

# SANDAG / SDMMP Grazing Monitoring Study Updates

Felix Ratcliff<sup>1</sup> and James Bartolome<sup>2</sup>

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# Project Team

- **SDMMP Project Sponsors:** Sarah McCutcheon and Kris Preston
- **Project PIs:** UC Berkeley Professors James Bartolome and Lynn Hunstinger
- **Project Manager:** Felix Ratcliff
- **Consultants:** Michael White, Matthew Shapero, Larry Ford, Joyce Qiao and Kaveh Motamed
- **UC Berkeley Graduate Student Researcher:** Anson Tan

# Project Contributors and Collaborators

- **California Department of Fish and Wildlife**
- **San Diego Zoo Wildlife Alliance**
- **US Geological Survey**
- **RCD of Greater San Diego County**
- **Endangered Habitats Conservancy**
- **San Diego Habitat Conservancy**
- **The Nature Conservancy**
- **USDA/ARS**
- John Austel (Rancher)
- Rand Evett (Phytolith researcher)
- **Many volunteers contributed to field sampling!**

# Study Question #1

Can grazing enhance disturbed native coastal sage scrub habitat?



Grazing



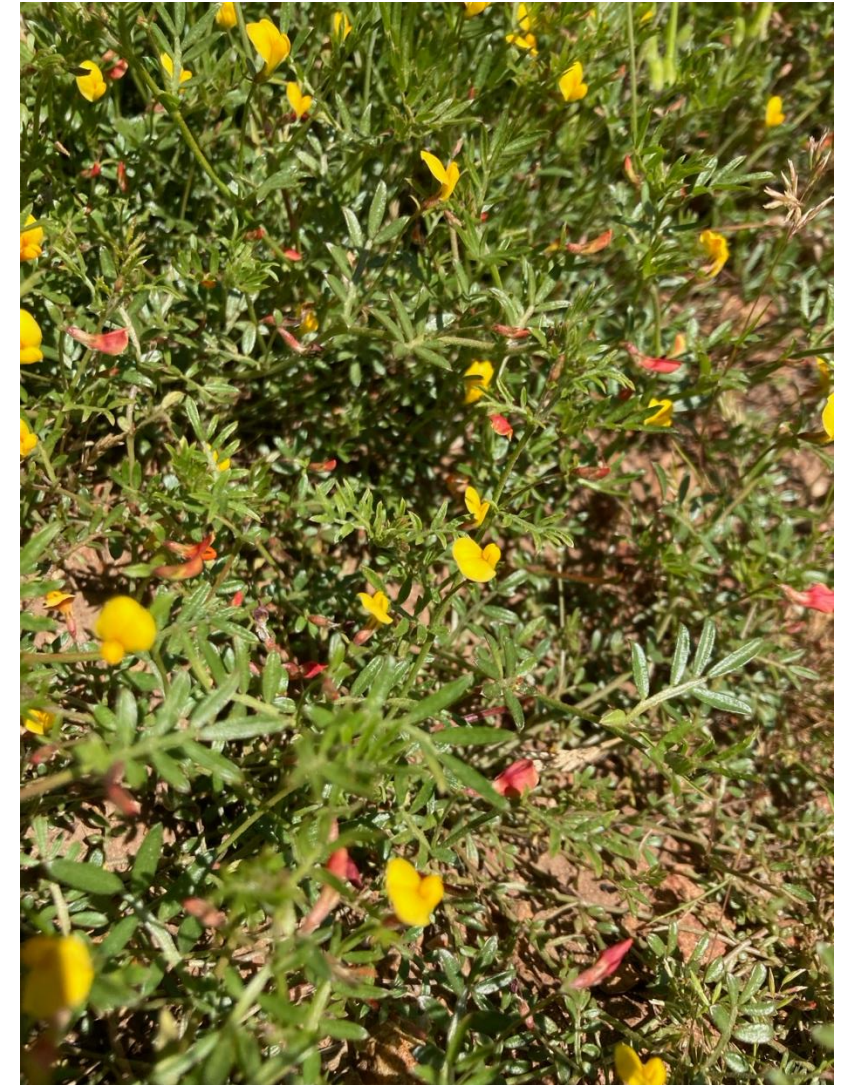
CSS  
Shrublands

# Study Question #2

Can grazing effectively enhance disturbed native grassland and forbland habitats?



Grazing



Grasslands and  
Forblands

# Study Question #3

Can grazing effectively improve habitat for MSP species?



Grazing



MSP  
Species

Wikimedia Commons

# Study Question #4

How effective is grazing at reducing fire risk?



