2007

BASIN HIGHLIGHTS REPORT

FOR THE

RIO GRANDE BASIN

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Texas Commission on Environmental Quality.
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MONITORING

The United States Section of the International Boundary and Water Commission (USIBWC) supports and administers the 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.

CRP partners throughout the basin have been a valuable asset in water quality monitoring, advice and suggestions on improving the program and the basin; developing and assisting in special studies; and communicating and educating the general public.

During the past year, the CRP continued to maintain its large network of water quality monitoring stations, and added new real-time stations throughout the basin.

Monitoring Types

Routine monitoring – This is the primary monitoring type performed in the basin. Routine monitoring is performed at fixed locations at regular intervals throughout the year for specific parameters. This data is used to establish a baseline and provide information about ambient water quality conditions in the water body. It is through routine monitoring that positive or negative trends in water quality can be determined and concerns or impairments can be identified.

Intensive monitoring – This type of monitoring is performed at a routine monitoring site to provide more detailed information by using a more intensive schedule or additional parameters not performed during the routine analysis. This type of monitoring is usually initiated after the routine monitoring has identified a problem with water quality that needs to be further isolated by source in order to find a solution to the water quality issue.

Special studies – This type of monitoring is performed in a river segment to address concerns identified by other agencies, local communities, or academia to determine unique impacts in that area. These studies are usually short term and very intensive, utilizing the efforts of several different organizations to produce data on a single aspect of the water body.

TCEQ and USIBWC personnel conducting a biological survey in the Pecos River.

Parameters Monitored

Field

When samples are collected for laboratory analysis, personnel also take measurements to record conditions at the time the sample was taken. Field measurements include: weather conditions at the time of collection, recent rain events in the area, the water and air temperature, water depth, stream width, 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, conductivity, and dissolved oxygen.

pH - is a measure of how acidic or basic the water is. The range goes from 0 to 14, with 7 being neutral. pH values less than 7 indicate acidity, whereas a pH greater than 7 indicates a base. State water quality standards require the pH to be between 6.5 and 9.0. In general, pH values greater than 9.0 and less than 5.0 can begin to have detrimental affects on the health of aquatic life, wildlife, and humans.

Partners from the USIBWC Presidio field office collecting field data in the Rio Grande near Presidio.

Conductivity – is an indicator of how well the water conducts electricity. Pure water does not conduct electricity; the impurities in 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.

Dissolved oxygen (DO) – one of the most important water quality parameter of them all. Low DO values can lead to reduced numbers of aquatic plants and animals in a water body. Water bodies with very low oxygen levels can support large populations of bacteria, some possibly harmful. State standards for DO vary depending on the designated use of the water body for the quality of aquatic life.

Conventional

Conventional parameters are collected in the field and analyzed by a laboratory. All of the sites monitored are analyzed for conventional parameters, which include:

Solids – total and dissolved material of any kind. High solids lead to murky water and lower available oxygen for plants and animals. High dissolved solids can render the water unusable as a drinking water source without costly advanced treatment processes.

Nutrients – such as nitrogen compounds, ammonia, and phosphorous. High nutrient levels can cause excessive plant growth, which can lead to reduced dissolved oxygen, reduced stream flow and reduced navigability of the waters.

Salts – sodium, potassium, magnesium, calcium, chloride, and sulfate. These parameters combine to produce salts in the water, which can make the water difficult to treat for use as drinking water, unsuitable for agriculture and livestock, and unfit for use by a variety of plant and animal species.

Chlorophyll-a – an indicator of excessive plant and algal growth in the water body.

Alkalinity – measures the acid neutralizing ability of the water due to the amount of carbonates, bicarbonates, and hydroxides in the water. Alkaline water is detrimental to agriculture and plant growth.

Other parameters that are periodically tested are silica, organic carbon, fluoride, and oil and greases.

Metals

High concentrations of metals can be highly toxic to aquatic life. Metals can be tested as total or dissolved metals in water and can be tested in the sediment to determine long-term accumulation of metals. Metals typically analyzed are aluminum, arsenic, barium, chromium, copper, lead, mercury, nickel, silver, and zinc.

Organics

Organic compounds are chemicals containing carbon and hydrogen. Organic compounds analyzed are herbicides, pesticides and industrial organic compounds in the water and the sediment. These compounds can be toxic to aquatic plants and animals.

Bacteria

The CRP analyzes samples for fecal coliform and *E. coli* as indicators of bacterial contamination of the water body. The state of Texas has switched from fecal coliform to *E. coli* as the preferred indicator bacteria, but the USIBWC is still analyzing for both to satisfy international criteria.

Screening Criteria

Data collected for the previously mentioned parameters are then checked by the CRP for accuracy, quality, and adherence to approved methods. The data are then submitted to 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 five years that contain at least 10 data points are thencompared to the Texas Surface Water Quality Standards (TSWQS) that are assigned to each stream segment to create a summary of water quality. This summary is included in the Texas Water Quality Inventory. The Texas Water Quality Inventory is done by the TCEQ every two years as required by the Clean Water Act. Any section of a water body that does not meet the primary standards is then placed on the 303(d) list, which contains water quality impairments in the water bodies of the state. 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.

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

Concerns are identified when data is compared to secondary screening levels. Secondary criteria 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 a freshwater stream are:

Parameter	Criteria
Ammonia	0.33 mg/l
Nitrate + nitrite	2.00 mg/l
Total phosphorous	0.69 mg/l
Ortho phosphorous	0.37 mg/l
Chlorophyll-a	14.1 ug/l

The secondary parameters for a tidal stream are:

Parameter	Criteria
Ammonia	0.46 mg/l
Nitrate + nitrite	1.10 mg/l
Total phosphorous	0.66 mg/l
Ortho phosphorous	0.46 mg/l
Chlorophyll-a	21.0 ug/l

A section is listed as having a concern if more than 25% of the data fail to meet the above criteria.

Designated Uses

Contact recreation – fishing, swimming, wading, boating, etc. The primary parameter of concern for this use is bacteria. The standard for the geometric mean for *E. coli* is 126 colony forming units/100 ml (CFU). For fecal coliform it is 200 CFU. The standard for a single grab sample is 396 CFU for *E. coli* and 400 CFU for fecal coliform.

Domestic water supply - as a drinking water source, the primary concern is TDS. The SDWA standard is 1,000 mg/l.

Aquatic life use – this designated use has four levels depending on the ability of a waterbody to support aquatic life such as fish, benthics (aquatic insects), and plants. The primary parameter for this use is DO. The four aquatic life use categories and criteria are, exceptional (6.0 mg/l), high (5.0 mg/l), intermediate (4.0 mg/l), and limited (3.0 mg/l).

Fish consumption - this applies to stream segments where citizens may collect and consume fish from the river.

The standard for pH in all uses in the Rio Grande basin is between 6.5 and 9.0. The standard for temperature in the basin falls between 31^{o} and 35^{o} Celsius, or 88^{o} and 95^{o} Fahrenheit.

Assessment and Monitoring Schedule

On the following pages is the assessment of water quality by sub-basin followed by the monitoring schedule, coordinated with our partners in the basin during our annual coordinated monitoring meetings, and a map of the sub-basin and station locations. The monitoring schedule lists the TCEQ designated segment and TCEQ region that the station is located in, the latitude and longitude of the station, the station description and I.D. number, and the number of times per year that the specified parameter is collected at each station by one of our partners.

