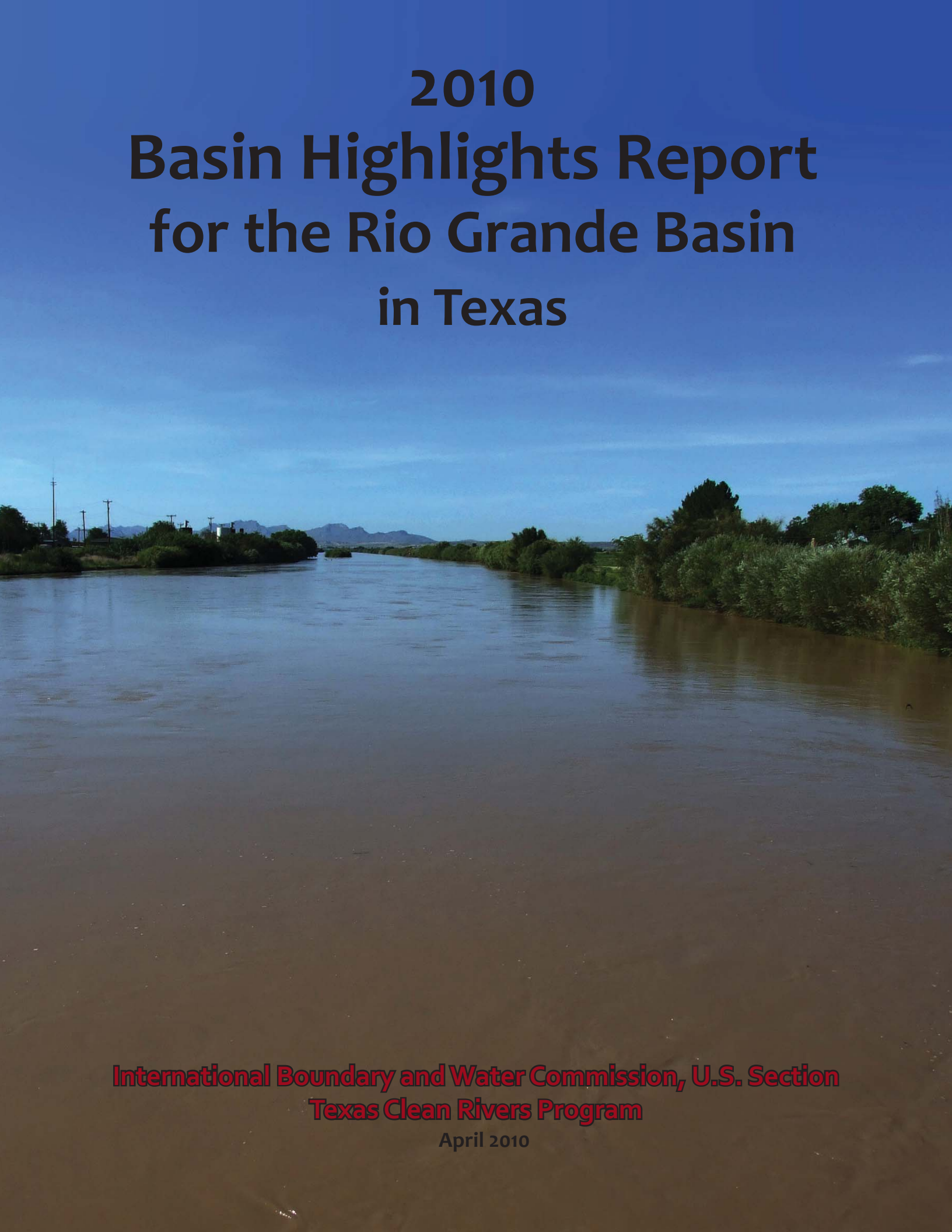
# 2010
# Basin Highlights Report for the Rio Grande Basin in Texas

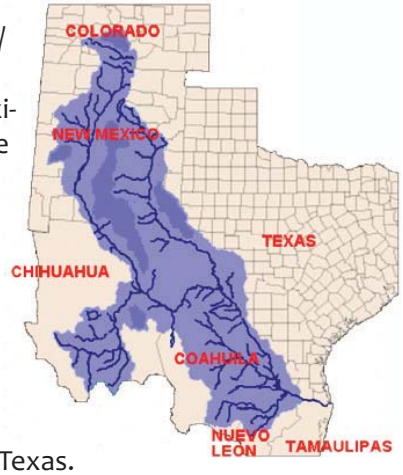


International Boundary and Water Commission, U.S. Section
Texas Clean Rivers Program
April 2010

# 2010 Rio Grande Basin Highlights Report

## Introduction

The United States Section of the International Boundary and Water Commission (USIBWC) supports and administers the Texas Clean Rivers Program (CRP) in the Rio Grande Basin under the guidance of the Texas Commission on Environmental Quality (TCEQ), providing expert insight into the needs and water quality issues that are unique to an international water boundary. This report summarizes the 2009 to 2010 USIBWC CRP water quality monitoring activities as well as water quality data for the Rio Grande Basin in Texas.




The entire Rio Grande/ Rio Bravo watershed covers an area approximately 924,300 square kilometers (335,000 square miles), with approximately half the watershed in the United States and the other half in Mexico. Roughly 50,000 square miles of the watershed are within Texas.

The river runs 1,255 miles along the international boundary with Mexico. The study area of the USIBWC CRP Rio Grande Basin encompasses this international reach of the Rio Grande/Rio Bravo from the New Mexico/Texas/ Chihuahua border (El Paso/Cuidad Juarez area) to the Gulf of Mexico (Brownsville/ Matamoros area). For the purpose of coordination and planning, the USIBWC study area has been divided into four sub-basins: the Upper Sub-Basin extending from the New Mexico/ Texas state line downstream to International Amistad Reservoir; the Pecos River Sub-Basin; the Middle Sub-Basin from International Amistad Reservoir downstream to International Falcon Reservoir and including the Devil's River; and the Lower Sub-Basin from International Falcon Reservoir downstream to the Gulf of Mexico.

Due to the basin's sheer size, the USIBWC CRP depends on sampling partners to collect the necessary water quality data for the State of Texas. CRP partners throughout the basin have been a valuable asset in water quality monitoring, providing advice and suggestions on improving the program and the basin, developing and assisting in special studies, and communicating and educating the general public.

## This Year's Highlights

### USIBWC Canalization Project Record of Decision

In June 2009, the USIBWC Commissioner signed the Record of Decision (ROD) for River Management Alternatives for the Rio Grande Canalization Project (RGCP), a 105.4-mile river corridor that extends along the Rio Grande from below Percha Dam in Sierra County, New Mexico to American Dam in El Paso County, Texas. The ROD selects the Integrated Land Management Alternative for long-term maintenance and operation of the RGCP and includes the implementation of several environmental measures within the floodway and river channel intended to enhance or rehabilitate a mosaic of native riparian habitats, restore river and floodplain connectivity where feasible, and diversify the aquatic habitat.

### USIBWC Adopt-A-River Program

During the summer of 2009, management of the USIBWC Adopt-a-River Program was transferred to the USIBWC Clean Rivers Program. The Adopt-a-River Program promotes a litter-free Rio Grande throughout the IBWC Upper Rio Grande Project, via agreements with volunteer groups. CRP staff are excited to integrate the outreach goals of the two programs.


Volunteers conduct an Adopt-A-River cleanup in El Paso's Upper Valley, September 2009

### Draft 2010 Assessment/Integrated Report

TCEQ has completed the first phase of data analysis for the 2010 Assessment/ Integrated Report, as required by the Clean Water Act. Segments of waterbodies that exceed water quality standards are placed on the 303(d) Impairment list. The preliminary analysis showed that Segment 2306 (from Presidio to Amistad Reservoir, including the Big Bend stretch)

*Cover Photo: Canutillo Bridge looking upstream, El Paso County, July 2009. Backcover: Canutillo Bridge looking downstream.*

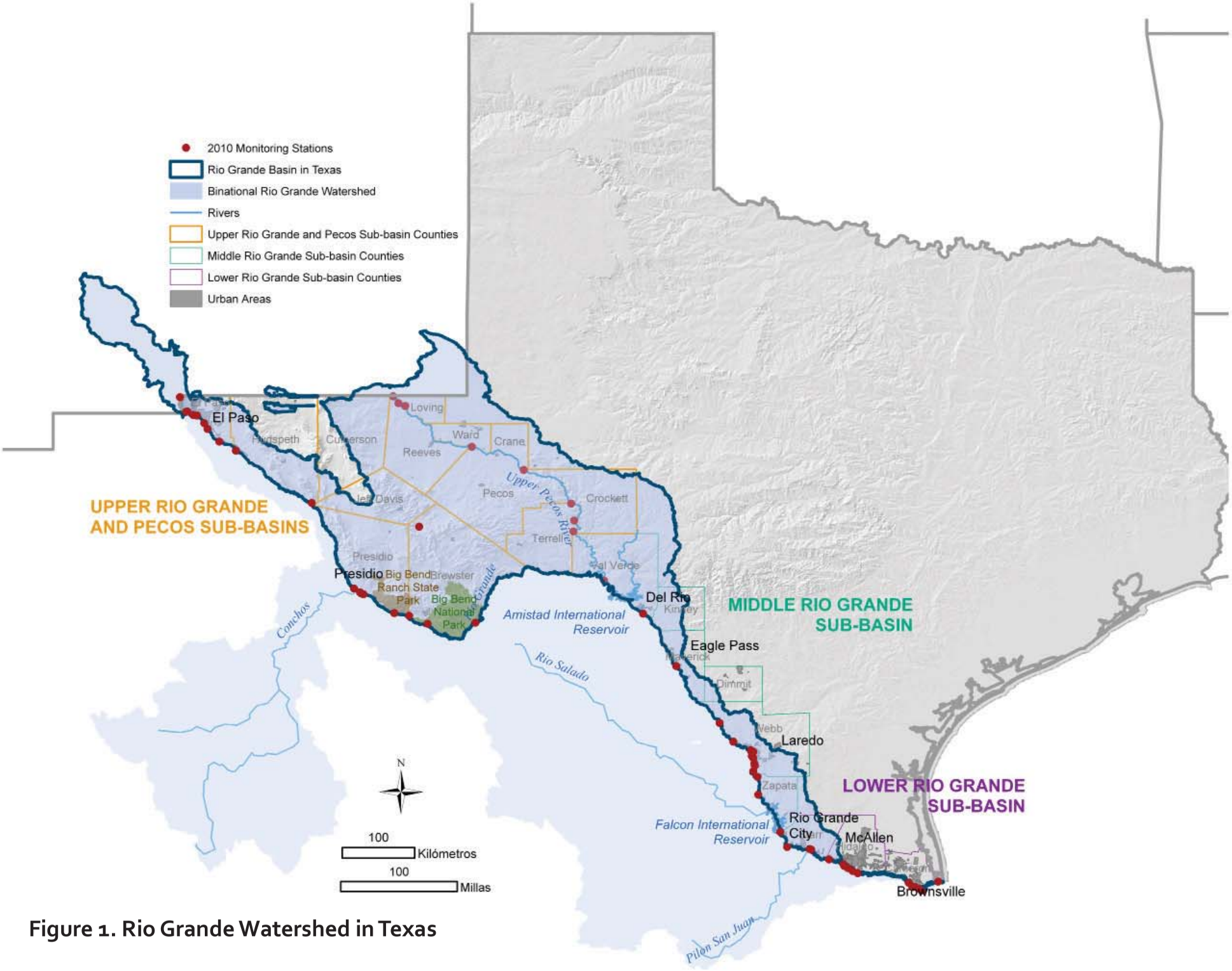



**Figure 1. Rio Grande Watershed in Texas**

has been listed as impaired for salinity. See the water quality sections of this report (Table 5 and Figure 2).

## 2009 Fish Kills

In May of 2009, fish kills occurred in the Big Bend stretch of the Rio Grande. TCEQ and Texas Parks and Wildlife Department (TPWD) are investigating the possible causes. In October and November of 2009, massive fish kills occurred along Gulf of Mexico coast near Corpus Christi Bay due to red tide. However, TPWD did not detect red tide as far south as the mouth of the Rio Grande. To report fish kills or suspected red tide events 24 hours a day, call TPWD at 512-389-4848.

## Minute 313 Work

IBWC is continuing work under IBWC Minute 313 to maintain the river channel and floodplain from El Paso to Fort Quitman. Maintenance work is intended to prevent the international boundary from changing and to upkeep flood control projects.

Station 15795 upstream of Fort Hancock, TX, before maintenance work (left) and after (right)

## BECC/ NADBank Infrastructure Projects

In the past several years, the Border Environment Cooperation Commission (BECC) has certified numerous border infrastructure projects to be funded by the North American Development Bank (NADBank). Projects in progress include wastewater treatment plant improvements in Texas (Progreso, La Pryor, La Villa, La Grulla, Pharr) and Mexico (Anapra, Ciudad Juarez, Reynosa, Miguel Aleman, Matamoros, El Porvenir, Nuevo Laredo) to name a few. These projects have direct impacts on the water quality of the Rio Grande.

## New Protected Area in Mexico

In the summer of 2009, Mexico's President Felipe Calderon issued a decree to create a protected area of over 800,000 acres in the Rio Grande corridor near Big Bend. The protected area, the Ocampo Flora and Fauna Protection Area in northern Coahuila, connects two federally protected areas, the Maderas del Cármen and the Cañon de Santa Elena Flora and Fauna protection areas. The Ocampo links about 2 million acres of conservation area in Mexico. In the U.S., an additional 1.3 million acres is protected within the Big Bend State and National Parks, the Wild and Scenic River stretch of the Rio Grande, Black Gap Wildlife Management Area and The Nature Conservancy (TNC)'s Davis Mountains Preserve. More can be found at the TNC Website (p. 30).

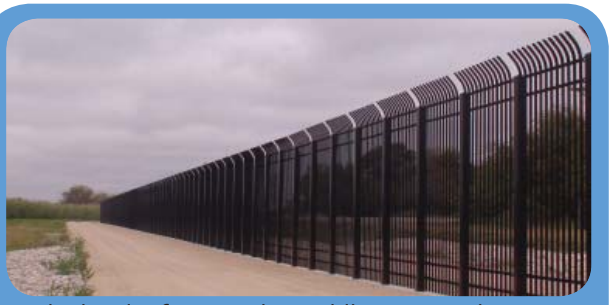
## Border Fence

During 2009, the Department of Homeland Security (DHS) continued construction of the border fence along the Rio Grande. In some locations, such as the Lower Rio Grande Valley, DHS and IBWC are collaborating on infrastructure for both flood protection and security.

