

Hydrogeological Assessment of Salinity in the Pecos River

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BACKGROUND

The Pecos River is the largest river sub-basin flowing into the Rio Grande from the United States. The Pecos River is the lifeblood of many communities within its reaches, serving mainly as an irrigation source, while also providing recreational uses, supplying recharge to underlying aquifers, and as a public drinking water supply for users in the downstream reaches. Elevated salinity levels in the river are threatening to prevent some of these uses, especially drinking water and irrigation. Coarse-scale evaluations of specific sources of salt loading to the river have been conducted and the general consensus is that there are four reaches where much of the salt loading occurs. One of them is in Texas between Coyanosa and Girvin and the others are upstream in New Mexico. In all cases, groundwater discharge to the river is seen as a primary delivery mechanism. The Coyanosa to Girvin reach of the river was also identified in the Pecos River



Gage Station of the Pecos River at Coyanosa

Watershed Protection Plan (WPP) as the most critical area of the river needing to be addressed. The WPP further acknowledges the relative lack of data to support implementation of management measures aimed at reducing salinity impacts. This project will address the problems/needs described above by employing a data collection and assessment approach that combines ground-based hydrogeological data and heliborne Electromagnetic (EM) geophysical survey data.

OBJECTIVES

The primary goal of this project is to gain a better understanding of hydrological connection between surface water and groundwater along this reach as well as regional water resources. The specific objectives in this project are to:

- conduct appropriate historical data review and assessment to develop an understanding of hydrological connections between surface water and groundwater as well as inter-aquifer exchanges in the selected reach;
- work with a contractor to conduct an heliborne EM survey along the Coyanosa to Girvin reach of the Pecos River in Texas to rapidly collect high resolution surface, near surface and deep subsurface data on electrical resistivity; and
- derive information on geologic salt content over a large geographical area using integrated heliborne EM data and hydrogeological data.

ANTICIPATED RESULTS AND BENEFITS

The results from the project will be utilized to produce an accurate assessment of the water resources in the area and recommendations for remediation, which could result in great economic impacts by assuring reliable water supplies with improved water quality for both agriculture and urban users. The following results are anticipated at completion of the project:

- Integrated database and GIS coverage of assessed areas of the watershed, which includes data and information as well as analysis results from the desktop hydrogeological assessment and heliborne EM survey data.
- Technical report on preliminary hydrogeological assessment and heliborne EM survey and its data analysis.
- Delineation and mapping of potential saline intrusion areas as illustrated in EM results and
- Identification of saline intrusion hotspots and areas where ground truthing is needed as well as work plan for next phase.