

Background

Riparian zones in urban streams of the arid southwestern part of the United States are deprived of native trees, shrubs and grasses such as cottonwood, black and coyote willows, desert willow, grasses and among other plant species. These native plants which historically used to thrive on the banks of the streams, have struggled to survive due to canalization of the streams, decline of groundwater table, lack of surface water and precipitation, and decline of water quality suitable for plant growth. Riparian zones are well known for their beneficial role in the environment. They are important in buffering wind, controlling soil erosion, filtering sediments from flood runoff, and providing a healthy ecosystem for wildlife and improving soil microenvironment. This project investigates the use of solar irrigation pump to irrigate native plants grown in trenches near a drainage canal using the canal's brackish water.

Objectives

- Establish cottonwood, desert willow and black willow near Diez Lagos drainage canal at ReNUWIt Sunland Park Test-Bed where depth to groundwater is greater than 10 ft
- Plant the trees in a trapezoidal trenches about 5 ft deep
- Use low flow solar powered pump for irrigation

Approach

1. Three trenches were dug using an excavator (See Figure 1); the trenches were dug as shown in Figure 2
2. Plant cottonwood and black willow cuttings of about 1 to 2 inches diameter in the trenches (See Figure 3)
3. Plant desert willow cuttings the following year
4. Irrigate the trees thoroughly after planting once a week for 6 weeks so plants can establish roots (Figure 4)
5. Use solar pump to pump water from the Diez Lagos canal to the trenches (See Figure 5)
6. Rotate the irrigation cycle once a week from one trench to another.
7. Conduct survey of plant growth and survival.

The goal of the project is to assess the survivability of the trees using brackish water while conserving water



Figure 1. Excavator digging trenches at ReNUWIt Sunland Park Test-Bed.

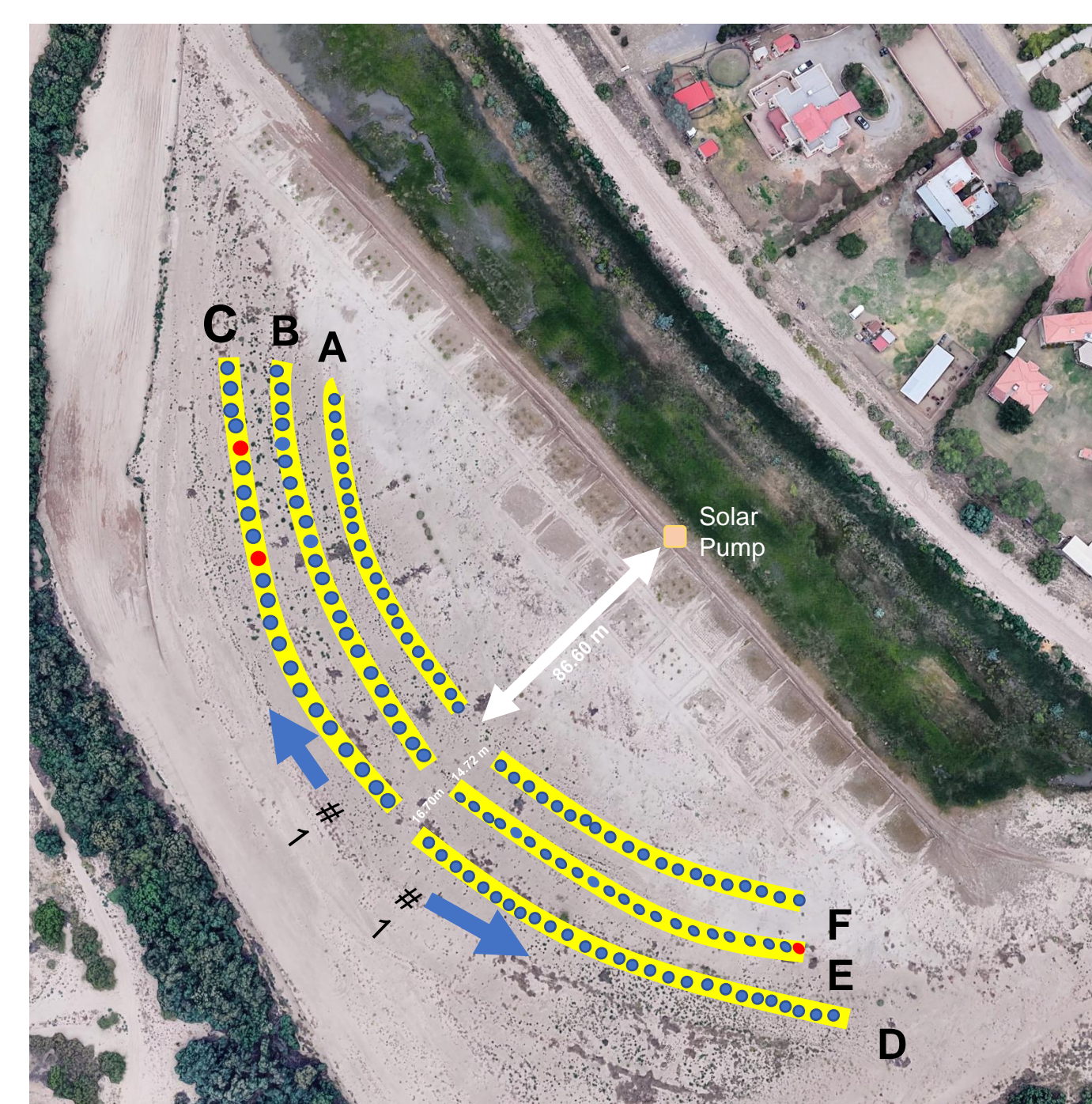


Figure 2. Layout of trenches at ReNUWIt Sunland Park Test-Bed.



Figure 3. Cottonwood cuttings planted in the trenches 5ft apart,



Figure 4. Irrigating trench with gas pump to establish roots.



Figure 5. Solar pump used to pump water from Diez Lagos canal.



Figure 6. Water pumped from Diez Lagos canal, into trench.

Conclusions

Preliminary results show that the cottonwoods planted in 2018 are surviving. Two out of 25 plantings of cottonwood died (8%). In 2019, additional cottonwood cuttings were planted. In addition, black willow cuttings were also planted in March of 2019. New cuttings are currently being observed for survival.

Next Steps

- Desert willow cuttings are planned to be planted next year after the frost.
- Survival of the plants will continue to be monitored
- The results of the study will be published in a technical report and discussed through professional conferences and other venues.

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