SOIL MODIFICATION AS A RESTORATION TOOL TO REDUCE OLD WORLD BLUESTEMS

Trials, Tribulations, & Interesting Finds

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Old World bluestem grasses

(OWB, *Bothriochloa* spp., *Dichanthium* spp.)

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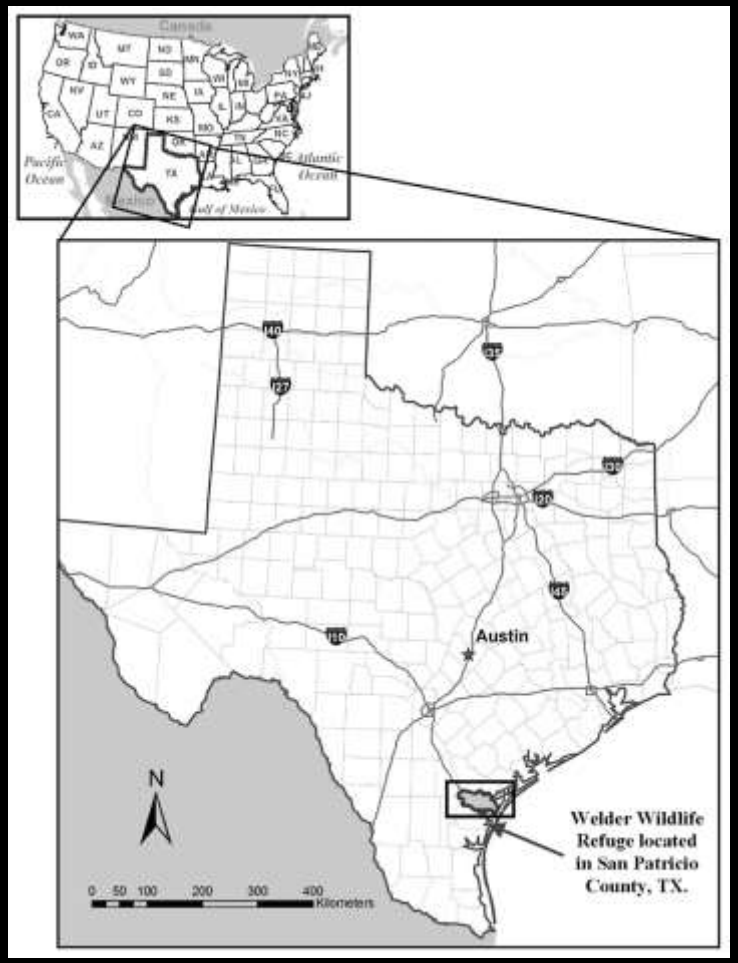
Soil Modification

- Changes in soil pH
- Nutrient availability
- Soil microbiota

Goals & Objectives

- Restore Native Vegetation
  - Reduce OWB dominance, cover, composition, and structure
- Restore Native Arthropod Communities
  - Increase abundance and diversity
- Quantify Efficacy for Landowners

Study Site



Kleberg bluestem
(*D. annulatum*)

Control and Reference Site

Initial Treatments: Disking

Initial Treatments: Soil treatments

- Disturbance
- pH decrease
- pH increase
- Carbon addition
- Mycorrhizae
- Disturbance+seed
- pH decrease+seed
- pH increase+seed
- Carbon addition+seed
- Mycorrhizae+seed

Initial Treatments: Soil treatments

- Disturbance

- pH decrease: Sulfur
  - 3.59 kg/plot
- pH increase: Lime
  - 69.84 kg/plot
- Carbon: Sucrose
  - 7.35 kg/plot
- Mycorrhizae: MycoGrow
  - 57.6 kg/plot

Initial Treatments: Seeding

Sampling Methods

- Plots
  - 6 x 9-m
- Quadrats
  - 1m^2
  - 2 each
- Sampled every month in the summer

Vegetation Sampling

- Canopy Cover
- Density
- Height
- Species
- Soil Chemisty

Arthropod Sampling

- Pitfall Traps
- DVAC
- Berlese Funnel
- Family, Morphospecies
- Functional Group

