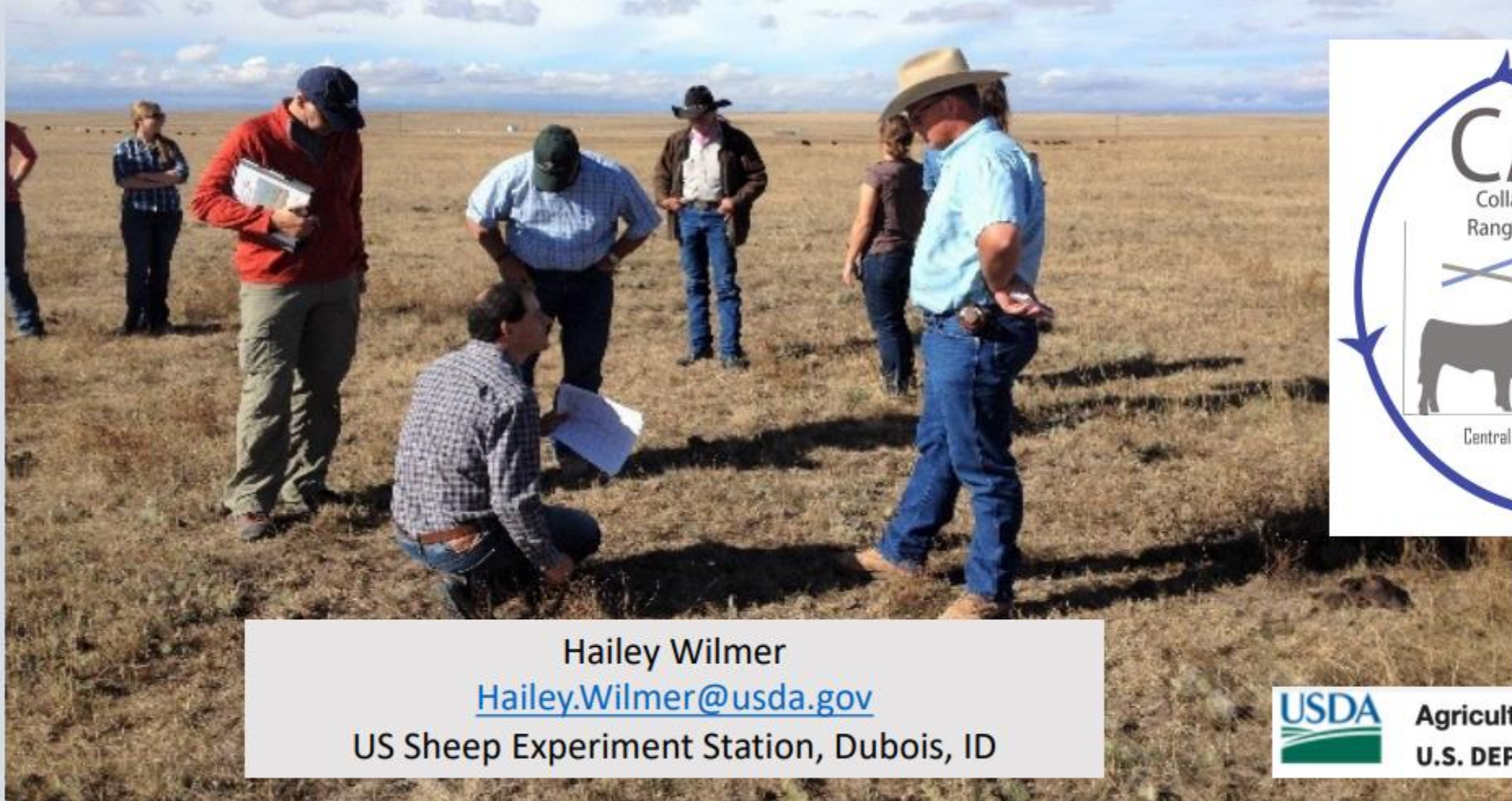


Breathing life into rangeland living laboratories in the US



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CARM Collaborators and Funding

