Working Lands

Balance, Collaboration, Adaptation

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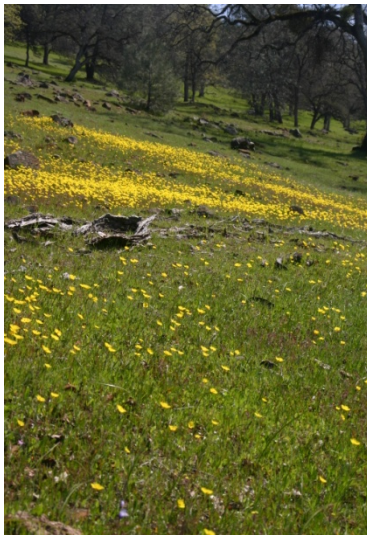
UC RANGELANDS
Supporting Working Landscapes





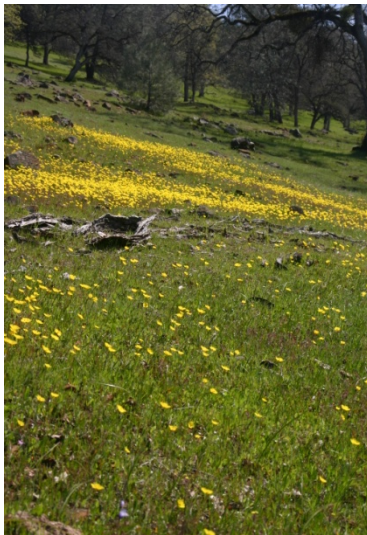



Working Lands

- What are some of the issues and challenges in sustaining working landscapes?
- How do science and management co-engage to address these challenges?
- What do we know, and what can we do better – together?





Working lands provide critical ecosystem services

Sustaining these benefits requires balance, collaboration, adaptation

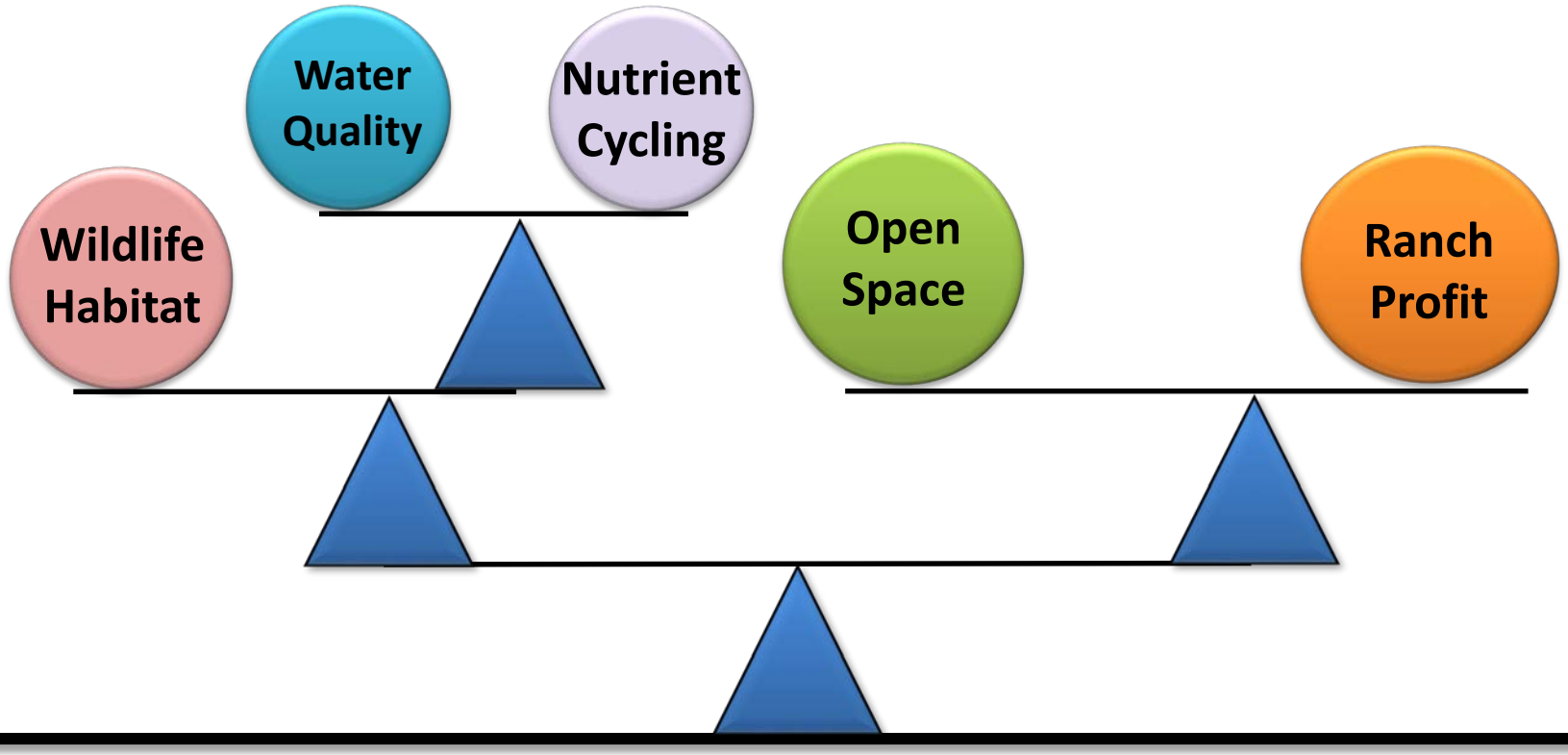
Working Lands: Balance

- Strong cultural, economic, and ecological connections.

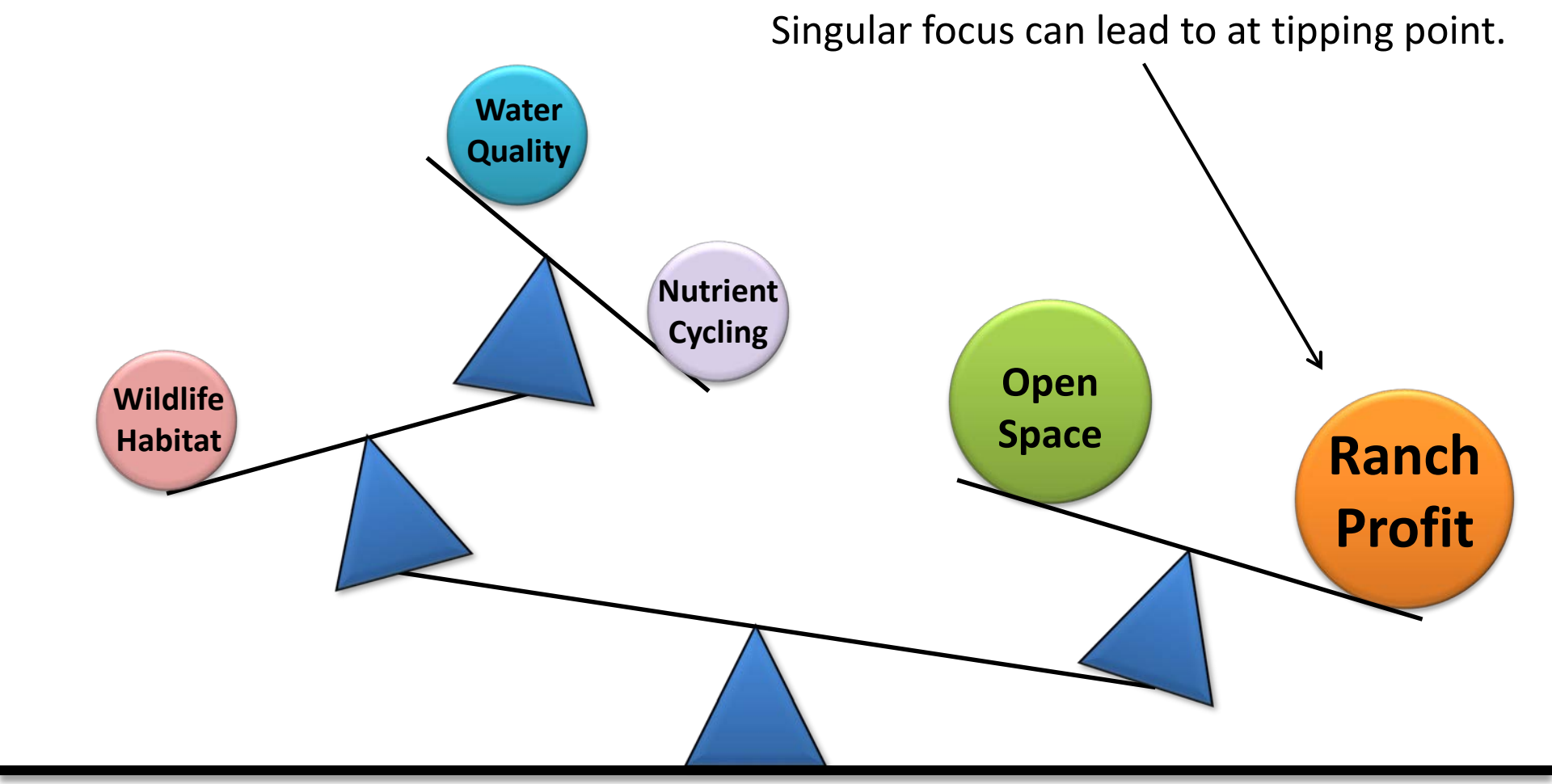
Working Lands: Balance

- Strong cultural, economic, and ecological connections.
- Livelihoods are at stake, and are they are dependent upon ecological function and resulting services.

