

Rangeland Weed Management: Practices and Perspectives

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UC RANGELANDS
Supporting Working Landscapes

Grazing Management

Prescribed grazing is the controlled implementation of the timing, frequency, and intensity of grazing to achieve specific goal(s)

The grazing manager can prescribe:

1. Type of livestock (*e.g., cattle, sheep, goats*)
2. Number of livestock (*stocking density – head/acre*)
3. Duration of grazing (*stocking rate – head/acre/year*)
4. Seasonal timing of grazing (*e.g., spring, summer, etc*)
5. Frequency of grazing (*e.g., 1X, 2X per growing season*)
6. Spatial distribution of grazing (*e.g., fences, water*)



Grazing Management

Infrastructure

- Fencing, drinking water, supplemental feeding, etc. facilities needed to implement grazing prescription

Key Considerations

- Nutritional requirements - vary annually (e.g., breeding, gestation, lactation, growth)
- Plant requirements to conduct critical functions (e.g., photosynthesis, reproduction)
- Mitigate potential negative impacts of animals on soils, riparian areas, non-target plant species, etc.



Cattle Grazing in a Noxious Weed-Dominated Rangeland





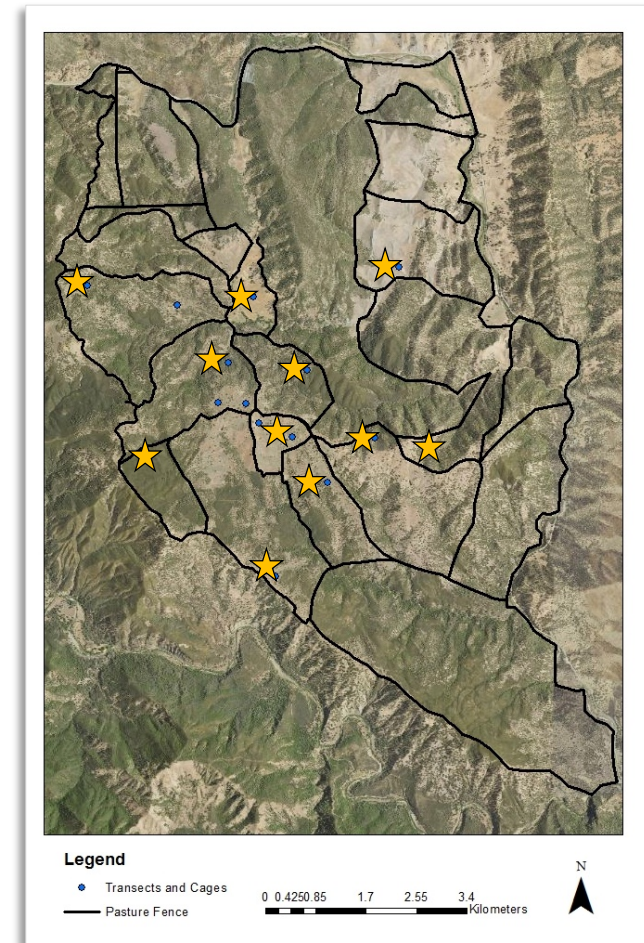
Bear Creek Management Unit

- 11,000 acres BLM-managed land
- Re-introduction of cattle grazing after 5 years of exclusion (2001-2006)
 - **Objective:** *reduce invasive weed cover*

