Post-Wildfire Livestock Grazing on Public Lands in Northern California

Laura K. Snell

Livestock and Natural Resource Advisor

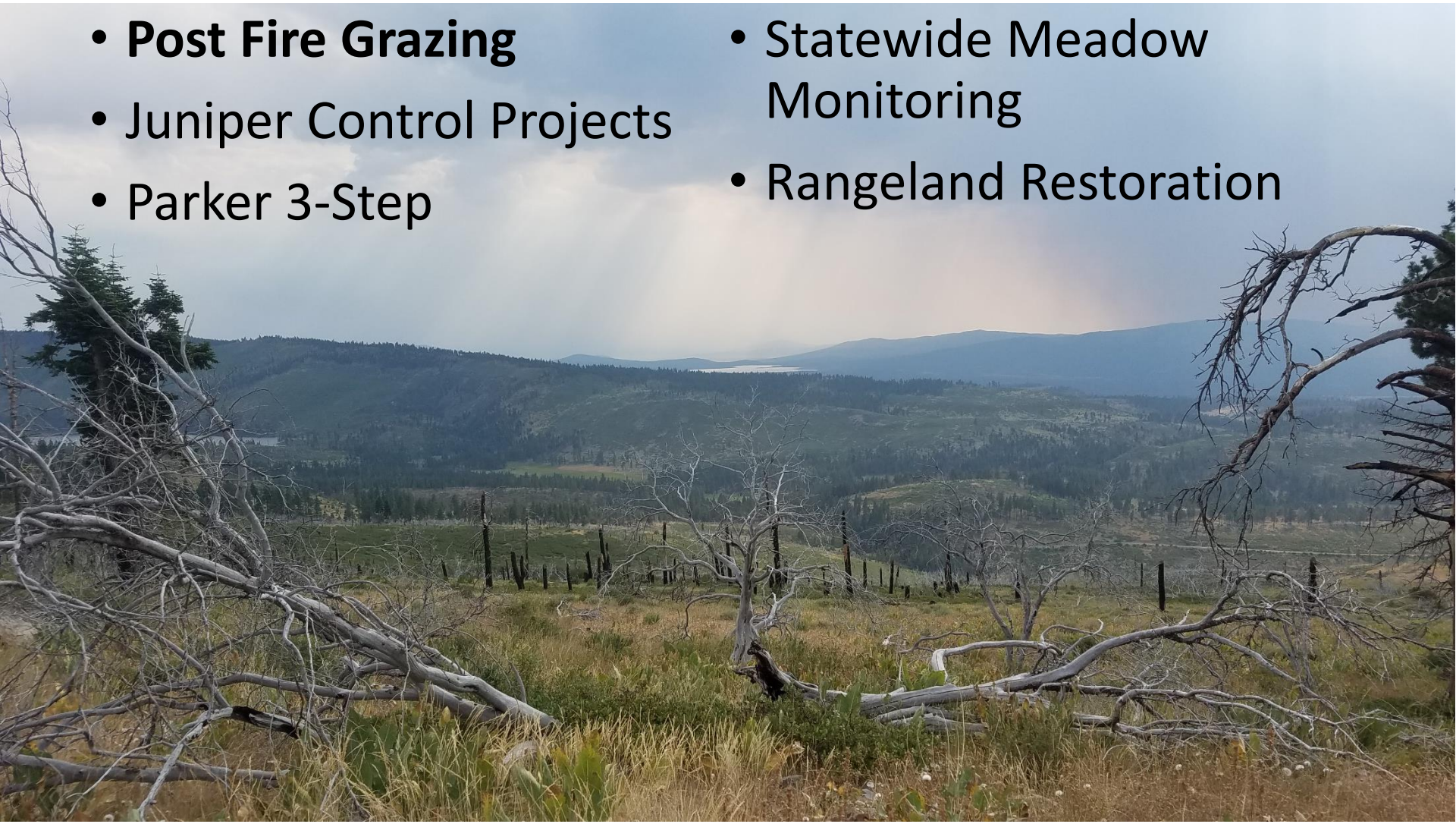University of California Cooperative Extension

