

Rio Grande Basin Summary Report

Executive Summary

USIBWC Clean Rivers
Program



Introduction

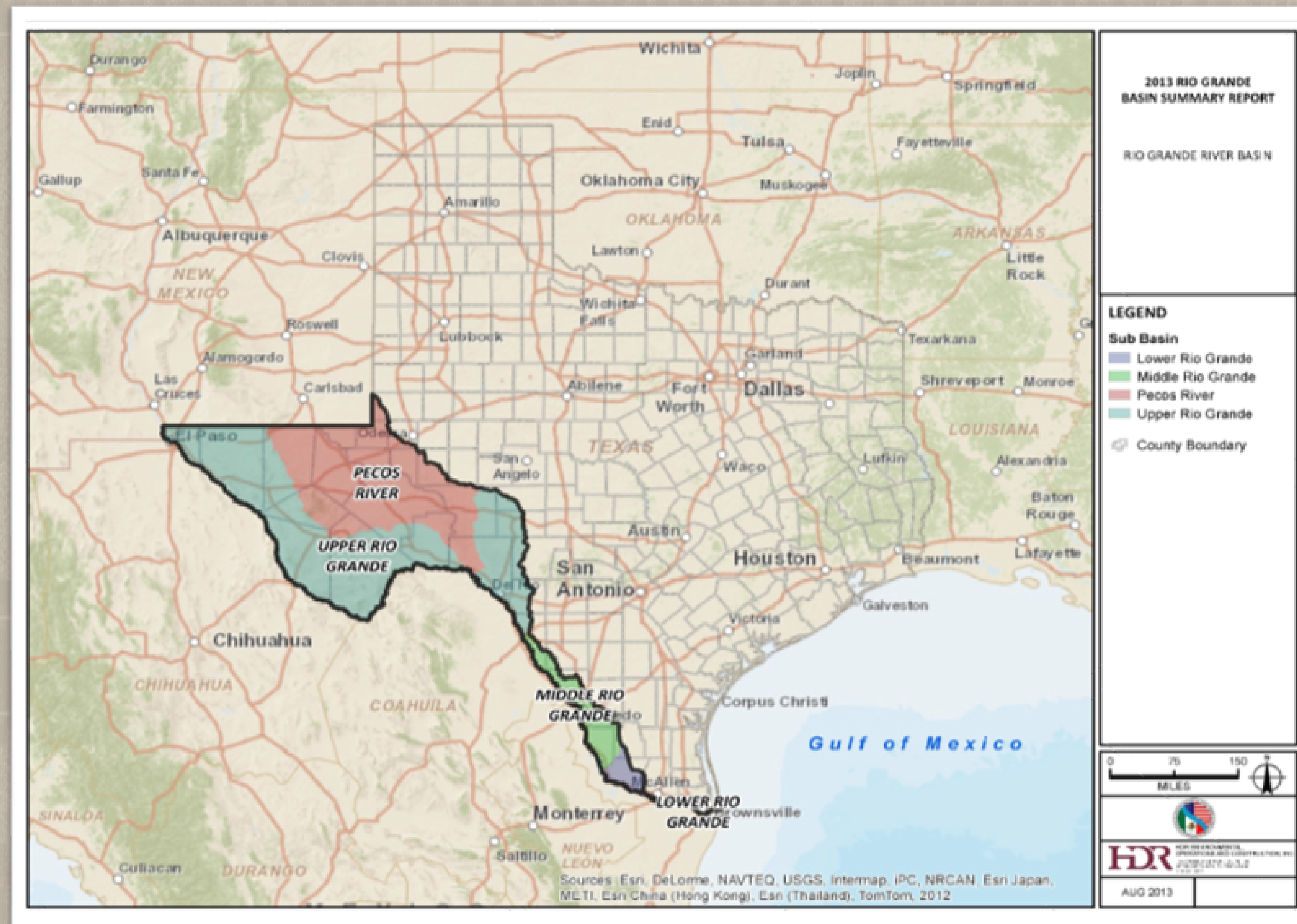
The Rio Grande Basin is the largest basin in Texas by area, covering roughly 182, 200 square miles, and encompassing three U.S. states and five Mexican States. The Rio Grande, which flows 1,254 miles between El Paso, TX and the Gulf of Mexico, forms the international border between the United States and Mexico and presents unique challenges for the administration of its waters. Due to the river's bi-national nature, only about 20% of the river's flows reach the Gulf of Mexico. The rest of its waters are taken to fulfill treaty obligations between the two countries, including irrigation and drinking water for the millions of people who live along the river on both sides of the border. For many of the border communities along the river, its waters provide 100% of the drinking water, making the river a priceless resource for the survival of all living things within the Chihuahuan Desert.

