

Livestock Grazing and Landscape Diversity in Vernal Pools

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Overview and Approach

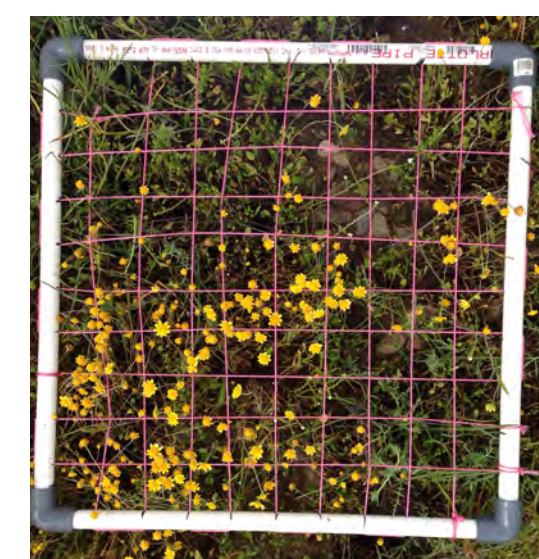
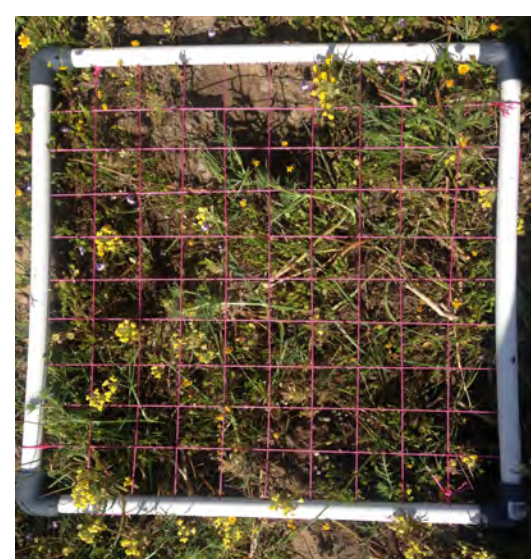
Livestock grazing is increasingly being used as a management tool to control exotic species in California's vernal pool ecosystems. It is important to understand the long-term impacts of livestock grazing on patterns of plant diversity and composition. In spring 2015 I conducted an experimental comparison of plant diversity between historically grazed and ungrazed vernal pools.

