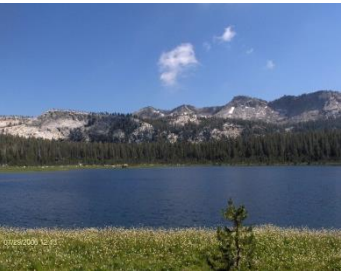


Grazing Management & Yosemite Toad Conservation



Leslie Roche and Ken Tate
Rangeland Watershed Lab
University of California, Davis



Grazing Ecology and Management Workshop
Catheys Valley, CA
12 March 2014

Rangeland Management and...

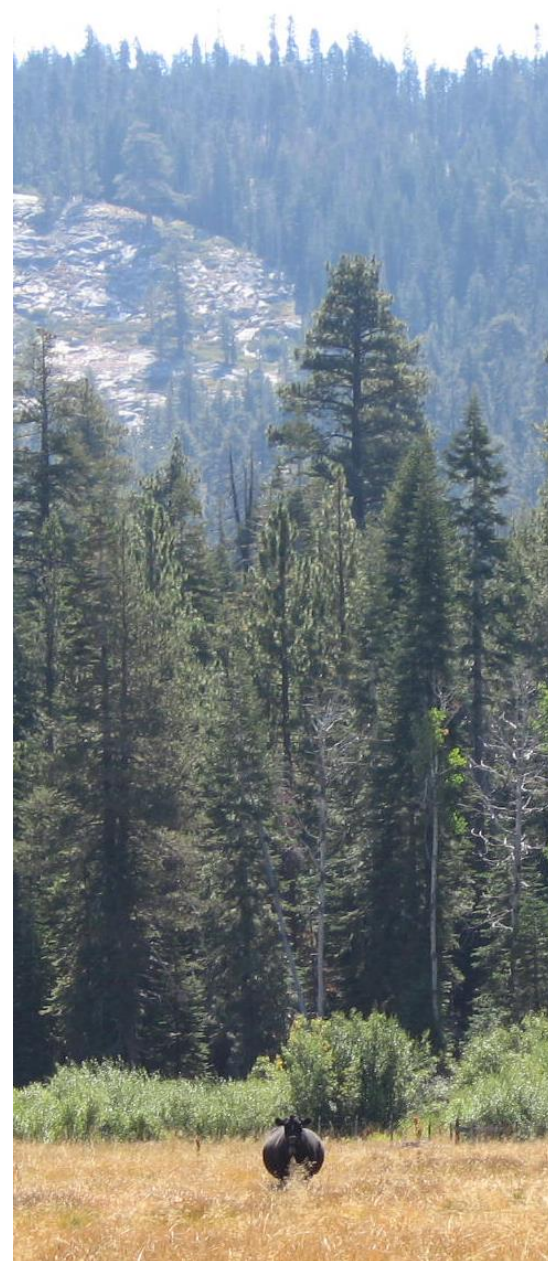
Water quality, species of concern, riparian and meadow health, soil quality, invasive plants, forage production, and livestock performance...



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

Yosemite Toad Adaptive Management Project

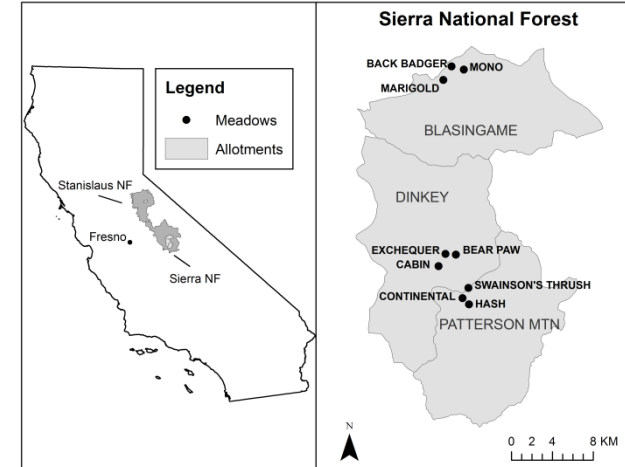
- **Yosemite Toad** - Proposed for listing under ESA
 - Mountain Meadows – Key breeding and rearing habitat
 - Believed to be declining
 - Livestock as a potential driver of decline?
- 2005-2010 Research Collaboration
 - USFS, UC Davis, UC Berkeley, UCCE, range stakeholders
 - Multiple Research Approaches
 - Cattle exclusion experiments
 - 1) Fence breeding area, 2) Fence whole meadow, 3) Grazed control
 - Cross-sectional survey



Cattle Exclusion Experiments

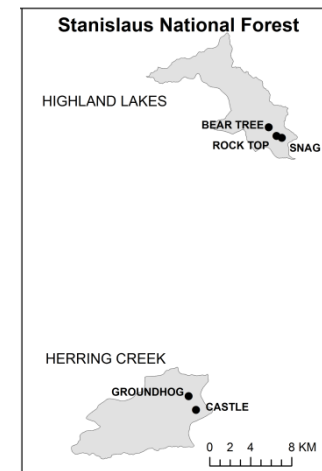
Cattle Exclusion – Toad breeding pool habitat response

- 2006-2008
- 3 Sierra NF Allotments
- 9 Meadows
- Monitored water quality and vegetative cover



Cattle Exclusion – Tadpoles & young of year response

- 2006-2010
- 2 Stanislaus NF Allotments;
3 Sierra NF Allotments
- 14 Meadows
- Monitored pool occupancy by
toads and early life stage
densities



Cattle Exclusion Experiments

Results

- Nutrients $\geq 90\%$ below levels of ecological concern.
- Turbidity, temperature, depth, and cover not significantly different among grazed and ungrazed treatments.
- No benefit to Yosemite toad presence or early life stages in ungrazed compared to grazed treatments.
- Toad populations appeared constant over the period of the study.

