2022
Basin Highlights Report

Rio Grande Basin Program Update
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Texas Clean Rivers Program

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Inside front cover photo by Mr. Delbert Humberson

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Overview

The Rio Grande Basin encompasses an area of 335,000 square miles, with approximately 50,000 square miles in Texas alone. The Rio Grande River travels a total of 1,896 miles traversing through three U.S. and four Mexican states, before emptying into the Gulf of Mexico. Along its path, the river forms the roughly 1,200-mile international border between Texas and Mexico.

The USIBWC is one of 15 partner agencies that collaborate with the Texas Commission on Environmental Quality (TCEQ) through the Texas Clean Rivers Program (CRP) for conducting water quality monitoring, assessments and stakeholder outreach in the 23 river and coastal basins of Texas.

The focus of the CRP is to work at the watershed level within each river basin to coordinate the efforts of local stakeholders and organizations interested in the health of our surface water resources.

Overall, the main goals of the CRP include:

- Provide quality-assured data to the TCEQ for use in decision-making
- Identify and evaluate water quality issues
- Promote cooperative watershed planning
- Recommend management strategies
- Inform and engage stakeholders (any individual or group who has an interest in the water quality of the basin)
- Maintain efficient use of public funds

Basin Highlights Reports

The USIBWC CRP is committed to inform and engage the public and stakeholders in all major activities and water quality issues that occur in our basin. To fulfill this objective, basin reports are produced and used to disseminate information and demonstrate effective use of program data.

We invite partners, stakeholders and members of the public to submit small summaries of projects or activities occurring in the basin. We look for people, issues, projects and other work pertinent to our river basin to highlight in these reports. We also invite the public to submit pictures of the recreational activities, natural scenery and wildlife. Submissions can be made to USIBWC CRP staff via email. Pictures, if used, are properly credited to the photographer. Please contact staff with any questions.

Introduction

The Texas Clean Rivers Program (CRP) was created in 1991 with the objective of monitoring and improving the quality of Texas surface waters through an ongoing partnership between the TCEQ- one of the largest environmental agencies in the United States- regional water authorities, local staekholders, and advisory committees. Today, the TCEQ implements the CRP by contracting 15 partner agencies to monitor the 23 basins of Texas, generating about 60% of the data used by the state to make decisions relating to surface water.

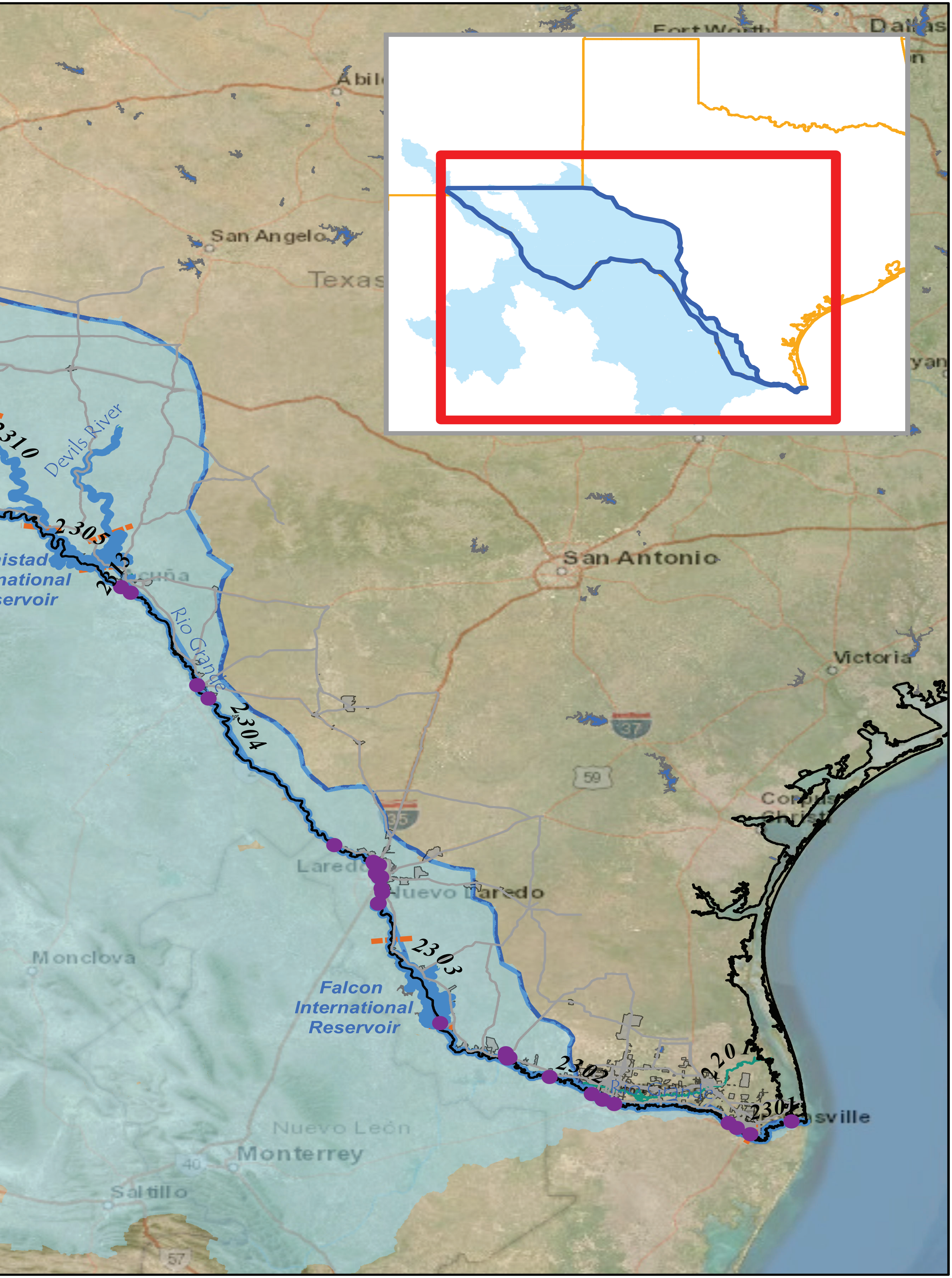
In Texas, the Rio Grande basin extends from the desert areas of El Paso to the canyons of Big Bend National Park, down the Texas valley before reaching the Gulf of Mexico. This 1,255-mile stretch demarcates the boundary between the United States and Mexico. Monitoring and assessing these portions of the basin is a challenging task, one that is greatly facilitated by the IBWC as an international agency created by both countries.

Since its integration into the CRP in 1998, the USIBWC has monitored and assessed the waters of the Rio Grande, which provide a supply of drinking water and habitat for numerous flora and fauna. Water quality data from the USIBWC is collected through a partnership of 13 additional entities including USIBWC field offices, universities, municipalities, and a non-profit organization. This extensive collaboration between the USIBWC and its sub-partners provides useful information for indentifying sources of pollution and promoting the overall health of the Rio Grande. In 2021, the USIBWC CRP oversaw direct monitoring of 52 water quality stations, and, along with the 37 collected by the TCEQ regional offices, managed the data for over 90 total stations in the basin.

The USIBWC CRP divides the basin in Texas into four sub-regions to facilitate coordination and planning: the Pecos region and the Upper, Middle and Lower Rio Grande regions. This report provides an overview of USIBWC CRP activities during 2021 and highlights important issues, activities or changes that the general public may find useful. If you have questions on the data or information presented in this report, please contact USIBWC CRP staff.