Methods

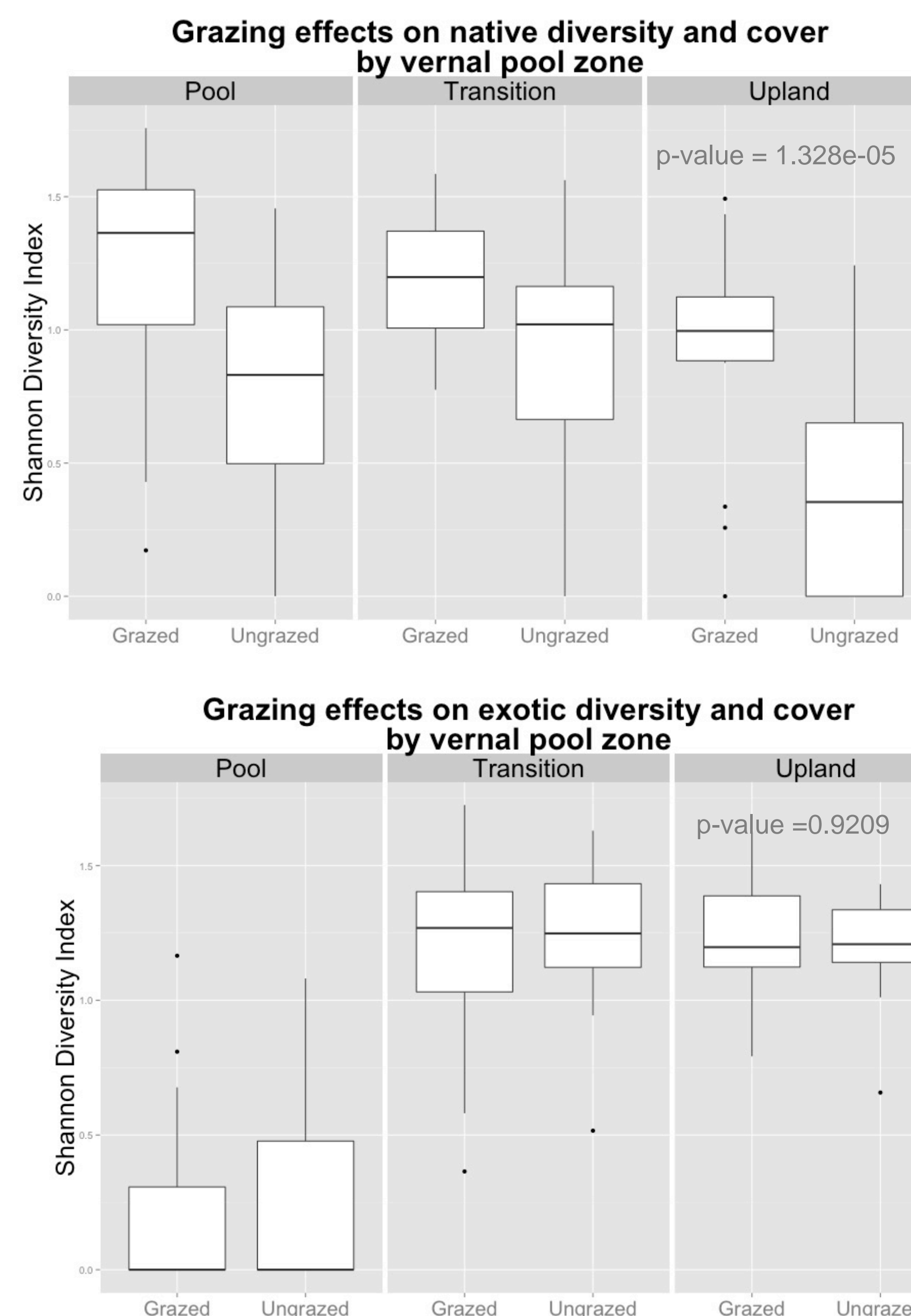
Study Site: Rancho Seco is a 1132-acre site in SE Sacramento County owned by the Sacramento Municipal Utility District (SMUD) with over 50 acres of protected vernal pools across several soil types and a wide range of pool characteristics. A fence divides vernal pools that have been grazed continuously for over 45 years and pools that have been fenced off from livestock since the 1970s.

Comparing Plant Communities: I paired 15 grazed and 15 ungrazed pools based on soil type, water depth, depth to claypan, and size. I established nine vegetation quadrats per pool, spanning the pool bottom, edges, and upland (30 pools, 270 quadrats total). During peak flowering season, I

