TAMARISK INFESTATION: PROBLEMS, INVENTORY ON ABCI LANDS, AND REMOVAL STRATEGIES

OUTLINE OF THE PRESENTATION

- Invasive species – Why We Need to Control and Remove Tamarisk
  - Hydrological negative impacts
  - Soil degradation
  - Habitat loss
  - Fire risks
- ABCI – Inventory of Tamarisk in Select Locations
- Lessons Learned
  - Removal methods
  - Regrowth of native vegetation
  - Use of dead trees for habitat while new growth begins
- Next Steps
  - Working group of stakeholders to assess risks
  - Alliances and possible partners

Damage

- **From web site of Center for Invasive Species Research (UCR): https://cisr.ucr.edu/invasive-species/saltcedar**

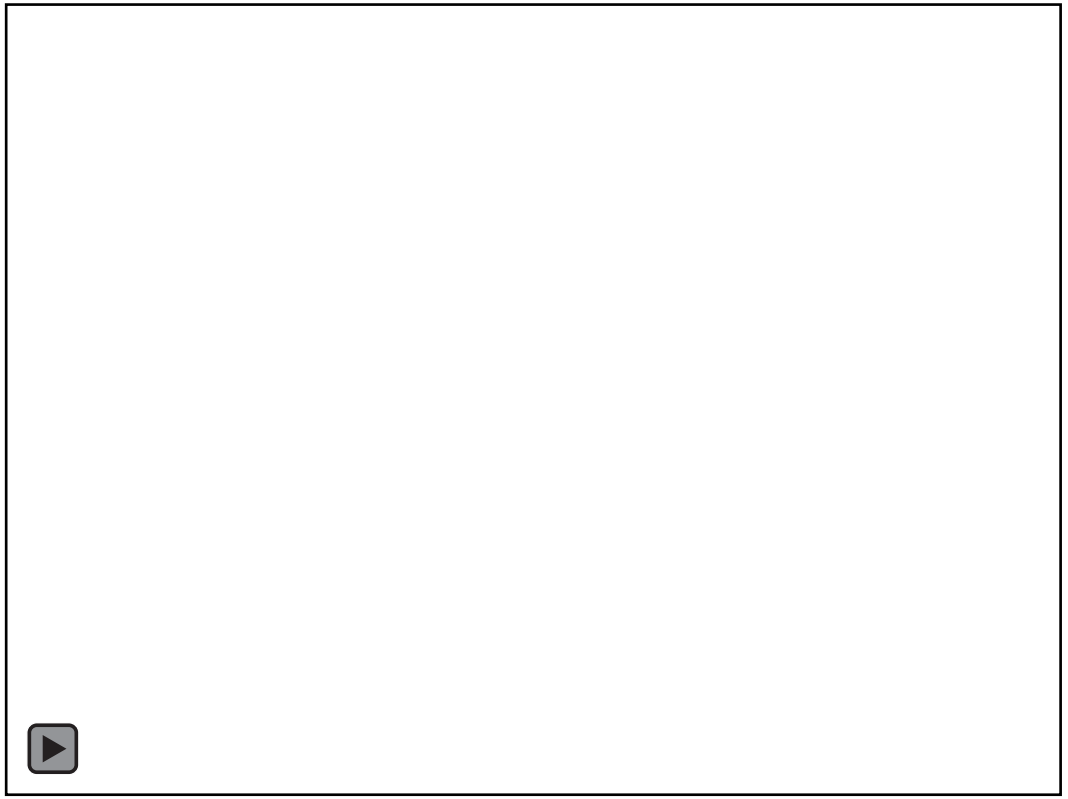
- Once established, Tamarisk/Saltcedar is tolerant to high salinity and secretes salt at a high rate which is deposited on the soil surface to the detriment of native plant species.
- Saltcedar increases fire frequency within the riparian [and other] habitats it dominates because of its high levels of dead leaves and branches that provide fuel for fires.
  - After fires, Saltcedar sprouts vigorously, while native riparian trees and shrubs generally do not.
- Saltcedar groves push out native species, affecting their reproductive potential and contributing to a loss of natural biodiversity.

