

1 **Saltcedar Management and Water Salvage Estimates on the Pecos River in**  
2 **Texas, 1999-2005**

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10 **Abstract**

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12 A large scale ecosystem restoration program was initiated in 1999 on the Pecos River in Western  
13 Texas. Saltcedar (*Tamarix* spp.), a non-native invasive tree, had created a near monoculture  
14 along the banks of the river by replacing most native vegetation. Local irrigation districts,  
15 private landowners, federal and state agencies, and private industry worked together to formulate  
16 and implement a restoration plan, with a goal of reducing the effects of saltcedar and restoring  
17 the native ecosystem of the river. An initial management phase utilizing state-of-the-art aerial  
18 application of herbicide began in 1999 and continued through 2005. Over 13,000 acres of  
19 saltcedar have been treated within the Pecos River Basin over 6 years. Intensive monitoring and  
20 research to assess the affects of saltcedar removal on water loss and water salvage has been  
21 conducted at a site near Mentone, Texas since the fall of 2000. Stand-level and stem-level water  
22 loss resulting from evapotranspiration, and water salvage from saltcedar control are being  
23 estimated. Stand-level losses are estimated by monitoring groundwater diurnal fluctuations

1 within two saltcedar sites along the river channel. Shallow groundwater monitoring wells were  
2 installed at each site, each well equipped with a pressure transducer water level loggers to  
3 provide data on the diurnal fluctuation of the groundwater table. Mathematical models were  
4 developed to estimate total water loss from the sites based on the magnitude of the diurnal  
5 fluctuations. Sites were monitored for one growing season, then saltcedar was treated on one site  
6 and comparisons made between the treated and untreated sites through 2006. Additionally, sap  
7 flow measurements were made on individual trees during the growing seasons of 2004, 2005 and  
8 2006. Heat dissipation probes were installed in 12 to 20 trees each year. The trees were selected  
9 in 3 groups based on the distance from the tree to the edge of the river. The probes were  
10 interrogated every 10 seconds and a 30 minute average sap flux was reported. Zero flow  
11 calculations were based on nighttime maximum temperature differences. The amount of  
12 sapwood per unit ground area was sampled by harvesting all stems in a 10 \* 10 m area and  
13 recording sapwood using digital cameras. Diurnal fluctuation in sap flux was modeled and  
14 compared to the diurnal fluctuations from the monitoring wells. Transpiration was partitioned  
15 from evapotranspiration resulting in estimates of stand level water use.