

Sustainable Public Lands Grazing

Striking a Multiple Use Balance



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UC Davis, US Forest Service

Sustainable Public Lands Grazing

Federal Public Grazing Lands



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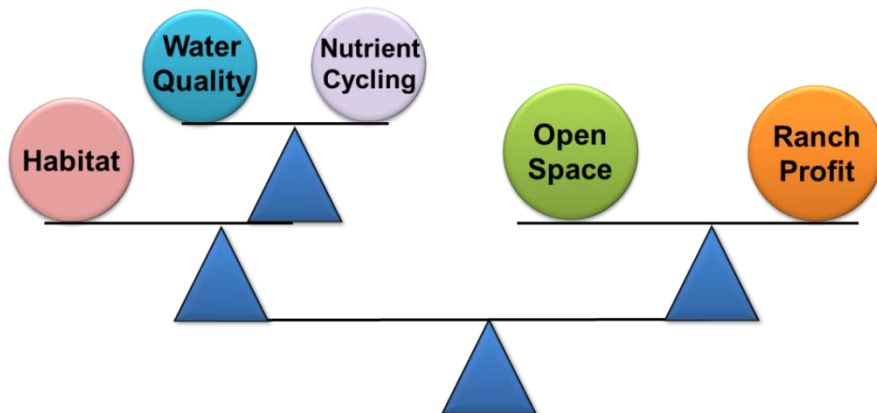
1) Reflect the global debate about the sustainability of livestock production.



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Federal Public Grazing Lands

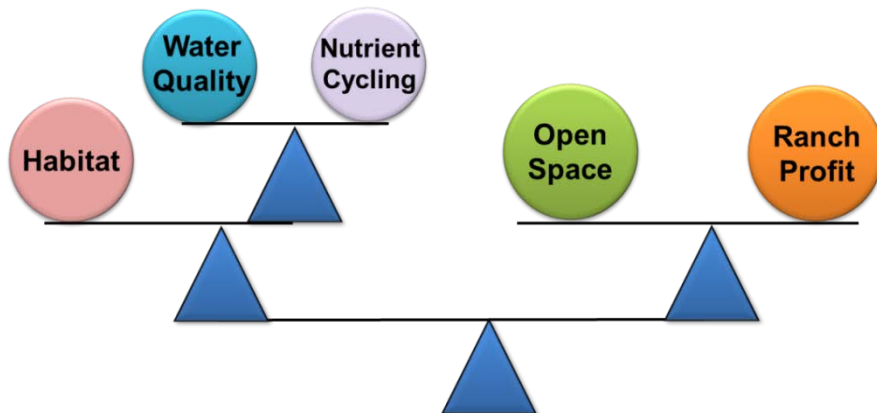
- 1) Reflect the global debate about the sustainability of livestock production.
- 2) Ground zero for multiple use policy and management to meet everyone's goals.



Sustainable Public Lands Grazing

Federal Public Grazing Lands

- 1) Reflect the global debate about the sustainability of livestock production.
- 2) Ground zero for multiple use policy and management to meet everyone's goals.
- 3) Perceptions of “conflicting” research conclusions.**



Sustainable Public Lands Grazing

Research and Management Eras

Sustainable Public Lands Grazing

Research and Management Eras

- 1) A body of case studies & research from the 1970's through mid-1990's that demonstrates the negative outcomes of management to optimize meat and fiber.



Sustainable Public Lands Grazing

1970s through mid-1990s research body

Examples

Kauffman and Krueger. 1984. *Livestock impacts on riparian ecosystems and streamside management implications: a review*. Range Management.

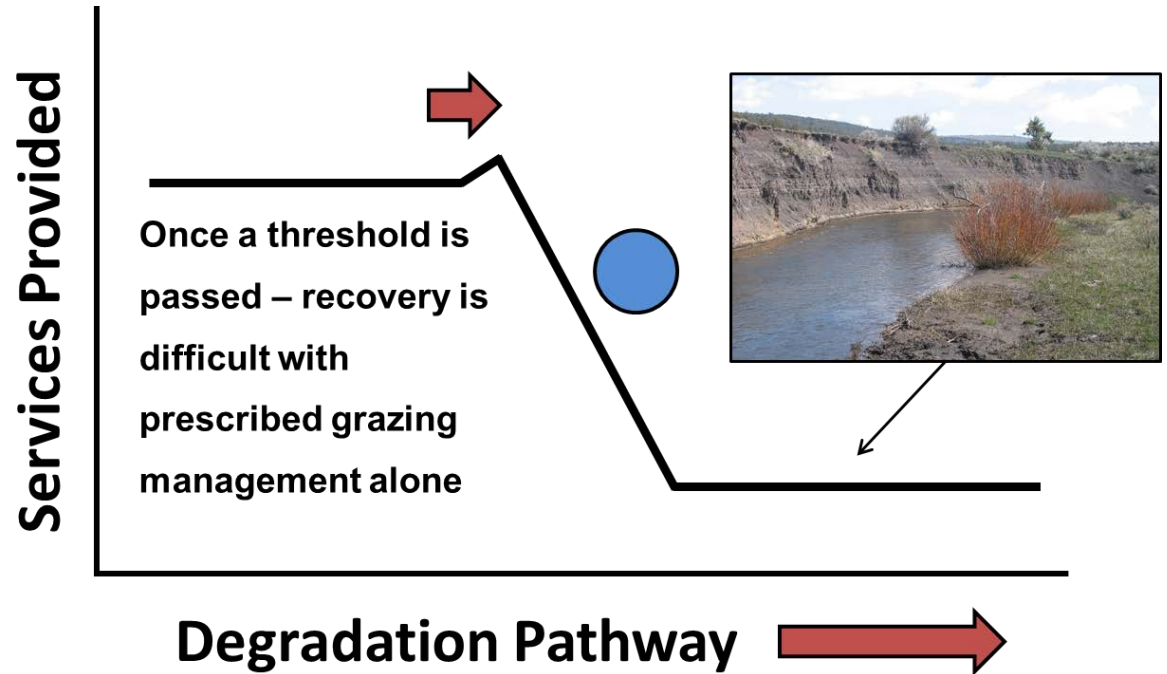
Fleischner. 1994. *Ecological costs of livestock grazing in western North America*. Conservation Biology.

Belsky et al. 1999. *Survey of livestock influences on stream and riparian ecosystems in the western U.S.* Soil Water Conservation.

Excessive Riparian Grazing



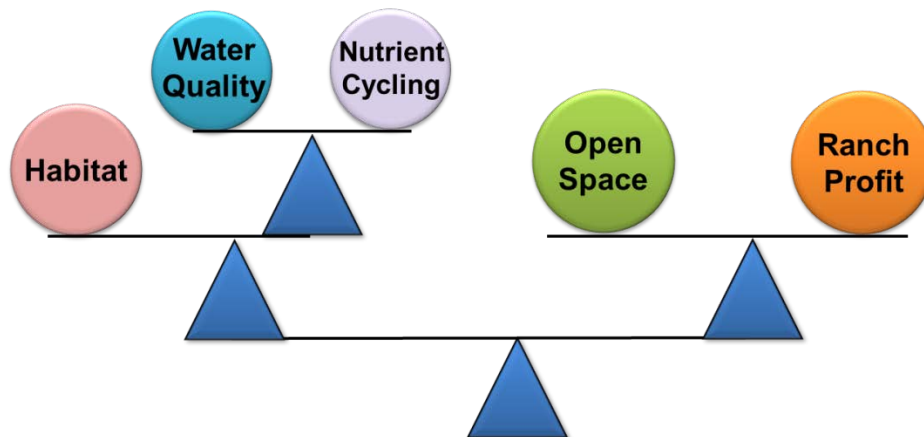
- damage to riparian vegetation → invasive plants
- loss of native riparian plants
- bare, unstable stream banks
- stream channel erosion
- loss of water table, habitat, and water quality



Sustainable Public Lands Grazing

Research and Management Eras

- 1) A body of case studies & research from the 1970's through mid-1990's that demonstrates the negative outcomes of management to optimize meat and fiber.
- 2) A contemporary body of research demonstrates the effectiveness of modern management for achieving multiple ecosystem services.