Stakeholder Participants:

Bird Conservancy of the Rockies
Colorado State Land Board
Colorado State University Extension
Crow Valley Livestock Cooperative
Environmental Defense Fund
The Nature Conservancy
USDA Forest Service
USDA Natural Resources Conservation Service

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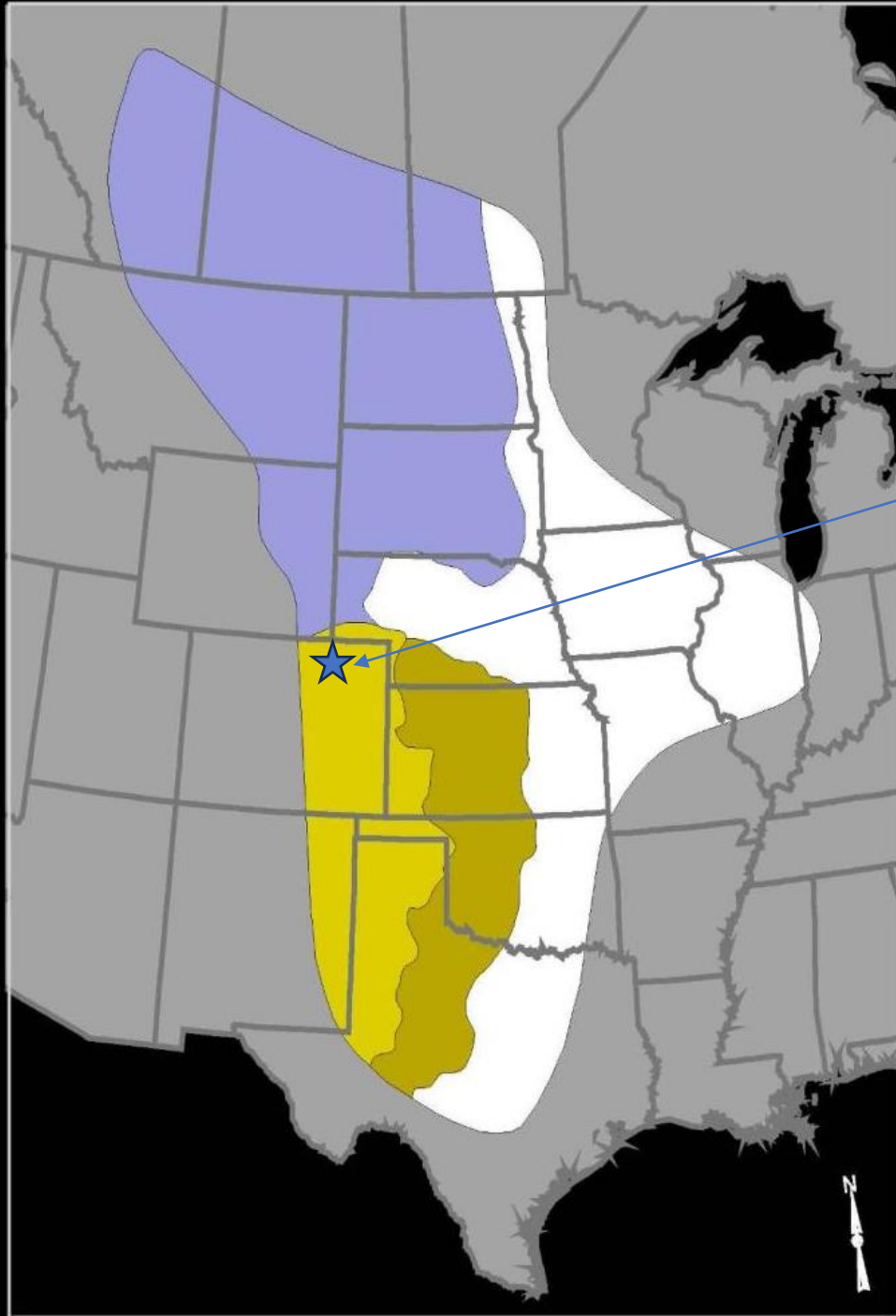
Research Collaborators:



CENTRAL GRASSLANDS REGION

Central Plains Experimental Range

- Northern Mixed
- Shortgrass Steppe
- Southern Mixed
- Tallgrass Prairie



After the Dust Bowl drought of the 1930s, the US government invested in rangeland science research on the Great Plains, where family ranches were organized to graze on the newly formed National Grassland system.

For the next 80+ years, research at **the Central Plains Experimental Range in Colorado** generated a strong body of rangeland knowledge.

Central Plains Experimental Range



However, the conventional approach to research had limitations. The Experimental Range:

- largely operated apart from complex social dynamics.
- excluded direct public participation in research.
- mainly just focused on production questions, ignoring wildlife, conservation, or social problems.

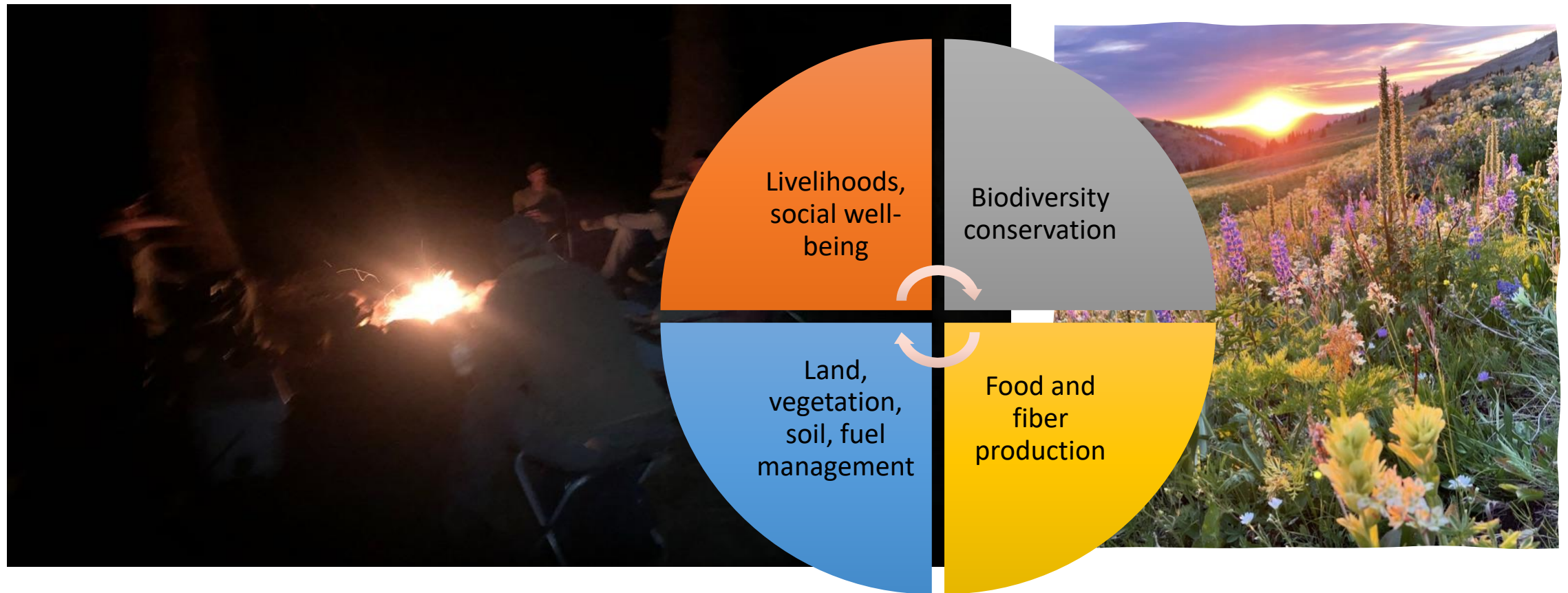
Central Plains Experimental Range



By the early 2010s, the urgent challenges to ranch sustainability and grassland conservation intensified.



