
AWRA 2011 ANNUAL WATER RESOURCES CONFERENCE
Albuquerque, New Mexico

November 7-10, 2011

Copyright © 2011 AWRA

REGIONAL-SCALE IMPACTS OF TAMARIX LEAF BEETLES (*Diorhabda carinulata*) ON LEAF PHENOLOGY AND WATER USE OF *Tamarix* spp. ON WESTERN U.S. RIVERS

Pamela L. Nagler*, Tim Brown, Kevin R. Hultine, Charles van Riper III, Daniel W. Bean, Philip E. Dennison, R. Scott Murray, Edward P. Glenn

ABSTRACT: Tamarix leaf beetles (*Diorhabda carinulata*) have been widely released on western U.S. rivers to control introduced shrubs in the genus *Tamarix*. Part of the motivation to control *Tamarix* is to salvage water for human use. Information is needed on the impact of beetles on *Tamarix* leaf phenology and subsequent water use over multiple cycles of annual defoliation. We combined ground surveys with high resolution phenocam imagery and moderate resolution (Landsat) and coarser resolution (MODIS) satellite imagery from 2000 to 2010, which encompassed years before and after beetle release at each study site on the Dolores, Lower Colorado, Humbolt, Walker and Bighorn Rivers. The original biocontrol model predicted that *Tamarix* mortality would reach 75-85% over several years of defoliation due to progressive weakening of the shrubs each year, but over the early stages of leaf beetle-*Tamarix* interactions studied here (3-8 years), actual reductions in vegetation indices and ET were only 14 to 15% across sites, respectively by Landsat and MODIS. Baseline ET rates before defoliation were low, 394 mm yr⁻¹ by Landsat and 314 mm yr⁻¹ by MODIS estimates (20-25% of potential ET), further constraining the amount of water that could be salvaged. Beetle-*Tamarix* interactions are in their early stage of development on this continent and it is too soon to predict the eventual extent to which *Tamarix* populations will be reduced.

* Research Physical Scientist, USGS, 1110 E. South Campus Dr., Tucson, AZ 85719 USA, Phone: 520-626-1472, Fax: 520-670-5001, Email: pnagler@usgs.gov