## National Rivers and Streams Assessment

In 2009, scientists from TCEQ, TPWD, U.S. Geological Survey (USGS), USIBWC, and other organizations, participated in U.S. Environmental Protection Agency (EPA)'s National Rivers and Streams Assessment (NRSA) in Texas. Water and sediment quality data, as well as fish, aquatic invertebrates, and habitat information, were collected at eight sites on the Rio Grande and several more on the Pecos River. For more info, visit the NRSA website (p. 30).

The new Ocampo conservation area will help protect species like Desert Big Horn Sheep. Photo taken from Lower Canyons on the U.S. side, in March 2009



The border fence in the Middle Rio Grande, near Del Rio TX, November 2009

Scientists gather fish information during NRSA field work in Hudspeth County, September 2009

# Overview of Water Quality Monitoring

IBWC staff and UTEP students sample San Elizario, TX, downstream of El Paso, in September 2009

IBWC staff from American Dam collect samples in the shallow waters of the channelized portion of the river, Segment 2308, in El Paso, TX, August 2009

IBWC staff from Amistad Dam use a multiprobe instrument to collect field parameters such as pH and DO, downstream of Eagle Pass, TX, November 2009

IBWC staff and El Paso Community College students measure flow near Fort Hancock, TX, August 2009

## How do we tell the quality of water?

During the past year, the USIBWC CRP continued to maintain its large network of water quality stations. CRP and TCEQ gain an understanding of the conditions of the water quality through **routine monitoring**, which is performed at fixed locations at regular intervals throughout the year. Table 1 shows the kinds of data that we analyze during routine monitoring and why.

Routine monitoring helps us understand questions about how the river can be used (Table 3), such as:

- Is it swimmable?
- Is it drinkable?
- Is it fishable?
- Is it healthy for aquatic life?

CRP partners throughout the basin collect water quality and sediment samples at about 80 routine stations. When these samples are collected for laboratory analysis, personnel also make field observations to record conditions at the time the sample was taken. **Field observations** include things such as weather conditions at the time of collection, recent rain events in the area, water color, and other general notes related to water quality and stream uses. Important **field measurements** are made using different pieces of equipment, and include: water and air temperature, water depth, stream flow and how that flow compares to the normal flow for that water body, secchi disk or how murky the water is, and three of the most important water quality parameters in a water body -- pH, specific conductance, and dissolved oxygen (DO). These field parameters are described in more detail in Table 1.

The routine collection of field parameters together with laboratory parameters, also described in Table 1, allow us to determine the health of the river ecosystem and what potential human and ecological issues we should focus on. Data collected is compared with criteria in Table 2 and screening levels in Table 4; these steps are described in the next section.

When routine monitoring shows a water quality issue or trend, we begin more **intensive monitoring and special studies**. Special studies are created to gather information to address a specific water quality issue.

# Table 1. 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 affects 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. | High conductivity can cause physiological effects in animals and plants. |
| **Dissolved Oxygen (DO)** | Measure of the oxygen in the water. DO is one of the most important water quality parameters. | Low DO values can lead to reduced numbers of aquatic life in a water body. Very low levels (<2) can be indicative of higher levels of oxygen-demanding pollutants 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 healthier aquatic plant life (particles in water block sunlight for photosynthesis). |
| **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. |
| **Nutrients** | Nutrients include nitrogen compounds, ammonia, and phosphorus. | High levels can cause excessive plant growth, which can lead to reduced dissolved oxygen, reduced stream flow and reduced navigability of the waters. Elevated ammonia can also be toxic to aquatic life. |
| **Chlorophyll-a** | Chlorophyll-a is an indicator of excessive plant and algal growth in the water. | High levels for long periods indicate low water quality and are indicative of excess nutrient levels. |
| **Alkalinity** | A measure of the acid neutralizing ability of the water due to the amount of carbonates, bicarbonates, and hydroxides. | Alkaline water is detrimental to agriculture and plant growth. |
| **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 organic compounds both in water and in sediment. | Organics can result in long- and short-term effects on aquatic life and human health. |

# Table 2. Primary Surface Water Quality Standards for the Rio Grande Basin

| Texas Surface Water Quality Standards for the Rio Grande Basin | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEGMENT | | USES | | | CRITERIA | | | | | | |
| Segment | Segment Name | Recre-ation | Aquatic Life | Domestic Water Supply | $Cl^-$ (mg/l) | $SO4^{2-}$ (mg/l) | TDS (mg/l) | DO (mg/l) | pH range (SU) | Bacteria geo/grab (#/100ml) | Temper-ature (deg F) |
| 2301 | Rio Grande Tidal | CR | E | - | - | - | - | 5.0 | 6.5-9.0 | 35/200 | 95 |
| 2302 | RG Below Falcon Reservoir | CR | H | PS | 270 | 350 | 880 | 5.0 | 6.5-9.0 | 126/200 | 90 |
| 2303 | Falcon International Reservoir | CR | H | PS | 200 | 300 | 1,000 | 5.0 | 6.5-9.0 | 126/200 | 93 |
| 2304 | RG Below Amistad International Res-ervoir | CR | H | PS | 200 | 300 | 1,000 | 5.0 | 6.5-9.0 | 126/200 | 95 |
| 2305 | International Amis-tad Reservoir | CR | H | PS | 150 | 270 | 800 | 5.0 | 6.5-9.0 | 126/200 | 88 |
| 2306 | RG Above Amistad International Res-ervoir | CR | H | PS | 300 | 570 | 1,550 | 5.0 | 6.5-9.0 | 126/200 | 93 |
| 2307 | RG Below Riverside Diversion Dam | CR | H | PS | 300 | 550 | 1,500 | 5.0 | 6.5-9.0 | 126/200 | 93 |
| 2308 | RG Below Interna-tional Dam | NCR | L | PS | 250 | 450 | 1,400 | 3.0 | 6.5-9.0 | 605/2,000 | 95 |
| 2309 | Devils River | CR | E | PS | 50 | 50 | 300 | 6.0 | 6.5-9.0 | 126/200 | 90 |
| 2310 | Lower Pecos River | CR | H | PS | 1,700 | 1,000 | 4,000 | 5.0 | 6.5-9.0 | 126/200 | 92 |
| 2311 | Upper Pecos River | CR | H | - | 7,000 | 3,500 | 15,000 | 5.0 | 6.5-9.0 | 126/200 | 92 |
| 2312 | Red Bluff Reservoir | CR | H | - | 3,200 | 2,200 | 9,400 | 5.0 | 6.5-9.0 | 126/200 | 90 |
| 2313 | San Felipe Creek | CR | H | PS | 50 | 50 | 400 | 5.0 | 6.5-9.0 | 126/200 | 90 |
| 2314 | RG Above Interna-tional Dam | CR | H | PS | 340 | 600 | 1,800 | 5.0 | 6.5-9.0 | 126/200 | 92 |

| Texas Surface Water Quality Standards for the Rio Grande Basin: Site Specific Receiving Water Assessments | | | | | |
|---|---|---|---|---|---|
| SEGMENT | COUNTY | WATER BODY | ALU | D.O. | DESCRIPTION |
| 2304 | Val Verde | Cienegas Creek | H | 5.0 | Perennial stream from the confluence with the Rio Grande to the headwater spring source (Cienegas Springs) approximately 0.8 km north of Cienega Lane |
| 2310 | Terrell | Independence Creek | E | 6.0 | Perennial stream from the confluence of the Pecos River to the mouth of Surveyor Canyon (upstream of FM 2400) |

CR - Contact Recreation
NCR - Noncontact Recreation
E - Exceptional Aquatic Life
H - High Aquatic Life
ALU - Aquatic Life Use
PWS - Public Water Supply
L - Limited Aquatic Life
TDS - Total Dissolved Solids, $Cl^-$ - chloride, $SO4^{2-}$ - sulfate, DO - Dissolved Oxygen, geo/grab - geometric mean/grab sample

More information on primary standards can be found at TCEQ's Surface Water Quality Standards (TSWQS) website (p. 30). In addition, in 2010, the TSWQS are undergoing revisions and, if approved, may affect contact recreation standards listed above.

# Designated Uses

The State of Texas assigns designated uses to specific water bodies. Typical uses include domestic water supply, categories of aquatic life use, recreation categories, and aquifer protection. Table 3 describes the designated uses for the Rio Grande Basin, and Table 2 lists the uses and standards for each segment. Designated uses and water quality standards are defined in the Texas Surface Water Quality Standards (TSWQS). For more info, see TSWQS website (p. 30).

Contact recreation (CR) – Fishing, swimming, wading, boating, and direct water contact. The primary parameter of concern for this use is bacteria. The 2010 draft revisions to the TSWQS include changes to recreation uses.

Public water supply (PWS) - As a drinking water source, the primary concern is Total Dissolved Solids (TDS). The TSWQS include a list of parameters that are screened to ensure the domestic water supply use is met.

Aquatic life use (ALU) – To protect aquatic species. This designated use has four levels depending on the ability of a water body to support aquatic life such as fish, benthic macroinvertebrates (aquatic insects), and plants. The primary parameter is DO. The four aquatic life use categories are exceptional, high, intermediate, and limited.

Fish consumption (FC) - This applies to stream segments where citizens may collect and consume fish from the river. The TSWQS include 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 3. Designated Uses for Freshwater

| Designated Use | Description | Primary Parameter | Criteria | |
|---|---|---|---|---|
| **Contact Recreation (CR)** | Fishing, swimming, wading, boating, etc | Bacteria: Primary – *E. Coli* Secondary – fecal coliform (FC) *Tidal - Enterococcus (Entero)* | Geometric Mean | Grab Sample |
| | | | 126 colony forming units (CFU) for *E. Coli* 200 CFU FC *35 CFU Entero* | 394 CFU for *E. Coli* 400 CFU for FC *89 CFU Entero* |
| **Public Water Supply (PWS)** | Drinking water source | *See full list of Human Health Criteria in Table 3 of the TSWQS* | | |
| **Aquatic Life Use (ALU)** | 4 levels depending on the ability of water body to support aquatic life | DO - average values | Exceptional | 6.0 mg/L |
| | | | High | 5.0 mg/L |
| | | | Intermediate | 4.0 mg/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 3 of the TSWQS* Example: Mercury - 0.0122 ug/L in water & fish | | |
| **General Use (GU)** | General water quality | Water Temp, High pH, Low pH, Dissolved Soilds, Nutrients, and Chlorophyll-a. *See Tables 2 and 4.* | | |

# Water Quality Concerns

Concerns in a water body are identified when data is compared to secondary screening levels. Secondary screening levels are determined based on the water body type. The entire Rio Grande basin is listed as a freshwater stream except Segment 2301, which is listed as a tidal stream. The secondary parameters for freshwater and tidal water are listed in Table 4 to the right.

A section is listed as having a concern if more than 25% of the data fail to meet the screening levels listed in table 4. The Surface Water Quality Monitoring (SWQM) website (p. 30) has more information on secondary screening levels.

## Table 4. Secondary Screening Levels for Water Quality Concerns

| Secondary Screening Level, Freshwater | |
|---|---|
| Ammonia | 0.33 mg/L |
| Nitrate + Nitrite | 1.95 mg/L |
| Total Phosphorus | 0.69 mg/L |
| Orthophosphorus | 0.37 mg/L |
| Chlorophyll-a | 14.1 ug/L |
| **Secondary Screening Level, Tidal** | |
| Ammonia | 0.46 mg/L |
| Nitrate + Nitrite | 1.10 mg/L |
| Total Phosphorus | 0.66 mg/L |
| Orthophosphorus | 0.46 mg/L |
| Chlorophyll-a | 21.0 ug/L |

# What do we do with the water quality data?

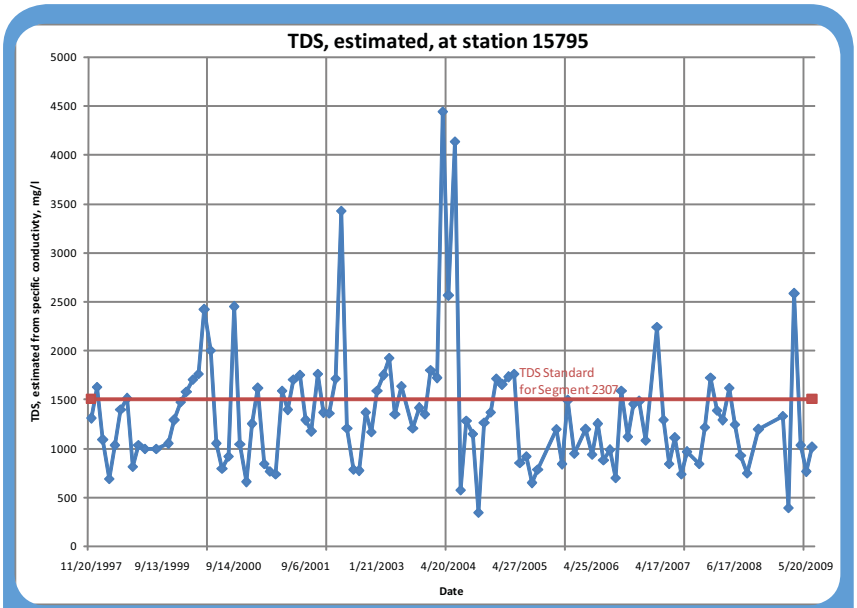
Once samples are collected, an accredited laboratory analyzes the lab parameters in Table 1, then CRP checks both field and laboratory data for accuracy, quality and adherence to approved methods. CRP submits the reviewed and quality-assured data to the TCEQ, which also runs quality assurance checks on the data before including the data in the State Surface Water Quality database.

Data from the past seven years, that contain at least 10 data points, are then compared to the TSWQS that have been assigned to each stream segment (Table 2). This comparison is used to create a summary of water quality, the Texas Water Quality Inventory (also called the Integrated Report). The Texas Water Quality Inventory is done by the TCEQ every two years as required by the Clean Water Act. (CWA) Any section of a water body that does not meet the primary standards is then placed on the 303(d) list, which contains impaired water bodies throughout the state.

**Impairments** are determined when a section does not meet the primary standards assigned to the segment. The designated use of the stream segment (Table 3) determines what value will be set for the standard. Primary water quality standards (Table 2) are set for chloride, sulfate, total dissolved solids (TDS), DO, pH, temperature, and bacteria.

**Concerns** are identified when data is compared to secondary screening levels (Table 4), which are determined based on the water body type.

Sections of a water body on the 303(d) list are then assessed to determine the course of action to take in identifying the source of the impairment and possible corrective solutions.



