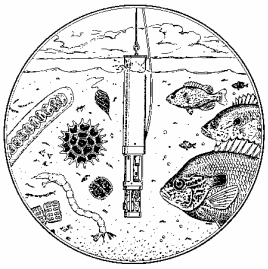
Texas Commission on Environmental Quality

Surface Water Quality Monitoring Program

PROJECT SUMMARY — JANUARY 2008

UPPER RIO GRANDE BASIN SALINITY MONITORING PROJECTS



Monitoring in the Upper Rio Grande Basin

Increasing salinity has become the greatest water quality challenge facing water bodies in the Rio Grande Basin. The challenge faced in remote areas of west Texas, where these water bodies flow, was finding a way to enhance existing water quality monitoring. The Rio Grande flows 1,276 miles along the Texas-Mexico border from El Paso to the Gulf of Mexico. The Texas portion of the Pecos River flows approximately 400 miles from Red Bluff Reservoir to the Rio Grande confluence. Since basic field measurements can be used to monitor salinity existing technology allowed remote, unattended, and continuous monitoring. The first project in this network of continuous water quality monitoring (CWQM) stations started in 2004 on the Upper Pecos River and has been growing ever since. From the two sites in 2004 to 10 sites in 2007 with two more scheduled for installation in 2008. The following is a brief summary of these monitoring projects.

Rio Grande and Pecos Rivers

What Parameters Are Measured?

CWQM stations in the Rio Grande Basin commonly measure temperature, pH, dissolved oxygen, and specific conductance using established multiparameter instrument technology, a data logger and communication/telemetry equipment. Most of the stations are associated with flow measurement by USGS or the International Boundary and Water Commission (IBWC).

Pecos River

Segments 2310 and 2311

The Pecos River is an important source of surface water in the arid western portion of Texas and is one of the main U.S. tributaries flowing into the Rio Grande. Natural geologic deposits in the Pecos River watershed increase the concentration of chloride, sulfate, and dissolved solids to levels that are as much as ten times higher than typical surface waters.

In addition to these natural deposits, the salt cedar plant, (*Tamarisk* sp.), contributes to elevated salinity levels in the Pecos River. Salt cedar is an invasive, non-indigenous, salt tolerant species that increases salinity by transpiration of freshwater sources. Other activities such as oil and gas exploration, irrigation demands, and droughts compound the issues facing water quality and water quantity in the Pecos River.

The visible results of increasing salinity are the fish kills caused by the golden alga, *Prymnesium parvum.* Fish kills related to *P. parvum* have been documented in the Pecos River since 1985.

The objective of these sites was to employ existing technology capable of continuous monitoring and logging of conventional water quality parameters. The data generated will be used to monitor changes in salt concentrations (using specific conductance) and surface water flow associated with salt cedar removal, to collect data to support research by on the cause of toxic golden alga blooms, and provide data for the State of Texas Water Quality Inventory or 305(b) Report.

Lower Pecos River

Upper Rio Grande

Segments 2306 and 2307

The Upper Rio Grande has been affected by drastic hydrological modifications developed to divert water for irrigation and drinking water. In the recent past, little water remains after irrigation withdrawal in the upper part of the Rio Grande Basin in Texas. Long-term drought throughout northern Mexico, the desert southwest, and the southern Rockies in the U.S. has put pressure on an already over-appropriated basin. The end result is increasing dissolved solids and salinity. The lack of consistent flow and the subsequent impact on water quality in the Rio Grande is of international, national, and regional concern.

The Rio Grande in the Big Bend area has increased and variable and there are concerns about the current water quality criterion for total dissolved solids (TDS). The upper portion of Segment 2306 is affected by high salinity from Segment 2307 and possibly the Rio Conchos. The lower half receives input from freshwater springs down to Amistad International Reservoir.