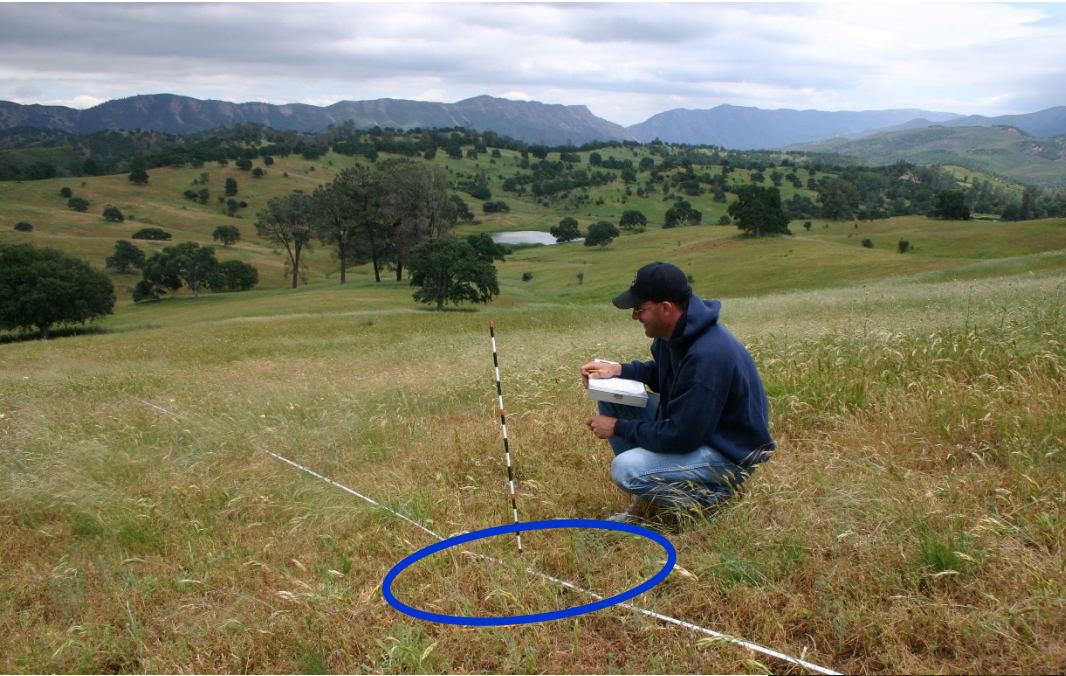


Re-introducing Grazing...

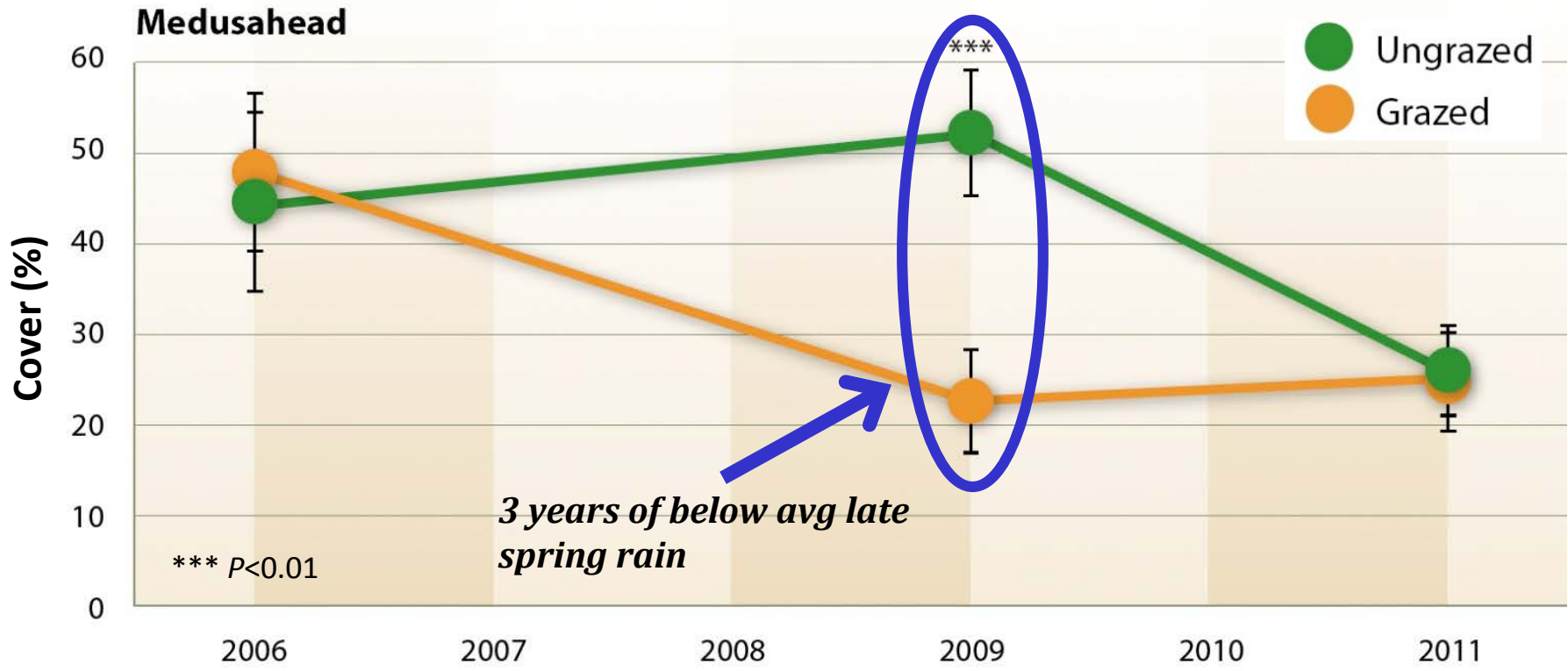
- Rotational grazing system
 - 80-600 ac paddocks
 - ~400 cow-calf pairs
 - Jan-May, 2006-2011
- Grazed 2x
 - *Winter* – Thatch
 - *Spring* – Late-flowering invasives
 - Cattle off end of May