Sustainable Public Lands Grazing

Contemporary research body

Examples

Clary. 1999. *Stream channel and vegetation responses to late spring cattle grazing*. Range Management.

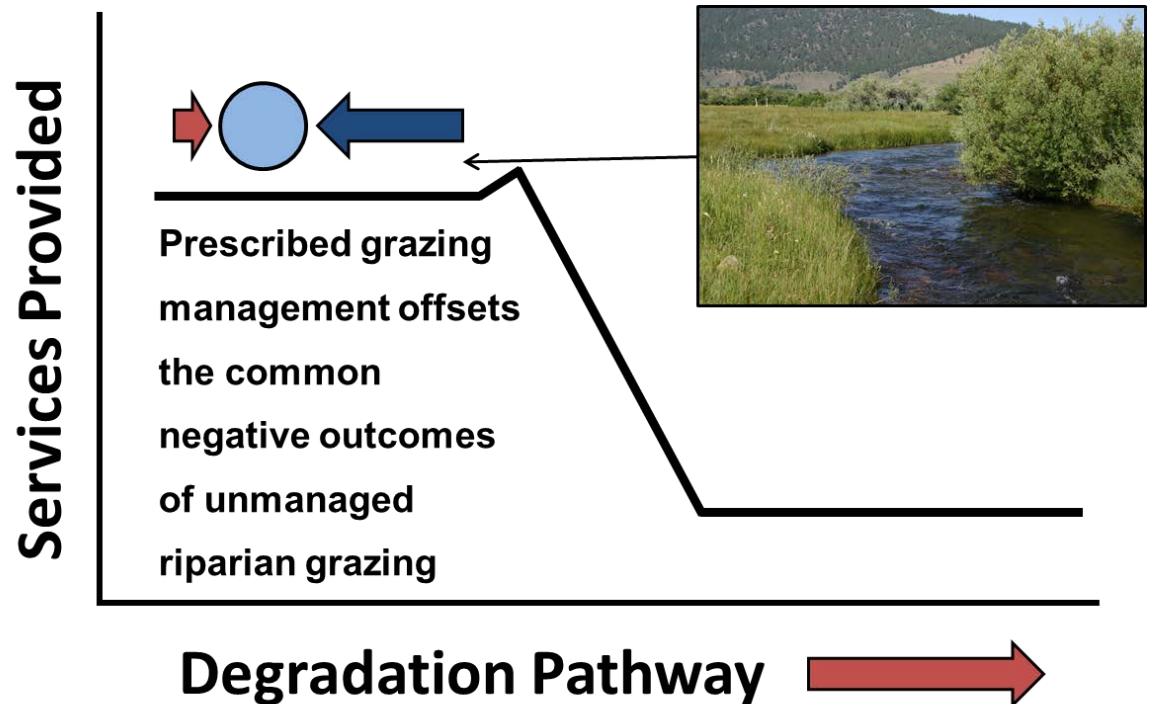
George et al. 2011. *A scientific assessment of the effectiveness of riparian management practices*. USDA Rangeland CEAP.

Freitas et al. 2014. *Montane meadow plant community response to grazing*. Environmental Management.