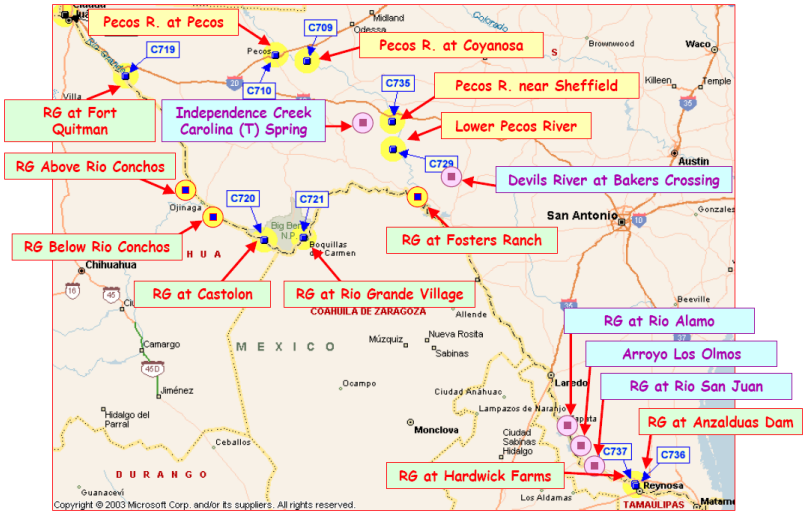
By averaging the chloride, sulfate, and TDS values across the entire segment, the problems in the upper portion are masked. Current water quality standards (TDS, chloride, and sulfate) are not protective of the upper portion of Segment 2306 which flows through Big Bend National Park and the protected areas in Chihuahua and Coahuila, important national resources for both the U.S. and Mexico.

This project is providing data to support ongoing work by the National Park Service, USGS, and TCEQ to evaluate salinity in the Rio Grande from Presidio to the headwaters of Amistad. In addition, this data will be used to support future revisions to the Texas Water Quality Standards.

Devils River

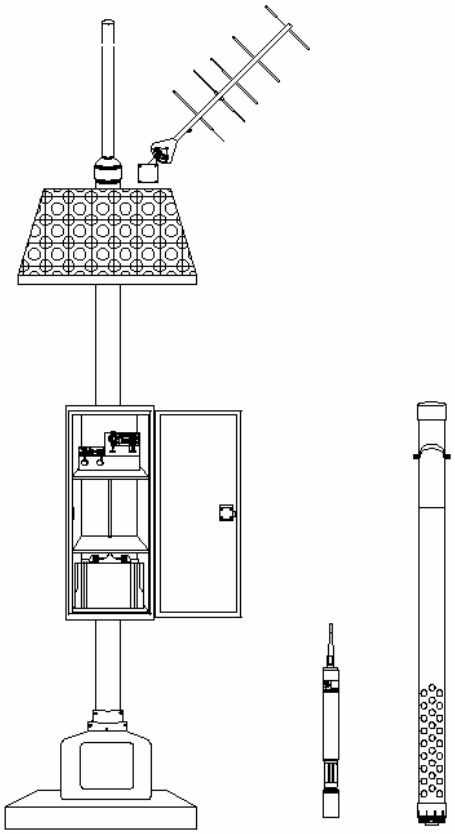
Segment 2309

The Devils River, a spring fed stream, is one of the most pristine water bodies in Texas. A great deal has been done to protect the quality of the river by protecting the watershed. However, increasing oil and gas production in the watershed pose a threat to water quality. The TDS concentrations are increasing so that they are close to the limit set by the Texas Water Quality Standards. The purpose of this site is to collect water quality data to document status and trends in the Devils River and to screen water quality conditions for possible impact from oil and gas exploration and development. A site will be installed on the Devils River near Bakers Crossing in 2008.



Rio Grande CWQMN Stations

(Stations in blue are scheduled for installation in 2008)



Basic CWQM Station Equipment

Data Access

To access Rio Grande Basin and other TCEQ CWQMN data online go to

<http://www.texaswaterdata.org>

Lower Pecos River CWQM Web Page

Project Partners

- National Park Service-BBNP
- US Geological Survey
- IBWC
- TCEQ Region 7
- TCEQ SWQM Program

Pecos River Data User

Station Locations

The current CWQM sites in the Rio Grande Basin are,

Segment 2311
Pecos River on Bus 20 Near Pecos
Pecos River at FM 1776 Near Coyanosa
Pecos River at SH 290 Near Sheffield

Segment 2310
Pecos River Near the Terrell/Val Verde County Line
Independence Creek at Carolina (T) Spring-Coming in 2008

Segment 2309
Devils River near Bakers Crossing-Coming in 2008

Segment 2307
Rio Grande at Fort Quitman
Rio Grande Upstream Rio Conchos

Segment 2306
Rio Grande Downstream Rio Conchos
Rio Grande at Castolon (BBNP)
Rio Grande at Rio Grande Village (BBNP)
Rio Grande at Fosters Ranch

Upper Rio Grande

For More Information

For more information contact,

Christine Kolbe
SWQM Program
Rio Grande Basin Project Lead
512-23-5831
<ckolbe@tceq.state.tx.us>