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 (1045 km). The river flows through 8 counties in the United States and consists of five river segments; 2314, 2308, 2307, 2306, and 2305. In segment 2314, the river meanders in and out of Texas and New Mexico and in some parts forms the boundary between the two states. After Segment 2314, the Rio Grande forms the international boundary between the United States and Mexico.

During irrigation season, the water in the river is used for agriculture by New Mexico, Texas, and Mexico. The city of El Paso, TX also uses the river to provide half of its drinking water supply. The sister cities of El Paso and Ciudad Juarez, Chihuahua have a combined population of over 2 million and lands surrounding the cities are used primarily for agriculture. This reduces the quantity and the quality of water in the river significantly. Water in the river downstream of these cities is primarily composed of agricultural return flows, wastewater effluent, and raw or partially treated sewage. Because of this, the upper Rio Grande downstream of El Paso/Juarez is very high in salts and bacteria.

As the river flows by the sister cities of Presidio, TX and Ojinaga, Chihuahua, the Rio Conchos combines with the Rio Grande improving the water quality slightly. The combined water from both rivers then flows along Big Bend National Park, where the quality and quantity of the water is depended on by tourism and wildlife in the park.

Before the river is impounded by International Amistad Dam, the Pecos River enters the Rio Grande increasing the water quantity. The International Amistad Dam is operated by the IBWC. Benefits created by the dam include flood prevention for downstream communities, improved water quality, water supply, and steady, continuous flow in the river below the dam as well as fishing and recreation. The dam also contains two hydroelectric plants that can produce electricity for communities on both sides of the border.

The Rio Grande River as it passes by Fabens, TX.

Water Quality Review

Segment 2314 extends from the New Mexico – Texas state line downstream to the International Dam in El Paso County, a length of 21 miles (33 km). Designated uses for this segment are high aquatic life use, public water supply, fish consumption, and contact recreation. There are two existing monitoring stations in this segment and another station that is being used as a special study site. Primary impacts in this segment are concentrated animal feeding operations (CAFO), irrigated agriculture, some industry, and municipal wastewater treatment plant effluent. Treaty allotments of water for the United States are diverted at the American Dam. A short distance downstream, Mexico's treaty allotment is diverted at the International Dam. For more information on the treaties between the United States and Mexico, visit *www.ibwc.state.gov/html/treaties.html*. Water diverted for the United States is sent along a canal system, the Rio Grande American Canal Extension (RGACE) and the Franklin Canal, for use by El Paso as a drinking water

source and for irrigation by United States farmers. Water diverted into Mexico is used by Mexican farmers for irrigation purposes in the Juarez Valley.

This segment is listed as having a contact recreation impairment due to bacterial values exceeding the standards. The bacteria levels have dropped dramatically due to improvements in wastewater treatment plants in the area but the bacteria levels are still above the Texas and New Mexico water quality stnadards. The sources are not known but are believed to be linked to large number of CAFO's located upstream of the segment.

Segment 2308 is the region below International Dam downstream to the Riverside Diversion Dam in El Paso County, a length of 15 miles (24 km). The designated uses for this segment are limited aquatic life use, noncontact recreation, and fish consumption. There are three monitoring stations along this segment. The upper portion of this segment was concrete lined to prevent meandering of the international boundary. Since the creation of the RGACE canal, this segment contains very little water. This segment is meeting all of its primary standards, but is listed as having a concern for phosphorous and nitrate.

Segment 2307 runs from the Riverside Diversion Dam in El Paso County to the confluence with the Rio Conchos in Presidio County, a length of 222 miles (357 km). The designated uses for Segment 2307 are contact recreation, public water supply, high aquatic life use, and fish consumption. There are five monitoring stations in this segment and three special study sites.

The upper portion of this segment receives flow from irrigated agriculture and wastewater treatment plant effluent from both countries and also receives poorly treated sewage as well. Because of this, this segment has an impairment due to elevated bacteria levels, and high and TDS concentrations. This site has also exhibited high ammonia and phosphorous levels leading to high algal content.

Below these points, there are no impactors on the river as it meanders through rough terrain and sparse ranch land. Bacteria and salt concentrations decline slightly as the river reaches the end of the segment but still exceed the standards.

Fish sampling in the Rio Grande below Big Bend National Park.

Segment 2306 flows from the confluence with the Rio Conchos in Presidio County to the confluence with Ramsey Canyon in Val Verde County, a length of 313 miles (503 km). The designated uses are high aquatic life use, contact recreation, fish consumption, and public water supply. There are seven monitoring stations along this segment. Presidio, Texas and Ojinaga, Chihuahua are the primary impactors in this segment. The river then flows through Big Bend Ranch State Park and Big Bend National Park and then meets with the Pecos River. High TDS levels from Segment 2307 still affect this segment causing a concern for drinking water use, while elevated bacteria levels create an impairment for contact recreation use. There is also a concern for elevated algal growth throughout the Big Bend area. Bacteria levels drop below the standard as the river reaches the end of the segment. TDS and chloride levels decrease due to increased spring flow in the area from Big Bend to the confluence with the Pecos River. Nutrient levels are also high in this segment and algal blooms have occurred in this portion of the river.

Segment 2305 runs from the confluence of the Pecos River in Ramsey Canyon in Val Verde County to the International Amistad Dam along the Rio Grande and from the confluence of Little Satan Creek in Val Verde County to the Dam along the Devils River, a total length of 75 miles (120 km). The designated uses are contact recreation, high aquatic life use, fish consumption, and public water supply. This segment has four monitoring stations on the lake. All of the designated uses are being met, but there is a nitrate concern in the reservoir. Due to good rains in the United States and Mexico and to conservation efforts, the reservoir is close to conservation levels.

Segment 2309 is the Devils River, which is 67 miles (108 km) long, from its origin in Sutton County to the confluence of Little Satan Creek. The designated uses for the Devils River are exceptional aquatic life, contact recreation, fish consumption, and public water supply. All uses are fully supported, as water quality is very high. Typical TDS values are below 500 mg/l and there are few impactors along this river. There are three monitoring stations in this segment. The USIBWC, USGS, and The Nature Conservacy are currently monitoring the river to assess impacts from oil and gas operations and expanded growth in the area.

Special Studies

A special study in Big Bend to source track nutrient and salinity contamination between Presidio and Amistad Dam is being conducted this year by Big Bend NPS, the USGS, TCEQ and the USIBWC. To obtain a comprehensive assessment of water quality conditions, real-time water quality monitoring stations in the Rio Grande within Big Bend National Park have been installed. The study will also monitor water quality and quantity from several springs along the river to assess their impact on the Rio Grande. High bacteria, salt, and nutrient levels threaten the ecosystem and recreational activities along the Rio Grande in Big Bend. The purpose of the study will be to quantify water flows by identifying gaining and losing reaches and to characterize nutrient loadings from Presidio to Lake Amistad.

Partners

USIBWC American Dam Office – collects water quality samples at five sites in segments 2314, 2308, and 2307 around El Paso.

El Paso Water Utilities – provides laboratory analysis of water quality samples collected by the USIBWC American Dam Office and special samples collected in the El Paso area.