Plant Species Composition

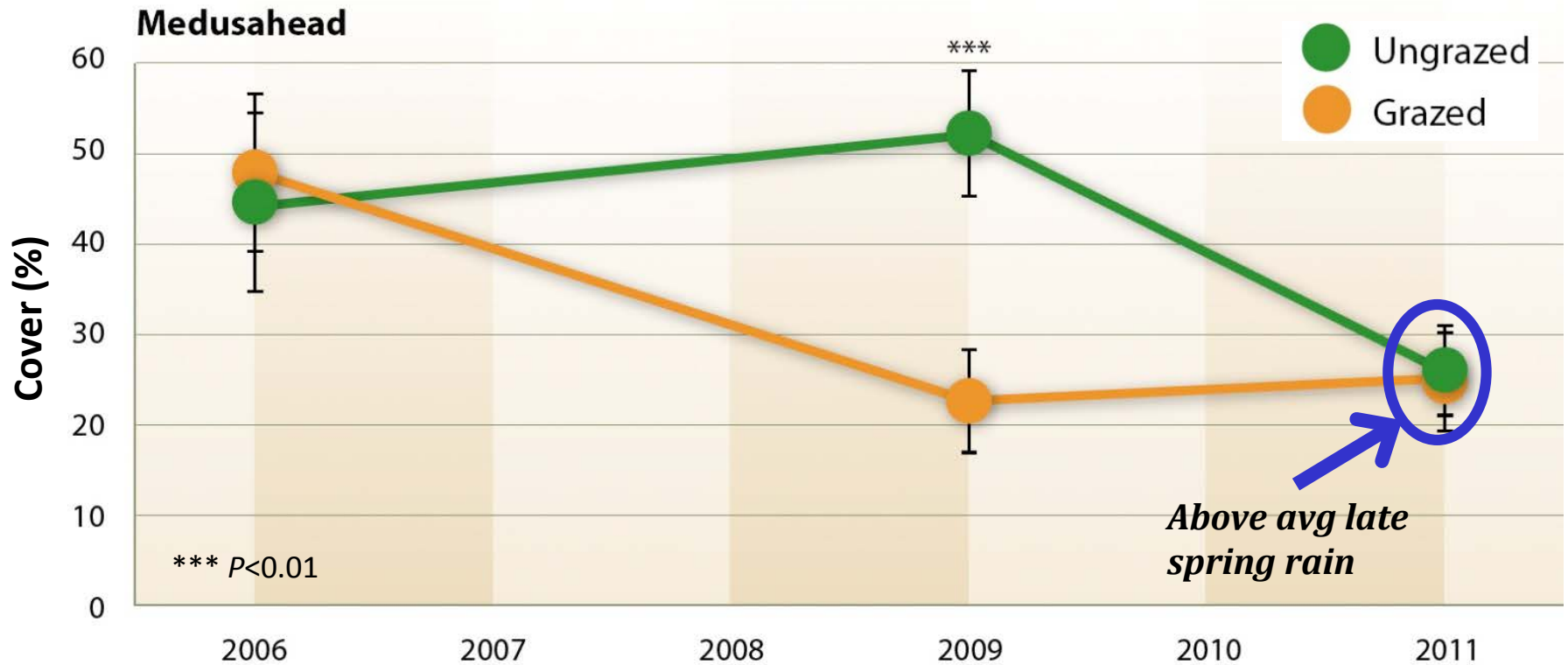


Medusahead Response



- Medusahead reductions in dry springs

Medusahead Response



- Medusahead reductions in dry springs
- No further reductions in wet springs

Plant Community Response



- Ungrazed: Medusahead replaced by other undesirable plants (ripgut, red brome)

Plant Community Response



- Ungrazed: Medusahead replaced by other undesirable plants (ripgut, red brome)
- Grazed: Increases in desirable plants (slender oats, filaree)

What did we learn?

- Prescribed grazing more beneficial to management goals than grazing exclusion
- To be more effective – Late season grazing is key
 - Not staying long enough to impact MH in late wet springs
 - Not staying long enough to impact YST
- Challenges: Available drinking water and animal welfare/production concerns in late season

Collaborative Adaptive Grazing Management Project



and more!...