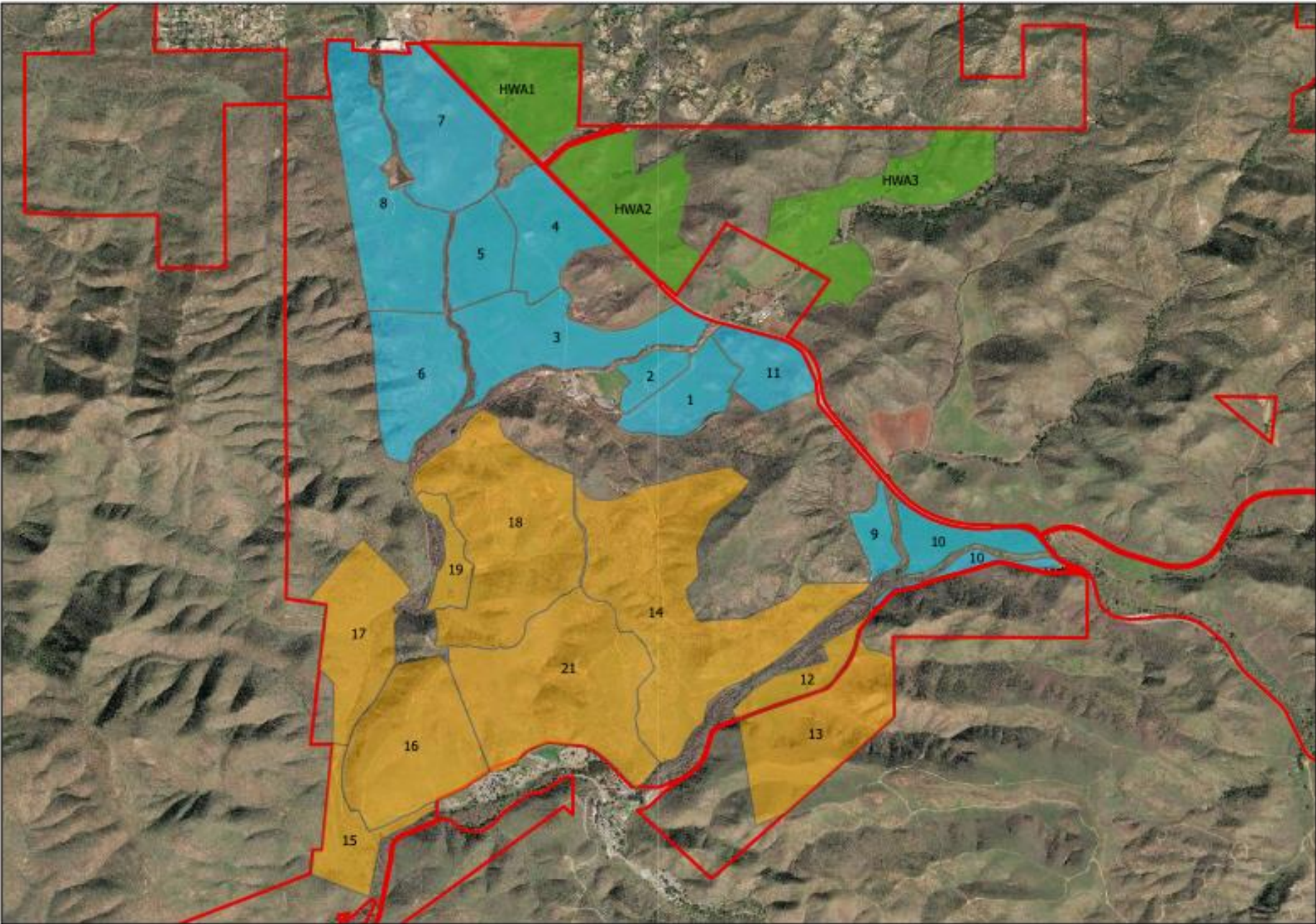
Grazing



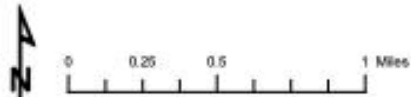
Grass Fuel  
Loads

# First Study Sites

# Rancho Jamul and Hollenbeck Canyon



Blue RJER grazing pastures  
Green HCWA grazing pastures  
Yellow Softlines\_RJER



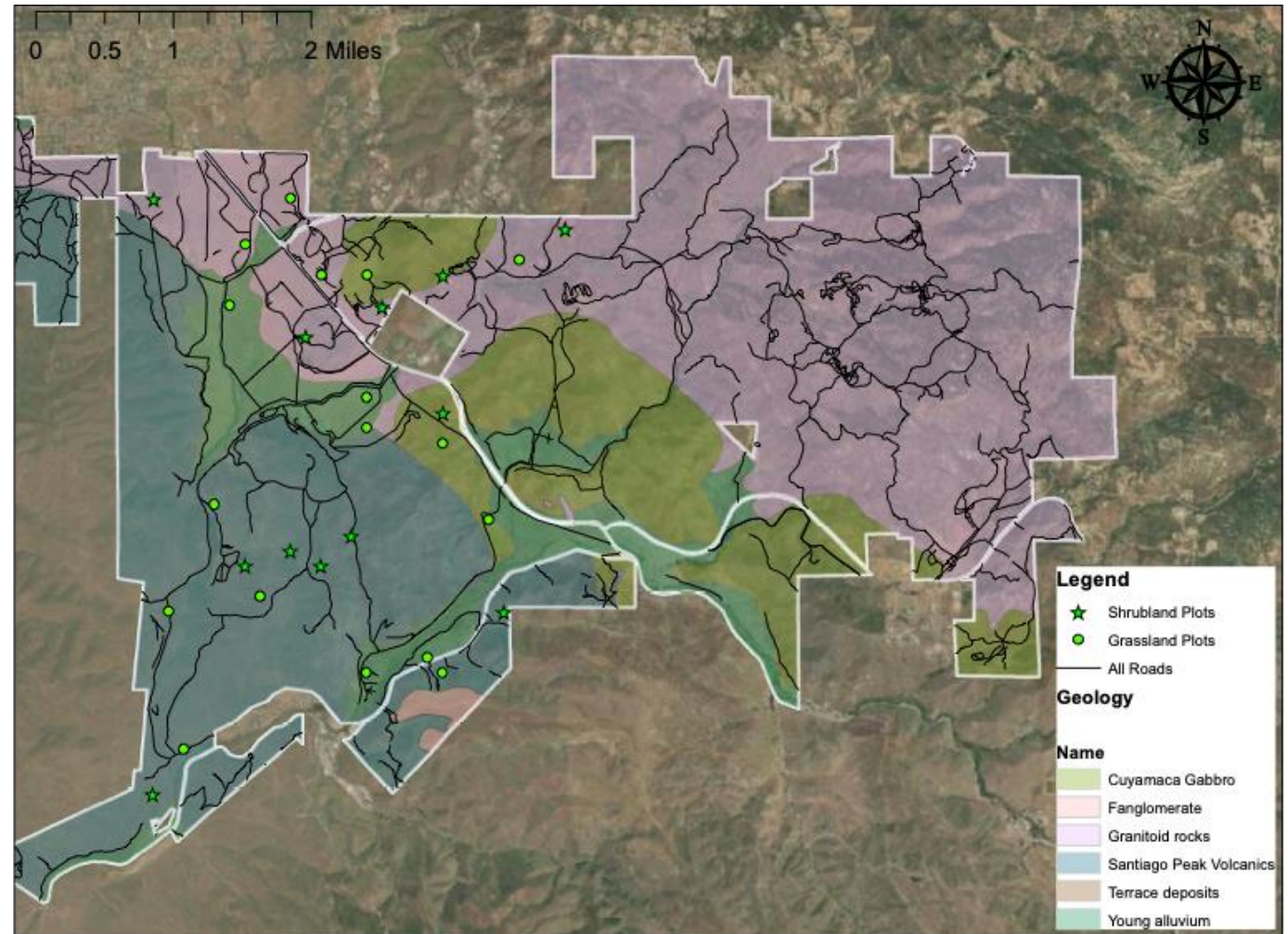
**Rancho Jamul & Hollenbeck Canyon  
Grazing Pastures  
4J Horse & Livestock**

