

Lower Colorado River Multi-Species Conservation Program



Balancing Resource Use and Conservation

Tamarisk Beetle Update

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Introduction

- What is the expansion of the beetle over the last two years
- There is large increase in research and information recently published on the beetle
- What are the effects of the beetle on the LCR and its tributaries so far

The Tamarisk Beetle



Eggs –
hatch in 7
days



1st and 2nd
instar larvae
8-13 days



3rd instar
larvae

feeds for 3-7
days and then
enters leaf litter
and is inactive
for 3-7 days and
then is in a pupal
stage for 7-10
days



Adult
Live 2-4 weeks after
emerging

Tamarisk Beetle

- Adults feed and mate immediately upon emerging in spring or summer
- Adults secrete pheromones to promote mating and grouping
- Females lay eggs every day
- Beetles enter diapause in the fall and burrow into the leaf litter to pass through the winter.

Other Species

- Splendid Tamarisk Weevil (*Coniatus splendidula*)



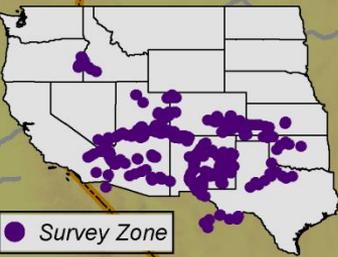
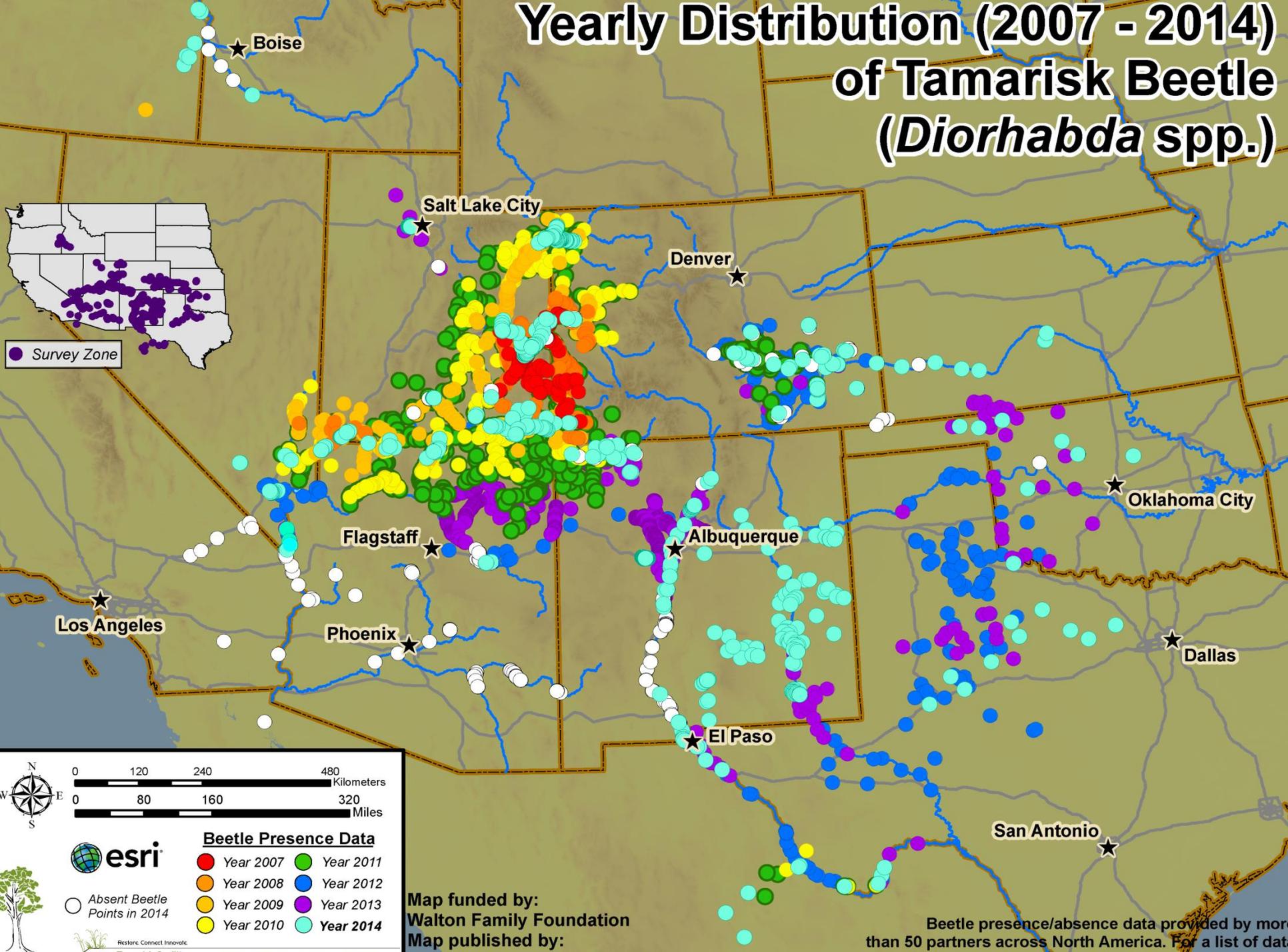
Eckberg, J. R., & Foster, M. E. (2011). First account of the splendid tamarisk weevil, *Coniatus splendidulus* Fabricius, 1781 (Coleoptera: Curculionidae) in Nevada. *The Pan-Pacific Entomologist*, 87(1), 51-53.