No grazing treatment-induced trends.



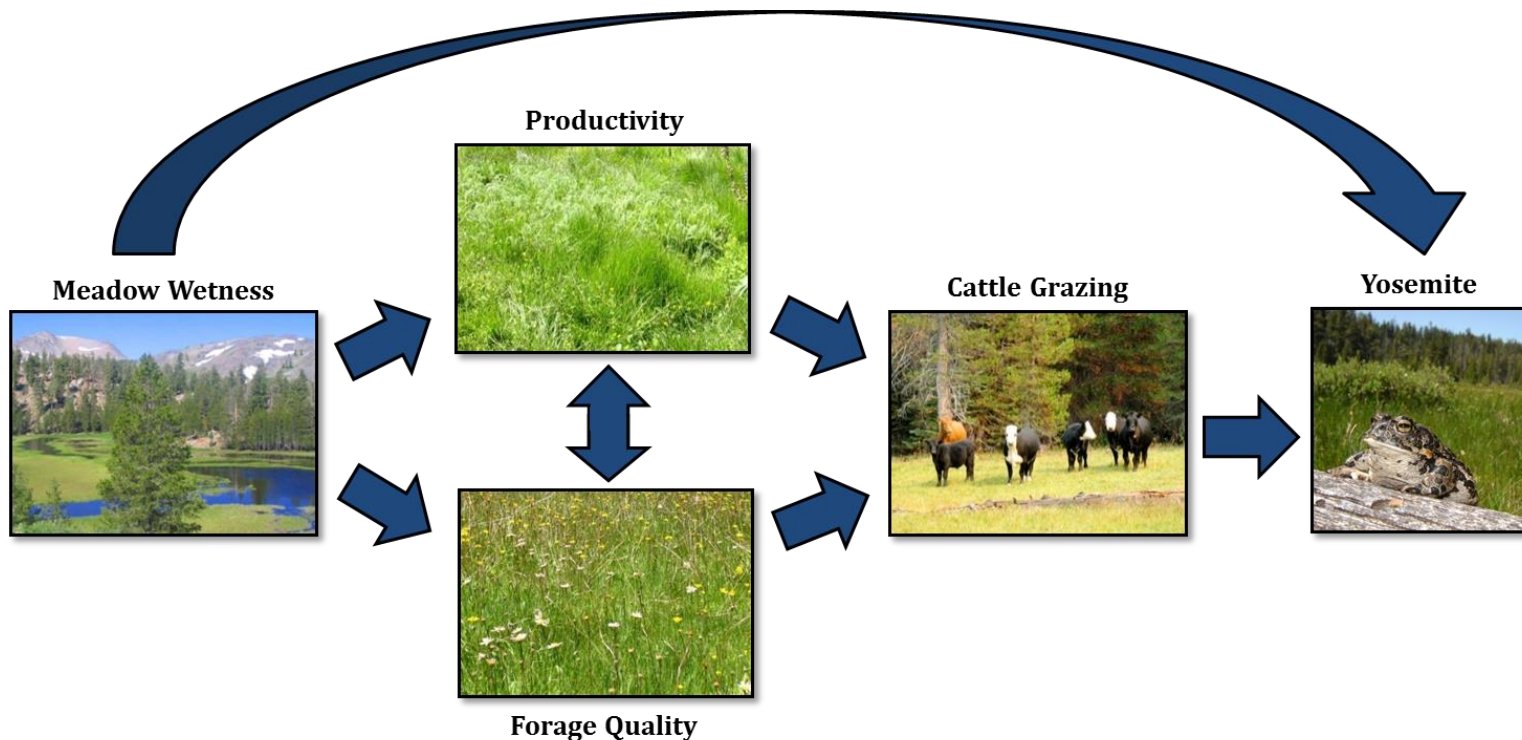
Yosemite Toad Adaptive Management Project