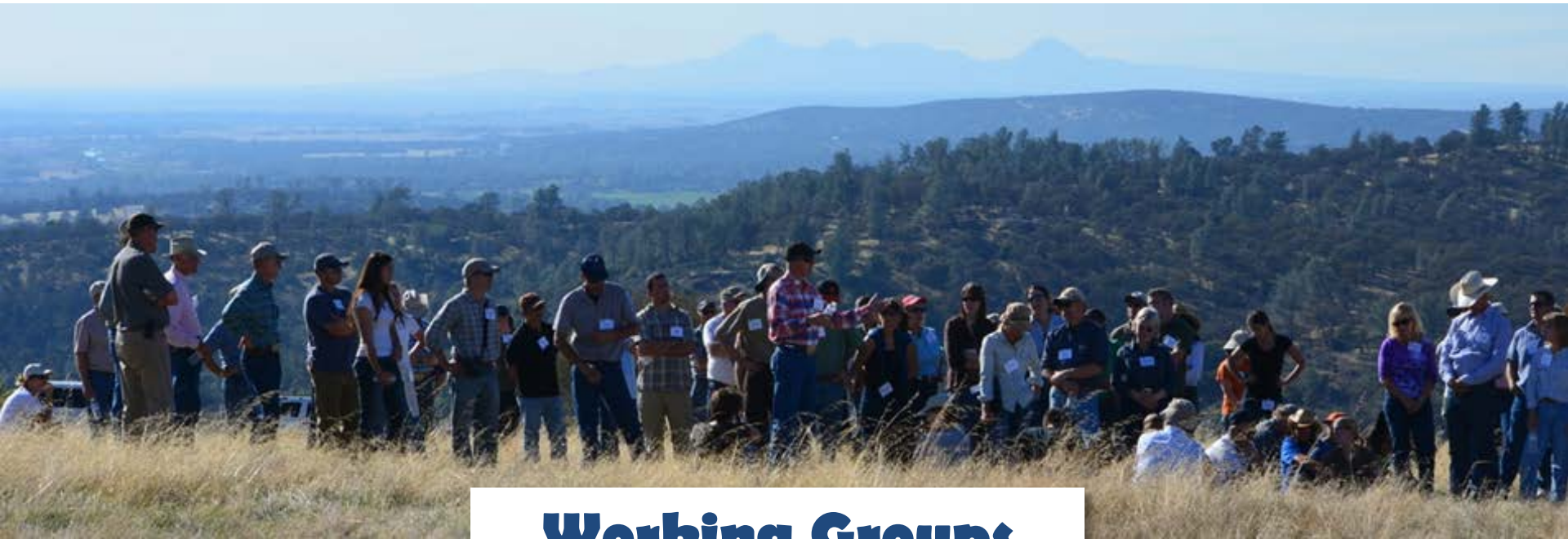


Collaborative Adaptive Grazing Management Project



- Engage diverse stakeholder at the very beginning of research
- Stakeholders prescribed goals (monitoring metrics) and strategies (treatments)
- Implementing, monitoring, and adapting with stakeholder input

Stakeholder Engagement Workshops



Working Groups

- Ranchers
 - Rangeland Professionals
 - Conservation Professionals
- } • Decision-making priorities
- Group interaction and learning

Participants

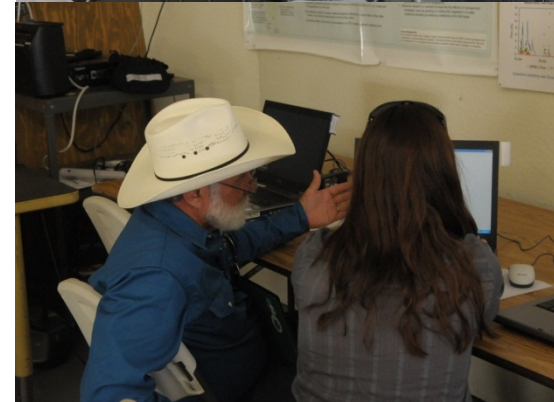
- Ranchers
- Ranch Managers
- Audubon California
- Beale Air Force Base
- CA Department of Fish and Wildlife
- Center for Natural Lands Management
- City of Fairfield
- Contra Costa Water District
- Defenders of Wildlife
- East Bay Municipal Utility District
- East Bay Regional Parks
- Environmental Consultants
- Hedgerow Farms
- Natural Resource Conservation Service
- Nevada Irrigation District
- Placer Land Trust
- Point Reyes National Park
- Point Blue Conservation Science
- San Francisco Public Utilities Commission
- The Nature Conservancy
- UC Cooperative Extension
- UC Davis Natural Reserve System
- US Fish & Wildlife Service
- US Forest Service



Workshops

UC Research Center
8 pastures, 1200 acres

- 1) Primary natural resource and agricultural goals
- 2) Potential challenges and opportunities for goals
- 3) Adaptive management strategies to achieve goals



Field Visits and Group Discussions



Common Goals and Objectives

“Economic and Ecological Sustainability”

