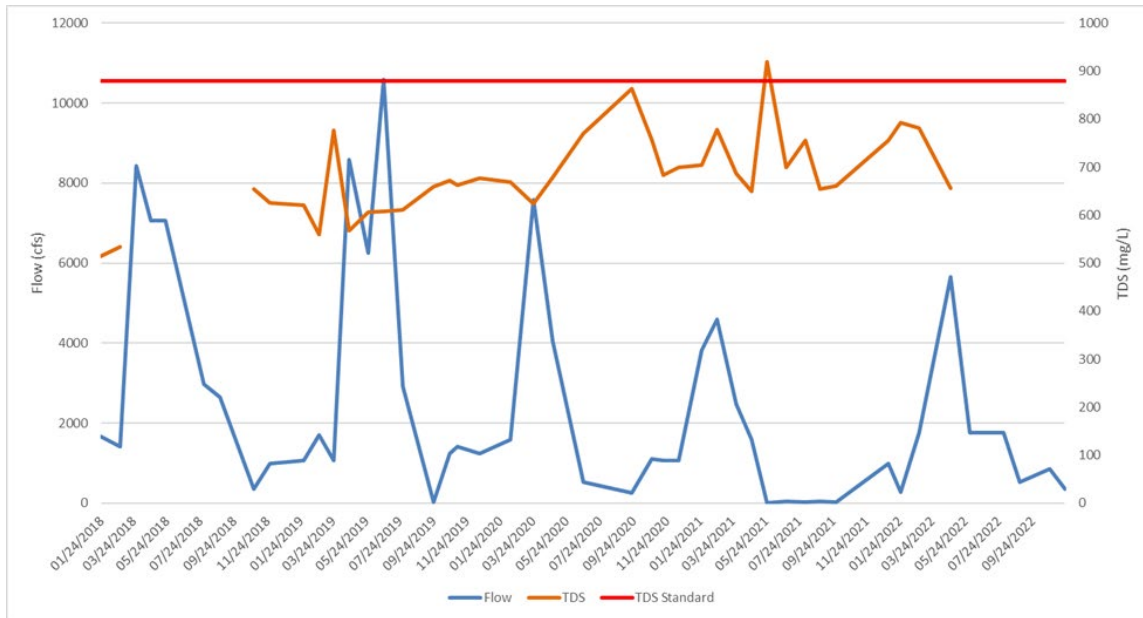
# Bacteria Issues in the lower Rio Grande

- Decreasing bacteria in the Valley
  - Decreasing in Brownsville since 2008
  - Most likely due to wastewater treatment plant going online in 2008 in Matamoros.
  - Bacteria issues in this section of the river are improving
- Other areas show increasing levels of bacteria
  - Rio Grande City
  - Hidalgo
  - McAllen