# Environmental Heterogeneity



Variable Topography

RJER and HCWA Monitoring Plots Fall 2021 w/ Geology

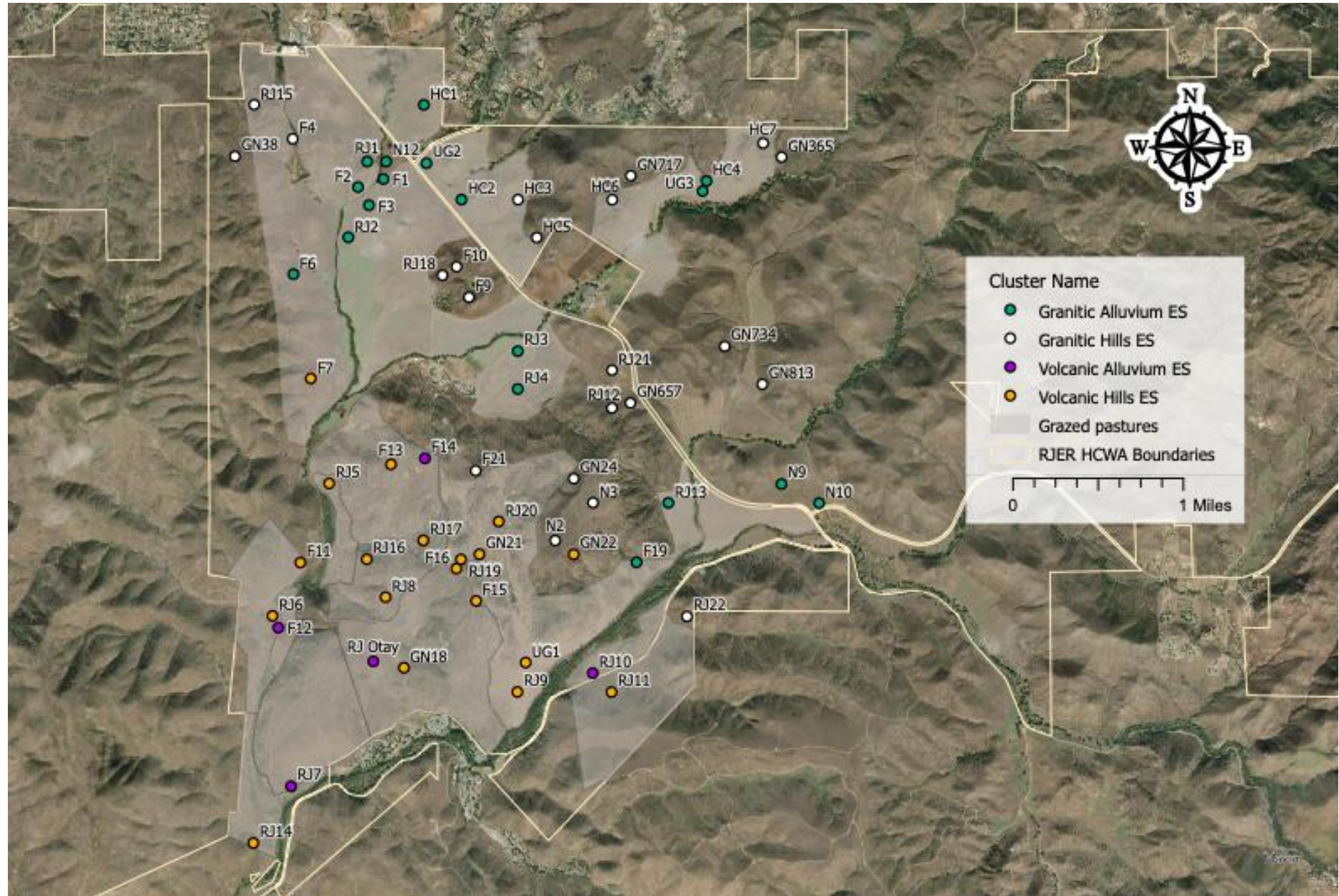


UC Berkeley Range Lab 2021

Heterogenous Geology & Soils

# Randomly Sited Study Plots

- Started with 29 plots
- Added to these over the years
- WE now have 64 plots



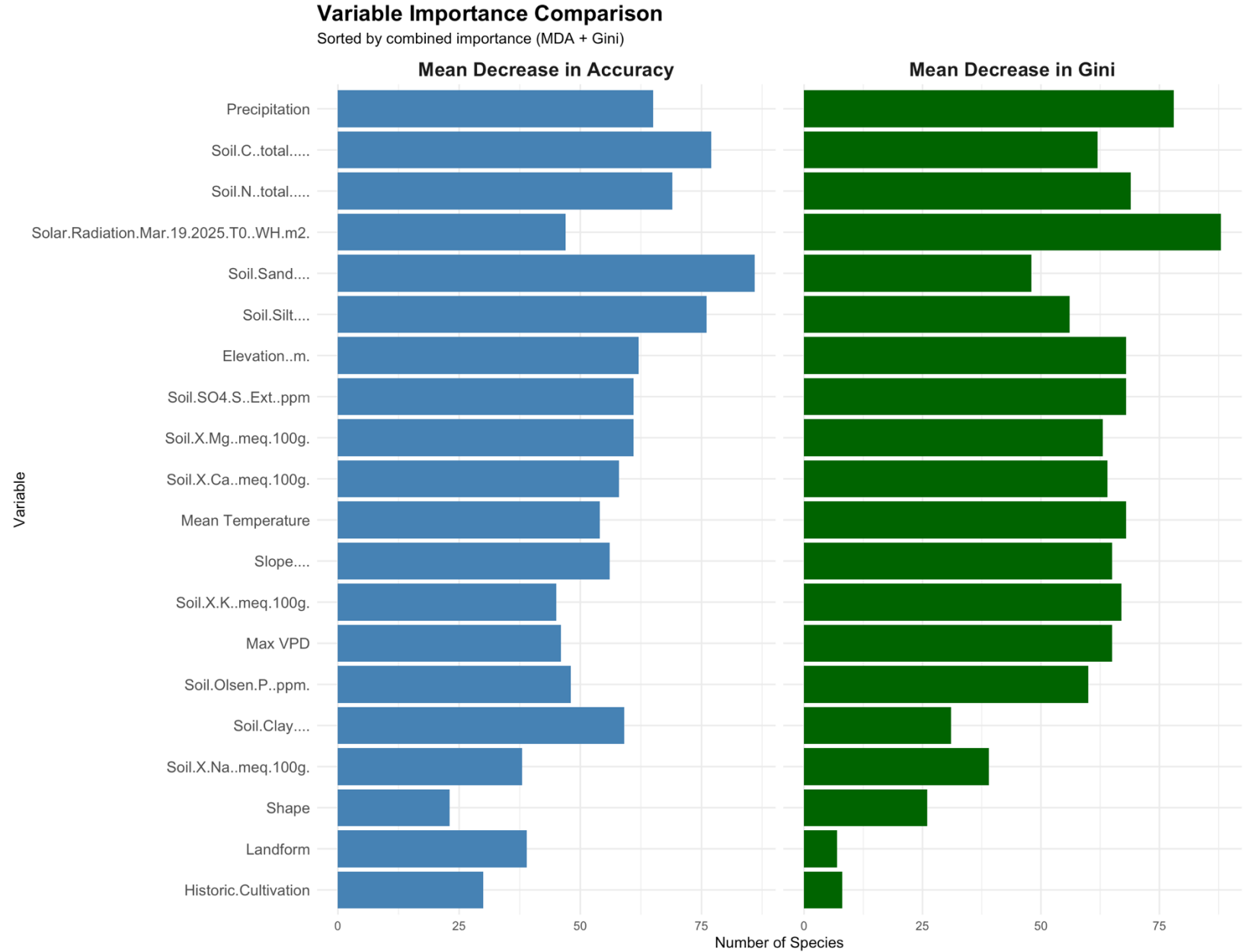
# Soils, Topographic and Microclimatic Data