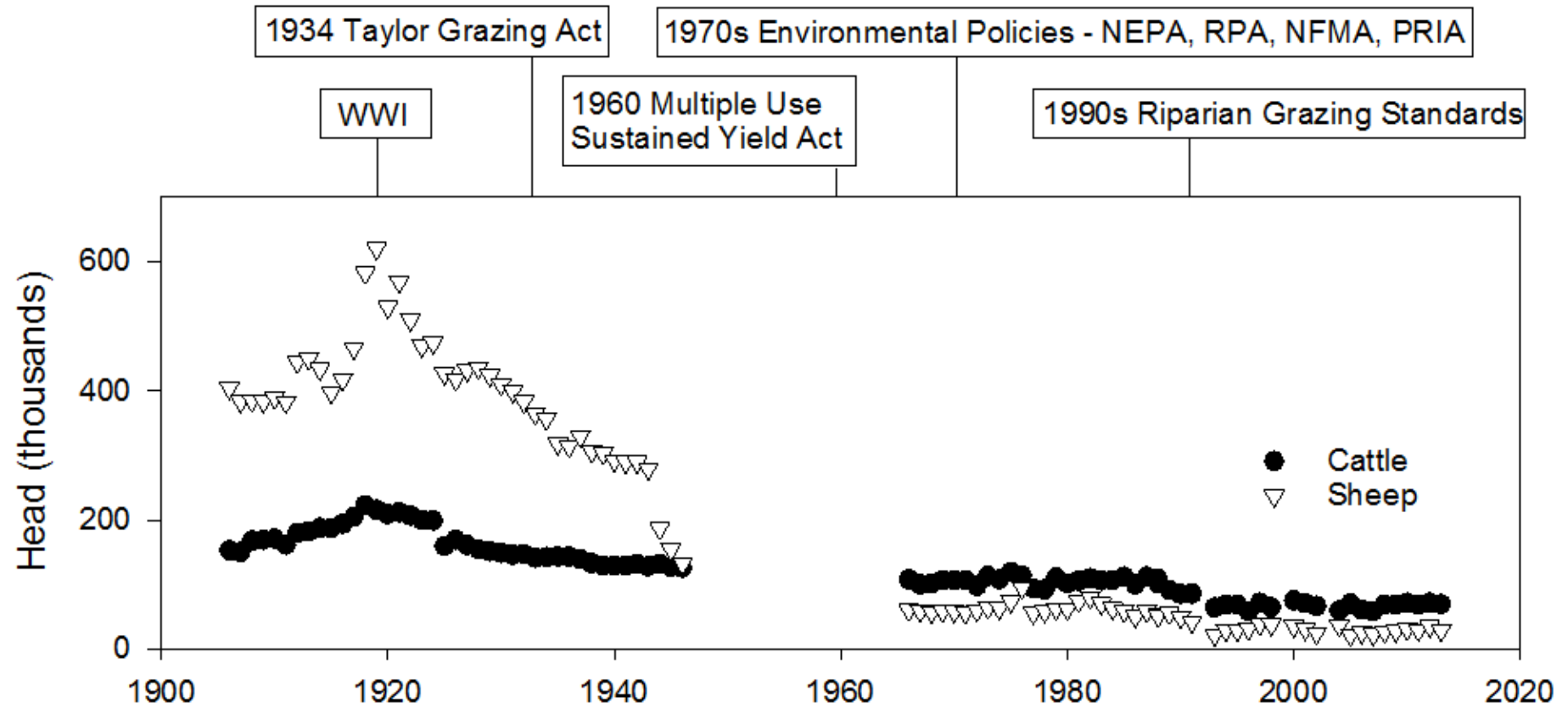
Managed Riparian Grazing



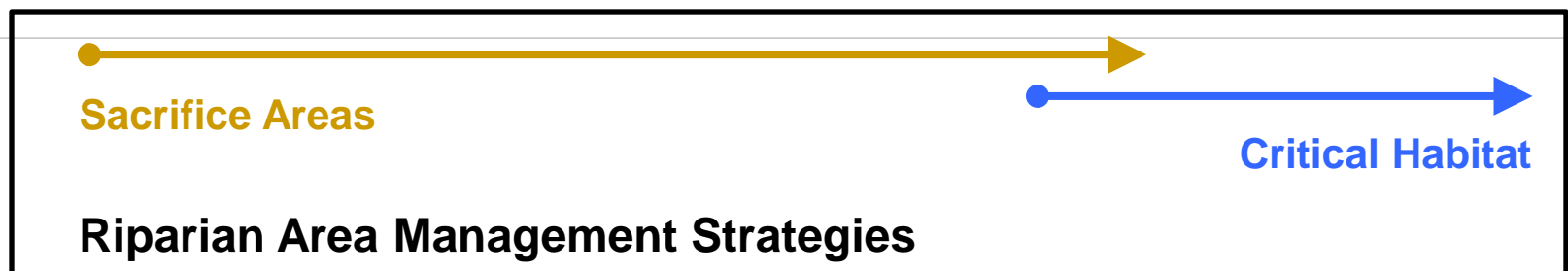
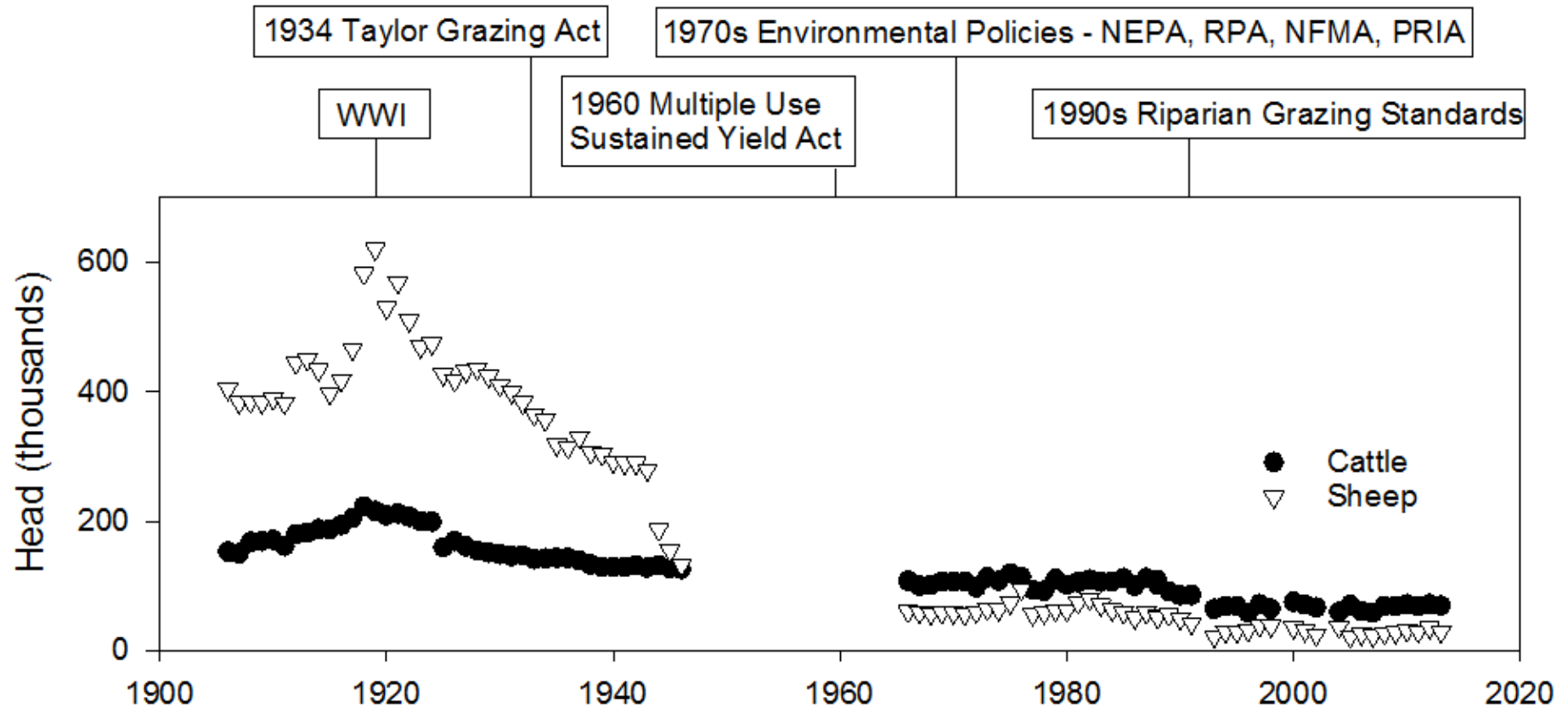
- set riparian enhancement goals
- set limits on livestock browse on desired plants, and disturbance to stream banks
- adaptive grazing management to meet these targets



Policies and Trends in Livestock on USFS Lands in CA 1906 through 2013



Policies and Trends in Livestock on USFS Lands in CA 1906 through 2013



Late 1990s – early 2000s

Riparian Grazing Standards and Guidelines

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- **Browse on Riparian Woody Plants** – Limits on the percentage of new year's leader growth which can be browsed on species such as aspen and willow (e.g., 20%).

Late 1990s – early 2000s

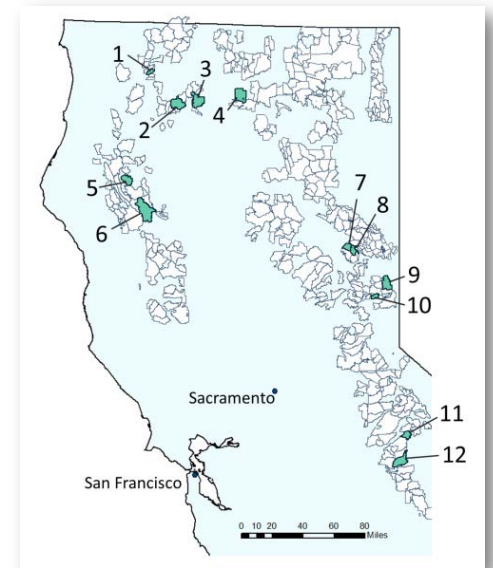
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- **Browse on Riparian Woody Plants** – Limits on the percentage of new year's leader growth which can be browsed on species such as aspen and willow (e.g., 20%).
- **Streambank Disturbance** – Limits the amount of livestock hoof damage or trampling on streambanks (e.g., 10%).

Contemporary Management & Research

“Cattle grazing, recreation, and clean water can be compatible goals across these national forest lands”

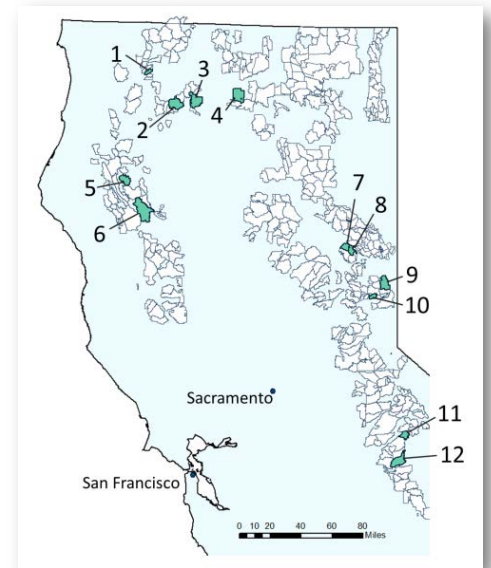
Roche et al. 2013 PLOS ONE



Contemporary Management & Research

“Cattle grazing, recreation, and clean water can be compatible goals across these national forest lands”

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“No benefit to Yosemite toad in fenced meadows compared to USFS riparian grazing standards and guidelines”

McIlroy et al. 2013 PLOS ONE



Contemporary Management & Research

“Aspen w $\leq 20\%$ of leader growth removed annually grow above the browse line within several years.”
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“Livestock grazing compliant with USFS riparian grazing standards did not degrade or hamper recovery of meadow plant communities”
Freitas et al. 2014 Envir. Manage.

