

Comparison of Sap Flux, Moisture Flux Tower and MODIS Enhanced Vegetation Index Methods for Estimating Riparian Evapotranspiration

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Riparian evapotranspiration (ET) was measured on a saltcedar (*Tamarix* spp.) dominated river terrace on the Lower Colorado River from 2007-2009 using tissue-heat-balance sap flux sensors at six sites representing very dense, medium dense, and sparse stands of plants. Saltcedar ET varied markedly across sites, and sap flux sensors showed that plants were subject to various degrees of stress, detected as midday depression of transpiration and stomatal conductance. Sap flux results were scaled from the leaf level of measurement to the stand level by measuring plant-specific leaf area index and fractional ground cover at each site. Results were compared to Bowen ratio moisture tower data available for three of the sites. Sap flux sensors and flux tower results ranked the sites the same and had similar estimates of ET. A regression equation, relating measured ET of saltcedar and other riparian plants and crops on the Lower Colorado River to the Enhanced Vegetation Index from the MODIS sensor on the Terra satellite and reference crop ET measured at meteorological stations, was able to predict actual ET with an accuracy or uncertainty of about 20%, despite between-site differences for saltcedar. Peak summer saltcedar ET averaged about 6 mm d⁻¹ across sites and methods of measurement.