Alternative restoration treatments to maximize growth and survival of Tamaulipan thornscrub species during seedling establishment

Jennifer L. Vela¹
Heather D. Alexander¹, Jonathan Moczygemba², and Alejandro Cabo-Fierro¹

¹University of Texas at Brownsville
²United States Fish and Wildlife Service
Thornscrub

- Drought-tolerant species
- Dense, tightly-woven canopy
- 4-6 m in height
- Slow growth rates
Tamaulipan Thornscrub

• Over 95% of Tamaulipan thornscrub has been cleared since 1920s.

• Continues at ~2% annually.

• Habitat for endangered and migratory species.

• May lead to species extinctions.

Federally Endangered Ocelot
(*Leopardus pardalis*)

- 30-35 individuals
- Cameron & Willacy Counties
Current Efforts

- Large-scale revegetation effort
- Laguna Atascosa National Wildlife Refuge (LANWR)
- Establish travel corridor between ocelot populations
Competition with Invasive Grasses
Browse Climate
Seedling Growth and Survival

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Objective

- To determine if the use of seedling shelter tubes, planting at different stand densities, and a pre-planting severe burn leads to increased survival, growth, and production of reproductive structures (flowers, fruits, & seeds).
Approach (Treatments)

- Pre-planting severe burn
- Seedling shelter tubes
- Planting density
  - High (0.5 m$^{-2}$)
  - Medium (1 m$^{-2}$)
  - Low (2 m$^{-2}$)
Experimental Design

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NT = no tube  
T = tube  
L = low density  
M = medium density  
H = high density  

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County Rd  

→ N
7 red flags = Texas ebony

7 orange flags = Spiny hackberry

7 yellow flags = Narrow-leaf elbowbush

48 plots x 21 seedlings in each = 1008 seedlings
Approach (Data Collection)

Beginning March 2014
• Four-month basis
  • Stem Height
  • Basal Diameter
  • Browse
  • %Cover by Invasive Grasses
  • Reproductive Structures
Hypothesis

- I hypothesize that the combined use of
  - seedling shelter tubes
  - high-density planting
  - high severity pre-planting burn

will lead to greater seedling survival, growth, and production of reproductive structures compared to seedlings grown without or with only a single treatment.
Competition with Invasive Grasses

Seedling Shelter Tubes

Browse Climate

Planting Density

Species Composition

Pre-planting Severe Burn

Seedling Growth and Survival

Species Composition

Planting Density

Climate

Browse

Seedling Shelter Tubes

Pre-planting Severe Burn

Seedling Growth and Survival
Preliminary Results (Height)
Preliminary Results (Basal Diameter)
Preliminary Results (Seedling Survival)

N = 907
Implications

- Biological invasions and land-use changes may lead to species extinctions.

- Ecological conditions suitable for improving the growth and survival of thornscrub seedlings.

- Aid land managers in adjusting current restoration practices.
• Olegario Vazquez Rana Faculty Fellowship Foundation

• A very special ‘thank you’ to the dedicated fieldwork volunteers. Without you, this would not have been possible:

  Monica Delgado, Soraya Delgado, Krysten Dick, Guadalupe Garcia III, Juan Garcia, Tom Gomez, Homero Pena, Ivonne Trujillo, Mackenzie Vela, Tyler Vela, Eric Verderber, Parker Watson, Aaron White, and the numerous volunteers with USFWS.