Can Functional Traits Improve Grassland Restoration?

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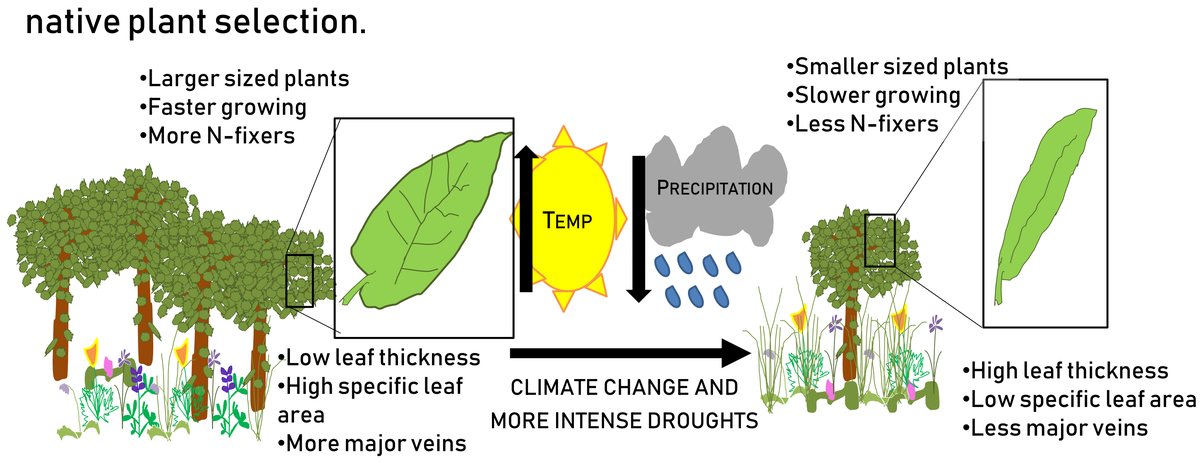
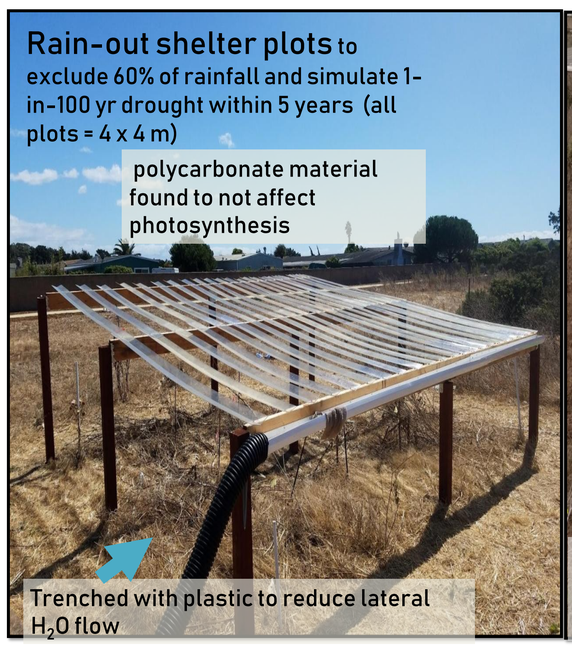
Background

- There is increasing investment in restoration.
- Restoration success is unpredictable due to a focus on recreating reference communities.
- Understanding species traits and the phylogenetic distance between community members could improve restoration success in a changing climate and across heterogeneous sites, and inform native plant selection.



Study Area and Methods

- This study was conducted at Younger Lagoon Reserve, a UC Natural Reserve in Santa Cruz that focuses on native plantings and invasive species control.