El Paso Community College – conducting special studies on bacteria in the El Paso area.

University of Texas at El Paso – collects water quality samples at Fabens and San Elizario, Texas and conducts special studies on riparian habitat in the Upper Rio Grande area.

TCEQ El Paso Office – collects water quality samples throughout the upper Rio Grande from El Paso to Big Bend.

USIBWC Presidio Office – collects water quality samples around Presidio.

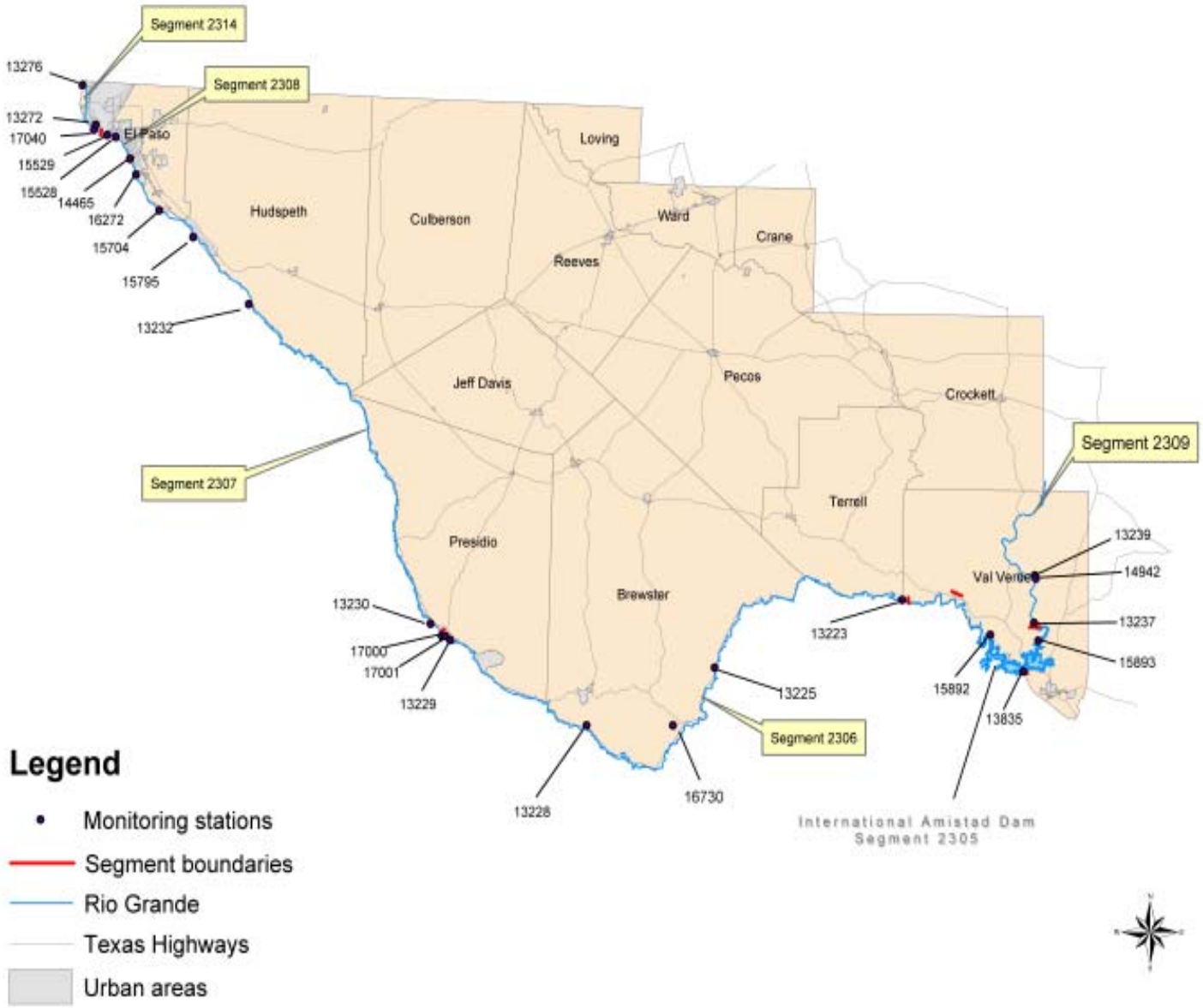
Big Bend National Park Service – collects water quality samples and conducts special studies in the Big Bend area.

USIBWC Amistad Dam Office – collects water quality samples in the International Amistad Reservoir.

Amistad National Recreation Area National Park Service - collects water quality samples and conducts special studies in Lake Amistad.

FY2008 UPPER RIO GRANDE MONITORING STATIONS

RIVER SEGMENT	Region	LAT	LONG	STATION DESCRIPTION	STATION ID.#	Metals Water	Org. Sed.	Metals Sed.	CONV	Tox.	Bacteria	Flow	FIELD
2305	13	29.460	-101.060	AMISTAD RESERVOIR AT BUOY #1	13835				4		4		4
2305	13	29.625	-101.251	AMISTAD RESERVOIR RIO GRANDE ARM AT BUOY #28	15892				4		4		4
2305	13	29.601	-100.976	AMISTAD RESERVOIR DEVILS RIVER ARM AT BUOY DRP	15893				4		4		4
2306	13	29.780	-101.760	RIO GRANDE AT FOSTER RANCH WEST OF LANGTRY OFF HWY 90W	13223				2		2	2	2
2306	6	29.450	-102.830	RIO GRANDE AT FM 2627 (GERSTACKER BRIDGE) BELOW BIG BEND	13225				4		4	4	4
2306	6	29.180	-103.060	RIO GRANDE AT RIO GRANDE VILLAGE IN BIG BEND NATONAL PARK	16730				8		8	8	8
2306	6	29.167	-103.554	RIO GRANDE AT THE MOUTH OF SANTA ELENA CANYON	13228		2		12		12	12	12
2306	6	29.533	-104.350	RIO GRANDE BELOW RIO CONCHOS CONFLUENCE NEAR PRESIDIO	13229		2		12		12	12	12
2306	6	29.543	-104.377	RIO GRANDE AT PRESIDIO RAILROAD BRIDGE	17000						8	8	8
2306	6	29.557	-104.384	RIO GRANDE AT PRESIDIO OJINAGA VEHICLE BRIDGE	17001						8	8	8
2307	6	29.604	-104.467	RIO GRANDE 2.4 MI.UPSTREAM FROM RIO CONCHOS CONFLUENCE	13230				12		12	12	12
2307	6	31.025	-105.594	RIO GRANDE AT NEELY CANYON, SOUTH OF FORT QUITMAN	13232	2			4		4	4	4
2307	6	31.317	-105.936	RIO GRANDE AT ALAMO CONTROL STRUCTURE, 9.7 KM UPSTREAM OF FORT HANCOCK PORT OF ENTRY	15795	4	4		10	2	10	10	10
2307	6	31.430	-106.142	RIO GRANDE AT GUADALUPE POINT OF ENTRY BRIDGE AT FM 1109 WEST OF TORNILLO	15704		2		8		8	8	8
2307	6	31.587	-106.289	RIO GRANDE AT SAN ELIZARIO, 500M UPSTREAM OF CAPOMO ROAD END OF PAVEMENT AND 10.2 KM DOWNSTREAM OF ZARAGOSA INTERNATIONAL BRIDGE	16272		2		8		8	8	8
2308	6	31.658	-106.329	RIO GRANDE AT RIVERSIDE CANAL 1.8 KM DOWNSTREAM OF ZARAGOSA INT'L BRIDGE	14465	12	12		12		12		12
2308	6	31.753	-106.419	RIO GRANDE 1.3 KM DOWNSTREAM FROM HASKELL ST. WWTP OUTFALL	15528	12	12		12		12	12	12
2308	6	31.760	-106.470	RIO GRANDE 2.4 KM UPSTREAM FROM HASKELL ST. WWTP OUTFALL, SOUTH OF BOWIE HIGH SCHOOL FOOTBALL STADIUM IN EL PASO	15529	12	12		12		12	12	12
2309	13	29.683	-101.000	DEVILS RIVER AT PAFFORD CROSSING NEAR COMSTOCK	13237				4		4	4	4
2309	13	29.900	-100.998	DEVILS RIVER ON DEVILS RIVER STATE NATURAL AREA 1.7 KM UPSTREAM OF DOLAN CREEK	13239				4		4	4	4
2309	13	29.886	-100.992	DOLAN SPRINGS 100 YDS. UPSTREAM OF CONFLUENCE WITH DEVILS RIVER IMMEDIATELY UPSTREAM OF ROAD CROSSING	14942				4		4	4	4
2314	6	31.803	-106.540	RIO GRANDE AT COURCHESNE BRIDGE, 1.7 MI UPSTREAM FROM AMERICAN DAM	13272	12	12		12		12	12	12
2314	6	31.780	-106.550	RIO GRANDE AT ANAPRA BRIDGE	17040						12		12
2314	6	31.981	-106.631	RIO GRANDE UPSTREAM OF EAST DRAIN	13276				4		4	4	4