Working Lands: Balance



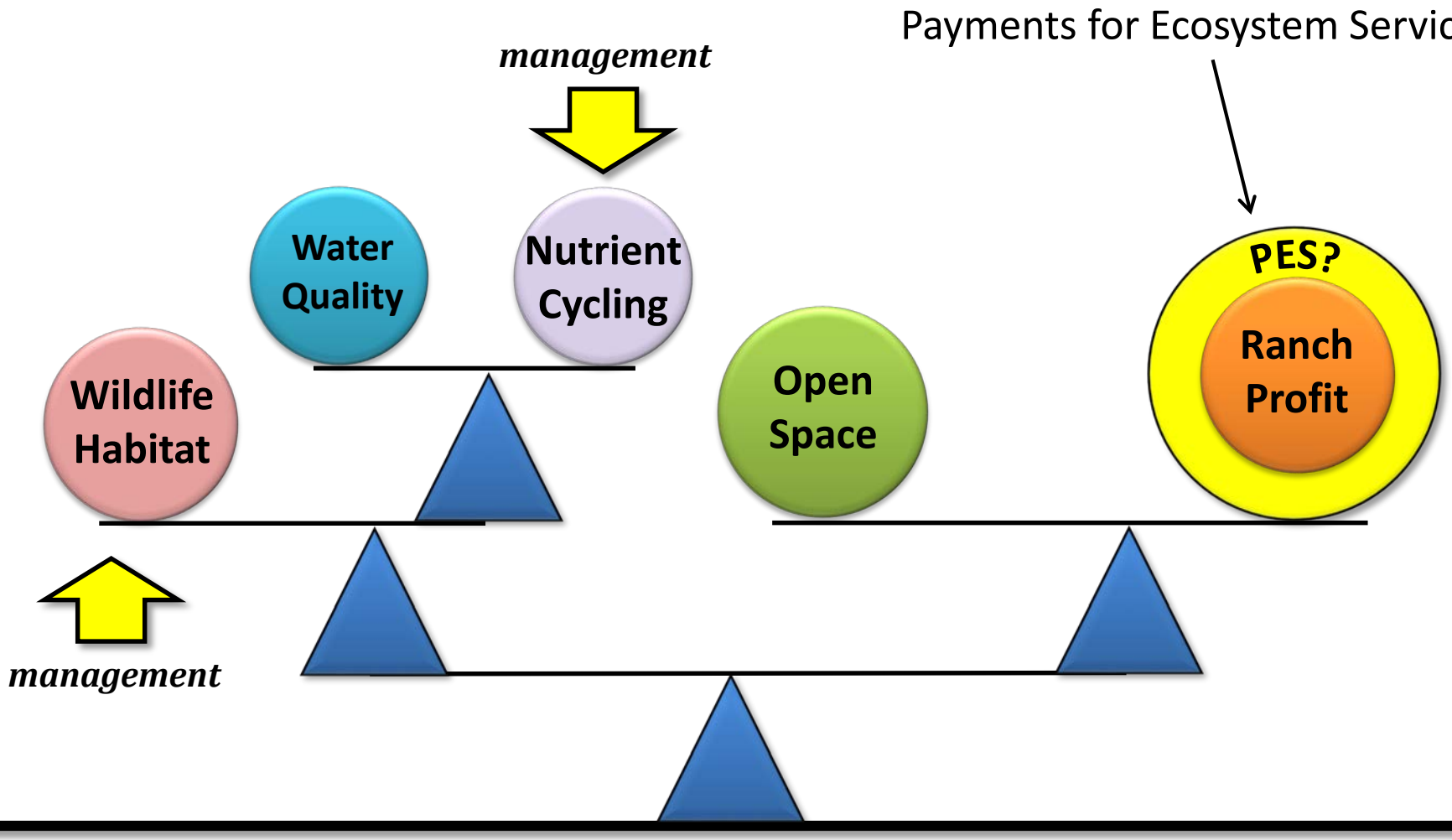
Working Lands: Balance



Working Lands: Balance

Singular focus can cause an unraveling of the system

Working Lands: Balance



Working Lands: Collaboration

- Sustainable management directly benefits the cultural, economic, and ecological facets of the community.

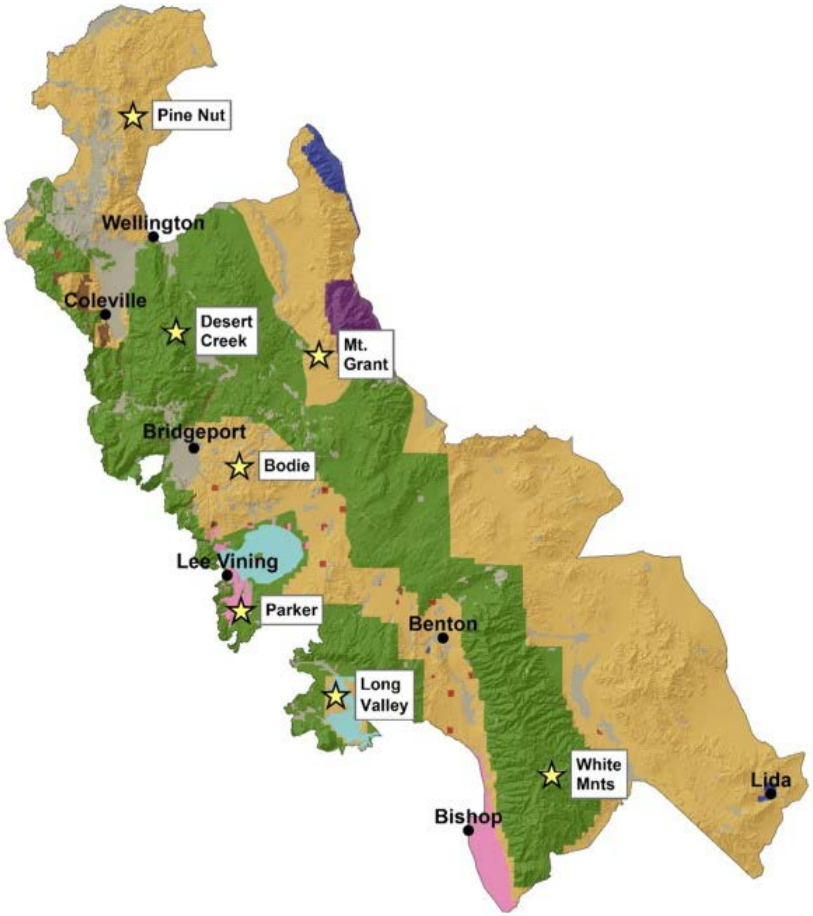
col·lab·o·ra·tion

noun

Two or more people working together towards shared goals

A LARGE CROWD GATHERED IN BURNS, ORE., JAN. 6 TO DISCUSS A PROPOSED ENVIRONMENTAL IMPACT

“Bi-State” sage grouse conservation case study



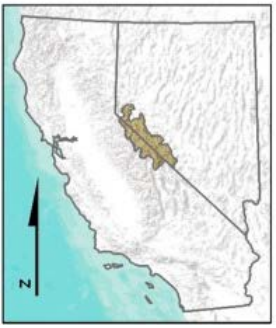
A landscape-scale, collaborative conservation effort

1) Pending ESA listing action was transformed into opportunity for conservation partnership

2) A locally based partnership anchored collaboration and engagement in conservation

3) Best-available science plus local knowledge led to “certainty of effectiveness and implementation”—the criteria used by the US Fish and Wildlife Service to evaluate conservation efforts when making listing decisions.

4) Precluded the need for an ESA listing of the Bi-State population of sage grouse.



Land Ownership

BIA	1%	Local Gov.	2%
BLM	48%	Private/Other	8%
DOD	1%	State	<1%
FS	38%	Water	2%
FWS	<1%		

Features

- Cities
- Sage-grouse Populations
- Bi-state Extent

0 12.5 25 50 75
km

http://www.sciencedirect.com/science/article/pii/S1550742416300604

Working Lands: Collaboration?

- Fundamental values differences and disagreements on appropriate goals and land uses.