Pictured: CRP staff Leslie Grijalva preparing to collect water samples at Station 14465, Rio Grande downstream of Haskell WWTP in El Paso, TX. Photo by Lisa Torres


Figure 1
Carlsbad
Las Cruces
Midland
Odessa
2314
2308
2312
2311
Upper Pecos River
Rio Grande
2307
2310A
Big Bend
National Park
2306
Chihuahua
Chihuahua
Coahuila
Hidalgo
Torreon
Rio Grande Basin
2022 CRP Water Quality Monitoring Stations
2022 USIBWC CRP Stations
River Segment Boundary
Rio Grande Basin in Texas
Binational Rio Grande Watershed
Urban Areas
0 25 50 100 150 200
Miles
N
S



San Angelo
Texas
San Antonio
Victoria
Devils River
2310
2305
2313
Amistad International Reservoir
Rio Grande
2304
Laredo
Nuevo Laredo
Monclova
2303
Falcon International Reservoir
2302
2201
2301
Nuevo León
Monterrey
Saltillo

Figure 2

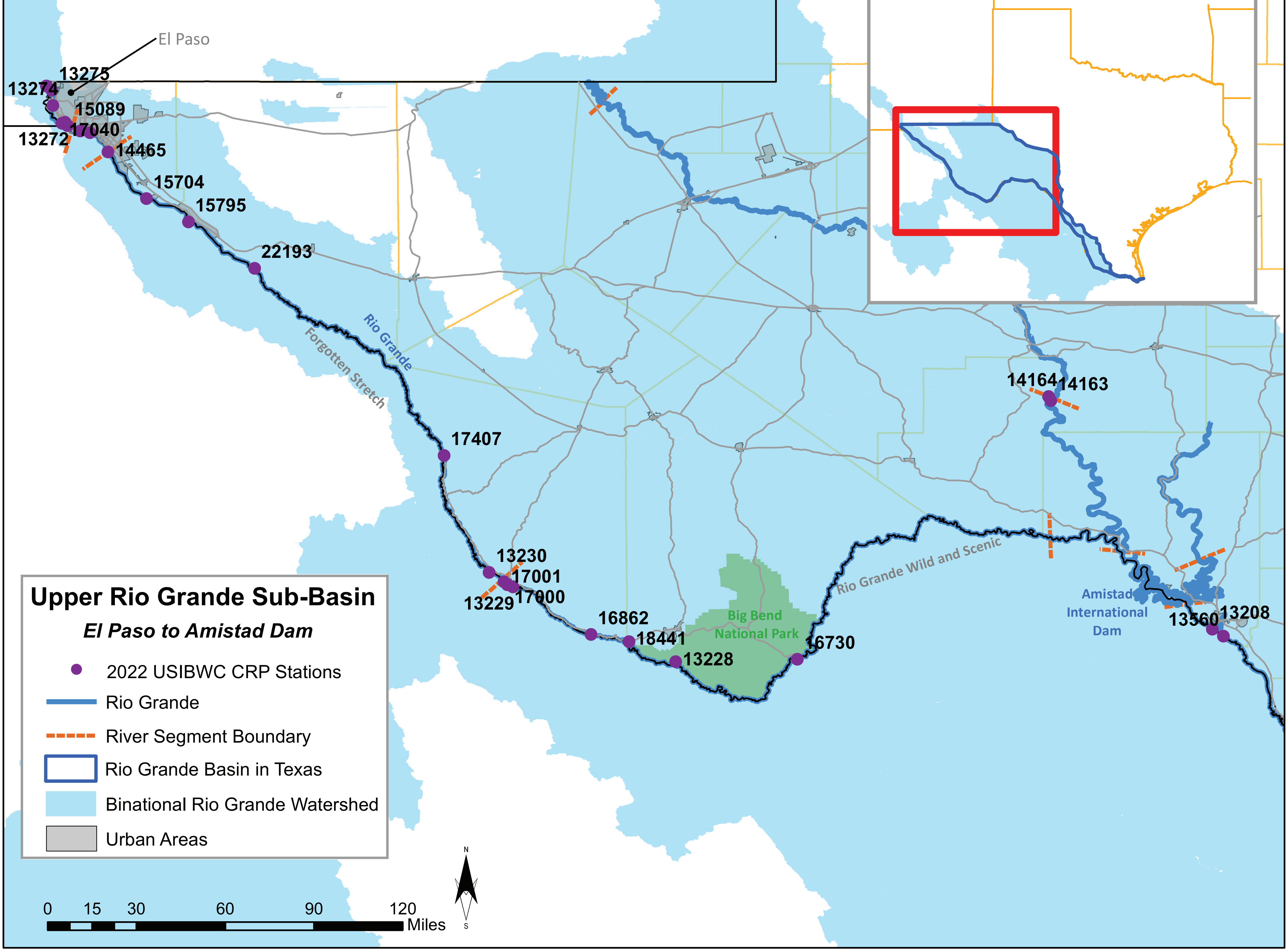
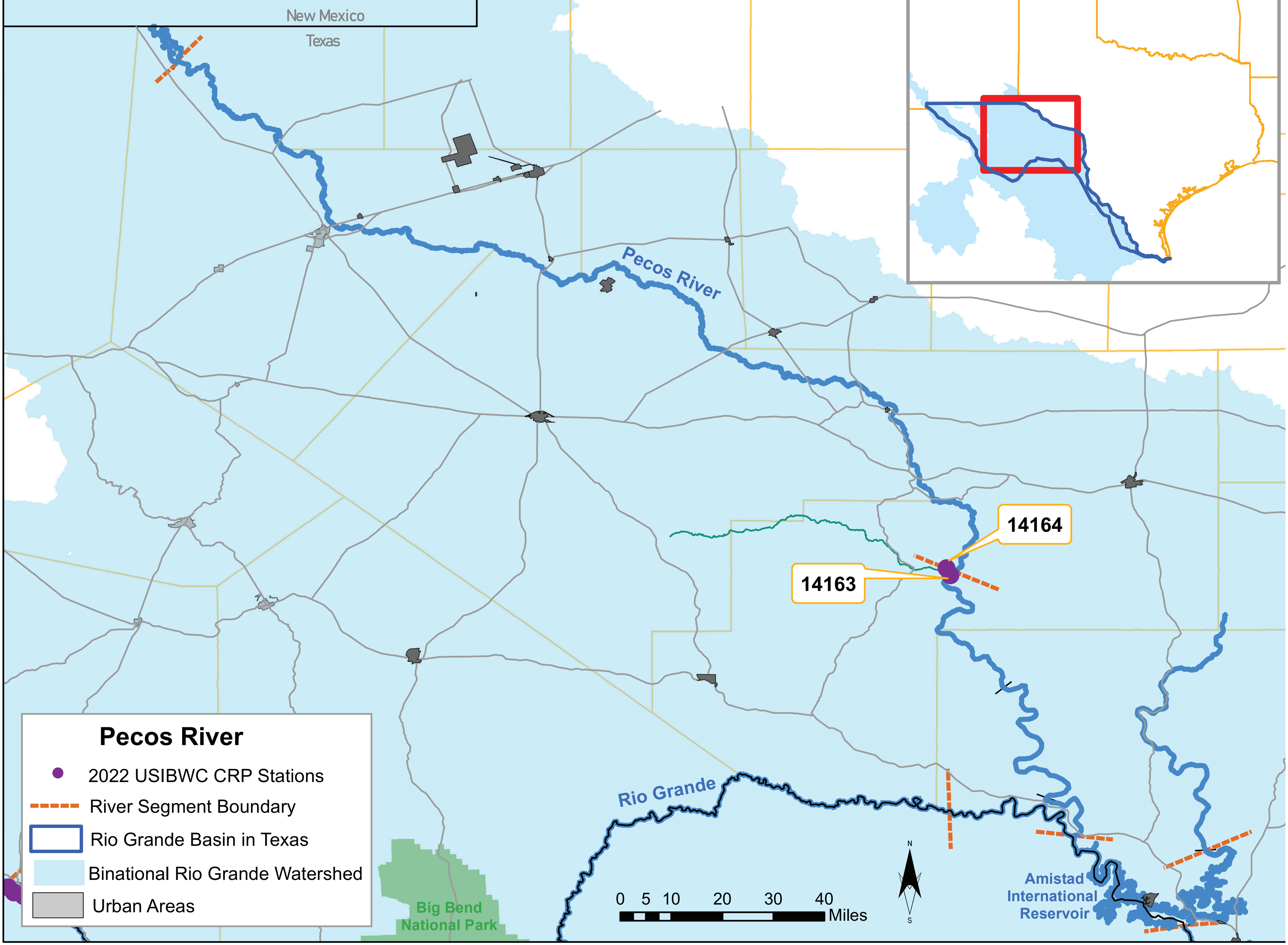

El Paso
13275
13274
15089
17040
13272
14465
15704
15795
22193
Rio Grande
Forgotten Stretch
17407
13230
17001
17000
13229
16862
18441
13228
Big Bend
National Park
16730
Rio Grande Wild and Scenic
14164
14163
Amistad
International
Dam
13560
13208
Upper Rio Grande Sub-Basin
El Paso to Amistad Dam
2022 USIBWC CRP Stations
Rio Grande
River Segment Boundary
Rio Grande Basin in Texas
Binational Rio Grande Watershed
Urban Areas
0
15
30
60
90
120
Miles
N
S

Figure 3


New Mexico
Texas
Pecos River
Rio Grande
14164
14163
Amistad International Reservoir
Big Bend National Park
0 5 10 20 30 40 Miles
N
S
Pecos River
2022 USIBWC CRP Stations
River Segment Boundary
Rio Grande Basin in Texas
Binational Rio Grande Watershed
Urban Areas