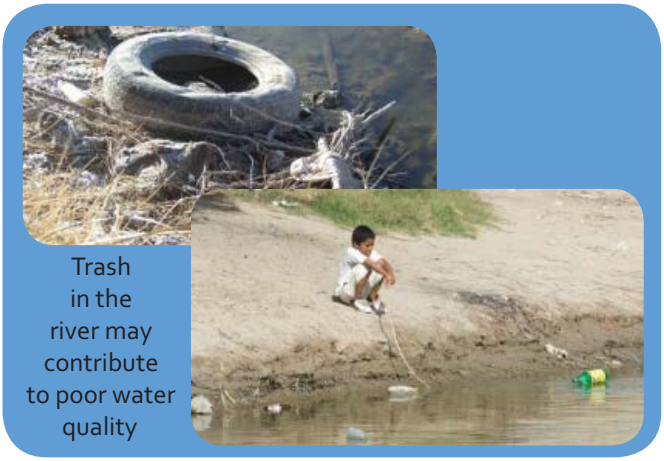

The graph shows total dissolved solids at Station 15795 in Segment 2307, in comparison to the water quality standard. Table 5 shows that Segment 2307 is impaired for TDS (a measure of salinity)

| | A | B | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Date | Flow (ft3/sec) | Days Since Last Precip | Air Temp (deg C) | Water Temp (deg C) | Dissolved Oxygen (mg/l) | PH (S.U.) | Secchi Disc (m) | Fecal Coliform (#/100ml) | E.Coli MPN | Specific Conductance (S/cm) |
| 137 | 02/21/2007 | 735 | 9 | 21.0 | 18.3 | 5.0 | 7.8 | | 220 | 16.9 | 1157 |
| 138 | 03/21/2007 | 986 | 10 | 25.0 | 22.4 | 7.7 | 7.6 | | | 105.4 | 1048 |
| 139 | 05/23/2007 | 3600 | 4 | 27.0 | 1.5 | 6.6 | 8.0 | | 6.67 | 1732.9 | 1152 |
| 140 | 06/26/2007 | 1088 | 4 | 32 | 28.5 | 9.2 | 7.8 | 0.4 | | 45 | 1060 |
| 141 | 08/29/2007 | 1160 | 4 | 35 | 30.2 | 8.3 | 8.1 | 0.35 | 117 | >2400 | 1162 |
| 142 | 9/25/07 | 1030 | > 7 | 33 | 29.9 | 14.2 | 8.2 | 1.5 | | 50.4 | 1455 |
| 143 | 11/27/07 | 900 | 3 | 18 | 17.6 | 8.8 | 8.2 | 0.25 | | 42.6 | 1064 |
| 144 | 12/12/07 | 1236 | | 28 | 23.3 | 5.1 | 8.3 | | | 72.3 | 1303 |
| 145 | 02/20/2008 | 1826 | > 7 | 24 | 20.2 | 4.9 | 8.1 | 1.2 | | 12.2 | 1090 |
| 146 | 03/18/2008 | 2917 | > 7 | 29 | 24 | 7.3 | 8.1 | 1.2 | | 101.4 | 1075 |
| 147 | 05/20/2008 | 1970 | > 7 | 28 | 26.8 | 2.4 | 8.2 | 0.76 | | 36.8 | 1160 |
| 148 | 06/24/2008 | 2589 | > 7 | 31 | 29.6 | 6 | 8 | 3 | | >2419.6 | 1070 |
| 149 | 08/26/2008 | 3000 | 1 | 30 | 29.7 | 6 | 7.7 | 1.5 | | 298.1 | 1560 |
| 150 | 09/24/2008 | 670 | 1 | 29 | 27.1 | 5.2 | 7.7 | 4 | | 228 | 1050 |
| 151 | 11/19/2008 | 640 | 5 | 22 | 20.3 | 5.7 | 8.1 | 2 | | 20 | 1220 |
| 152 | 12/18/2008 | 987 | > 7 | 20 | 16.1 | 6.3 | 8 | 1.2 | | 22.6 | 1340 |
| 153 | 02/24/2009 | 1529 | 7 | 24 | 19.1 | 7.1 | 8.2 | 0.45 | | 14.5 | 1300 |
| 154 | 03/30/2009 | 2100 | > 7 | 28 | 20.6 | 5.5 | 8.5 | 2 | | 32.7 | 93 |
| | 05/27/2009 | | 4 | 31 | 28.9 | 4.4 | 7.8 | 2.5 | | | |

Water quality data for each station is available on our website http://www.ibwc.gov/CRP/monstats.htm

# How is the quality of water?

Major water quality issues throughout the basin include bacteria and salinity. **Impairments and concerns in the Rio Grande Basin are listed in Table 5 and shown in Figure 2.** The Draft 2010 Integrated Report lists additional segments as impaired from the 2008 Integrated Report. River water with high bacteria levels may pose health risks to swimmers and other recreational users. High salinity can damage crops, is expensive to treat for drinking, and is harmful to freshwater fish and aquatic invertebrates. USIBWC CRP is committed to collecting the necessary water quality information so that the appropriate authorities can make decisions pertaining to water quality issues.



Trash in the river may contribute to poor water quality

# Table 5. Water Quality Impairments and Concerns in the Rio Grande Basin

| Water Quality Impairments and Concerns in the Rio Grande Basin - 303(d) List | | | | | |
|---|---|---|---|---|---|
| **Segment** | **Segment Name** | **Parameter (s) Impaired** | **Year First Listed** | **Parameter(s) of Concern** | **Type of Concern** |
| 2301 | Rio Grande Tidal | No Impairment | | Bacteria<br>Chlorophyll-a | CN<br>CS |
| 2302 | RG Below Falcon Reservoir | **Bacteria** | 1996, 2010 | Mercury in Edible Tissue<br>Depressed DO<br>Ammonia* | CS<br>CS<br>CS |
| 2302A | Los Olmos Arroyo | **Bacteria** | 2004 | Chlorophyll-a* | **CS** |
| 2303 | International Falcon Reservoir | No Impairment | | Toxicity in Ambient Water<br>Total Phosphorus*<br>Ammonia*<br>Nitrate*<br>Orthosphosphorus* | CN<br>CS<br>CS<br>CS<br>CS |
| 2304 | RG Below Amistad International Reservoir | **Bacteria** | 1996 | Toxicity in Ambient Water | CN |
| 2304B | Manadas Creek | No impairment | | Bacteria<br>Chlorophyll-a | CN<br>CS |
| 2305 | International Amistad Reservoir | No Impairment | | Nitrate | CS |
| 2306 | RG Above Amistad International Reservoir | **Bacteria**<br>**Total Dissolved Solids***<br>**Chloride***<br>**Sulfate*** | 1999<br>2010<br>2010<br>2010 | Chlorophyll-a<br>Total Phosphorus<br>Fish Kill Report* | CS<br>CS<br>CN |
| 2307 | RG Below Riverside Diversion Dam | **Bacteria**<br>**Chloride**<br>**Total Dissolved Solids** | 1996<br>1996<br>1996 | Nitrate<br>Orthophosphorus<br>Total Phosphorus<br>Ammonia<br>Chlorophyll-a<br>Depressed DO<br>Bacteria* | CS<br>CS<br>CS<br>CS<br>CS<br>CS<br>CS |
| 2308 | RG Below International Dam | No Impairment | | Chlorophyll-a<br>Nitrate<br>Total Phosphorus<br>Ammonia* | CS<br>CS<br>CS<br>CS |
| 2309 | Devils Rivers | No Impairment | | No Concern | |
| 2310 | Lower Pecos River | No Impairment | | Harmful algal bloom/golden alga | CN |
| 2311 | Upper Pecos River | **Depressed DO** | 2006 | Harmful algal bloom/golden alga<br>Bacteria<br>Chlorophyll-a<br>Depressed DO | CN<br>CN<br>CS<br>CS |
| 2312 | Red Bluff Reservoir | No Impairment | | Harmful algal bloom/golden alga<br>Chlorophyll-a<br>Nitrate<br>1,2-Dibromoethane in water* | CN<br>CS<br>CS<br>CN |
| 2313 | San Felipe Creek | No Impairment | | No Concern | |
| 2314 | RG Above International Dam | **Bacteria** | 1996 | Chlorophyll-a | CS |

**CN - Concern for near-nonattainment of the Water Quality Standards, CS - Concern for water quality based on screening levels**
*** - Draft 2010 Integrated Report**
*Note: Each Segment is further subdivided into* **Assessment Units (AU)**. *The entire segment may not be impaired.*
*The complete Impairments list can be found at the TCEQ 303(d) website (p. 30).*

