

Native Grassland Revegetation on a Utility Scale Solar Development in South Texas

Micayla E. Pearson



Introduction - Background

- Renewable energy has steadily grown over the last 20 years resulting in a 90% increase in renewables used from 2000-2020.
- Looking specifically at the United States, 20% of the total energy produced came from a renewable source, roughly 3% of that came from solar.
- Utility scale solar developments (USSD's) span more than 35,400 kilometers(km) (8,747,530 ac) of the total land area in the U.S.



Can we restore
native grassland on
solar
developments?

Standard Practices on New Solar Developments in Texas

- Site Preparation
 - Grade sites
 - Install pilings
 - Install racking system
 - Install solar panels
- Seed based on time of year
 - March/April
 - September/October
- Seed mix
 - Texas Department of Transportation (TXDOT) early 2000's seed spec
 - Bermuda grass
 - Green sprangletop
 - Sideoats grama
 - Buffalograss
 - Bundleflower
 - Hydro seeded and drill seeded

Site Background



- 1800ac mix solar – wind development
- Bee County, Texas
- Soil mix:
 - Goliad Sandy Loam, 1–3% slopes
 - Parnitas Sandy Clay Loam, 2–5% slopes
- Historic Vegetation
 - Mixed native brush surrounded by improved pasture
- 20ac project area divided into 80-0.25ac² research plots



Project Map

Seed Mixes

All seed mixes are planted at the same rate
The base seed mix (Low diversity) is present across all mixes

Control:

No seed

Low Diversity:

Slender grama

Hairy grama

Texas grama

Buffalograss

Mid Diversity:

Slender grama

Hairy grama

Texas grama

Buffalograss

Rough tridens

Hall's panicum

Hooded windmillgrass

Shortspike windmillgrass

Englemann daisy

Indian blanket

Prostrate bundleflower

High Diversity:

Slender grama

Hairy grama

Texas grama

Buffalograss

Rough tridens

Hall's panicum

Hooded windmillgrass

Shortspike windmillgrass

Sideoats grama

Sand dropseed

Arizona cottontop

Pink appasgrass

Englemann daisy

Indian blanket

Prostrate bundleflower

Awnless bush sunflower

Orange zexmenia

Purple prairie clover

Rio Grande clammyweed

Methods: Planting

Seeding Techniques

- Hydroseeding
 - Profile: 70/30 wood mulch/paper blend
 - Broadcast at 2000 lbs./ac
 - 40 plots
- Drill seeding
 - Truax Flex II native seed drill
 - 40 plots

Seeding Dates

- October 2021
 - Before installation of pilings and site development
- August 2022
 - Post site development

Methods: Data Collection

- Vegetation cover, density, and diversity estimates
- Randomized points in ArcGIS determined permanent locations of collection for repeated measures.
- Pin frame collections
 - Modified for specialized use on USSD
 - 4 pins enter from side of frame
 - 5cm, 30cm, 60cm, 100cm
 - 10 segments to represent 10 traditional pins





Some Results

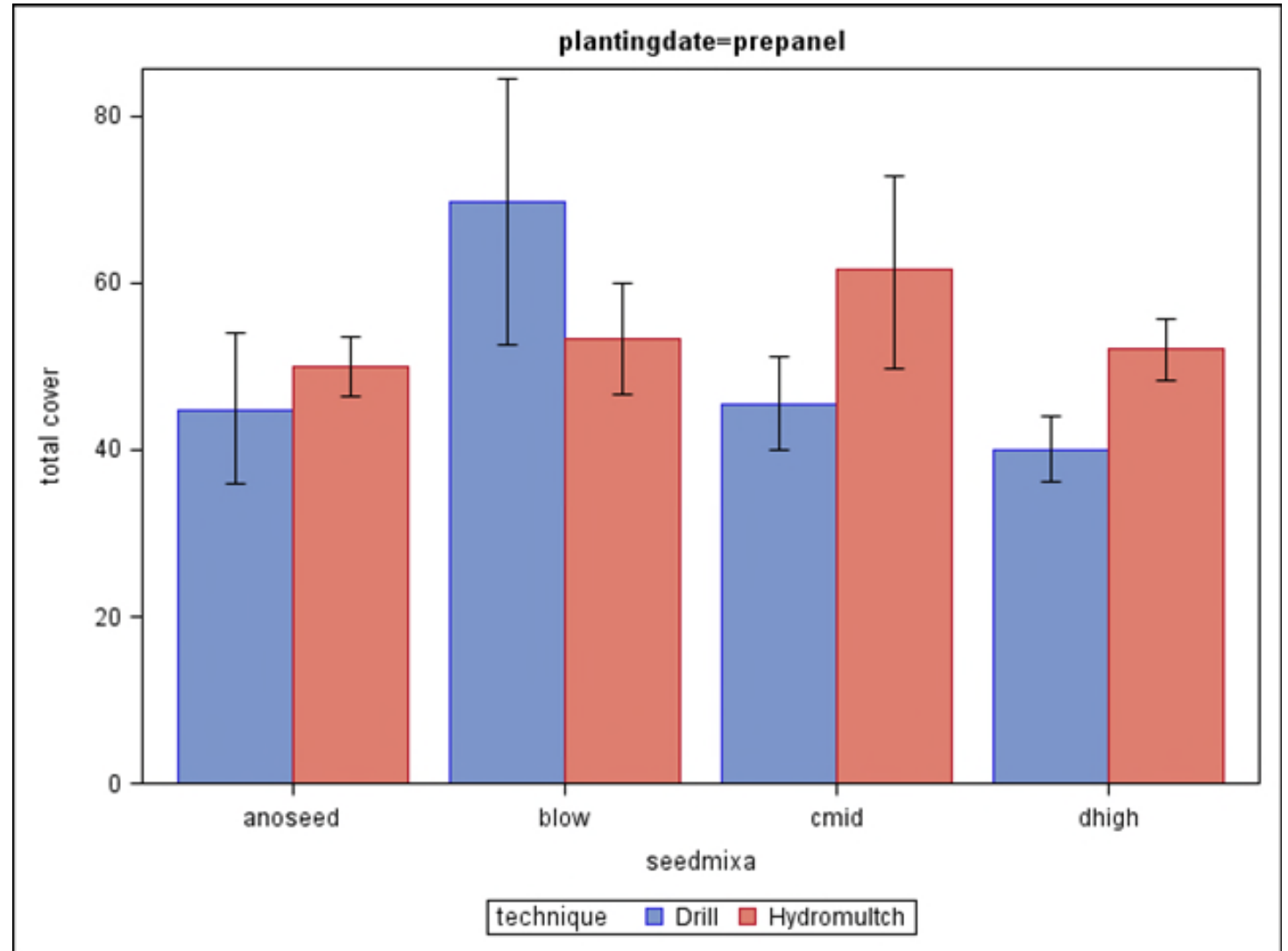
Total cover all height: 3-way interaction: Planting date | Technique | Seed mix: $P= 0.038$