Especially public lands around the western US, managers tasked with complying with complex grazing regulatory processes were already asked to integrate multiple disciplines and scales into management decisions. The question became: could science catch up? Researchers at the ARS, Colorado State University, and Texas A&M decided that the way they did research needed to change.



A group of researchers, led by Justin Derner, envisioned a **collaborative, adaptive ranch-scale study** that would provide a place for ranchers, conservationists, public lands managers, and researchers to experiment and learn together.

Derner gathered a team of scientists from multiple disciplines, reached out to a diverse group of stakeholders in the area, secured research dollars, and the **Collaborative Adaptive Rangeland Management project, or CARM**, was born.



A living lab was born

The project team implemented a comprehensive collaborative adaptive management project to enhance multiple aspects of the rangeland: ranch profitability and drought resilience, bird and plant diversity, and social learning.

1. Collaborative Team

Established 2012



The team divided the experiment station into two, ecologically paired ranches, and managed one with the “business as usual” approach common in the area, and gave decision-making control to a group of stakeholders, keeping stocking rates the same.

2. Ranch-Scale Study
USDA-ARS Central Plains Experimental Range

Grazing Treatments

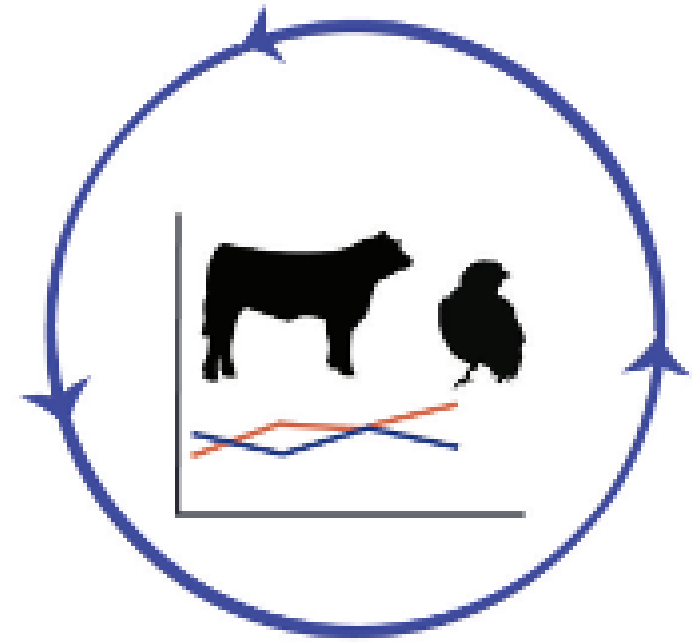
- Ten pairs of 130 ha pastures with similar soil, topography, and vegetation
- Pairs of pastures grazed with same stocking rate (number of yearling steers per total 1300 ha mid-May to September)

Traditional Rangeland Management (TRM)	Collaborative Adaptive Rangeland Management (CARM)
Similar to management on local ranches: Season-long grazing without adaptive decision-making	Stakeholders decide: 1. Goals and objectives 2. Annual stocking rate 3. Stock density 4. Pasture grazing sequence and rest 5. Cattle rotation triggers

Running the two ranch-scale treatments allowed scientists to monitor and evaluate project outcomes, and the group cycled through goal setting, stocking, grazing, prescribed fire, and drought decisions, tracking learning and as they went.

The group committed to this ranch-scale experiment for ten years. Plenty of time to learn and adapt.