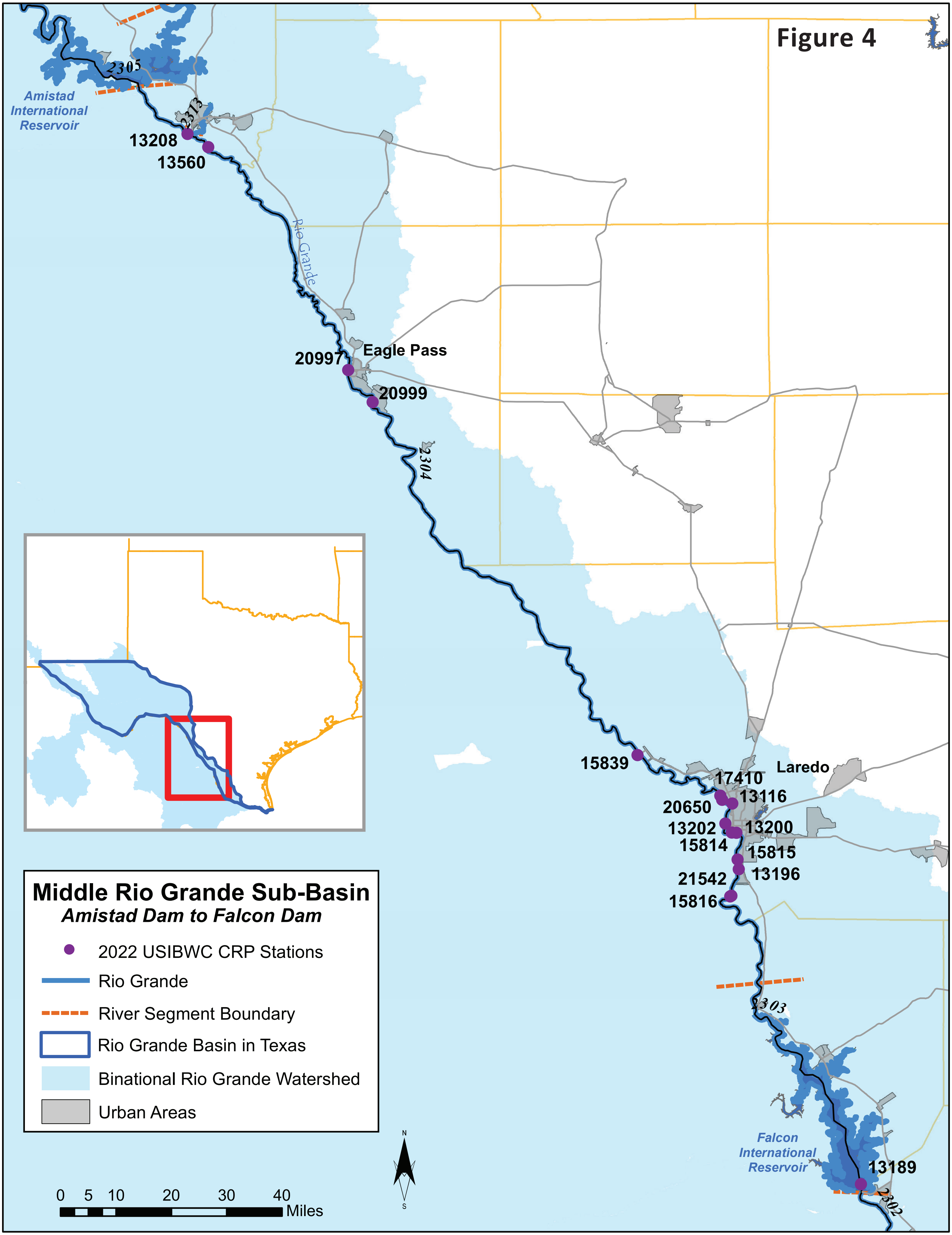


Figure 4
Amistad International Reservoir
2305
2313
13208
13560
Rio Grande
Eagle Pass
20997
20999
2304
15839
Laredo
17410
13116
20650
13202
13200
15814
15815
21542
13196
15816
2303
Falcon International Reservoir
13189
2302
Middle Rio Grande Sub-Basin
Amistad Dam to Falcon Dam
2022 USIBWC CRP Stations
Rio Grande
River Segment Boundary
Rio Grande Basin in Texas
Binational Rio Grande Watershed
Urban Areas
0 5 10 20 30 40
Miles
N
S

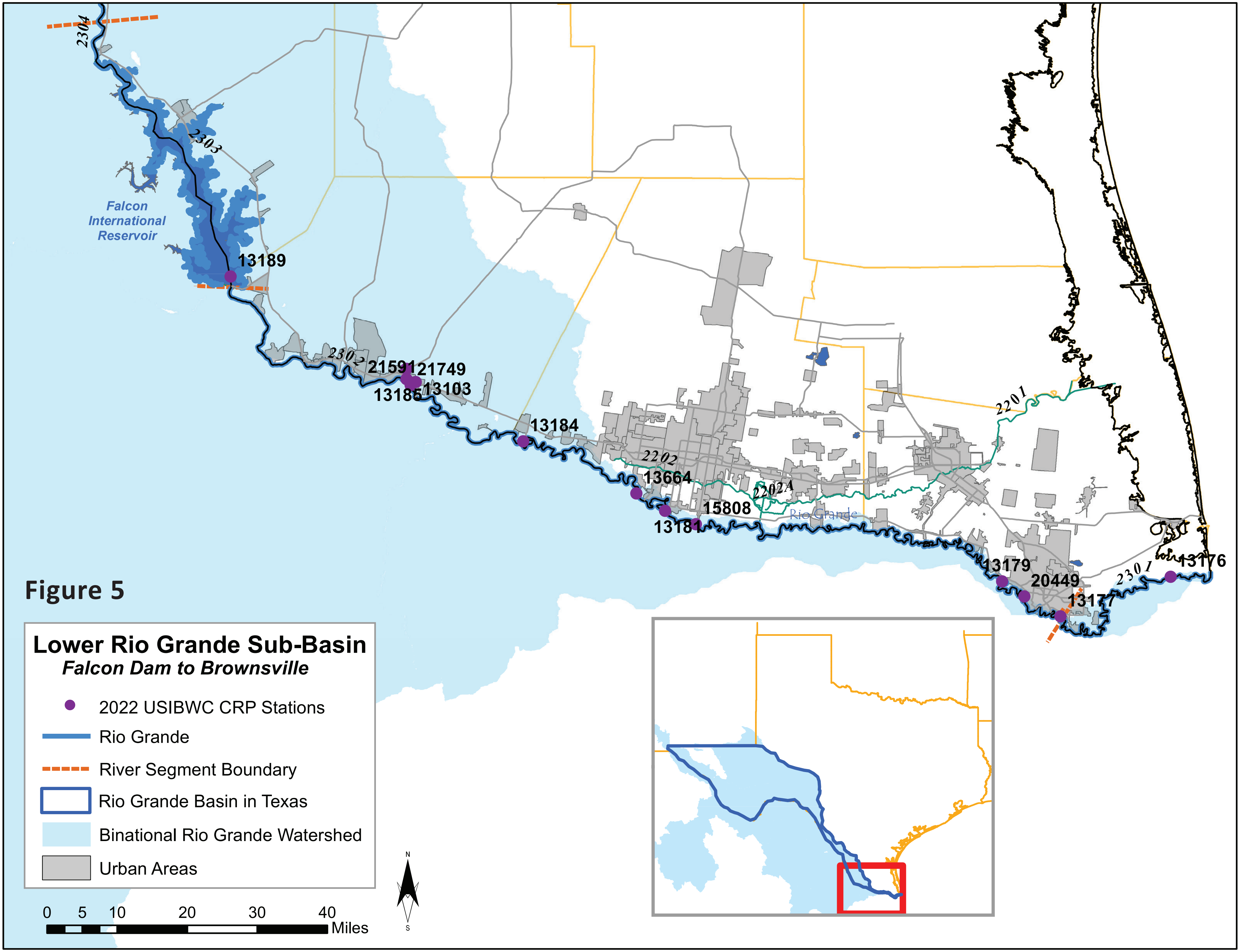


Figure 5
Lower Rio Grande Sub-Basin
Falcon Dam to Brownsville
2022 USIBWC CRP Stations
Rio Grande
River Segment Boundary
Rio Grande Basin in Texas
Binational Rio Grande Watershed
Urban Areas
0 5 10 20 30 40 Miles
N
S
Falcon International Reservoir
2304
2303
2302
2202
2202A
2201
2301
Rio Grande
13189
21591
21749
13185
13103
13184
13664
15808
13181
13179
20449
13177
13176

How is the Water Quality?