When the Texas Clean Rivers Program [CRP] was initiated in 1991, no river agency existed for the Rio Grande Basin. Matters were further complicated by the fact that two countries share the river. In order to address the international nature of the watershed, the State of Texas, through the Texas Commission on Environmental Quality [TCEQ], contracted with the United States Section, International Boundary and Water Commission [USIBWC] in October 1998 to administer the CRP throughout the Texas portion of the Rio Grande Basin. In order to deal with a basin so large in territory, the USIBWC CRP splits the basin in Texas into four sub-basins: Upper, Middle, Lower, and the Pecos.

The USIBWC is a bi-national commission, established to apply boundary and water treaties and agreements between the United States [U.S.] and Mexico, and to settle disputes that arise in the application of these agreements. They are one of 15 partner agencies that collaborate with the TCEQ to administer the Texas CRP in the 24 river and coastal basins in Texas. The contract between the USIBWC and the TCEQ was established to coordinate and conduct water quality monitoring, facilitate stakeholder outreach, and to provide an assessment of the water quality data and water resources in the region. The primary and fundamental goal of this partnership is to improve surface water quality within the basin.

Rio Grande Basin

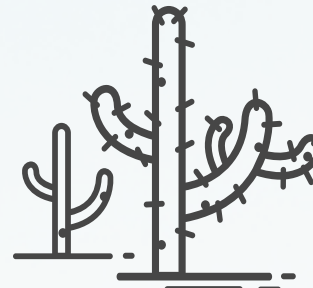
The Rio Grande Basin is subdivided into four sub-basins: Upper, Middle, Lower, and the Pecos.





Sub-basins

Four Sub-basins exist within the Rio Grande Basin



The Upper Rio Grande Sub-basin

The Upper Rio Grande Sub-basin extends from the New Mexico-Texas state line downstream to the International Amistad Reservoir, a length of 650 river miles (1,045 km). Water use for agricultural purposes substantially reduces the quantity and the quality of water within the river downstream of cities such as El Paso, TX. Near the city of Presidio, TX, the addition of the Rio Conchos helps to improve water quality and quantity throughout the remainder of the basin.



The Pecos River Sub-basin

The Pecos River is the largest U.S. tributary in the Rio Grande Basin, extending 926 river miles (1,490 km) from the New Mexico/Texas state line until it empties into International Amistad Reservoir. Irrigation and municipal needs account for the two largest water consumer; however, population centers are relatively few and the area has seen a general decline in population over the last few decades. Water quality concerns in this sub-basin consist of low dissolved oxygen and high salinity.



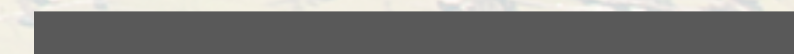
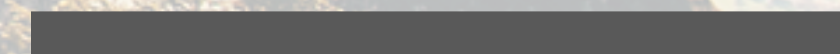
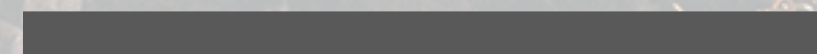
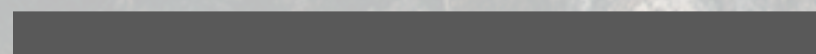
The Middle Rio Grande Sub-basin

The Middle Rio Grande Sub-basin consists of 303 river miles (488 km) of the Rio Grande, flowing from below International Amistad Reservoir to above International Falcon Reservoir. Most municipalities along this portion of the Rio Grande are dependent on surface water for domestic, agricultural, and industrial use. This area is experiencing some of the fastest population growth within Texas, and high bacteria levels are common.