3. Collaborative Adaptive Management (10 years)



Monitoring data and dialogue inform decision-making

As you can imagine, the decade that followed was **incredible**- but incredibly challenging.

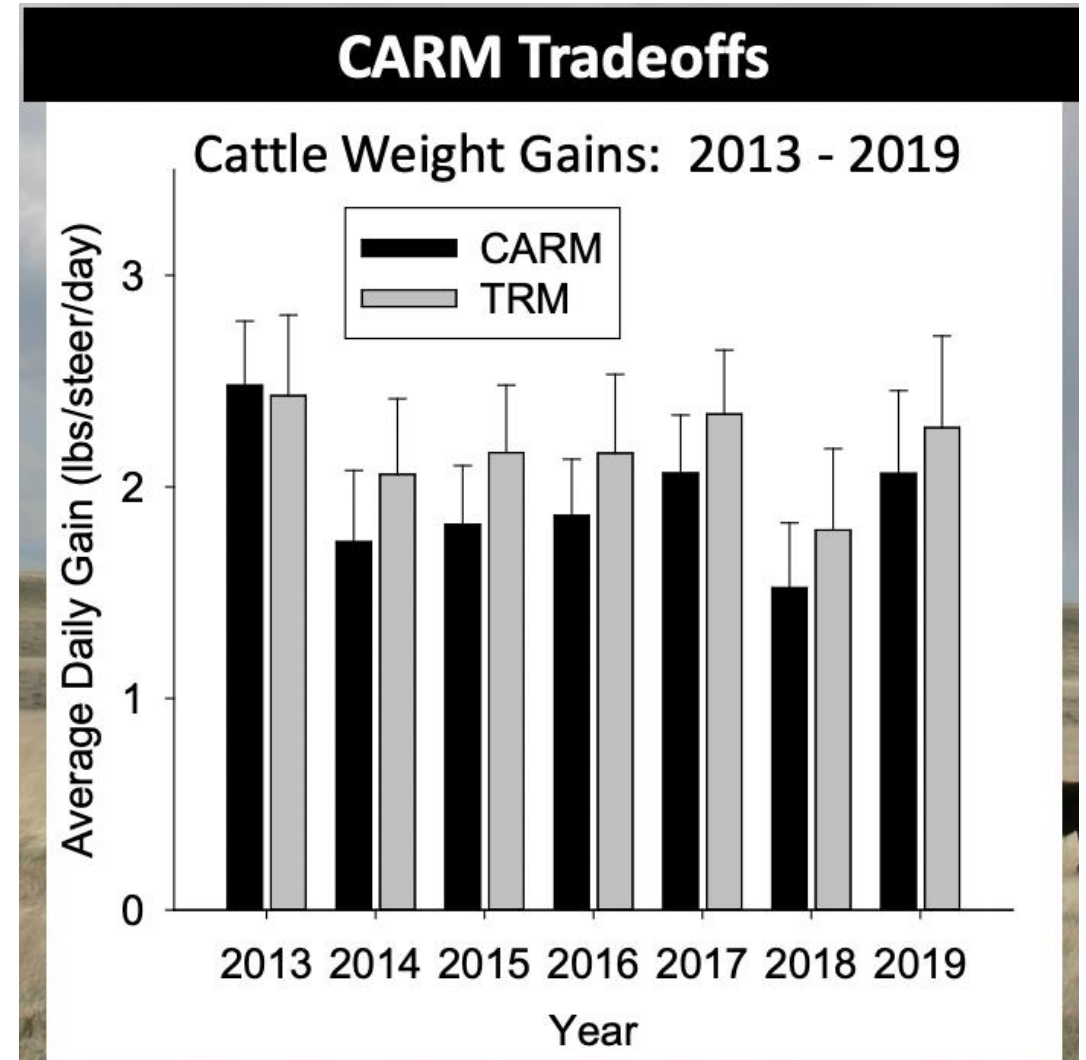
Working and learning together in this context was an entirely new environment for scientists and stakeholders.