What are Impaired Waters?

The State of Texas publishes the Texas Surface Water Quality Standards (TSWQS) for each river basin. USIBWC Clean Rivers Program water quality data is used to help determine whether stream segments are meeting the standards. Every parameter of concern in the Rio Grande Basin does not have standards associated with it. However, screening levels exist for parameters that have historically led to environmental issues in the area. A water body is listed as "impaired" in the Texas Integrated Report if the data shows the standards are not being met. A water body is described as having a concern if it is near non-attainment to the standard (CN) or is not meeting the screening levels (CS). The EPA approved the 2018 TSWQS for the Rio Grande Basin, which can be viewed on the link below. The 2020 Integrated Report was released by TCEQ and can be found at the link listed below.

TSWQS https://www.tceq.texas.gov/waterquality/standards/2018-surface-water-quality-standards

Integrated Report: https://www.tceq.texas.gov/waterquality/assessment/20twqi

Pictured: Foam in the Rio Grande at Station 15795, Rio Grande at Alamo Grade Control Structure, Ft. Hancock, just outside of El Paso, TX. Photo by Leslie Grijalva

Table I. Primary Surface Water Quality Standards for the Rio Grande basin

2018 Texas Surface Water Quality Standards for the Rio Grande Basin												
SEGMENT		USES			CRITERIA							
Segment	Segment Name	Recreation	Aquatic Life	Domestic Water Supply	Cl^- (mg/l)	$SO4^{2-}$ (mg/l)	TDS (mg/l)	DO (mg/l)	pH range (SU)	Indicator Bacteria[1] (#/100ml)	Temperature (deg F)
2301	**Rio Grande Tidal**	PCR1	E	-	-	-	-	5.0	6.5-9.0	35	95
2302	**RG Below Falcon Reservoir**	PCR1	H	PS	270	350	880	5.0	6.5-9.0	126	90
2303	**Falcon International Reservoir**	PCR1	H	PS	200	300	1,000	5.0	6.5-9.0	126	93
2304	**RG Below Amistad International Reservoir**	PCR1	H	PS	200	300	1,000	5.0	6.5-9.0	126	95
2305	**International Amistad Reservoir**	PCR1	H	PS	150	270	800	5.0	6.5-9.0	126	88
2306	**RG Above Amistad International Reservoir**	PCR1	H	PS	200	450	1,400	5.0	6.5-9.0	126	93
2307	**RG Below Riverside Diversion Dam**	PCR1	H	PS	300	550	1,500	5.0	6.5-9.0	126	93
2308	**RG Below International Dam**	NCR	L	-	250	450	1,400	3.0	6.5-9.0	605	95
2309	**Devils River[2]**	PCR1	E	PS	50	50	300	6.0	6.5-9.0	126	90
2310	**Lower Pecos River**	PCR1	H	PS	1,700	1,000	4,000	5.0	6.5-9.0	126	92
2311	**Upper Pecos River**	PCR1	L	-	7,000	3,500	15,000	5.0[3]	6.5-9.0	33	92
2312	**Red Bluff Reservoir**	PCR1	H	-	3,200	2,200	9,400	5.0	6.5-9.0	33	90
2313	**San Felipe Creek[2]**	PCR1	H	PS	50	50	400	5.0	6.5-9.0	126	90
2314	**RG Above International Dam**	PCR1	H	PS	340	600	1,800	5.0	6.5-9.0	126	92
2315	**Rio Grande Below Rio Conchos**	PCR1	H	-	450	750	2,100	5.0	6.5-9.0	126	93

PCR - Primary Contact Recreation NCR - Noncontact Recreation PS - Public Water Supply E - Exceptional Aquatic Life
L - Limited Aquatic Life H - High Aquatic Life TDS - Total Dissolved Solids Cl^- - chloride $SO4^{2-}$ - sulfate

Footnote
1 - The indicator bacteria for freshwater is *E.coli* and for saltwater is Enterococci. The indicator bacteria for Segments 2301, 2311 and 2312 is Enterococci.
2 - The critical low flow is calculated in accordance with 307.8(a)(2)(A) of this title.
3 - The 24- hr minimum dissolved oxygen criterion is 1.0 mg/L.
Source to these standards: https://www.tceq.texas.gov/waterquality/standards/2018-surface-water-quality-standards

Water Quality Impairments and Concerns

Table 2. Table of Water Quality Impairments and Concerns from the 2020 305(b) Texas Water Quallity Inventory and 030(d) List of Impaired Waterbodies*			
Segment	Segment Name	Parameter (s) Impaired	Parameter(s) of Concern
2301	Rio Grande Tidal		Bacteria Chlorophyll-a Nitrate DO[1]
2302	RG Below Falcon Reservoir	Bacteria	Ammonia Chlorophyll-a DO[1]
2302A	Los Olmos Arroyo	Bacteria	Chlorophyll-a DO[1]
2303	International Falcon Reservoir		Fish kills Toxicity in Water
2304	RG Below Amistad International Reservoir	Bacteria	Toxicity in Water Ammonia
2304B	Manadas Creek		Bacteria Antimony in Sediment Nitrate Total Phosphorus
2305	International Amistad Reservoir		Fish Kills
2306	RG Above Amistad International Reservoir	Sulfate	Chlorophyll-a Fish kills Total Phosphorus
2306A	Alamito Creek		
2307	RG Below Riverside Diversion Dam	Bacteria Chloride TDS	Nitrate Total Phosphorus Ammonia Chlorophyll-a DO[1]
2308	RG Below International Dam	Bacteria	Chlorophyll-a Total Phosphorus Ammonia
2309	Devils Rivers		
2310	Lower Pecos River	TDS[2]	
2310A	Independence Creek		
2311	Upper Pecos River	Dissolved oxygen	Bacteria Chlorophyll-a
2312	Red Bluff Reservoir		DO[1]
2313	San Felipe Creek	Bacteria	
2314	RG Above International Dam	Bacteria	Chlorophyll-a Ammonia Nitrate Total Phosphorus

*Information obtained from the 2020 Texas integrated Report
[1]Dissolved oxygen· If DO is listed as a concern› then the mean concentration exceeded the screening level of a grab sample·
[2]Newly listed impairment·

What are the main water quality issues in the Rio Grande Basin?

Bacteria

Seven segments (out of 14) in the Rio Grande are impaired for bacteria. Although there have been vast improvements since the mid- 90's, bacteria impairments are still an issue of great concern. In many parts of the basin, aging infrastructure, population growth and lack of sanitation services altogether are all commonly seen when bacteria levels are high. High levels of bacteria can cause illness or skin infections in people or pets that come in contact with the water.

Salinity

Two segments (out of 14) are impaired for Total Dissolved Solids, which is an issue of great importance to farmers and irrigation districts in many parts of the basin, particularly the Lower Rio Grande Valley. Oftentimes the high salinity makes water unusable for irrigation purposes. In other parts of the basin, such as in the Pecos, the high salinity makes it unusable for drinking as well.

Nutrients

Eight segments (out of 14) have concerns for high levels of nutrients. High nutrient levels are caused by many reasons, to include agricultural and domestic runoff from the use of fertilizers by both industries and homeowners. Wastewater effluent can also introduce nutrients into the river. Nutrients can cause changes in taste and odor in drinking water, as well as algal blooms, which are also a concern in many segments.

Depressed Dissolved Oxygen

Six segments are impaired for low dissolved oxygen levels, which is also a recurring issue throughout the basin. In the Upper Rio Grande and Pecos, low flows coupled with very high temperatures cause drops in the DO levels. This has resulted in fish kills and algal blooms in the past.

Pictured Above: Sewage spill upstream of Station 17040, Rio Grande at Anapra Bridge, El Paso, TX. Photo by Leslie Grijalva

Rio Grande
Rio Conchos
Alamito Creek
Upper Pec
Independenc
Conchos
Mexico
Nuevo Casas Grandes
El Paso
Chihuahua
Hidalgo del Parral
Legend
CRP Stations
Streams
Texas Rivers
Impaired Sections
Watershed
N
0
30
60
120
180
240
Miles

Figure 2

Texas Clean Rivers Program
Bacteria Impaired River Sections

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Overview of Water Quality Monitoring

The CRP and the TCEQ develop an understanding of the water quality conditions through routine monitoring, which is performed at fixed locations at regular intervals throughout the year. Routine monitoring enables us to answer questions about how the river can be used, such as:

- **Is the Rio Grande Watershed swimmable?**
- **Is the Rio Grande Watershed drinkable?**
- **Is the Rio Grande Watershed fishable?**
- **Is the habitat in the Rio Grande Watershed healthy for aquatic life?**

(For more information on designated uses, see Table 3 on page 15)

In 2021, theUSIBWC CRP maintained its network of water quality stations which included 52 routine monitoring stations. When personnel collect water quality and sediment samples for laboratory analysis they record field observations such as weather conditions, recent rain events in the area, water color, and other general notes related to water quality and stream uses. Specialized equipment is also used by personnel to measure other field parameters such as water and air temperature, water depth, Secchi disk, and stream flow. A list of field parameters and laboratory parameters is described in more detail in Table 4.