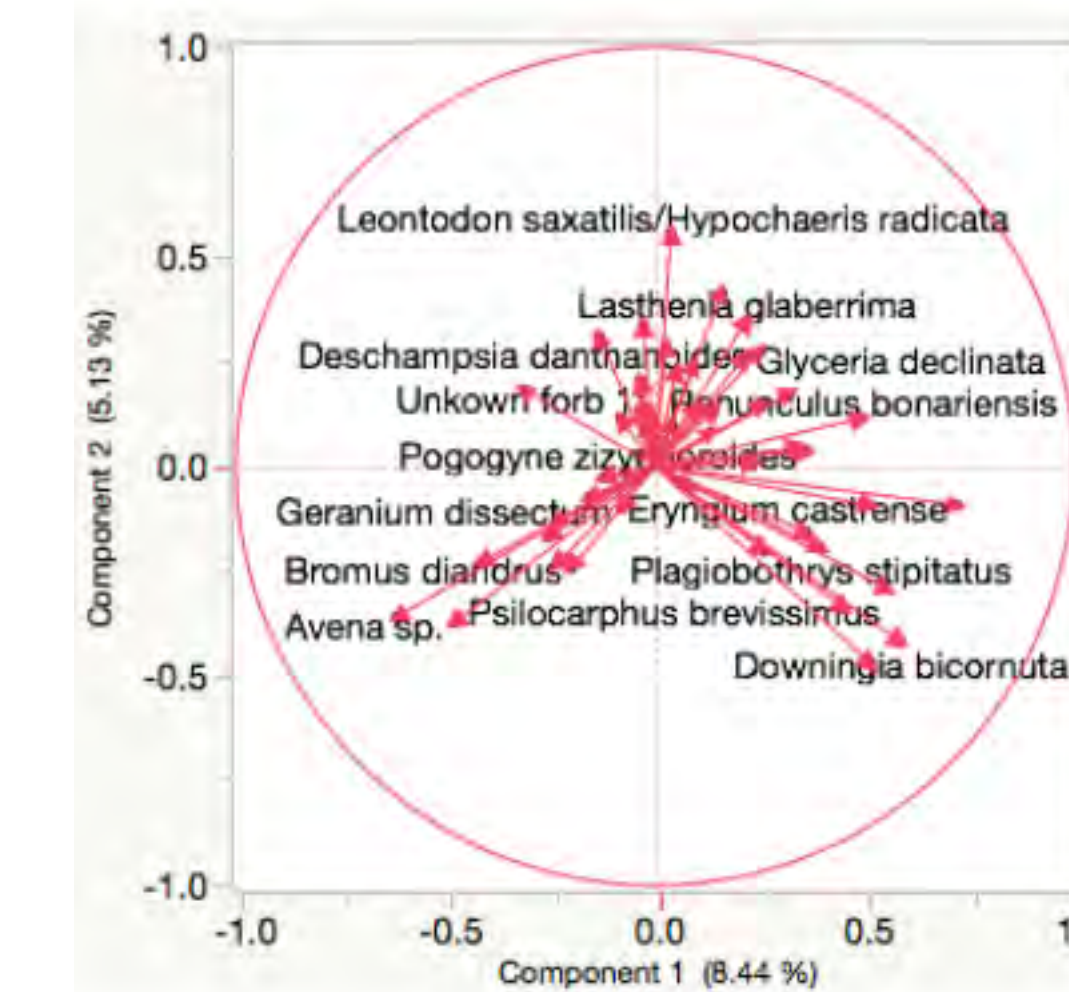
sampled these quadrats for grasses and forbs, and calculated richness, cover and abundance, for both individual species and for native vs. exotic species.



Preliminary Results



Results Summary:

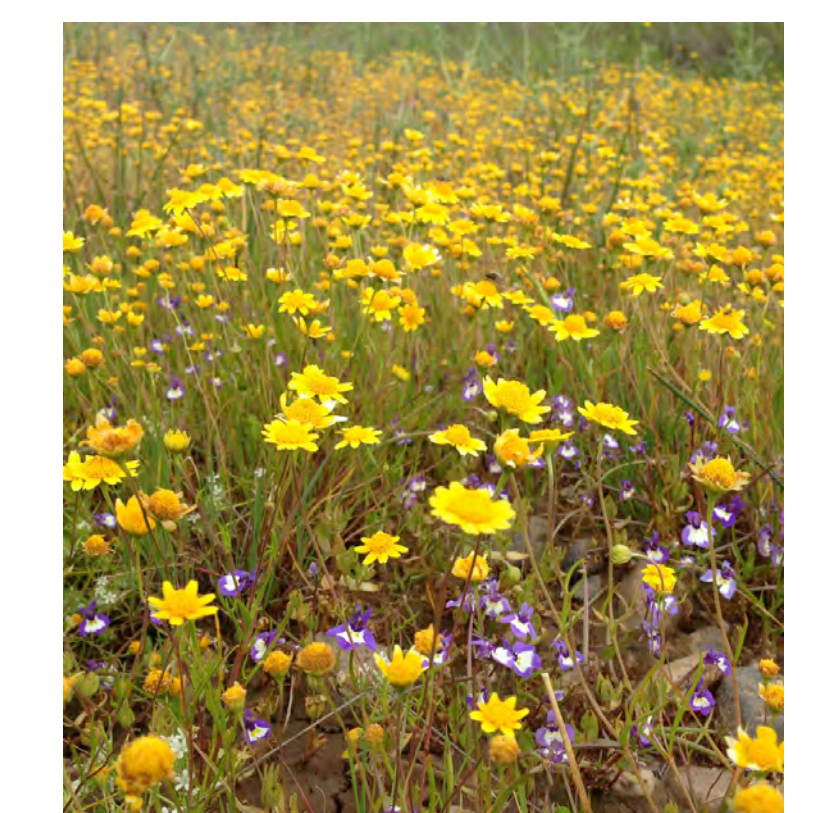
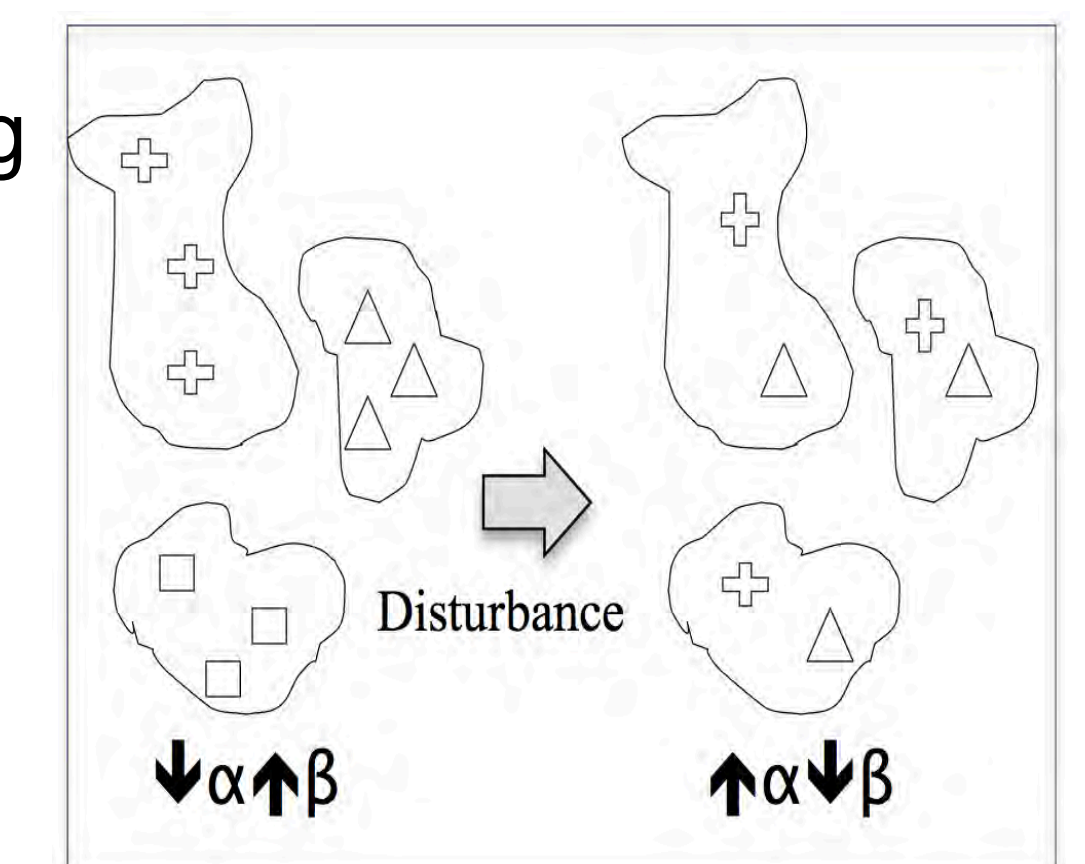


- **Grazed pools had significantly higher native diversity and cover than ungrazed pools**
- **There was no significant difference in exotic diversity and cover between grazed and ungrazed pools**

PCA analysis reveals species clustering significantly associated with grazing along PC #1 ($p=0.0049$)

Future Research Directions

I am interested in whether disturbance-mediated changes in diversity may be stronger between pools (β diversity) than within-pools (α diversity). It is possible that disturbance could increase plant diversity within pools while homogenizing plant communities between pools. I will investigate grazing effects on α and β diversity across site characteristics, grazing level, and regional climate.



Vernal pools are characterized by high β diversity--adjacent pools may host unique species assemblages

Acknowledgements

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I am seeking field sites with grazed vernal pools for my cross-sectional study. Please contact jmichaels@ucdavis.edu if you are interested.