From the first goal setting workshop, they realized they faced an uphill journey to understand one another disciplines, goals, and communication styles.



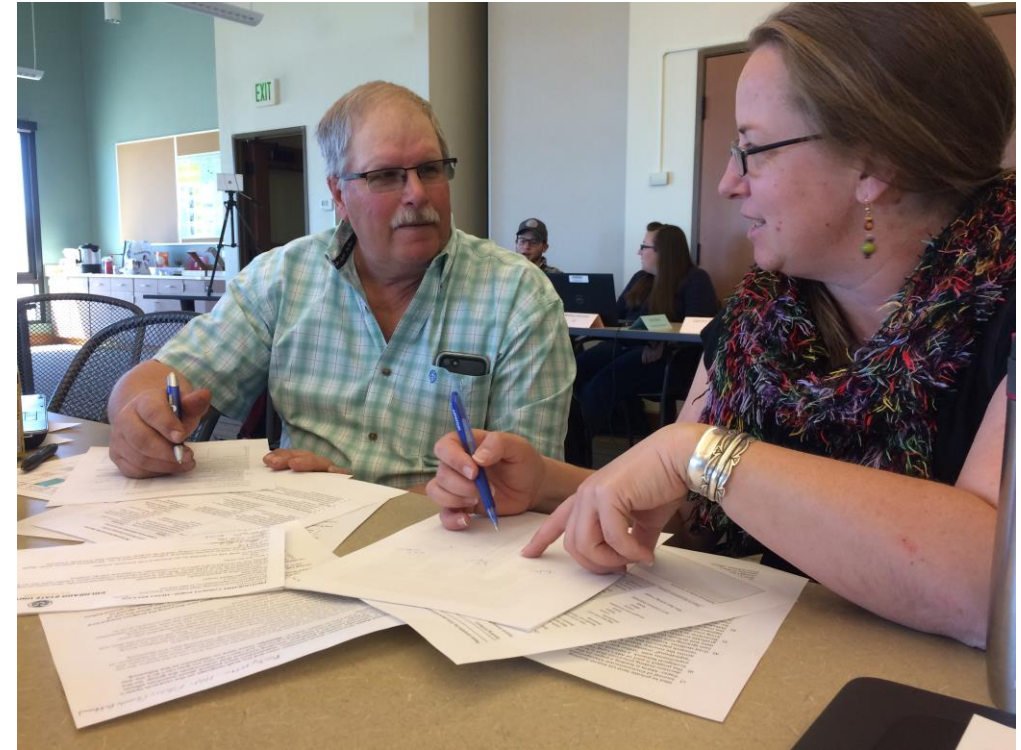
Plus, while everyone could agree big picture goals,

- the stakeholder managed steers were gaining far less weight (12-16% a year, on average), than the traditional steers,
- efforts to improve bird and grass conditions were inconclusive,
- ranchers flat out rejected data that suggested prescribed fire could be beneficial and voted against the use of fire,
- and to top it off the roles of researchers as scientists, facilitators, and decision-makers became confused and frustrating.