Data generated from routine monitoring of field and laboratory parameters is used to determine the health of river ecosystems and potential human and ecological issues. Data are compared with the Texas Surface Water Quality Standards (TSWQS) criteria in Tables 1, 2 and 3 as indicated in the following sections of this report.

When routine monitoring indicates a water quality issue or trend, we begin more intensive monitoring. Data may indicate that there is a need for a source-tracking or other type of special study to address a specific water quality issue. For example, increasing levels of bacteria may indicate that a source-tracking study may need to be done to see if the source of the pollution can be determined.

Pictured: CRP staff Leslie Grijalva preparing to collect water samples at Station 17040, Rio Grande at Anapra Bridge in El Paso, TX Photo by Frankie Piñon

Table 3. Designated Uses for Freshwater

Designated Uses			
Designated Use	**Description**	**Primary Parameter**	**Criteria**
Contact Recreation (CR)	3 levels depending on the use of the water:Fishing, swimming, wading, boating, etc **Note**: Secondary contact recreation criteria is not applied in any of the segments in the Rio Grande Basin	Bacteria: *E. Coli* Tidal and saline- Enterococcus (Entero)	Primary Contact Recreation (significant possibility of water ingestion, i.e. swimming). Geometric mean: 126 colony forming units (CFU) for *E. Coli*, 35 CFU Entero
			Secondary Contact Recreation (limited body contact that poses a less significant risk of ingestion of water, i.e. fishing, boating). Geometric mean: 630 colony forming units (CFU) for *E. Coli,* 175 CFU Entero
			Non- Contact Recreation: Unsuitable for contact recreation
Public Water Supply (PS)	Drinking water source	See full list of Human Health Criteria in Table 2 of the TSWQS	
Aquatic Life Use (ALU)	4 levels depending on the ability of water body to support aquatic life	DO - average values	(E) Exceptional 6.0 mg/L
			(H) High 5.0 mg/L
			(I) Intermediate 4.0 mg/L
			(L) Limited 3.0 mg/L
	Toxics in Water	See full list of Aquatic Life Criteria in Table 1 of the TSWQS	
Fish Consumption (FC)	Prevent contamination to protect human health	See full list of Human Health Criteria in Table 2 of the TSWQS. Example: Mercury - 0.0122 ug/L in water & fish	

Designated Uses

The State of Texas assigns designated uses to specific water bodies. Table 3 describes the designated uses for the Rio Grande Basin, and Table 1 on page 9 lists the uses and standards for each segment. Designated uses and water quality standards are defined in the TSWQS. For more info, see TSWQS website.

Contact Recreation (CR) – Fishing, swimming, wading by children, boating, and direct water contact. *E. Coli* and Enterococci bacteria are used as indicators. The proposed 2014 revisions to the TSWQS created subcategories of Primary (PCR) and Secondary Contact Recreation (SCR). PCR refers to activities such as swimming, and SCR refers to non-immersing recreation activities such as canoeing and fishing.

Public Water Supply (PS) – As a drinking water source, the primary concern is total dissolved solids (TDS). The TSWQS includes a list of parameters that are screened to ensure safe domestic water supply use.

Aquatic Life Use (ALU) – This designated use is designed to protect aquatic species including fish and benthic macroinvertebrates (aquatic insects). This designated use has four levels depending on the ability of a water body to support aquatic life (exceptional, high, intermediate, and limited). The primary parameter used to determine the ALU of a waterbody is Dissolved Oxygen.

Fish Consumption (FC) – This applies to all water bodies where citizens may collect and consume fish. The TSWQS includes a list of parameters that are screened to ensure the fish consumption use is met.

General Use – To safeguard general water quality rather than for protection of one specific use.

Table 4. Water Quality Parameters

Field Parameters		
Parameter	**Description**	**Effects to Water body**
pH	Measure of how acidic or basic the water is. The values range from 0 to 14, with 7 being neutral. pH values less than 7 indicate acidity, whereas a pH greater than 7 indicates a base.	Values greater than 9.0 and less than 5.0 can have detrimental effects on the health of aquatic life, wildlife, and humans.
Specific Conductance	Indicator of how well the water conducts electricity. Pure water does not conduct electricity; impurities of water are what allow electricity to pass through the water. These impurities are salts and metals. Since total and dissolved metal values are very low, conductivity primarily measures how much salt is in the water. Most naturally occurring waters have some level of conductivity.	High conductivity can cause physiological effects in animals and plants. It also has negative implications for TDS. Indirect effects of excess dissolved solids are primarily the elimination of desirable food plants and habitat-forming plant species. Agricultural uses of water for livestock watering are limited by excessive dissolved solids and high dissolved solids can be a problem in water used for irrigation.
Dissolved Oxygen (DO)	Measure of the oxygen in the water.	Low DO values can lead to a reduced abundance and diversity in aquatic communities. Very low levels (<2) can be indicative of higher levels of oxygen-demanding plants that use up DO during the decay process.
Secchi Depth	A measure of the transparency of water - the maximum depth at which a black and white disk is visible.	Higher transparency leads to a more robust aquatic plant life (particles in water block sunlight for photosynthesis). High transparency coupled with high nutrients can lead to negative impacts on DO and aquatic life.
Stream Flow	Volume of water moving over a location over a period of time. Low flow conditions common in the warm summer months create critical conditions for aquatic organisms.	At low flows, the stream has a lower assimilative capacity for waste inputs from point and nonpoint sources.
Conventional Laboratory Parameters		
Parameter	**Description**	**Effects to Water body**
Solids	Total and dissolved materials of any kind (calcium, magnesium, potassium, sodium, bicarbonates, chlorides, and sulfates).	High total dissolved solids indicate higher amounts of dissolved salts which can reduce the diversity of aquatic life and can render the water unusable for human consumption, industry and agriculture.
Nutrients	Nutrients include nitrogen compounds, ammonia, and phosphorus.	High levels can cause excessive plant growth, which can lead to reduced dissolved oxygen and fish kills, reduced stream flow and reduced navigability of the waters. Elevated ammonia can also be toxic to aquatic life.
Chlorophyll-a	Chlorophyll-a is used as an indicator of algal growth in water.	High levels for long periods may indicate low water quality and excess nutrient levels.
Non-conventional Laboratory Parameters		
Parameter	**Description**	**Effects to Water body**
Metals	Aluminum, arsenic, barium, chromium, copper, lead, mercury, nickel, silver, and zinc. Metals can be tested as total or dissolved metals in water or metals in sediment to determine long-term accumulation.	High concentrations can result in long- and short-term effects on aquatic life and human health.
Organics	Chemicals containing carbon and hydrogen. Organic compounds analyzed are herbicides, pesticides and industrial compounds both in water and in sediment.	Organics can result in long- and short-term effects on aquatic life and human health.
Biological Parameters		
Parameter	**Description**	**Effects to Water body**
Nekton	Fish captured in the river during biological surveys using both electrofishing and seining methods	Using Index of Biological Integrity (IBI), Indicate biodiversity and overall health of river.
Benthics	Freshwater macroinvertebrates collected during a five-minute kick net method	Using IBI, this biological aquatic assemblage analysis indicates biodiversity and overall health of river. Healthy macroinvertebrate communities can be excellent indicators of high water quality.

How does the program function?

The USIBWC CRP is proud to collaborate with following 13 partners: the El Paso Water and Brownsville Public Utilities Board laboratories, the USIBWC American Dam, Presidio, Amistad Dam, Falcon Dam and Mercedes field offices, UTRGV- Edinburg, Midland College, Big Bend National Park, TX Parks and Wildlife, the City of Laredo Environmental Services Department and the Rio Grande International Study Center. These partners have volunteered to collect water quality data in addition to their own projects and work assignments. As a whole, this collaboration ensures that our expansive basin is continuously monitored. The large collaboration is successful because USIBWC CRP staff remains in constant contact with all the partners via phone calls, emails, and meetings. In addition, the USIBWC CRP convenes with its partners in annual meetings, called Coordinated Monitoring Meetings, where comprehensive monitoring schedules are developed to support the various basin and statewide objectives of the CRP. These meetings also provide a forum for discourse and communication of local water quality interests and problems, allowing participants to raise their questions and concerns to CRP staff regarding their corresponding watersheds.