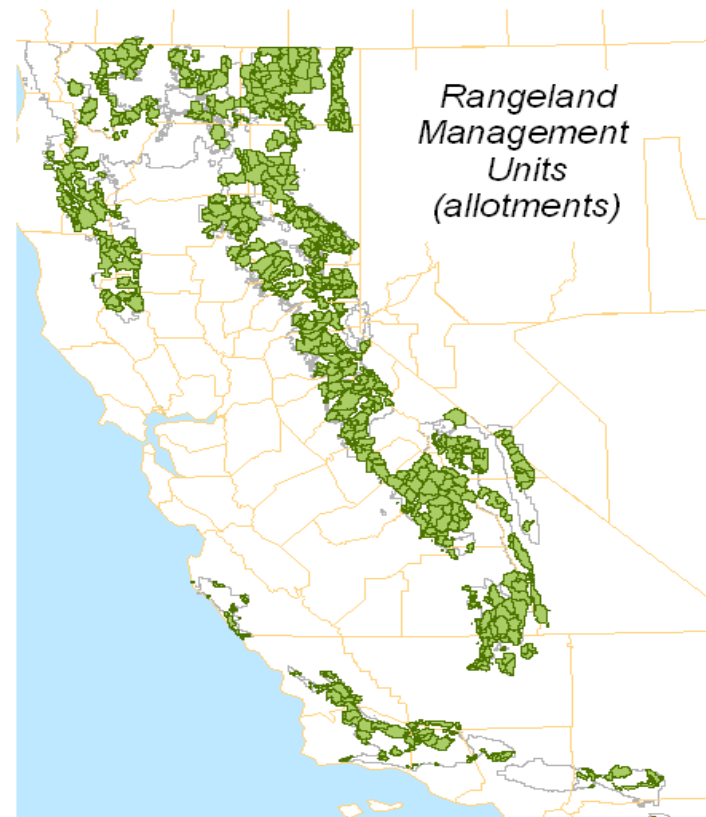


Authorized Use Trends 2000 through 2013

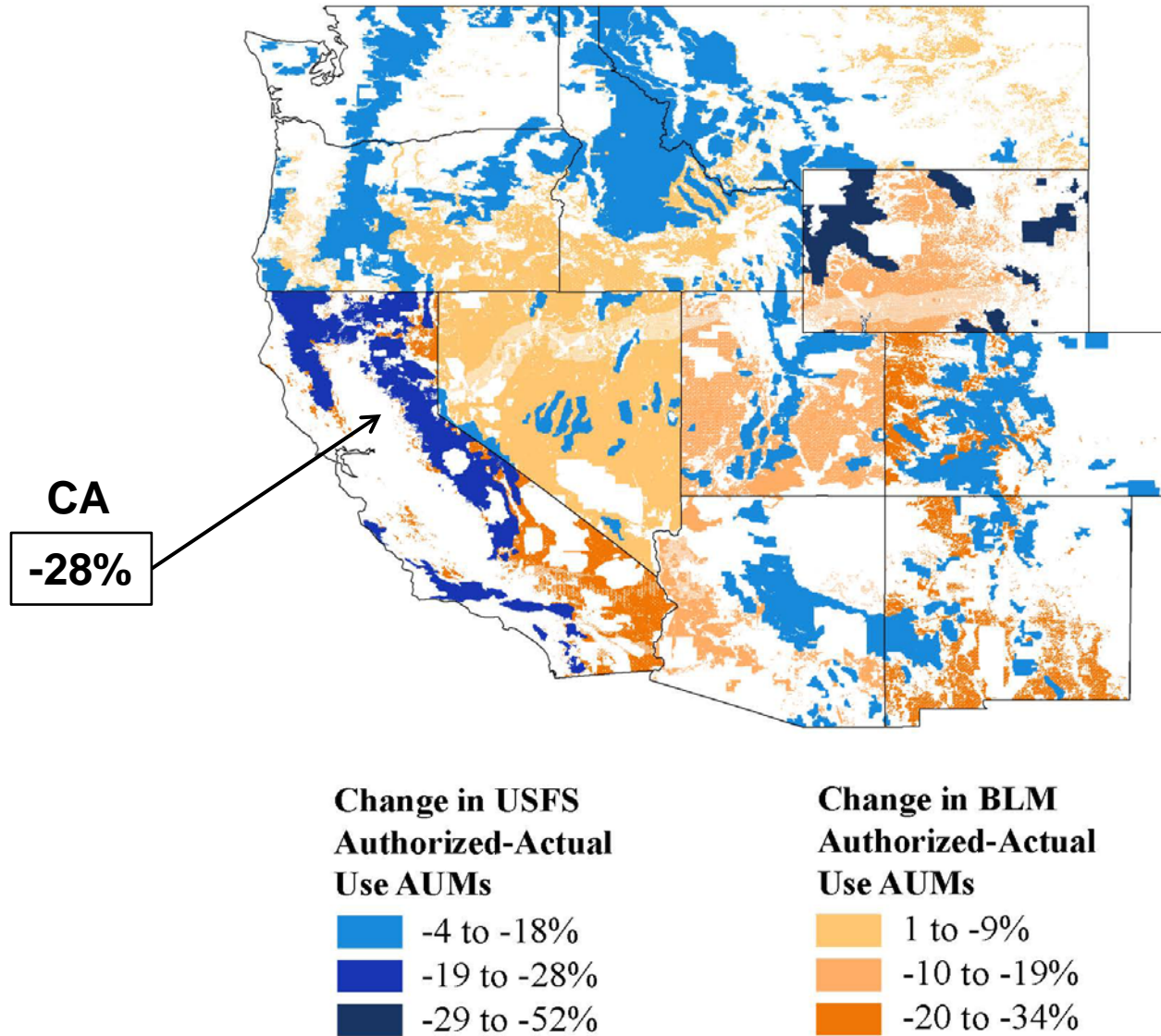
Year	Permittees		Livestock AUMs	
2000	464		452,712	
2013	368	-21%	332,099	-28%

Use restrictions due for sensitive, threatened, and endangered species.

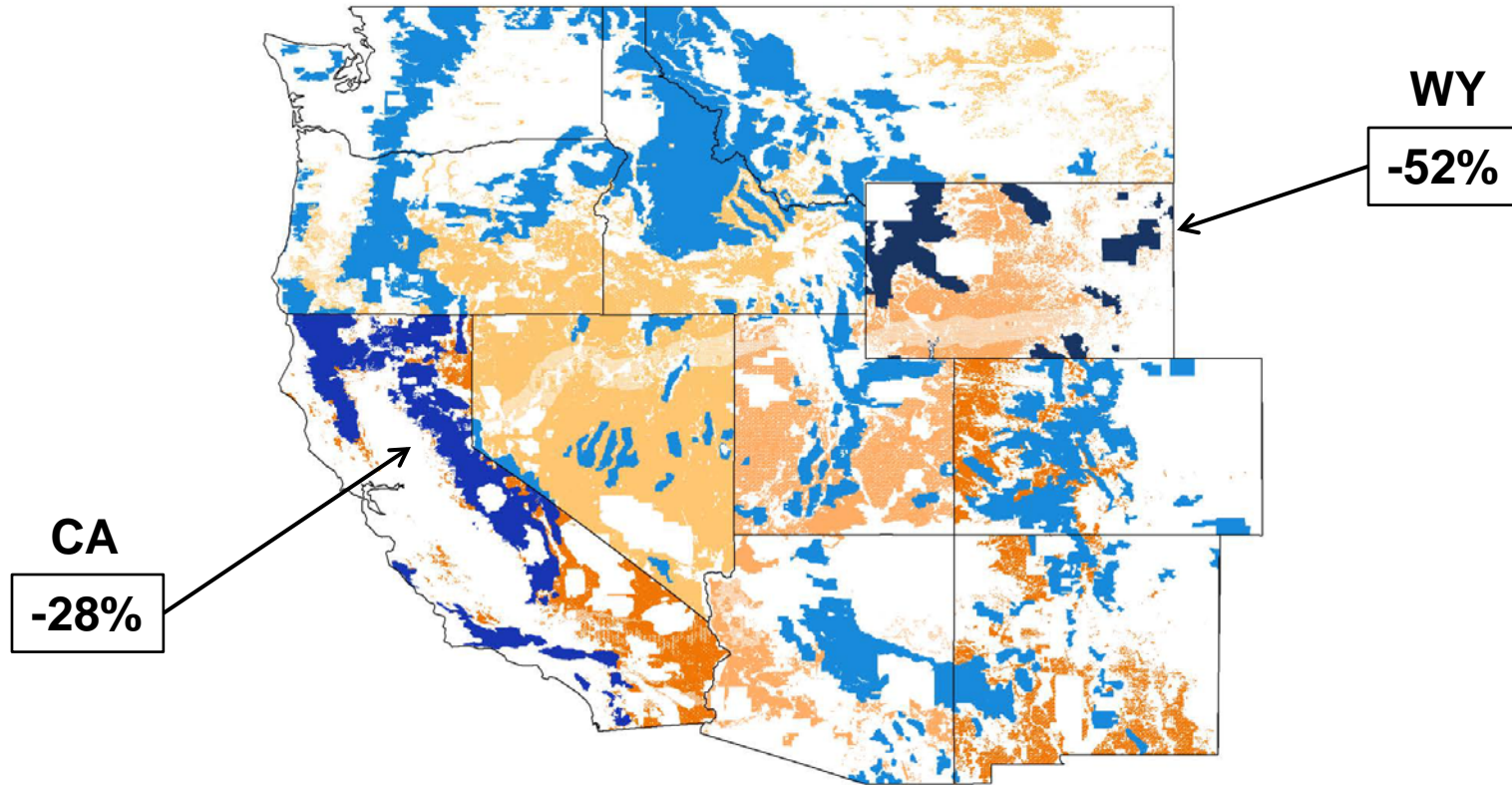
In addition to riparian grazing standards and guidelines.