http://www.columbia.edu/itc/cerc/danoff-burg/invasion_bio/inv_spp_summ/Tamarix_ramosissima.html
Photo by Steve Dewey; Utah State University

On ABCI lands, Tamarisk is generally growing in depressions and along roads and drainages that collect moisture; and in areas where the water table is likely high. In some areas, it is currently on the edges of thick stands of mesquite and other plants – in the future it may cause losses of the native vegetation

Hydrology Impacts

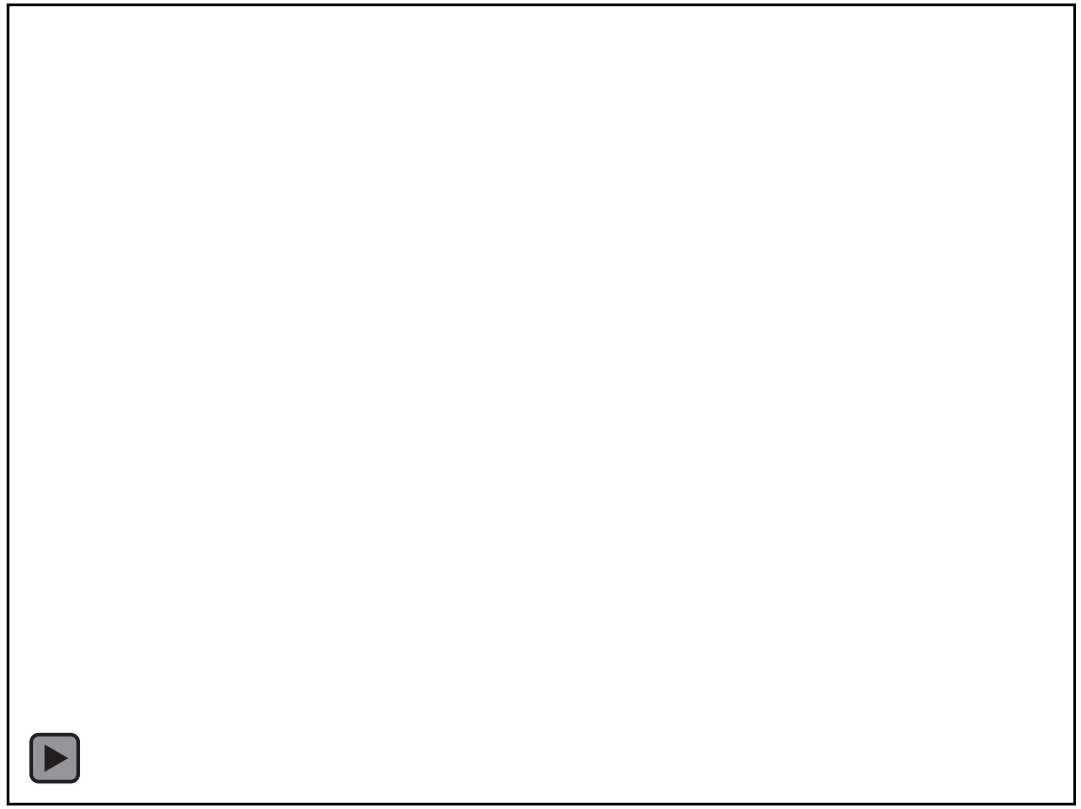
- NASA and USDA experts estimate that Tamarisk (Saltcedar) has infested more than 3.3 million acres in the western United States. Tamarisk is one of our most harmful invasive species because the plant's long roots tap into underground aquifers. Its groundwater-absorbing qualities may be adding to the severity of the drought in the western U.S.
- Tamarisk's extensive root system can reach up to **50 feet laterally and 100 feet in depth** to access water. As this invasive plant draws up large amounts of water, it can lower the water table. Native plants with shallower root systems have to compete for an already-dwindling water supply. One large Tamarisk plant can absorb up to **200 gallons of water per day** - that's twice the amount the average person uses in the same timeframe.