Segment 2314
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Segment 2308
13272
17040
El Paso
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15528
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MIDDLE RIO GRANDE BASIN

Introduction

The middle Rio Grande sub-basin consists of that 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 populations 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 over the last few years. Water impounded behind Amistad Dam slows in velocity and much of the suspended solids carried from the upper Rio Grande sub-basin settles. 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.

Rio Grande below Amistad Dam.

Water Quality Review

Segment 2304 runs from Amistad Dam in Val Verde County to the confluence of the Rio Salado (Mexico) in Zapata County , a length of 226 miles (364 km). The water body uses for this segment are high aquatic life use, contact recreation, general uses, fish consumption, and public water supply use. The public water supply, fish consumption, and general uses are fully supported.

The water quality standard for bacteria was not met from below Del Rio to the end of the segment indicating an impairment for contact recreation. There is a concern for nitrate and low dissolved oxygen from below the dam to the confluence with San Felipe Creek. There are 21 monitoring stations in this segment primarily located within the populated areas along the river.

Segment 2303 runs from the confluence of the Rio Salado (Mexico) in Zapata County to Falcon Dam in Starr County, a length of 68 miles (109 km). Falcon reservoir, like Amistad, is used for recreation, water supply, and hydroelectric power generation. Less water is impounded in Falcon than is in Amistad.

The designated uses for the reservoir include contact recreation, high aquatic life use, fish consumption, and public water supply use. The public water supply and general uses are fully supported. The high aquatic life use, contact recreation and fish consumption uses were not assessed. Nutrient levels for nitrate and ammonia show a concern in the lake. There is limited data for bacteria but the available data shows elevated bacteria

Water quality sample collection in the Rio Grande below Amistad Dam.

levels around the Zapata Water Treatment Plant intake. There are three monitoring stations in this segment.

Segment 2313, San Felipe Creek, is a 9-mile (15-km) long stretch of high quality stream originating in the Del Rio area. Two springs, located within the city limits, make up the San Felipe Creek providing the city with a high quality water supply for drinking, fishing, and swimming. Recently, the City of Del Rio, TX constructed a reverse osmosis water treatment facility to protect from high turbidity values in their drinking water supply during heavy rain events.

The segment is designated for high aquatic life use, contact recreation, general use, fish consumption, and for public water supply use. All uses were fully supported except for fish consumption, which was not assessed due to lack of fish tissue data. This creek has a positive effect on the Rio Grande. Water quality is very high and reduces some of the loading in the Rio Grande as it travels downstream to other communities. There are three monitoring stations in San Felipe Creek.

Special Studies

The USIBWC is currently assisting Texas A&M - Kingsville with a study looking at potential metals contamination in Manadas Creek from metals processing and possible impacts to the Rio Grande.

Partners

USIBWC Amistad Field Office – Collects field data, flow and water samples in Segment 2304.

USIBWC Falcon Field Office - Collects field data and water samples in Segment 2303.

City of Laredo Environmental Services Department - collects field data and water samples in Manadas Creek in Segment 2304.

City of Laredo Health Department – Collects bacteriological samples at eight sites around Laredo, TX.

Rio Grande International Study Center – Collects field data and water samples in Segment 2304 and also conducts special studies in the Rio Grande and its tributaries.

TCEQ San Antonio Office – Collects field data and water samples in Segment 2304.