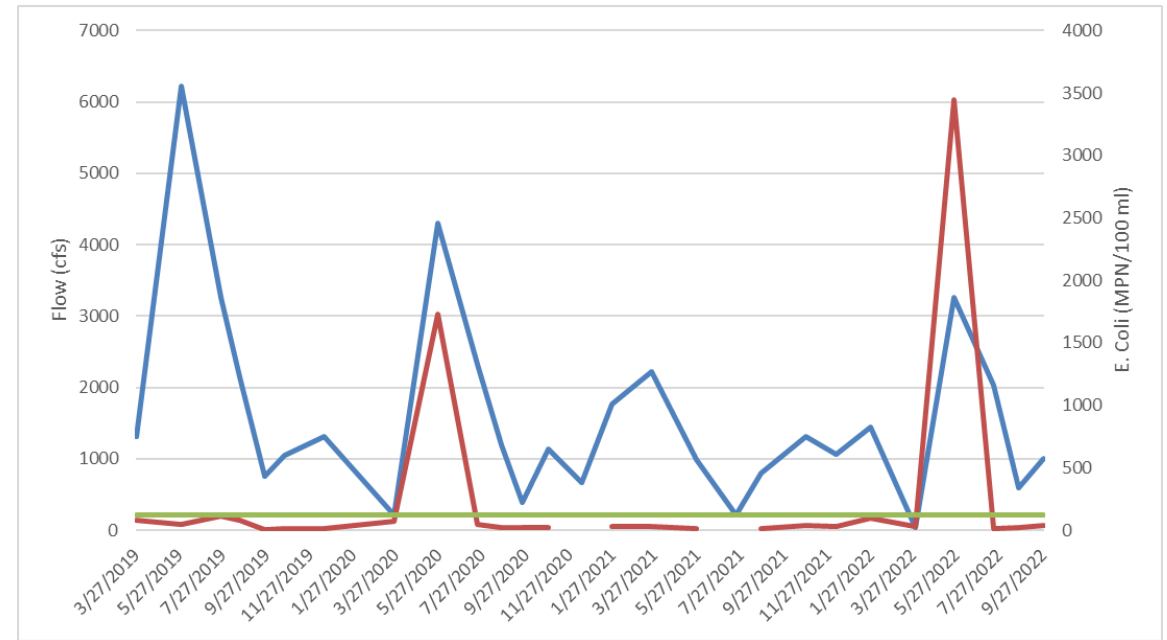
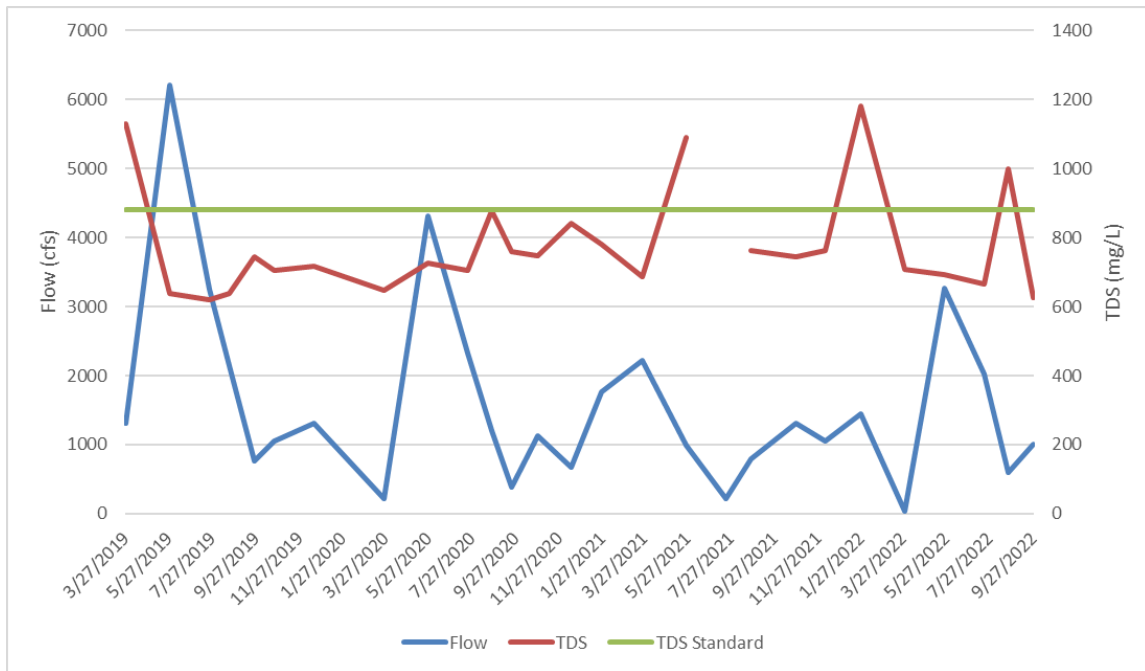
# Texas Clean Rivers Program Bacteria Impaired River Sections