Animation showing the difference between the Tamarisk root system and native trees – from NASA's Conceptual Image Lab: https://svs.gsfc.nasa.gov/20089
Click on picture and then the play button to start the animation

Soil Degradation

- Tamarisk plants (trees and shrubs) grow in high salt environments
- Leaf-fall and excretions are believed to increase salts in the soils around the plants
- The increase in salts inhibits the growth of other native salt-intolerant species



Animation showing how salts are transferred from the subsurface and brought up to the topsoil making conditions unfavorable for native vegetation – from NASA's Conceptual Image Lab: https://svs.gsfc.nasa.gov/20090
Click on the picture and then the play button to start the animation

Habitat Loss

From: Invasive Species Summary Project: http://www.columbia.edu/itc/cerc/danoff-burg/invasion_bio/inv_spp_summ/Tamarix_ramosissima.html

- Although Tamarisk does provide nesting area for some species, bird density and diversity decrease when Tamarisk is present
- Studies have found that Tamarisk supported 4 species of large animals/birds per hundred acres in comparison to 154 species per hundred acres of native vegetation
- Fewer insects live on Tamarisk than other native species

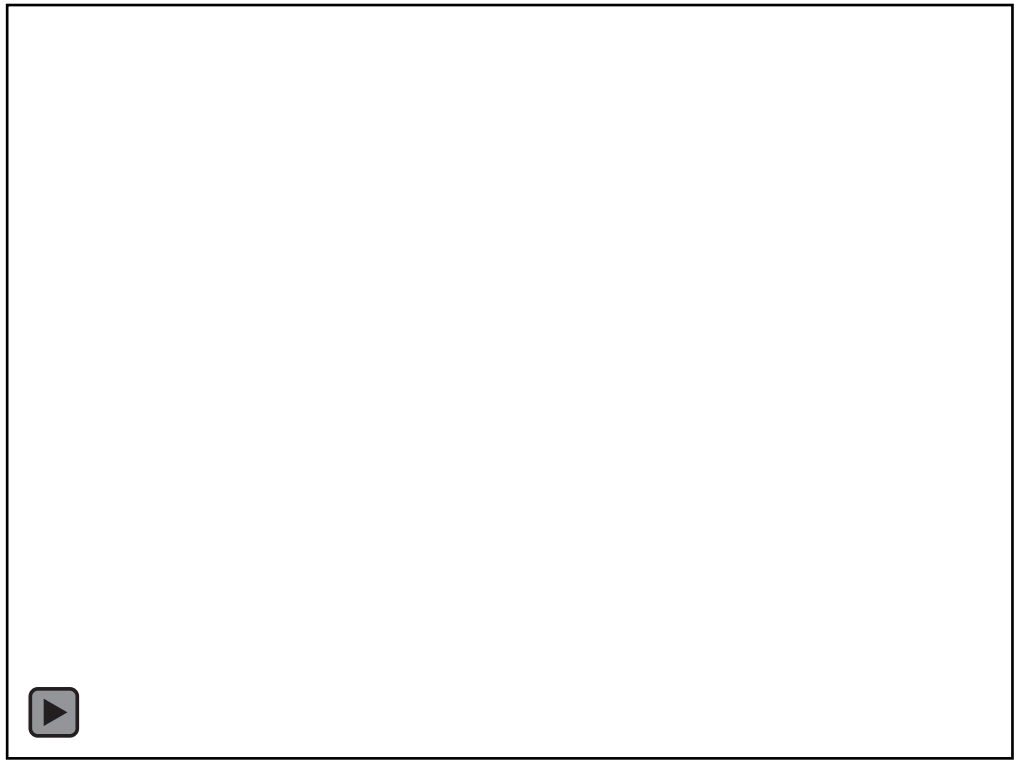
The Table lists total bird densities in various tree community types in a Lower Colorado River valley December 1975 to November 1976

From: https://www.fs.fed.us/rm/boise/AWAE/labs/awae_flagstaff/Hot_Topics/ripthreatbib/andersonbw_avianuse.pd f

Community	Dec, Jan, Feb	Mar, Apr	May, June, July	Aug, Sept	Oct, Nov
Cottonwood-Willow	148	172	336	262	210
Screwbean Mesquite	73	109	318	307	183
Honey Mesquite	193	193	323	195	270
Saltcedar-Honey Mesquite	42	111	295	184	177
Saltcedar	54	71	216	177	129
Desert Wash	68	115	176	118	185
Arrowweed	18	23	124	141	99
Orchard	158	158	678	540	135

Fire Risks

- As Tamarisk drops its leaves, it creates a debris layer known as 'duff' which chokes the ground below.
  - This adds to the fuel load, compounding an already high fire danger in the drought-stricken West.
- When fires ravage an area, Tamarisk ignites quickly, leading to a more severe burn.
- To make matters worse, this invasive plant tends to come back more quickly than native plants in these burned areas.