GOALS

Vegetation

Livestock

Habitat

Soil health/
Water quality

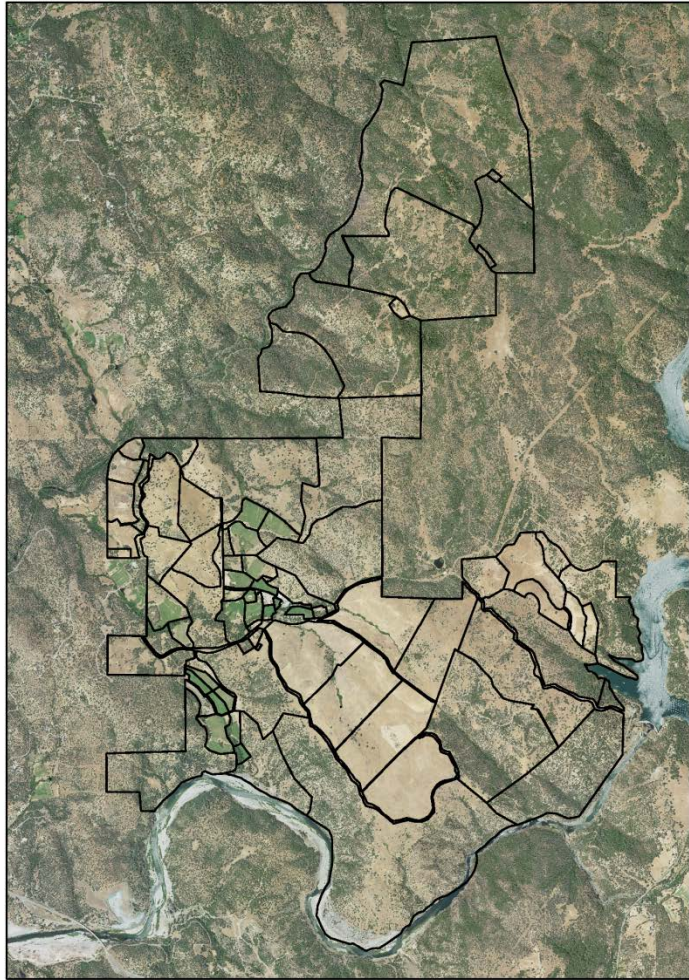
SPECIFIC OBJECTIVES

- Increase plant diversity
- Increase forage species diversity
- Increase forage production
- Reduce medusahead

- Maintain or increase livestock weight gain
- Minimize operating/practice costs

- Increase grassland bird diversity
- Increase variation in vegetation structure
- Increase native wildlife and habitat diversity

- Minimize compaction
- Restore soil fertility
- Maintain or restore water quality



***Computer
Surveys***



***Group
Discussions***

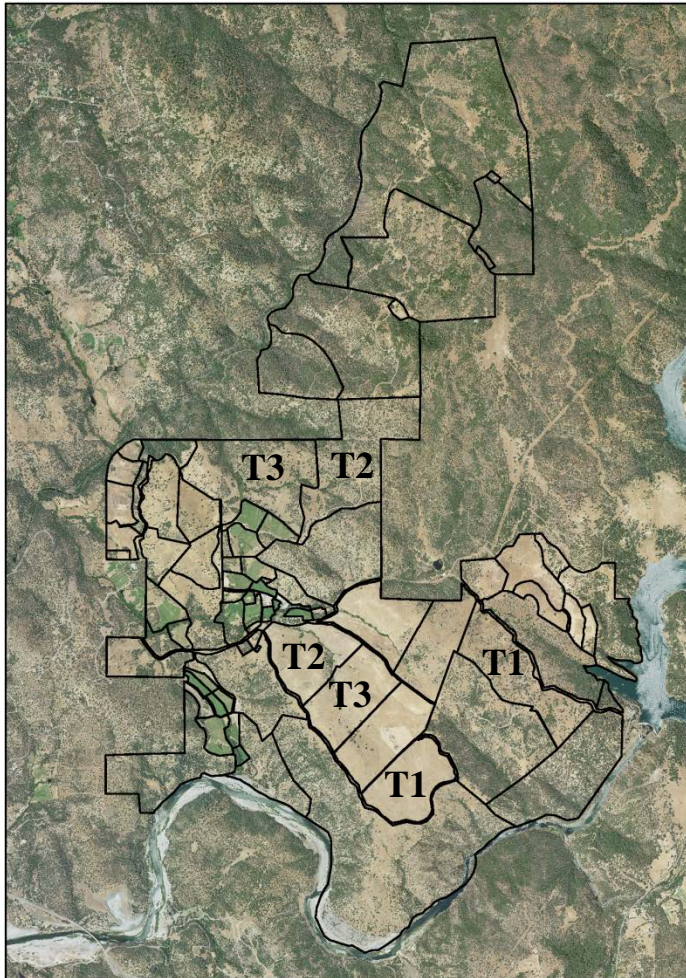


***Advisory
Team
meetings***

Three prescribed grazing strategies recommended for study...



Prescribed Grazing Strategies



T1 Season-Long Grazing
(~6 months)

T2 Fall/Spring Grazing
(~3 months)

T3 Fall/Spring, Targeted Grazing
(~3 months)

Grassland pastures ~ 3 head months/acre
Oak pastures ~ 1.2 head months/acre



Spatially targeted grazing treatment...

Monitoring multiple outcomes

GOAL	MONITORING
Livestock	Steer weight gains (ADG, gain/acre, etc.)
Vegetation	Diversity/richness/cover of invasive weeds and desirable forages, standing crop
Habitat	Ground bird hiding cover (veg structure)
Soil Health	Cover, RDM, fecal distribution