# Upstream of Rio Grande City Rio Grande River at Fort Ringgold, near Rio Grande City – Station 13185

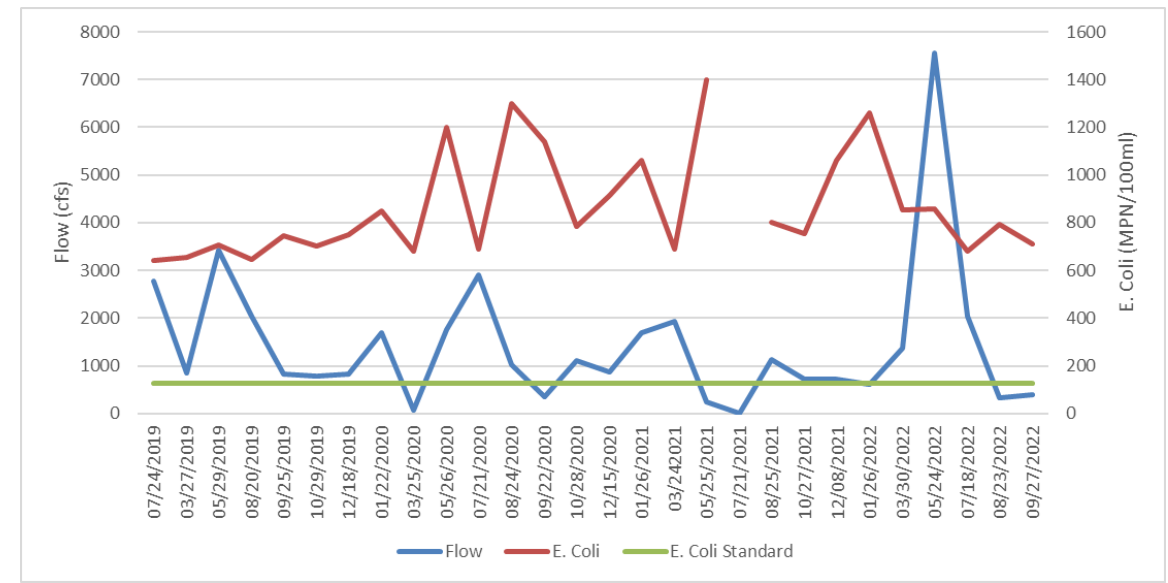
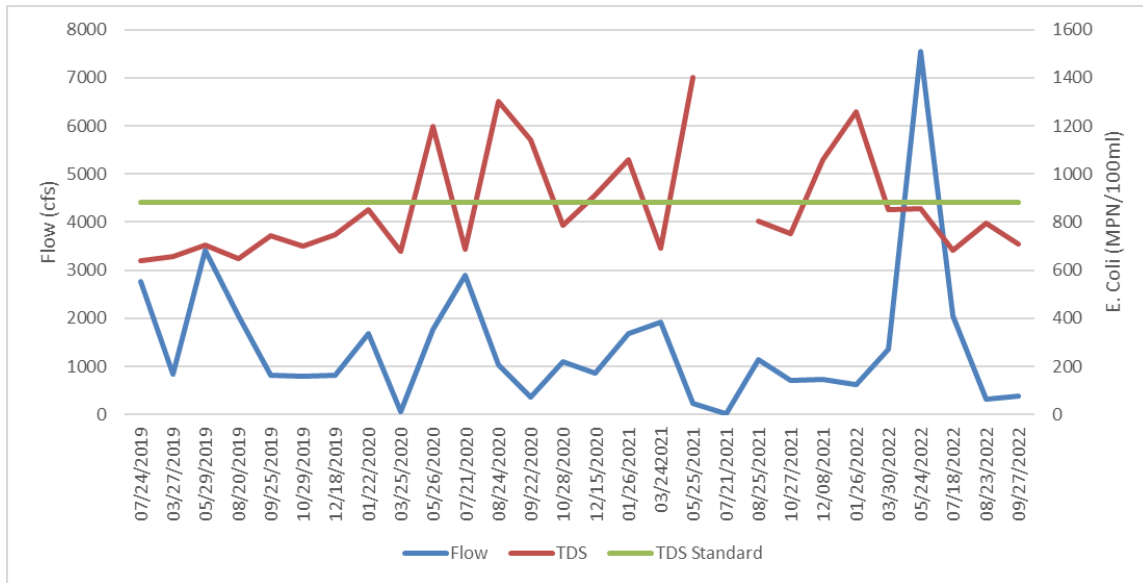