J.M. Little, E.S. Gornish, D.F. Lile, S.D. Hogan, D.J. Eastburn, Y. Jin, and L.M. Roche

UC CE | University *of* California
Agriculture and Natural Resources ▪ Cooperative Extension

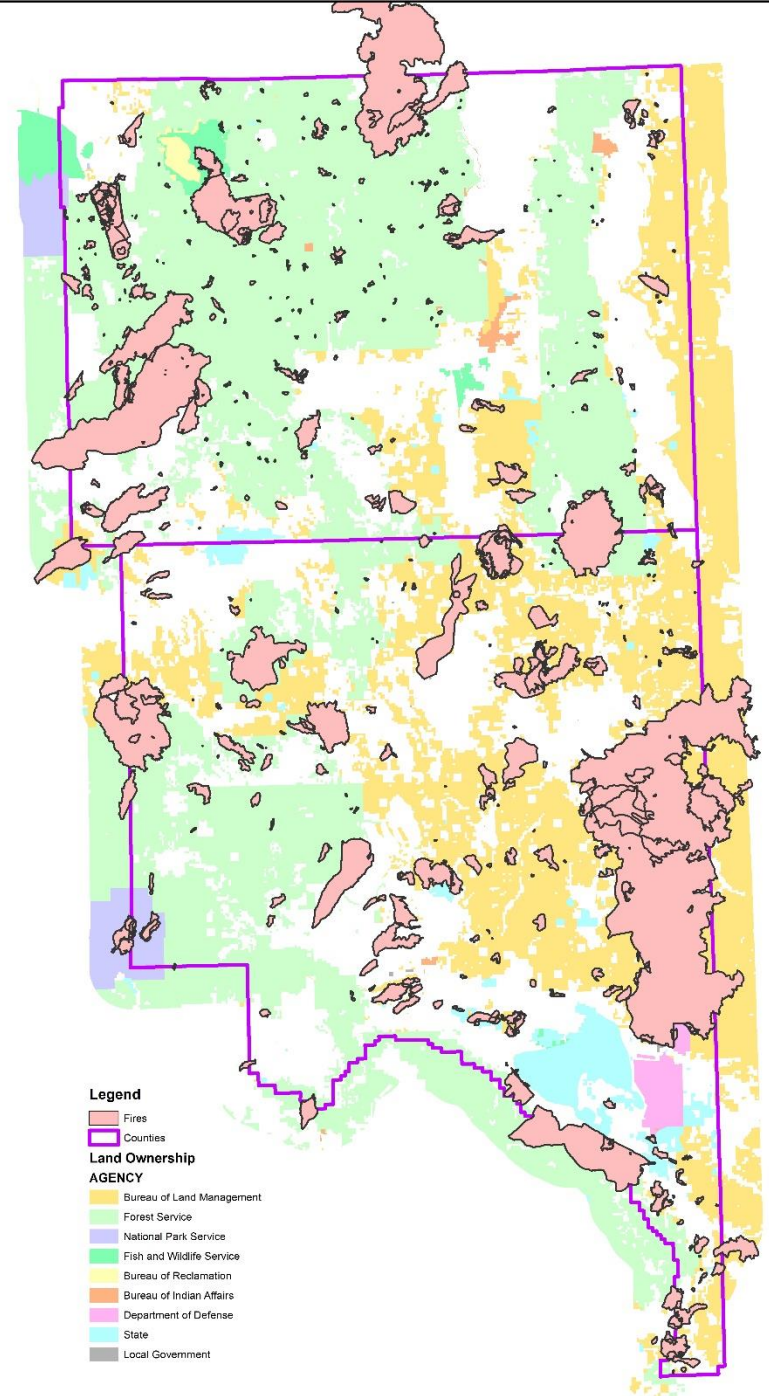# Adaptive Management in Working Rangelands

- Adaptive management incorporates research into conservation action. Specifically, it is the integration of design, management, and monitoring to systematically test assumptions in order to adapt and learn.
    - Foundations of Success www.fosonline.org