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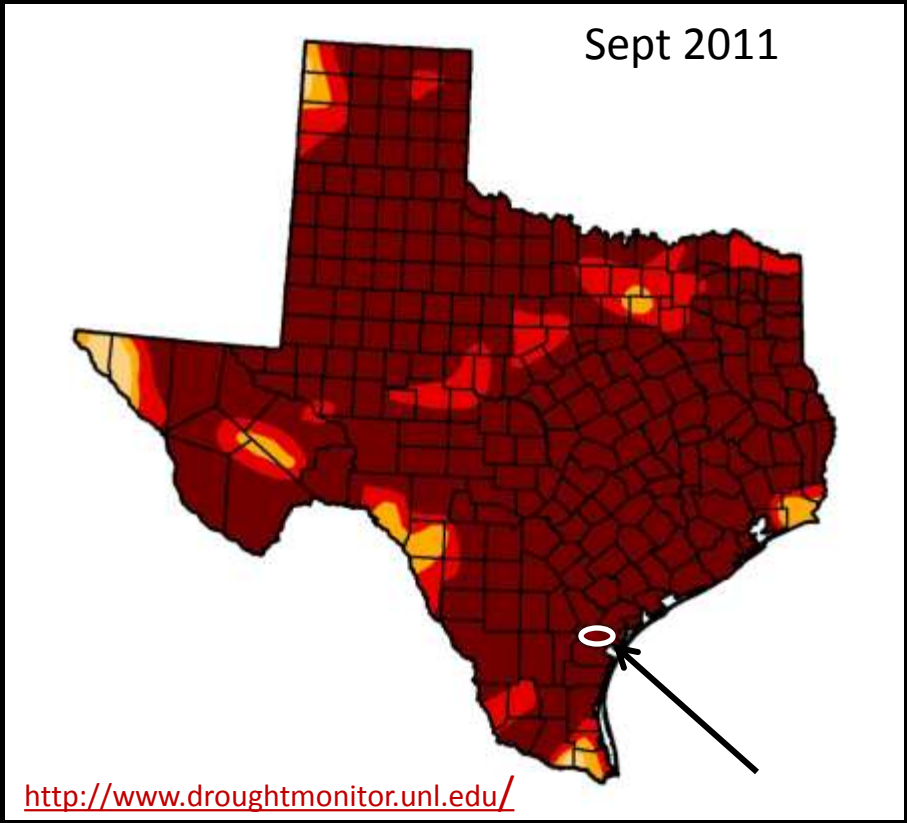
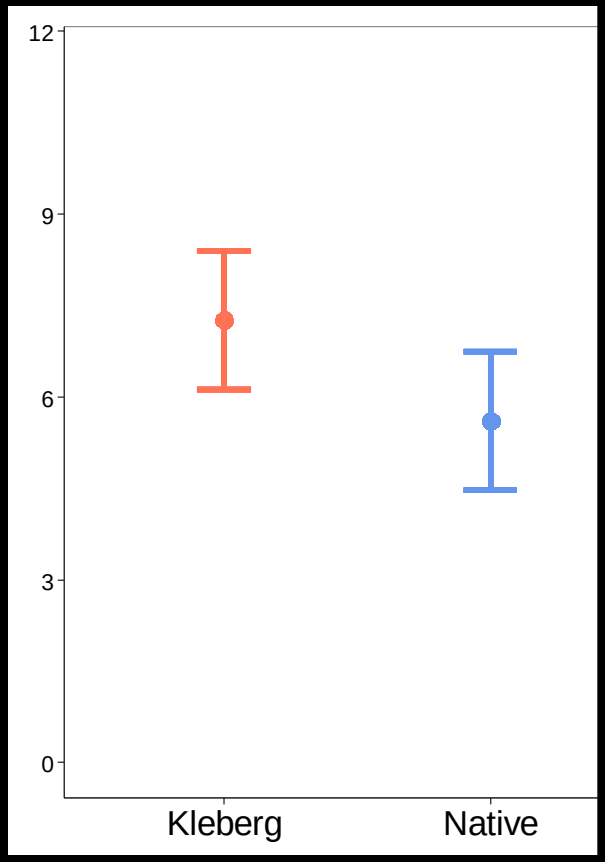
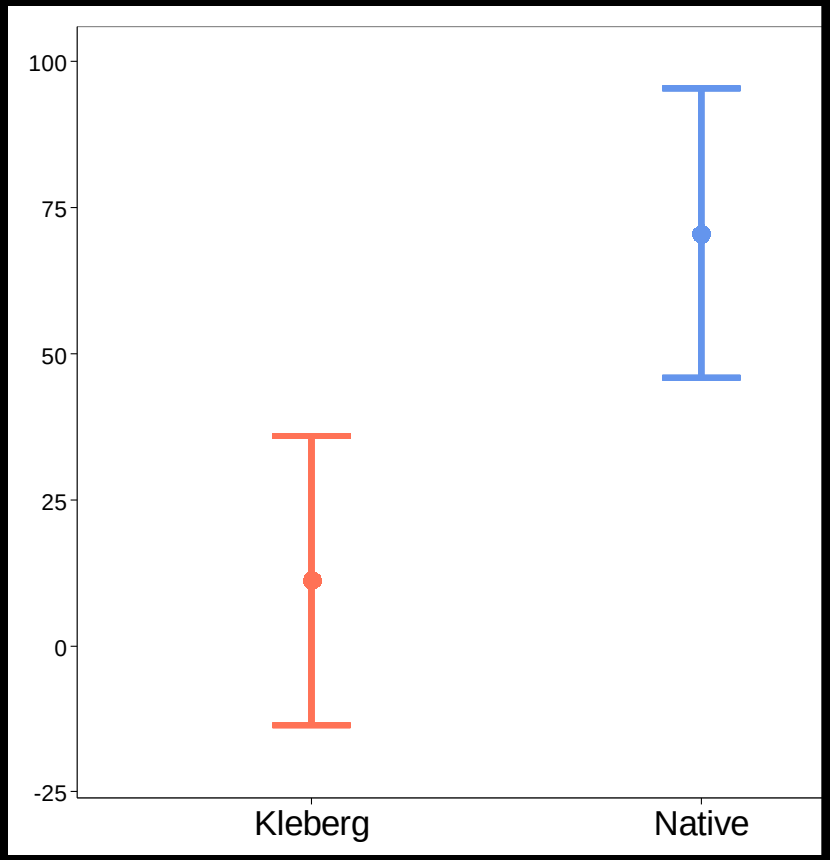
Results: Post-Treatment 2011