# Upstream of McAllen Rio Grande River near Los Ebanos – Station 13184

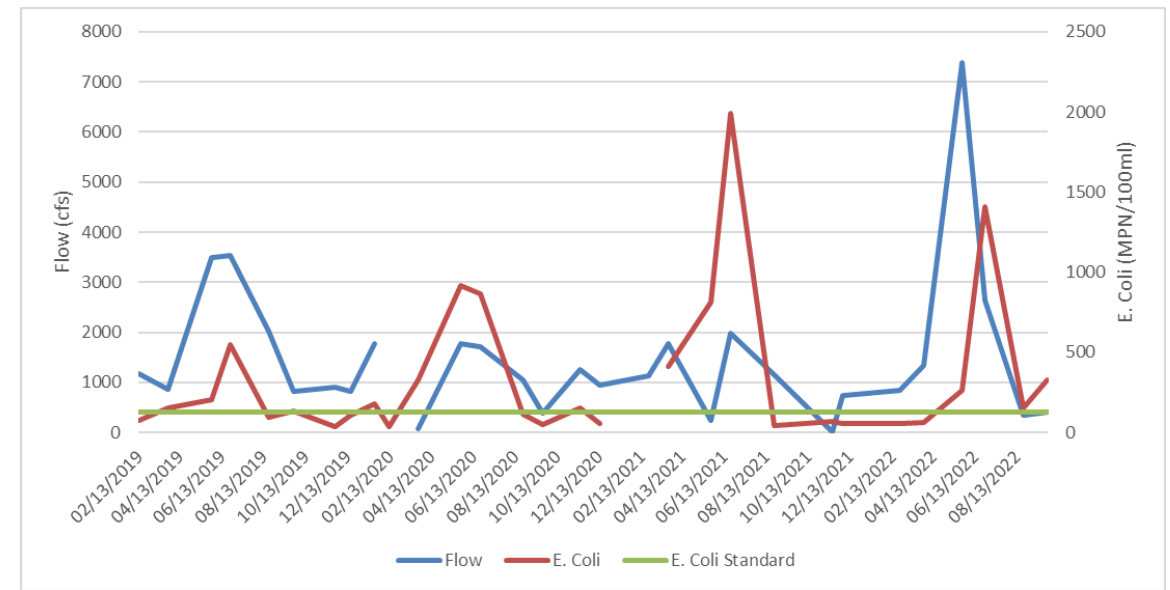
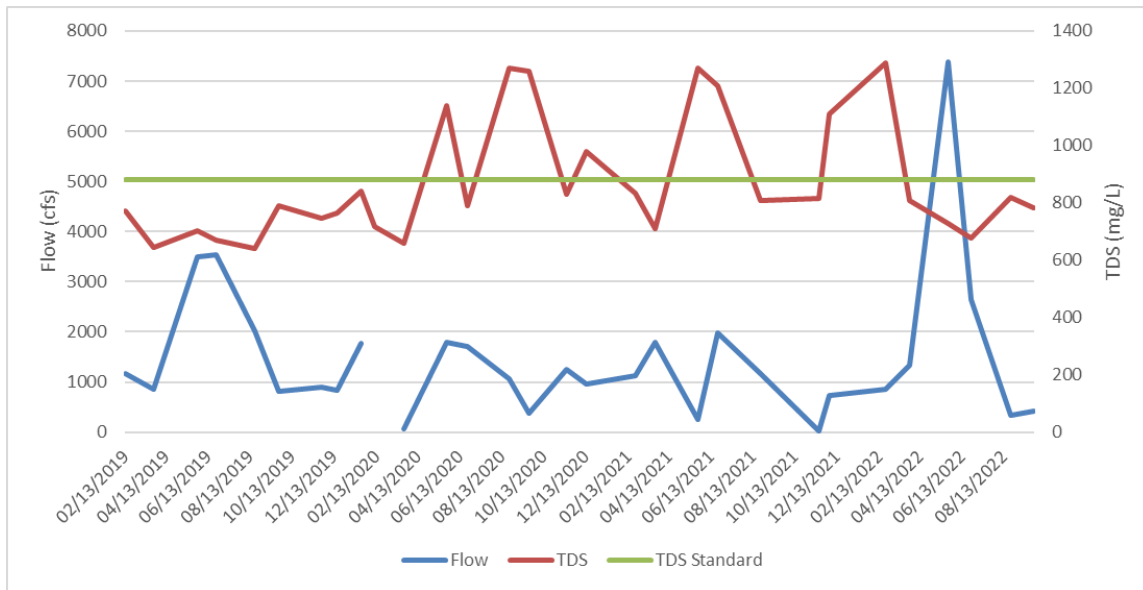




