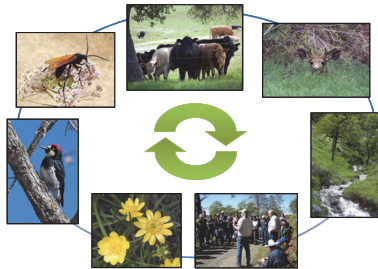


## Sustaining Multiple Ecosystem Services on Working Rangelands



Leslie M. Roche  
University of California, Davis



## Integrating Science & Practice

### Rangeland Decision-Making Mail Survey

- California Cattlemen's Association
- Wyoming Stock Growers Association

### Stakeholder-Prescribed Grazing Project

- Sierra Foothill Research & Extension Center
- Central Plains Experimental Range

### California Ranch Stewardship Project



## Collaborators and Partners

**Project Leaders:** Leslie Roche, Justin Derner, Valerie Eviner, Mark Lubell, Rick Standford, Lynn Huntsinger, Mel George, Toby O'Geen, Emily Kachergis, Bethany Cutts, Lorian Jasny, Dave Briske, Maria Fernandez-Gimenez, Ken Tate.

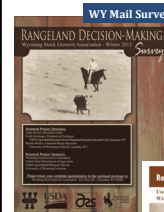
**Project Collaborators:** Sheila Barry, Theresa Becchetti, Josh Davy, Julie Fenzel, Larry Forero, Morgan Doran, Dustin Flavell, John Harper, Roger Ingram, Jeremy James, Royce Larsen, Stephanie Larson, David, Lewis, David Lile, Missy Merrill, Davies, Neil McDougald, Glenn Nader, Scott Oneto, Tracy Schohr.



Stakeholder Focus Groups



## Rangeland Decision-Making Surveys



- Determine factors driving grazing management decisions.
- Understand how managers receive, assess, and use information.
- Perspectives on adaptive grazing management for multiple goals.
- 1700 ranchers in California.
- 700 ranchers in Wyoming.

## RANGELAND DECISION-MAKING: GOALS



**CALIFORNIA**

1. Livestock Production, Forage Production
2. Water Quality, Invasive Weed Management, and Soil Health
3. Riparian/Meadow Health and Wildlife
4. Recreation and Carbon Sequestration

**WYOMING**

1. Livestock Production, Forage Production
2. Soil Health, Water Quality, Riparian/Meadow Health, Invasive Weed Management
3. Wildlife, Recreation, Carbon Sequestration



## CHARACTERIZING ON-RANCH GRAZING STRATEGIES

3 'California Brands' of Strategies

- Rotational Grazing
- Season-Long Continuous Grazing
- Year-Long Continuous Grazing


'California brand' of rotational grazing 42% of respondents

"I like to experiment with new ways of doing things"


Agree → # information sources ranked good/excellent (prob. = 0.37) → Rank of livestock production goal (1 or 2, prob. = 0.46)

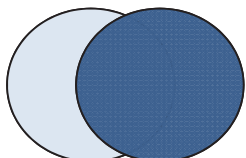
Neutral/Disagree → prob. = 0.26 → Rank of livestock production goal (3-9, prob. = 0.67)

## Stakeholder-Prescribed Adaptive Grazing Management Project




**Research**






**Application**



Improve overlap in objectives, adaptation of treatments, and outcomes monitored.

## Stakeholder Advisory Teams



UC Sierra Foothill Research and Extension Center  
USDA-ARS Central Plains Experimental Range

- Rancher, range manager, and conservation professionals.
- Prescribe goals and management strategies (treatments).
- We implement, monitor, adapt with stakeholder input.

## Diverse Project Partners


**SFREC Adaptive Grazing Management Project Workshops (May 2012)**

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

**CPER Adaptive Grazing Management Project Workshop (Sept 2012)**

Crow Valley Livestock Cooperative	Natural Resource Conservation Service
Colorado State University Extension	Rocky Mountain Bird Observatory
Environmental Consultants	The Nature Conservancy
Environmental Defense Fund	US Forest Service

## Stakeholder Advisory Teams



Stakeholder-Prescribed Adaptive Grazing Management Experiment - SFREC

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

### So....What do you think?

8 pastures, 1200 acres

- Oak and grassland pastures
- Computer survey: Goals & Practices
  - Individual and group discussions






Connecting social network and decision making analyses with field ecology and livestock research.


### Stakeholder Prescribed Adaptive Grazing Management Project



#### Goals

- Livestock and forage production.
- Diverse plant and animal communities.
- Soil health and clean water (i.e., infiltration, nutrient retention).