- *Our overall goal is to provide a science-management framework to assess rangeland ecosystem responses to management actions and extreme disturbances and inform decision-making (close the adaptive management loop).*

On the Ground Research

- **Post Fire Grazing**
- Juniper Control Projects
- Parker 3-Step
- Statewide Meadow Monitoring
- Rangeland Restoration

Fire History
in Lassen and
Modoc Counties
(50 yrs)

Legend
- Fires
- Counties

Land Ownership
AGENCY
- Bureau of Land Management
- Forest Service
- National Park Service
- Fish and Wildlife Service
- Bureau of Reclamation
- Bureau of Indian Affairs
- Department of Defense
- State
- Local Government

Objectives

- Survey existing wildfire burned areas to estimate recovery paths using chronosequence methods

- Establish long-term study sites in recent wildfire areas to directly measure site-specific trends

- Use drone imagery to assess on the ground measurements and develop models for management implications

Experimental Design

- Selected 108 sites from 19 fires that occurred within the last 15 years

- Avoided confounding variables:
  - Seeded areas
  - Salvage logged areas
  - Overlapping fires
  - Non- traditional Public Land Grazing

- Took into account:
  - Years post fire (1-5, 6-10, 11-15 year categories)
  - Grazing management (rest, regular grazing)
  - Burn severity (low, moderate-high)
 - Climate (based on soil temp and moisture)

Grazing Management

- **Managed Grazing**
  - Specific number of animals for a specific amount of time with goals for sustainability and multi-use
  - control the season, frequency, duration and intensity of grazing
- **Public Land Grazing Management**
  - Data from Range Conservationists and historical files

Site Selection

- Survey Area
  - Intersected variables of interest
  - Erased variables to avoid
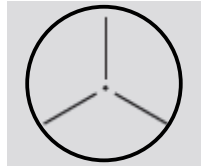
- Site Selection
  - Generated 3 random, balanced sample points within each category
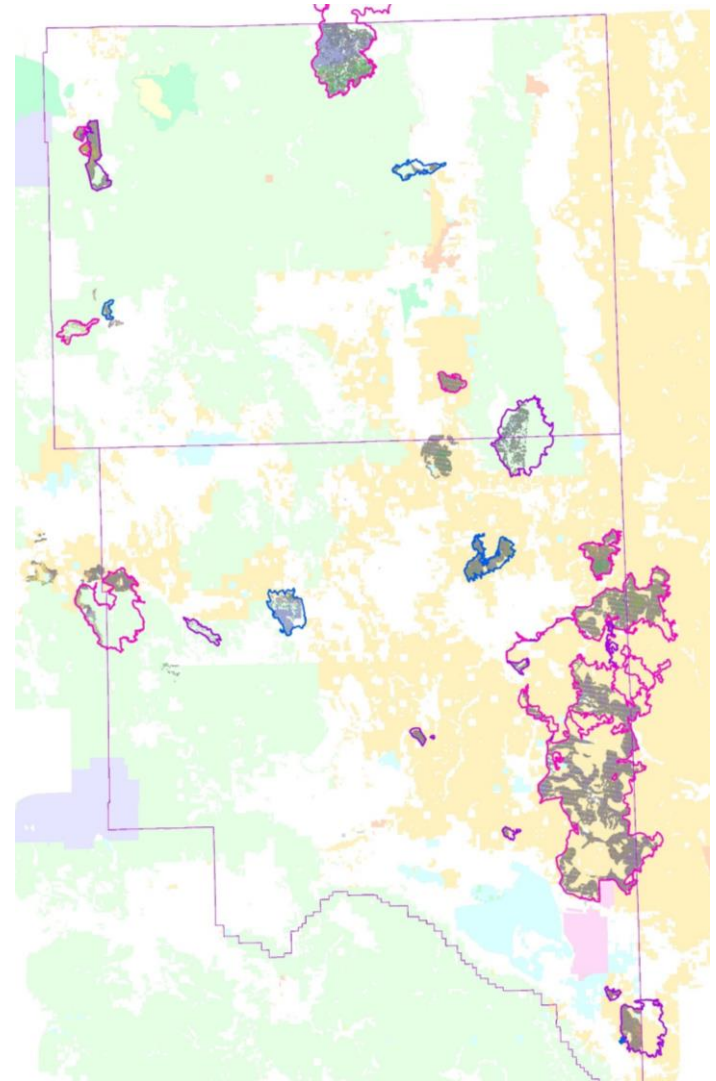
Methods