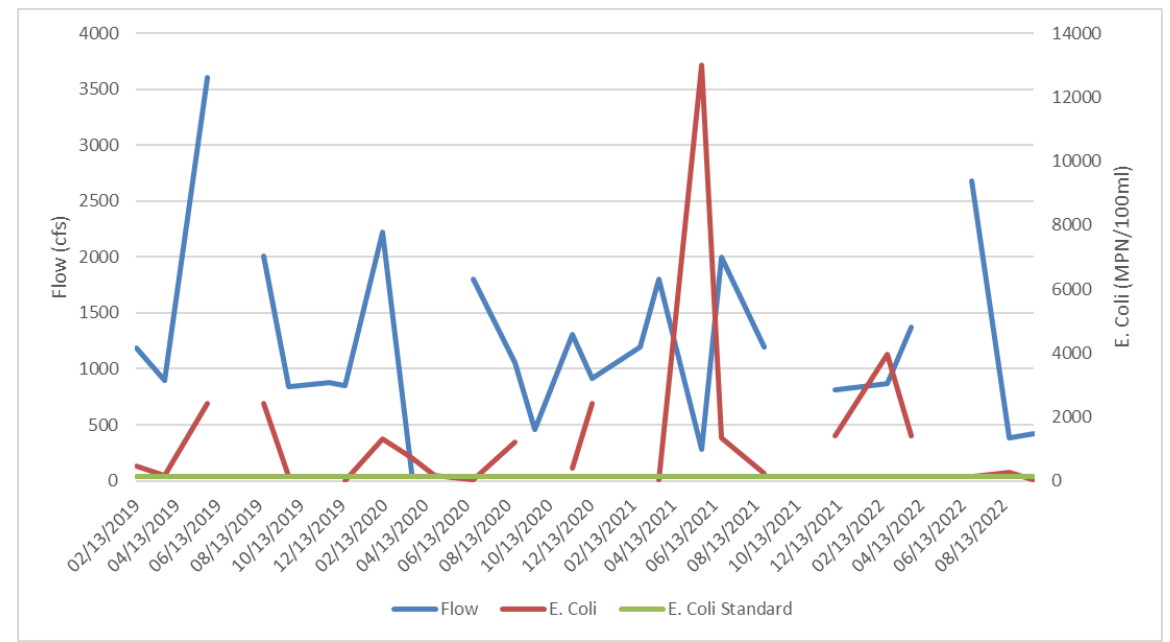
# Upstream of McAllen Rio Grande Downstream of Anzalduas Dam – Station 13664