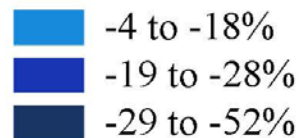
Trends in livestock animal unit months (AUMs) on federal forest and rangelands – 2000 through 2013.



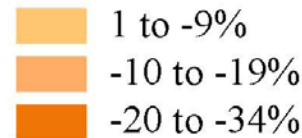
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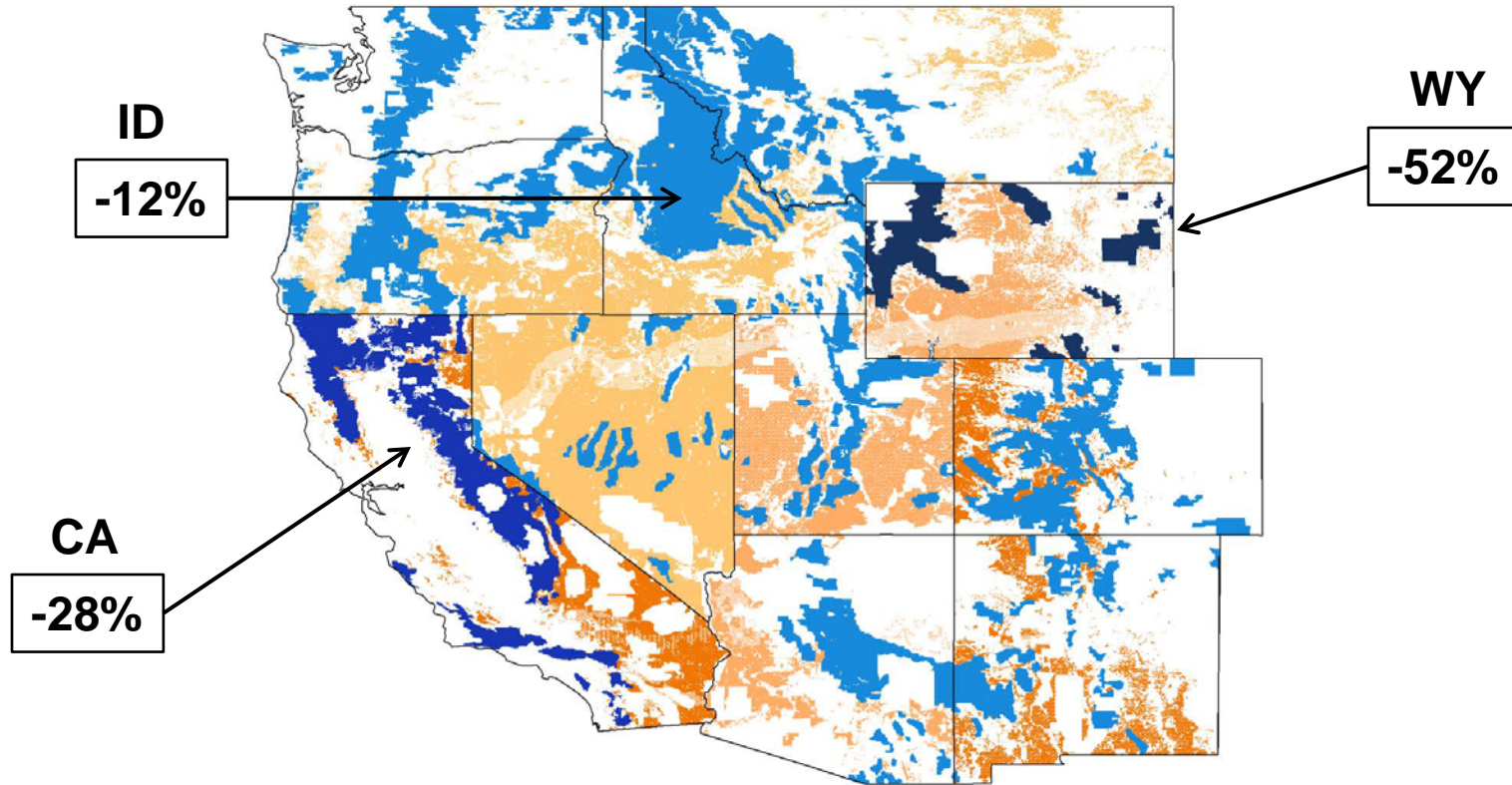
**Change in USFS
Authorized-Actual
Use AUMs**