- Collected plot-based samples and measurements of:
  - Soils
  - Phytoliths
  - Slope / aspect
  - Geomorphologic classes
- Remotely-sensed variables:
  - Solar radiation
  - Temperature data
  - Precipitation Data
  - Vapor Pressure Differential

These measurements allow us to document environmental variability across the preserves.

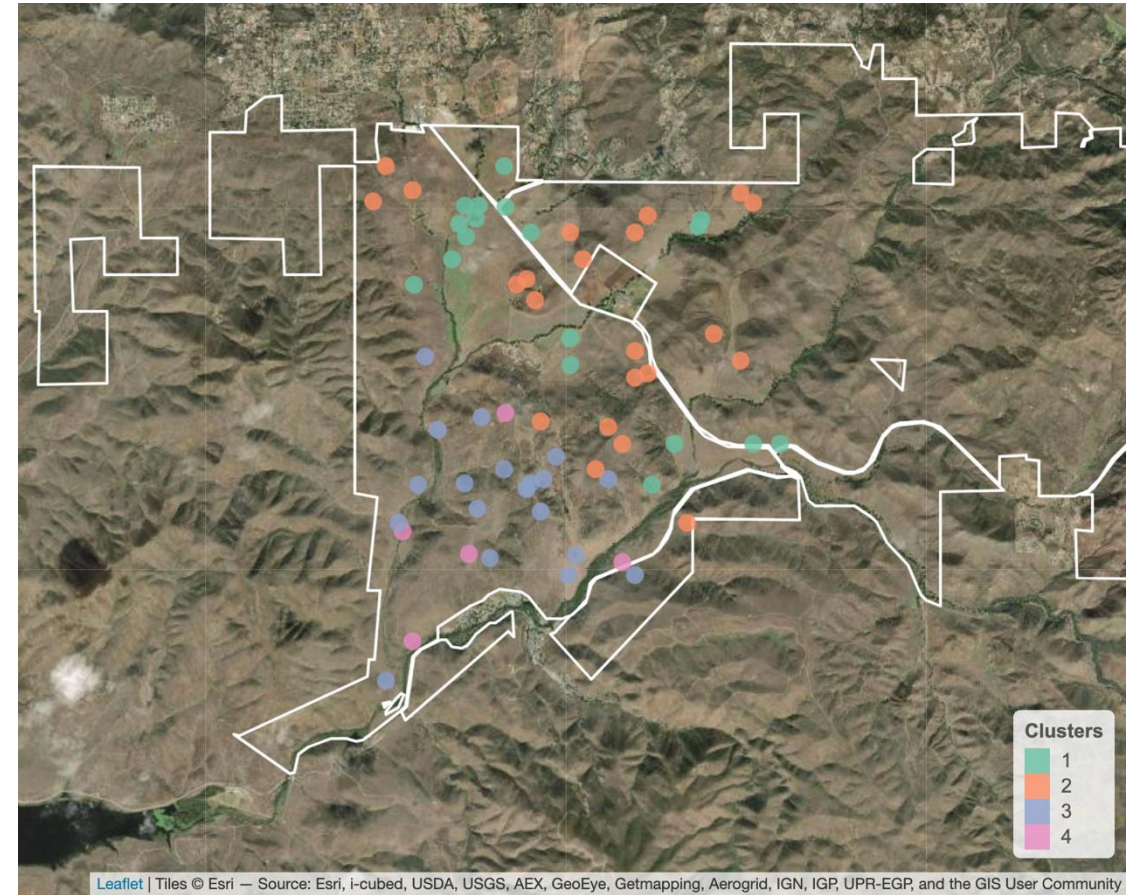
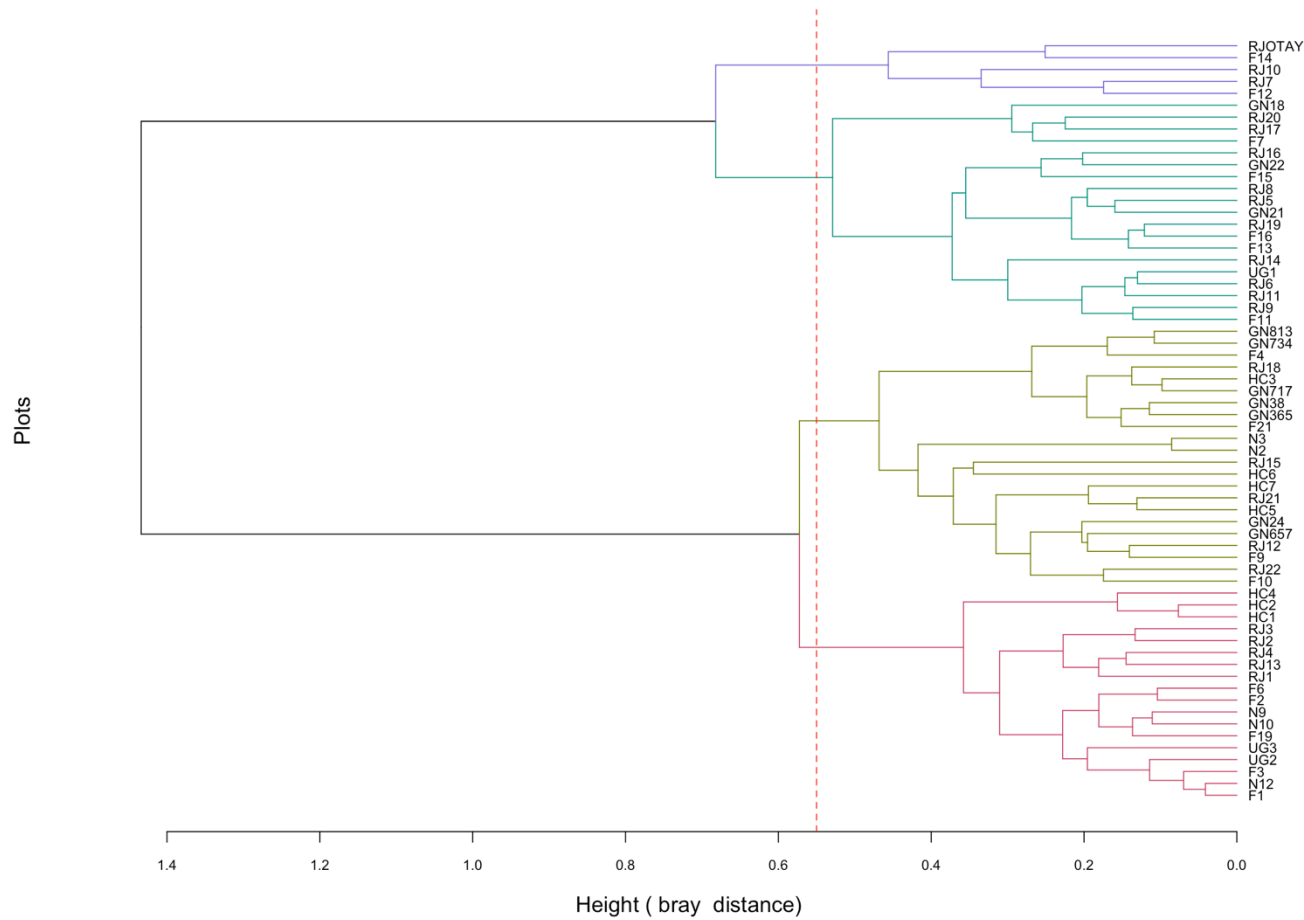