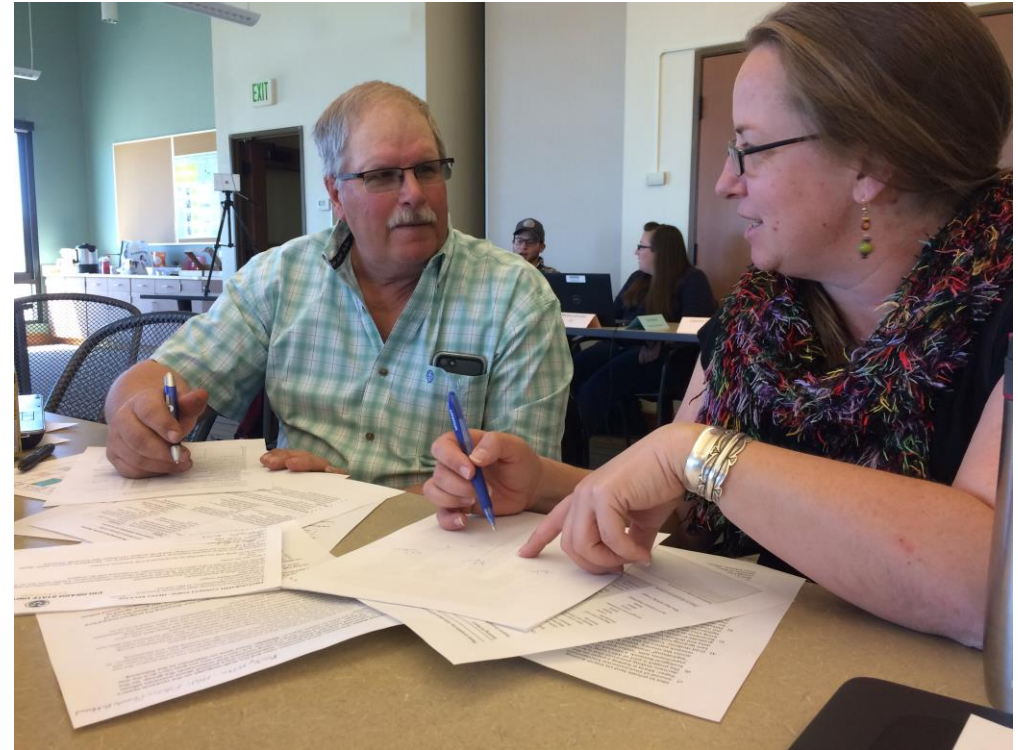




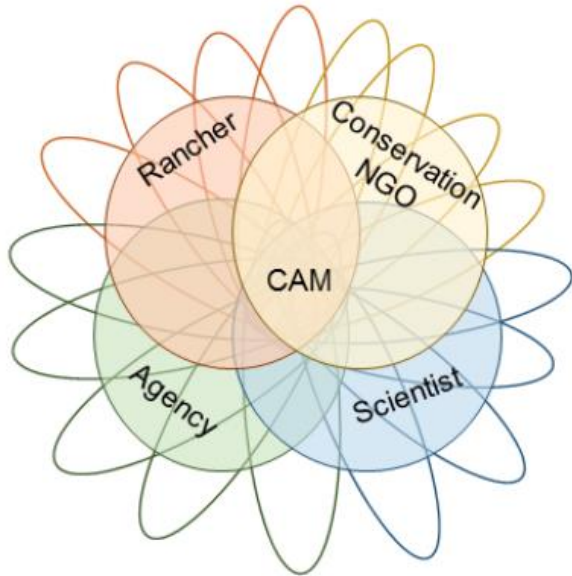
But then, somehow, through some mix of courage, or stubbornness, or more likely, an organic social cohesion that formed out of time together on the land and flexible, supportive leadership...



the CARM process began to actually...work.



The exact moment
it began to happen
is unclear.



We saw how trust supports a culture of flexibility and creativity, experimentation and learning. **This leads to scientific productivity and enhances adaptive capacity.**

And, because we had integrated social science into the core of the project, we were able to document the aspects of the project that facilitated social learning, and to reflect honestly on the challenges and opportunities of the approach.

Gwendwr Meredith at UNL is taking this to the next level with ongoing social work in CARM.



