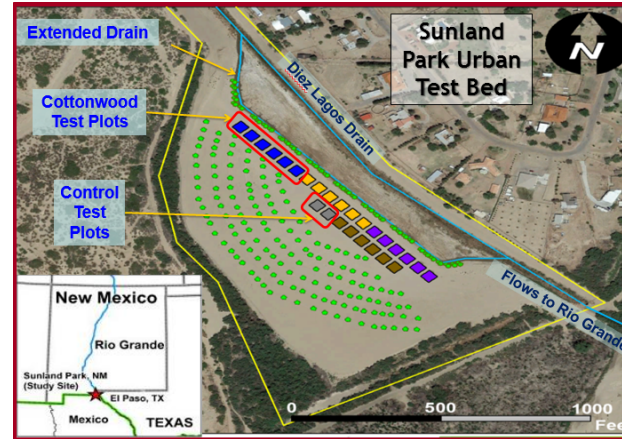


Research Questions

Can native riparian vegetation such as cottonwood (*Populus fremontii* spp. *Fremontii*) improve the quality of water in streams and drains?

Will the addition of clinoptilolite zeolite to native riparian soil improve filtering of contaminants from irrigation drainage water?

Location and Test-Bed Site Layout



Methodology - Continue



Objectives

- Grow native riparian cottonwood trees and study their ability to improve water quality along urban rivers and streams.
- Grow the cottonwood trees in two soil treatments: in-situ riparian sandy soil and in-situ riparian sandy soil amended with a layer of clinoptilolite zeolite. The zeolite layer is used to improve water quality filtration and retain moisture