# Drivers of Plant Composition and Structure



# Ecological Site Models

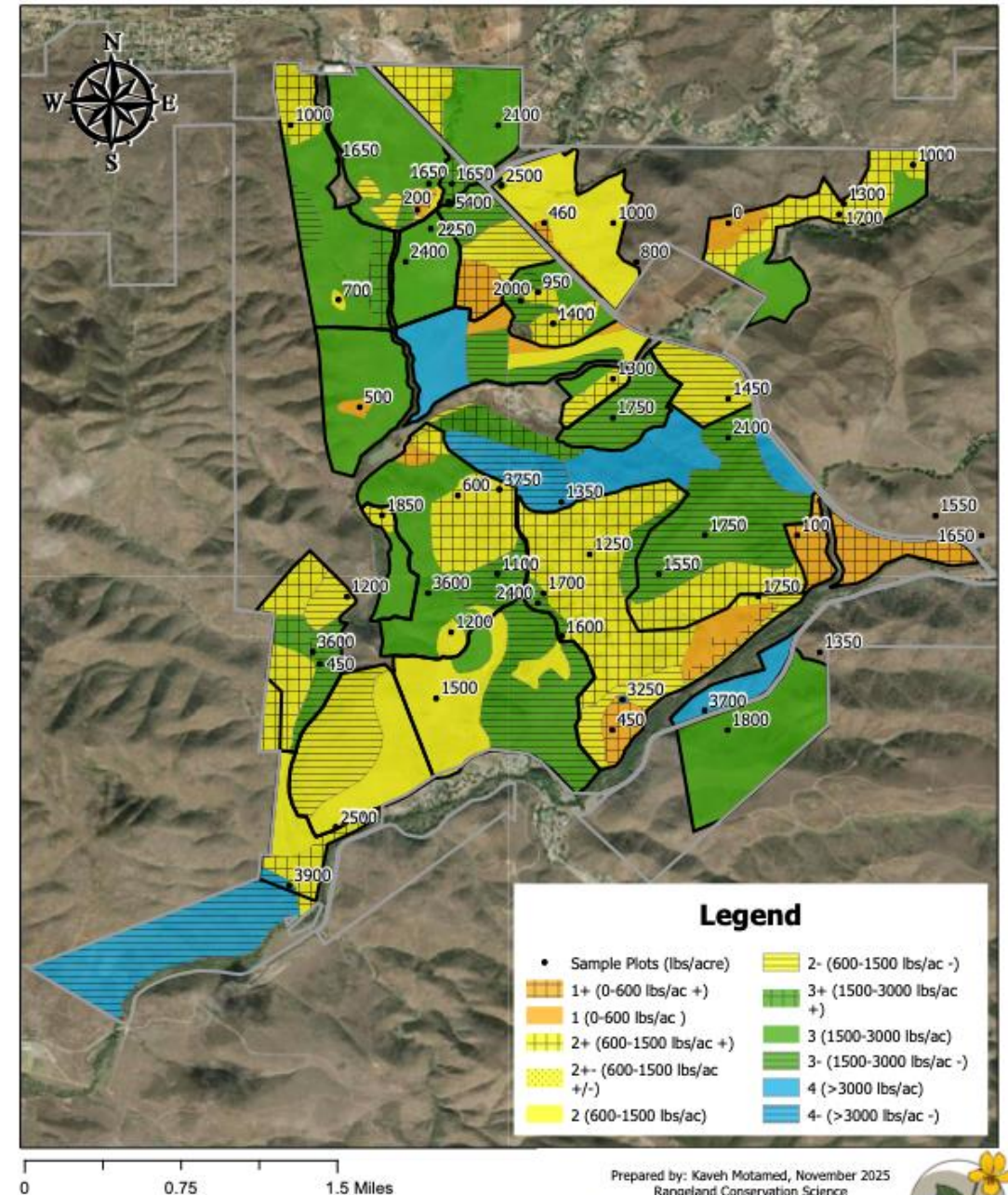
Cluster Dendrogram ( 4 clusters)