FY2008 MIDDLE RIO GRANDE MONITORING STATIONS

RIVER SEGMENT	Region	LAT	LONG	STATION DESCRIPTION	STATION ID.#	Metals Water	Org. Sed.	Metals Sed.	Toxicity	CONV	Bacteria	Flow	FIELD
2303	16	26.8644	-99.308	FALCON LAKE AT INTERNATIONAL BOUNDARY MONUMENT #1	13189					4	4		4
2303	16	27.043	-99.444	FALCON RESERVOIR AT SAN YGNACIO WTP INTAKE, 350M DWNSTR FROM US 83 BRIDGE	15818					2	2		2
2304	16	27.265	-99.454	RIO GRANDE AT WEBB/ZAPATA COUNTY LINE	15817		2			12	12	12	12
2304	16	27.404	-99.487	RIO GRANDE AT PIPELINE CROSSING, 13.9 KM BELOW LAREDO	13196	8	8	8		8	12	8	8
2304	16	27.330	-99.510	RIO GRANDE AT RIO BRAVO, 0.5KM DWNSTR OF THE COMMUNITY OF EL CENIZO	15816						12		
2304	16	27.430	-99.490	RIO GRANDE AT MASTERSON RD IN LAREDO, 9.9KM DOWNSTREAM OF INT'L BRIDGE#1(WEST BRIDGE)UPSTR SOUTHSIDE WWTP AND UPSTR NUEVO LAREDO WWTP	15815						12		
2304	16	27.499	-99.507	RIO GRANDE AT INTERNATIONAL BRIDGE #2 (EAST BRIDGE) IN LAREDO	15814		2			4	12	4	4
2304	16	27.500	-99.510	RIO GRANDE 30 METERS UPSTREAM OF US 81 BRIDGE (CONVENT AVENUE) IN LAREDO	13201						12		
2304	16	27.523	-99.524	RIO GRANDE LAREDO WATER TREATMENT PLANT PUMP INTAKE	13202		2			4	12	4	4
2304	16	27.570	-99.510	RIO GRANDE AT CP&L POWER PLANT INTAKE	15813						12		
2304	16	27.580	-99.500	MANADAS CREEK AT FM 1472 NORTH OF LAREDO	13116	4	2	4		4	4	4	4
2304	16	27.597	-99.533	RIO GRANDE BELOW WORLD TRADE BRIDGE	17410		2			4	4	4	4
2304	16	27.702	-99.754	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					4	12	4	4
2304	13	27.933	-99.924	RIO GRANDE AT APACHE RANCH	17596					4	4	4	4
2304	13	28.346	-100.310	RIO GRANDE AT IBWC WEIR DAM 6 MI. SOUTH OF EL INDIO, 0.6 MI. DOWNSTREAM OF CUERVO CREEK	15274					4	4	4	4
2304	13	28.663	-100.500	RIO GRANDE NEAR IRRIGATION CANAL LATERAL 50 US 277 BRIDGE IN EAGLE PASS	13205					12	12	12	12
2304	13	29.292	-100.876	RIO GRANDE, 4.5 MI. DOWNSTREAM OF DEL RIO AT MOODY RANCH	13560		2			12	12	12	12
2304	13	29.326	-100.931	RIO GRANDE 12.8 MI. BELOW AMISTAD DAM, NEAR GAGE, 340 M UPSTREAM OF US 277 BRIDGE IN DEL RIO	13208		2			6	6	6	6
2304	13	29.424	-101.041	RIO GRANDE 3.4 KM DOWNSTREAM OF AMISTAD DAM ABOVE WEIR DAM (IBWC GAGE #08-4509.00)	15340					2	2	2	2
2313	13	29.331	-100.889	SAN FELIPE CREEK AT GUYLER CONFLUENCE WITH THE RIO GRANDE	13270					2	2	2	2
2313	13	29.369	-100.884	SAN FELIPE CREEK AT BLUE HOLE FLOOD GATES, IN PARK BETWEEN US 90 BRIDGE AND SOUTHERN PACIFIC RR BRIDGE IN DEL RIO (50M DWNSTR OF US 90)	15821					2	2	2	2
2313	13	29.373	-100.885	SAN FELIPE CREEK AT WEST SPRINGS, NEAR WEST WELLS IN DEL RIO (IN WEST CHANNEL OF CREEK, 0.5 KM UPSTREAM FROM US 90 BRIDGE)	15820					2	2	2	


International
Amistad Dam
Val Verde
Segment 2313
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15820
15821
15340
13270
Kinney
13208
13560
13206
Maverick
13205
Dimmit
15274
Segment 2304
17596
Webb
15839
13116
15813
17410
13202
15814
13201
15815
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15816
15817
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LOWER RIO GRANDE 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, the 2000 census shows the lower Rio Grande Valley has 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.

In 2004, increased rainfall and water deliveries from Mexico have allowed reservoirs to increase storage. Research is also being done on increased storage of the river by construction of a weir around Brownsville and desalinization of groundwater and ocean water to supplement drinking water supplies in the lower valley.

Invasive aquatic weeds such as hydrilla and water hyacinth were an issue in the lower Rio Grande. These aquatic plants choke portions of the river preventing boat traffic, impeding water flow and increase water loss through consumption and evapotranspiration. Mechanical removal and biological control, using triploid grass carp, reduced the problem significantly. Heavy rains also helped push the aquatic plants into saline waters where they cannot survive. At present, the problem is not the issue that it was in 2003 but hydrilla is rapidly re-establishing in the river.

The Rio Grande impounded behind Anzalduas Dam.

Water Quality Review

Segment 2302 is classified as a freshwater stream with a length of 231 miles (371 km) and contains 13 monitoring stations. Its designated uses are high aquatic life use, contact recreation, general use, fish consumption, and public water supply. A portion of this segment (from Pharr International Bridge to downstream of Santa Ana National Wildlife Refuge) contained an impairment for contact recreation use due to high bacteria levels, but has since been delisted, however high bacteria levels are now creating in impairment downstream around the city of Brownsville. As this is a new impairment for this segment, the sources are unknown. This segment also shows increased sulfate levels indicating potential wastewater influences that can adversely affect the public water supply. Recent fish tissue analyses show that

The Rio Grande as it passes Brownsville.

the entire segment has a concern for fish consumption due to elevated mercury levels in fish.

Segment 2301 extends from the confluence of the Rio Grande with the Gulf of Mexico to a point 6.7 miles (10.8 km) downstream of the International Bridge in Cameron County. This 49-mile (73-km) long segment is classified as a tidal stream and is designated for exceptional aquatic life use, contact recreation, general use, and fish consumption. All uses are supported, except fish consumption, which has not been assessed.

Segment 2301 has two monitoring stations; one in the tidal area of the river, which shows a concern for excessive algal growth as indicated by periodic high chlorophyll-*a* levels, and one at the Sabal Palm Audubon Center and Sanctuary.

Partners

University of Texas at Brownsville – collects field data and water samples in segments 2301 and 2302

TCEQ Harlingen Field Office – collects field data and water samples in segments 2301 and 2302

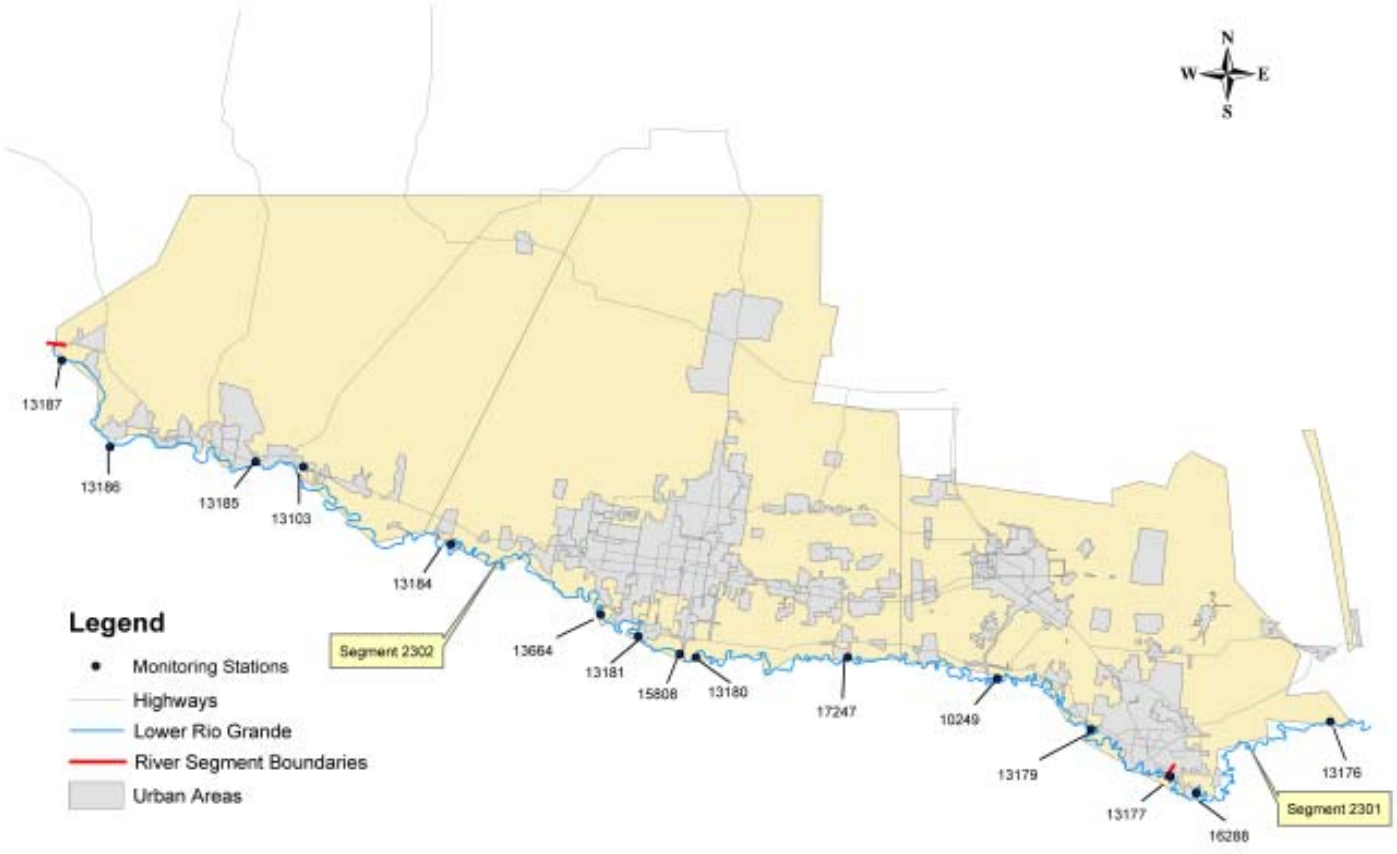
USGS – collects field data in Segment 2302