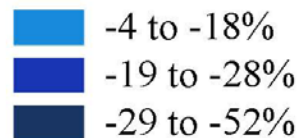
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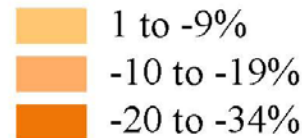
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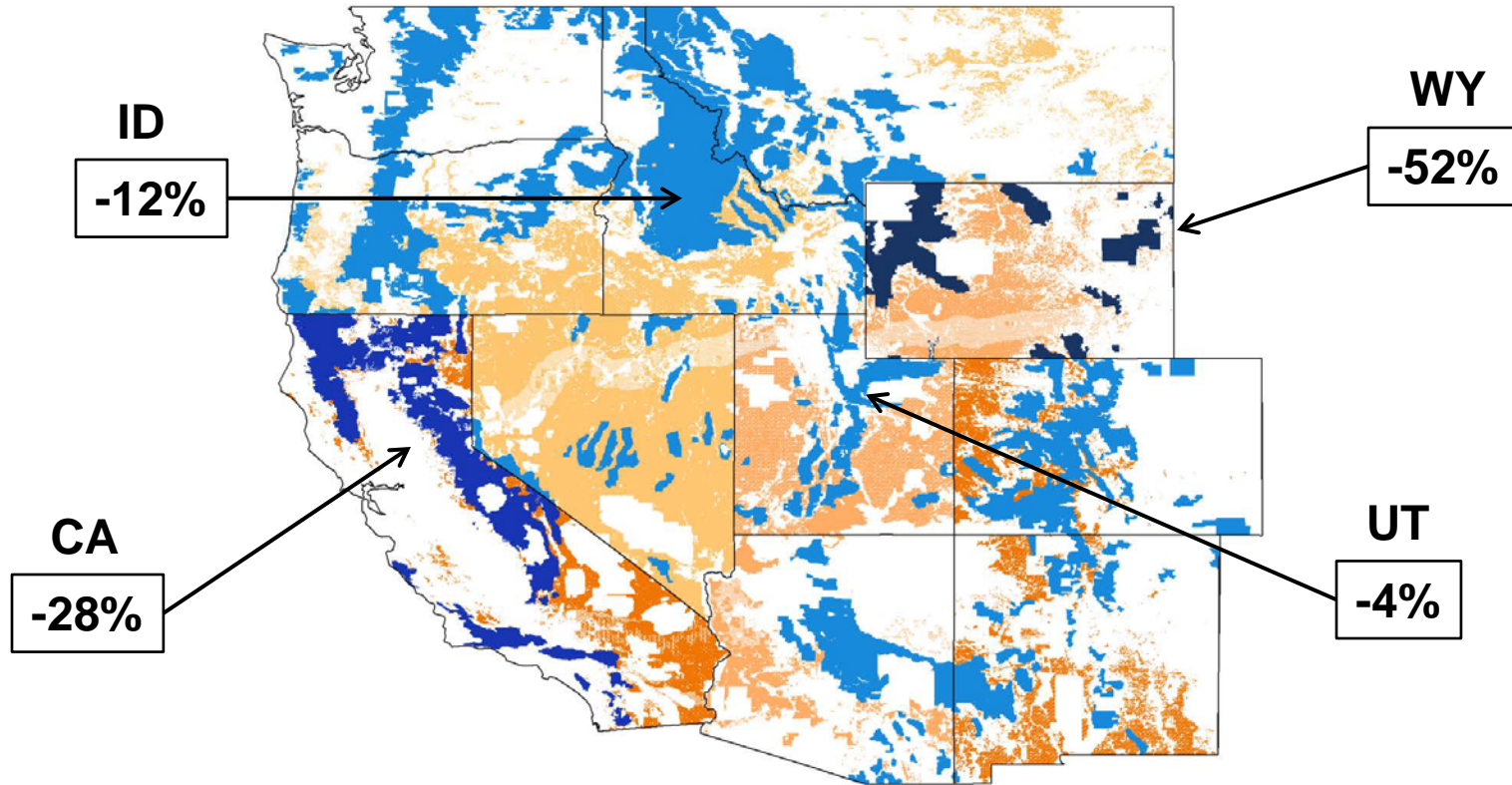
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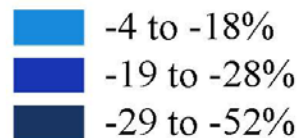
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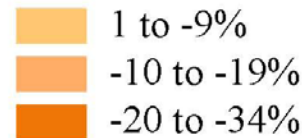
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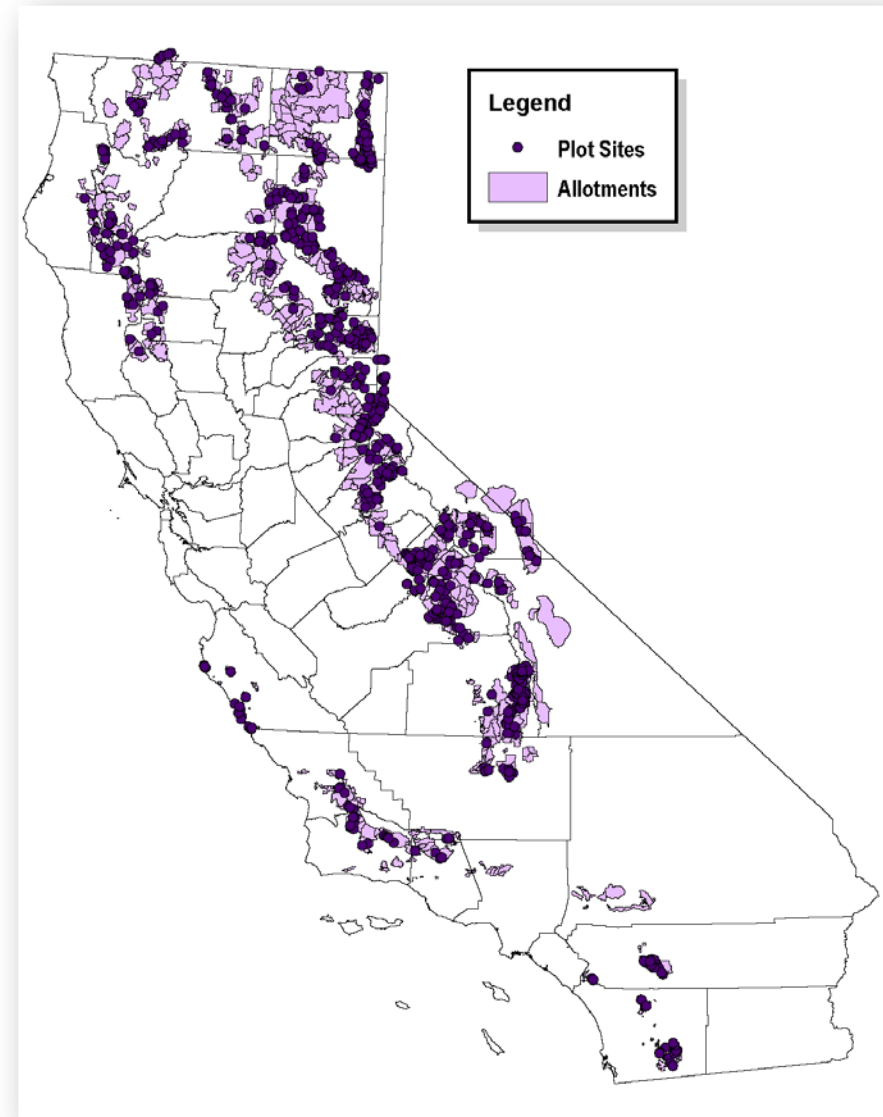


USFS R5 LONG-TERM RANGE MONITORING

- **1997: Initiated long-term monitoring program.**
 1. Document baseline conditions as new standards and guidelines were coming into use.
 2. Examine long-term trends following implementation of standard and guidelines.
- **UCD partnering with USFS to analyze these data.**

Range Condition Monitoring 1997-2014

- **Over 800 permanent plots**
 - Read every 5 years
 - 325 with 8+ years of data
- **Plant species composition**
 - Diversity
 - Richness
 - Ecological Functions
- **Current data analysis**
 - Range Condition
 - Trend in Condition
 - Initial Condition x Weather x Site Type x Management



Meadows Conditions 1997-2014

Mean (s.e.) change in plant community metrics across all 325 monitoring sites (overall), 67 non-grazed sites, and 258 grazed sites.

Metric	Overall	Non-Grazed	Grazed
Richness (S)	3.1 (0.3)	3.1 (0.5)	3.1 (0.4)
Diversity (H') (log scale)	0.18 (0.02)	0.17 (0.04)	0.18 (0.02)

1. Plant species richness and diversity increased.

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Rel. Freq. Highly Invasive	0.2 (0.02)	0.2 (0.03)	0.2 (0.02)

- 1. Plant species richness and diversity increased.**
- 2. Invasive species did not increase (<1%).**