# Residual Dry Matter

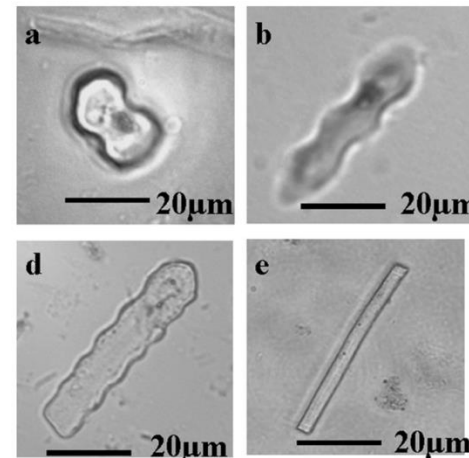
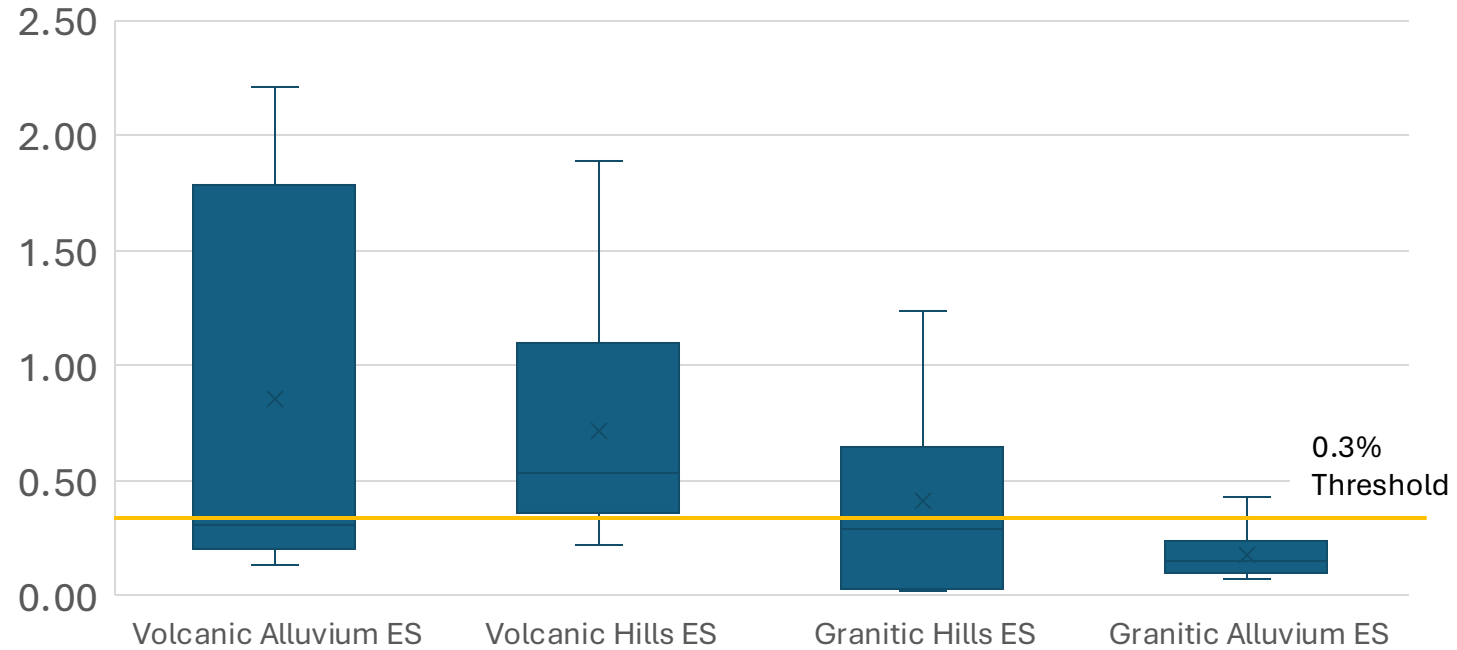
- RDM: amount of above ground herbaceous biomass left in the fall
- Can affect production and species composition in subsequent years
- Closely related to herbaceous fuel loads



# Phytoliths

- Metavolcanic ES types have much higher phytolith amounts
- Granitic Alluvium ES has little evidence for prior grass dominance
  - So what was it? Forbland? Shrubland?
- Phytolith evidence suggests native grasses were patchily distributed (perhaps due to patchy shrub cover)

