

TAMARISK LEAF BEETLE – GRAND CANYON NATIONAL PARK UPDATE 2011



Basic Background on Tamarisk and the Tamarisk Leaf Beetle

Tamarisk is an invasive woody plant that has taken over many riparian areas of the West. It is one of the dominant tree species along the Colorado River in Grand Canyon since the completion of Glen Canyon dam, and if you have rafted the river or camped along it, you know this plant. This aggressive invader can out-compete many native plants, reduce (or sometimes increase) wildlife habitat, increase wildfire severity, change stream morphology, and reduce water table levels in some areas. Tamarisk removal has cost landowners and land management agencies millions of dollars. The National Park Service (NPS) in Grand Canyon has focused on removing this species from the park's side canyons and tributaries, where natural flow regimes still occur. To date crews have removed over 275,000 individual plants from over 6,000 acres (refer to *Tamarisk Management and Tributary Restoration bulletin*).

Biological control is the deliberate use of living organisms to reduce the population of an invasive species, and it is considered a more cost-effective method for controlling invasive species with expansive distribution. After much overseas exploration and extensive research, the tamarisk leaf beetle, several species in the genus *Diorhabda*, was selected as the best potential biological control agent for tamarisk. After 10 years of intensive laboratory testing focused on ensuring that the beetle would have no detrimental effects on non-target species (i.e. native plants and agricultural crops), the first "open" releases in North America began in 2001. The beetle was released by local, state and federal resource managers, as well as private landowners, and can now be found throughout widespread areas of the Colorado River Basin and Texas.

The small beetle and its larvae control tamarisk by eating the outer foliage of the plants. It is important to understand that ecosystem balance, and not eradication, is the objective when using biological control agents. The goal of the beetle is to control the damage to the ecosystem caused by tamarisk and to prevent its further spread and domination. Ecosystems with beetle populations will never see the case of the last beetle eating the last tamarisk plant.

Has The Beetle Arrived in the Grand Canyon Area?

Yes. Beetle populations have expanded and arrived in the Grand Canyon area **without** land managers actively releasing them. In fact, there have been no approved releases in the state of Arizona. Keep in mind that the beetles are great hitchhikers, so they may have also arrived on river gear, on vehicles, and maybe even on you!

What Changes Can I Expect To See in the Grand Canyon Area With the Arrival of the Beetle?

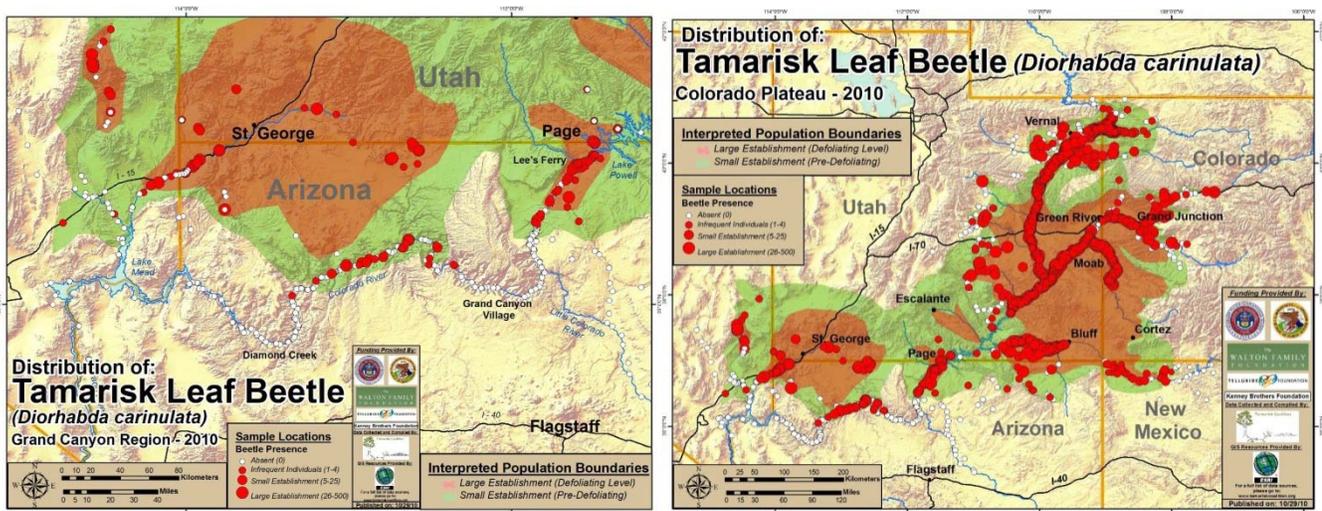
Tamarisk defoliation - Tamarisk foliage will turn brown on part or all of the plant, reducing the density and shading effect of the foliage. This may happen multiple times during the growing season. This reaction **DOES NOT** indicate the plant is dead. In fact, in areas with good soils and water availability, it may take several years or more of repeated beetle defoliation to actually kill the tamarisk. If tamarisk is cut down before it is dead, it will very likely re-sprout with thicker growth from the stump.