All USIBWC CRP partners are trained by USIBWC CRP staff and use the sampling methods outlined in TCEQ's Surface Water Quality Monitoring Procedures Manual, Volume 1. Field sheets and chain of custody records are kept on file so that the integrity of the data can be traced if needed. All partners use the same standard equipment for water monitoring. The water samples are sent to laboratories accredited by the State of Texas under the National Environmental Laboratory Accreditation Program (NELAP). This is a requirement for generating quality-assured data that meet the needs and guidelines of the State of Texas. Laboratory and field water quality data that is collected and processed by partners are then sent to USIBWC CRP staff.

The USIBWC CRP staff compiles and validates partner data against rigorous quality assurance criteria before sending to the TCEQ for review. Upon TCEQ approval, data is uploaded into the state's database, called SWQMIS (Surface Water Quality Monitoring Information System). Data collected by CRP partners is available to the public via the TCEQ and USIBWC CRP websites.

Coordinated Monitoring Schedule

All entities that monitor the Rio Grande in Texas gather annually to discuss and coordinate monitoring activities. You can see who is collecting water quality data, where, and how often within the Rio Grande watershed on the Coordinated Monitoring Schedule.

http://cms.lcra.org/

Pictured: Rio Grande River downstream of Amistad Dam in Del Rio, TX. Photo by Frankie Piñon

Sewage Spill in El Paso, TX

On August 13, 2021, the City of El Paso crews were performing maintenance work in the upper El Paso, TX area when they accidently ruptured a major sewage line. This initial break, coupled with significant rainfall the area experienced during the month of August, caused a second rupture of the sewage line. This led to the release of approximately one billion gallons of untreated sewage directly into the Rio Grande that continued through January 2022. El Paso Water (EPW), TCEQ, and the USIBWC started a joint effort to monitor the spill while EPW worked on fixing the line ruptures. The USIBWC CRP was onsite days after the spill collecting samples, both routinely and as needed, to monitor the water quality of the area directly downstream of the spill. USIBWC CRP monitored the water quality at 8 stations, with two immediately downstream of the spill and six moving downstream toward Fort Quitman, about 60 miles outside of El Paso. The detrimental effects of the sewage spill could be seen along the river almost immediately after the spill. Within the first few weeks after the spill, USIBWC CRP staff recorded the lowest dissolved oxygen levels ever in the two sites immediately downstream. (See tables below) Dead fish were recorded in the water all the way downriver at the Fabens/Tornillo POE site (Station 15704), which is about 38 miles away from the spill site. In October 2021, EPW began discharging additional treated effluent from one of their wastewater treatment plants into the river to dilute the contaminated water until line repairs were completed. Conditions have only begun to improve recently, with dissolved oxygen levels rising but still well below required water quality standards. The broken lines were fully repaired as of January 2022 and current plans are in place to address the biosolids that remain in the river now that the water is low.

Date	Bacteria (E.coli, MPN)		Dissolved Oxygen (mg/L)	
	13272	*14465*	*13272*	*14465*
01/19/2021	650	30	11.1	9.9
2/11/2021	250	20	7.0	9.6
3/9/2021	140	440	3.7	13
4/13/2021	110	770	9.03	8.3
5/11/2021	170	240	6.09	4.4
6/10/2021	120	140	6.5	8.1
7/13/2021	2400	Not sampled	7.1	Not sampled
8/10/2021	120	Dry	6.5	Dry
9/14/2021	>2400	>2400	0.28	0.24
10/13/2021	>2400	>2400	1.4	0.36
12/14/2021	>2400	>2400	0.49	0.3
01/11/2022	>2400	>2400	7.4	0.29

Water quality data from the station immediately downstream of the sewage spill (Station 13272, Rio Grande at Courchesne Bridge) and the station located at the end of the channelized portion (Station 14465, Rio Grande at Riverside Diversion Dam). Data in red text is after the sewage spill and shows a spike in bacteria levels combined with a significant drop in disolved oxygen levels in the river.

E. *Coli* Sampling Results

8/27/2021 at Station 13272	**41,060**	Data not collected, water sample only
8/27/2021 at Station 15089, about 0.5-1 mile downstream of 13272	**6,310**	Data not collected, water sample only

Pictured on page 19: Rio Grande at Courchesne Bridge, Station 13272, immediately downstream of the site of the sewage spill. Pictures taken in January 2022 and sewage is still clearly visible in the water. Photos taken by Leslie Grijalva

Security, Safety and Sampling Along the Border

2021 was a difficult year for security along the border for those sampling in the Rio Grande. The increase in the number of migrant crossings created difficulties for those collecting samples. Many of the stations where USIBWC CRP partners collect water samples are very remote and are, oftentimes, frequent spots for crossings and illegal activities. This has forced sampling personnel to take additional precautions when out in the field. It has become common for sampling personnel to encounter people crossing while out at the river or come upon illicit activity occurring. Above all else, safety is always a priority for USIBWC CRP partners- when in doubt, stay out of the area. In the past, stations have been dropped due to concerns over personnel safety. CRP staff encourage all sampling personnel, regardless of the area, to follow a few basic steps to ensure safety:

- Make a plan! Make sure your sampling event is planned and coworkers or your supervisor know where you'll be going, how long you'll be out and when you're expected to return.
- Always use the buddy system- never go out into the field alone.
- If you have a security office, safety office, etc., work with them to make sure you're following your agency's guidelines for field work.
- If you're sampling in remote areas with little to no cell phone reception, try to have a satellite phone or GPS device that will allow people to find you.
- If your field work requires work behind the border wall, coordinate with Border Patrol so that patrolling units know who you are, where you'll be and can be nearby if they're needed. It also helps in case you need access to gates.
- Ensure your vehicle is locked and your belongings are secure whenever you step away. Always keep a method of communication on you.
- Always be aware of your surroundings. If something doesn't feel right, leave the area.
- If you're in danger and unable to get to safety, remember- vehicles, equipment, and personal belongings can be replaced. You are not replaceable. Give them whatever they want.
- Always report incidents to the proper people in your organization.

Pictured: Border Wall. Photo by Frankie Piñon

Water Monitoring During the Pandemic

Pictured: USIBWC CRP staff Lisa Torres with USIBWC Presidio FO staff Julia Klejmont collecting samples. Photo by Leslie Grijalva

Pictured: USIBWC Amistad FO staff Joel Shier collecting a bucket sample. Photo by Leslie Grijalva

The COVID-19 pandemic changed how we do everything, including water quality monitoring. The USIBWC CRP staff, as well as the field offices, continued working throughout the pandemic. Since the stations collected by the field offices are "treaty" stations, or stations that are listed in the treaties with Mexico, water monitoring was deemed mission critical by the Commission. These stations comprise a large portion of those sampled by the program. At the height of the pandemic, the USIBWC CRP was one of the few water quality monitoring programs in the State of Texas that was able to maintain almost normal levels of monitoring during the shutdown in 2020.

Routine monitoring was back to its regular schedule by March 2021 at the request of our partners. USIBWC CRP staff faced a challenge in making sure that partners were up to date with changing guidelines and protocols. Many of the safety guidelines were the same as those for the general public- for example, personnel were asked to wear masks and practice social distancing. But many partners followed additional restrictions, such as operating vehicles with no more than one person at a time, which placed a burden on some partners with limited access to vehicles.

Once everyone started to get back into a regular routine, USIBWC CRP staff noticed one big issue- partners who were not actively sampling sites during the pandemic were having trouble remembering proper procedures. In addition, equipment required maintenance. USIBWC CRP staff immediately provided all partners with what they needed to get their equipment back in tip-top shape. However, with travel restrictions still in place, an alternative for conducting refresher training was needed for partners. USIBWC CRP staff had just the solution: video trainings! The USIBWC CRP staff employed all means of video capability available- Skype, Teams, Facetime and Zoom. Currently, the USIBWC CRP staff is also working on pre-recorded videos on procedures, such as calibration and post-calibration, that will be made available to partners so they have resources to use when staff is not readily available.

Once USIBWC CRP staff received the all-clear to begin traveling, they set out to train new sampling personnel to ensure they knew how to conduct correct sampling and monitoring procedures. USIBWC CRP staff will be going out to train on-site to help partners return to their regular routine.

Effects of Nonpoint and Point Source Pollution on the Environment

What is nonpoint and point source pollution?

That's a great question! Point source pollution is just that- pollution released from an identified source. The EPA defines point source pollution as "any contaminant that enters the environment from an easily identified and confined space." A great example of point source pollution is the sewage spill in El Paso, TX that was discussed earlier in this report. Some communities along the border are not connected to city sewer systems for various reasons and may dump sewage and household waste straight into the river. This unfortunately contaminates the very same water they later have to drink.