Monitoring multiple outcomes

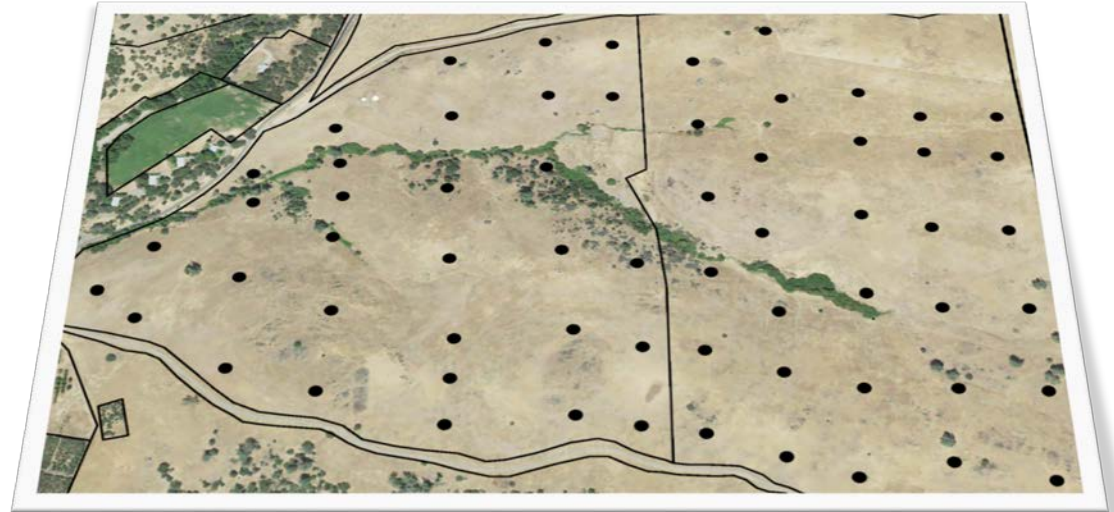
GOAL

MONITORING

Vegetation

Habitat

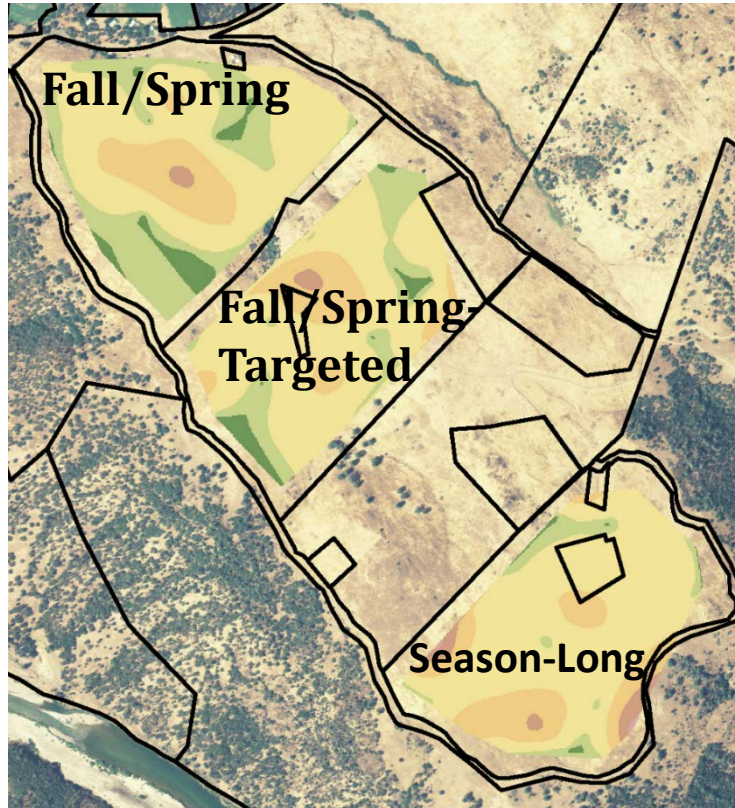
Soil Health



• **Sample sites**



Invasive Plant Response: Medusahead (MH)