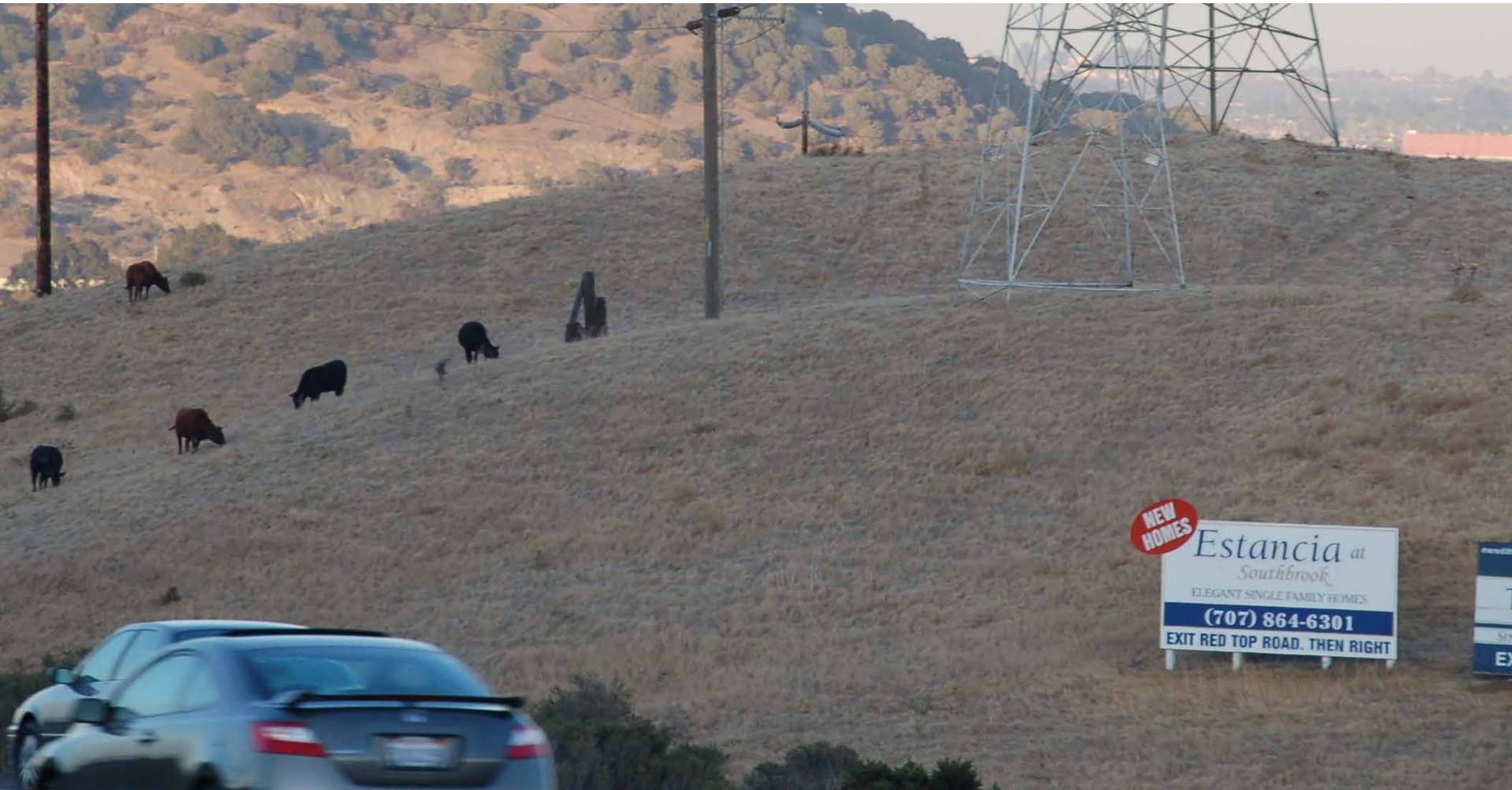
Cattle Free by '93!

vs.

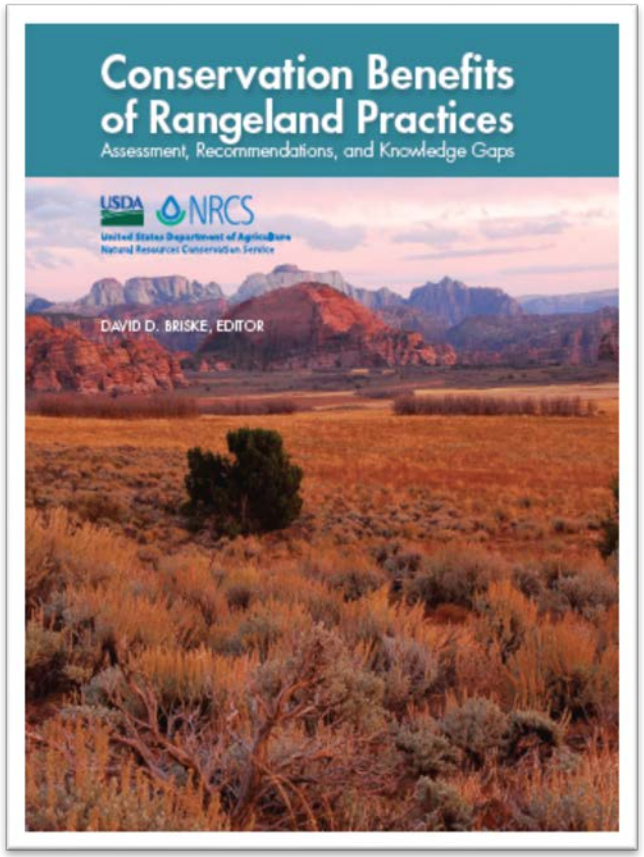
Cattle Galore by '94!

Working Lands: Adaptation

- The only certainty is constant environmental, cultural, and economic change.

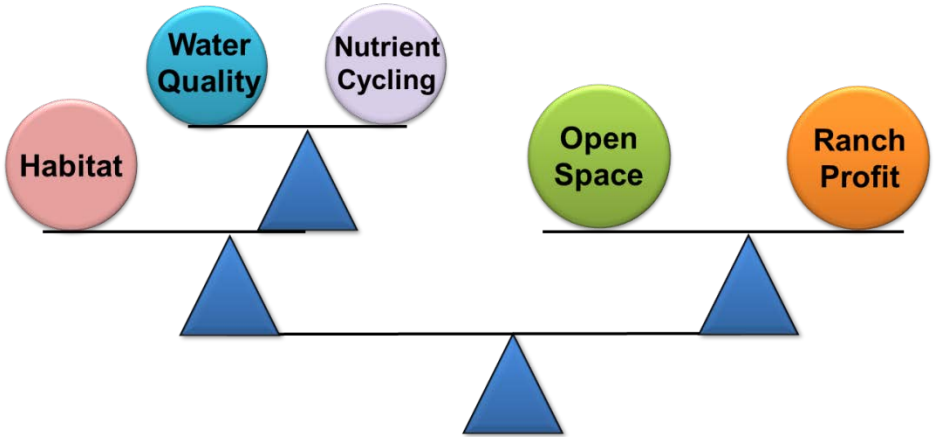


Science – Management Syntheses



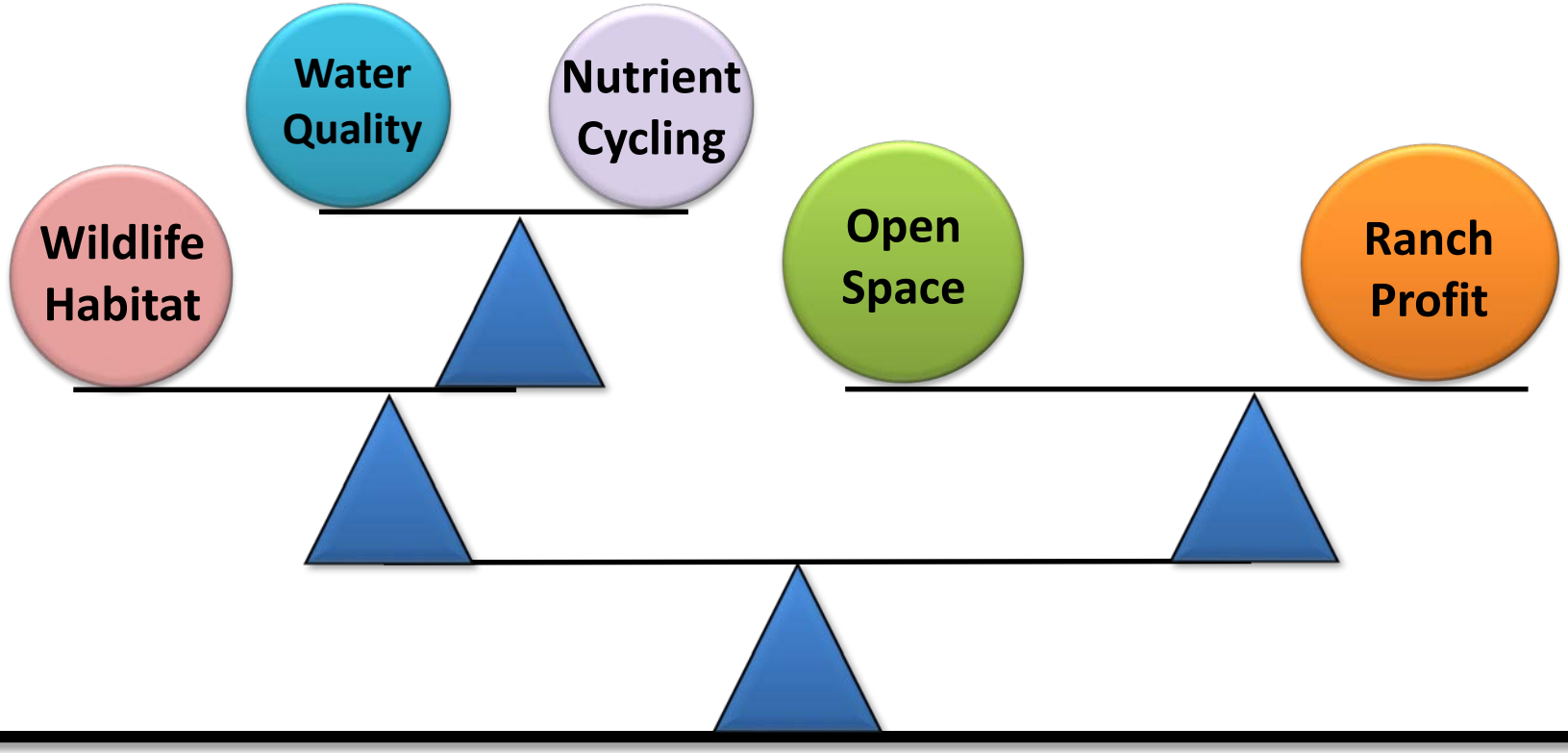
Key Recommendations

1) Expand collaborations between scientists and land managers.
2) Integrate socio-economic and ecological factors in examining outcomes.
3) Evaluate roles of adaptive management in meeting multiple goals.