Multi-Pronged Approach

Sierra National Forest

Cross-Sectional Survey

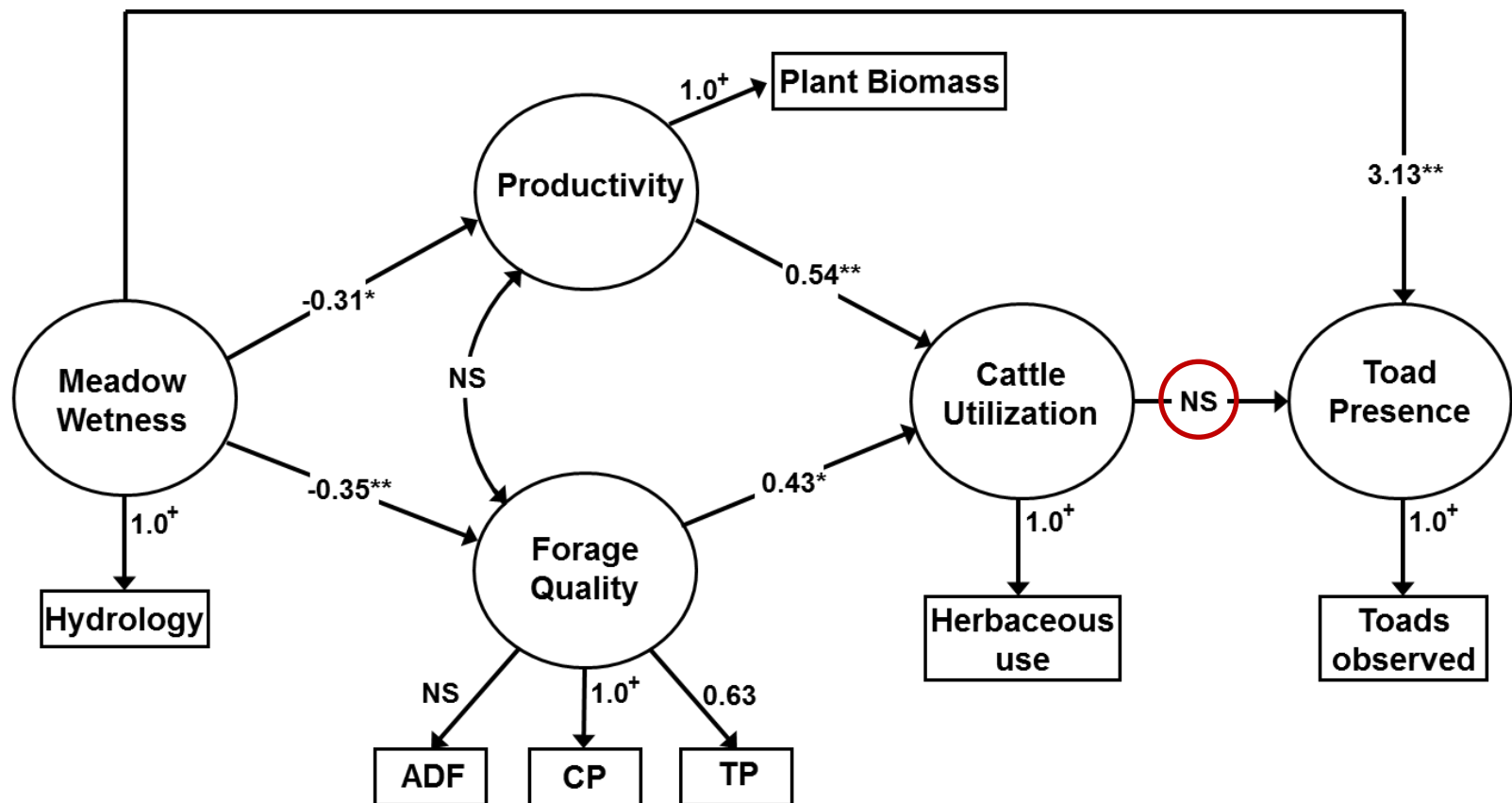
- Under standard USFS grazing management
- Coarse-scale habitat overlap of cattle and toads



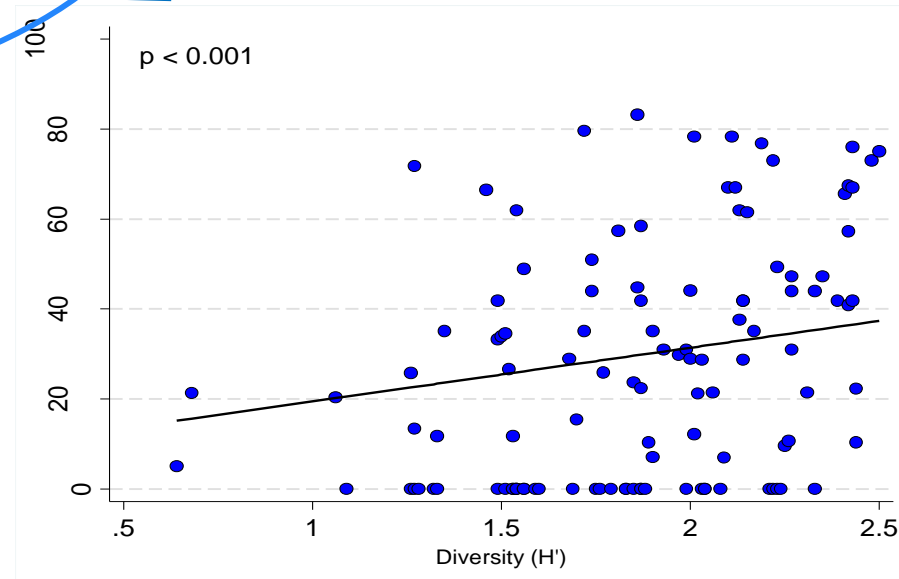
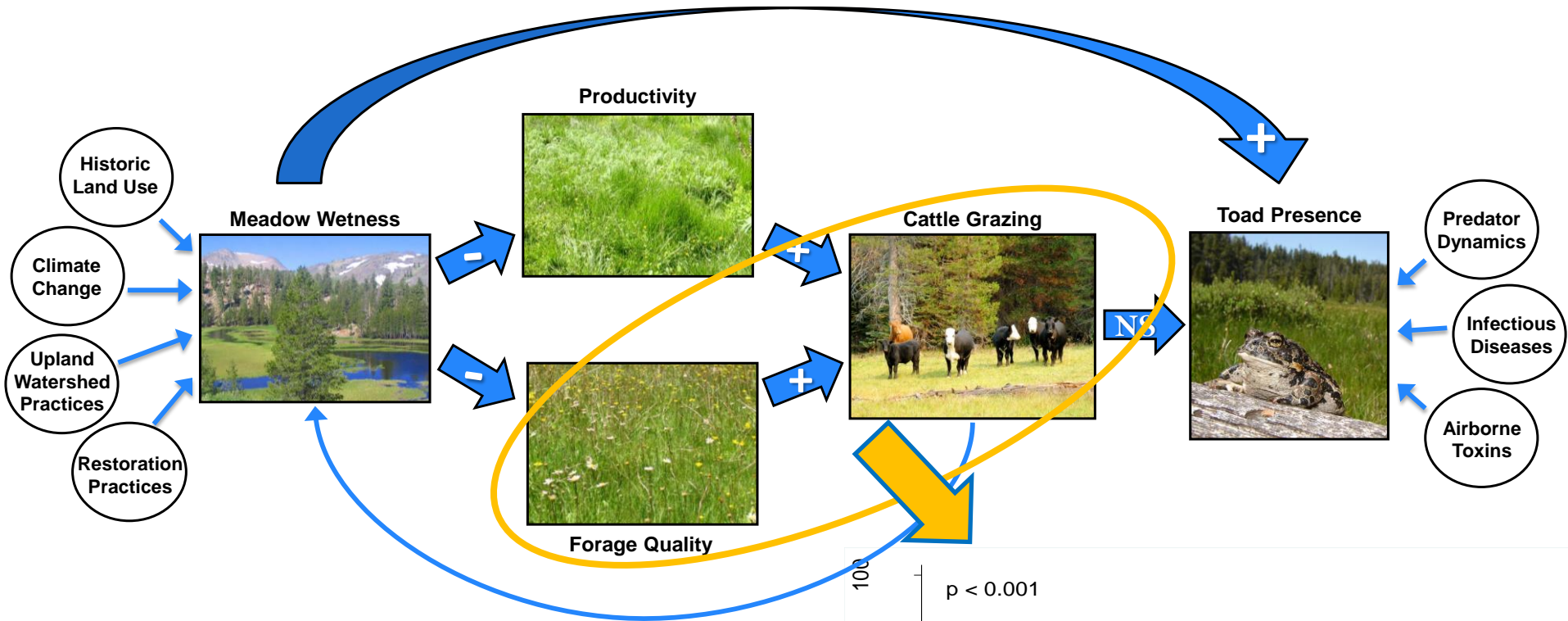
Yosemite Toad Adaptive Management Project