Total Phytolith (%) in Ecological Sites

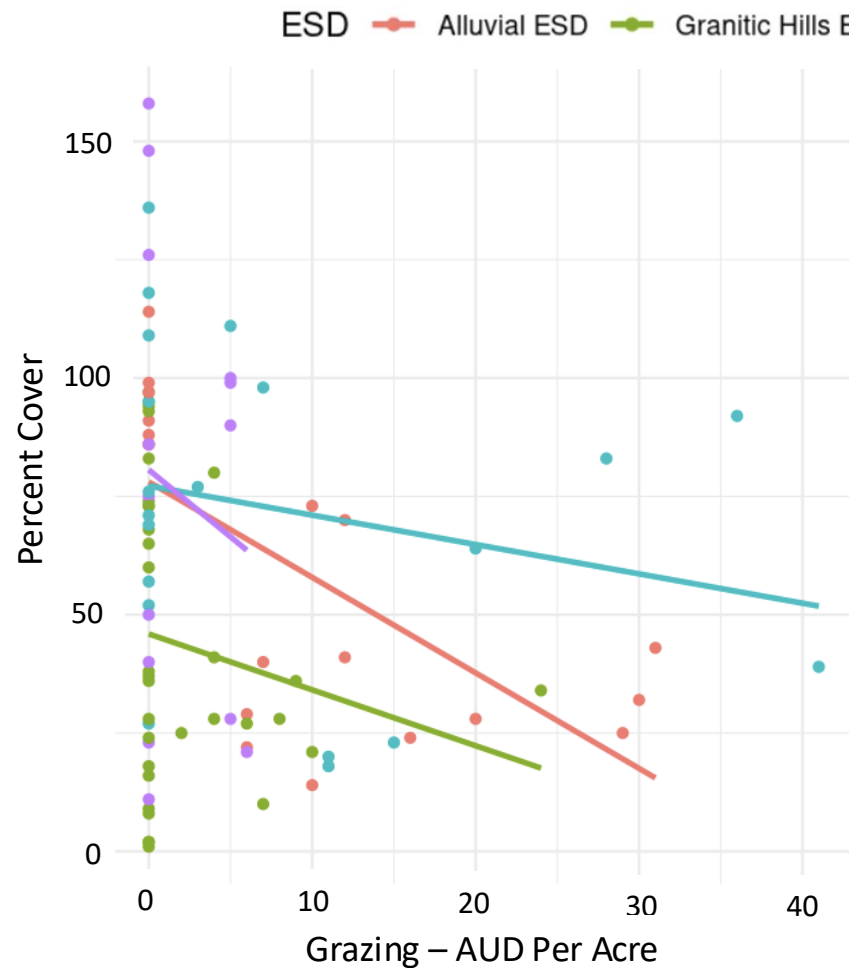


# Grazing effects on vegetation

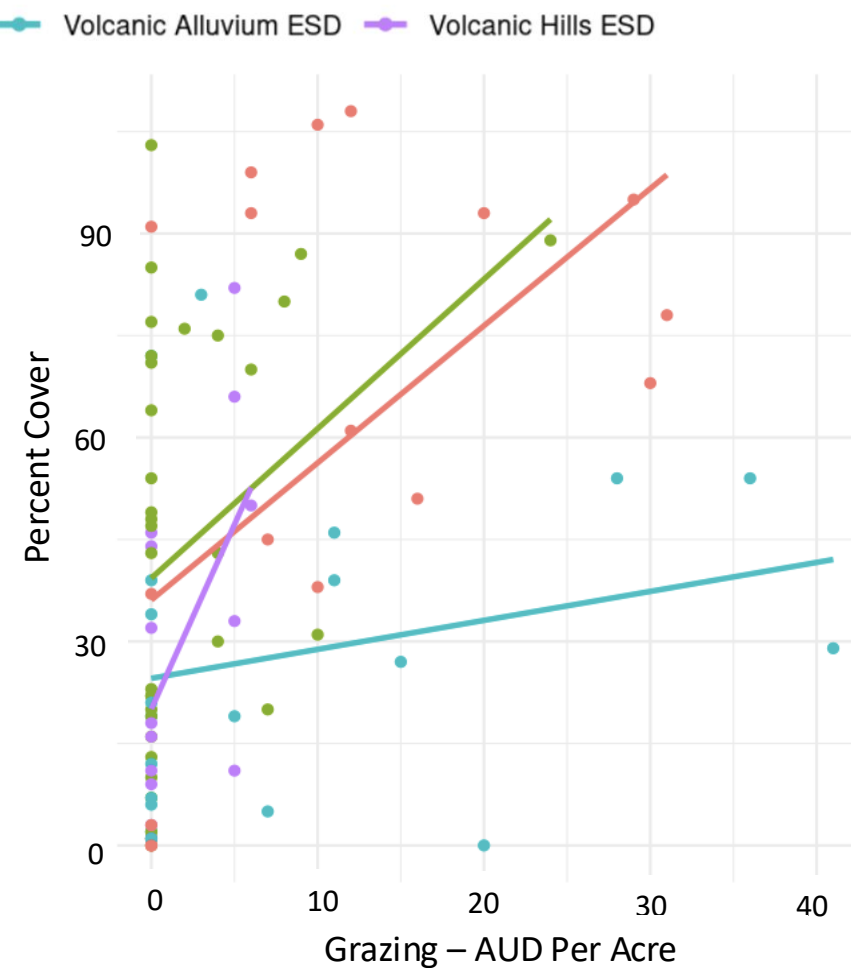
- From prior years' analysis we know that grazing Jamul and Hollenbeck:
  - Decreases exotic annual grass cover
  - Increases annual forb cover (largely exotic)
  - Reduces vegetation height and biomass
  - Has little direct effect on most CSS shrub species
- We're updating this analysis right now. Results will be shown at our next presentation in March.