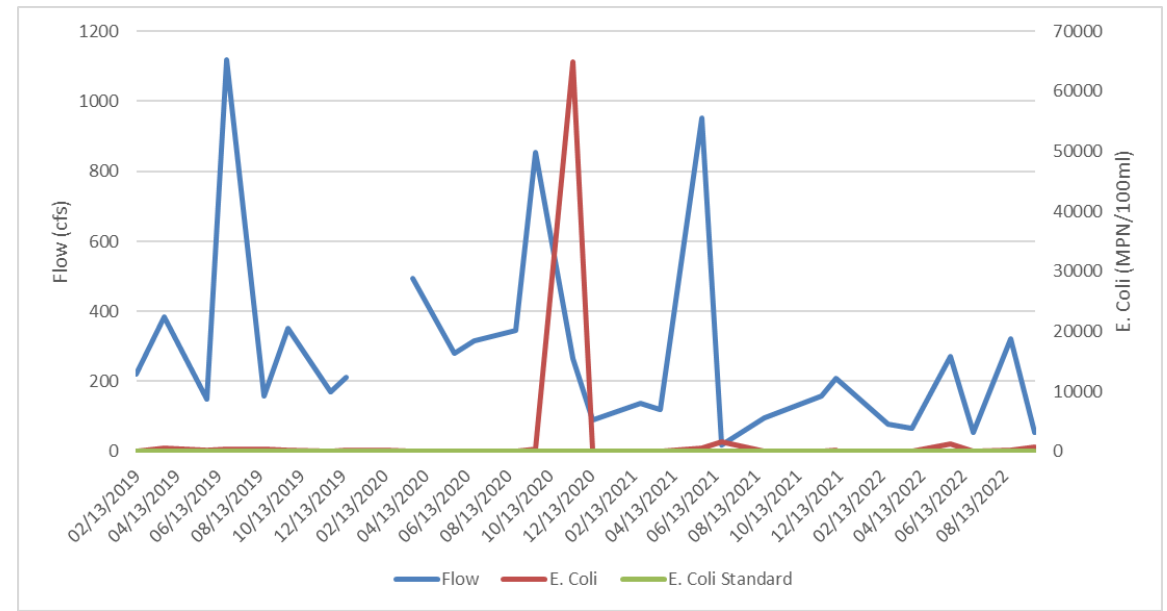
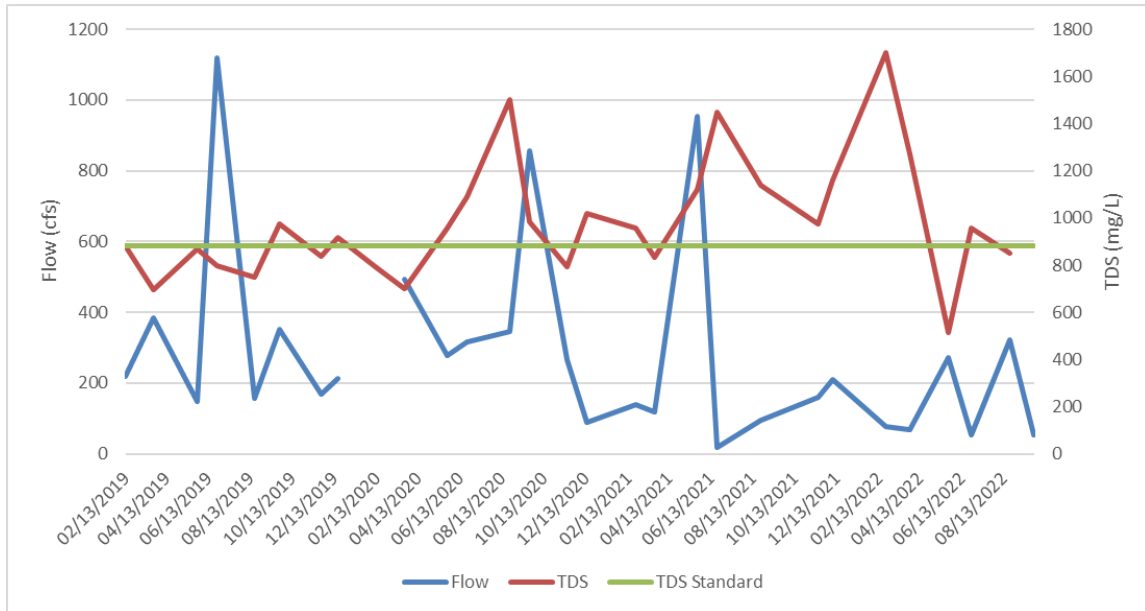
# Downstream of McAllen Rio Grande River at Hidalgo – Station 13181



# Downstream of McAllen Rio Grande Upstream of Pharr International Bridge – Station 15808



# Downstream of Brownsville Rio Grande at El Jardin Pump – Station 13177



# What does the data tell us?

- Bacteria levels are still above the standard on most of the area.
  - Non-point sources, such as storm water and agricultural runoff.
  - Urban areas have grown and increasing population may also be contributing to the issue.
- TDS levels tend to rise when flows are low, and decrease when flows are high.
- Currently, in CRP's monitoring framework, the increasing salinity values are something we are monitoring closely
  - No current impairment or concern exists for salinity in this reach under the 303d list.
  - Average is still under the water quality standard of 880 mg/L.
- The program continues to monitor at the stations on a routine basis and provides the data to the TCEQ.

