

ABSTRACT

Water Use by Saltcedar (*Tamarix* sp.) and Associated Vegetation on the Canadian,
Colorado and Pecos Rivers in Texas.

(May 2003)

Kenneth Brian Hays, B.S., Texas A&M University

Chair of Advisory Committee: Dr. Larry D. White

Increasing water demands in Texas have led to state supported brush control programs for enhancing water yields. This study was initiated to: 1) determine a method for calculating estimated water use by saltcedar (*Tamarix* sp.) and associated vegetation from daily diurnal groundwater fluctuations, and 2) estimate water use under different situations to better target brush control efforts. Studies were initiated in April 2000 on the Colorado River in Borden County, September 2000 on the Pecos River in Loving County and October 2000 on the Canadian River in Hemphill County. At each location, shallow wells were hand cored into the groundwater table. Wells were equipped with loggers that utilize pressure transducer sensors to measure hourly water depth. Vegetation, depth to the water table, and specific yield differed between locations and wells. Seven methods of calculation were investigated. The Draw Down Recharge Method that estimated daily water use from draw down plus recharge during the draw down period was considered the best under these conditions. No method was found to estimate water use under unstable conditions, i.e. rapid water level changes due to river fluctuations that prevented a diurnal cycle. The estimated growing season water use

ranged from 2.5885 m to 4.2650 m, 0.2715 m to 0.8524 m, and 0.0358 m to 2.9596 m for the Canadian, Colorado and Pecos locations respectively. Average daily water use was low in April, peaked in May – July, and decreased in the fall at the Canadian and Pecos locations. Paired plot analysis at the Colorado location for 2001 (one plot herbicide treated in August 2000 and one plot left untreated) revealed a potential water savings of 0.4043 m. due to herbicide treatment that achieved a 49% mortality with total top kill of saltcedar. Use of the paired plot method is the best procedure for determining immediate water savings; however, native vegetation had not reestablished. Therefore, results reported above do not reflect long term water savings. Saltcedar and associated vegetation water use differed depending on the depth to groundwater, soil texture, specific yield, stand density, and season.