



## Saltcedar, *Tamarix* spp.: An Emerging Success

**Economic and Ecological Impact:** Saltcedar, *Tamarix ramosissima* (and related *Tamarix* spp.), is native to central Asia and the Mediterranean area, and is a major invasive riparian weed. This shrub to small tree was deliberately released in the U.S. in 1837 to help control wind and water erosion. It can grow up to 30 feet tall, infests over one million acres, and is still spreading along rivers and streams throughout the West (Fig. 1). Saltcedar uses water otherwise used for irrigation or native vegetation, and has contributed to significant reductions in beneficial vegetation, such as willows, cottonwoods and other plants crucial to agriculture and the natural environment. Saltcedar degrades wildlife habitat and stream channel morphology and flow, and increases soil salinity and wildfire frequency. These changes have had a cascading effect through the ecosystem, resulting in loss of arthropods and other biota that lived in and around the native plant communities. Economic losses from saltcedar have been estimated at millions of dollars per year. A large consortium of Federal, State, local and private sector customers and stakeholders have joined to support biologically based management of saltcedar.

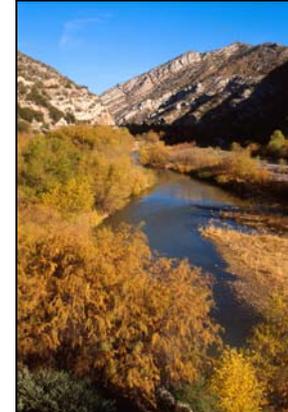


Fig. 1. Saltcedar dominating native vegetation along the Gila River in Arizona.



Fig. 2. Adult *Diorhabda elongata*, the saltcedar leaf-feeding beetle.

**Significant Accomplishments:** ARS scientists at Albany, California, Reno, Nevada, Sidney, Montana, and Temple and Weslaco, Texas, are developing a biologically based integrated weed management program for saltcedar. Classical biological control, using host-specific natural enemies, and revegetation with desirable plants are the keystones of sustainable management of saltcedar. Herbicides and cultural controls are also very valuable tools in this program. The first biological control agent for saltcedar, the leaf-feeding beetle, *Diorhabda elongata* (Fig. 2) was initially released in secure field cages in 1999 at ten sites in six states (California, Colorado, Nevada, Texas, Utah and Wyoming). Cages were removed at these sites in 2001. The original few hundred individuals released have produced millions of offspring. Additional release sites were added in Montana, Oregon and New Mexico in 2003. *Diorhabda* is already impacting saltcedar at release sites (Fig. 3) and is spreading to other locations.

Fig. 3. Dr. C. Jack DeLoach (USDA-ARS, Temple, Texas) standing before saltcedar damaged by *Diorhabda elongata* two years after its release at a site near Lovelock, Nevada.



Fig. 4. The southwestern willow flycatcher, an endangered bird that colonized saltcedar after its preferred native nesting habitat was out-competed by saltcedar. Measuring the recovery of this bird is a priority of this program.

Before releases were initiated, an endangered bird, the southwestern willow flycatcher, *Empidonax traillii extimus* (Fig. 4) was found to use saltcedar as a nesting substrate in parts of Arizona, New Mexico, and Nevada. The flycatcher adopted saltcedar because the weed had resulted in the loss of the native trees and shrubs that are its preferred nesting habitat. To ensure minimal impact on the flycatcher, the U.S. Fish & Wildlife Service was involved in selecting release sites, and is participating in post-release monitoring of *Diorhabda* and impact of saltcedar.

**Future:** Impacts of *Diorhabda* on saltcedar, revegetation, the recovery of the flycatcher, and changes in other biota will be monitored for several years by ARS and our partners and stakeholders. Other natural enemies from the native range of saltcedar are being tested, and may be released in the future if needed.

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