**2022 Texas Integrated Report - Potential Sources of Impairments and Concerns**

**Seg Id: 2302 - Rio Grande Below Falcon Reservoir**

AU ID	Assessment Method	Parameter	LOS	Sources
2302_03	Nutrient Screening Levels	Chlorophyll-a	CS	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers; PS - Unknown Point Source; UNK - Source Unknown
	Bacteria Geomean	E. coli	NS	NPS - Non-Point Source; NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers
2302_04	Nutrient Screening Levels	Chlorophyll-a	CS	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers; PS - Unknown Point Source; UNK - Source Unknown
2302_05	Nutrient Screening Levels	Chlorophyll-a	CS	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers; PS - Unknown Point Source; UNK - Source Unknown
2302_06	Nutrient Screening Levels	Chlorophyll-a	CS	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers; PS - Unknown Point Source; UNK - Source Unknown
	High pH	pH	CN	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers; PS - Unknown Point Source; UNK - Source Unknown
2302_07	Nutrient Screening Levels	Ammonia	CS	NPS - Sources Outside State Jurisdiction Or Borders; PS - Municipal Point Source Discharges

**Seg Id: 2302A - Arroyo Los Olmos**

AU ID	Assessment Method	Parameter	LOS	Sources
2302A_01	Nutrient Screening Levels	Chlorophyll-a	CS	NPS - Non-Point Source; UNK - Source Unknown
	Dissolved Oxygen grab minimum	Dissolved oxygen Grab	NS	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers
	Dissolved Oxygen grab screening level	Dissolved oxygen Grab	CS	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers
	Bacteria Geomean	E. coli	NS	NPS - Non-Point Source; NPS - Urban Runoff/Storm Sewers; UNK - Source Unknown

**Seg Id: 2303 - International Falcon Reservoir**

AU ID	Assessment Method	Parameter	LOS	Sources
2303_04	Fish Kill Reports	Fish Kill Reports	CN	NPS - Non-Point Source
2303_05	TOXNET ambient toxicity tests in water - sublethality	Water toxicity (sub-lethal effects)	CS	UNK - Source Unknown

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**Seg Id: 2302 - Rio Grande Below Falcon Reservoir**

AU ID	Assessment Method	Parameter	LOS	Sources
2302_01	Nutrient Screening Levels	Chlorophyll-a	CS	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers
	Dissolved Oxygen grab screening level	Dissolved oxygen Grab	CS	NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers
2302_02	Nutrient Screening Levels	Chlorophyll-a	CS	NPS - Crop Production (Irrigated); NPS - Non-Point Source; NPS - Sources Outside State Jurisdiction Or Borders; NPS - Urban Runoff/Storm Sewers

# Lower Rio Grande Water Quality Initiative

- Objectives:
  - Establish, under the IBWC, a group from the United States and Mexico to explore border sanitation and water quality management
  - Improve salinity management for return flows into the Lower Rio Grande
  - Address current and future water quality issues of the Lower Rio Grande
  - Implement management procedures and programs that enable affected parties to manage wastewater discharges and improve water quality conditions
  - Evaluate current wastewater infrastructure and management strategies for the potential for improving the effluent quality
  - Evaluate new mechanisms and strategies for system operations that could improve ambient water quality
- Implement programs and projects to meet these objectives as appropriate, that will result in sustainable improvement in water quality.
- Will Serve as an institutional model for addressing additional trans-boundary water quality issues in other parts of the Rio Grande.



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**Thank you!**

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<https://ibwc.gov/CRP/Index.htm>