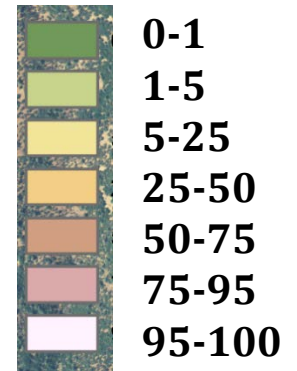


Baseline






Year 3

MH %

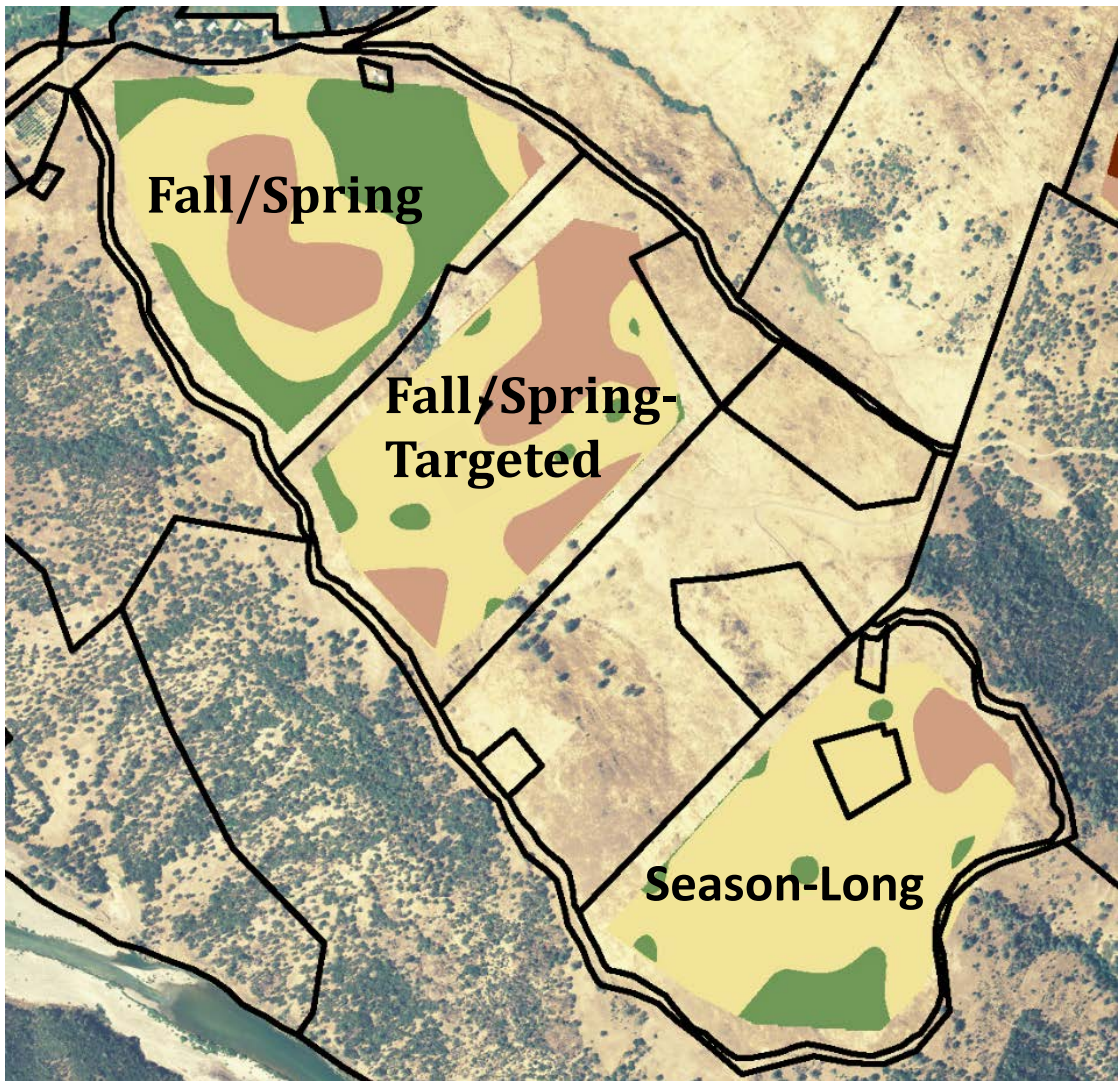


Animal Performance (steers)

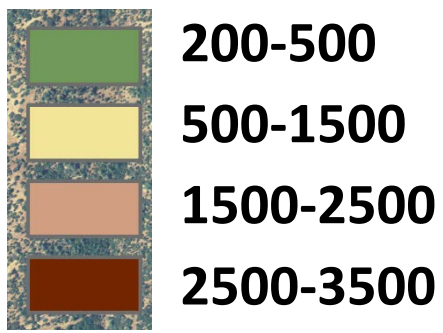
Spring Average Daily Gain (lbs/day)

	2012-13	2013-14	2014-15
Season-Long (T1)	2.6	3.5	3.2
Fall-Spring (T2)	3.2	4.1	3.4
Fall Spring-Targeted (T3)	 2.6	 3.8	 2.6

Standing Crop



lbs/acre



Year 3

Findings after 3 years of extreme drought...

- ~**15** to **25%** reductions in MH across all treatments
 - Greater reduction of MH dominated sites in fall/spring targeted treatments
- Intensive rotational grazing ↓ individual animal spring ADG
 - Still observed 2.5-4 lbs/day across MH-invaded pastures
- Capacity to adapt to drought greatest in intensive rotational grazing treatments
 - More available forage (↑ forage harvest efficiency, rest-regrowth dynamics)

Take Home Points...

- In systems with high weed invasion/pressure – grazing shown to be more effective than exclusion
- Experimental and experiential knowledge show that grazing timing and intensity are key to successfully meeting goals
- Management context: real world constraints



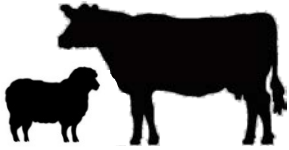
Deriving knowledge from managers...