# Grazing Intensity and Functional Group Cover – 2023 Results

## Exotic Annual Grass Cover and Grazing



## Forb Cover and Grazing





Ungrazed



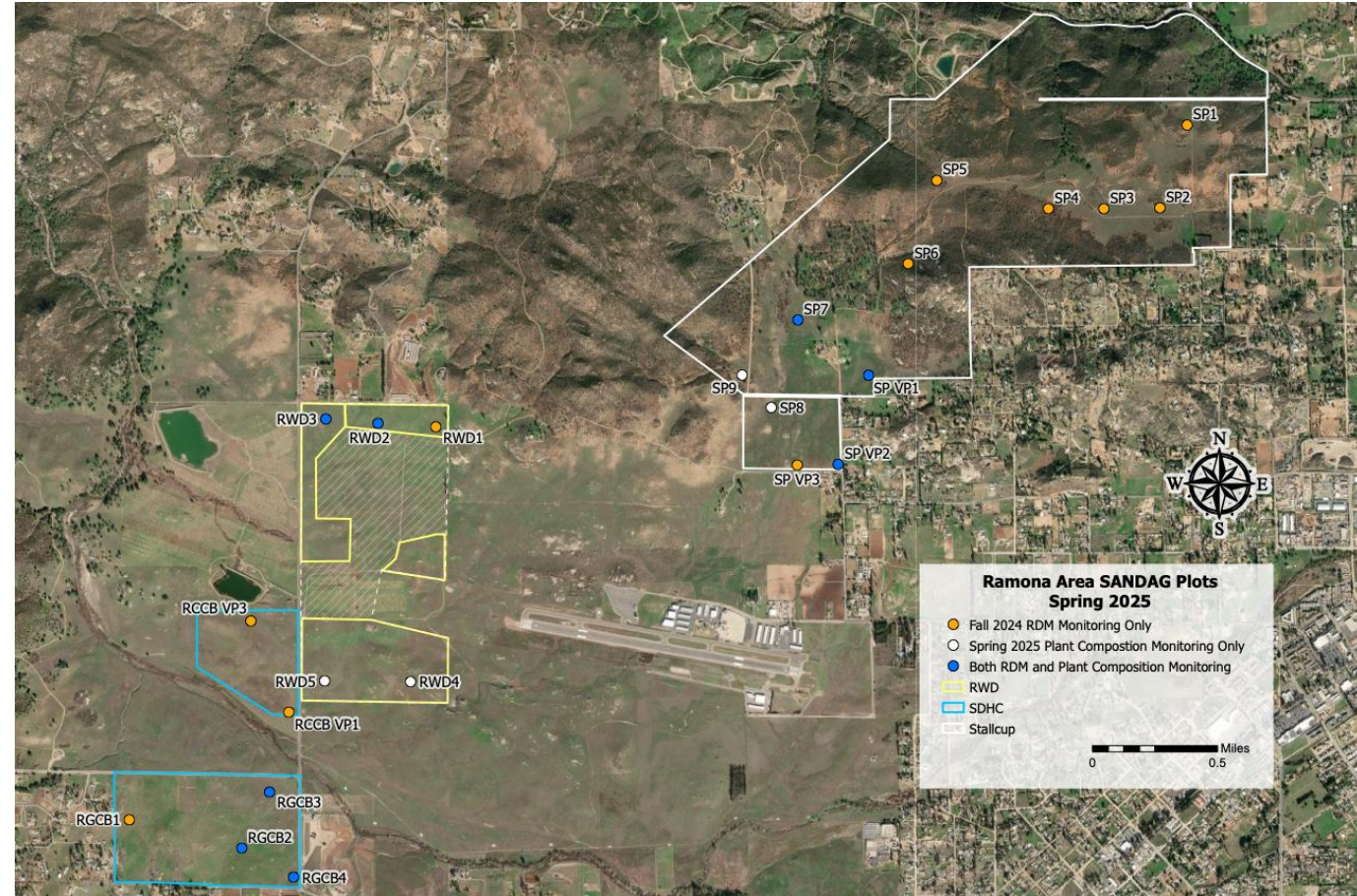
Grazed

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# Alluvial Ecological Site

# Ramona Sites

- Expanded study to 3 preserves in Ramona in 2024
  - Stallcup Preserve (Endangered Habitats Conservancy)
  - Ramona Grasslands Mitigation Bank (San Diego Habitat Conservancy)
  - Ramona Water District land (The Nature Conservancy)
- New Conservation foci:
  - Vernal pools
  - Stephen's Kangaroo Rat habitat
  - New Ecological Sites



# Reports

## How useful is grazing in the restoration toolbox?

A Literature Review

Draft November 22, 2021

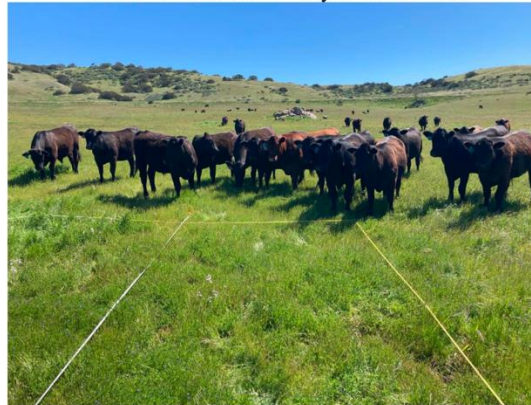
Kaveh Motamed, Michael D. White, and James W. Bartolome

### Outline

1. Introduction
2. Historical background
3. History of Ranching in San Diego
4. ESDs and S-T Models
5. Grazing for Fire Risk Reduction
6. Grazing to Enhance Disturbed Native Habitats
7. Grazing to Enhance Shrub Habitat
8. Climate and Drought
9. Type Conversion
10. SDMMP Species
11. Monitoring
12. Benefits and tradeoffs of different grazing animals
13. Summary and conclusions

## Evaluating Grazing for Conservation and Fuel Management

Results from a 2-year Study at Rancho Jamul Ecological Reserve and Hollenbeck Canyon Wildlife Area



**December 2023**

Revised in July 2024

**UC Berkeley Project Team:** James Bartolome<sup>1\*</sup>, Lynn Huntsinger<sup>2\*</sup>, Matthew Shapero<sup>2\*</sup>, Michael D. White<sup>3</sup>, Lawrence Ford<sup>4</sup>, Felix Ratcliff<sup>1\*</sup>, Kaveh Motamed<sup>5</sup>, Joyce Qiao<sup>6</sup>, Chris Nygard

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<sup>6</sup> Certified Rangeland Manager

Prepared for San Diego Association of Governments  
SANDAG CONTRACT NO. S684214

## Adaptive Management and Monitoring Recommendations for Grazed San Diego County Conserved Lands



**October 2024**

Revised August 2025

**Project Team:** Felix Ratcliff<sup>1\*</sup>, James Bartolome<sup>2\*</sup>, Lynn Huntsinger<sup>2\*</sup>, Michael D. White<sup>3,4</sup>

<sup>1</sup> Rangeland Conservation Science

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\*California Certified Rangeland Manager

Prepared for San Diego Association of Governments  
SANDAG CONTRACT NO. S684214

**2021** Literature Review

**2023** Report on Results

**2024** – Adaptive Management and  
Monitoring Recommendations

Available at: [https://sdmmp.com/view\\_project.php?sdid=SDMMP\\_SDID\\_187\\_5dfaaad75575d#overview-tab](https://sdmmp.com/view_project.php?sdid=SDMMP_SDID_187_5dfaaad75575d#overview-tab)

# Future Directions

- Project goes through 2026
- Continue monitoring in 2026
- New topics:
  - Grazing effects on insects
  - Grazing and Stephen's Kangaroo Rat Habitat Management in Ramona
  - Grazing and BUOW habitat management with SDZWA
  - Spatial interpolation of Ecological Sites
- 2026 Reports:
  - Comprehensive results report
  - Developing guidelines for conservation grazing in San Diego County

# Preview of Upcoming Events and Presentations

- 2026 International Society for Rangeland Management Meeting Symposium
  - February 9, 2026 – 10:20 to noon
  - Presenters from UC Berkeley, Rangeland Conservation Science, SDMMP, USDA/ARS
  - Broad audience of rangeland professionals
  - Published abstracts and eventually papers
- 2026 SDMMP Management and Monitoring Coordination Meeting
  - March 25, 2026 – 9:30 to 11:30
  - Comprehensive update on project results

# Acknowledgements

- SANDAG – Project Funder
- SDMMP – Project Sponsor
- All the collaborators, contributors, and volunteers who have been integral to the study
- Robert Fisher’s Lab for sharing long-term data and contributing to fieldwork
- UC Berkeley Range Management Master’s Program

Thank you!

Questions?