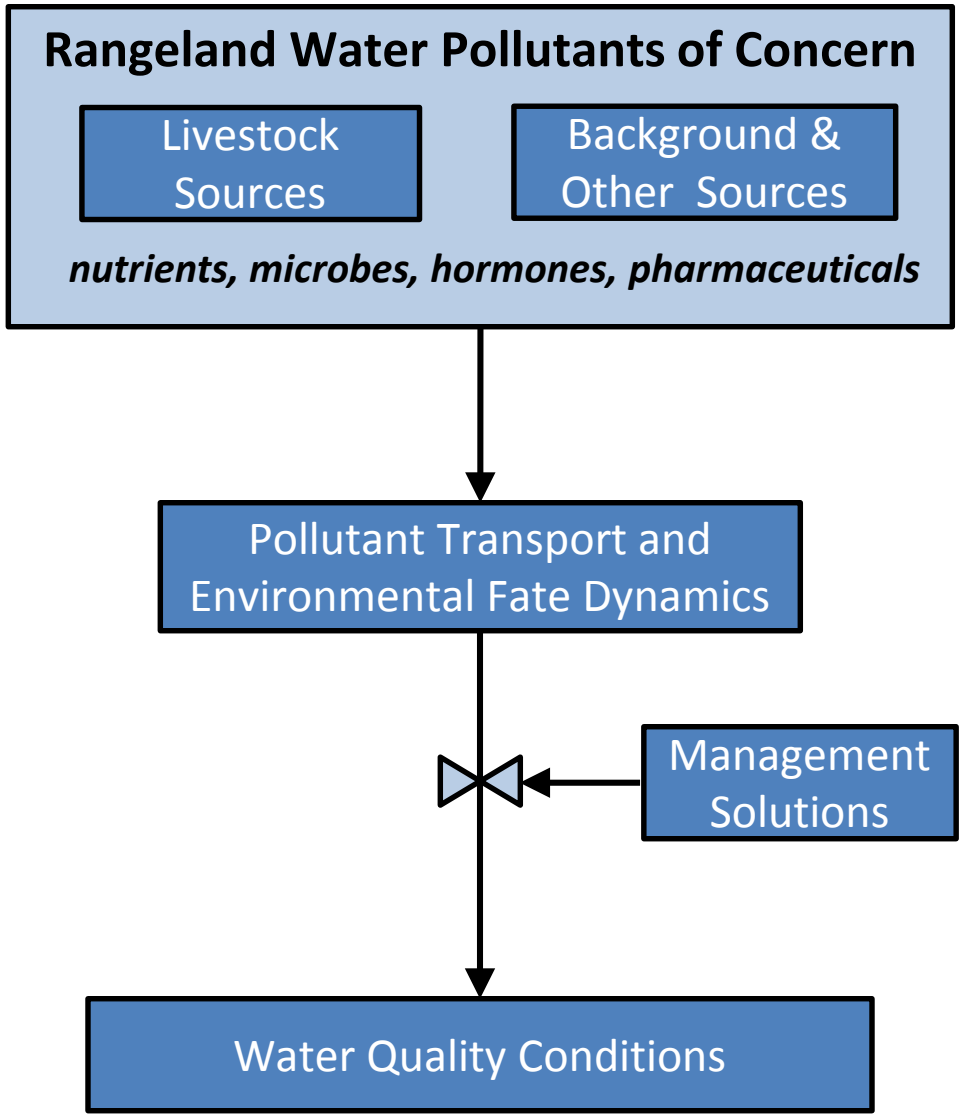


Working Lands: Science

- Substantial evidence that we can manage to balance conservation and production biophysical outcomes.



Science: Grazing & Water Quality



- **A toolbox of effective WQ protection practices**
- **With good management – clean water and grazing are compatible**

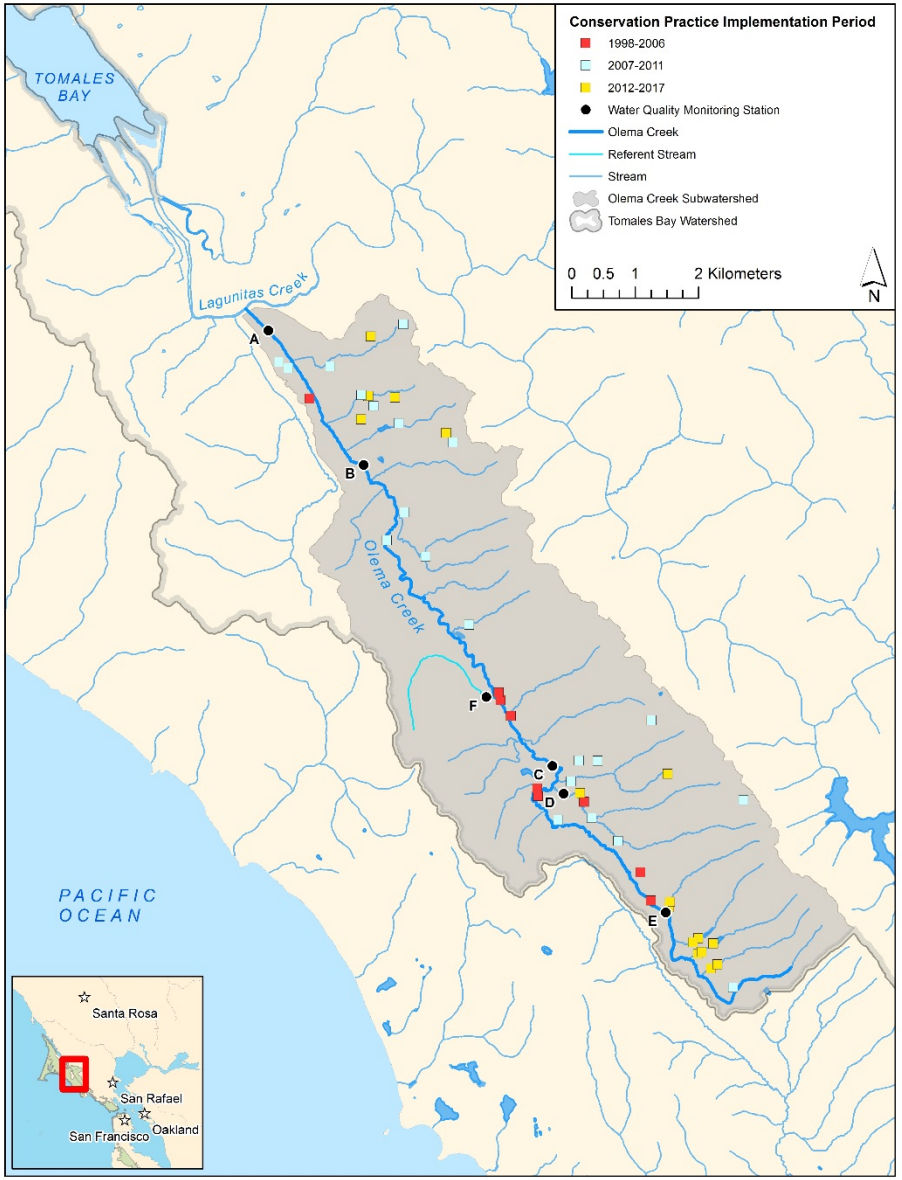
Pt. Reyes National Seashore

Working Lands Case Study

Olema Creek Riparian Restoration

Pt. Reyes National Seashore

- Elevated microbial pollution.
- Impairment aquatic habitat and stream health.
- Unmanaged livestock access to stream.