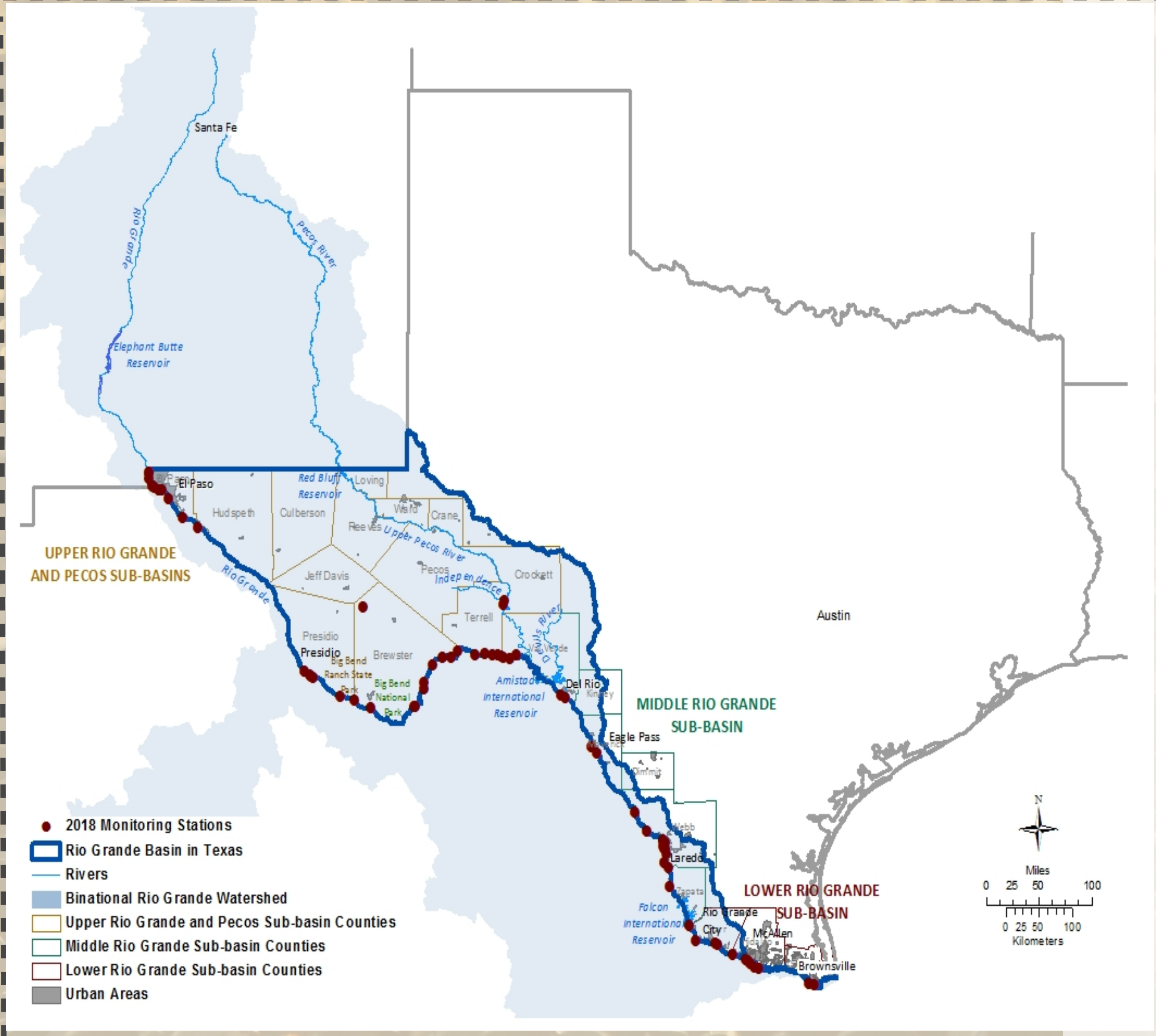
The Lower Rio Grande Sub-basin

The Lower Rio Grande Sub-basin stretches 280 river miles (451 km), from below International Falcon Dam to its confluence with the Gulf of Mexico. Drinking water requirements of the Lower Rio Grande Sub-basin depend entirely on the Rio Grande. Water quality concerns in this sub-basin consist of high bacteria levels and increased salinity. Increased water demands from rapid population growth are anticipated to further strain this resource.