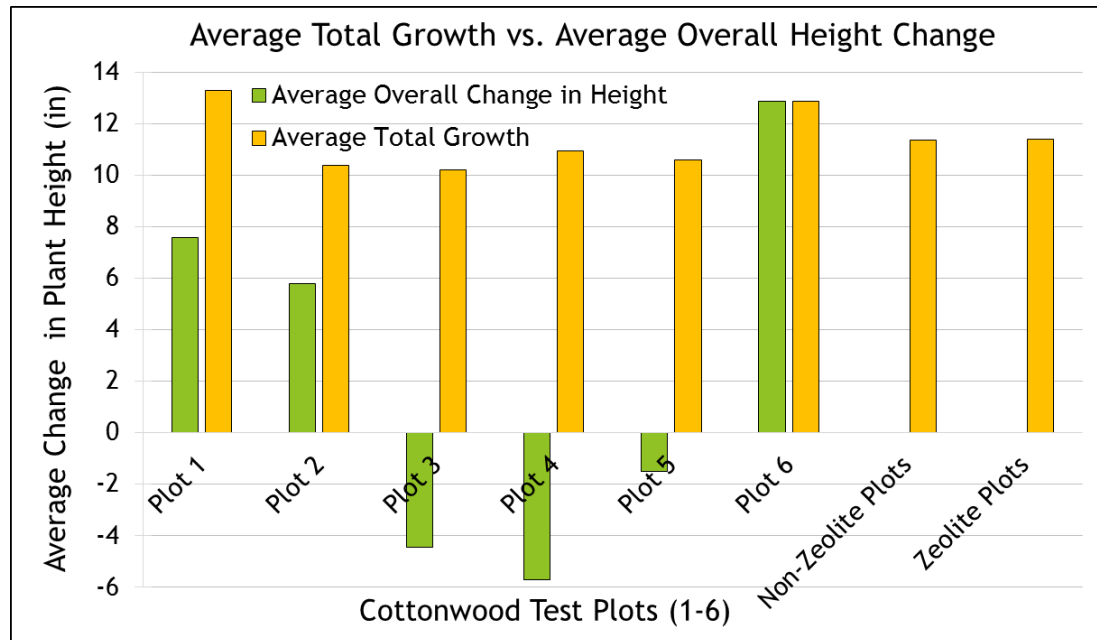
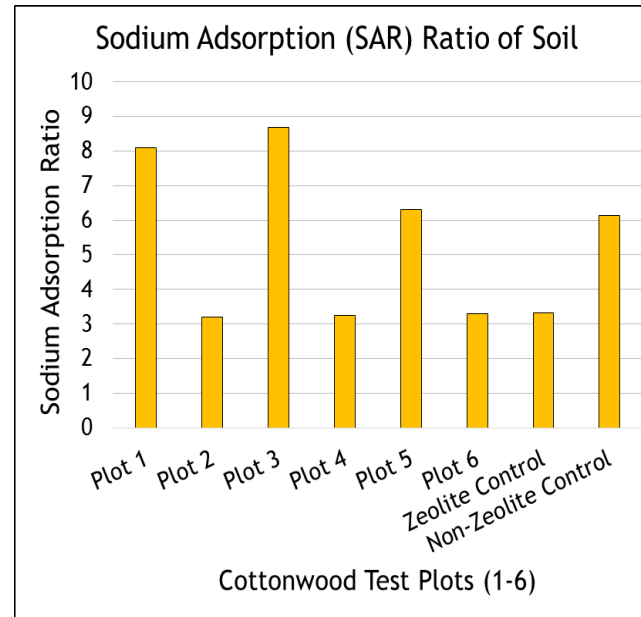
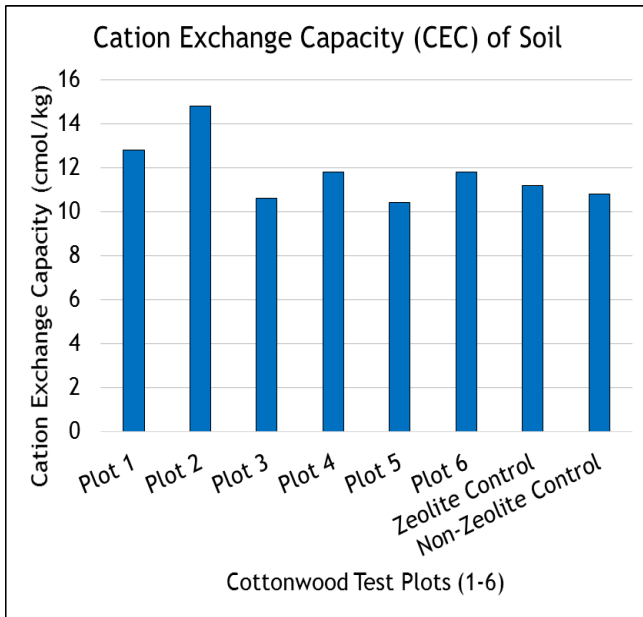
Methodology

- Collect soil samples to determine the soil type, sodium adsorption ratio, and other soil chemical properties in each test plot
- Install drainage pipes to collect leachate samples after irrigation
- Measure depth to groundwater
- Conduct health assessment of cottonwood trees in the experimental plots on a weekly basis to determine growth and survivability
- Measure water quality of irrigation and the leachate in the drainage pipes



Drainage Pipe Installation

Preliminary Results



Conclusion

The data collected served as baseline data for conditions of the soil and plants within the test plots prior to the irrigation test.

A sieve analysis of the soil type in each plot classified the soil as sand. This information was used to help design the drainage pipes for leachate collection and which test to perform on the soil to identify its hydraulic properties.

Data from plant assessments showed 100% survival rate of cottonwoods in all plots. Damage caused by beavers resulted in a negative average overall change in plant height for plots 3 through 5. Despite this, the average total growth of cottonwoods per plot were similar.

The cation exchange capacity (CEC) of soil saturated paste (soil: distilled water slurry of 1:1) ranged from 10.4 to 14.8 cmol/kg which is typical for sandy and silt loam soils. The sodium adsorption ratio (SAR) for the plots ranged from 3.19 to 8.68. The sodium adsorption ratio (SAR) for the plots were below 13. At a SAR of 13 or above plants can be negatively affected.

Future Research: Begin irrigation test and collect leachate samples. Perform further monitoring and analysis on the experimental plots including water quality, plant health, and nutrients will continue to be monitored as the project progresses.

Acknowledgments

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