- Plot specs
  - Circular plot
  - 3 transects in spoke design
  - 25m transects
  - 5m radius sacrifice zone at plot center

- All data collected in 2016 and 2017
  - Line-point intercept (to species)
  - Continuous line intercept (growth form only)
  - Species Richness (timed plant census)
  - Photo points
  - General plot characteristics (slope, aspect, elevation, soil, landform, slope shape, etc.)

Survey Sites Completed

- Total of 108 survey sites completed in 19 fires
  - ➢ 2016- 50 sites
  - ➢ 2017- 58 sites

- 21 long term plots in 2 different fires surveyed both years

- Drones at 5 fires
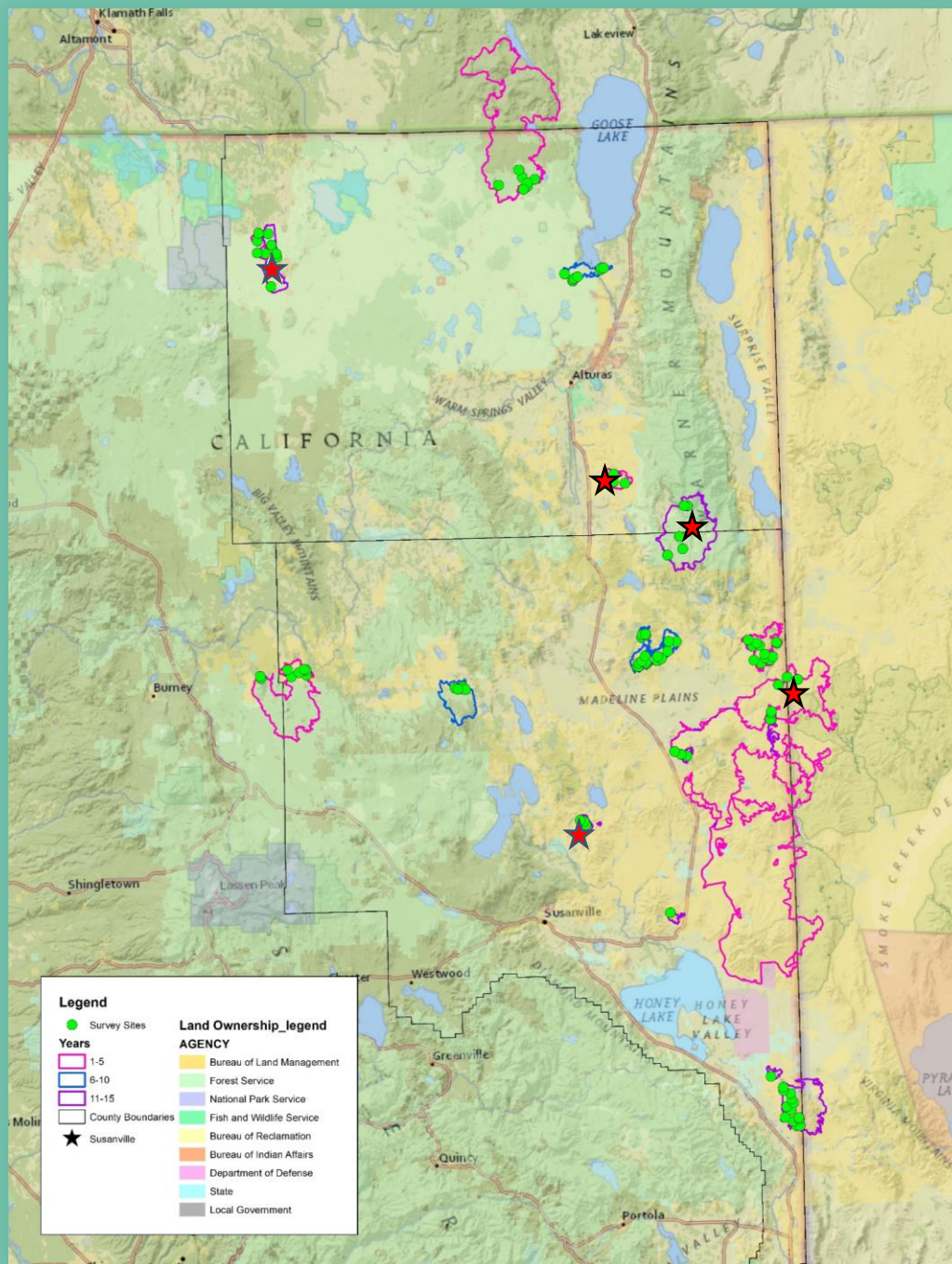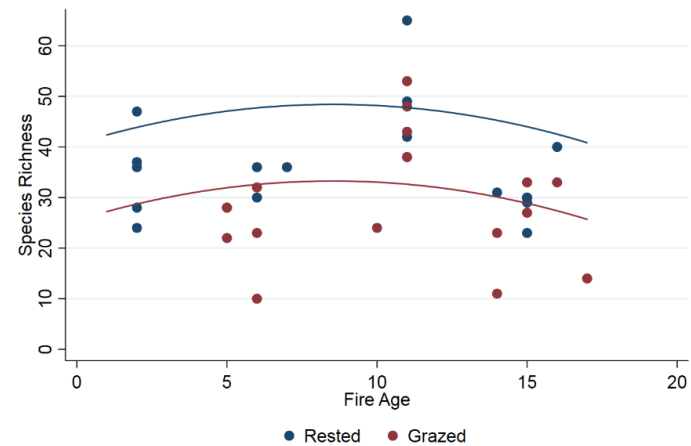
Results