# Figure 2 -a). Water Quality Impairments and Concerns in the Rio Grande Basin

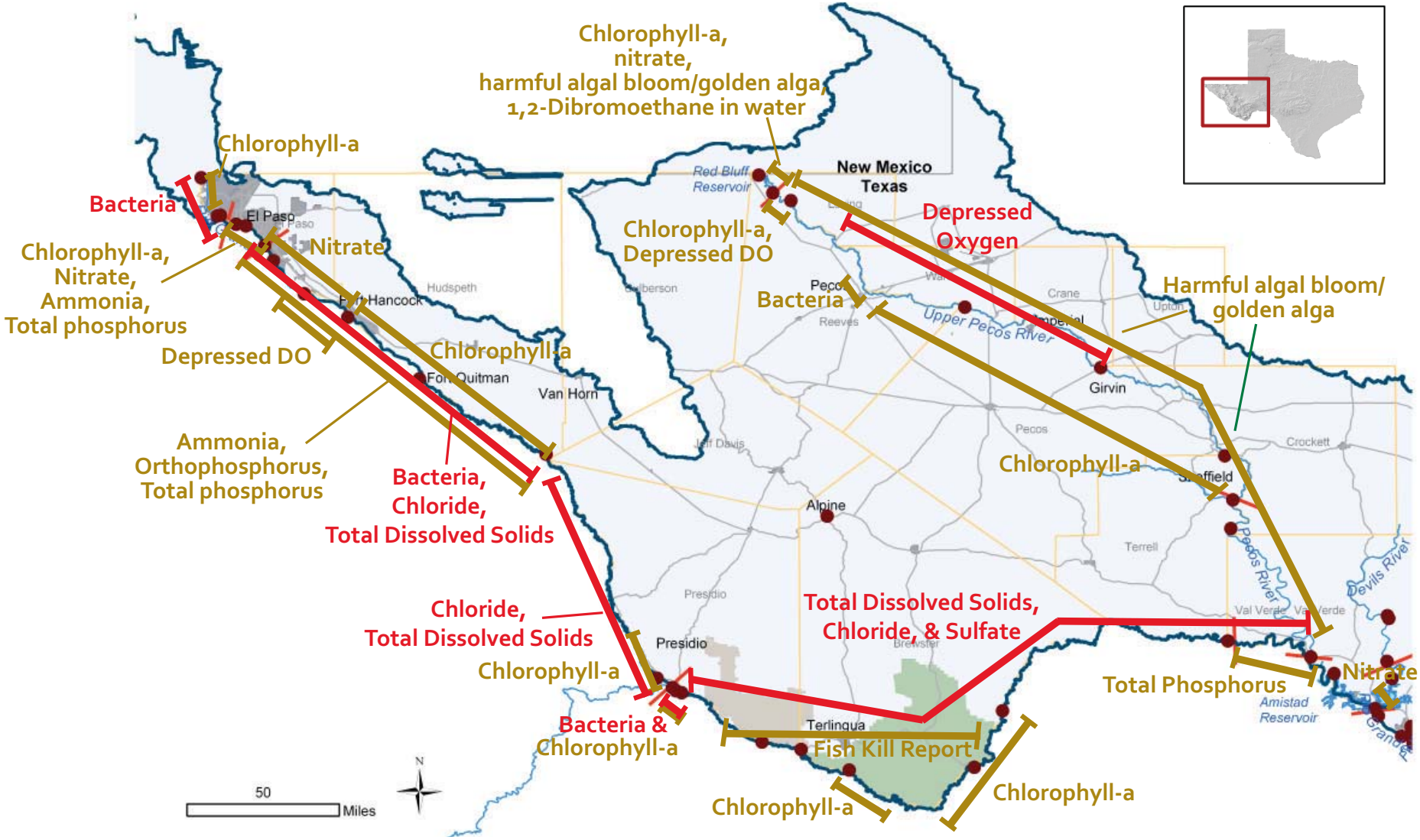



Figure 2. a) Upper Rio Grande and Pecos

# Figure 2 - b) and c). Water Quality Impairments and Concerns in the Rio Grande Basin

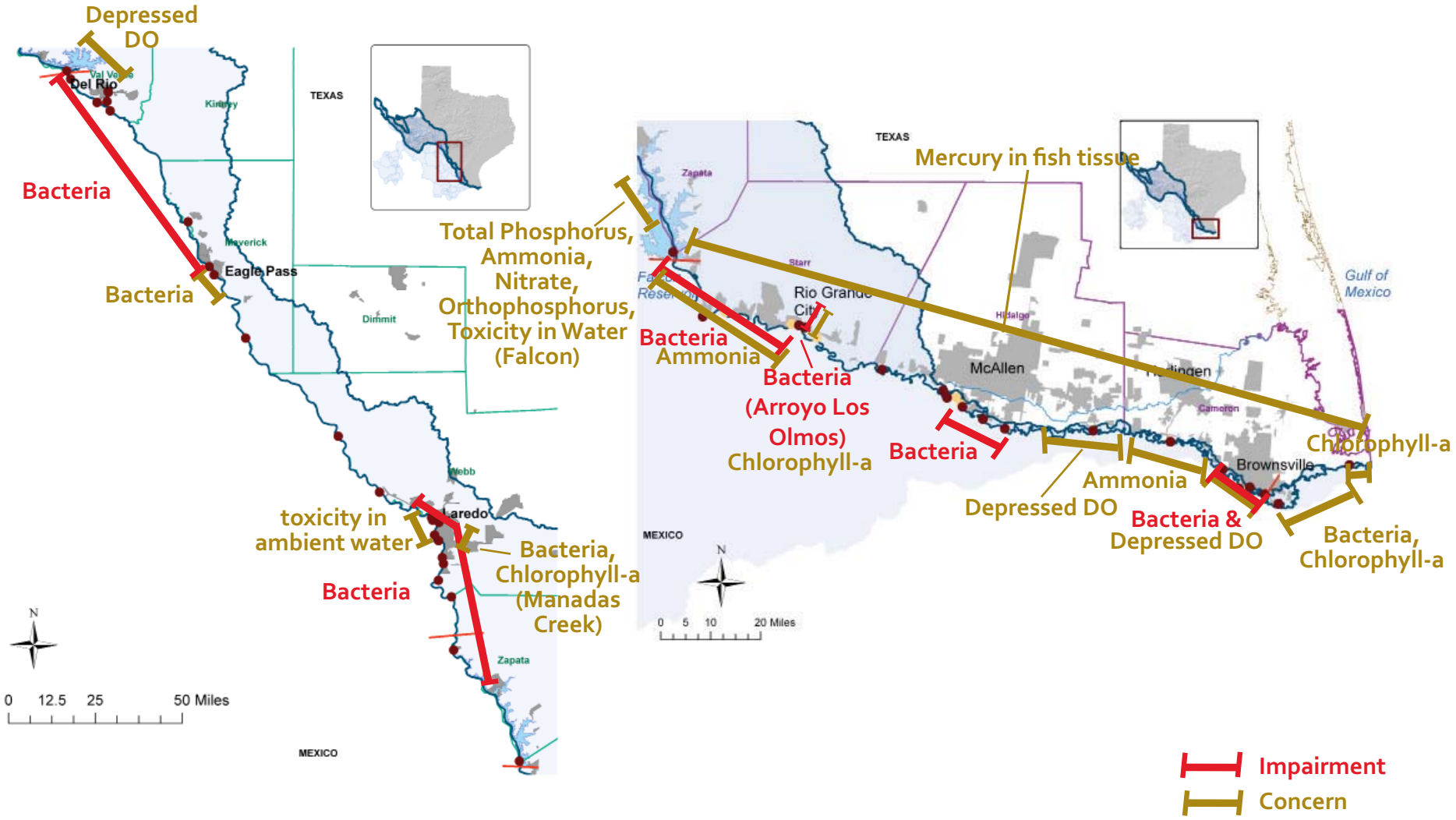



**Figure 2. b) Middle Rio Grande**

**Figure 2. c) Lower Rio Grande**

# Sub-basin Summaries

## Upper Rio Grande Sub-Basin

### Introduction

The Upper Rio Grande sub-basin extends from the Texas-New Mexico state line downstream to the International Amistad Dam, a length of 650 miles (1,045 km). The water in the upper portion of this segment is used for agriculture and drinking water. Water in the river downstream of El Paso and Juarez is primarily composed of agricultural return flows, wastewater effluent, and raw or partially treated sewage, and is therefore high in salts and bacteria. Further downstream, two major tributaries (the Rio Conchos from Mexico and the Pecos River in Texas) join the Rio Grande, increasing water quality and quantity. Between those tributaries lie Big Bend Ranch State Park, Big Bend National Park, and the Wild and Scenic River stretch of the Rio Grande. The Upper Rio Grande sub-basin ends at the International Amistad Dam, operated by the IBWC. The dam provides fishing, recreation, flood control, improved water quality, increased water supply, a steady flow in the river below the dam, and hydroelectric power on both sides of the border.

### 2010 Upper Rio Grande Sub-basin Updates and Special Studies

*New Mexico addresses Bacteria.* The Paso del Norte Watershed Council applied, through the New Mexico Environment Department (NMED), for EPA's Federal Clean Water Act Section 319(h) Nonpoint Source Grant in order to address the bacteria impairment in the lower reach of the Rio Grande in New Mexico. Their application to monitor bacteria in the stretch of the Rio Grande between Elephant Butte and American Dam in Texas was accepted by NMED and the EPA. The Council is currently working on developing the specific monitoring plan. USIBWC will support this effort with in-kind support and technical expertise.

*Silvery Minnow Habitat Research.* Biologists, geographers, and hydrologists with the U.S. Geological Survey's (USGS) Texas Water Science Center in Austin, Texas have begun a cooperative project with the U.S. Fish and Wildlife Service (USFWS) to evaluate available habitat of the Rio Grande silvery minnow in relation to river flow in the Rio Grande in and near Big Bend National Park (BBNP). This project is intended to assist the USFWS in determining differences in available habitat at the sites where the minnows have been released over the last year. USGS staff will use a GIS-based field mapping tool to map habitats that are important for this species. This is a 3-year project that will begin in the winter of 2010. For more information, please contact Bruce Moring (jbmoring@usgs.gov) with the USGS in Austin (512-927-3585).

*Big Bend Nutrients and Salinity.* In the past few years, BBNP, the USGS, TCEQ and the USIBWC have conducted a special study in Big Bend to track the source of nutrient and salinity contamination between Presidio and Amistad Dam. Some portions of the study have concluded and a report is currently being prepared by USGS.

### Upper Rio Grande CRP Partners

**USIBWC American Dam/Carlos Marin Field Office**
**El Paso Water Utilities**
**El Paso Community College**
**University of Texas at El Paso**
**TCEQ El Paso Office**
**USIBWC Presidio Office**
**Big Bend National Park**
**Big Bend Ranch State Park/ Texas Parks and Wildlife**
**USIBWC Amistad Dam Office**

A view of the Rio Grande from Big Bend National Park, October 2009

*Continuous Water Quality Monitoring in Big Bend.* TCEQ has replaced the real-time water quality monitoring stations within BBNP that had been damaged by the September 2008 floods. The continuous data stations throughout the Rio Grande Basin were installed to provide information about salinity and dissolved oxygen levels in the river. These stations also aid river runners in determining actual flows in the river. Data can be viewed at the Continuous Water Quality Monitoring website (p. 30).

*Big Bend Lower Canyons Water Quality.* Personnel from BBNP, in cooperation with the USIBWC CRP, TCEQ's SWQM, and Sul Ross State, have been characterizing the water resources and monitoring water quality in the remote Lower Canyons of the Rio Grande. Located in Brewster and Terrell Counties, the Lower Canyons have been referred to as the best wilderness canoe trip in the lower 48 states. Studies have focused on aquatic invertebrates, and water quality in springs. Besides the flows of the Rio Grande, water in the river comes from numerous limestone springs found throughout the reach. Information from this study led the Far West Texas Water Planning Group to recognize these springs as "ecologically significant." These springs come from the Edwards-Trinity Plateau Aquifer on the Texas side and the Cerro Colorado-la Partida, Santa Fe del Pino aquifers in Mexico. Future research questions center around determining source information for these springs as well as springs on the lower Pecos and Devil's River. Information like this can be used by communities and landowners to provide appropriate protection plans. Preliminary results from this study were presented at the fall Geological Society of America meeting in 2009.

*River Restoration in Big Bend.* Natural and cultural resources and park infrastructure along the Big Bend reach of the Rio Grande are threatened by increased flooding attributed to changing channel conditions of the Rio Grande and its ephemeral tributaries. Sedimentation in the channel has led to channel narrowing. This problem was dramatically illustrated in late 2008 when flooding occurred along the entire river corridor from above Ojinaga to Lake Amistad. Although the peak discharge was only a one in 12-15 year event, flood elevations achieved record heights. Channel narrowing resulted in a loss of channel flow conveyance, flooding at lower discharges, and continued growth in the elevation of the flood plain, even though flood magnitudes have decreased. Channel sedimentation is exacerbated by the invasion of non-native salt cedar (*Tamarix spp.*) and giant river cane (*Arundo donax*), which have increased sedimentation along the river margins. Additionally, anecdotal observations indicate that floodwaters from tributary flooding are now ponded behind sediment build-up at the confluence with the main stem. Over the past six years, the NPS, World Wildlife Fund, TPWD, and counterparts in Mexico, have completed riparian rehabilitation projects on some 35 miles of the river. Focused primarily on removing exotic vegetation, the projects have involved citizens from both sides of the river and opened up the riparian zone to native vegetation.

*Rio Grande Research Center Award.* In 2009, Sul Ross State University's Rio Grande Research Center in Alpine, TX, was awarded over $1 million in research aid

Station 13276 upstream of Anthony Drain near the TX/NM border, September 2009

Segment 2308, the channelized portion of the Rio Grande, in El Paso, TX, August 2009

Station 13229, Rio Grande below Rio Conchos confluence in Presidio, TX, October 2009

by the U.S. Department of Agriculture. The project money will be used to study biophysical research in the Rio Grande Basin.

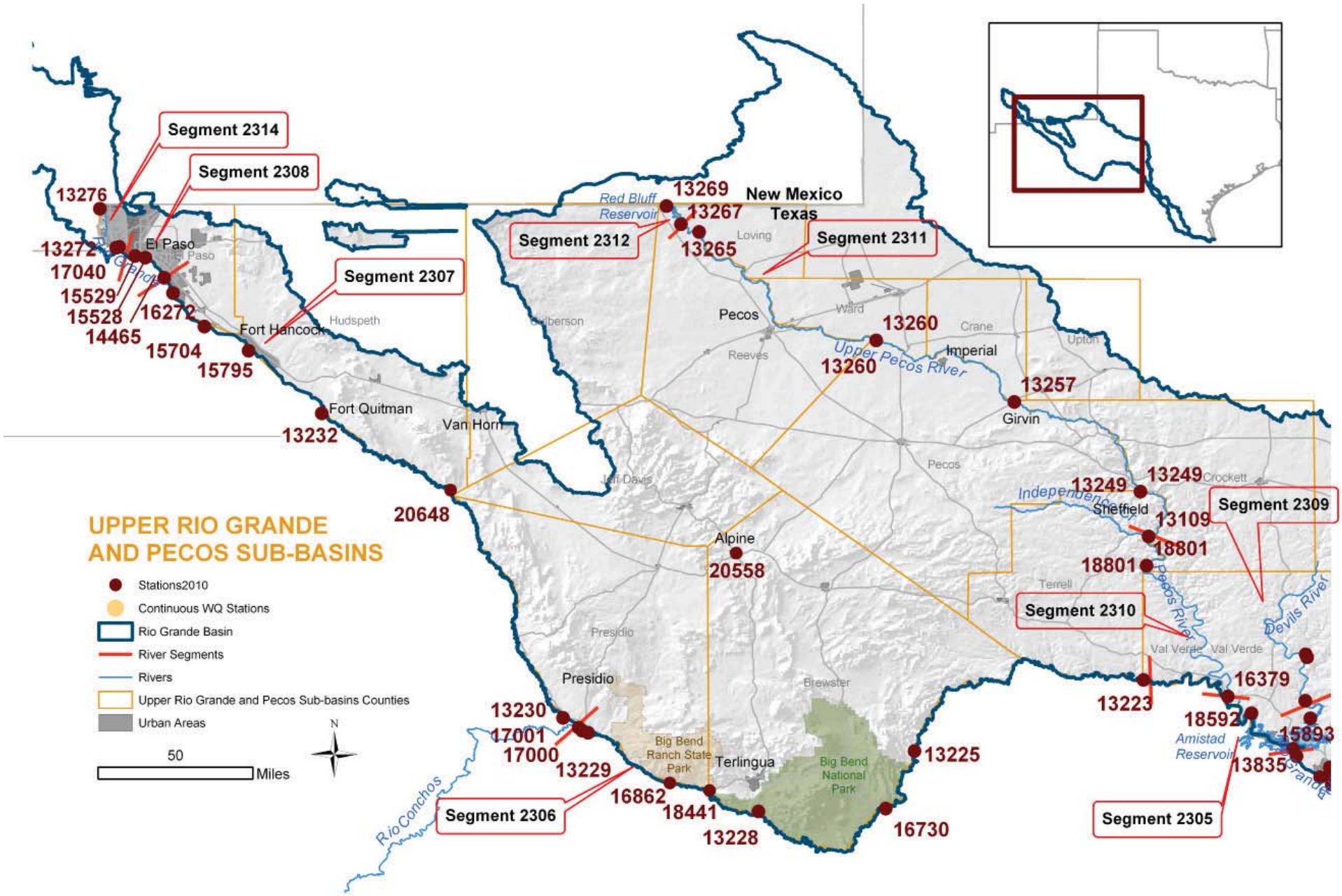
*Organics in the Upper Rio Grande Sub-basin.* From 2007 to 2009, USIBWC CRP collected data on pesticides and other organics twice a year at routine monitoring sites. At six stations in the Upper Rio Grande Basin, 23 chemicals were analyzed in sediment. The majority of data did not detect any pesticides in the sediment. Data is available on the USIBWC CRP website. In 2010, USIBWC CRP is continuing to collect sediment samples for organics, once a year and at stations that had previously detected organics.

A new site in the very remote Forgotten River Stretch, station 20648, collected by UTEP

## Table 6: Water Quality Review of the Upper Rio Grande Sub Basin

| Segment Name | Uses | Stations | Length | Segment Characteristics | Water Quality Summary |
|---|---|---|---|---|---|
| 2314 - RG Above International Dam | CR, H, PS, FC, GU | 13276, 17040, 13272 | 21 mi | Treaty allotments of water for the U.S. are diverted at American Dam, and carried through El Paso in the Rio Grande American Canal Extension and Franklin Canal for use by El Paso as a drinking water source and for irrigation by U.S. farmers. Mexico's water is diverted at International Dam and used for irrigation in the Juarez Valley. | Contact recreation impairment due to **high bacteria**. Primary impacts are concentrated animal feeding operations (CAFOs), irrigated agriculture, some industry, and municipal wastewater treatment plant effluent. |
| 2308 - RG Below International Dam | NCR, L, PS, | 14465, 15528, 15529 | 15 mi | The upper portion is concrete lined to prevent meandering of the international boundary. Since the creation of the RGACE canal, this segment contains very little water, and therefore has designated uses for limited aquatic life and noncontact recreation. | Meeting all primary standards, which are lower than other segments. Concerns for phosphorous and nitrate. |
| 2307 - RG Below Riverside Diversion Dam | CR, H, PS, FC, GU | 16272, 15704, 15795, 13232, 13230, 20648 | 222 mi | The upper portion of this segment receives flow from irrigated agriculture and waterwater treatment plant effluent from both countries as well as poorly treated sewage. The lower portion of this segment has no impactors on the river as it meanders through rough terrain and sparse ranch land, the "Forgotten Stretch." | Impairments of **high bacteria, chloride, and TDS**. High phosphorus levels lead to high algal content. High ammonia levels can be harmful to aquatic life. |
| 2306 - RG Above Amistad International Reservoir | CR, H, PS, FC, GU | 17001, 17000, 13229, 13228, 16730, 13225, 13223 | 313 mi | Flows from Rio Conchos confluence in Presidio County to the confluence wiht Ramsey Canyon in Val Verde County. Flows through Big Bend Ranch State Park and Big Bend National Park, then joins the headwaters of Amistad Reservoir. | **Bacteria** levels are high downstream of Presidio/Ojinaga; Big Bend reach has elevated algal growth; high nutrient levels below Big Bend; **high TDS, sulfate and chloride** in the upper portion of segment. Entire segment added to 2010 Impairment list for salinity. |
| 2305 - International Amistad Reservoir | CF, H, PS, FC, GU | 13835, 15892, 15893 | 75 mi | From Amistad Dam in Val Verde County to a point 1.8 km (1.1 miles) downstream of the confluence of Ramsey Canyon on the Rio Grande Arm in Val Verde County and to a point 0.7 km (0.4 miles) downstream of the confluence of Painted Canyon on the Pecos Arm in Val Verde County. | Reservoir has high aquatic life use and contact recreation uses being met; **nitrate** concern but exact sources are not known. High salinity input from the Pecos is potentially a concern. |
| 2309 - Devils River | CR, E, PS, FC, GU | 14942, 13239, 13237 | 67 mi | From a point 0.4 miles (0.6 km) downstream of the confluence of Little Satan Creek in Val Verde County to the confluence of Dry Devils River in Sutton County. | Exceptional aquatic life and contact recreation uses fully supported; excellent water quality with low salinity (typical TDS values are below 500 mg/l). Few impactors. |

