



TAMARISK LEAF BEETLE INVASION
INTO THE COLORADO RIVER ECOSYSTEM
DOWNSTREAM FROM GLEN CANYON DAM

Larry Stevens
Grand Canyon Wildlands Council, Inc.

THE TAMARISK CONTROVERSY



**Bum Rap: Tamarisk is bad habitat
in lower CR (Ohmart et al.)**

**OR: Tamarisk is pretty good habitat
in Grand Canyon (Brown et al.)**

- * ~ 30 neotropical migrant bird spp.
nest in it in GC
- * 80-95% of ~300 willow flycatcher
nests in Arizona are in tamarisk
- * It is designated as potential critical
habitat for endangered WIFL

Tamarisk supports >250 invertebrate herbivores
in the Middle East, but <10 (mostly non-natives) in the SW



Non-native Manna leafhopper
Opsius stactagalus



Native *Schistocerca alutacea*
shoshone



**Biological Control:
Tamarisk leaf beetle
(Chrysomelidae: *Diorhabda elongata*)**

***Diorhabda* Introduction Background**

- Tamarisk leaf beetles (*Diorhabda* sp.) from the Middle East are moving into the Grand Canyon region from the north
- The beetle was selected as the preferred bio-control agent for tamarisk by the USDA Animal and Plant Health Inspection Service (APHIS) and the Agricultural Research Station (both Dept. of Agriculture), with U. S. Fish and Wildlife Service
- In 1999, after both National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) compliance was completed, the beetles were released into cages in several locations across the Rocky Mountains and Great Plains; however, the beetle was not to be released within 200 miles of SWFL habitat
- The beetle was introduced by private individuals and southern Utah counties, and is rapidly moving southward towards the Grand Canyon region
- The beetle may eliminate a large portion of the riparian habitat in Grand Canyon

DIORHABDA LIFE CYCLE

- 300-500 eggs/female, hatch in 7 days
- Larvae live 14-27 days, 3 instars
- Pupation in a silk cocoon, 7 days
- Adults emerge, secrete pheromones to promote aggregation and mating;
female lays eggs on tamarisk foliage every day, living 2-4 weeks
- 1-2 generations /yr depending on day length (greater at higher latitudes)



FAILED CAVEATS AND CONTAINMENT EFFORTS

Only the Fukang (China) and Chlik (Kazakhstan) strains were to be released. These strains were believed to only persist in areas above 38° north latitude (approximately at the upper end of Lake Powell) due to day-length requirements and would not be successful below that latitude.

No releases were to be made within 200 miles of tamarisk areas that supported endangered southwestern willow flycatcher nesting.

The ESA consultation covered the placement of the beetles in field cages, and the later removal of the cages to free the insects to surrounding areas. Coverage for active movement of the beetles from the experimental release areas was not included.

In 2004, the Delta, Utah, experimental release site was opened for collection of beetles for use by local agencies in Utah to introduce the beetles to non-Federal lands. Grand County, Utah, stocked beetles in at least two sites near Moab in 2004 and another three in 2005. Defoliation on a larger scale was observed in 2005. Since then, the beetles have moved down the Colorado River almost to the upper end of Lake Powell. In 2006, The City of St. George, Utah, released beetles along the Virgin River at 37° north latitude. By 2008, defoliation along the river and at a southwestern willow flycatcher breeding site was documented. The beetles have spread downstream on the Virgin River to at least Littlefield, Arizona, and are expected to reach Lake Mead in 2009 or 2010. Beetles from Moab down the Colorado River to Lake Powell have slowed their advance; however, entry into Arizona via Lake Powell/Colorado River is still likely to occur.



“Not Wanted in Arizona: Tamarisk Leaf Beetles “



RAPID REDUCTION OF TAMARISK AND UNINTENDED CONSEQUENCES: THE SINGLE LARGEST ECO-IMPACT ON THE COLORADO RIVER SINCE GLEN CANYON DAM?

- Increased erosion
- Fire hazard
- Loss of SWFL and breeding habitat
- Loss of other ~ 30 Neotropical migrant birds that breed preferentially in tamarisk?
- Other wildlife (e.g., reptiles)
- Low tamarisk mortality?
- Rapid selection for resistance to beetles
- Long-term consequences?



SCIENTIFIC AMERICAN, March 19, 2009

Are Beetles Imported into the U.S. to Kill Invasive Trees Doing Too Good a Job? Strategy that unleashed cedar leaf beetles on Tamarisk trees may have to be revised as the chompers spread to threaten endangered birds.

By [Anne Minard](#)

SALT CEDAR LEAF BEETLE: Is this little bug being too efficient?

BOB RICHARD/US ANIMAL AND PLANT HEALTH INSPECTION SERVICE

A foreign beetle imported to attack invasive trees in the U.S. Southwest may have brought its own culinary agenda. Researchers in Utah and Arizona are sounding the alarm about salt cedar leaf beetles, which were imported from Kazakhstan several years ago to control invasive tamarisk trees.

"Now that the beetle is spreading to large areas, we need to start looking for unexpected consequences of defoliation and death of the tamarisk," says Philip Dennison, a geographer at The University of Utah and lead author of a study warning of the unintended risks published this month in the online edition of the journal [Remote Sensing of Environment](#).

Agriculture Department Forced to Re-examine Tamarisk Leaf-eating Beetle Program That Hurts Endangered Songbird

TUCSON, *Ariz.*— A lawsuit filed by the Center for Biological Diversity and the Maricopa Audubon Society on 17 June 2009 has forced the U.S. Department of Agriculture and its Animal and Plant Health Inspection Service (APHIS) to re-evaluate their tamarisk leaf-eating beetle program. APHIS-released beetles are contributing to the decline of the endangered [southwestern willow flycatcher](#) by defoliating the trees in which the flycatchers nest. The re-evaluation should lead to modification of the program and to emergency habitat restoration.

From:

http://www.biologicaldiversity.org/news/press_releases/2009/southwestern-willow-flycatcher-06-17-2009.html

WHAT TO DO IN THE CRE?

- Interagency coordination?
- Monitor, esp. habitats, shoreline vertebrates?
- Active restoration planning for native vegetation (e.g., GCWC Report)?
- Implementation of restoration efforts?

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