“Knocking Out Noxious Weeds on Rangelands”



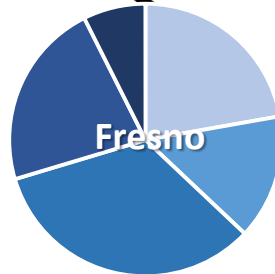
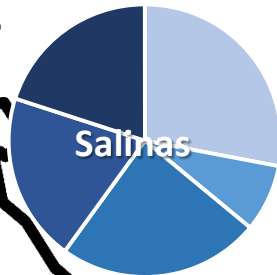
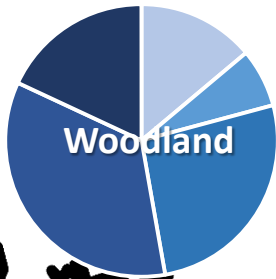
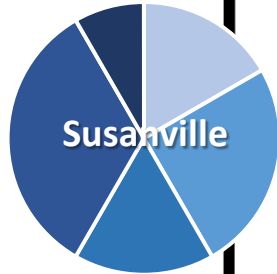
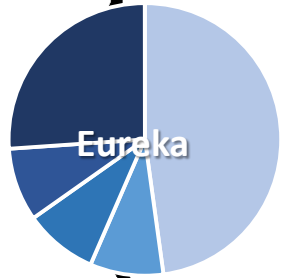
306 participants, 6 workshops

- How do practitioners make decisions about approaches
- Identify factors contributing to successes/failures
- How can we strengthen linkages between academic research and field application of Integrated Pest Management (IPM)



How often do you use grazing to manage weeds?

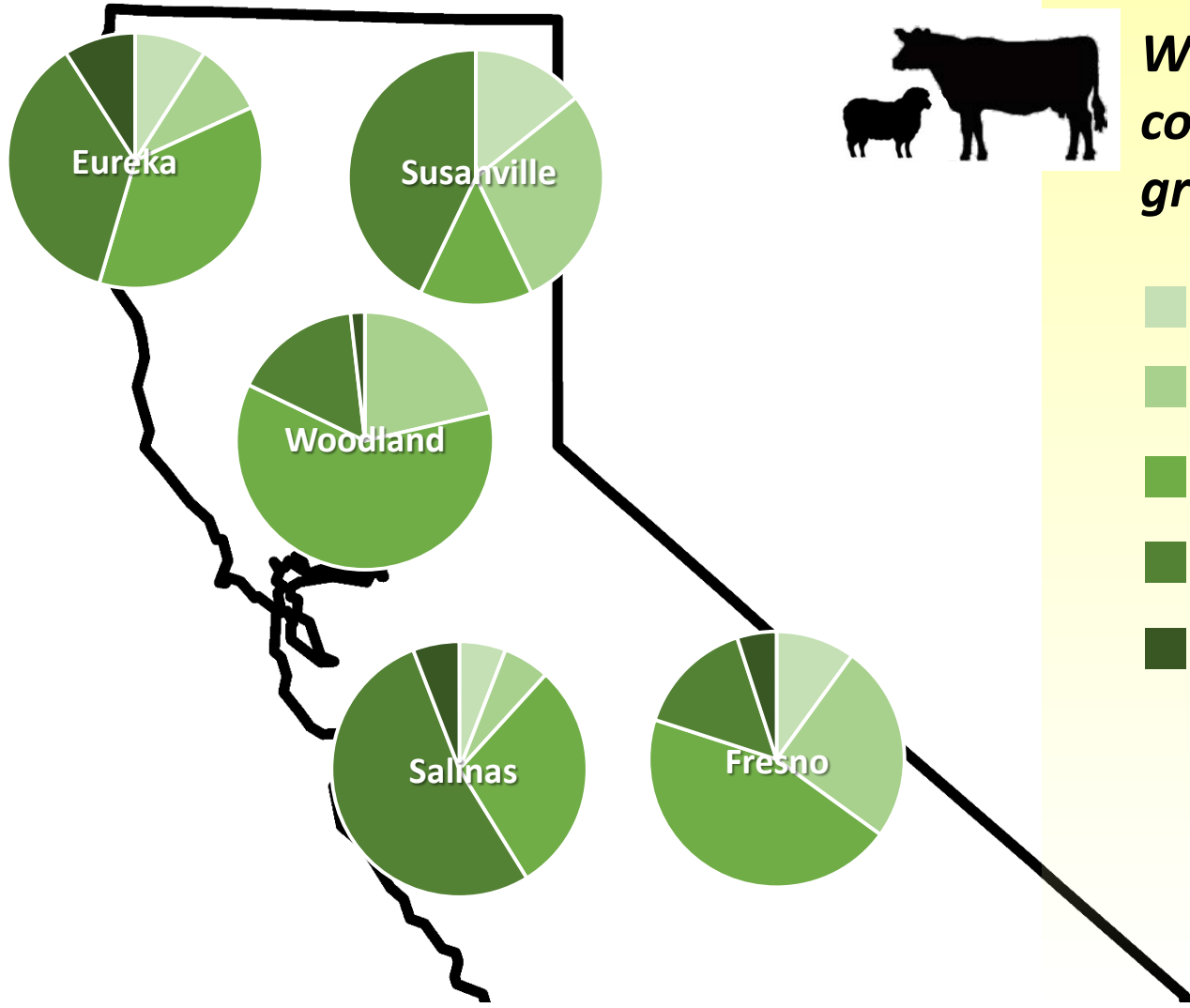
- Never
- Rarely
- Sometimes
- Often
- Always





What is your success in controlling weeds with grazing?

- Very poor
- Poor
- Fair
- Good
- Excellent



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