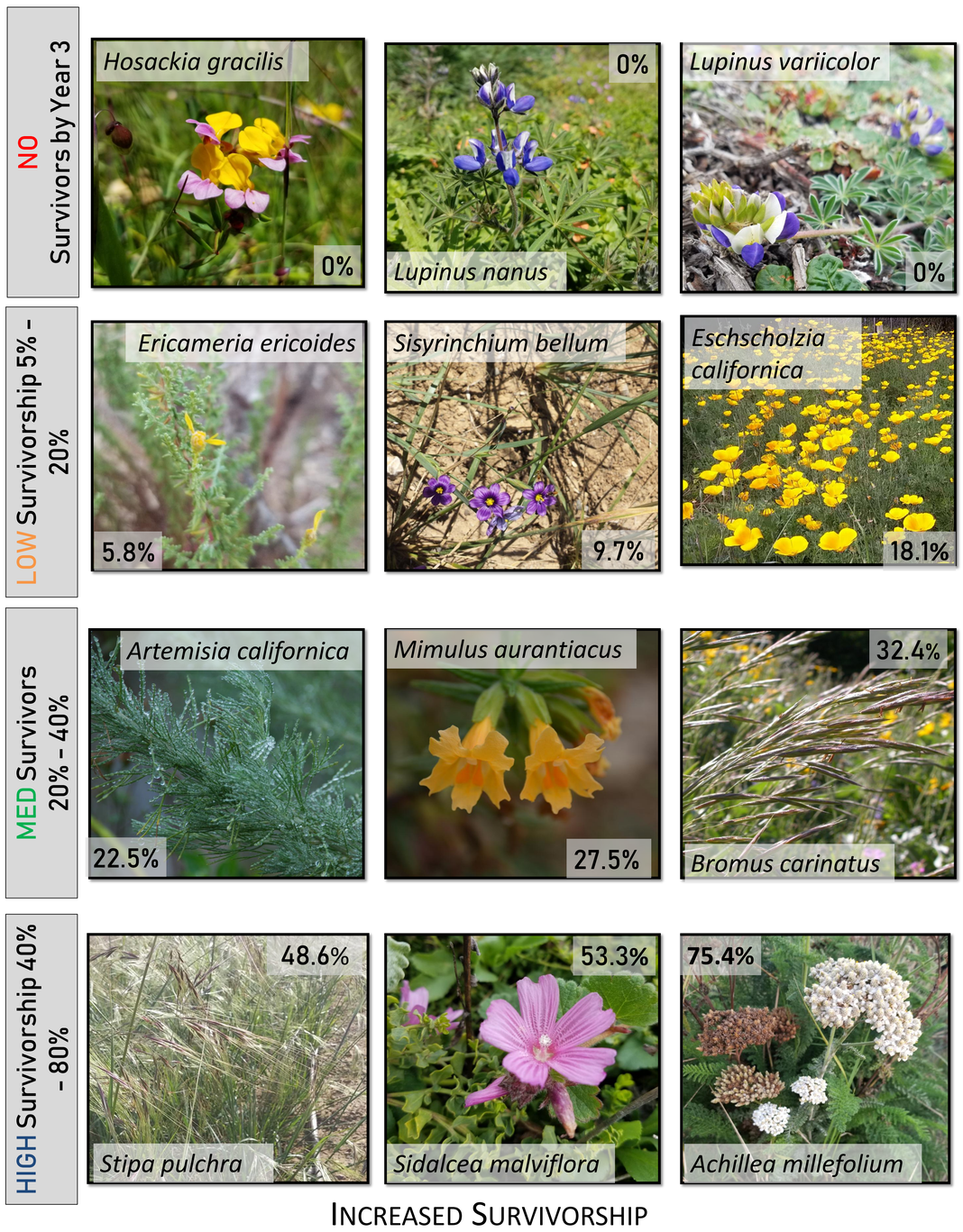


Dominant Invasive Species

- *Avena fatua* (Wild Oats)
- *Bromus diandrus* (Rip-Gut Brome)
- *Bromus hordeaceus* (Soft-Chess Brome)
- *Carduus pycnocephalus* (Italian Thistle)
- *Geranium dissectum* (Cut-leaf Geranium)
- *Medicago polymorpha* (Bur clover)
- *Raphanus sativus* (Wild Radish)

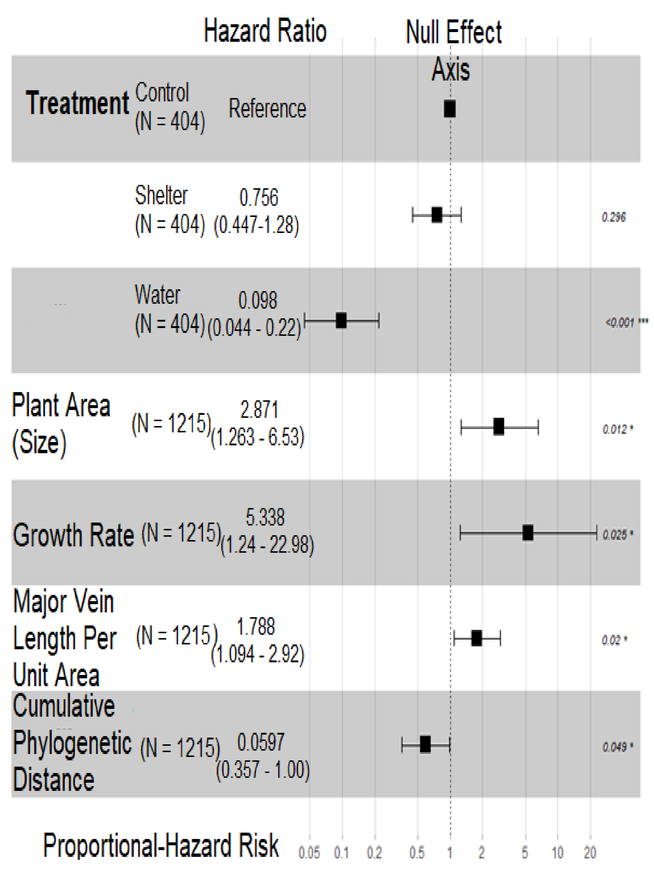
- Natives planted Jan 2016
- Annual survival surveys are ongoing
- Leaf traits related to drought were sampled to determine if they can be used to understand planting success.
- Community composition was quantified in each plot.
- Native plants were locally sourced.

Results



INCREASED SURVIVORSHIP WITHIN OVERALL SURVIVORSHIP

- Seedlings in the water treatment had lower risk of death.
- Drought and water treatments caused community composition to be drastically different between treatments.
- Seedlings on drought plots were smaller and slower growing with lower specific leaf and major length vein per leaf area (more resource conservative).
- Planted species that were more evolutionarily distant from extant invasive species community had lower death risk.
- Nine of 12 Native species showed no significant differences in survival with drought.



Take-Aways and Management Implications

- Early watering as a management tool can reduce overall risk of death for the community of planted natives (especially the *E. californica* and *S. pulchra*).
- However, early water does not improve survivorship for most native species
- *S. malviflora* is an ideal species for planting while planning for climate change
- Conservative traits are plants with slower growth rates, lower maximum size, low specific leaf area and low major leaf venation per leaf area
- Selecting species with conservative leaf traits can improve restoration success
- Leaf thickness did not explain survival

ACKNOWLEDGEMENTS

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