

TR-304

Quantity and Fate of Water Salvage as a Result of Saltcedar Control on the Pecos River in Texas

Z. Sheng, A. K. McDonald, C. Hart, W. Hatler, J. Villalobos

- [Full Text](#)

This report presents results for the Subtask 3.3 of the Pecos River Basin Assessment Project sponsored by the U.S. Environmental Protection Agency (EPA) and the Texas State Soil and Water Conservation Board (TSSWCB). The overall objective of Subtask 3.3 is to examine the hydrologic impacts of *Tamarix* spp. (saltcedar) control along a 5 km segment of the Pecos River near Mentone, Texas. This report is also based on work supported in part by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreements No. 2005-34461-15661 and No. 2005-45049-03209, Texas Cooperative Extension (TCE), and Texas Agricultural Experiment Station (TAES).

As part of the deliverables of this project, an existing monitoring network of 8 wells was examined and enhanced with 9 additional wells equipped with water level loggers. Land surface profile and piezometric surface profile were developed to characterize interaction of surface and groundwater for different seasons as well as for verification of monitored water levels. Flow measurements were conducted during a release of water from Red Bluff Reservoir in March 2005 to determine losses or gains within the selected reach. Continued water level monitoring data provide more detailed information about water exchange between surface water and groundwater under different flow conditions. Correlation analyses of river stage and groundwater levels in monitoring boreholes provided further insight.

Results show that the river is hydraulically connected with shallow groundwater for this 5 km segment, which is comprised of Sites A and B, near Mentone, Texas in Loving County. Generally, the river is losing water to the aquifer at both sites. A gentle hydraulic gradient exists on the east bank of the river while a steeper gradient occurs on the west bank probably due to different hydrological properties of soils. Seepage from the river not only recharges the shallow aquifer, but also creates groundwater flow parallel to the channel, which may eventually discharge back to

the river downstream. The reversed hydraulic gradients also demonstrate complexity of the dynamic relationship between the river and the aquifer. Water loss at the treated Site A decreased dramatically following saltcedar control in 2001, and remained very low through 2004. This study conservatively estimates water salvage of 0.5 – 1.0 acre feet per acre from control of saltcedar at this particular site. 2 Salvaged water most likely contributes to aquifer recharge rather than increased streamflow. Vegetation return in the form of native grasses and saltcedar re-growth at Site A may be the cause of corresponding increases in water loss in 2005 and 2006. Site A may also be affected by the untreated adjacent upriver segment (Site B), resulting in over-estimated water loss. Although the saltcedar water loss and salvage estimates presented here are believed to be conservative, the extreme differences in yearly site conditions throughout the study made it difficult to compare pre and post treatment calculations with confidence. It is recommended that additional flow measurements for longer reaches, enhanced monitoring of surface water and groundwater interaction, and further studies on hydrological impacts of saltcedar control be conducted. For future studies using the paired plot method, it is recommended that both sites be logged for at least 3 years prior to treatment. To reduce the potential for upriver treatment affect on downriver study areas, it is recommended that hydrological and ecological conditions immediately upstream of each plot be alike.

Texas Water Resources Institute

1500 Research Parkway A110
2260 TAMU
College Station, TX 77843-2260

Phone:
979.845.1851
Fax: 979.845.0662
Email:
twri@tamu.edu

TWRI and the [Texas A&M Institute of Renewable Natural Resources](#) are working together to foster and communicate research and educational outreach programs focused on water and natural resources science and management issues in Texas and beyond.

[Compact with Texans](#) | [Privacy and Security](#) | [Accessibility Policy](#) | [State Link Policy](#) | [Statewide Search](#) | [Plug-ins](#) | [Veterans Benefits](#)
[Military Families](#) | [Texas Homeland Security](#) | [Open Records/Public Information](#) | [Equal Opportunity Statement](#) | [Risk, Fraud & Misconduct Hotline](#)

© 2013 All rights reserved. Problem with this page? Contact: twri-webmaster@tamu.edu



[SSO](#) |

[CANOPY](#)