Results

- Cattle select for higher forage quality diets (relatively drier meadows)
- Toads more prevalent in wetter meadows.



Yosemite Toad Adaptive Management Project



Win-Win-Win:
Toad conservation + Cattle grazing + Diverse plant communities.

Cattle grazing & Yosemite toad conservation can be compatible goals

1. Cattle Grazing and Yosemite Toad (*Bufo canorus* Camp) Breeding Habitat in Sierra Nevada Meadows.

L.M. Roche, B. Allen-Diaz, D.J. Eastburn, K.W. Tate. 2012. *Rangeland Ecology & Management*.



2. Cattle grazing and conservation of a meadow-dependent amphibian species in the Sierra Nevada.

L.M. Roche, A.M. Latimer, D.J. Eastburn, K.W. Tate. 2012. *PLOS ONE*.



3. Determining the effects of cattle grazing treatments on Yosemite toads (*Anaxyrus canorus*) in montane meadows. S. McIlroy, A.J. Lind, B.H. Allen-Diaz, L.M. Roche, W.E. Frost, R.L. Grasso, K.W. Tate. 2013. *PLOS ONE*.



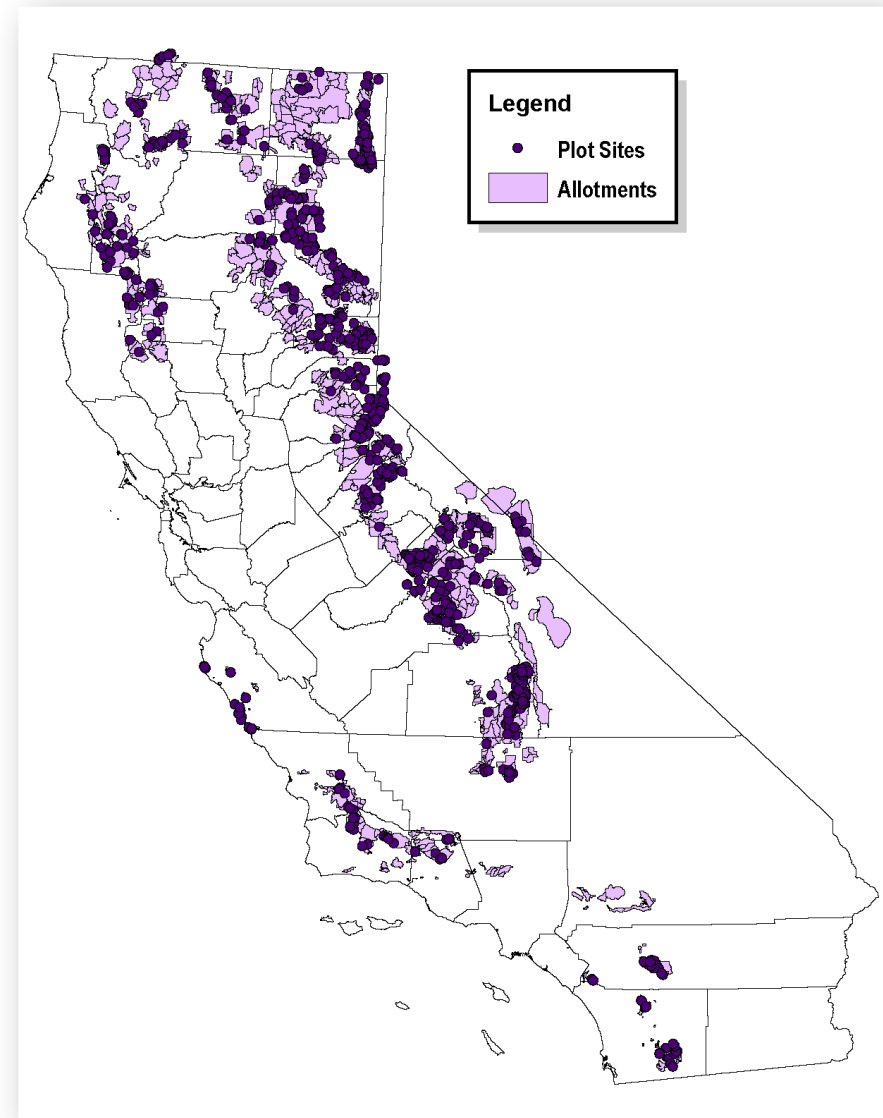
Meadow Conditions on National Forest Grazing Allotments