Species Richness
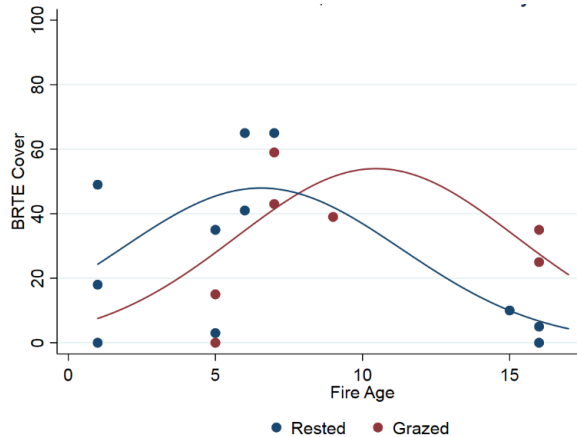

Cool-Wet Sites   Moderate Sites   Warm-Dry Sites
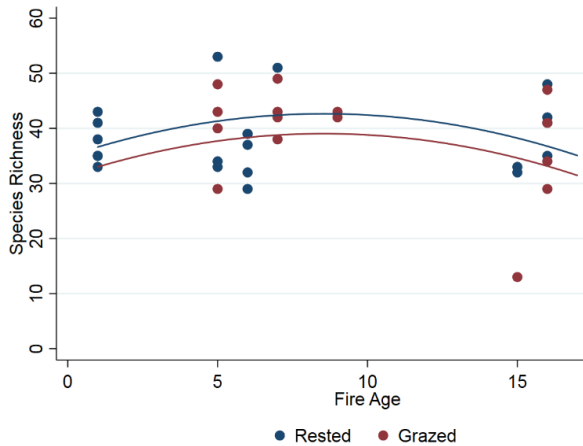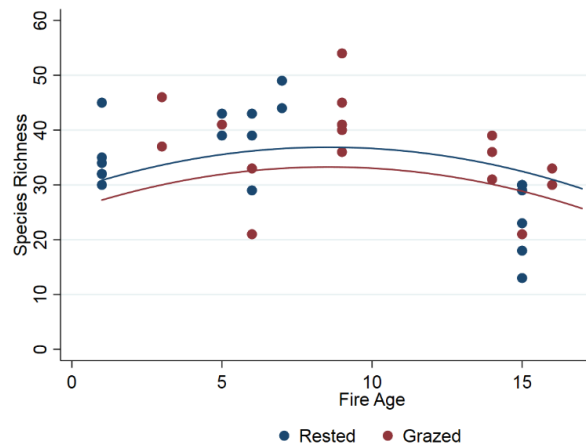
Significant Model Variables
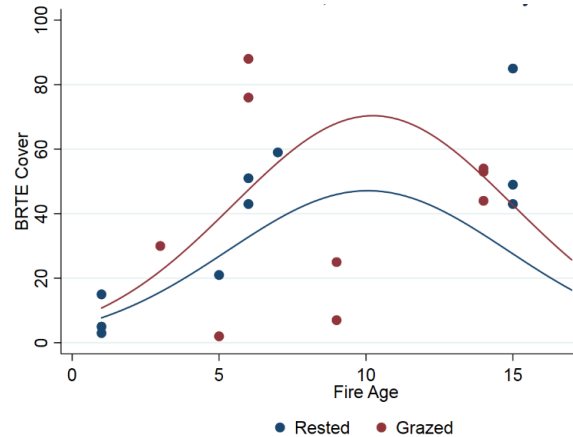
- Grazing management
- Fire Age