Water Quality Monitoring

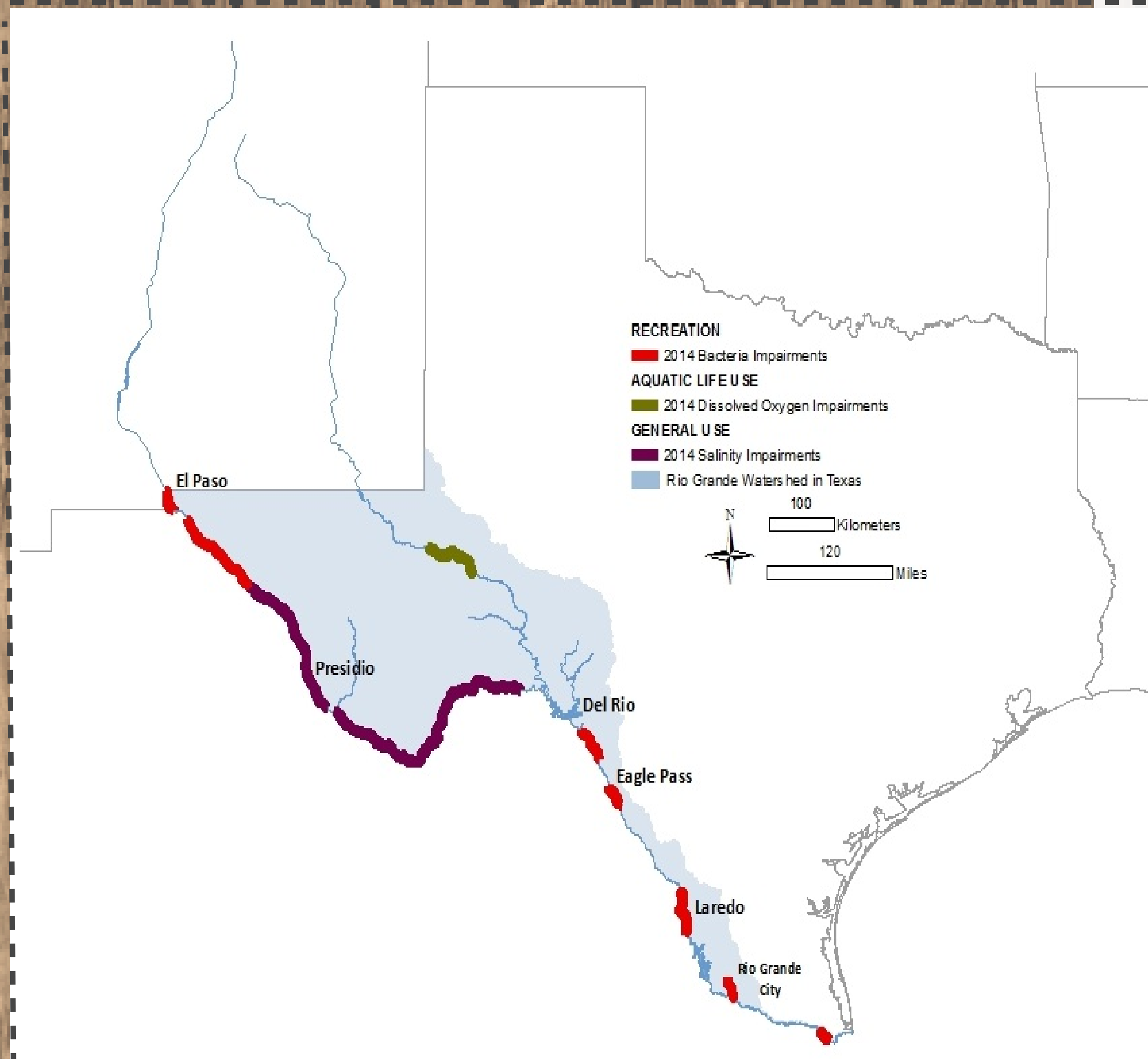


Routine water quality monitoring is conducted through an extensive network of volunteer partners and the regional offices of the TCEQ. Ninety-one stations are monitored by five USIBWC field offices, four universities, three municipalities, the National Park Service, Texas Parks and Wildlife, a non-profit organization, and the TCEQ Regional Offices. All data is collected under a TCEQ-approved Quality Assurance Project Plan. The USIBWC CRP also receives in-kind laboratory services from three municipal laboratories and one contract laboratory. All laboratories are accredited by the National Environmental Laboratory Accreditation Program (NELAP). Partners meet on an annual basis at the Coordinated Monitoring Meetings to discuss sampling sites, monitoring schedules, and any issues in their regions.

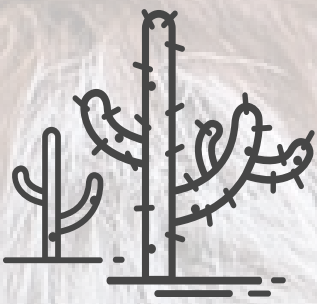
Significant Findings

The primary water quality issue within the basin between 2006 and 2016 is high bacteria levels, and the issue is not only basin-wide, but border-wide. This stems from many factors, some of which are related to the rapid population growth that border communities have experienced in the past five to ten years. While the population has increased, infrastructure has not, and wastewater treatment plants on both sides of the border are not equipped to deal with the substantially increased sewage flows. Many of these border communities have treatment plants that are aging, and may be in serious need of upgrades and repairs in addition to expansion, but lack the funds to make the needed changes. Along the border there are also many communities, termed *colonias*, that lack connections to city sewage and trash pickup systems. In the Middle Rio Grande sub-basin, near Laredo, TX, the bacteria concentration issues have worsened in the past 5 years due to many of the aforementioned issues.