Changes in stream bank structure - With the reduction in tamarisk populations, it is possible that over time the soil stabilization properties of tamarisk root structure will be compromised and we could see increased stream bank erosion. However, tamarisk mortality may come slowly and the root structure may remain underground for years following tamarisk death. This factor allows ample time for active or passive re-vegetation efforts with native species that will anchor soils.

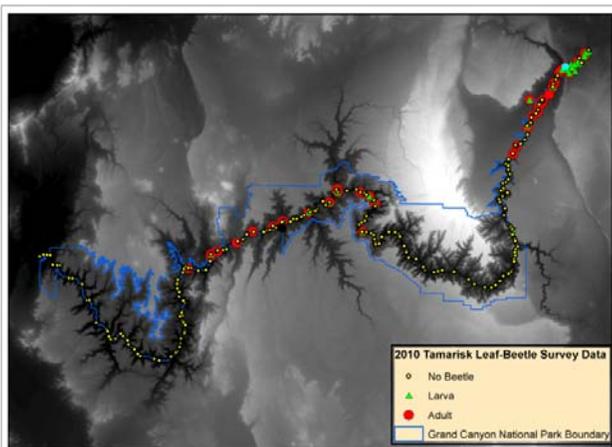
Changes in fire regimes - Although defoliated tamarisk may look brown and dry, it may not be more of a fire hazard than green tamarisk. Green tamarisk burns rapidly and hot. When tamarisk is completely defoliated and only the branch structure remains, it is a reduced fire hazard because there are fewer needles and aboveground structure. It is important to remember that even when unchecked by beetles or other treatments, tamarisk grows in dense stands that increase fire danger and fuel loads.

Changes in plant and animal communities - As tamarisk populations are slowly reduced by beetle defoliation, native and non-native plant communities may increase. With an increase in native plant species, the richness and biodiversity of bird, animal, fish, and insect communities will subsequently increase. In areas where substantial exotic plant species populations exist with tamarisk (i.e. Russian knapweed, Russian thistle, camelthorn), the weeds may become aggressive secondary invaders of the opening left in the ecosystem by dying tamarisk. These secondary invasions can be prevented by treating the existing weed populations and active re-vegetation of native plant species.

Monitoring tamarisk leaf beetle populations is necessary to provide critical insight and data on the direct and indirect impacts of this biological control agent on the riparian ecosystem. In 2007, the Tamarisk Coalition, partnering with the Colorado Department of Agriculture, initiated beetle monitoring efforts on the Colorado and Green Rivers as no one was tackling this critically important activity. In 2008 the effort expanded to include a longer stretch of the Green, the Dolores River, and various tributaries along the western slope of Colorado and in Utah. In 2009 and 2010, in partnership with NPS, Bureau of Land Management (BLM), U.S. Geological Survey (USGS), and other key organizations, the monitoring area expanded to encompass much of the northern Colorado Plateau, as well as the Virgin River and Grand Canyon. The distribution maps provide a summary of the 2010 monitoring completed.



In Grand Canyon, crews conducted beetle sampling (using sweep nets and a standard protocol) every month from May through September. Only scattered individuals were found until about July, and by the end of the season a total of 848 adults and 540 larvae were counted at the sample locations. Keep in mind that these numbers give us an overall idea of the distribution of the beetle in the park and also where the sampling occurred, but do NOT represent the number of beetles in the park. We will continue the sampling and continue to monitor the beetle's progress in 2011. We will also continue our partnership with USGS, and we will be collecting microhabitat information at about 25 sites in an effort to really understand changes to bird habitat.



What Can You Expect to See in 2011?

- If you have not seen the beetles yet, it is very likely that you will in 2011 because the numbers will likely increase. Get to know what the adults and larvae look like and point them out to people.
- By late summer, we expect to see more defoliation and stands of brown tamarisk.
- You are likely to see biologists sweeping insect nets through vegetation throughout the summer. Please stop and ask them questions and get updates for your passengers and friends.
- You might see large groups of adult beetles flying from one tamarisk patch to another.

The NPS and partners will provide a summary update in the fall of 2011, but if you have questions prior to that, contact Lori Makarick at (928)638-7455 or Lori.Makarick@nps.gov. The NPS is pro-actively planning for the changes that we expect to see in the river corridor over the next few years, and we welcome your input. For more detailed information about the beetle, please visit the Tamarisk Coalition's website (www.tamariskcoalition.org).