# Riparian habitat restoration on the Lower Colorado River, USA: responses of vegetation, wildlife, and sensitive species

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**River Partners** 

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## Design drawing 2010



## Aerial image 2020



Photo: NAIP 2005



Salt-tolerant shrub and herbaceous Enhancement







February 2010

June 2010

October 2010





August 2011

August 2022



Planted mesquite forest "Treatment"



#### Naturally regenerated arrow weed scrub "Control"





## **Vegetation Monitoring Results:**

1. Active restoration plots had significantly greater total native cover than areas left to passively regenerate. Plots in the active restoration area had twice the amount of cover as control plots (70% vs 30%)

80-60-Total % Native Cover Treatment Unrestored (control) Restored (impact) 20-0-Treatment 60-40-Total % Cover Treatment Unrestored (control) Restored (impact) 20-0 -Strata

2. Actively restored areas had higher tree cover but similar shrub cover (arrow weed fills in on its own!).



### **Vegetation Monitoring Results**

3. No statistically significant difference between restoration and control on cover of tamarisk. Wildfire, drought, and perhaps some manual removal has kept tamarisk cover low in the control areas. From management perspective <0.5% vs. 4% cover is likely important.

4. Actively restored areas twice as many species present as control plots.





## Vegetation Monitoring Results:

5. Actively restored areas had 7 of the 15 planted species from the plant palette (control plots had 3 of 15 without being planted)

- Arrow weed and salt cedar both present in both types of plots without being planted
- Creosote, which was planted, was in the control plots but not the restoration plots
- Mesquite and fourwing saltbush both present in control plots, but less frequently than planted plots

Planted species not detected on the site:

- Cattle saltbush (66% survival)
- Willow baccharis (41%)
- Saltgrass (97%)
- Ironwood (66%)
- Desert mallow (93%)
- Alkali sacaton (98%)





## Acoustic Recording Units

Programmed to turn on two hours before sunrise until three hours after sunrise and to turn on one hour before sunset until two hours after sunset

Records for 1 minute, then sleeps for 9 minutes

71,264 one-minute recordings

Recordings are run through BirdNet Sound ID program, which compares bird calls to species known to occur in the area, identifies possible matches and gives a confidence estimate





AudioMoth v.1.1.0 acoustic logger



## Avian & focal species richness

- 90% confidence rating or higher recorded at least once
- 87 avian species across all point types, including 18 focal species
- Active restoration (impact) resulted in a significantly different avian community composition than where vegetation passively regenerated (control)





## **Focal Bird Species**

- 18 focal species recorded across all point types
- 2 focal species not recorded, were detected in point count surveys (Song sparrow, Yellowbreasted chat)
- 10 focal species not detected at the site at all





## Rapid Pollinator Surveys

- Recorded 79 individuals belonging to 10 taxonomic categories
- Palmer's metalmark uses mesquite exclusively as larval hosts
- Mesquite provides abundant floral resources during May survey but blooms in the upper canopy which were not accessible for this type of survey, anecdotally lots and lots of bees observed in the mesquite canopy in May





## Wildlife Cameras - Species richness

- Species richness more than double in the restored mesquite forest as compared to naturally regenerating arrow weed shrub lands
- AI software unable to detect well camouflaged reptiles







### Mammals and reptiles









## Lessons for Restoration Design

- Diverse group of focal wildlife species present 12 years after restoration, including both primary and secondary cavity nesters
- Some species were likely present before restoration and still are very abundant
- Shrubs and herbs that had high survivorship in Year 3, are barely present in Year 12 indicates need for longer establishment period and more experimentation with species in plant palette
- Larger sites with more structural diversity, time for tall trees to get taller, open areas
- More floral and fruit diversity











## Thank you!

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