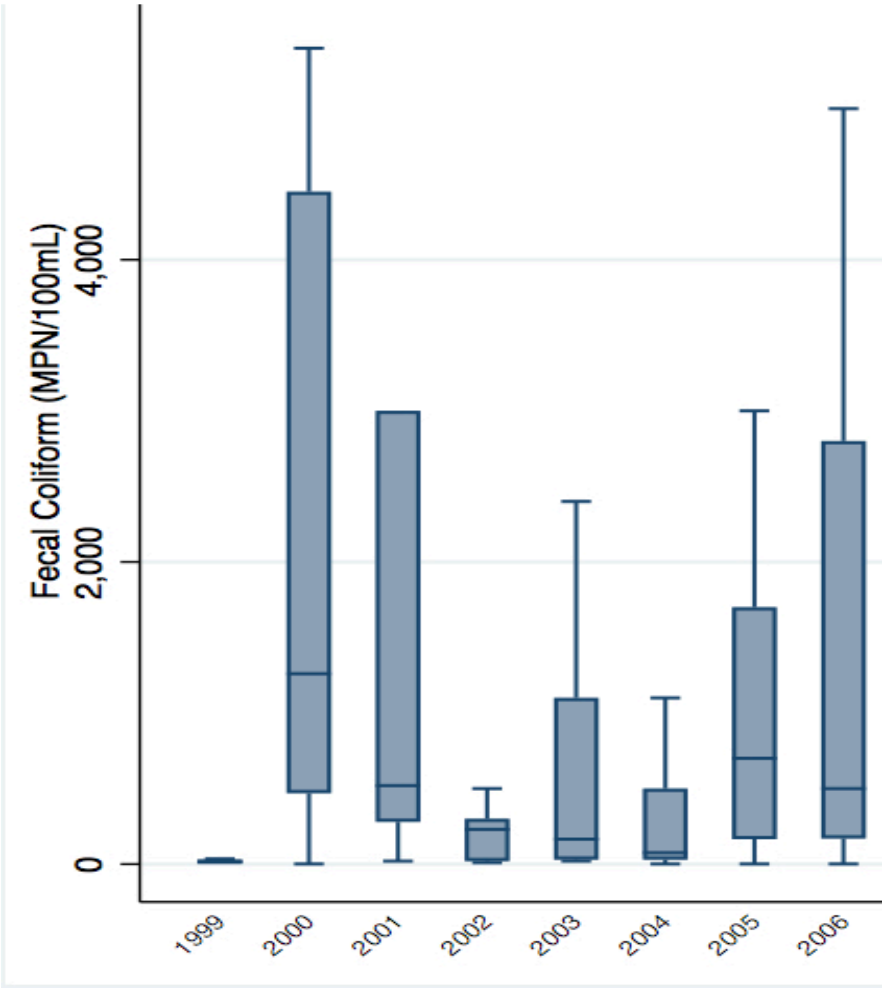
Olema Creek Riparian Restoration

Pt. Reyes National Seashore

1999 → 2006

9 Conservation Practices
4.16 Stream KM Influenced

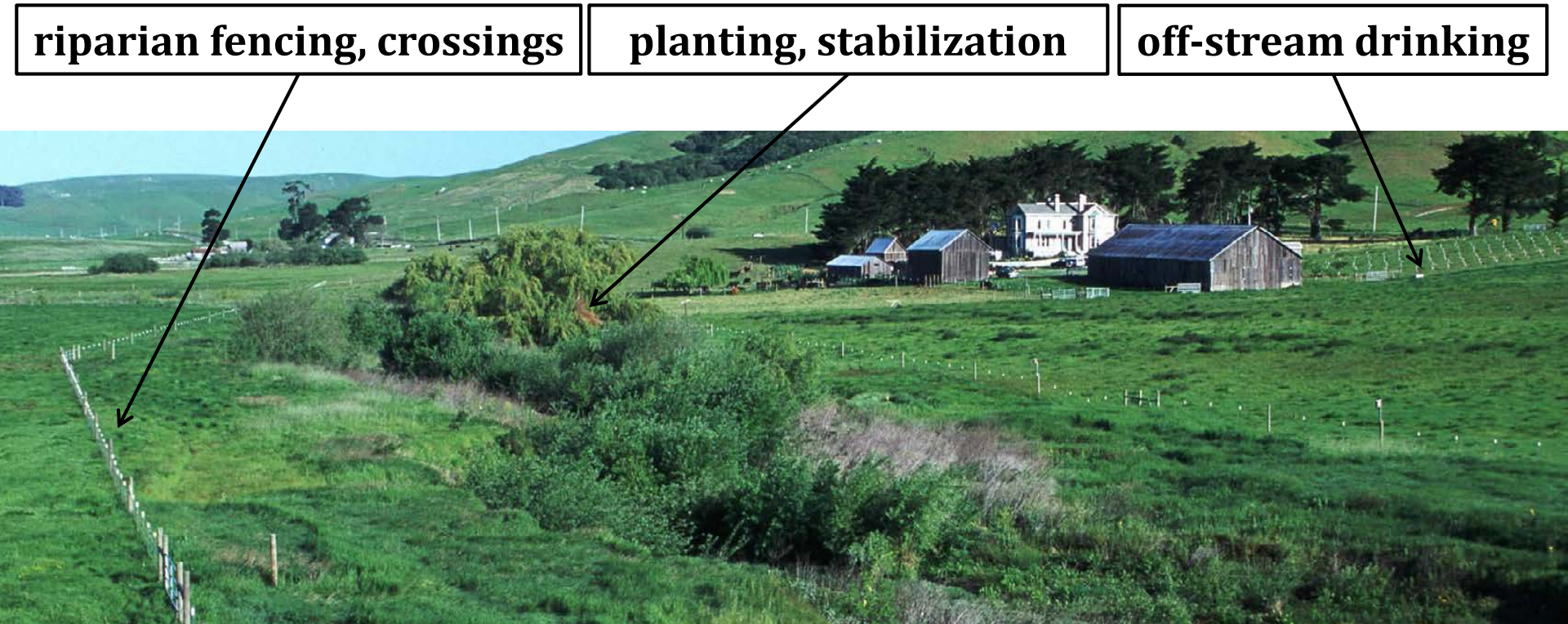
Sites	3	3	4	4	5	5	5	5
Samples	7	12	17	12	27	77	100	88



Olema Creek Riparian Restoration

Pt. Reyes National Seashore

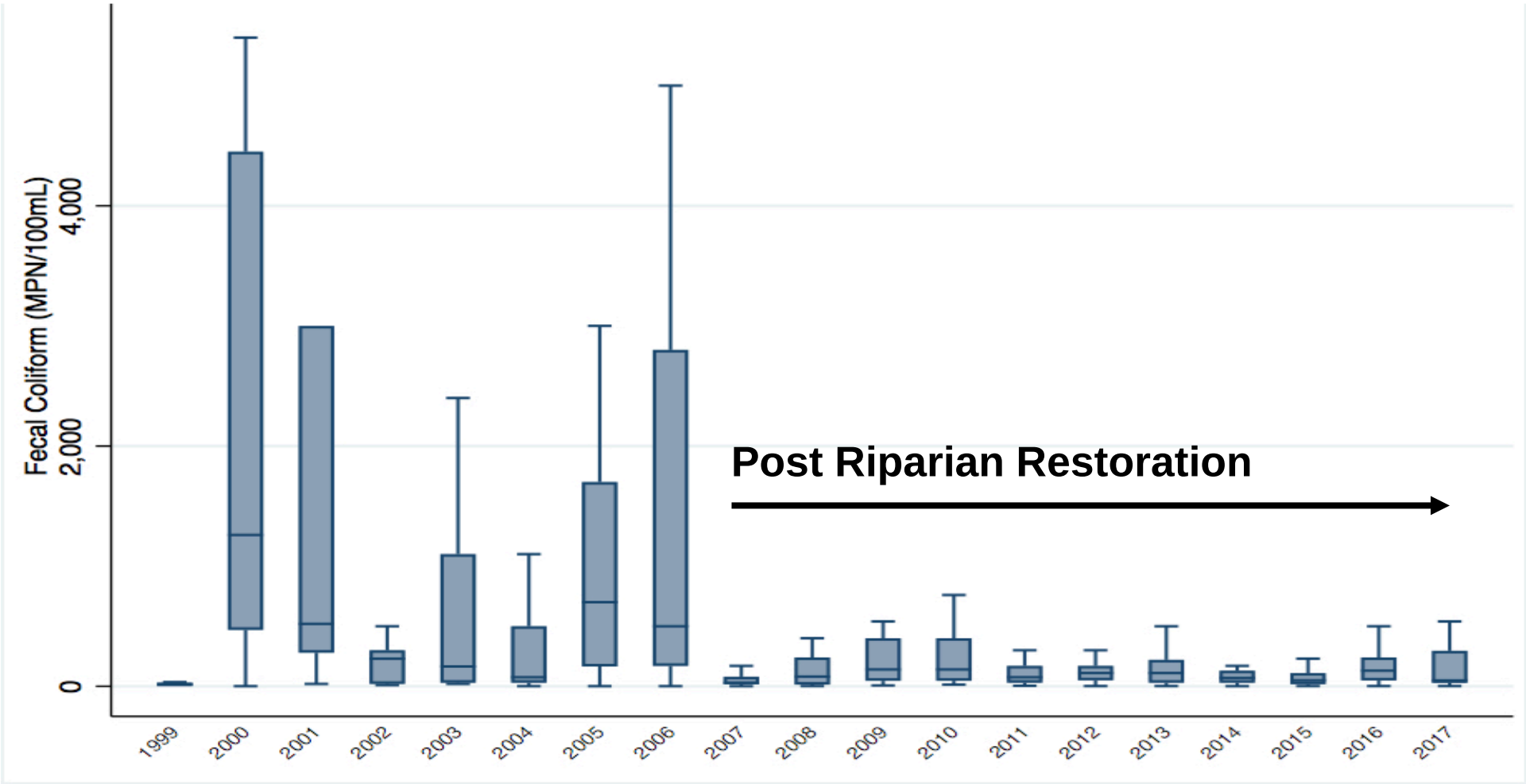
- A campaign of management improvements
- NPS, ranchers, EPA & water boards, NRCS, RCDs, UCCE, etc
- Planning, permitting, funding, implementation, monitoring.