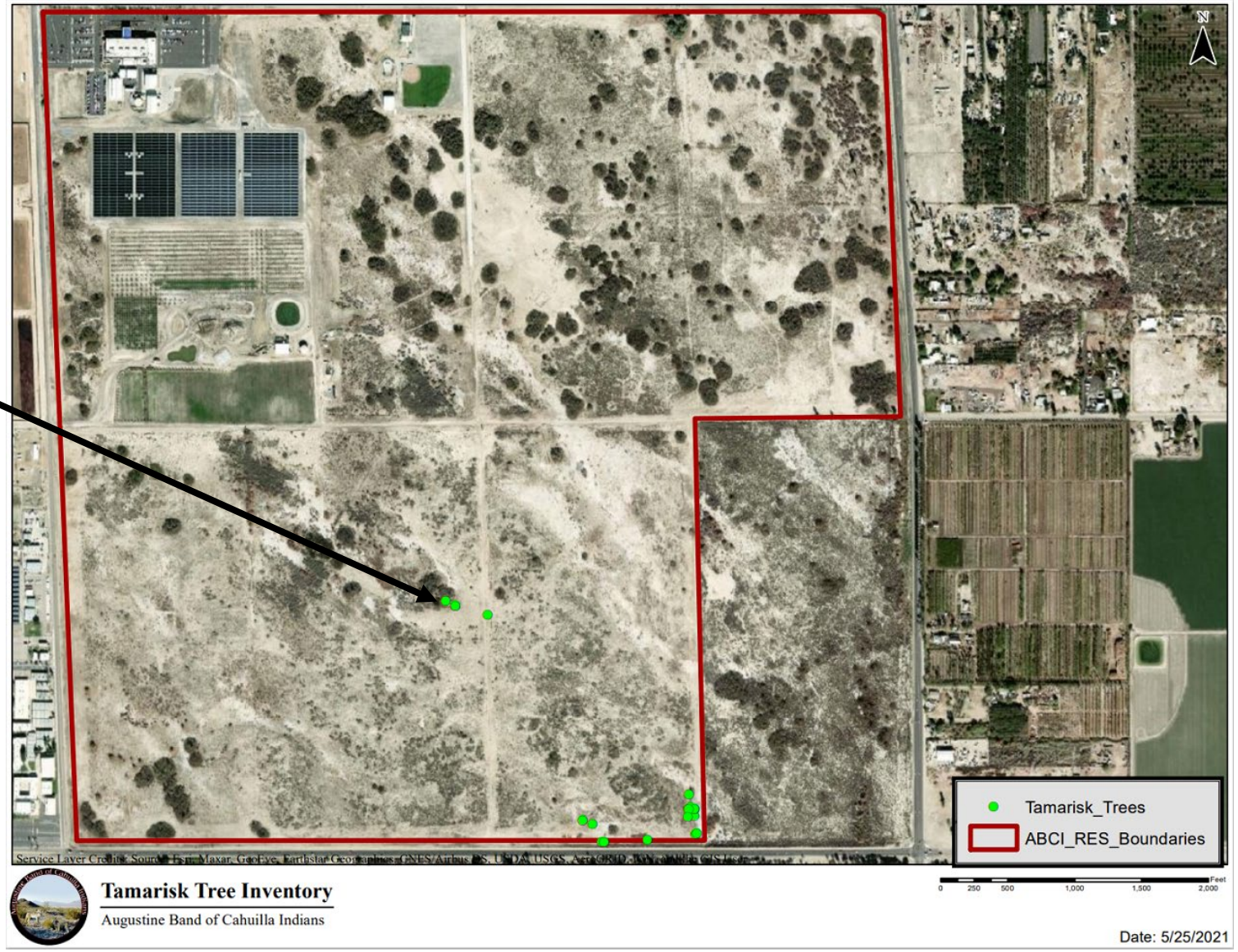


Animation of a fire starting from dropped Tamarisk leaves – from NASA's Conceptual Image Lab: https://svs.gsfc.nasa.gov/20091
Click on the picture and then the play button to start the animation