Pictured: USIBWC staff conducting a visit of a drain located on the Mexican side of the river across from El Paso, TX. Lots of trash and bad quality water always visible. Photo taken by Leslie Grijalva

Nonpoint source pollution is the opposite- it is pollution that may come from many places, all at once, with sources that are much harder to identify. Nonpoint source pollution can be caused by many things, including stormwater runoff from city streets, trash and even things we do in our everyday life. Community members generally don't realize that stormwater drains are connected to the river and may not consider the negative effects on the environment when substances such as used oil or solvents are poured down the drain. This is an aspect of our outreach and environmental education that we focus on.

Herbicides and pesticides are another form of nonpoint source pollution. Many times these chemicals, which are used to inhibit the growth and propagation of unwanted plants and pests in crops, end up in waterways due to water runoff. As the runoff makes its way to the water, other substances are picked up, which contributes more to the pollution.

High levels of fertilizers contribute to high levels of nutrients in water, which, along with other factors, have been linked to an increase in algal blooms. Algal blooms can have many detrimental effects on the environment, including fish kills, very low levels of dissolved oxygen and may even be toxic to humans and animals. However, chemicals are not the only forms of water pollution.

The Rio Grande Basin has a significant issue with trash and illegal dumping. It is very common to see the riverbed or surrounding banks littered with trash, especially in the Upper Rio Grande region where the river is dry most of the year. The pandemic has worsened this issue due to temporary closures of trash collection sites, altered trash collection schedules and an increased use of pandemic-associated plastic and single-use personal protective equipment such as gloves and disposable masks. Not only is the trash unsightly, but it can cause clogs in water ways. In El Paso, USIBWC CRP staff discovered an alarming amount of non-flushable items in the water, such as feminine hygiene products, following the sewage spill.

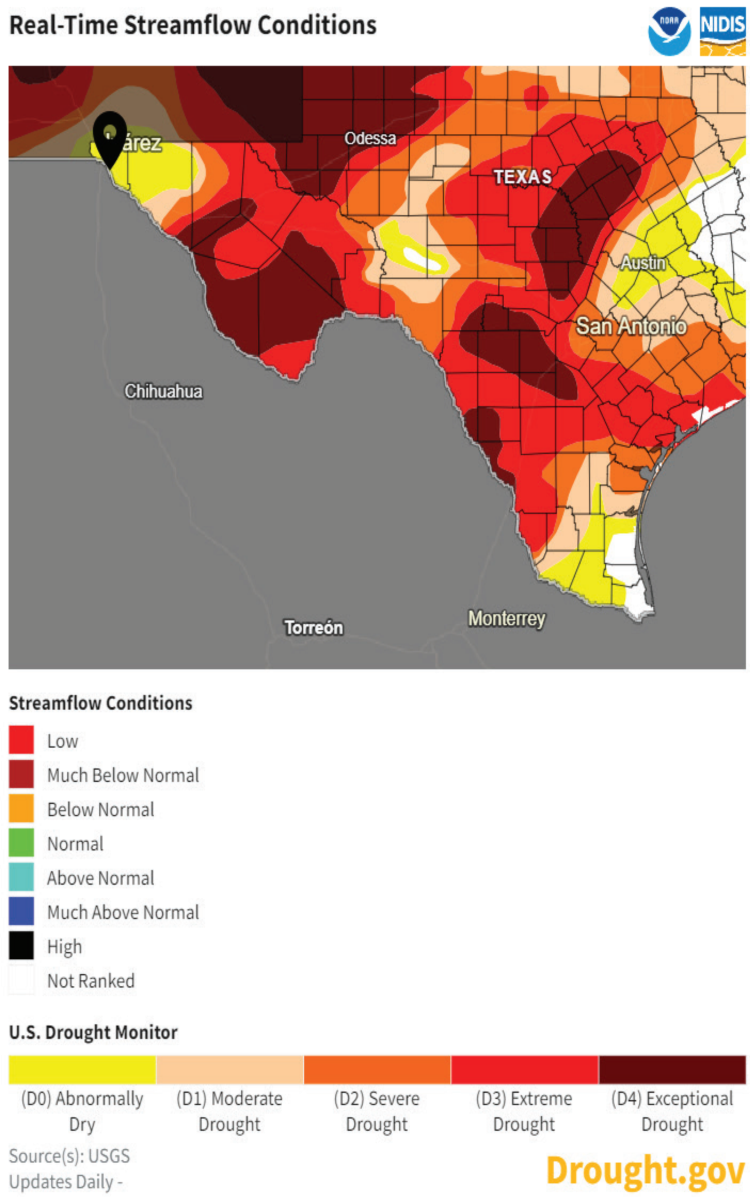
What can we do to help?

We can all help keep our waterways clean by being more environmentally conscious when we make decisions. Choose the non-toxic products for your lawn so that when you're watering, or when it rains, those harmful chemicals don't make their way to the river. Instead of washing your car in your driveway and letting that soapy water run into the storm drains, take your car to a car wash. Additionally, dispose of your trash properly and don't flush things other than toilet paper down the toilet!

Is there a trash issue near you? Host a cleanup! The USIBWC has a program, the Adopt-a-River Program, that can solve that issue. Modeled after the Adopt-a-Highway program, groups in the El Paso and surrounding area can adopt a section of the river and do cleanups throughout the year. It's a great way to get the community involved in doing something to help the environment and keep the Rio Grande Clean. Currently the program only has adoptable sections in the El Paso and neighboring New Mexico areas, but if you are interested in starting something similar in other parts of the river basin, please contact USIBWC CRP staff.

Pictured at left, top to bottom: Trash and clothing along the banks of the river in Del Rio TX; Disposable gloves left on the ground in a parking lot, El Paso, TX; River Cleanup by El Paso Community College. Photos by Leslie Grijalva

Drought in the Rio Grande Basin



According to an article in Smithsonian Magazine, the current megadrought (a severe drought lasting two or more decades) in much of the western U.S. is one of the worst droughts in history. During times of significant drought, care is taken to ensure that there is enough water to meet human demand (a process called water accounting, which is also a USIBWC function). But what if there's not enough water in the river?

Due to multiple diversions and dams throughout Colorado, New Mexico and Texas, those in the Rio Grande watershed depend greatly on rainfall and snowpack from its headwaters in the Colorado San Juan mountains. During the current drought, caused by the multiple years of La Niña weather patterns, there has not been enough rainfall or snow over the past two decades, resulting in very dry periods. Elephant Butte Reservoir, New Mexico's largest reservoir and where Texas gets its water delivery from New Mexico, is at a critically low 7.3 percent capacity. Amistad and Falcon Reservoirs in Texas are at 41.4 percent and 19.7 percent capacity, respectively, and this water must be shared with Mexico.

Drought in the Rio Grande Basin is a big deal! The Rio Grande is one of the most endangered rivers in the United States. Over the course of time, and especially during times of severe drought, water diversions and heavy water consumption leaves about 20% of the water free to flow into the Gulf of Mexico. If you live anywhere in the Rio Grande Basin, the river can make up anywhere from 30-100% of your drinking water. In many areas, such as El Paso, it is a primary source of drinking water, accounting for about 30% of drinking water for residents. In areas such as Laredo, TX and down through the Lower Rio Grande Valley, the river is their sole source of drinking water. Population growth in these borderland cities has placed a higher demand on already stressed water supplies.

Drought brings with it water quality related implications. Salinity levels can increase when flows are low, which in turn makes the water unusable for irrigation. In addition to high salinity levels, low flows are also correlated with low dissolved oxygen levels as well as algal blooms. Algal blooms are triggered by high temperatures, lots of sunlight and high availability of nutrients (phosphorus and nitrogen). Blooms can be distinguished by the discoloration of the water that can create green, red, brown or yellow discoloration. These blooms can cause fish kills, potentially creating a ripple effect on the food chain of the local ecosystem. Since communities rely on the river for drinking water, this presents another issue.