Increasing dissolved solids concentrations (also expressed as salinity), especially during drought conditions, have become a major water quality issue for the Rio Grande Basin. Several areas of the basin, particularly the Pecos River and the Lower Rio Grande Valley, are highly saline due to irrigation return flow and municipal wastewater returns from outside state and international boundaries. In recent years, several other parameters have become issues; the Upper Rio Grande, Pecos and Lower Rio Grande sub-basins have seen increases in nutrient and chlorophyll-a levels and reports of algal blooms. The Pecos and Lower Rio Grande sub-basins also increasingly display depressed dissolved oxygen concentrations. The Lower Rio Grande Valley has excessive populations of invasive aquatic weeds in many areas, which may be contributing to the depressed dissolved oxygen in this area. The Lower Rio Grande sub-basin also has a concern for toxicity in fish, although the exact cause of this is unknown. These issues continue to impact the health of fish and wildlife in the Rio Grande Basin.



Water Quality Summary by Sub-basin



The Upper Rio Grande Sub-basin

Bacteria, chloride, and total dissolved solids continue to impair most segments in the Upper Rio Grande Sub-basin. In addition, sulfate, nitrite, phosphorus, ammonia, and chlorophyll-a, concentrations are a concern at multiple locations. Some parameters do show an improving trend, however, they are often still above the standard. Segment 2308 should be considered for reclassification to intermittent. Recommend additional monitoring stations in sparsely sampled areas.



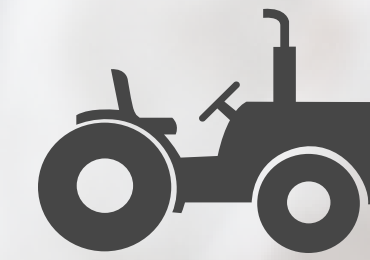
The Pecos River Sub-basin

The Pecos River Sub-basin continues to contain high levels of dissolved solids, however, only twelve percent of sites are above the Texas State Water Quality Standard. Other parameters affecting water quality in the region include sulfate, chloride, and bacteria. Collaborative studies between multiple agencies should be conducted to reassess salinity issues. The Watershed Protection Plan should be updated, and additional partners/stations should be sought for more effective monitoring in this reach.



The Middle Rio Grande Sub-basin

The Middle Rio Grande Sub-basin's rapid urban growth has contributed to its high bacteria levels throughout the basin, as almost sixty percent of sampling sites report bacteria numbers above the State Standard. While standards are typically not exceeded for other parameters, more than twenty five percent of sites have shown increasing trends for chlorophyll-a, sulfate, chloride, and total dissolved solids. This sub-basin would benefit from a more focused approach, such as special studies, to deal with water quality issues.



The Lower Rio Grande Sub-basin

The Lower Rio Grande Sub-basin has a high occurrence of bacteria, especially near urban areas, due to runoff, wastewater influences, and other non-point source pollution. Additionally, sulfate, total dissolved solids, and chlorophyll-a levels are a concern within certain segments. This area would benefit from collaborative work, such as The Lower Rio Grande Water Quality Initiative, to establish guidelines to deal with salinity and determine solutions for bacteria issues.

Special Projects

In cooperation with the TCEQ, the EPA, and multiple entities in Mexico, the USIBWC has played an integral role in the development and execution of the Lower Rio Grande Water Quality Initiative, a bi-national project tasked with creating a water model that can be applied to the entire border region, and will result in the first-ever bi-national watershed protection plan. Together, the agencies from both countries:

- devised a project plan,
- agreed on laboratory parameters and methods,
- developed a Quality Assurance Project Plan,
- conducted multiple trainings on water sampling techniques used by both countries,
- conducted four bi-national sampling events,
- developed a water quality model,
- will jointly write a final report for the project.

The resultant model and watershed protection plan will be an important first step in bi-national cooperation to improve water quality.