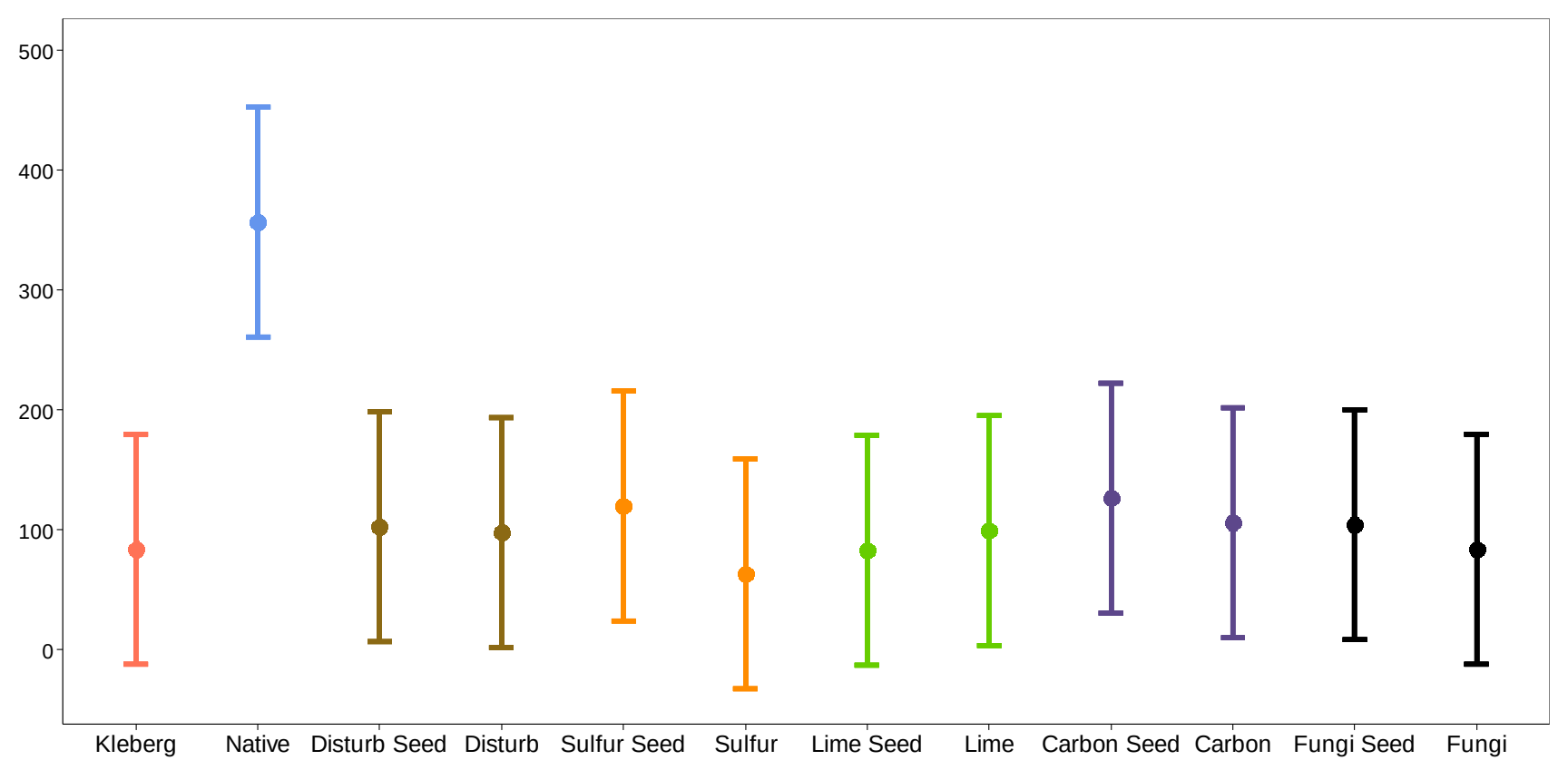
Soil pH



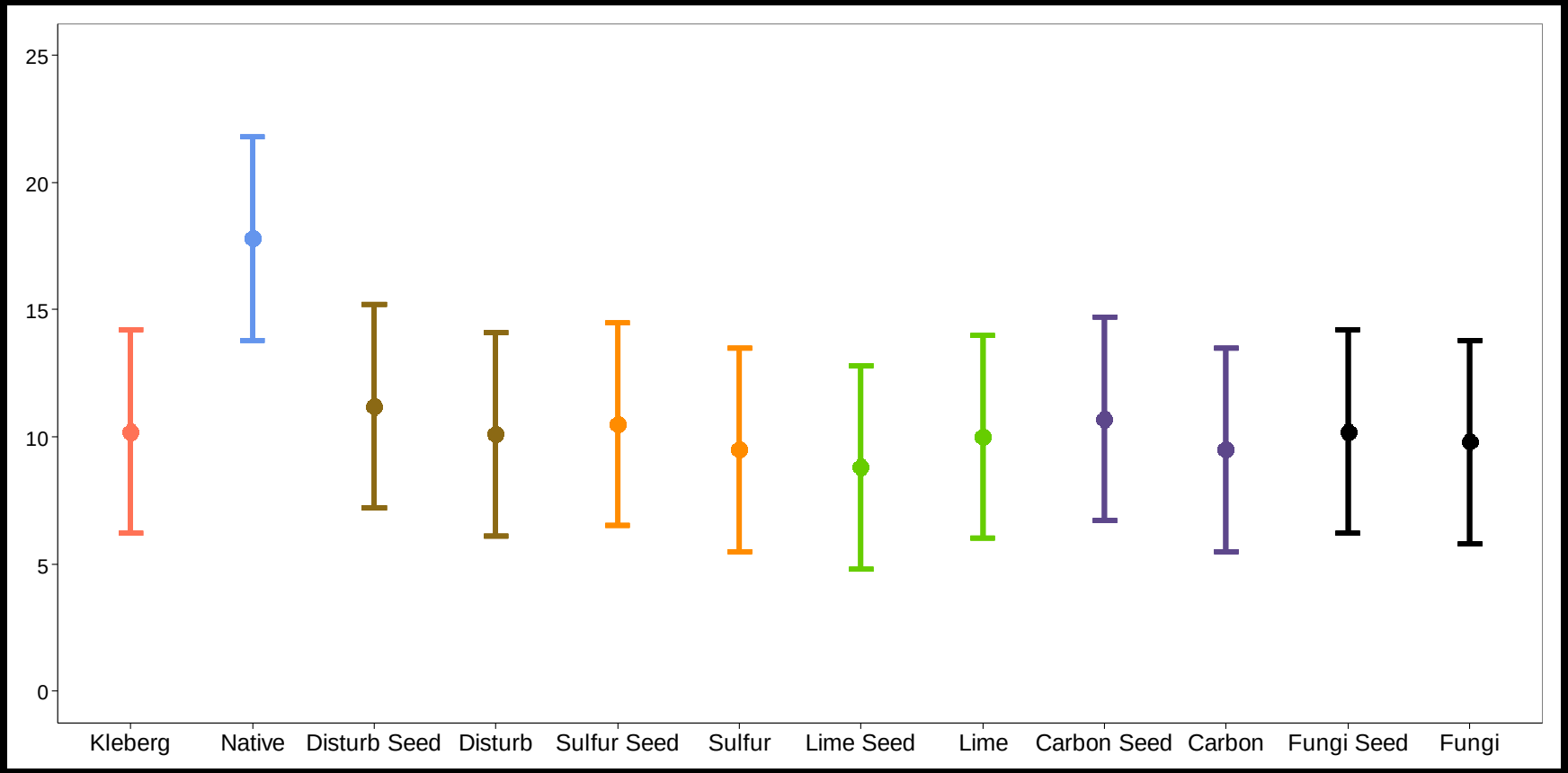
Available Nitrate



Arthropod Abundance



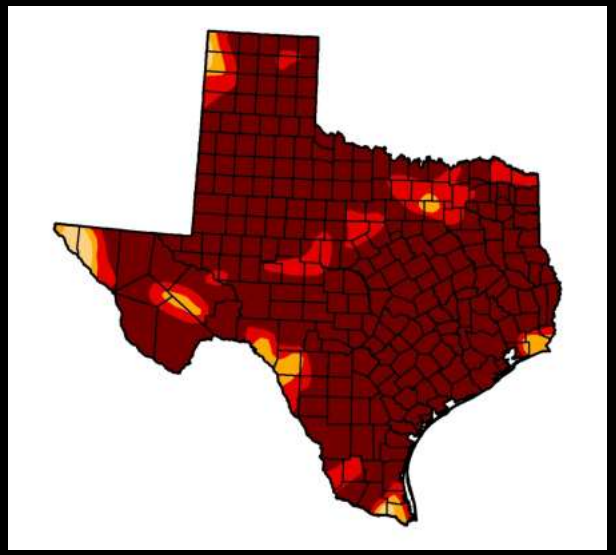
Arthropod Species Richness

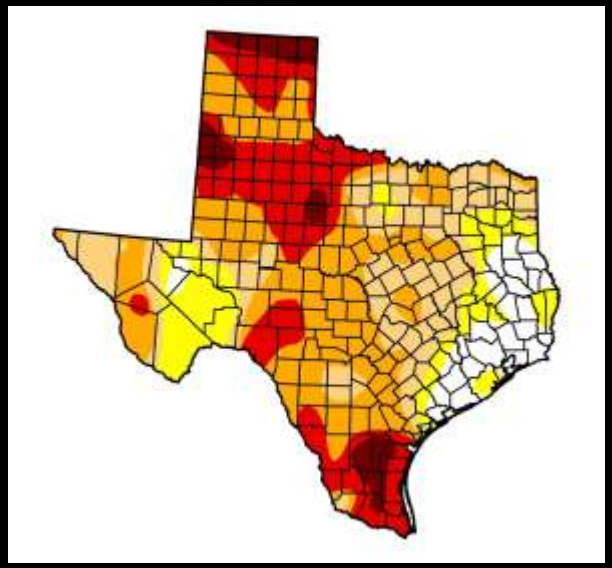


Results: Post-Treatment 2012