USFS REGION 5 RANGE PROGRAM CONDITION AND TREND MONITORING

- Sierra Nevada Forest Plan Amendment (early 2000s) – Set riparian grazing utilization limits (i.e. browse on willow, bank trampling, amount of annual forage consumed).
- 1998: USFS initiated long-term meadow condition and trend monitoring program.
 - **1)** Document baseline meadow conditions as new riparian use limits were coming into use.
 - **2)** Examine long-term trends in meadow condition following implementation of limits.
- UC Davis Rangeland Watershed Lab partnering with USFS to analyze these data.

Range Condition Monitoring 1998-Present

- **850 Permanent plots**
 - Read every 5 years
 - Over 270 with 10 years of data
- **Plant species composition**
 - Diversity
 - Richness
 - Stability
 - CIR – Range Condition
- **Current data analysis**
 - Current Condition
 - Trends in Condition
 - Initial Condition x Weather x Site Type x Management



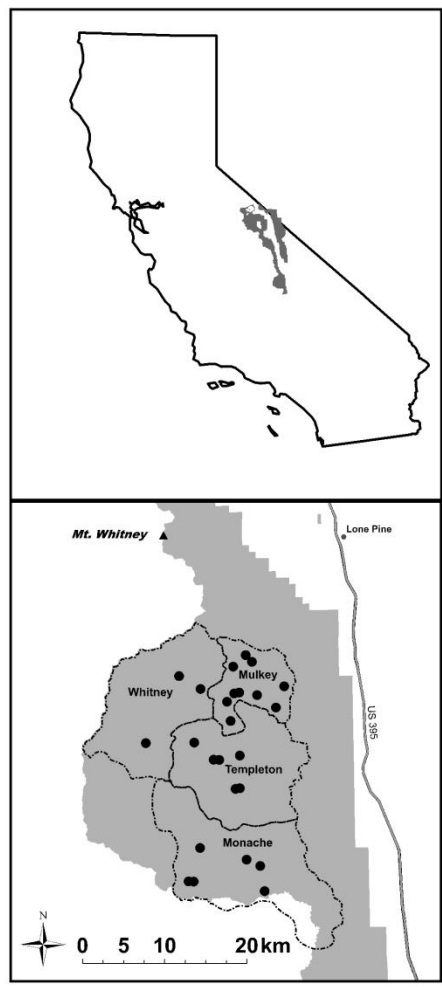
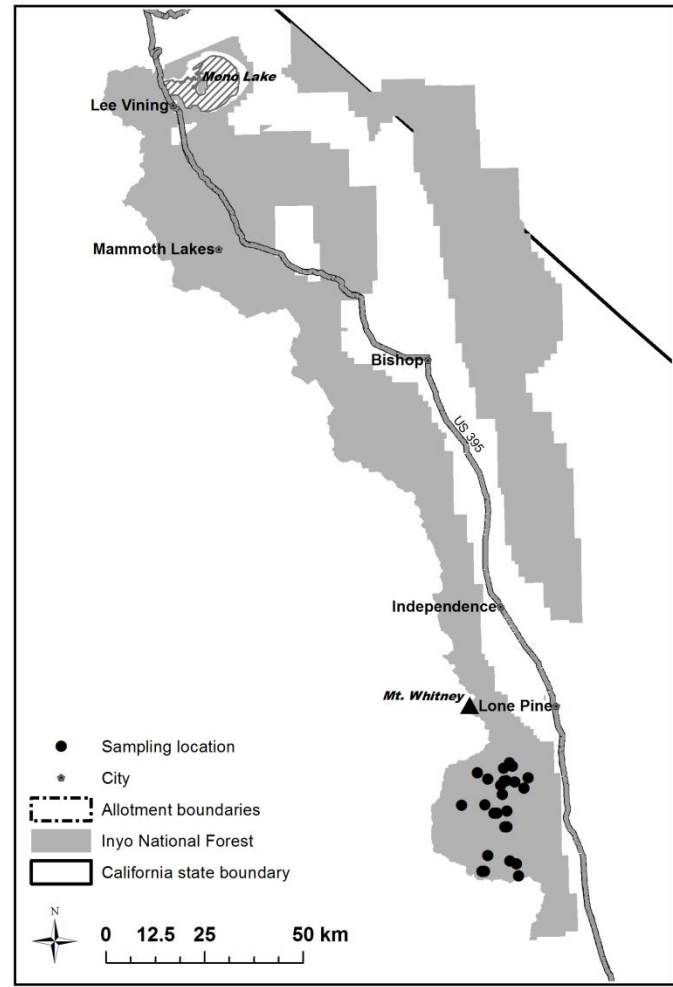
Comparing Grazing w/ Riparian Standards to Ungrazed Conditions