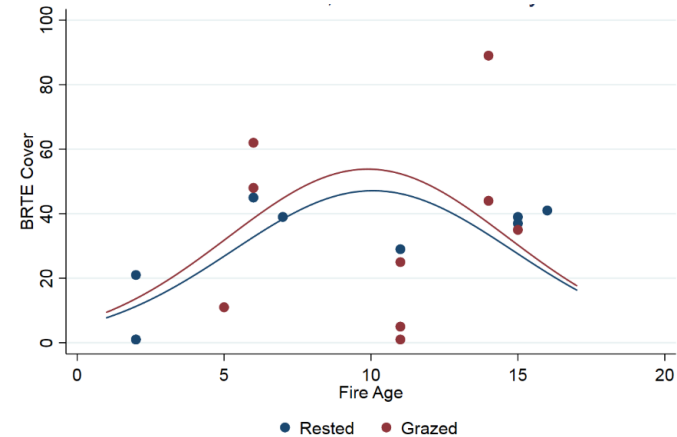- Climate
- Slope

Cheatgrass Cover

Low Burn Severity

Cool-Wet Sites

Moderate Sites
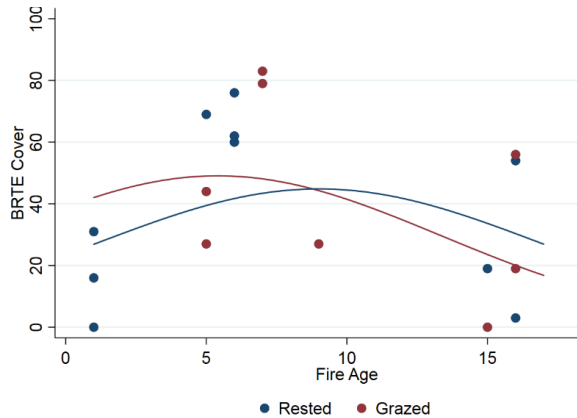
Warm-Dry Sites

Significant Model Variables

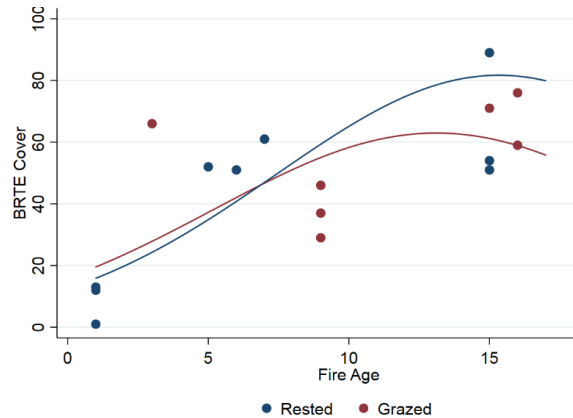- Grazing Management
- Fire Age
- Burn Severity
- Climate