Olema Creek Riparian Restoration

Pt. Reyes National Seashore

	1999 → 2006								2007 → 2011					2012 → 2017					
	9 Conservation Practices 4.16 Stream KM Influenced								21 Conservation Practices 15.64 Stream KM Influenced					16 Conservation Practices 8.56 Stream KM Influenced					
Sites	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Samples	7	12	17	12	27	77	100	88	50	25	82	70	70	87	60	25	74	79	91



CENTER *for* BIOLOGICAL DIVERSITY

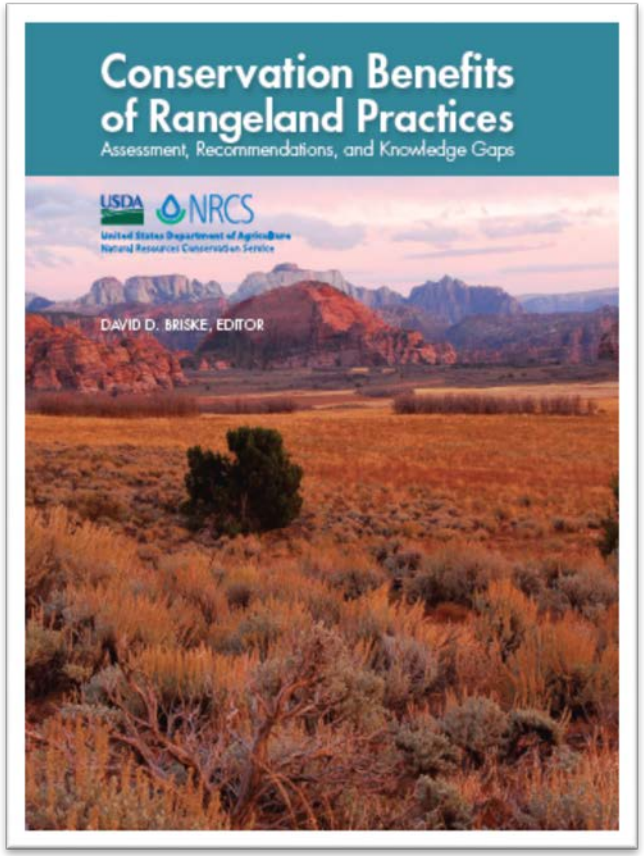
Because life is good.

For Immediate Release, November 21, 2017

Cattle Waste Puts California's Point Reyes on 'Crappiest Places in America' List

POINT REYES, *Calif.*— The livestock-polluted waters of Point Reyes National Seashore rank in the top 10 percent of U.S. locations most contaminated by feces indicated by *E. coli* bacteria, according to a new report published on the investigative journalism website *The Revelator*.

Science – Management Syntheses



Key Recommendations

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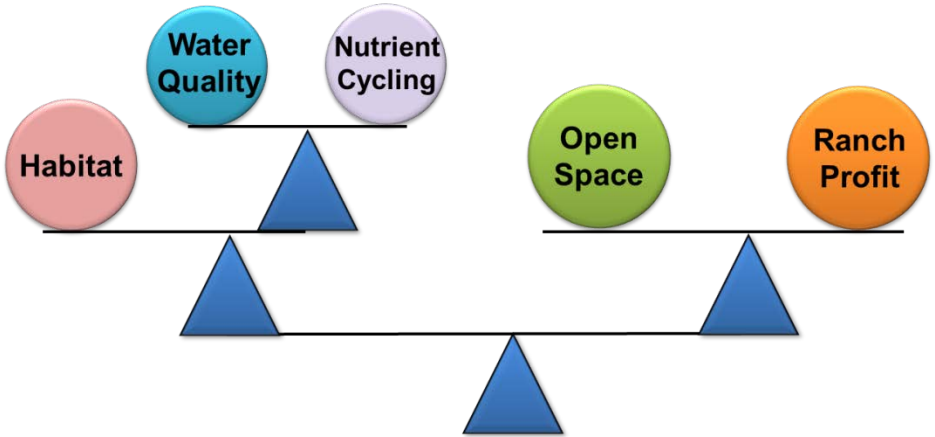
2) **Integrate socio-economic and ecological factors in examining outcomes.**

3) Evaluate roles of adaptive management in meeting multiple goals.



Integrating Management & Science

Research

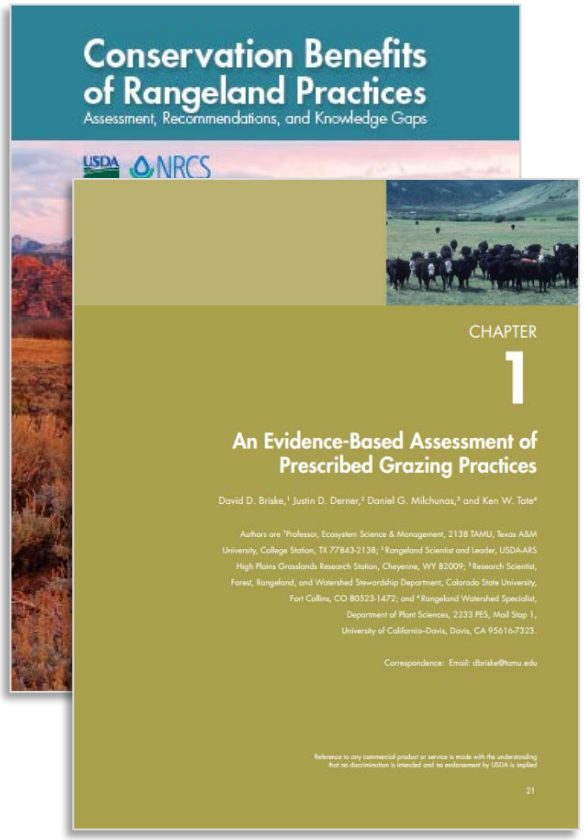
Management

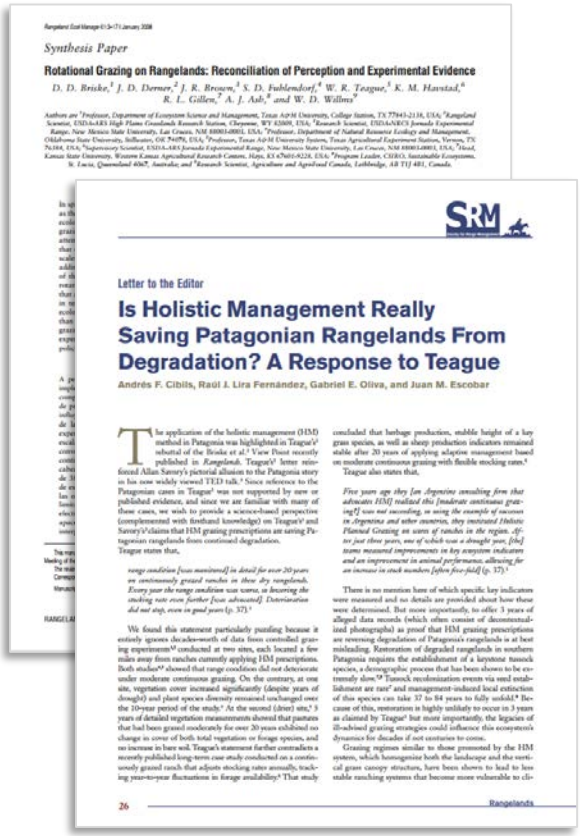
Artificial, controlled experiments

Adaptively implemented, landscape strategies

Classic Example = Grazing Systems Dilemma

- No ecological, agricultural, economic benefit to rotational over continuous grazing strategies…
- Rotational grazing improves soil health, forage production, economics, makes happy cows…