Inyo National Forest

Four Allotments
2000-2010

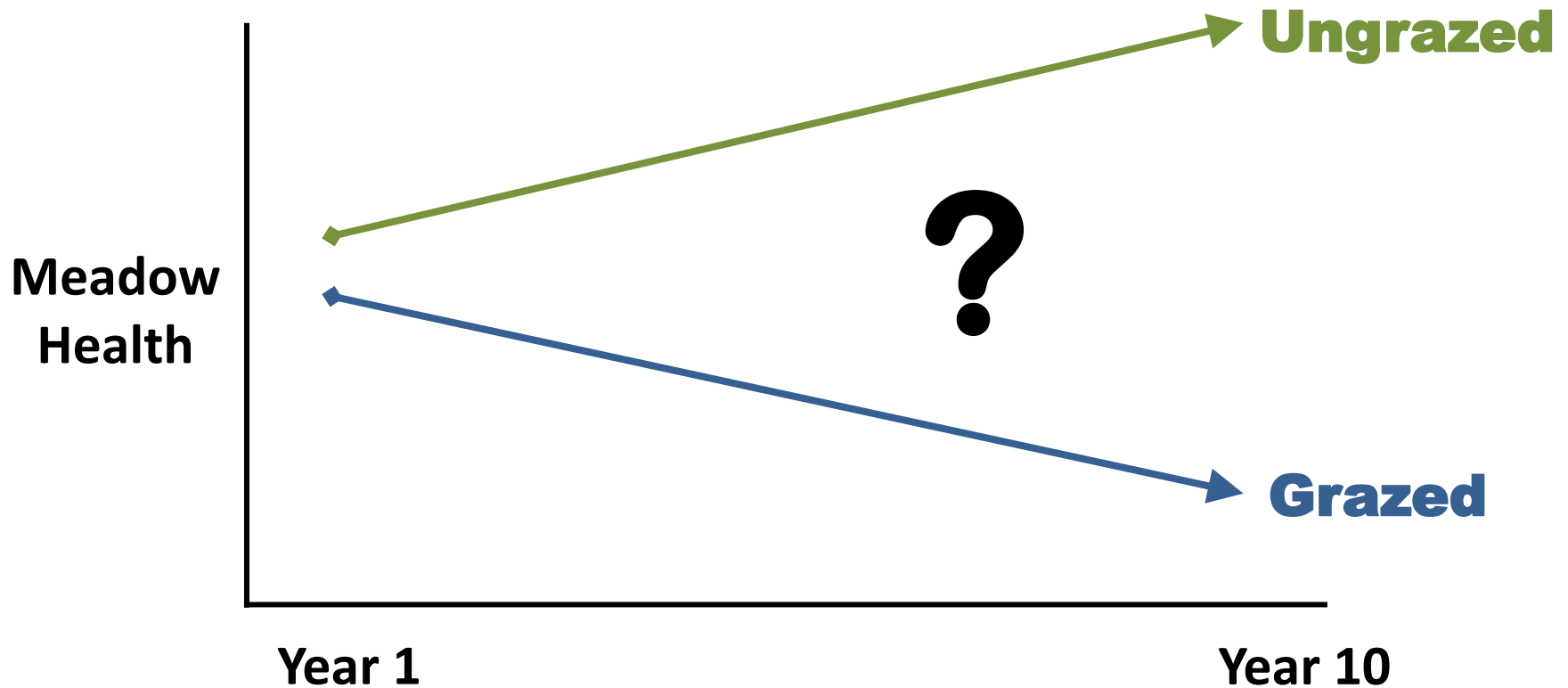
2 closed to grazing
2 grazed with
riparian use limits

25 monitoring plots
16 grazed
9 ungrazed



Comparing Grazing w/ Riparian Use Limits to Ungrazed Conditions

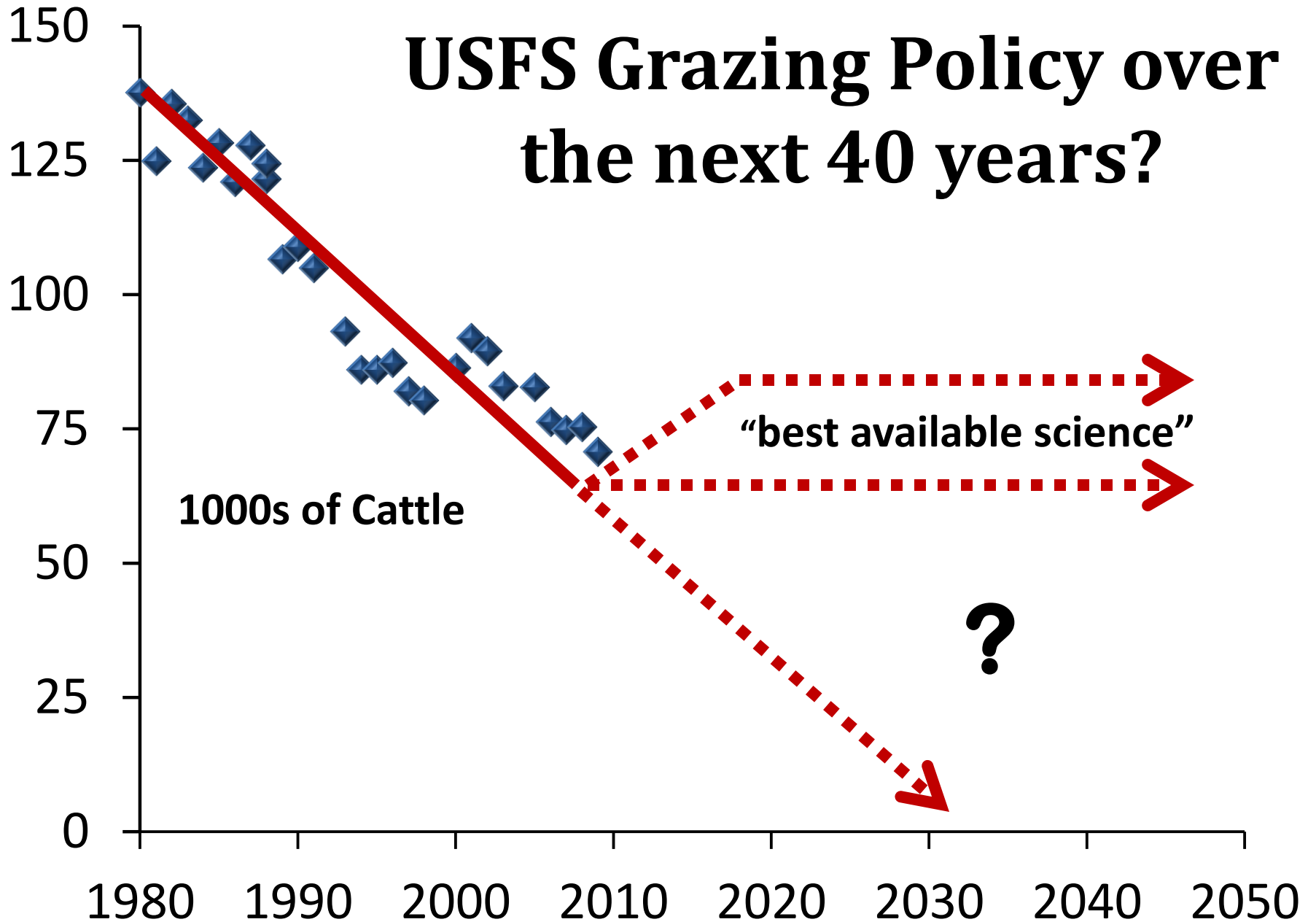
Tested the hypothesis that meadow conditions would improve more in the non-grazed compared to grazed allotments.