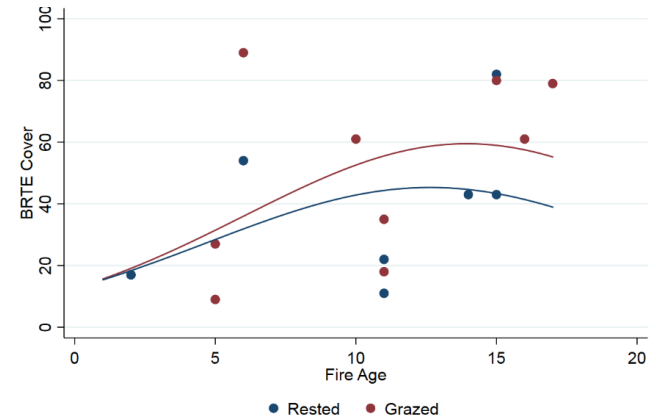# Cheatgrass Cover

Moderate-High Burn Severity

Cool-Wet Sites

Moderate Sites

Warm-Dry Sites

Significant Model Variables

- Grazing Management
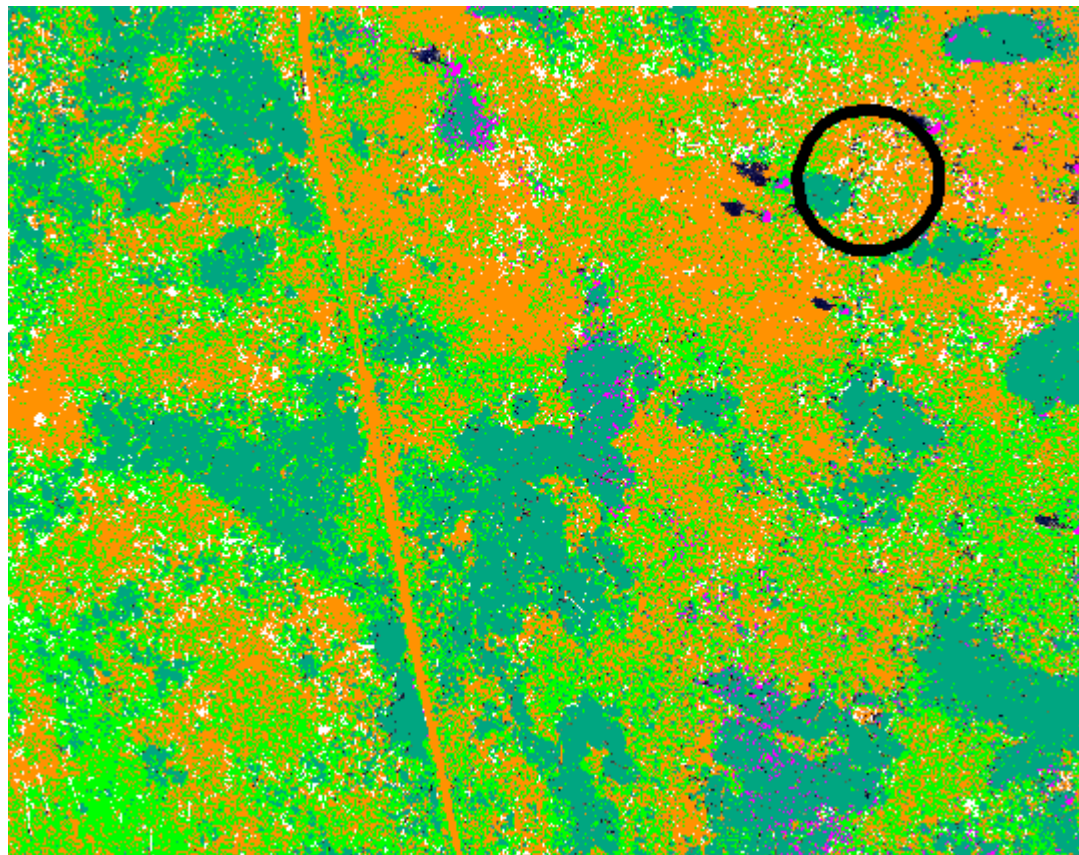- Fire Age
- Burn Severity
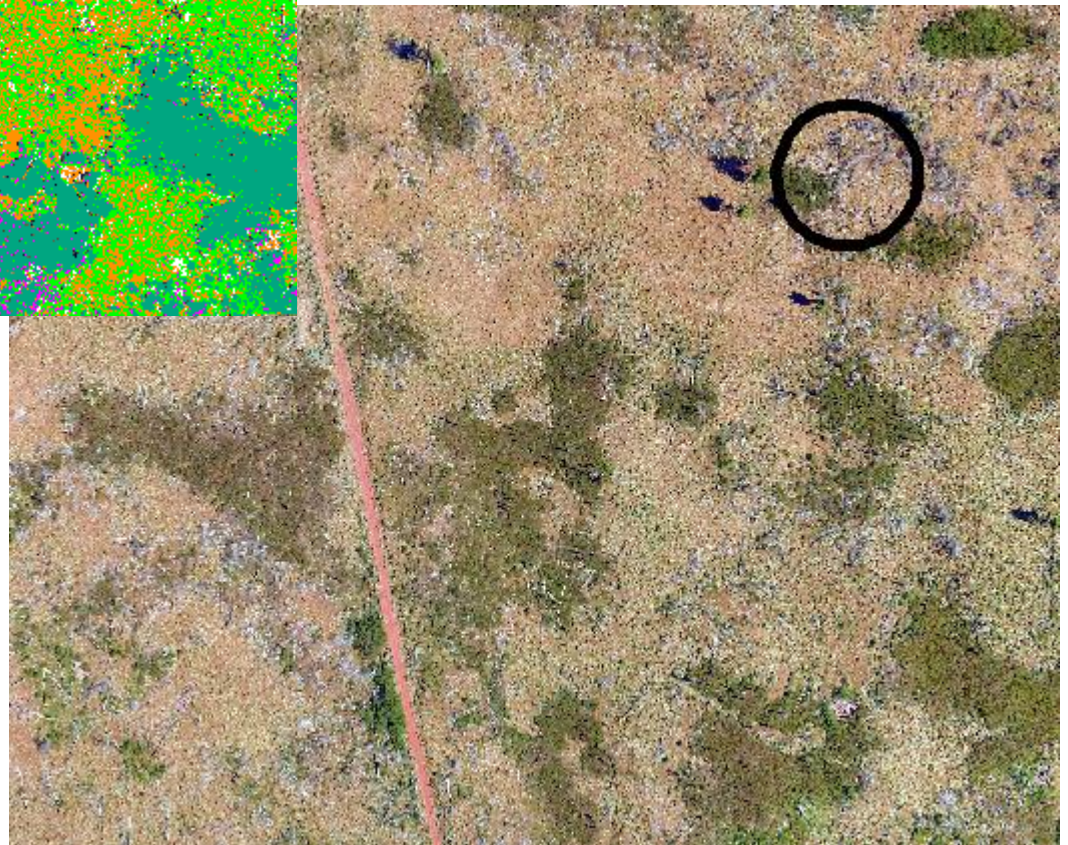- Climate

Drone Imagery

Blue Fire

Drones

Trees
Heavy Brush
Light Brush
Residual Dry Matter/Bare Ground
Woody Debris

Conclusions

- Fire Intensity Matter

- Site Climate Variables Matter (Wet/Dry Cool/Warm Sites)

- Richness
  - *No grazing treatment effect on total species richness*

- Cheat Grass
  - *grazing management outcomes vary*

Next Steps

- Seeding treatments after fire
- Fire frequency- overlapping fires
- Remote sensing/GIS

Thank You!

- Research was funded by the Russell L. Rustici Rangeland & Cattle Research Endowment

- Special thanks to all of seasonal technicians who collected data in the field

- USDA Forest Service and USDI Bureau of Land Management for their partnership, local knowledge, and use of resources

Questions?