- Elm leaf beetle and virbunum leaf beetle are very similar in appearance to the tamarisk beetle.

The Tamarisk Beetle

- There are two species of beetle that are currently of main concern in the western U.S.
- *Diorhabda carinulata*
 - Released in St. George and other parts of Utah and Colorado
 - Spreading into the LCR down from the Virgin River
- *Diorhabda sublineata*
 - Released in Texas and spreading

Yearly Distribution (2007 - 2014) of Tamarisk Beetle (*Diorhabda* spp.)



Beetle Presence Data

● Year 2007	● Year 2011
● Year 2008	● Year 2012
● Year 2009	● Year 2013
● Year 2010	● Year 2014

○ Absent Beetle Points in 2014

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Map funded by:
Walton Family Foundation
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Beetle presence/absence data provided by more than 50 partners across North America. For a list of data

How does the beetle affect Tamarisk?

- There is usually a full defoliation event in the first or second year beetles arrive. (Depending on arrival of beetles in first year).
- In subsequent years defoliation and lasting effects have shown variability
- Some trees foliate again and show “poodling”, others show apparent mortality

Beetles effects so far in our region

- In St. George the defoliation pattern is somewhat patchy and variable between years, but is not complete.
- At Mormon Mesa defoliation is mostly complete and lasting with large areas remaining mostly defoliated.

Google Image of the Mormon Mesa Area



Recent Research

- Bean, D. W., Dalin, P., & Dudley, T. L. (2012). Evolution of critical day length for diapause induction enables range expansion of *Diorhabda carinulata*, a biological control agent against tamarisk (*Tamarix* spp.). *Evolutionary applications*, 5(5), 511-523.
- *D. carinulata* has adapted to delay their induction of diapause to allow them to exploit tamarisk habitat further south than originally anticipated.
- Bateman, H. L., Nagler, P. L., & Glenn, E. P. (2013). Plot-and landscape-level changes in climate and vegetation following defoliation of exotic saltcedar (*Tamarix* sp.) from the biocontrol agent *Diorhabda carinulata* along a stream in the Mojave Desert (USA). *Journal of Arid Environments*, 89, 16-20.
- Tamarisk stands became drier and hotter after defoliation occurred on the Virgin River. Satellite imagery can be used to track beetle defoliation.

Quigley, M. F. (2013). *Tamarix: A Case Study of Ecological Change in the American West*. Oxford University Press.

- This book provides a wealth of information about the tamarisk plant
- Articles by Pamela Nagler, Edward Glenn, and James Cleverly discuss and summarize the known research on water use by Tamarisk
 - There is no published results that support increased water use by tamarisk as compared to native riparian vegetation.
 - Water use by all riparian plants can be highly variable and therefore difficult to measure or compare based on one daily value

Wildlife (Quigley 2013)

- Wildlife use of tamarisk is mixed benefiting some species and not others
 - The Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) found 76% of low to mid-elevation riparian birds breeding in tamarisk
 - Greater abundance of herpetofauna in mixed stands of tamarisk than in monotypic stands (Bateman et al. 2008, 2009)
 - Small mammals found in tamarisk tend to be generalist species and species richness is generally lower.

Wildlife

- Not all tamarisk stands are the same
- On site conditions can influence the suitability and quality of the habitat provided by salt cedar

Questions?