USIBWC Mercedes Office – collects field data and water samples in Segment 2302

Sabal Palm Audubon Center & Sanctuary - Collects field data and water samples in Segment 2301 at the Sabal Palm Sanctuary.

FY2008 LOWER RIO GRANDE MONITORING STATIONS

RIVER SEGMENT	Region	LAT	LONG	STATION DESCRIPTION	STATION ID.#	Metals Water	Org. Sed.	Metals Sed.	CONV	Bacteria	Flow	FIELD
2301	15	25.962	-97.208	RIO GRANDE TIDAL AT SH 4 NEAR BOCA CHICA	13176		2		4	4		4
2301	15	25.850	-97.414	RIO GRANDE AT SABAL PALM SANCTUARY AT NORTHEAST BOUNDARY OFF PARK ROAD 1 MI. SOUTH OF FM 1419 NEAR PALM GROVE	16288		2		4	4		4
2302	15	25.876	-97.454	RIO GRANDE EL JARDIN PUMP STATION, AT LOW WATER DAM 300 FT. BELOW INTAKE	13177	8	8	8	8	8	8	8
2302	15	25.950	-97.576	RIO GRANDE NEAR RIVER BEND BOAT RAMP, 8 KM WEST OF BROWNSVILLE ON US 281	13179		2		4	4		4
2302	15	26.030	-97.720	RIO GRANDE 6.3 KM DOWNSTREAM FROM SAN BENITO PUMPING PLANT	10249				4	4		4
2302	15	26.063	-97.950	RIO GRANDE 100 METERS UPSTREAM FROM THE FM 1015 BRIDGE THAT CROSSES INTO MEXICO AT PROGRESSO	17247				4	4		4
2302	15	26.068	-98.208	RIO GRANDE 200M UPSTREAM OF PHARR INTERNATIONAL BRIDGE (US 281)	15808		2		8	8	8	8
2302	15	26.096	-98.272	RIO GRANDE INTERNATIONAL BRIDGE AT US 281 AT HIDALGO	13181		2		8	8	8	8
2302	15	26.130	-98.330	RIO GRANDE 0.5 MI. BELOW ANZALDUAS DAM, 12.2 MI. FROM HIDALGO	13664		2		8	8	8	8
2302	15	26.240	-98.560	RIO GRANDE AT SH 886 NEAR LOS EBANOS	13184		2		6	6	6	6
2302	15	26.370	-98.860	RIO GRANDE AT FORT RINGGOLD 1 MI. DOWNSTREAM FROM RIO GRANDE CITY	13185		2		12	12	12	12
2302	15	26.393	-99.084	RIO GRANDE BELOW RIO ALAMO NEAR FRONTON	13186		2		8	8	8	8
2302	15	26.529	-99.158	RIO GRANDE 2.5 MI. BELOW FALCON DAM AT DIVERSION STRUCTURE	13187	6	6	6	6		6	6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13187
13186
13185
13103
13184
Segment 2302
13664
13181
15808
13180
17247
10249
13179
13177
16288
13176
Segment 2301
Legend
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Highways
Lower Rio Grande
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PECOS RIVER BASIN

Introduction

The Pecos River in Texas begins at the Texas – New Mexico state line and is then impounded by Red Bluff Reservoir. Releases from Red Bluff are made in accordance with the Pecos River Compact for distribution to irrigation districts in the basin. 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 saltcedar plants have also been linked to reduced water levels and increased salinity in the Pecos River basin. Since 1999, Texas A&M Cooperative Extension (TCE) has been successfully reducing the species along the Pecos River under a research grant and has received national recognition for their project. Plans are underway to continue the reduction and control of saltcedar along the entire Pecos River. Due to the success of TCE, other river basins with the same problem have begun similar programs.

Seining for fish in The Pecos River near Sheffield, TX.

Water Quality Review

Segment 2312 is the Red Bluff Reservoir from the Texas – New Mexico state line to the end of the dam, a distance of 11 miles (18 km). Designated uses for this segment are high aquatic life use, fish consumption, and contact recreation. There are two monitoring stations in this segment. Salinity levels in the reservoir are typically over 6,000 mg/l, preventing use as a public water supply and restricting agriculture to salt-tolerant crops. This segment is listed as having a nutrient concern for nitrate and ammonia in the and as having harmful golden alga blooms.

Segment 2311 is located directly below the Red Bluff Reservoir to the confluence of Independence Creek in Crockett/Terrell County, a length of 349 miles (561 km). The designated uses for this segment are aquatic life use, contact recreation, and fish consumption. There are six monitoring stations along this segment. The salinity continues to increase in the Pecos River in this segment, climbing to an average of 21,000 mg/l at Girvin. Because of naturally high salt levels, the standards for this segment are also high, therefore, this segment is meeting its standard. There is an aquatic life use concern, however due to impaired aquatic habitat and communities. There are also listed algal blooms as creating a concern and depressed dissolved oxygen levels around Coyanosa and Girvin.

Segment 2310 runs from the confluence of Independence Creek in Crockett/Terrell County down to the confluence with the Rio Grande in Painted Canyon in Val Verde County, a length of 49 miles (79 km). The designated uses for this segment are contact recreation, public water supply, high aquatic life use, and fish consumption. There are four monitoring stations in this segment.

The Pecos River from the highway US90 bridge looking upstream.

Independence Creek is a high quality stream that provides freshwater input into the Pecos River, bringing salinity values down to drinking water levels. Recent data show abnormally high salinity levels in the Pecos, resulting in this segment having a drinking water concern due to elevated levels of chloride, sulfate, and TDS.