Results

- Livestock exclusion did not lead to greater rates of meadow recovery compared to grazing to achieve riparian use limits.
- Grazing management implemented to achieve riparian use limits did not degrade meadow health.
- Demonstrates the effectiveness of 1) Setting riparian utilization objectives, and 2) Grazing management practices (i.e., herding, rest, rotation).

USFS Grazing Policy over the next 40 years?



What is all this research telling us?

- With good management – livestock production, clean water, healthy riparian areas, and conservation of sensitive species are compatible goals. *Takes work and goal setting.*
- Substantial new science supports this conclusion.
 - *Make certain this science is integrated into policy and management decision making – best available science.*
- Collaboration and communication between managers, policy makers, and scientists is essential.

Some relevant reviews

Rangeland Literature Synthesis. 2011

Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps

<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/ceap/?cid=stelprdb1045811>

Western Land Managers will Need all Available Tools for Adapting to Climate Change, Including Grazing: A Critique of Beschta et al. 2014. *Environmental Management*

Tony Svejcar • Chad Boyd • Kirk Davies • Matthew Madsen • Jon Bates • Roger Sheley • Clayton Marlow • David Bohnert • Mike Borman • Ricardo Mata-Gonzalez • John Buckhouse • Tamzen Stringham • Barry Perryman • Sherman Swanson • Kenneth Tate • Mel George • George Ruyle • Bruce Roundy • Chris Call • Kevin Jensen • Karen Launchbaugh • Amanda Gearhart • Lance Vermeire • John Tanaka • Justin Derner • Gary Frasier • Kris Havstad

<http://rangelandwatersheds.ucdavis.edu/main/GrazingPublicLandsClimateChange/index.html>