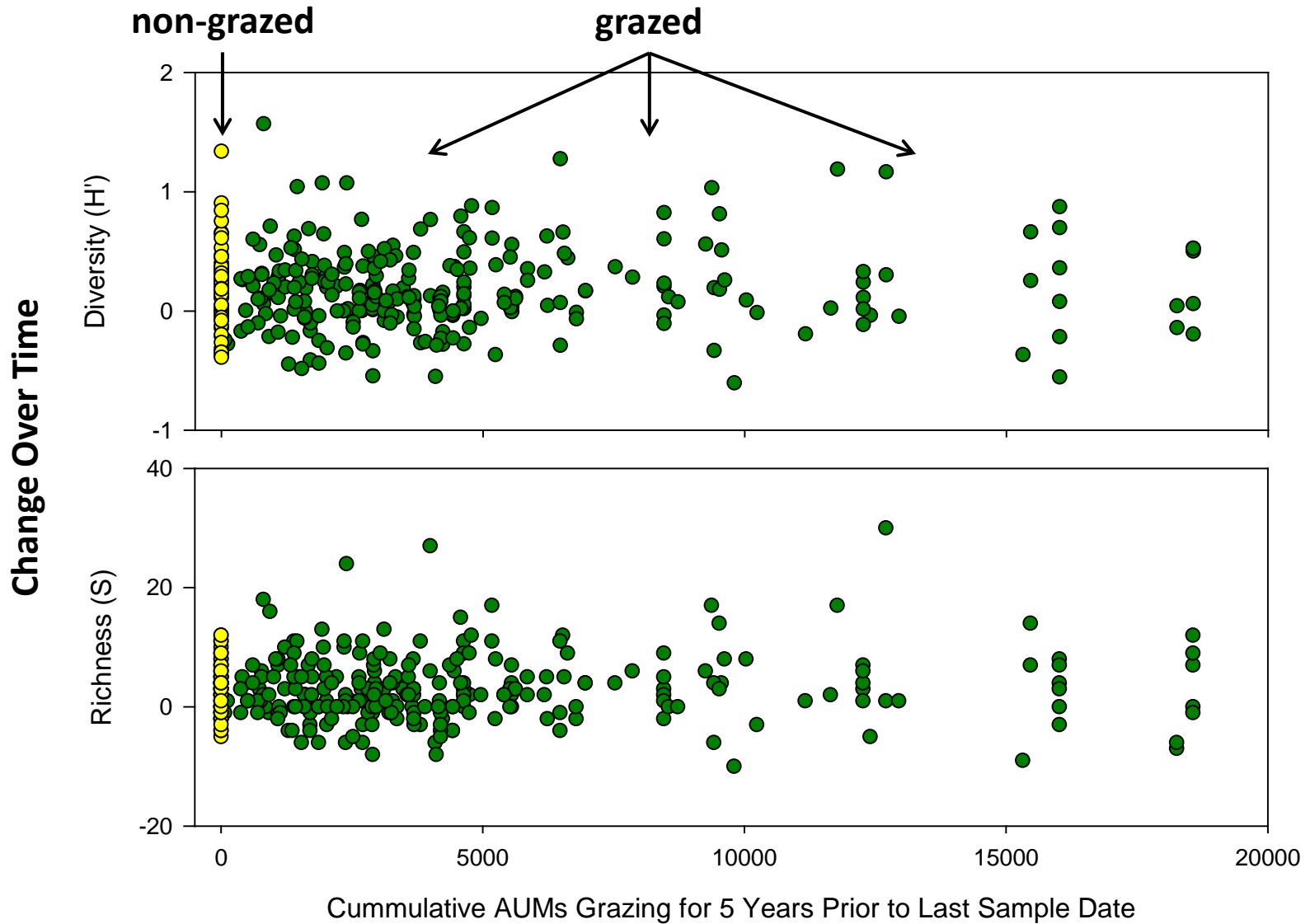
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Rel. Freq. Highly Invasive	0.2 (0.02)	0.2 (0.03)	0.2 (0.02)
Rel. Freq. Forbs	2.3 (0.7)	3.9 (1.5)	1.9 (0.8)

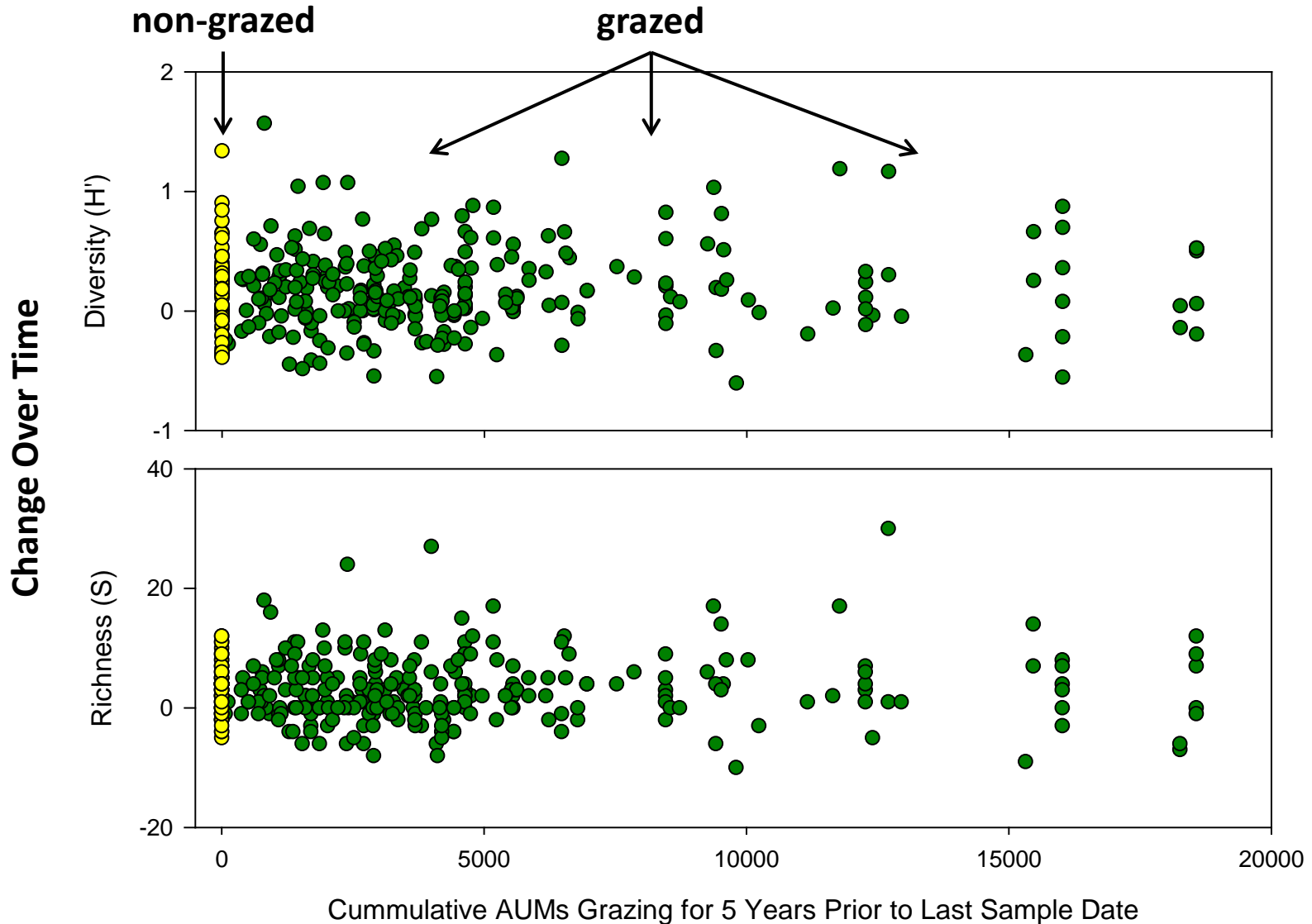
- 1. Plant species richness and diversity increased.**
- 2. Invasive species did not increase (<1%).**
- 3. Increased native forb component.**