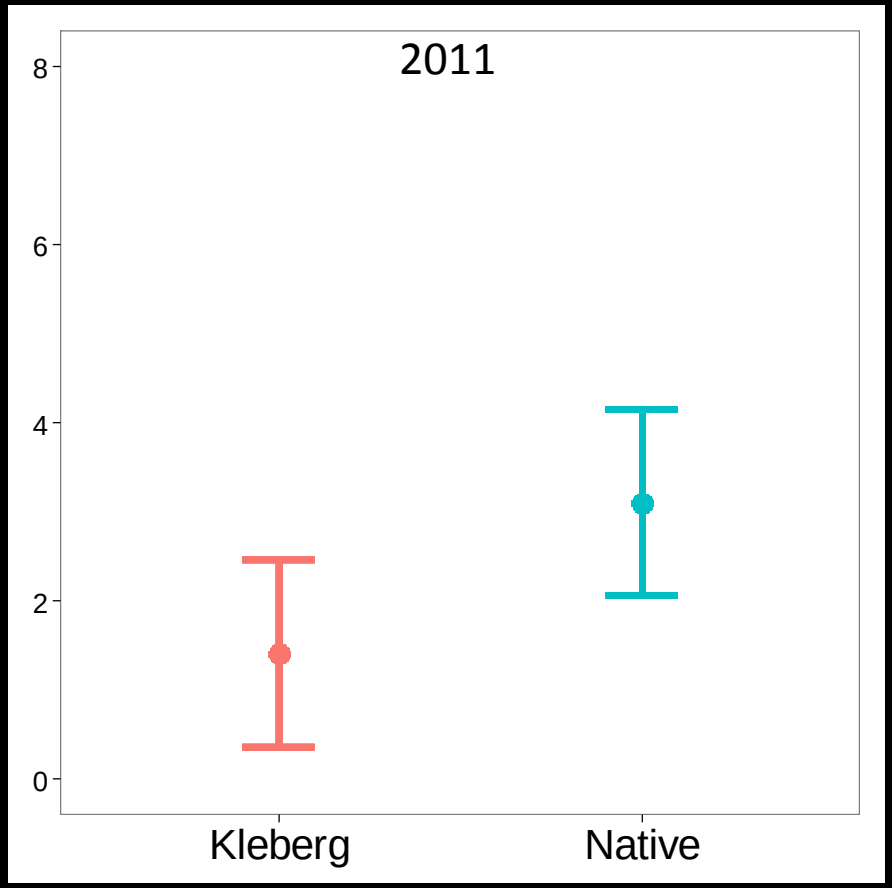
http:/

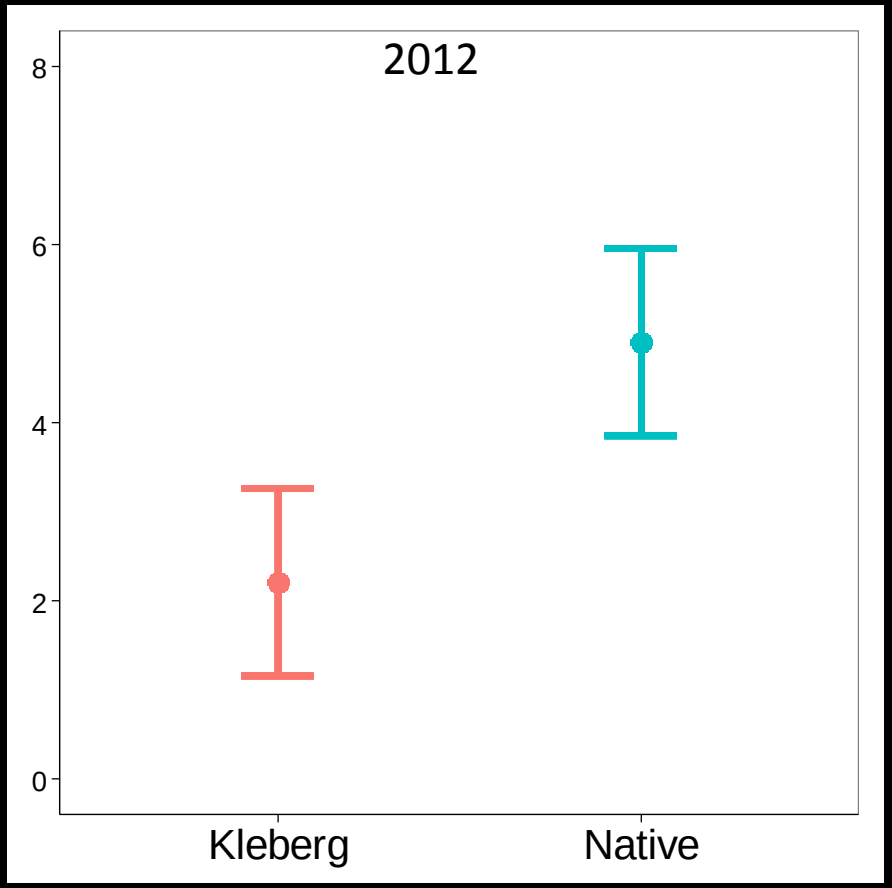
Invasion, Drought, & Interaction



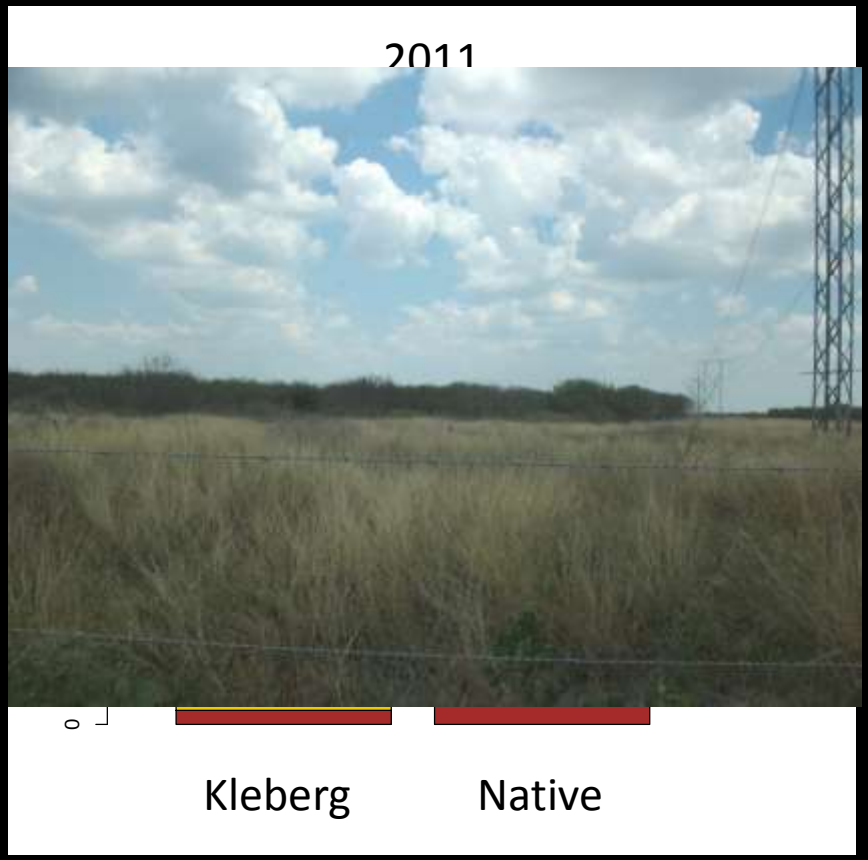


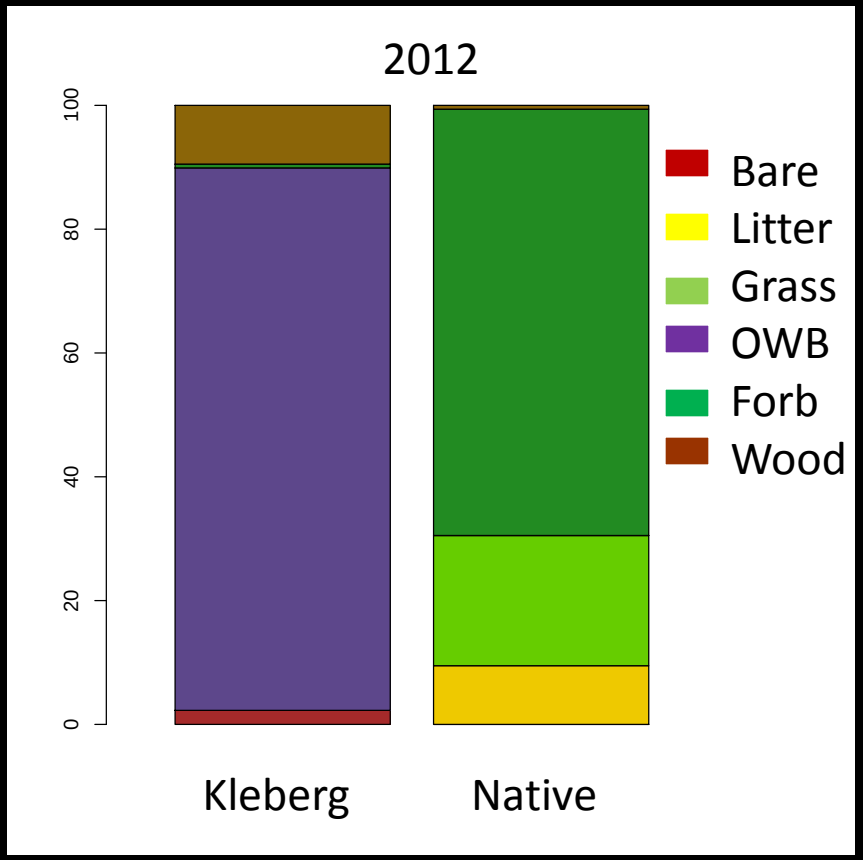
Plant Species Richness



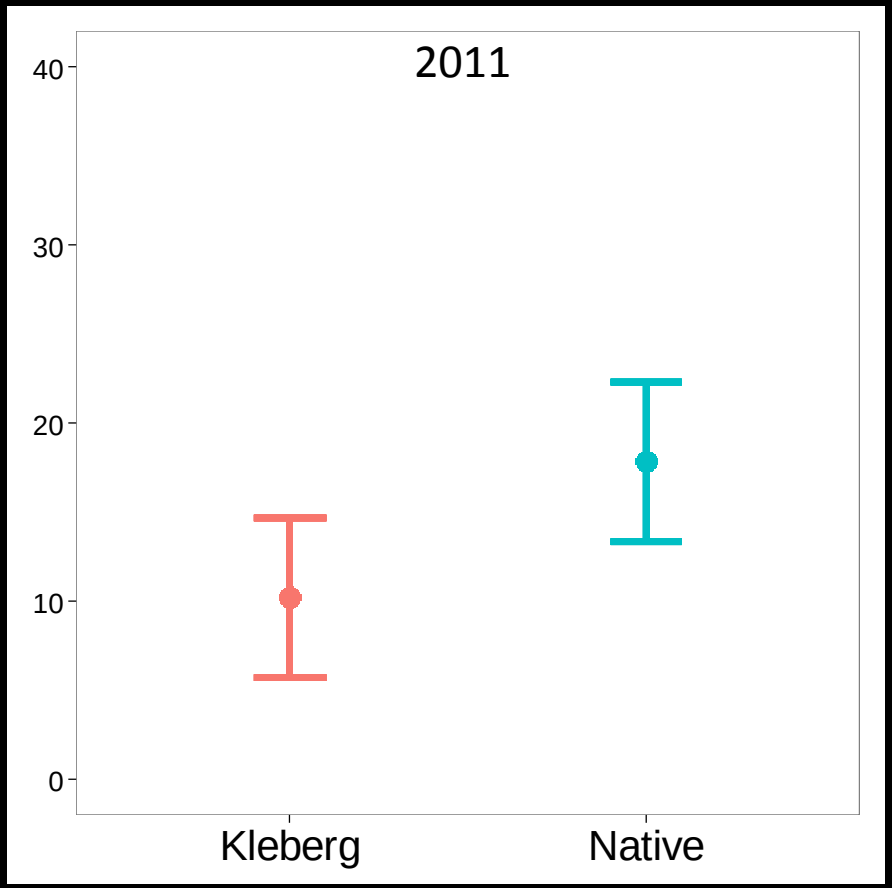