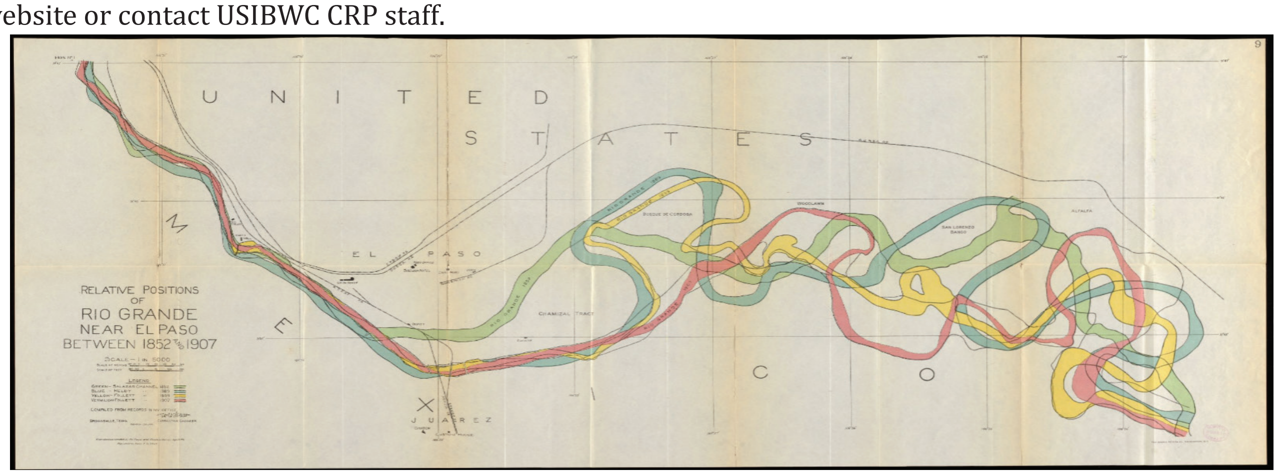
A Glimpse Through Time: The Chamizal Convention of 1963 and Segment 2308

Pictured: USIBWC CRP staff Lisa Torres collecting samples at Station 15528 in the channelized portion of the Rio Grande. Photo by Leslie Grijalva

Segment 2308 is the only segment in the Texas portion of the Rio Grande Basin that is not classifed for contact recreation. It is also not considered as a potable water source. This segment is located in the only concrete-lined portion of the 1,255 mile segment of the Rio Grande that creates the US-Mexico boundary. The 4.3 mile stretch of the river is famous for its part in the Chamizal Convention of 1963.

In the old days, the Rio Grande was a large, wild river affected by summer monsoons and flooding in the desert landscape. Its course changed continously and, at times, rather drastically (see picture below). This becomes an issue if that river is an international boundary. In 1848, the Treaty of Guadalupe Hidalgo was signed, which ended the Mexican- American War and also defined the international border as the “line along the middle of the deepest part of the channel in the Rio Grande, continuously and in tandem with any fluctuation in its channels or its banks.” In 1864, a major flood radically shifted the Rio Grande, causing conflict over land between the two countries for many years, from the mid-1800’s until the Chamizal Convention of 1963. In 1884, another treaty modified this definition, stating that the line of a river-defined border would follow the changing path of the boundary river in response to gradual changes caused by flowing waters.

The Chamizal Convention of 1963 ended the dispute over territory between the U.S. and Mexico and called for the river channel to be cemented and made into a concrete-lined channel to prevent the Rio Grande from changing course again. This channel is what became Segment 2308 in the Rio Grande Basin. Diversions from the river at American Dam into the American Canal for use by the U.S., and into International Dam for use by Mexico, means that this section of the river, by treaty, should always be dry. The only water in this section is from stormwater runoff, seepage or wastewater effluent. For these reasons, Segment 2308 has different designations under the Texas State Water Quality Standards for contact recreation and domestic water supply, and much higher standards for bacteria levels. For more information on this Treaty, please visit the USIBWC website or contact USIBWC CRP staff.

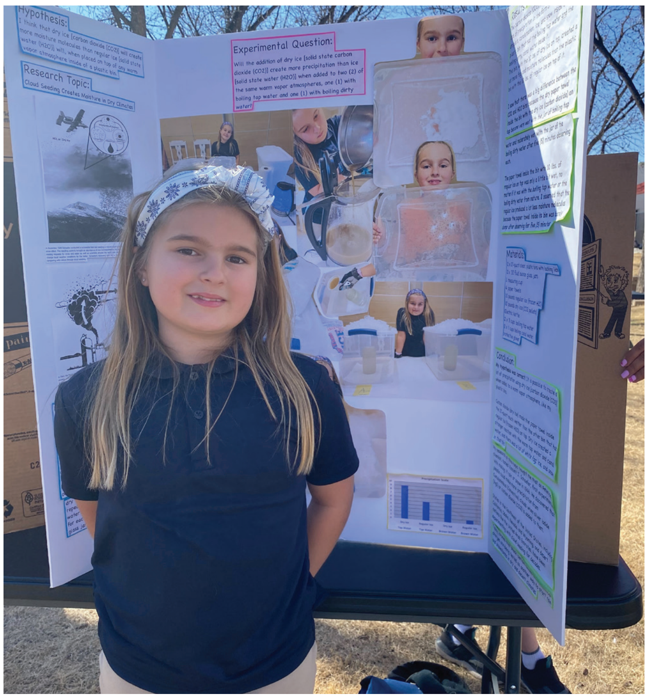


Pictured: Relative positions of the Rio Grande near El Paso between 1852 and 1907 showing how the river meandered before the channelization. Map provided by USIBWC Records Management Division

Public Participation and Outreach

Basin Advisory Committee Meetings

Basin Advisory Committee (BAC) meetings are held three times a year, and consist of meetings with the Upper Rio Grande (El Paso), the Lower Rio Grande Valley and the Pecos. The meetings usually involve an annual water quality update to the public, as well as updates about important issues in the area. This might include fish kills, water quality concerns, and projects in the area. Meetings are open to the public. Information on BAC meetings, minutes and agendas for past meetings can be found at: https://ibwc.gov/CRP/Calendar.htm.



Pictured: 4th Grade Student Hannah Klandrud by her science fair poster. Photo by Frances Castro

USIBWC CRP staff has always prided themselves on providing environmental education through outreach and community events, so they were so excited to hear about this young lady! In November 2020, USIBWC CRP staff gave a virtual presentation to Hannah Klandrud's (pictured at left) 3rd grade class about the Rio Grande. During the presentation, the USIBWC CRP staff explained how water is used by both countries, irrigation techniques and also gave the class a tour of American Dam, all on video. Hannah was so inspired by the presentation that she wanted to investigate how to help bring water back to the river. In 2021, she did a science fair project titled, "Cloud Seeding Creates Moisture in Dry Climates." Hannah gave a great presentation on her project and showed her passion and talent for science. The USIBWC CRP congratulates this young scientist and hopes to see her work on the Rio Grande in the future!

Pictured: USIBWC CRP staff Leslie Grijalva and Lisa Torres at an outreach event at UTEP. Photo by Javier Torres

COVID protocols canceled all in-person activities, including outreach. USIBWC CRP staff developed an innovative way to continue doing outreach by conducting it virtually, but were ready to get back to interacting with the community in person. Here, USIBWC CRP staff Leslie Grijalva (left) and Lisa Torres (right) hosted a booth at the University of Texas El Paso's Earth Science Day fair held in October 2021. This was the first in-person outreach event USIBWC CRP staff had conducted in a year and a half!

USIBWC CRP Website and Resources

The USIBWC CRP maintains a website with a wealth of information for the public:

- **About CRP:** An introduction to the Rio Grande Basin
- **Contact Information:** Contacts for the USIBWC CRP and program information
- **Study Area:** Maps of the Rio Grande Basin and monitoring locations
- **Monitoring Station Data:** USIBWC CRP and TCEQ water quality data in Excel files by station; information about quality assurance, parameters, and standards.
- **Other Information:** A calendar with information on upcoming meetings and activities. There are links to studies and publications about the Rio Grande Watershed and the USIBWC Adopt-a-River program. Partner links provide resources for monitoring partners, links to other planning agencies, and links to environmental groups and resources for the Rio Grande.
- **Media Gallery:** Photo albums and videos about monitoring, research, geography, wildlife, and outreach. Our video gallery now includes several videos, the most recent being about water quality in the Rio Grande.

USIBWC CRP Website
https://ibwc.gov/CRP/Index.htm

References, Additional Resources and Links:

TSWQS: https://www.tceq.texas.gov/waterquality/standards/2014standards.html

SWQM: http://www.tceq.texas.gov/waterquality/monitoring

2020 Texas Integrated Report: https://www.tceq.texas.gov/waterquality/assessment/20twqi

Coordinated Monitoring Schedule: http://cms.lcra.org/

EPA Recreational WQ Criteria: http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/

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RGISC: http://rgisc.org/

USIBWC website: http://www.ibwc.gov/home.html

U.S. Fish & Wildlife Service, Invasive and Exotic Species: https://www.fws.gov/invasives/

Rare. Threatened, amd Endangered Species of Texas by County, https://tpwd.texas.gov/gis/rtest/

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