Meadow Conditions 1997-2014

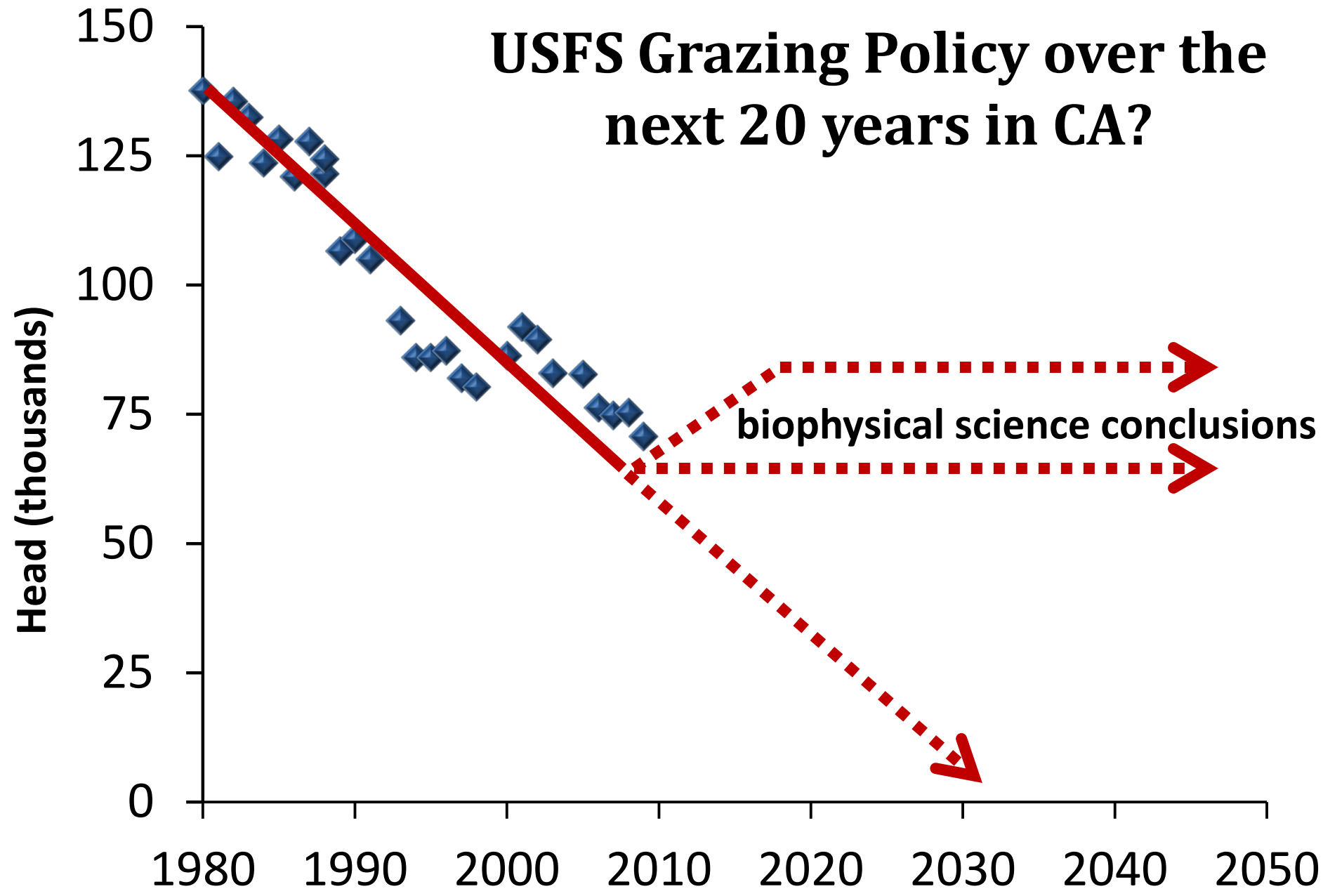


Meadow Conditions 1997-2014

Changes not correlated to grazing pressure



USFS Grazing Policy over the next 20 years in CA?



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Striking a Multiple Use Balance



- **The biophysical science is clear**
 - **Poor grazing management w/out conservation goals degrades resources.**
 - **Proper grazing management w/ conservation goals enhances-conserves multiple ecosystem services.**

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- **The biophysical science is not conflicting**
 - Research conducted during the different “grazing eras” do accurately reflect the divergent outcomes of the policies and strategies of each era.

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1985 ≠ 2015

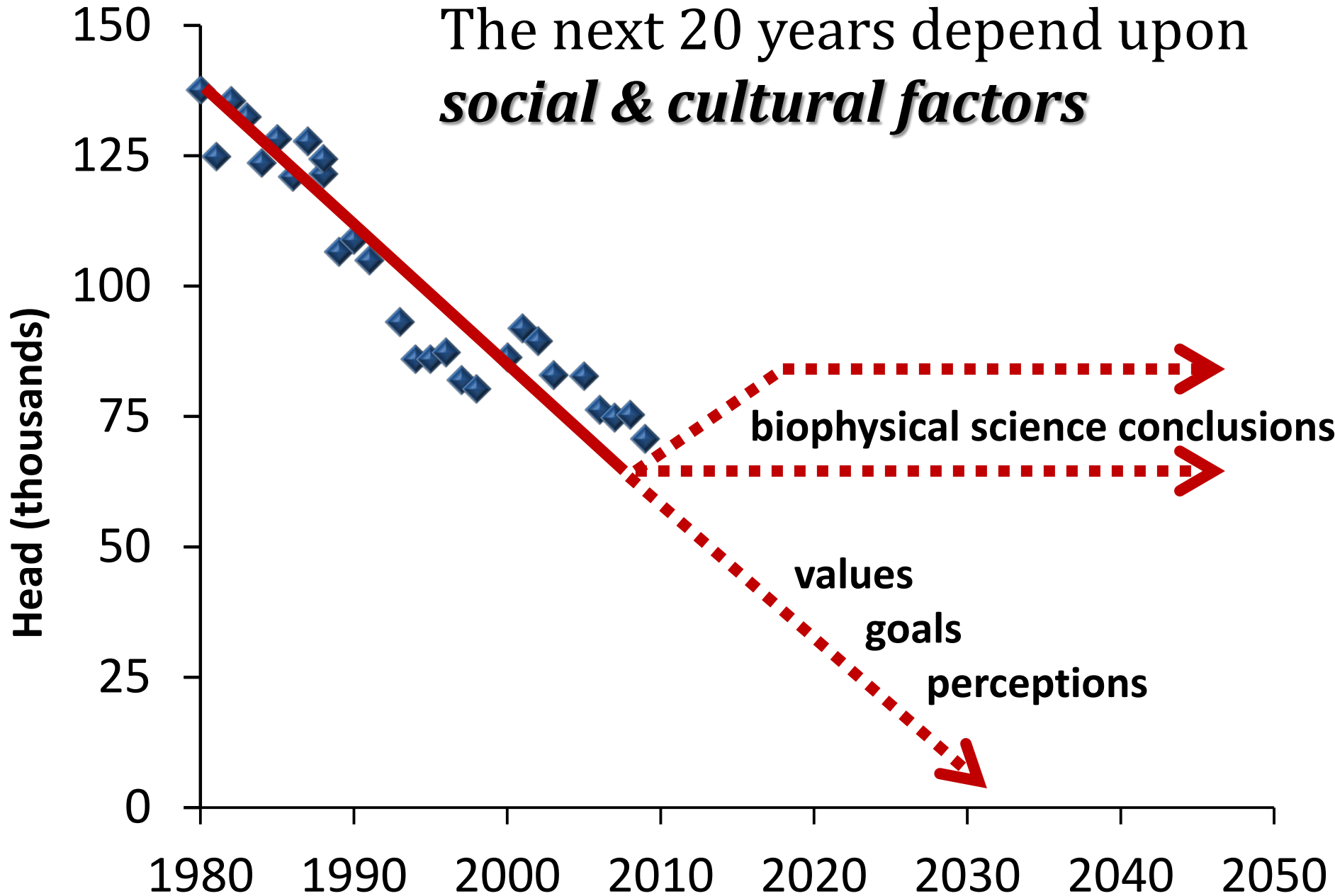
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Striking a Multiple Use Balance



- **Continued livestock reductions not broadly supported by science**
 - Recent studies showing no response to stocking rates – likely below a threshold.
 - **KEY** – Proper livestock distribution and attaining annual utilization standards on each allotment.

The next 20 years depend upon
social & cultural factors



Rangeland Watershed Laboratory

<http://rangelandwatersheds.ucdavis.edu>