# Figure 3 - Upper Rio Grande and Pecos Sub-Basins Station Map



# Table 7. Coordinated Monitoring Schedule for the Upper Rio Grande Basin

## Monitoring Schedule - Upper Rio Grande Sub-Basin

| Site Description | Station | SE | CE | Times per year sampled | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 24 DO | AT | MW | OW | MS | OS | Con | Bac | Flow | Field |
| **Segment 2306 Rio Grande Above Amistad Reservoir** | | | | | | | | | | | | | |
| Rio Grande at Foster Ranch west of Langtry off Hwy 90 W | 13223 | TCEQ | FO | | | | | | | 2 | 2 | 2 | 2 |
| Rio Grande at FM 2627 (Gerstacker Bridge) Below Big Bend | 13225 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at the Mouth of Santa Elena Canyon | 13228 | TCEQ | FO | | | | | | | 8 | 8 | 8 | 8 |
| Rio Grande at the Mouth of Santa Elena Canyon | 13228 | IBWC | BB | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande Below Rio Conchos Confluence near Presidio | 13229 | IBWC | IB | | | | | | | 8 | 8 | 8 | 8 |
| Rio Grande Below Rio Conchos Confluence near Presidio | 13229 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at Boat Ramp at Rio Grande Village in Big Bend National Park | 16730 | IBWC | BB | | | | | | | 8 | 8 | 8 | 8 |
| Rio Grande at Colorado Canyon Approx. 30Km SE of Redford on RR170 in Presidio County | 16862 | IBWC | PW | | | | | | | 6 | 6 | | 6 |
| Rio Grande at Presidio Railroad Bridge, 3.25Km Downstream of US67, South of Presidio | 17000 | IBWC | IB | | | | | | | | 8 | 8 | 8 |
| Rio Grande at Presidio/Ojinaga Toll Bridge (International), 0.75Km Downstream of US67 in Presidio | 17001 | IBWC | IB | | | | | | | | 8 | 8 | 8 |
| Rio Grande at Lajitas Resort/FM 170 Boat Ramp 240 M Upstream of Black Hills Creek Confluence Near Lajitas | 18441 | IBWC | PW | | | | | | | 6 | 6 | | 6 |
| **Segment 2307 Rio Grande Below Riverside Diversion Dam** | | | | | | | | | | | | | |
| Rio Grande 2.4 mi. Upstream from Rio Conchos Confluence | 13230 | IBWC | IB | | | | | | | 8 | 8 | 8 | 8 |
| Rio Grande 2.4 mi. Upstream from Rio Conchos Confluence | 13230 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at Neely Canyon, South of Fort Quitman | 13232 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at Guadalupe Point of Entry Bridge at FM 1109 west of Tornillo | 15704 | IBWC | UE | | | | | | 1 | 4 | 4 | 4 | 4 |
| Rio Grande at Guadalupe Point of Entry Bridge at FM 1109 west of Tornillo | 15704 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at Alamo Control Structure, 9.7Km Upstream of Ft. Hancock Port of Entry | 15795 | IBWC | EP/IB | | | 2 | | | 1 | 4 | 4 | 4 | 4 |
| Rio Grande at Alamo Control Structure, 9.7Km Upstream of Ft. Hancock Port of Entry | 15795 | TCEQ | FO | | | 4 | 2 | | 6 | 6 | 6 | 6 | 6 |
| Rio Grande at San Elizario, 500m Upstream of Capomo Road End of Pavement and 10.2Km Downstream of Zaragosa International Bridge | 16272 | IBWC | UE | | | 4 | | | 1 | 4 | 4 | 4 | 4 |
| Rio Grande at San Elizario, 500m Upstream of Capomo Road End of Pavement and 10.2Km Downstream of Zaragosa International Bridge | 16272 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande 1.47 Kilometers Upstream of the Confluence With Green River | 20648 | IBWC | UE | | | | | | | 4 | 4 | | 4 |
| **Segment 2308 Rio Grande Below International Dam** | | | | | | | | | | | | | |
| Rio Grande at Riverside Canal 1.8 km Downstream of Zaragosa International Bridge | 14465 | IBWC | IB | | | | | | | 12 | 12 | 12 | 12 |
| Rio Grande 1.3 km Downstream from Haskell St. WWTP Outfall | 15528 | IBWC | IB | | | | | | | 12 | 12 | 12 | 12 |
| Rio Grande 2.4 km Upstream from Haskell St. WWTP Outfall, South of Bowie High School Football Stadium in El Paso | 15529 | IBWC | IB | | | | | | | 12 | 12 | 12 | 12 |
| **Segment 2314 Rio Grande Above International Dam** | | | | | | | | | | | | | |
| Rio Grande at Courchesne Bridge, 1.7 Mi Upstream from American Dam | 13272 | IBWC | IB | | | 4 | | | | 12 | 12 | 12 | 12 |
| Rio Grande at Courchesne Bridge, 1.7 Mi Upstream from American Dam | 13272 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande Immed. Upstream of the Confl. with Anthony Drain East of La Tuna Prison near the State Line | 13276 | IBWC | UE | | | 4 | | | | 4 | 4 | | 4 |
| Rio Grande Immed. Upstream of the Confl. with Anthony Drain East of La Tuna Prison near the State Line | 13276 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at Anapra Bridge on Sunland Park Drive, 4.2Km Upstream from American Dam (in New Mexico) | 17040 | IBWC | EP/IB | | | 4 | | | | 4 | 4 | | 4 |

FO - TCEQ Field Office, IB - IBWC Field Office, BB - Big Bend National Park, EP - El Paso Community College, PW - Texas Parks and Wildlife, UE - University of Texas at El Paso. SE - submitting entity, CE - collecting entity 24 DO - 24-hour Dissolved Oxygen, MS - metals in sediment, OS - organics in sediment, MW - metals in water, OW - organics in water, Con - routine conventional parameters, Bac - Bacteria (ecoli), AT - Ambient Toxicity (W-water, S-soil)

# Pecos River Sub-Basin

## Introduction

The Pecos River in Texas begins at the Texas/New Mexico state line and is then impounded by Red Bluff Reservoir. The river then flows southeast until it empties into the Rio Grande upstream of International Amistad Dam, a journey of 409 miles (658 km). The Pecos River is divided into three segments: 2312, 2311, and 2310 upstream to downstream.

The heavy drought conditions in the southwest have caused the Pecos River to see episodes of discontinuity. Invasive salt cedar plants have also been linked to reduced water levels and increased salinity in the Pecos River Basin. Since 1999, the Texas AgriLife Extension Service (formerly the Texas Cooperative Extension) and other parties have been successfully reducing the salt cedar along the Pecos River. Utilizing multiple sources of funding, to date, these efforts have resulted in the treatment of over 12,000 acres of salt cedar in the Pecos River watershed. Due to the success of the Texas AgriLife Extension, other river basins with the same problem have begun similar programs.

## 2010 Pecos River Sub-basin Updates and Special Studies

*Continuous Water Quality Monitoring (CWQM) on the Pecos.* TCEQ and USIBWC have collaborated to install real-time water quality monitoring stations on the Pecos River to enhance data normally collected on a quarterly basis at routine sampling stations. The continuous monitoring sites serve a variety of data needs, including the evaluation of increasing salinity, the effects of salt cedar removal, increased oil and gas production, the quality of water for irrigation, and low dissolved oxygen in the upper Pecos. The stations are collecting DO, pH, conductivity and temperature at 15 minute intervals and the data are transmitted remotely to the TCEQ. The data are then validated and made available at the the CWQM website (p. 30).

The CWQM stations are located at the following sites: Pecos River near Pecos, TX (13261/C710); Pecos River at Coyanosa, TX (13260/C709); Pecos River at Sheffield (13249/C735); and Pecos River 2.3 miles upstream of the Terrell/Val Verde county

### Pecos River CRP Partners

**TCEQ Midland Office**
**Texas AgriLife Extension Service**
**USIBWC Amistad Dam Office**
**Sul Ross University**

## Table 8. Water Quality Review of the Pecos Sub-Basin

| Segment | Uses | Stations | Length | Segment Characteristics | Water Quality Summary |
|---|---|---|---|---|---|
| 2312 - Red Bluff Reservoir | H, GU, FC, CR | 13269, 13267 | 11 mi | From the TX/NM state line to end of dam. High salinity prevent use as a public water supply and restricts agriculture to salt-tolerant crops. | Segment has concern for golden alga blooms. Salinity values are typically over 6,000 mg/L. |
| 2311 - Upper Pecos River | H, GU, FC, CR | 13265, 13264, 13260, 13257, 15114 | 349 mi | From Red Bluff Reservoir to Independence Creek. | Water is not drinkable due to high salinity. Salinity increases in this segment, climbing to an average of 21,000 mg/L at Girvin, although overall TDS is within the standard (15,000 mg/L). Segment has concern for golden alga blooms. Aquatic life is negatively affected by depressed dissolved oxygen. |
| 2310 - Lower Pecos River | H, PS, GU, FC, CR | 13109, 13246, 13240, 16379, 18801 | 49 mi | From confluence of Independence Creek to the confluence with the Rio Grande. | Waters from Independence Creek in the past have brought salinity values down to drinking water levels, but recent data shows abnormally high values of chloride, sulfate, and TDS. Segment has concern for golden alga blooms. |

H - High Aquatic Life, PS - Public Drinking Supply, GU - General Use , FC - Fish Consumption , CR - Contact Recreation

lines (18801/C729). The four Pecos River stations have companion USGS gages which separately monitor flow. A fifth TCEQ station was installed at Oasis Ranch on Independence Creek (20338/C764), and a sixth station is currently in the works and will be installed on the Pecos River near Girvin, TX upstream of US 67.

Fish kills caused by the golden algae, *Prymnesium parvum*, are a visible result of increased salinity. Fish kills related to *P. parvum* have been documented in the Pecos River since 1985. The real-time data is being used by the TPWD to evaluate the potential triggers for golden alga blooms. More information can be found at the TPWD Golden Alga site (p. 30).

*Salinity Studies.* Total Dissolved Solids (TDS) values in the Pecos River enter Texas above 5,000 mg/L and climb to an average value of 20,000 mg/L as the water flows downstream to Girvin. TCEQ, USIBWC and Texas AgriLife Research are conducting a special study in the Pecos River to determine possible sources contributing to the increasing salinity. Currently, TCEQ is collecting monthly samples at six stations along the Pecos between Girvin and Imperial where salinity is highest. This study is evaluating the bromide/chloride ratio to help in determining the source of salts entering the river as well as the salt load.

Additionally, the Pecos River Compact Commissioner from Texas has asked the Texas Water Resources Institute (TWRI) to lead an effort to develop a plan of work to specifically determine the source(s) of salts entering the Pecos River in Texas and their respective intrusion points to the river. A draft scope of work is currently being developed and will be contributed to by various federal and state agencies including IBWC, Natural Resources Conservation Service (NRCS), TCEQ, TPWD, Texas State Soil and Water Conservation

## Table 9. Coordinated Monitoring Schedule for the Pecos River Sub-Basin

**Monitoring Schedule - Pecos River Sub-Basin**

| Site Description | Station | SE | CE | Times per year sampled | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 24 DO | AT | MW | OW | MS | OS | Con | Bac | Flow | Field |
| **Segment 2310 Lower Pecos River** | | | | | | | | | | | | | |
| Independence Creek 0.5 mi downstream from John Chandler Ranch Headquarters | 13209 | TCEQ | FO | 12 | | | | | | 4 | 4 | 4 | 4 |
| Pecos River 0.7 mi downstream from US90W in Val Verde County | 16379 | TCEQ | FO | | | | | | | 2 | 2 | 2 | 2 |
| Lower Pecos River West Bank 3.56 km/2.3 mi upstream of Terrell/ Val Verde/ Crockett County line convergence CAMS 0729 on Brotherton Ranch | 18801 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| **Segment 2311 Upper Pecos River** | | | | | | | | | | | | | |
| Pecos River Bridge on US 290 SE of Sheffield | 13249 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Pecos River at US 67 NE of Girvin | 13257 | TCEQ | FO | 2 | | 4 | | | | 4 | 4 | 4 | 4 |
| Pecos River at FM 1053 NE of Imperial | 13258 | TCEQ | FO | | | | | | | 12 | | | |
| Pecos River at SH 18, SSW of Grandfalls | 13259 | TCEQ | FO | | | | | | | 12 | | | |
| Pecos River at FM 1776 SW of Monahans | 13260 | TCEQ | FO | | | 4 | | | | 12 | 4 | 4 | 4 |
| Pecos River at US 80 NE of Pecos | 13261 | TCEQ | FO | | | | | | | 12 | | | |
| Pecos River at FM 652 Bridge NE of Orla | 13265 | TCEQ | FO | 2 | | | | | | 4 | 4 | 4 | 4 |
| Pecos River 62 m N and 17 m E to the end of Horse Head Road and 5.02 km N and 927 m east to the Intersection of RR 11 and Horse Head Road | 20399 | TCEQ | FO | | | | | | | 12 | | | |
| Kokernot Spring - Intersection of Alpine Creek and Hendryx Drive/Harrison St/SH 223 and 40 m E of the Kokernot Lodge on Sul Ross University Campus in Alpine | 20558 | IBWC | SL | | | | 2 | | 2 | 6 | 6 | | 6 |
| **Segment 2312 Red Bluff Reservoir** | | | | | | | | | | | | | |
| Red Bluff Reservoir above Dam, North of Orla | 13267 | TCEQ | FO | | | 2 | 2 | 2 | 2 | 2 | 2 | | 2 |
| Red Bluff Reservoir 1/2 mi S of TX-NM border | 13269 | TCEQ | FO | | | 2 | 2 | 2 | 2 | 2 | 2 | | 2 |

FO - TCEQ Field Office, IB - IBWC Field Office, SL - Sul Ross University, SE - submitting entity, CE - collecting entity
24 DO - 24-hour Dissolved Oxygen, MS - metals in sediment, OS - organics in sediment, MW - metals in water, OW - organics in water, Con - routine conventional parameters, Bac - Bacteria (ecoli), AT - Ambient Toxicity (W-water, S-soil)

Pecos River (Segment 2310) downstream of Independence Creek confluence; Station 18801

Board (TSSWCB) and Texas Water Development Board (TWDB). The scope of work developed will be used as a vehicle to secure funding to identify the source of salt entering the river and establish a basis of groundwork for developing and implementing management measures to mitigate these sources.