Special Studies

TCEQ and USIBWC have collaborated to install four real-time water quality monitoring stations on the Pecos River to enhance data normally collected on a quarterly basis. The stations are located at the following locations: Pecos River near Pecos, TX; Pecos River at Coyanosa, TX; Pecos River at Sheffield; and Pecos River 2.3 miles upstream of the Terrell/Val Verde county lines. The continuous monitoring stations are collecting DO, pH, conductivity, temperature, and water depth. The site at Coyanosa, TX is collecting water quantity data as well. Data from these sites are collected at 15 minute intervals and transmitted remotely to the TCEQ. The data is then validated and made available on the TCEQ website at the following address: www.tceq.tx.us/compliance/monitoring/water/quality/data/swqm_realtime_alt.html

The data is also being used by the Texas Parks and Wildlife Department to to evaluate the potential triggers for golden alga outbreaks. More information on this study can be found at: http://www.tpwd.state.tx.us/landwater/water/environconcerns/hab/ga/

Salinity in the Pecos River enters Texas above 5,000 mg/L and climbs to an average value of 20,000 mg/l as the water flows downstream to Girvin. TCE, with support from the USIBWC and other agencies are performing a special study in the Pecos River to determine all possible sources contributing to the increasing salinity. This study will last three years and will look at salinity inputs from geological sources, vegetation contributions, non-point source contamination, tributary input, and agricultural returns to determine the causes and potential solutions to the increasing salinity values in the Pecos River. This study may also lead to best management practices to reduce the impact to the river and to reduce the high salinity levels in the river.
More information on this project can be found on the web at: http://pecosbasin.tamu.edu/index.php

Partners

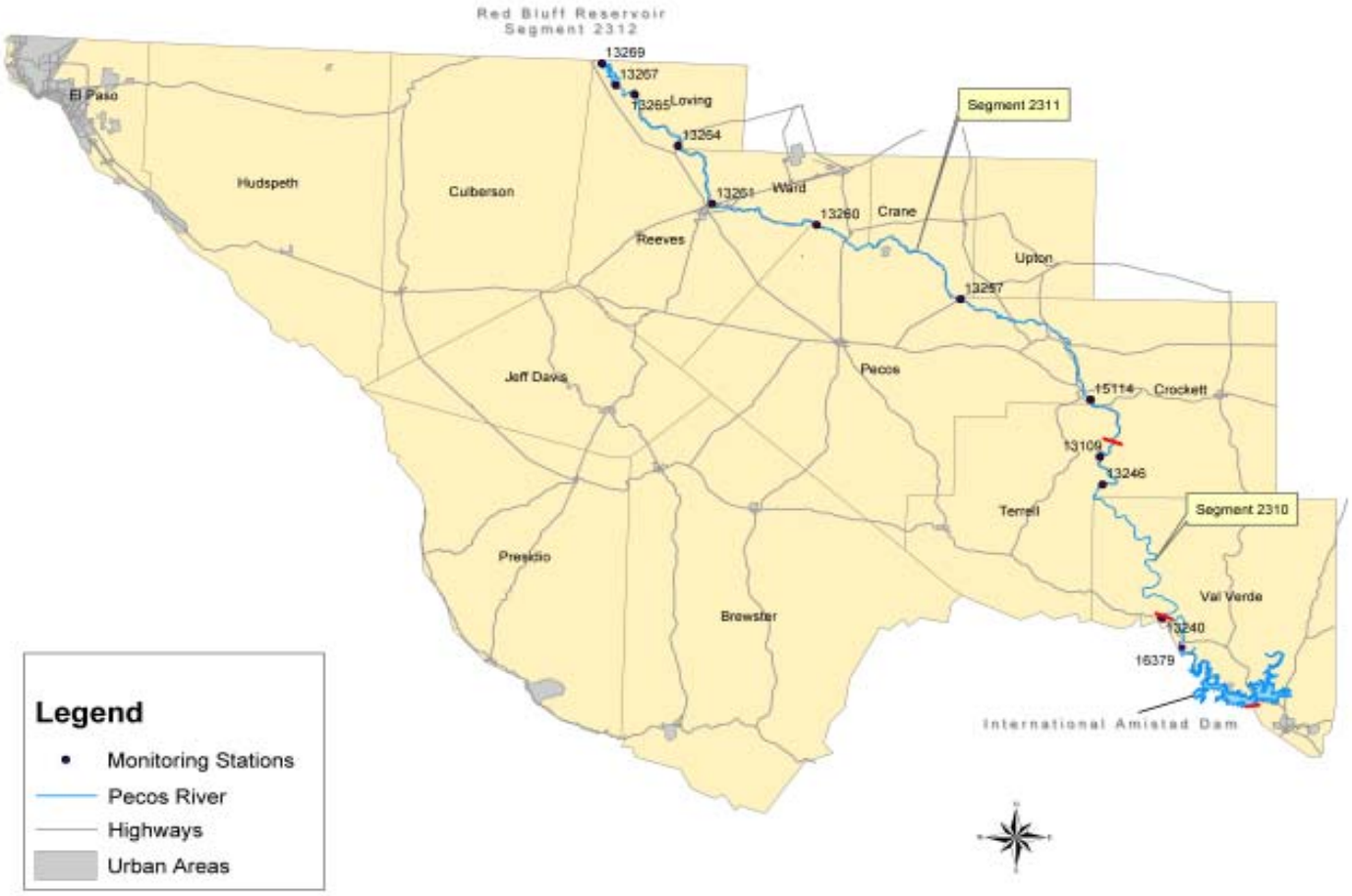
Texas A&M University Cooperative Extension (TCE) – collect water quality samples and condcuts special studies in the Pecos River.

TCEQ Midland Office – collects water quality samples at Red Bluff and along the entire Pecos River.

USIBWC Amistad Dam Office – collects water quality samples on the Pecos River as it enters the International Amistad Dam.

FY2008 PECOS RIVER MONITORING SCHEDULE

RIVER SEGMENT	Region	LAT	LONG	STATION DESCRIPTION	STATION ID.#	24 HR DO	Metals Water	Org. Water	Metals Sed.	CONV	Bacteria	Flow	FIELD
2310	13	29.700	-101.360	PECOS RIVER 0.7 MI.DOWNSTREAM FROM US 90W IN VAL VERDE COUNTY	16379					2	2	2	2
2310	13	29.800	-101.450	PECOS RIVER AT GAGING STATION 7.4 MI. EAST OF LANGTRY, 15.0 MI.UPSTREAM FROM CONFLUENCE WITH RIO GRANDE	13240		8	8	8	8		8	8
2310	7	30.338	-101.717	PECOS RIVER 7.52 KM UPSTREAM FROM THE VAL VERDE/TERRELL/CROCKETT COUNTY LINE CONVERGENCE	13246					4	4	4	4
2310	7	30.450	-101.732	INDEPENDENCE CREEK 0.5 MI. DOWNSTREAM FROM JOHN CHANDLER RANCH HEADQUARTERS	13109					4	4	4	4
2311	7	30.681	-101.776	PECOS RIVER 1.6 MI UPSTREAM OF US 290 BRIDGE, SE OF SHEFFIELD	15114					4	4	4	4
2311	7	31.079	-102.359	PECOS RIVER AT US 67 NE OF GIRVIN	13257	2	4			4	4	4	4
2311	7	31.366	-103.004	PECOS RIVER AT FM 1776 SW OF MONAHANS	13260	2	4			4	4	4	4
2311	7	31.872	-103.831	PECOS RIVER AT FM 652 BRIDGE NE OF ORLA	13265					4	4	4	4
2312	7	31.908	-103.917	RED BLUFF RESERVOIR ABOVE DAM, NORTH OF ORLA	13267				2	2	2		2
2312	7	31.994	-103.983	RED BLUFF RESERVOIR 1/2 MI.SOUTH OF TEXAS -NEW MEXICO BORDER	13269				2	2	2		2