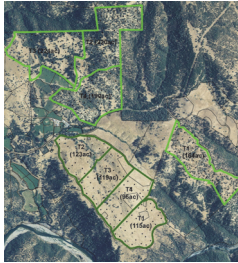
### Stakeholder Prescribed Adaptive Grazing Management Project



#### Challenge

- Medusahead infestation.
- Lacking diverse forage and plant base.

### Stakeholder Prescribed Adaptive Grazing Management Study





#### Grazing Treatments

- T1 7 month season long.
- T2 4 month Fall-Spring.
- T3 4 month Fall-Spring, targeted grazing using electric fence.
- T4 3 month Winter.

**Use forage:** Moderate-high stocking rate for all treatments.

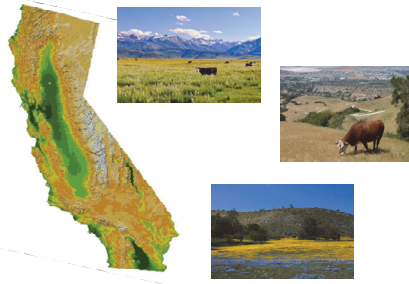







### Monitoring Ecosystem Service Responses to Prescribed Grazing Treatments – Year 1

GOAL	INDICATOR
Livestock & Forage	Cattle gains Available forage
Plant Cover, Diversity	Cover of weeds, forage species, richness, diversity
Habitat Diversity	Ground bird hiding cover
Soil and Water Quality	Cattle fecal – nutrient distribution

### On-ranch Strategies: Balancing Multiple Goals

#### California Ranch Stewardship Project

Adaptive Management for Economic Sustainability and Rangeland Health

## California Ranch Stewardship Project

### Adaptive Management for Profit and Rangeland Health

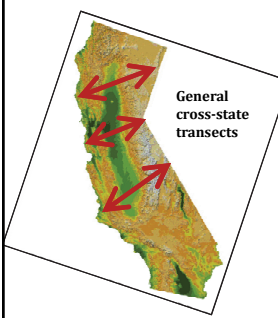
#### On-Ranch Interviews and Field Surveys



- Connect research and policy with how decisions get made on-the-ground.
- Link decision-making to agricultural and ecological outcomes.
- Integrate rancher knowledge and experimental approaches to provide insights into strategies to adapt to future changes.

## On-Ranch Interviews and Field Surveys

*Connecting the social, economic, and ecological dots of decision-making, implementation, and outcomes*



- 60 case-studies spanning cross-state transects
- Within each 'climatic bioregion' — ranchers with diverse strategies and goals
- In-person, semi-structured interviews (Spring-Summer 2013)
- On-ranch participatory field surveys (Fall 2013- Summer 2014)

## On-Ranch Interviews

### Operation/Operator Characteristics

- Enterprise ↔ Pasture
- Land types
- Information sources

### Values and Goals

- What gets you up in the morning?
- What keeps you up at night?

### Management Strategies/Perspectives (~Goals)

- What practices/programs have been successful (or not)?
- Aspect of management that you would change to improve social, economic, or natural resource goals?

### Adapting Management

- Preparing for and dealing with drought/extreme events.
- Major changes in strategies?



## California Ranch Stewardship Project


### NEXT STEPS

- Finish preliminary visits.
- Finish survey tool, feedback from collaborators.
- Recruit additional participants.
- Semi-structured interviews— Spring/Summer 2013.





Google  
"California Ranch Stewardship Project"

## Sustaining Multiple Ecosystem Services on Working Rangelands





**Mail Surveys**






**On-Ranch Interviews**





**Stakeholder-prescribed experiments**



**Multi-Pronged Approach**

## FIELD WORKSHOP

UC Sierra Foothill  
Research and Extension Center

*Protecting and enhancing your most critical rangeland resources*  
8:30-4:00 May 7th 2013, Browns Valley, CA

A hands on workshop to learn about:

- Adaptive grazing to optimize cattle gains and natural resources
- Foothill abortion management and vaccine development
- Soil health and function—diagnosis and management
- Pinkeye and eye cancer identification and treatment
- Medusahead management at a ranch-scale
- Rangeland wildfire economic impacts

**Limited class size**  
Register now online:  
<http://ucanr.org/sites/foohill/>  
\$12 Registration day of workshop covers lunch (Proceeds to High School Ag Scholarship)  
(530) 639-8800  
CEU Available

University of California  
Agriculture and Natural Resources | Research and Extension Center System

**California Rangeland Watershed Laboratory**  
<http://rangelandwatersheds.ucdavis.edu>



*Partnerships among scientists, managers, and conservationists are providing the most relevant knowledge for managing rangeland systems.*