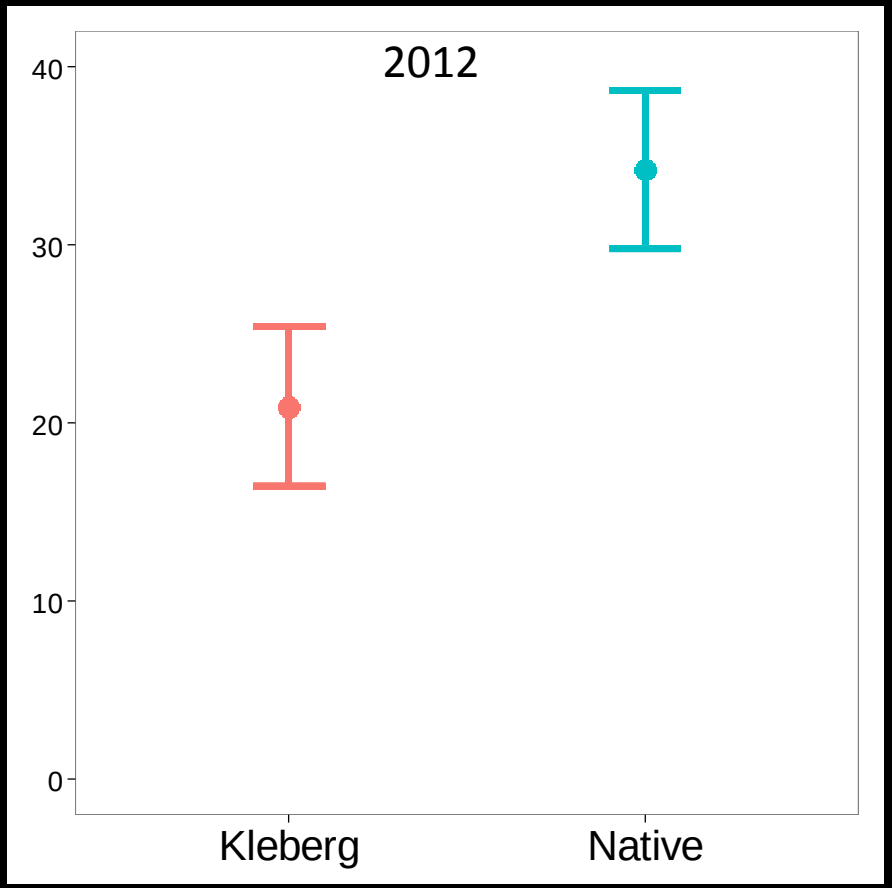
Plant Community Composition



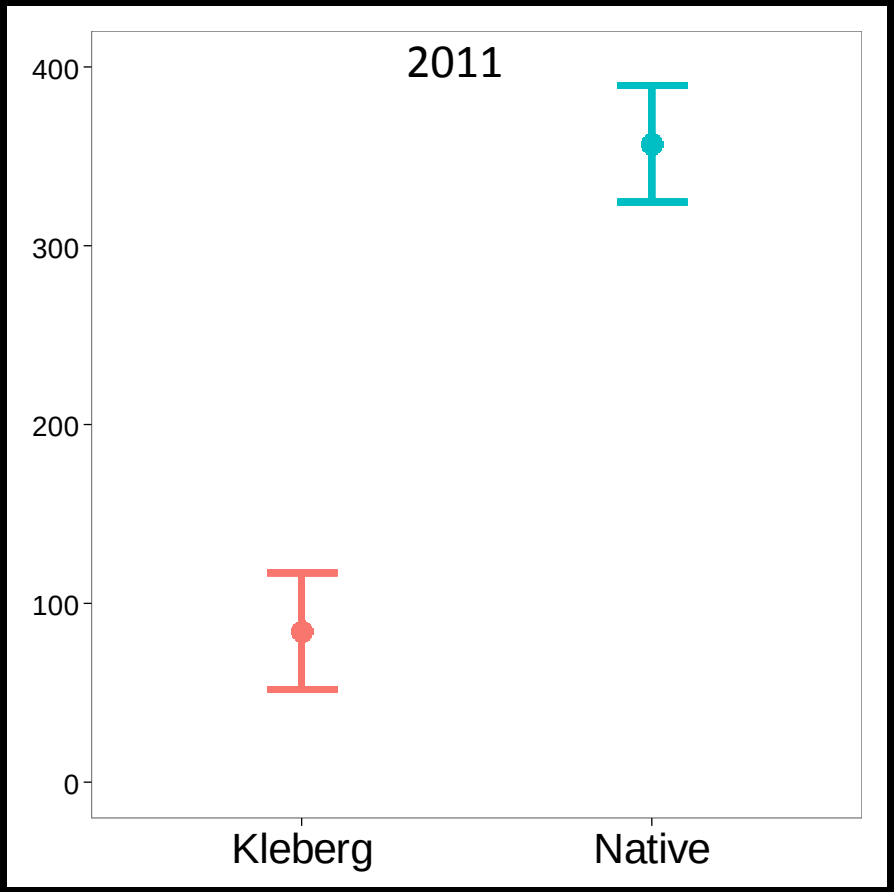


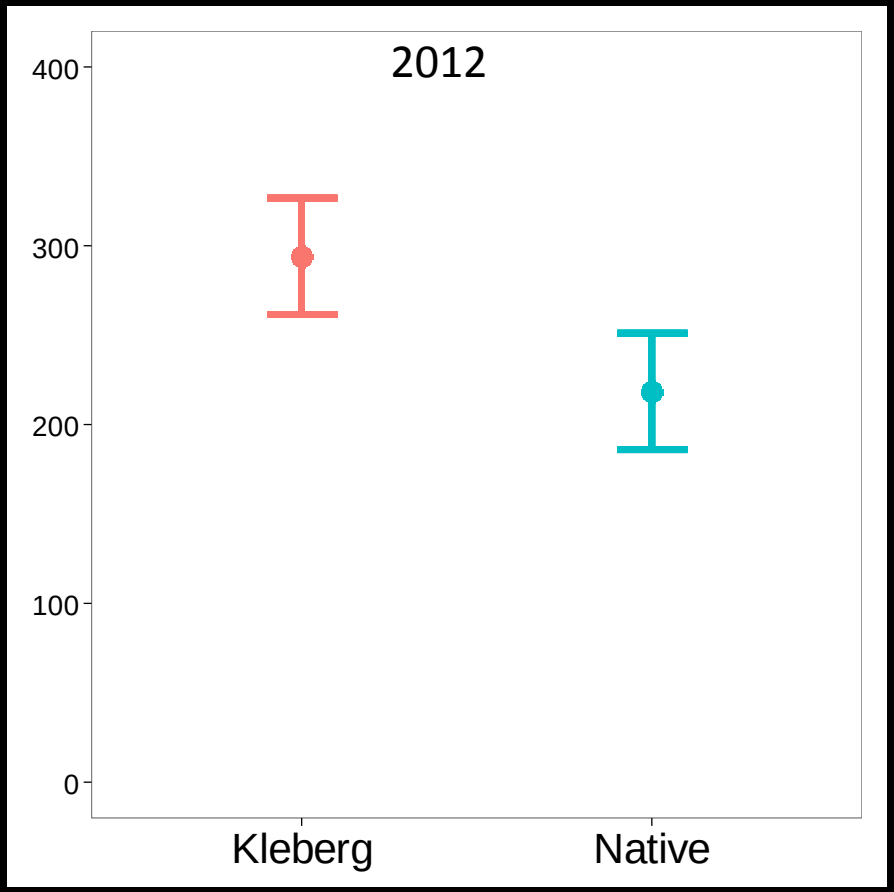
Arthropod Species Richness





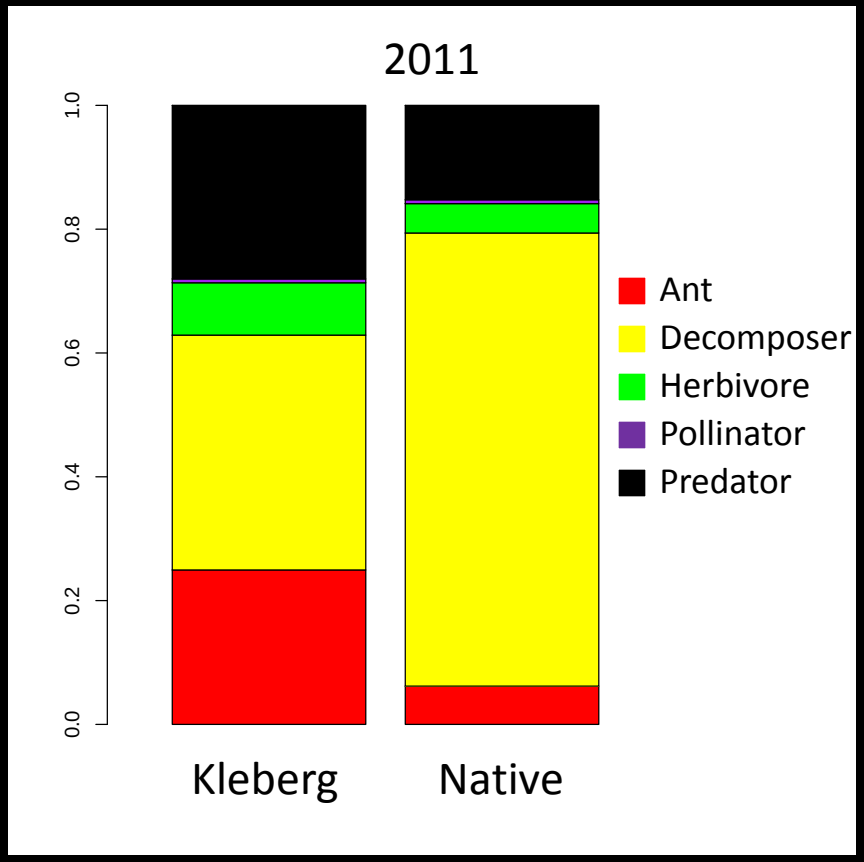
Arthropod Abundance

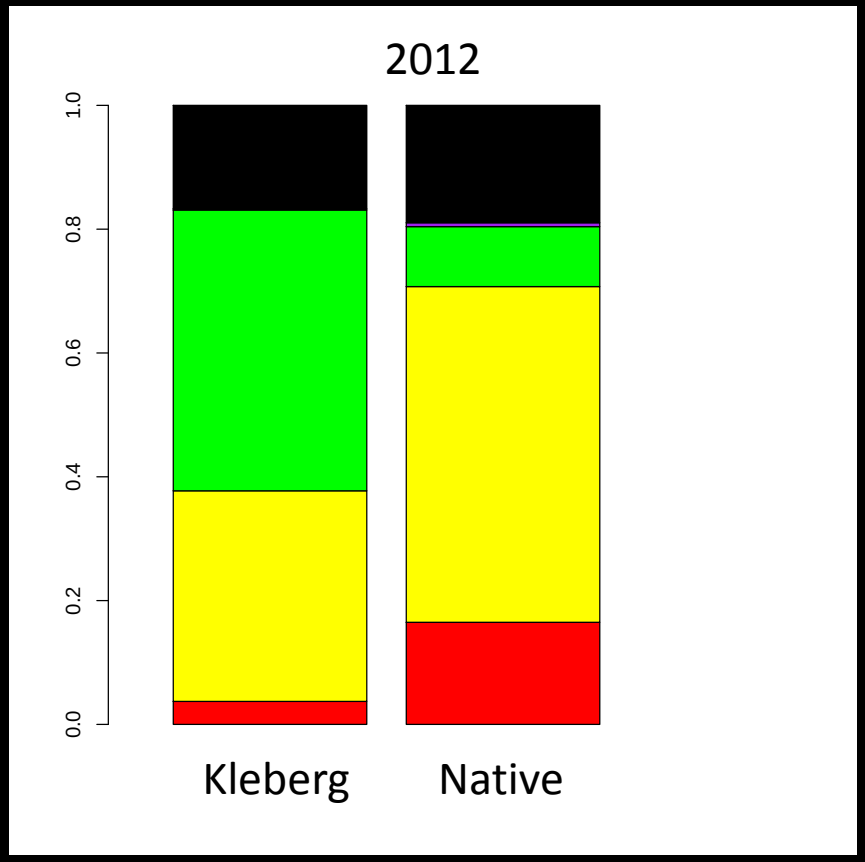




Arthropod Community Composition

Functional Groups





Arthropod Community Composition

- Kleberg 2011
  - *Blattella vaga* (21%)
  - *Solenopsis invicta* (17%)
  - *Armadillidium vulgare* (15%)



- Kleberg 2012
  - *Mochloribatula texana* (47%)
  - *Blatella vaga* (10%)
  - *Entomobyra* spp. (5%)



Arthropod Community Composition

- Native 2011
  - *Armadillidium vulgare* (70%)
  - *Entomobrya* spp. (8%)
  - *Solenopsis invicta* (5%)
- Native 2012
  - *Armadillidium vulgare* (30%)
  - *Solenopsis geminata* (8%)
  - *Entomobrya* spp. (7%)






Conclusions

- Impacts of plant invasion on communities are influenced by drought events
- Arthropod composition reflect changes in plant communities for higher trophic levels
- Relationships between plant invasion and climatic variation can give insight to management

Future Work