In the next several years, a bacterial study will be conducted in the Laredo, TX/Nuevo Laredo, Tamaulipas region to address the serious bacteria problems in this region. This may be conducted as a second phase to the 2012 CRP study or as a bi-national study similar to the project piloted in the Lower Rio Grande Valley. Routine water quality monitoring will continue at current stations and monitoring frequencies, coupled with increased outreach and environmental education, particularly in lower socio-economic communities. Coordination with the Mexican agencies charged with monitoring water quality has been ongoing in the past 4-5 years in an effort to reduce the significant levels of bacterial contamination in this region.





Public Outreach

The USIBWC CRP is proud of its outreach efforts with local communities. Throughout the year, the program staff participate in multiple events with local agencies, universities, and non-profit organizations. Outreach is an effective tool in teaching the community, young and old, about making decisions that are environmentally healthy and curbing behaviors that are detrimental to the ecosystem.

River Cleanups

Trash is a big problem in the Rio Grande Basin, and a big contributor to the pollution of the Rio Grande. River cleanups are a great way to get the public involved with the river. Throughout the basin, the USIBWC CRP often helps other agencies, such as Texas Parks and Wildlife in Big Bend Ranch State Park, and non-profit organizations like the Rio Grande International Study Center (RGISC), promote their river cleanups. In the El Paso area, the USIBWC CRP has the Adopt-a-River Program, where interested groups adopt a section of the river and commit to doing cleanups throughout the year. This was modeled after the Adopt-a-Highway program.



Rio Research Roundup

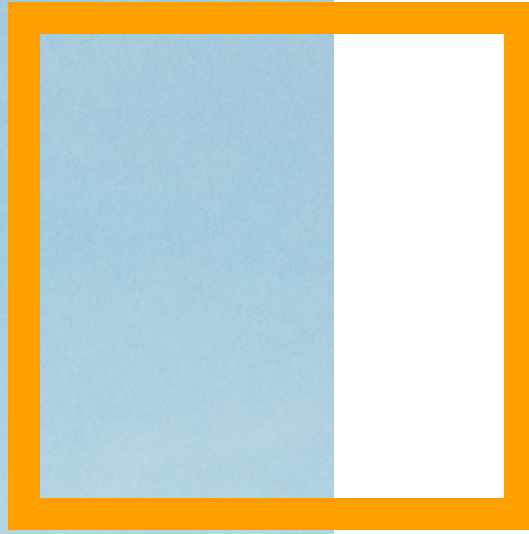
The USIBWC CRP and the Rio Grande International Study Center (RGISC) team up every year to do the Rio Research Roundup. The event is meant to demonstrate that we are all part of the same watershed. As part of a contest, high schools from all three U.S. states and neighboring Mexican states across the border collect water samples at the river on the same day. They perform basic water quality experiments using kits, learn how to take flow measurements, write essays about the river, and create a public service announcement. The entries are submitted for judging and the winning school is then chosen by the RGISC.



Environmental Eductaion

The USIBWC CRP is a partner of the El Paso Water Tech20 Center, the environmental education center for the El Paso Water Utilities. The Tech20 Center is one of the region's top places for environmental education programs for students in grades K-12. It is also a training facility for teachers and environmental personnel on programs that bring science and the environment to younger generations. The USIBWC CRP participates in numerous events with them throughout the year and has participated in many of their training opportunities as well.





Recommendations

The USIBWC, TCEQ, and other state and Federal entities are addressing problems identified in the basin in multiple projects that deal directly with the issues mentioned in the section discussing significant findings, including:

- biological control of salt cedar and river cane, and other invasive species;
- monitoring of metals in water;
- monitoring for non-point sources of bacteria;
- nutrient and total dissolved solids (TDS) loadings in the upper Rio Grande, including the Big Bend area;
- evaluation of salinity;
- creation of a watershed protection plan in the Rio Grande
- updating and implementing the current watershed protection plan in the Pecos River
- extensive aquatic life and habitat monitoring assessments in the Pecos River;
- Phase two bacteria special study and nutrient and heavy metals assessment in the middle Rio Grande; and
- monitoring and managing bacteria and TDS levels in the lower Rio Grande to mitigate agricultural return flows.

Routine monitoring by the USIBWC CRP will continue at the current monitoring stations and frequencies for all parameters currently analyzed. Special studies, such as those mentioned above, backed by years of historical data for most stations, will help the USIBWC to gain a better understanding of where some of these issues come from, what needs to be done to address them, and what is the best course of action. Environmental education is also essential. Educational programs about river ecology, ecosystems, and environmentally responsible choices and actions are powerful tools utilized by the program in an attempt to encourage stakeholders and the general public to engage in environmentally responsible behavior.

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