

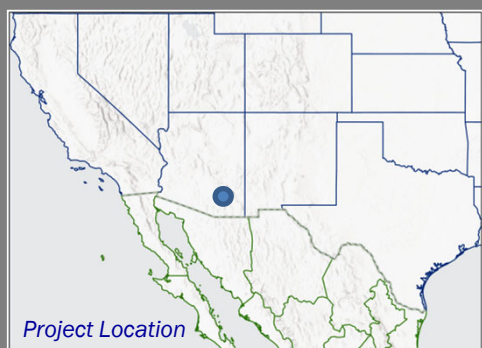
## RESTORATION

# Velvet Mesquite Thinning to Improve Riparian Forests along the San Pedro River

The Nature Conservancy  
Arizona

Mesquite bosques are characterized by stands of mature mesquite trees with low-stem density and a dense, closed canopy. These habitats are known to support a diversity of native plants in the understory and wildlife.

In an effort to restore a bosque structure to a velvet mesquite community, scientists with The Nature Conservancy implemented a tree-thinning experiment in 1998 at Bingham Cienega Natural Preserve (the Preserve), a 115-ha site on the San Pedro River owned by the Pima County Flood Control District. The site was revisited for monitoring in 2017, 19 years after the thinning occurred.



## KEY ISSUES ADDRESSED

Mesquite bosques were historically abundant along low-elevation (below 1200m) rivers in the southwestern U.S. and northwestern Mexico, but have been reduced to small remnant stands due to declining water tables and land clearing for agriculture. Virtually none remain in pristine condition, suggesting a need for both protection and restoration.

In some cases, abandoned farm fields have been rapidly recolonized by dense stands of small mesquites, all competing for water and sunlight. Research on other tree species has demonstrated that individual trees in dense stands will grow faster after thinning reduces resource competition. Thinning velvet mesquite in a riparian setting may help promote a bosque-like forest structure.

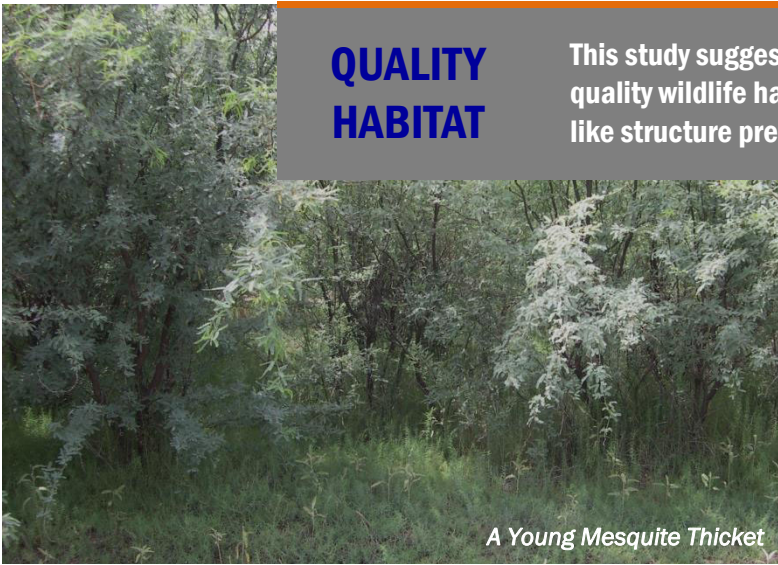
## PROJECT GOALS

- Determine whether thinning of a dense stand of young velvet mesquite can speed the development of mature mesquite bosque community characteristics



## QUALITY HABITAT

This study suggests that thinning can accelerate development of higher-quality wildlife habitat in young mesquite stands by establishing a bosque-like structure preferred by a diversity of birds and wildlife species.



*A Young Mesquite Thicket*

### PROJECT HIGHLIGHTS

**Experimental Design:** Study plots were established in 1998, with a 0.34 ha treatment plot and an adjacent 0.18 ha control. Initial density in the control plot was 2,683 trees/ha.

**Treatment and Monitoring:** The treatment plot was thinned in April 1998 to a spacing of 5-6 m between individuals (542 trees/ha). This value was informed by literature densities for mature mesquite forests. Trees were cut by hand, the cut stumps were treated with herbicide (Garlon), and the remaining trees were counted. Stem diameter and maximum height were measured in June 1998 and May 2000.

**19 Years Later:** Plots were revisited 19 years after treatment in December 2017. After relocating and marking boundaries, all mesquite trees were counted on each plot. Researchers measured diameters and counted stems for 20 randomly chosen mesquite trees on each plot and compared measurements between treatment and control sites.

### Collaborators

- The Nature Conservancy
- Pima County Flood Control District

### Funding Partners

- Arizona Water Protection Fund Grant No: 97-040 WPF

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Photos courtesy of Dale Turner/The Nature Conservancy

### LESSONS LEARNED

Thinning resulted in faster growth rates with 2.5cm diameter increase compared to 1.5cm increase in control plots over the first two years. The thinned plot also had lower tree density (1,363 trees/ha) compared to the control plot (1,975 trees/ha) in 2017.

Resprouted stems were conspicuous and significantly more abundant on the thinned plot than the control plot. Trees on the thinned plot had twice the average density of live stems at breast height than on the control plot, indicating resprouted trees developed a more shrub-like growth form.

It is possible that the benefits of thinning would have been stronger if the area had been retreated at least once to eliminate root sprouts from cut trees. Retreatment may have led to reduced stem density, increased growth rates, and lower basal area more typical of a mesquite bosque.

### NEXT STEPS

- These results may be useful for informing management decisions at Bingham Cienega, other sites with similar conditions along the San Pedro River, and elsewhere
- Implement a bird monitoring program in the experimental plots to test for differences in habitat use

### PROJECT RESOURCES

For more information on this project, contact Dale Turner: [dturner@tnc.org](mailto:dturner@tnc.org)

For additional project resources and case studies, visit the Collaborative Conservation and Adaptation Strategy Toolbox: [WWW.DESERTLCC.ORG/RESOURCE/CCAST](http://WWW.DESERTLCC.ORG/RESOURCE/CCAST)



*A Desert Spiny Lizard on a Mesquite Trunk*