*Pecos Watershed Protection Plan (WPP).* The Texas AgriLife Extension Service, along with the USIBWC, TCEQ, the TWRI, and the TSSWCB has completed an EPA-funded project to develop a watershed protection plan for the Texas portion of the Pecos River. The Watershed Protection Plan (WPP) for the Pecos River in Texas outlines needed management practices that can be voluntarily implemented in identified areas of the watershed to address water quality and other watershed concerns. The watershed protection plan has also identified potential sources of financial and technical assistance that landowners can utilize to offset some costs of voluntary practice implementation, while also setting goals and developing a timeline for trial implementation.

This plan is vital to the future ecosystem of the Pecos River. The Pecos River has experienced lowered water quality and stream flows, and the aquatic community of the Pecos River has been drastically altered, according to fishery biologists and to local users of the river. The greatly reduced aquatic diversity has been negatively affected by changes in river hydrology, riparian community destruction, oil and gas activities, irrigation demands, long and short-term droughts, damming of the river and the desertification of the upland watershed due to over-grazing. These factors, both natural and man-made, have allowed introduced plant species, such as saltcedar, to dominate the riparian systems within the watershed. The WPP addresses this issue by recommending best management practices for implementation throughout the watershed.

As the largest tributary to the Rio Grande in the US, the Pecos River contributes approximately 29.5 % of the salt loading into Amistad Lake while contributing only 11% of the stream inflow. This has led to a long-term trend in increasing salinity which exceeded the 1,000 ppm drinking water standard for a month in 1988, and has fluctuated since. It is of utmost importance to control salt loading from the Pecos to Rio Grande if the waters of Amistad Lake are to be used as an economically attractive source for drinking and irrigation waters in the future. In addition, Amistad is a nationally recognized fishery with great economic benefit to the local economy.

For more information on the project and to view reports developed from the research conducted by the various partnering agencies, visit the Pecos River WPP website (p. 30).

*Iraan Volunteer Monitors.* The Iraan Independent School District has developed an Ecology class for the Pecos River and associated local basin, after a local land owner, Ira Yates, initiated interest in the Pecos at Iraan High School. Two science teachers from Iraan High School and representatives for the Pecos River WPP participated in water quality monitoring training for the Texas Stream Team, a statewide volunteer monitoring program. The newly trained volunteer monitors will collect water quality information at several sites in and around Iraan, Texas. Their efforts, in conjunction with TCEQ, IBWC, Texas AgriLife Extension Service, and TWRI and its Rio Grande Basin Initiative will assist in gathering data to fulfill monitoring requirements of the WPP. The youth component of this project directly ties their efforts into the Texas 4-H SET (Science, Engineering and Technology) Emphasis to practice and sharpen their 4-H SET Abilities knowledge and skills.

Continuous Water Quality Station CAMS 0729, at Station 18801 in the Lower Pecos

# Middle Rio Grande Sub-Basin

## Introduction

The Middle Rio Grande sub-basin consists of the portion of the river flowing from just below International Amistad Reservoir to just above International Falcon Reservoir and also includes San Felipe Creek. This 303-mile (487 km) stretch of the river flows past five counties in Texas and the Mexican states of Coahuila, Nuevo Leon, and Tamaulipas. Del Rio, Eagle Pass and Laredo, along with Mexican sister cities Ciudad Acuña, Piedras Negras, and Nuevo Laredo comprise the bulk of the population living along the Rio Grande in this reach. Laredo, in particular, is one of the fastest growing cities in Texas. Increased trade with Mexico, manufacturing growth, and tourism have contributed to population increases in the area.

Overall water quality in the Middle Rio Grande sub-basin has been stable or has shown improvement in the last few years. Water impounded behind Amistad Dam slows in velocity, settling much of the suspended solids carried from the Upper Rio Grande sub-basin. Water in the Middle Rio Grande is used for irrigation and increasingly for municipal use. Most municipalities along the river are dependent on surface water for domestic and industrial use. Del Rio, TX is the only major city that relies on groundwater for its water needs.

## 2010 Middle Rio Grande Sub-basin Updates and Special Studies

*Organics in the Middle Rio Grande Sub-basin.* From 2007 to 2009, USIBWC CRP collected data on pesticides and other organics twice a year at routine monitoring sites. At 10 stations in the Middle Rio Grande basin, 23 chemicals were analyzed in sediment. The majority of samples collected did not result in any detected pesticides in the sediment. Data is available on the USIBWC CRP website. In 2010, USIBWC CRP is continuing to collect soil samples for organics, once a year at stations that had previously detected organics.

*Manadas Creek Metals.* USIBWC CRP sampling partners City of Laredo Environmental continue to monitor water quality of Manadas Creek, a tributary to the Rio Grande in Laredo. Previous studies, including one from 2008 by Texas A&M University - Kingsville (TAMUK) and the Rio Grande International Studies Center (RGISC), have shown that heavy metals (arsenic and antimony) exceeded state water quality standards. However, the 2010 assessment did not determine metals to be an impairment. USIBWC CRP is now sampling for metals in sediment in addition to metals in water and organics in sediment.

*Manadas Creek Organics.* TAMUK has also completed a study looking at organo-chlorinated pesticides in Manadas Creek. The report, published in 2008, showed that several organo-chlorinated pesticides, including HCH, heptachlor epoxide, endrin, and DDT were detected in either the creek water or the sediment. In USIBWC CRP samples, unrelated to the TAMUK study, only DDE was detected in the sediment.

*Exotic Cane in Laredo.* *Arundo donax* (called Carrizo Grande or Giant River Cane) is a significant problem in the Laredo area. The dense cane stands can reach up to 30 feet high and out-compete native plants. The Depart-

### Middle Rio Grande CRP Partners

USIBWC Amistad Field Office
USIBWC Falcon Field Office
City of Laredo Environmental Services Department
City of Laredo Health Department
Rio Grande International Study Center
TCEQ San Antonio Regional Office
TCEQ Laredo Regional Office

Staff from the City of Laredo Environmental collect water at Manadas Creek in July 2009

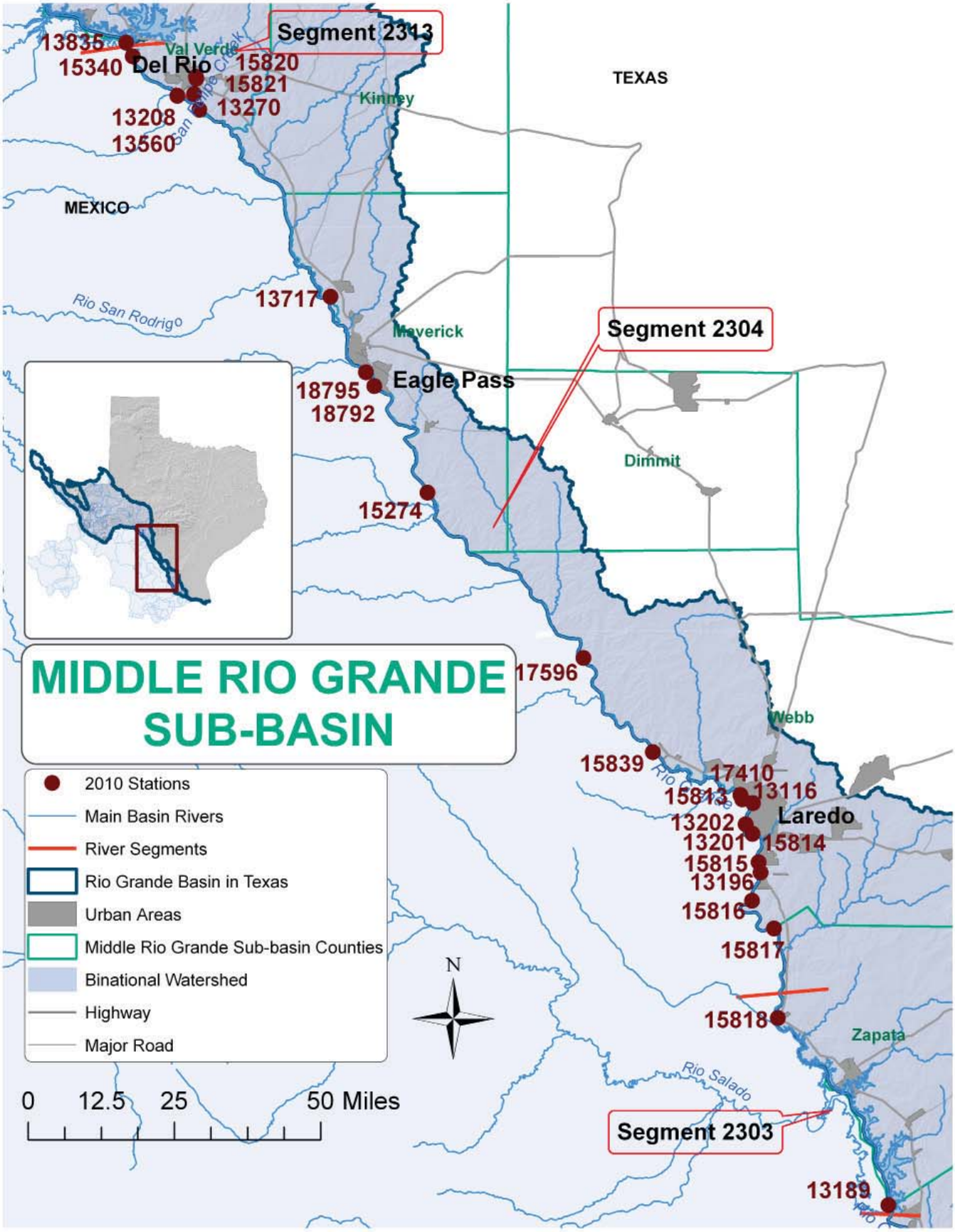



**Figure 4 - Middle Rio Grande Basin Station Map**

ment of Homeland Security (DHS) has been conducting a pilot project to eradicate cane using a variety of methods, including mechanical and chemical application on large stands of cane. In November of 2009, both the U.S. and Mexican Sections of the IBWC, as well as DHS and Mexico's National Ecology Institute (INE) participated in binational soil sampling to determine whether chemical application on the cane persisted in the soil. Both countries continue to conduct binational discussions on the cane removal project. Additional groups, including the Laredo Community College and organizations in Mexico, are conducting independent studies on cane management.

Representatives from both the U.S. and Mexico collect soil samples in the floodplain where cane eradication projects are underway, Nov. 2009. Left inset: dense cane before removal.

Public Health students assist Dr. Vaughan from RGISC to collect aquatic macroinvertebrates

Station 15817 at the Webb/Zapata county line, where CRP partner RGISC collect monthly samples

## Table 10. Water Quality Review for the Middle Rio Grande Sub-Basin

| Segment | Uses | Stations | Length | Segment Characteriscs | Water Quality Summary |
|---|---|---|---|---|---|
| 2304 - Rio Grande Below Amistad Reservoir | H, PS, GU, FC, CR | 15340, 13208, 13560, 13206, 13205, 18795, 18792, 15274, 17596, 15839, 17410, 13116, 15813, 13202, 15814, 13201, 15815, 13196, 15816, 15817, 15818 | 226 mi | From Amistad Dam to the confluence of Mexico's Rio Salado. | Impaired for contact recreation due to high bacteria below Del Rio; concern for nitrate and low DO from below the dam to the confluence with San Felipe Creek; near Laredo, concern for toxicity in ambient water. |
| 2303 - International Falcon Reservoir | H, PS, FC, CR | 15818, 13189 | 68 mi | Falcon Reservoir is used for recreation, water supply, and hydroelectric power generation. Less water is impounded in Falcon than is in Amistad. | No impairments, however there is a concern for toxicity in ambient water. Previous concerns for nitrate and ammonia in the lake have been removed. |
| 2313 - San Felipe Creek | H, PS, GU, FC, CR | 15820, 15821, 13270 | 9 mi | Originates in the Del Rio area, where two springs make up the San Felipe Creek, providing the city with a high-quality water supply for drinking, fishing, and swimming. | All uses are fully supported. San Felipe Creek has a positive effect on the Rio Grande, since the water quality is high and reduces some of the loading in the Rio Grande. |

H - High Aquatic Life, PS - Public Drinking Supply, GU - General Use , FC - Fish Consumption , CR - Contact Recreation