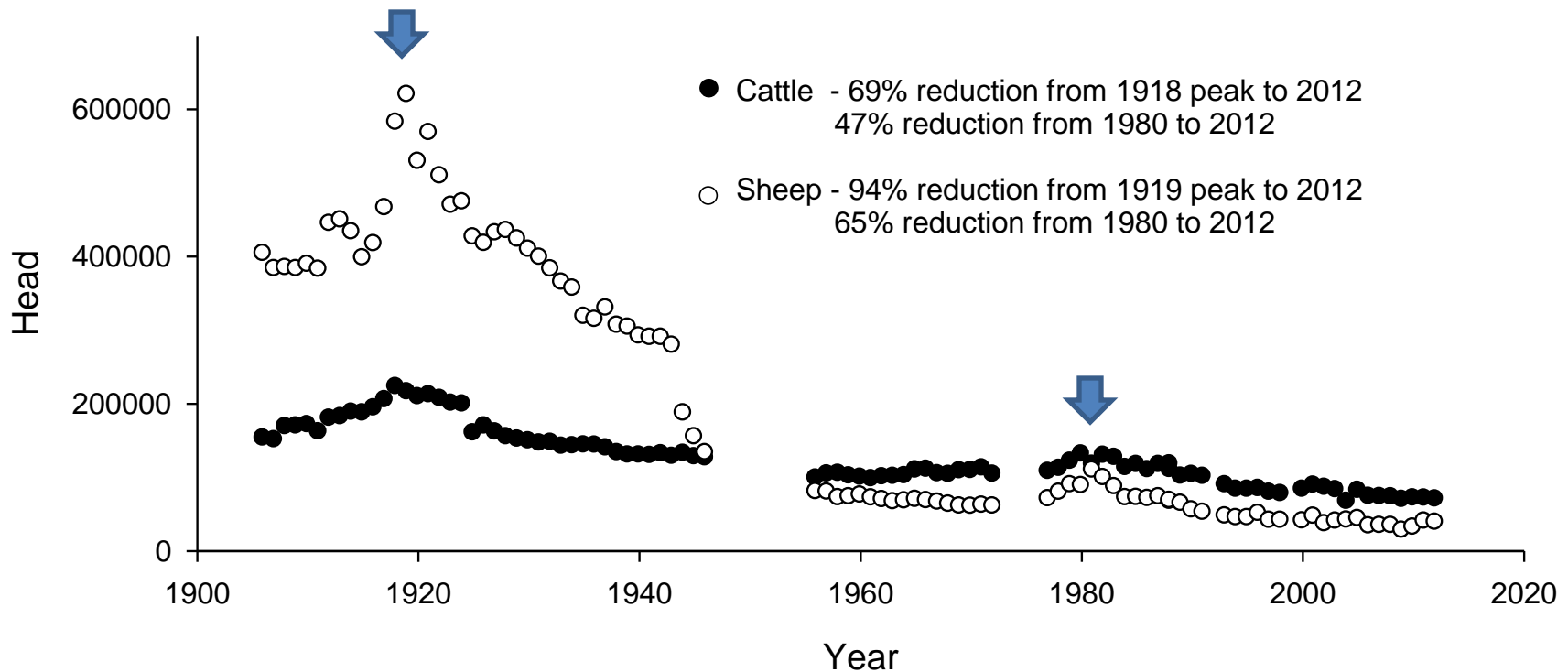


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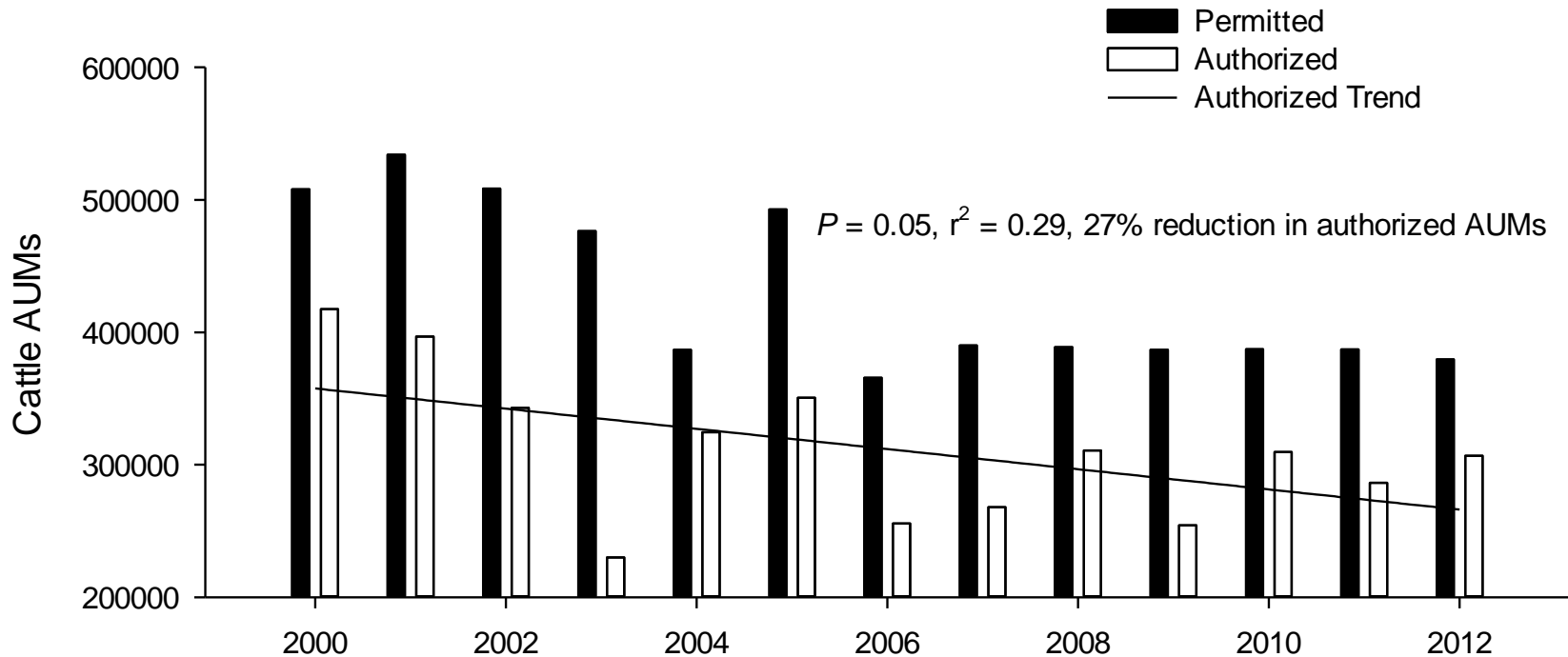
Google

rangeland watersheds

Head of Livestock on National Forest Grazing Allotments, 1906 - 2012



Cattle AUMs on National Forest Grazing Allotments, 2000 - 2012



Likely due to reductions in head and grazing duration, perhaps vacancies.

Driven by riparian annual utilization standards – consumption of herbaceous forage and woody spp., stream bank disturbance, herbaceous stubble ht.

Comparing Grazing w/ Riparian Standards to Non-Grazed Conditions

Riparian grazing utilization standards for meadows in study grazing allotments

Allotment	Time Period	Riparian Grazing Utilization Standard			
		Herbaceous (%)	Willow (%)	Streambank (%)	Stubble (cm)
Monache	Prior to 1996	60 – 70	No Standard	20	No Standard
	1996 – 2003	< 35	40	10	No Standard
	2004 – 2010	< 35	20	10	No Standard
Mulkey	Prior to 1996	50 – 65	No Standard	20	No Standard
	1996 – 2003	< 35	40	10	No Standard
	2004 – 2010	< 35	20	10	No Standard
Templeton	Prior to 1996	No Standard	No Standard	20	10
	1996 – 2000	No Standard	40	10	10
	2001 – 2010	-----Grazing Suspended-----			
Whitney	Prior to 1996	50 – 65	No Standard	20	No Standard
	1996 – 2000	50 – 65	40	10	No Standard
	2001 – 2010	-----Grazing Suspended-----			