Cover of seeded species at all heights: seed mix: $P= 0.009$

Species richness at all heights: no significance

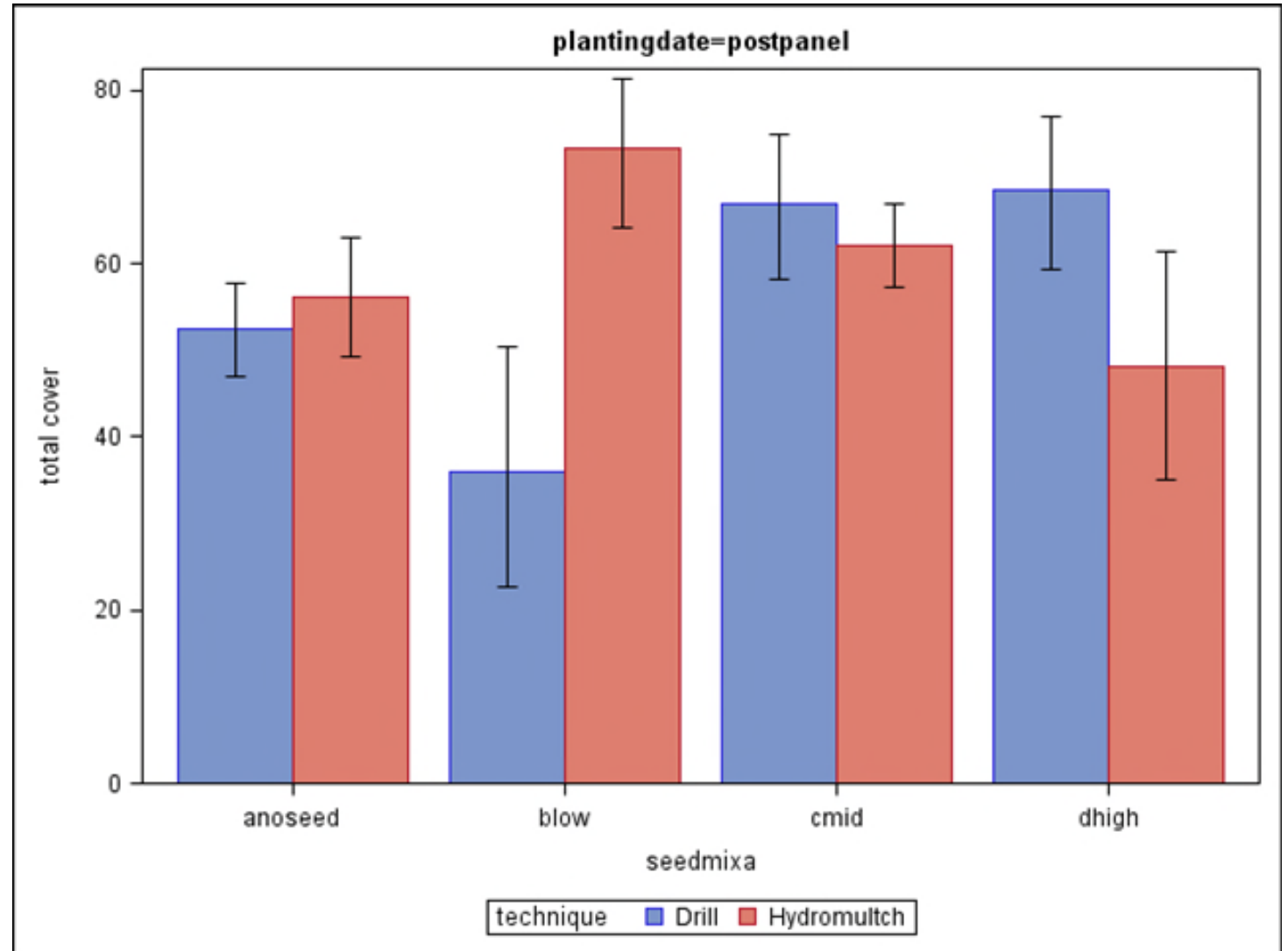
Planting Date – one

- P=0.46 planting 1 in Spring 2023
- October 2021



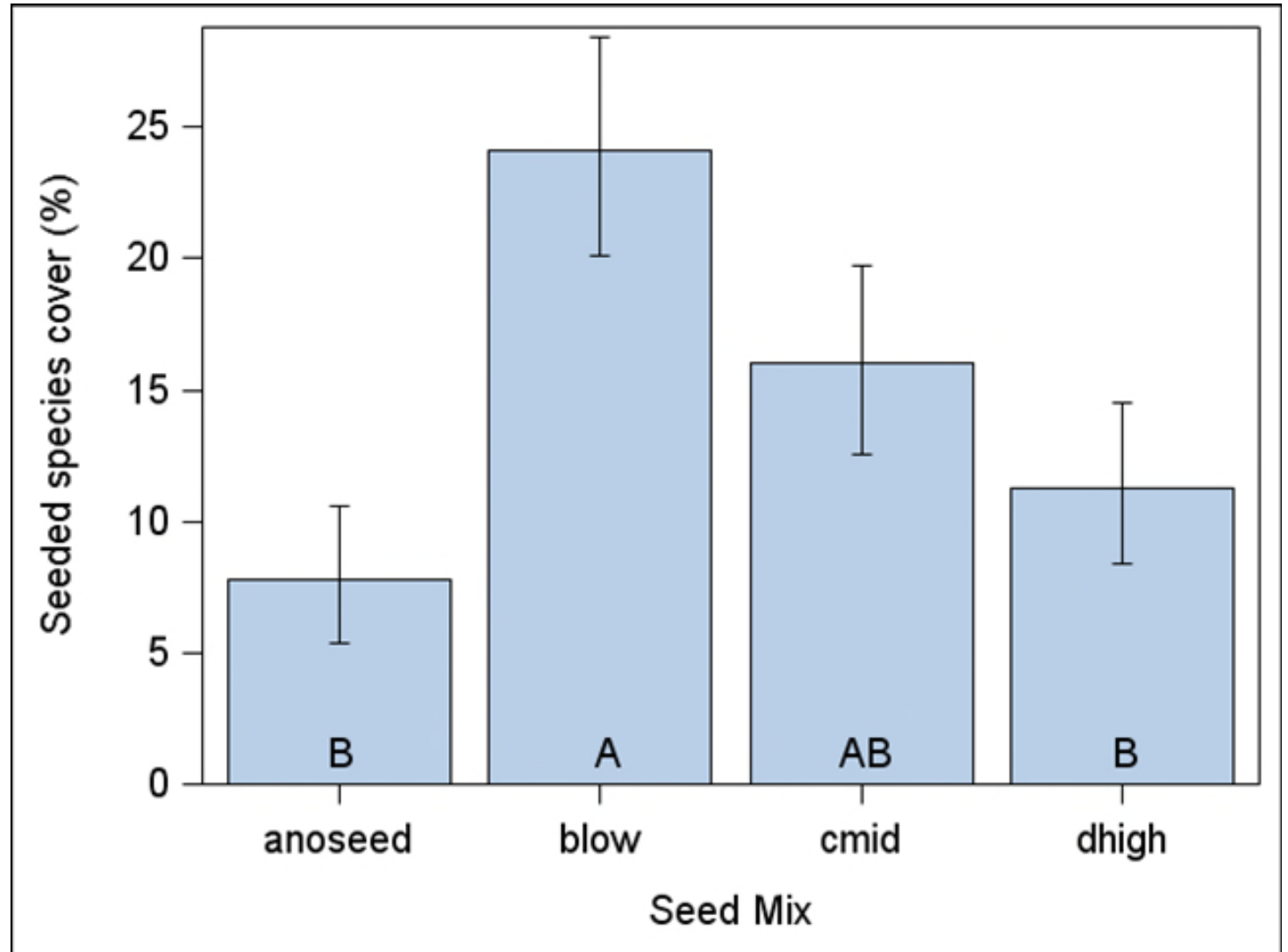
Planting Date – two

- P=0.092 planting 2 in Spring 2023
- August 2022



Cover by Seed Mix Spring 2023

- Low diversity seed mix produced the most coverage
- No difference between control and high diversity mix
- $P=0.009$





Discussion

- Still too early to make any decisions
- Early successional stage plants did well 6 months post planting





Acknowledgements



Questions??