# Table 11. Coordinated Monitoring Schedule for the Middle Rio Grande Sub-Basin

## Monitoring Schedule - Middle Rio Grande Sub-Basin

| Site Description | Station | SE | CE | Times per year sampled | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 24 DO | AT | MW | OW | MS | OS | Con | Bac | Flow | Field |
| **Segment 2304 Rio Grande Below Amistad Reservoir** | | | | | | | | | | | | | |
| Manadas Creek at FM 1472 North of Laredo | 13116 | IBWC | LE | | | 4 | | 4 | 1 | 4 | 4 | | 4 |
| Rio Grande at Pipeline Crossing 8.7 mi below Laredo | 13196 | IBWC | LA | | | | | | | | 12 | | 12 |
| Rio Grande 30 m Upstream of US 81 Bridge (Convent Avenue) in Laredo | 13201 | IBWC | LA | | | | | | | | 12 | | 12 |
| Rio Grande Laredo Water Treatment Plant Pump Intake | 13202 | IBWC | LA | | | | | | | | 12 | | 12 |
| Rio Grande Laredo Water Treatment Plant Pump Intake | 13202 | IBWC | RN | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande 12.8 mi Below Amistad Dam, Near Gage, 340m Upstream of US 277 Bridge in Del Rio | 13208 | IBWC | IB | | | | | | | 2 | 2 | 2 | 2 |
| Rio Grande 12.8 mi Below Amistad Dam, Near Gage, 340m Upstream of US 277 Bridge in Del Rio | 13208 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande 4.5 mi Downstream of Del Rio at Moody Ranch | 13560 | IBWC | IB | | | | | | 1 | 4 | 4 | 4 | 4 |
| Rio Grande 4.5 mi Downstream of Del Rio at Moody Ranch | 13560 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at IBWC Weir Dam 6 mi South of El Indio, 0.6 mi Downstream of Cuervo Creek | 15274 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande 4.3 km Downstream of Damistad Dam Above Weir Dam (IBWC Gage #08-4509.00) | 15340 | TCEQ | FO | | | | | | | 2 | 2 | 2 | 2 |
| Rio Grande at International Bridge #2 (East Bridge) in Laredo | 15814 | IBWC | LA | | | | | | | | 12 | 12 | 12 |
| Rio Grande at International Bridge #2 (East Bridge) in Laredo | 15814 | IBWC | RN | | | | | | 1 | 4 | 4 | 4 | 4 |
| Rio Grande at Masterson Rd in Laredo, 9.9 km Downstream Intl Bridge #1 (West Bridge), Dwnstr Southside WWTP and Upstr Nuevo Laredo WWTP | 15815 | IBWC | LA | | | | | | | | 12 | | 12 |
| Rio Grande at Rio Bravo, 0.5km Downstr of the Community of El Cenizo | 15816 | IBWC | LA | | | | | | | | 12 | | 12 |
| Rio Grande at Webb/Zapata County Line | 15817 | IBWC | RN | | | | | | 1 | 12 | 12 | 12 | 12 |
| Rio Grande at the Colombia Bridge, 2.7 km Upstream of the Dolores Pump Station, 45.1 km Upstream of the Laredo WTP Intake | 15839 | IBWC | LA | | | | | | | | 12 | 12 | 12 |
| Rio Grande at World Trade Bridge on FM 3484 | 17410 | IBWC | RN | | | | | | 1 | 4 | 4 | 4 | 4 |
| Rio Grande at Apache Ranch West of Intersection of Private Road and Eastern Airstrip Between Laredo and Eagle Pass | 17596 | IBWC | IB | | | | | | 1 | 4 | 4 | 4 | 4 |
| Rio Grande at Kickapoo Casino 300m South and 70m West of Kurt Bluedog Road at Riverside Drive South of Eagle Pass | 18792 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at Kickapoo Reservation 1.92 Km Southa nd 2.02 km West of RR and 1021 at Maverick County Hwy 523 South of Eagle Pass | 18795 | IBWC | IB | | | | | | 1 | 8 | 8 | 8 | 8 |
| Rio Grande 115 m South and 304 m west from Intersection of Rancho Viejo Drive/Zebu Court and Rienda Drive at Father MacNaboe Park, Laredo | 20650 | IBWC | LA | | | | | | | | 12 | | 12 |
| **Segment 2305 International Amistad Reservoir** | | | | | | | | | | | | | |
| Amistad Reservoir at Buoy #1 | 13835 | TCEQ | FO | | | | | | | 4 | 4 | | 4 |
| Amistad Reservoir Rio Grande Arm at Buoy 28 | 15892 | TCEQ | FO | | | | | | | 4 | 4 | | 4 |
| Amistad Reservoir Devils River Arm at Buoy DRP | 15893 | TCEQ | FO | | | | | | | 4 | 4 | | 4 |
| **Segment 2309 Devils River** | | | | | | | | | | | | | |
| Devils River at Pafford Crossing near Comstock | 13237 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Devils River on Devils River State Natural Area 1.7 km upstream of Dolan Creek | 13239 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Dolan Springs 100 yards upstream of Confludence with Devils River Immediately upstream of Road Crossing | 14942 | TCEQ | FO | | | | | | | 4 | 4 | | 4 |

FO - TCEQ Field Office, IB - IBWC Field Office, LA - City of Laredo Health Dept., RN - Rio Grande International Study Center, LE - City of Laredo Environmental Services Dept., SE - submitting entity, CE - collecting entity
24 DO - 24-hour Dissolved Oxygen, MS - metals in sediment, OS - organics in sediment, MW - metals in water, OW - organics in water,
Con - routine conventional parameters, Bac - Bacteria (ecoli), AT - Ambient Toxicity (W-water, S-soil)

# Lower Rio Grande Sub-Basin

## Introduction

The Lower Rio Grande sub-basin stretches from just below Falcon Dam to the mouth of the Rio Grande at its confluence with the Gulf of Mexico. This portion of the river is divided into two segments, 2301 and 2302. This 280-mile (451-km) stretch of the Rio Grande runs through Starr, Hidalgo, and Cameron Counties of Texas and forms the border between those counties and the Mexican State of Tamaulipas. Major cities in the sub-basin include McAllen, Harlingen, and Brownsville on the United States side of the river and Matamoros and Reynosa on the Mexican side. The largest portion of water used in the area is consumed by agriculture. However, 2000 census data identified the Lower Rio Grande Valley (LRGV) as having the fourth largest increase in population in the country. Increased municipal and industrial demands will only further strain a limited resource already taxed by previous drought conditions and high agricultural use. Groundwater in the area is brackish resulting in the construction of a desalinization plant and possibly more plants in the future.

A new monitoring site (20696) at the Lower Rio Grande Valley National Wildlife Refuge, looking upstream, July 2009

CRP staff train new partner, US Fish and Wildlife, on operating the multiprobe at a new site, July 2009

### Lower Rio Grande CRP Partners

**University of Texas at Brownsville**
**TCEQ Harlingen Field Office**
**USIBWC Mercedes Field Office**
**Brownsville Public Utilities Board**
**US Fish & Wildlife**

In 2004 and 2008, increased rainfall and water deliveries from Mexico have allowed reservoirs to increase their storage. Research is also being done to increase storage on the river by constructing a weir near Brownsville. Additional studies are being conducted on desalinization of groundwater and ocean water to supplement drinking water supplies in the LRGV.

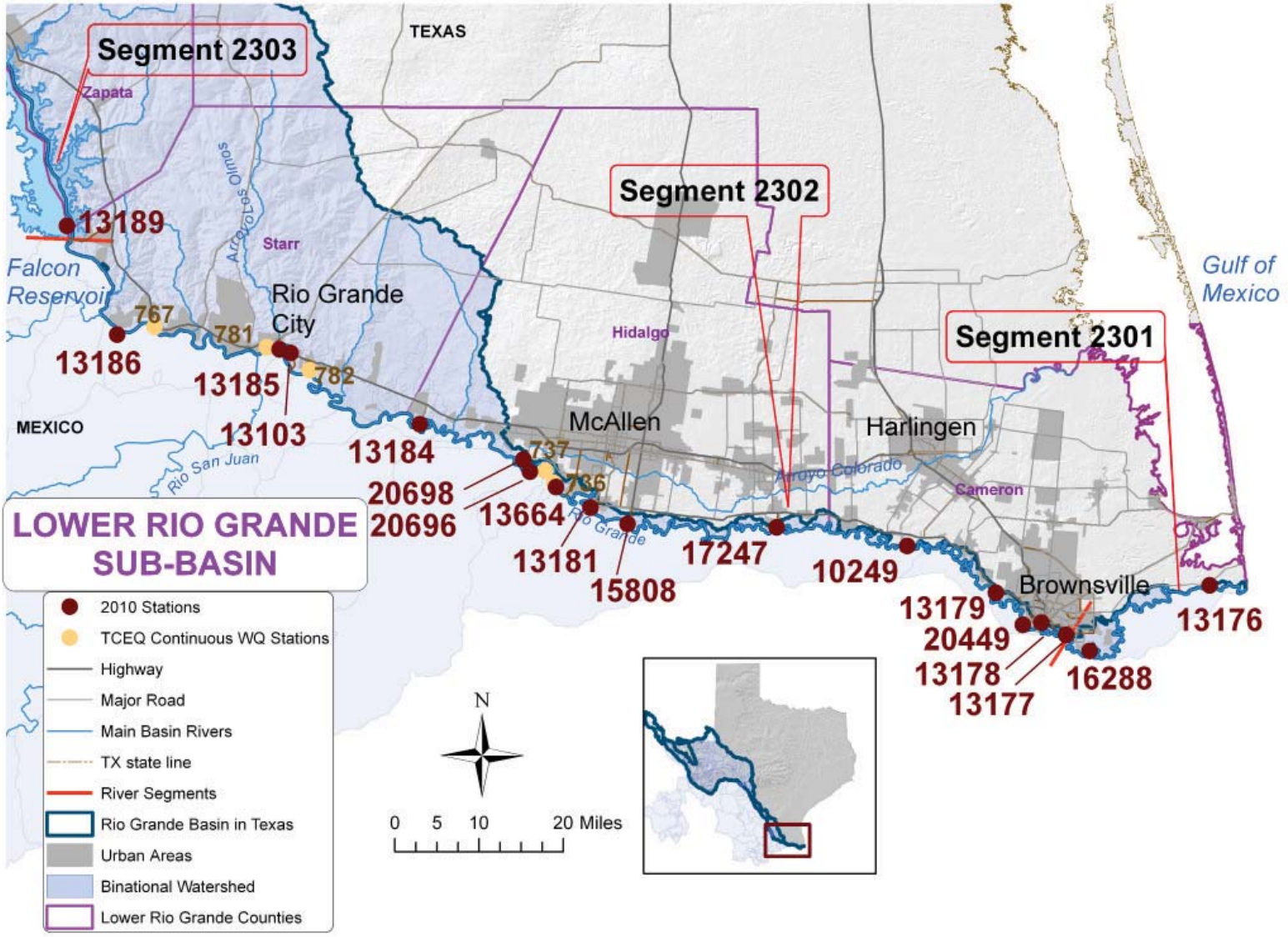
Invasive aquatic weeds such as hydrilla and water hyacinth have been an issue in the Lower Rio Grande. These aquatic plants choke portions of the river preventing boat traffic, impeding water flow and increasing water loss through consumption and evapotranspiration. Control methods (Mechanical removal and biological control using triploid grass carp) have reduced the problem significantly.

Heavy rains, such as those in the late summer of 2008, also helped push the aquatic plants into saline waters where they cannot survive. At present, the problem is not the serious issue that it was in 2003, but hydrilla is rapidly re-establishing itself in the river.

UTB and CRP sample in Brownsville for the bacteria special study, March 2010

## 2010 Lower Rio Grande Sub-basin Updates and Special Studies

*Bacteria Special Study in Brownsville.* The University of Texas at Brownsville (UTB) is collaborating with USIBWC CRP to conduct a special study to track the




## Table 12. Water Quality Review for the Lower Rio Grande Sub-Basin

| Segment | Uses | Stations | Length | Segment Characteristics | Water Quality Summary |
|---|---|---|---|---|---|
| 2302 - Rio Grande Below Falcon Reservoir | H, PS, GU, FC, CR | 13186, 13185, 13184, 13664, 13181, 15808, 13180, 17247, 10249, 13179, 13178, 20449, 13177 | 231 mi | Classified as a freshwater stream. Extends from Falcon Dam to below Brownsville and includes Anzalduas Dam and most of the LRGV. | The majority of this segment has no impairments, but there are consistently high bacterial counts around Brownsville and downstream of Falcon dam, impairing the segment for contact recration. Increased sulfate levels, indicating potential wastewater influences that can adversely affect the public water supply. The entire segment has a concern for fish consumption due to elevated mercury in fish. |
| 2301 - Rio Grande Tidal | E, GU, FC, CR | 16288, 13176 | 49 mi | Classified as a tidal stream. Extends from the confluene of the Rio Grande with the Gulf of Mexico to a point 6.7 miles downstream of the International Bridge in Brownsville, Cameron County. | Classified as a tidal stream. There are no impairments but closer to the Gulf there are high chlorophyll-a levels. The 2010 assessment used enterococcus as a bacteria indicator, showing a concern for bacteria. |

H - High Aquatic Life, E - Exceptional Aquatic Life, PS - Public Drinking Supply, GU - General Use , FC - Fish Consumption , CR - Contact Recreation

possible sources of bacteria contamination causing the impairment in a 20-mile segment of the river in Brownsville, TX. The special study will consist of intensive monitoring through the 20-mile section of impaired waters as well as a field survey of all drains and discharges emptying into the river and potential nonpoint source pollution. The year-long study will provide information to narrow the geographic extent of the contamination and determine whether the bacteria is coming from a point source. The Mexican Section of the IBWC has expressed support for the study.

The special study quality assurance project plan was approved in October 2009, and the first sampling event took place in March 2010. Additional sampling will take place in April, and a study report will be completed by Fall 2010. The report and data will be publicly available on the USIBWC CRP website.