Red Bluff Reservoir
Segment 2312
13269
13267
13265
Loving
13254
Segment 2311
El Paso
Hudspeth
Culberson
Ward
13261
13260
Crane
Reeves
Upton
13257
Jeff Davis
Pecos
15114
Crockett
13109
13246
Terrell
Segment 2310
Presidio
Val Verde
Brewster
13240
16379
International Amistad Dam
Legend
Monitoring Stations
Pecos River
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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 guidance for the program to ensure issues and concerns in the community are addressed. Input from the BAC assists the CRP in determining what direction the program should take, 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 be a member of the Rio Grande Basin BAC can contact anyone in the CRP (see page 27 for contacts).

BAC meetings are held once a year around July and August in El Paso, Laredo, and the Lower Rio Grande Valley. These meetings provide the USIBWC CRP with an opportunity to update the committee on recent activities and future plans. The meetings also provide a forum for other agencies and academia to present their programs and research and for everyone at the meeting to provide input into the program.

Texas Watch

The USIBWC CRP has partnered with Texas Watch in the Rio Grande Basin. Texas Watch is a network of trained volunteers and partners who gather information about the natural resources of Texas and ensure the information is available to the general public. Volunteers are trained to collect quality-assured information that can be used to make environmentally sound decisions. Currently, over 400 Texas Watch volunteers collect water quality data on lakes, rivers, streams, wetlands, bays, bayous, and estuaries in Texas. Texas Watch also provides training curriculum and continuing education credits to teachers so they can, in turn, provide future generations with the information necessary to protect our environment. We plan to continue our partnership with Texas Watch and expand the program throughout the basin. Texas Watch and the USIBWC CRP have held meetings together in Laredo and McAllen to pool our resources and reach a larger group of concerned citizens in the basin. These meetings have been a huge success for the CRP. We plan to continue our partnership with Texas Watch in the coming years and expand the program into the Upper and Lower Rio Grande in cities like El Paso, Brownsville, and McAllen and expand our current program in the Middle Rio Grande in cities like Del Rio and Eagle Pass.
To find out more about the Texas Watch program, go to their website at:
http://www.texaswatch.geo.txstate.edu

Friends of the Rio Grande

A recent initiative created as a sunset recommendation from the Texas State Legislature mandated TCEQ to create and fund a team called the Friends of the Rio Grande (FORG). The objective of FORG 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 partnership with TCEQ, the USIBWC CRP administers the FORG program in Texas. In 2004, TCEQ and the USIBWC CRP received over a dozen proposals for assistance with public education and outreach totalling over $80,000 in requests. The FORG committee then reviewed the proposals and awarded assistance based on compliance with the FORG mandates, capabilities, and availability of funds.

Many different types of groups received assistance including schools, museums, environmental awareness groups, and

parks. They all had one goal, however, and that was to educate the public on the environment and how to protect this valuable resource.
In recognition of their efforts to promote water quality awareness and stewardship within the basin, The FORG partners received commemorative plaques presented at the annual Basin Advisory Committee meetings held in El Paso and Mercedes. In the future, the FORG program will continue to support our partners in their endeavors and create new outreach partnerships.

For example, The USIBWC and TCEQ assisted Los Caminos del Rio in a well attended river cleanup in the Rio Grande around Roma, TX that included a bank cleanup as well as boaters using kayaks and canoes to clean trash in the river. We are also collaberating with our partners to bring heightened education about the river to the classroom with our partnerships with Sabal Palm, International Museum of Art and Science, and Los Caminos del Rio.

River cleanup on the Rio Grande near Roma, TX. This event run by Los Caminos Del Rio included a cleanup in the river on kayaks as well as on the bank.

Coordinated Monitoring Meetings

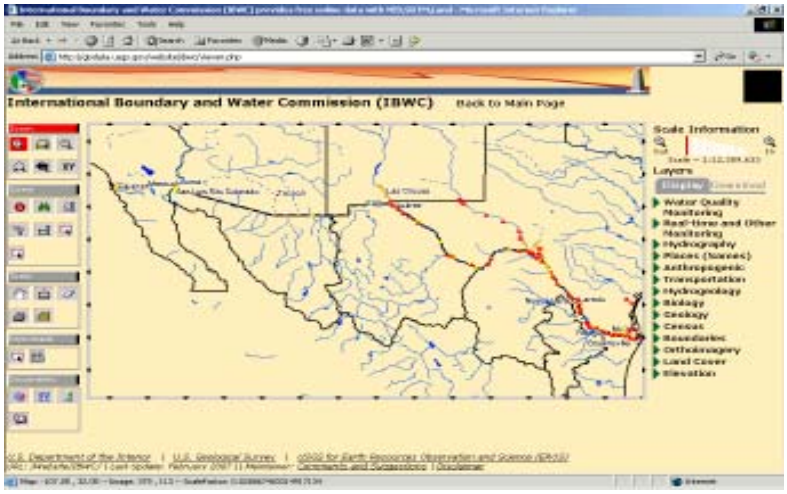
Coordinated Monitoring Meeting are held annually with our partners in the basin to coordinate water quality monitoring activities for the upcoming year. During these meetings, the monitoring schedule is reviewed to ensure comprehensive spatial coverage of the basin's water quality monitoring network, on a segment by segment basis, in order to collect the data necessary to properly assess water quality condition throughout the basin. Special studies are also discussed to provide for more intensive data collection in areas where specific water quality concerns need to be addressed. Meetings are held in the spring throughout the basin in Midland, El Paso, Laredo, and Harlingen.

CRP personnel training college students on water quality sampling on the Rio Grande.

WEBSITE

The USIBWC CRP website can be found at http://www.ibwc.state.gov/CRP/Welcome.htm.
Below is a list of the website pages and the information provided.

Study Area – This page contains an interactive map of the Rio Grande Basin. By clicking on one of the sub-basins, a detailed map of the area will be displayed, containing information about our monitoring sites. There is also a link to our new Internet Mapping Server that provides a GIS based interactive map providing information on water quality and water quantity stations monitored by the USIBWC. You can also query the map to find links to water quality and quantity data. For next fiscal year, we are going to add individual sites pages that will provide detailed information on our monitoring sites to include a picture of the site, a map, the coordinates, water quantity trends, and links to the water quality spreadsheets.



Calendar – We will post meetings that we will be attending or have attended and updates on current activities in the basin on this page.

Data – TCEQ links to the TCEQ SWQMIS database; and USIBWC CRP Data, which will take you to 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 the Rio Grande segment uses and water quality standards,and the laboratory specifications.

Publications – contains our Basin Highlights Reports and our five-year Basin Summary Report in PDF format.

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.

Contacts – contains contact information for the USIBWC CRP personnel.

Participation – contains information on participating in the Clean Rivers Program and/or Texas Watch. It also contains information on our Friends of the Rio Grande initiative.

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