Roche *et al. 2015.*

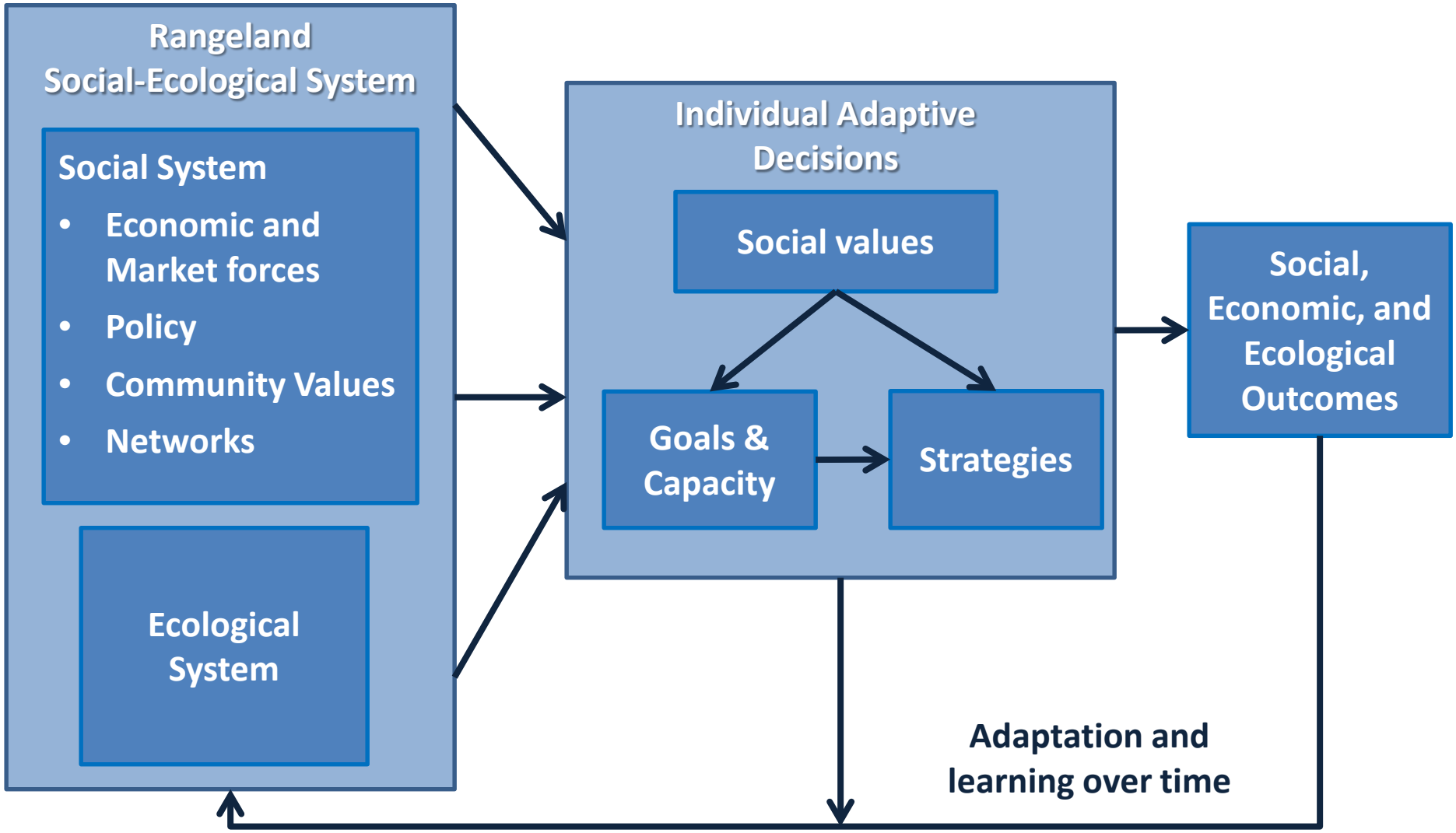
WY & CA On-Ranch Grazing Strategies

- 67% of 765 ranchers employ rotational grazing strategies.
- > 93% of all 'rotational' grazers use *extensive* intra-growing season rotation—moderate grazing periods, moderate livestock densities.
- Limited on-ranch adoption of intensive rotational strategies (5%).

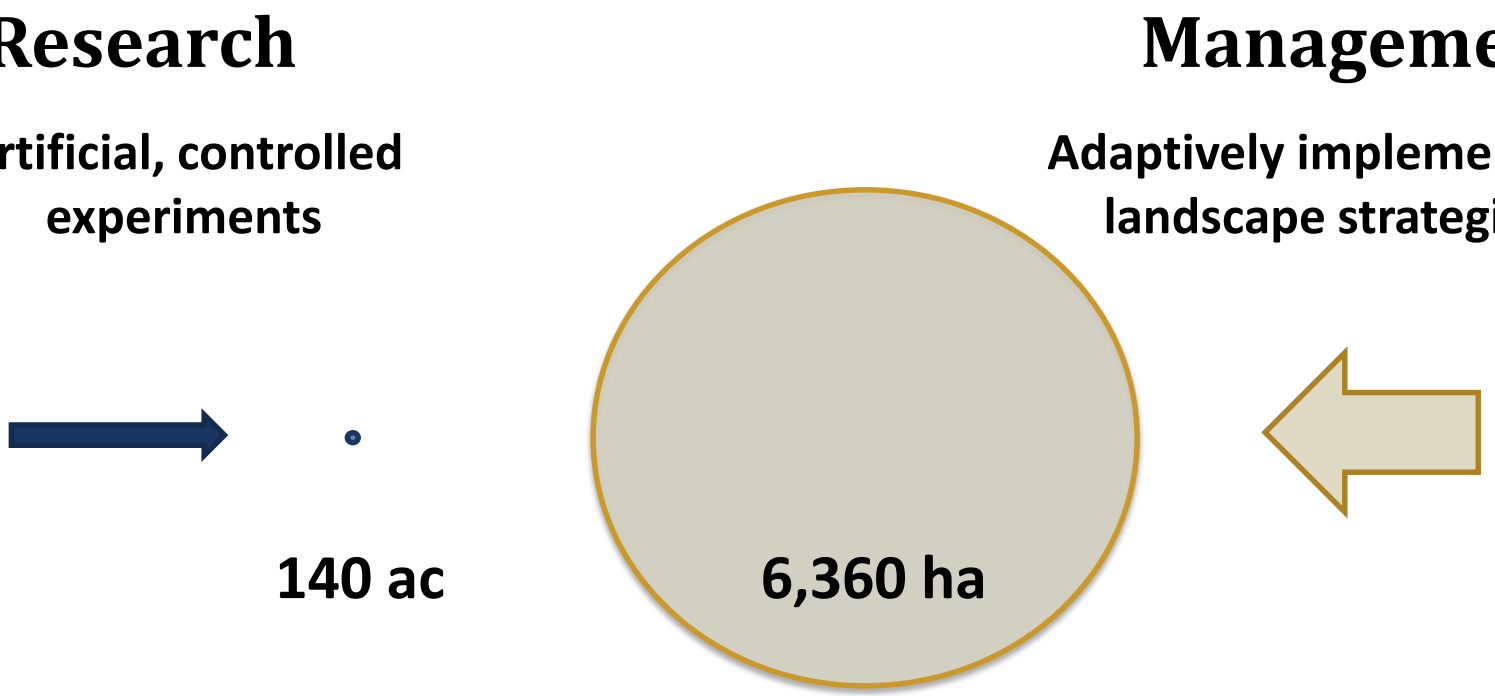
Roche *et al. 2015.*

Factors Driving On-Ranch Grazing Adoption

Differential Goal Setting • Risk Tolerance • Experimentation • Information Networks • Number of Livestock • Land Ownership • Eco-region



Relative Spatial Scale of Grazing Systems Research and On-Ranch Adaptive Grazing Management



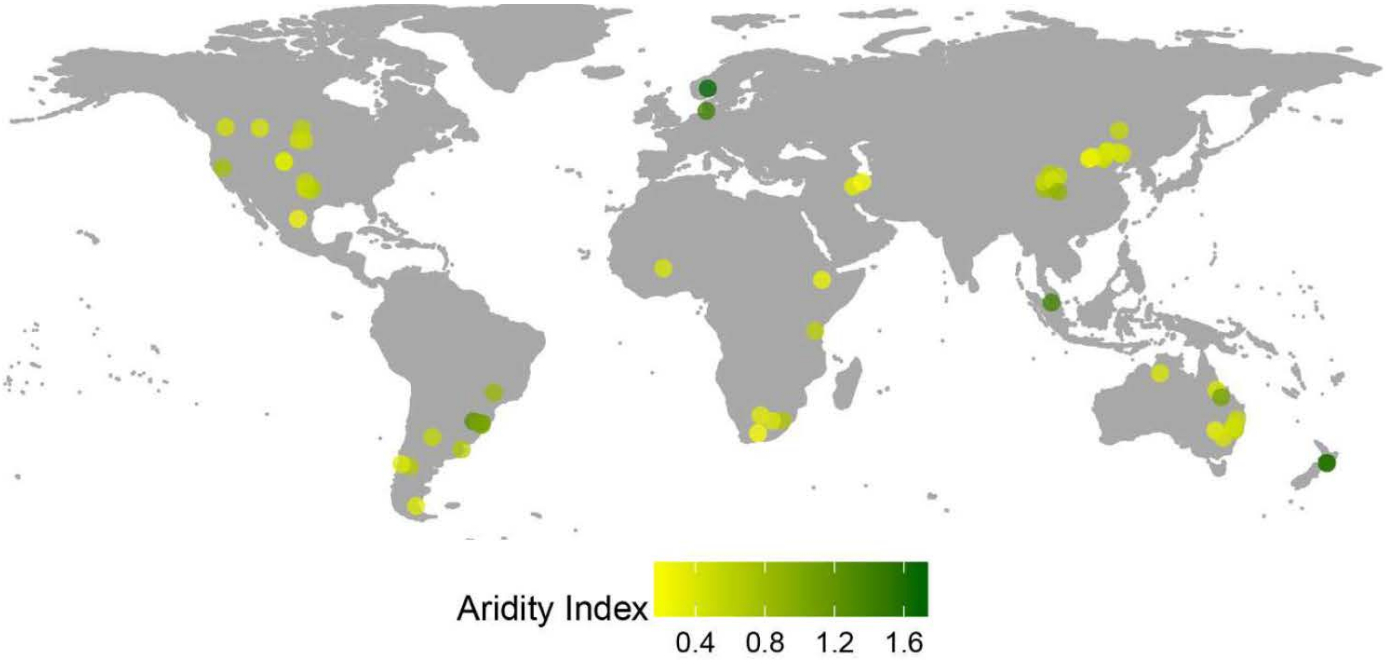
Warning: Objects are to Scale

Briske et al. 2011. Chap 1. *Prescribed Grazing Strategies*. Rangeland CEAP

Grazing Management for Healthy Soils and Climate Change Mitigation?

What do we know about how grazing management impacts soil health?