# Table 13. Coordinated Monitoring Schedule for the Lower Rio Grande Sub-Basin

## Monitoring Schedule - Lower Rio Grande Sub-Basin

| Site Description | Station | SE | CE | Times per year sampled | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 24 DO | AT | MW | OW | MS | OS | Con | Bac | Flow | Field |
| **Segment 2301 Rio Grande Tidal** | | | | | | | | | | | | | |
| Rio Grande Tidal at SH4 Near Boca Chica | 13176 | IBWC | UB | | | | | | 1 | 4 | 4 | | 4 |
| Rio Grande at Sabal Palm Sanctuary at Northeast Boundary off Park Road Approx. 1 mi south of FM 1419 near Palm Grive | 16288 | IBWC | UB | | | | | | | 4 | 4 | | 4 |
| **Segment 2302 Rio Grande Below Falcon Reservoir** | | | | | | | | | | | | | |
| Rio Grande 6.3 km downstream from San Benito Pumping Plant, 15.3 km SW of San Benity | 10249 | TCEQ | FO | | | | | | | 4 | 4 | | 4 |
| Arroyo Los Olmos Bridge on US 83 south of Rio Grande City (Segment 2302A) (Biased Flow, non-routine monitoring) | 13103 | IBWC | IB | | | | | | | 3 | 3 | 3 | 3 |
| Rio Grande El Jardin Pump Station at Low Water Dam 300 ft below intake | 13177 | IBWC | IB | | | | | | 1 | 8 | 8 | 8 | 8 |
| Rio Grande El Jardin Pump Station at Low Water Dam 300 ft below intake | 13177 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at International Bridge on US 77 at Brownsville | 13178 | IBWC | UB | | | | | | 1 | 4 | 4 | | 4 |
| Rio Grande near River Bend Boat Ramp Approximately 5 mi west of Brownsville on US 281 | 13179 | IBWC | UB | | | | | | 1 | 4 | 4 | | 4 |
| Rio Grande International Bridge at US 281 at Hidalgo | 13181 | IBWC | IB | | | | | | 1 | 8 | 8 | 8 | 8 |
| Rio Grande at SH 886 near Los Ebanos | 13184 | IBWC | IB | | | | | | | 7 | 7 | 7 | 7 |
| Rio Grande at Fort Ringgold 1 mi downstream from Rio Grande City | 13185 | IBWC | IB | | | | | | 1 | 12 | 12 | 12 | 12 |
| Rio Grande Below Rio Alamo near Fronton | 13186 | IBWC | IB | | | | | | | 8 | 8 | 8 | 8 |
| Rio Grande 0.5 mi below Anzalduas Dam, 12.2. mi from Hidalgo | 13664 | IBWC | IB | | | | | | | 8 | 8 | 8 | 8 |
| Rio Grande 200m upstream of Pharr International Bridge (US 281) | 15808 | IBWC | IB | | | | | | | 8 | 8 | 8 | 8 |
| Rio Grande 100m upstream of FM 1015 at Progresso | 17247 | TCEQ | FO | | | | | | | 4 | 4 | 4 | 4 |
| Rio Grande at Brownsville PUB Water Treatment Plant Number 1 Intake Between WTP Reservoir and Rio Grande Levee | 20449 | IBWC | BO | | | | | | | 12 | 12 | | |
| Rio Grande at the El Morillo Tract of the Lower Rio Grande Valley National Wildlife Refuge | 20698 | IBWC | UF | | | | | | | 4 | 4 | | 4 |
| Old Rio Grande meander La Parido Banco Number 144 Boat Ramp | 20698 | IBWC | UF | | | | | | | 4 | 4 | | 4 |
| **Segment 2303 International Falcon Reservoir** | | | | | | | | | | | | | |
| Falcon Lake at International Boundary Monument 1 | 13189 | IBWC | IB | | | | | | | 4 | 4 | | 4 |
| Falcon Reservoir at San Ygnacio WTP Intake, 350m Downstr from B83 Bridge | 15818 | IBWC | RN | | | | | | | 2 | 2 | | 2 |

FO - TCEQ Field Office, IB - IBWC Field Office, UB - University of Texas at Brownsville, BO - Brownsville Public Utilities Board, UF - US Fish and Wildlife Service, RN - Rio Grande International Study Center, SE - submitting entity, CE - collecting entity
24 DO - 24-hour Dissolved Oxygen, MS - metals in sediment, OS - organics in sediment, MW - metals in water, OW - organics in water, Con - routine conventional parameters, Bac - Bacteria (ecoli), AT - Ambient Toxicity (W-water, S-soil)

# USIBWC CRP Public Outreach

## Basin Advisory Committee

The Basin Advisory Committee (BAC) is a group of private citizens, government agency representatives, citizen groups, and academia who provide input and information for the CRP program to ensure issues and concerns in the community are addressed. Input from the BAC assists the CRP in determining changes to the monitoring schedule, new monitoring sites, special studies, and dissemination of information. People who are interested in providing input on environmental issues and who would like to participate in the Rio Grande Basin BAC can contact anyone in the CRP (see the back cover of this report for contacts).

BAC meetings are held once a year in the fall in El Paso and the LRGV, in conjunction with the USIBWC Rio Grande Citizens' Forum. The meetings provide the USIBWC CRP with an opportunity to update the public on recent activities and future plans, as well as forums for research exchange and input about the program.

## Texas Stream Team

The Texas Stream Team, formerly called Texas Watch, is a network of trained volunteers and partners who gather information about Texas natural resources and ensure information is available to the general public. In previous years, the USIBWC CRP has partnered with the Texas Stream Team on Rio Grande projects in Laredo and McAllen. In 2009 and 2010, we are continuing our partnership with Texas Stream Team to bring the program to the U.S.-Mexico border region, as well as to the Pecos sub-basin. Leslie Grijalva is the USIBWC contact for volunteer monitoring in the Rio Grande Basin, and she is a certified monitor and in the process of trainer certification. The Texas Stream Team program is excellent for teachers interested in monitoring with students. To find out more about the Texas Stream Team, contact Leslie or visit the website (p. 30).

## Friends of the Rio Grande and 2009 Small Project Funding Opportunity

The Friends of the Rio Grande (FORG) is an initiative whose objective is to promote environmental awareness along the Rio Grande through public outreach and education, organizing volunteer cleanups along the river, water quality monitoring, and recognition of exemplary environmental efforts. In 2004, TCEQ and the USIBWC CRP funded eight projects at schools, museums, environmental awareness groups, and parks.

USIBWC CRP staff discuss water quality of the Rio Grande at Courchesne Bridge in El Paso with EPCC students studying salinity of riparian plants.

In 2009, USIBWC CRP funded additional small projects for water quality and outreach projects affecting the Rio Grande. Projects funded, which are posted on the FORG website (p. 30), were the following:

- El Paso Community College (EPCC) Early College High School, Minority Science and Engineering Improvement Program (MSEIP) - Supplies for research on Salinity Tolerance of Riparian plants and water quality education
- University of Texas at El Paso (UTEP), Biological Sciences Department - Equipment for a continuous water quality station on a tributary of the Rio Grande near Indio Mountains Research Center in the Forgotten Stretch
- Individual Owners of the Rio Grande (RiGo) and other participating organizations - supplies for two river cleanups and river awareness days in the El Paso area
- City of Weslaco, Lower Rio Grande Stormwater Task Force - Soil Erosion Prevention and Awareness Program, printing of manuals and brochures for training

Fourth-graders test pH, DO and turbidity at the El Paso Water Festival in October 2009

- EPCC Research Initiative for Scientific Enhancement (RISE) Program - supplies to continue research on bacteria source tracking in the El Paso/Hudspeth counties

## Friends of the Rio Grande 2010 Awards

The USIBWC CRP, through the Friends of the Rio Grande, will be recognizing individuals or groups that have contributed to the education and research of the Rio Grande in 2010. If you would like to nominate a candidate, visit the FORG website (p. 30).

## Laredo celebrates Dia Del Rio

In October 2009, the RGISC in Laredo hosted a series of events to celebrate Dia del Rio, including a field trip to the Rio Grande, a Rio Grande/Rio Bravo Watershed Alliance Conference, a Worldwide Water Education workshop, trail work, and the Laredo RioFest Kayak/Canoe Race.

## Water Festival

This past year, the USIBWC CRP continued to provide support to the annual El Paso Water Festival, which brings children and educators to the El Paso Desalination Plant's Tech$_2$O Center. In October 2009, USIBWC CRP conducted water quality experiments using the World Water Monitoring Day kits to investigate water quality parameters of river water, tap water, and soapy water with local school children and the public.

Members of the Vinton, TX community gather to see water quality tests of tap and river water

Families of USIBWC employees volunteered at the El Paso cleanup in June 2009

## River Cleanups

In June and July 2009, the USIBWC CRP hosted river cleanups with RiGo and the Boy Scouts, Yucca Council. RiGo requested cleanup supplies from the USIBWC CRP through the 2009 Small Project funding opportunity. The cleanups, held in Canutillo and El Paso, TX, brought out volunteers to promote a litter-free Rio Grande and collected 57 bags of trash, 2 tires, piles of lumber, and a couch! Thank you to all the participants.

USIBWC CRP staff discuss Texas Stream Team bacteria analysis kits during a teacher workshop

## Healthy People Healthy Water Teacher Workshops

In January 2010, USIBWC CRP staff conducted several sessions on water quality monitoring and educational activities to El Paso middle and high school teachers. The workshop was part of Project WET's Healthy People Healthy Water curriculum for educators. In addition to curriculum activities, USIBWC CRP discussed a variety of methods available for water quality monitoring, including Texas Stream Team kits and World Water Monitoring Day kits.

## Publications in Spanish

USIBWC CRP has begun to publish outreach information in Spanish, including an Executive Summary of the 2009 Basin Highlights Report and brochures about protecting the Rio Grande as a drinking water source. The publications are available on our website, http://www.ibwc.gov/CRP/publications.htm.

## 2010 Rio Grande Calendar

USIBWC CRP compiled an outreach calendar to promote awareness of the Rio Grande and distributed calendars to stakeholders throughout the basin. The USIBWC CRP is currently working on the 2011 calendar, which will be bilingual.

## Binational Water Quality Database

USIBWC is working on a collaborative water quality database that will include data from both U.S. and

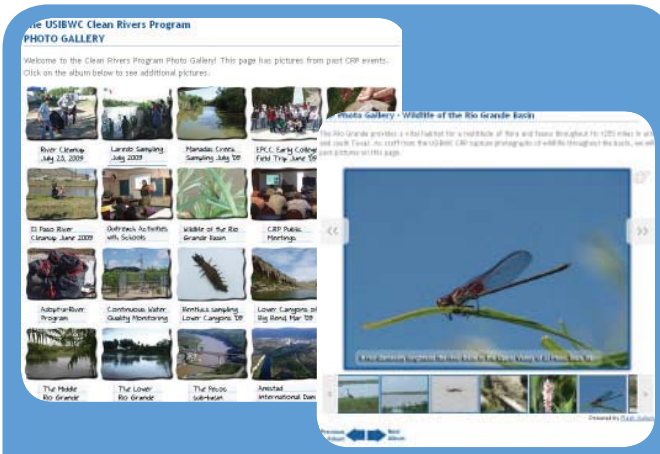
Mexican agencies. Data will be hosted on the USIBWC GIS server and will be accessible via the USIBWC CRP website as well as the USIBWC website, and will be functioning in 2010. Users will be able to query data by water quality parameters, date range, station, and collecting entities.

## Other Outreach Activities

USIBWC CRP has participated in numerous additional outreach activities to disseminate information about the Rio Grande, the CRP, and water quality data. Events include providing information at booths at the EPA Beyond Translation Forum's EcoCafe and local health fairs, as well as talks with local gardening groups. At the 2009 Village of Vinton Health Fair, USIBWC distributed bilingual information about protecting the Rio Grande as a drinking water source in the El Paso area.

## Photo Gallery

Photos of various aspects of the Rio Grande Basin are now posted on the USIBWC CRP Photo Gallery website. The public can see pictures of wildlife, CRP water quality monitoring and outreach activities, and different parts of the basin.




Visit the new Photo Gallery online at http://www.ibwc.gov/CRP/gallery.htm

## Highlight of 2009 Scientific Literature on the Rio Grande

**Geographical distribution of arsenic in sediments within the Rio Conchos Basin, Mexico.** 2009. Melinda Gutierrez, M. Teresa Alarcon-Herrera, Lucy M. Camacho. *Environmental Geology*, Vol. 57 pp. 929-935.

**Economic Implications of Biological Control of Arundo donax in the Texas Rio Grande Basin.** Texas Water Resources Institute Technical Report TR 358-2009. AgriLife Research & Extension, Texas A&M University.

**A River Transformed: Historic Geomorphic Changes of The Lower Rio Grande in the Big Bend Region of Texas, Chihuahua, and Coahuila.** David James Dean. Thesis submitted for Master of Science in Watershed Science, Utah State University, 2009.

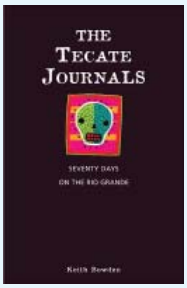
**Mapping giant reed with QuickBird imagery in the Mexican portion of the Rio Grande Basin.** Chenghai Yang, John A. Goolsby, and James H. Everitt. *Journal of Applied Remote Sensing,* Vol. 3, 033530, 2009.

## Highlight of Books on the Rio Grande

**Great River: The Rio Grande in North American History.** Paul Horgan. Wesleyan, New England, 1984.

**Rio Grande.** Edited and with a text by Jan Reid. University of Texas Press, Austin, 2004.

**The Tecate Journals: Seventy Days on the Rio Grande.** Keith Bowden. The Mountaineers Books, Seattle, 2007.




## Referenced Websites

NRSA, p. 2 - http://www.epa.gov/owow/riverssurvey/index.html
The Nature Conservancy in Texas, p. 4 - http://www.nature.org/texas09
TSWQS, p. 7 - http://www.tceq.state.tx.us/nav/eq/eq_swqs.html
SWQM, p. 8 - http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/wqm/mtr/index.html
TCEQ 303(d) List, p. 10 - http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/wqm/305_303.html
CWQM, p. 14, 18 - http://www.tceq.state.tx.us/compliance/monitoring/water/quality/data/wqm/swqm_realtime.html
TPWD Golden Alga, p 19 - http://www.tpwd.state.tx.us/landwater/water/environconcerns/hab/ga/
Pecos WPP, p. 20 - http://pecosbasin.tamu.edu
FORG, p. 28-29 - http://www.friendsoftheriogrande.com
Texas Stream Team, p 28 - http://txstreamteam.rivers.txstate.edu
USIBWC CRP - http://www.ibwc.gov/CRP/index.htm

# USIBWC CRP Website

The USIBWC CRP website provides the following pages and information:


Study Area – This page contains a GIS-based interactive map of the Rio Grande Basin and provides information on water quality and water quantity stations. IBWC is currently upgrading this interactive map service.

Data – USIBWC CRP monitoring station data, our water quality data page where you can acquire an Excel file of the water quality data by station since 1995. You can also find a link to the monitoring schedule website (cms.lcra.org), definition of monitoring parameters, available data on metals analysis in the basin, a spreadsheet of Rio Grande segment uses and water quality standards, laboratory specifications, and our Quality Assurance Project Plan.

Publications – contains our Basin Highlights Reports, our five-year Basin Summary Reports in PDF format, as well as other publications including outreach materials, brochures, special study reports, and administrative documents.

Participation – contains information on how the public can become involved with CRP.

Calendar/Current Activities – contains meetings that we will be hosting or presenting, and updates on current activities in the basin.

Partner Links – contains links to other planning agencies in Texas, the Rio Grande basin partners, and other related links to environmental agencies and groups in the federal government, Mexican government, and public sector. In addition, sampling partners and other stakeholders can find resources related to water quality in the basin and program-specific requirements.

Adopt-A-River - contains information about the USIBWC Adopt-A-River Program to promote a litter-free Rio Grande.

Scientific Research Portal - contains links and resources on scientific literature and GIS data of the Rio Grande Basin.

Photo Gallery - the USIBWC CRP Photo Gallery contains photo albums on the geography and wildlife of the Rio Grande Basin as well as CRP water quality monitoring activities, outreach activities, and more.

About CRP – contains contact information for CRP personnel as well as information about the program.

THE TEXAS CLEAN RIVERS PROGRAM

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**The preparation of this report was financed through grants from and in cooperation with the Texas Commission on Environmental Quality**