Tamarisk Inventory in Select Areas of ABCI Lands

Photograph taken at location marked on map (looking east)

Mapping of Tamarisk (using GIS) has been initiated – the marked areas are where we will begin a pilot removal project



Tamarisk Removal on ABCI Lands – September 2020

Tamarisk Project Site TAM 2E-1 Pre-Project Photo 09072020

Tamarisk Project Site TAM 2E-1 Post Project Photos 09212020

Mechanical equipment was used to excavate and remove Tamarisk trees over a two week period. The trees were mulched using rented equipment. As can be seen, mechanical excavation also removes other native species. We are evaluating these past removal areas to determine the success rate and how revegetation is progressing.

Lessons learned from Other Projects

- Removal methods - cut stump and drill method with herbicide injected into drilled stump or applied externally was found to be most effective
  - Several Tamarisk removal projects in the Coachella Valley area have effectively used the cut stump and drill method with an appropriate herbicide injected into the drilled stump to kill the roots. The dead stumps are removed mechanically later, or left to degrade
    - Torres Martinez Desert Cahuilla Indians – projects have removed Tamarisk and installed rainwater harvesting basins to help the growth of replanted native trees
    - Coachella Valley Preserve - a spring started to flow again after the Tamarisk were removed
    - Coachella Valley Water District – routinely uses herbicides along water canals to remove Tamarisk
  - Greater than 90% success was achieved in the project at the Coachella Valley Preserve project when the herbicide was injected into the stump within two minutes of cutting the tree down by hand and stump exposure. If the time was longer than two minutes, resprouting often occurred and the success rate dropped to 70%
- Loss of native vegetation was lower and regrowth of native vegetation was higher when trees were cut by hand instead of using mechanized equipment such as a back-hoe
- Use of dead trees for habitat while new growth begins – at the Coachella Valley Preserve instead of mulching and/or land-filling, the dead trees were left to degrade slowly and be available for wildlife habitat use
- November to January has been found to be the ideal time for successful Tamarisk removal

UC Weed Research and Information Center in Davis has Published Reports on Best Practices for Weed Removal, Including Tamarisk

- The Weed Report discusses mechanical, biological and chemical best practices for Tamarisk removal and most effective approaches to apply herbicides on Tamarisk stumps (available at - https://wric.ucdavis.edu/information/crop/natural%20areas/wr_T/Tamarix.pdf)

A **WEED REPORT** from the book *Weed Control in Natural Areas in the Western United States*

This WEED REPORT does not constitute a formal recommendation. When using herbicides always read the label, and when in doubt consult your farm advisor or county agent.

This WEED REPORT is an excerpt from the book *Weed Control in Natural Areas in the Western United States* **and is available wholesale through the UC Weed Research & Information Center (wric.ucdavis.edu) or retail through the Western Society of Weed Science (wsweedscience.org) or the California Invasive Species Council (cal-ipc.org).**

Tamarix aphylla (L.) Karst.; athel tamarisk
Tamarix chinensis Lour.; Chinese tamarisk
Tamarix gallica L.; French tamarisk
Tamarix parviflora DC.; smallflower tamarisk
Tamarix ramosissima Ledeb.; saltcedar, and hybrids of *T. ramosissima*, *T. gallica*, and *T. chinensis*

Saltcedar and tamarisk

Next Steps

- Next Steps
  - Working group of ABCI stakeholders to assess risks – composition of the group to be decided by the Council and likely composed of personnel from the Temalpakh Farm, Casino, and Tribal departments
  - Alliances and possible partners
    - Torres Martinez Desert Cahuilla Indians (we could tour their removal sites and learn from their experience)
    - UC Riverside Center for Invasive Species Research (to assist in Tamarisk identification and best practices for removal)
    - UC Riverside Center for Conservation Biology (to assist in selection of native plants for replanting)