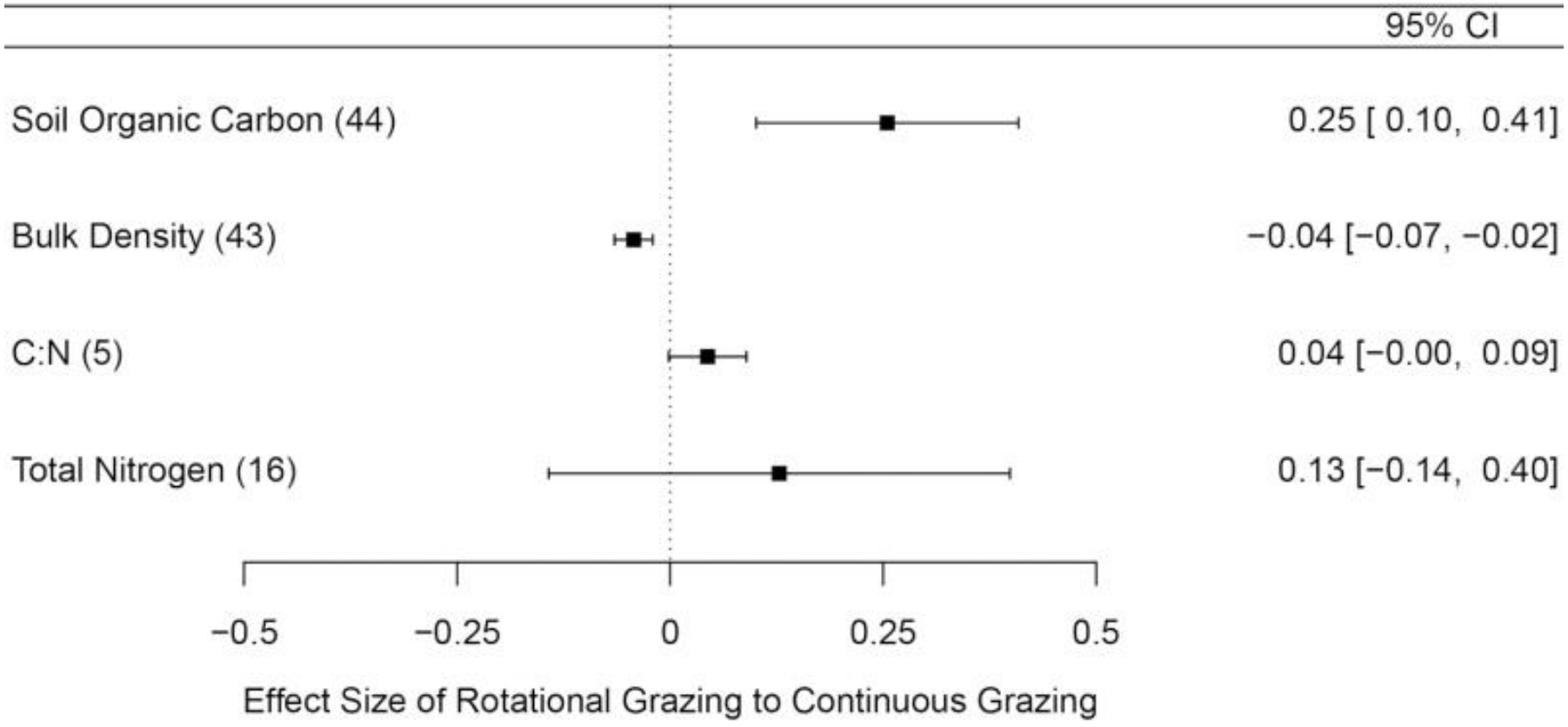
Byrnes, R.C., D.J. Eastburn, K.W. Tate, and L.M. Roche. 2018. *A Global Meta-Analysis of Grazing Impacts on Soil Health Indicators.* J. Environmental Quality.



Does Rotation Improve Soil Health over Continuous Grazing?

Compared to continuous grazing, rotational grazing results in:

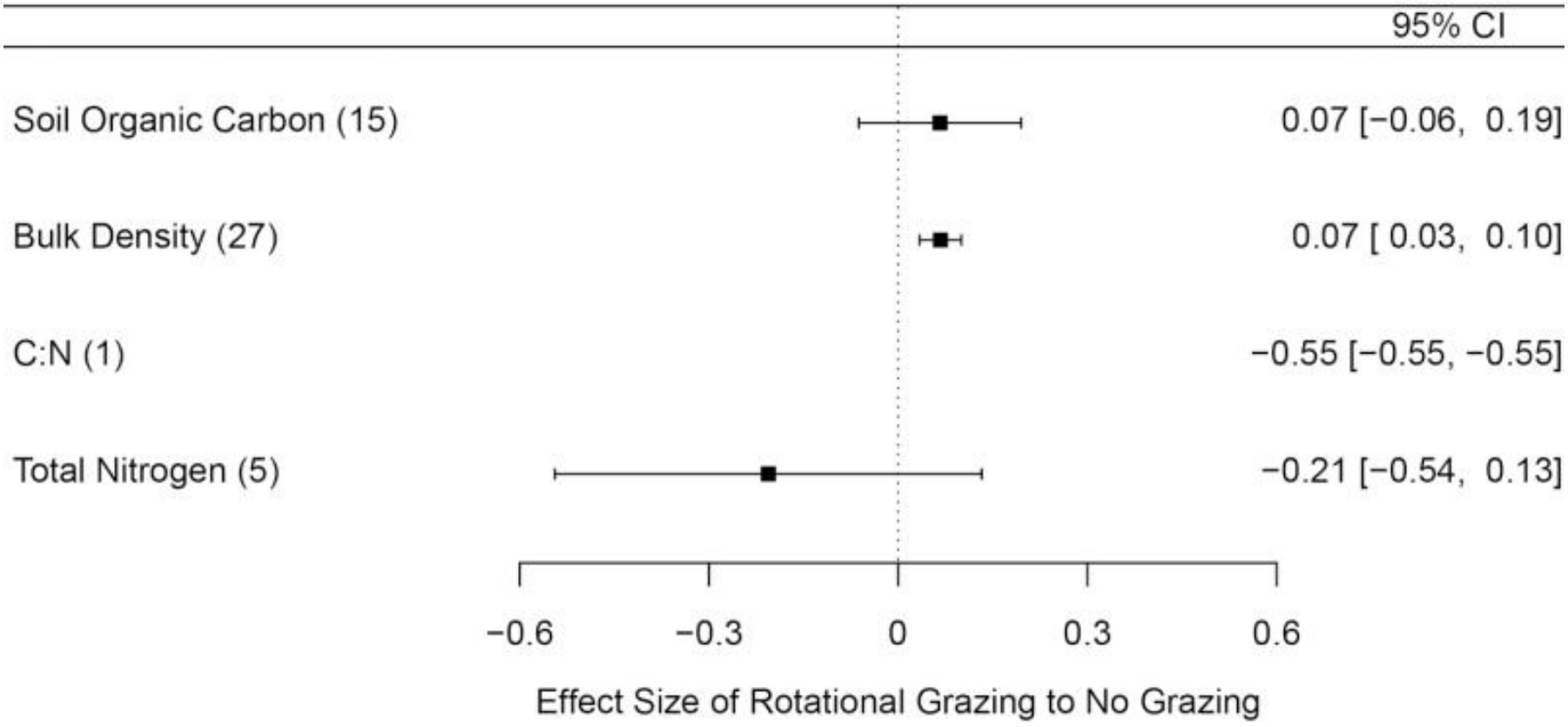
- Increased SOC, C:N, and apparent increased TN (n.s.).
- Decreased soil compaction.



Does Rotation Improve Soil Health over No Grazing?

Compared to no grazing, rotational grazing results in:

- No change in SOC or TN.
- Increased soil compaction.



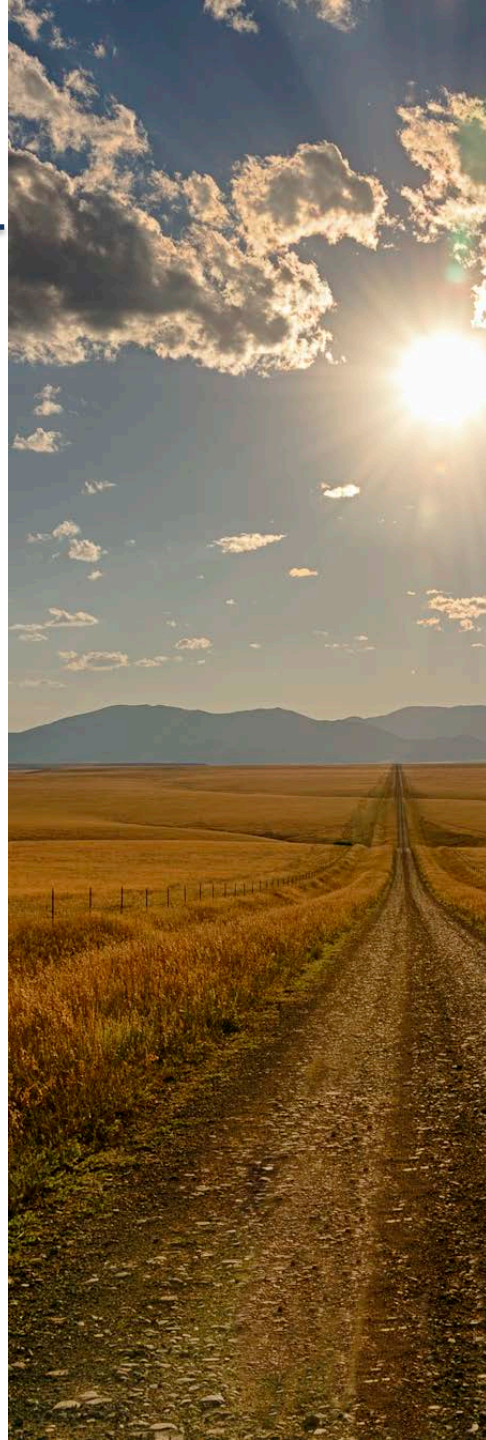
Research Gaps

- Only 64 of 275 papers (23%) adequately reported stocking rate and grazing strategy.
- Could not differentiate intensive from extensive rotation.
- Limited capacity to assess how site factors such as climate, soil, and plant community interact with grazing.

Working Lands

We need to work on:

- Shared goals – good outcomes are interconnected.
- Increased collaboration.
- Embedding on-the-ground research at appropriate scales, on social-economic-ecological outcomes.
- Flexibility, adaptation, and innovation to achieve shared goals in a changing world.



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