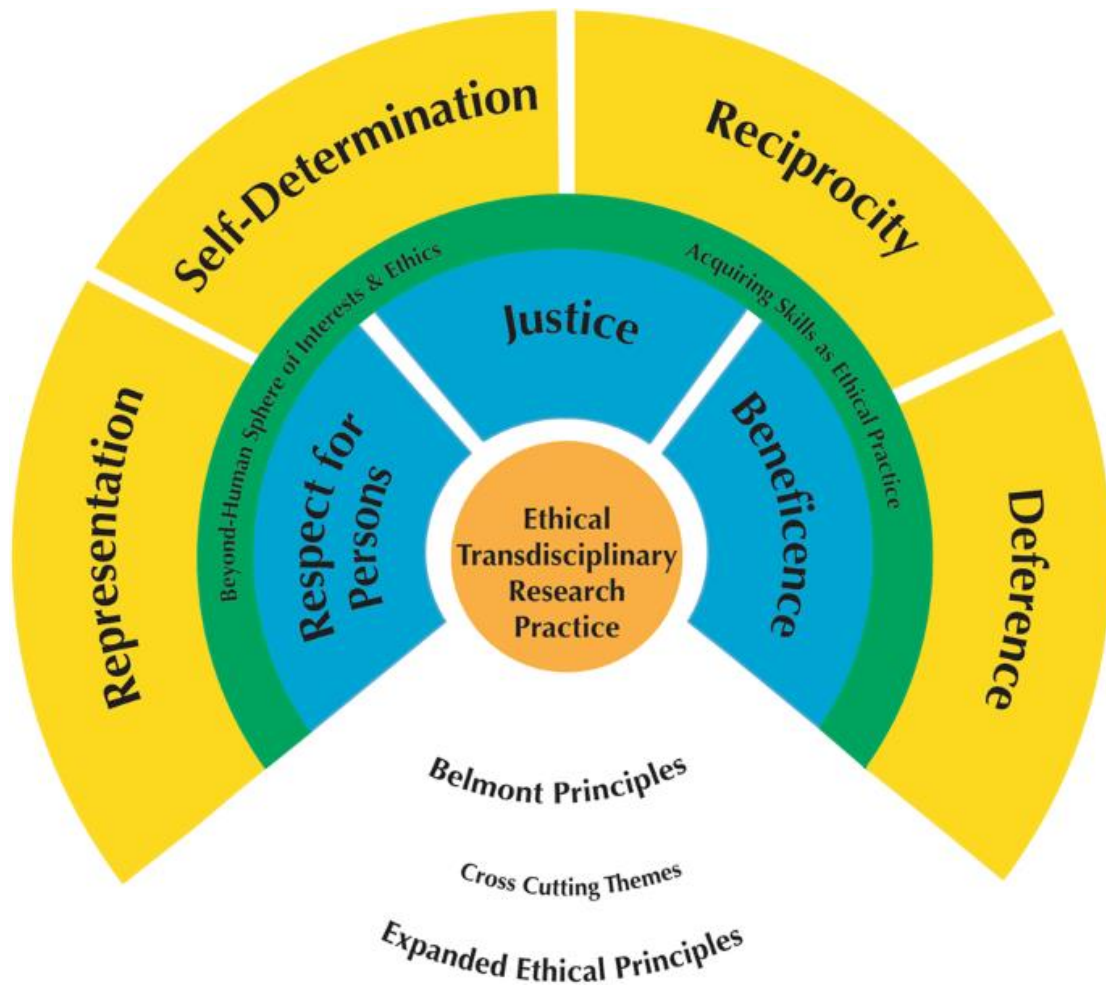
“ I hope the major lesson that comes out of it is that collaborative, multi-stakeholder processes actually work. That you can have your cake and eat it too. You can have three different parties with three different objectives sit down and manage something and everybody at the end of 10 years can be happy.”
-Gov't Agency Stakeholder



Looking back, we see which
key attributes of the project
fostered these outcomes

- 1) flexible, inclusive problem definition
- 2) respect for context and history
- 3) effective team leadership
- 5) power sharing
- 6) long-term investment in relationships
- 7) the capacity for collaborative creativity
- 8) Sufficient resource allocation
- 8) landscape-scale experimental design that invites diverse research questions and methods

And key principles of engagement help foster long-term relationships. Ethics matter.



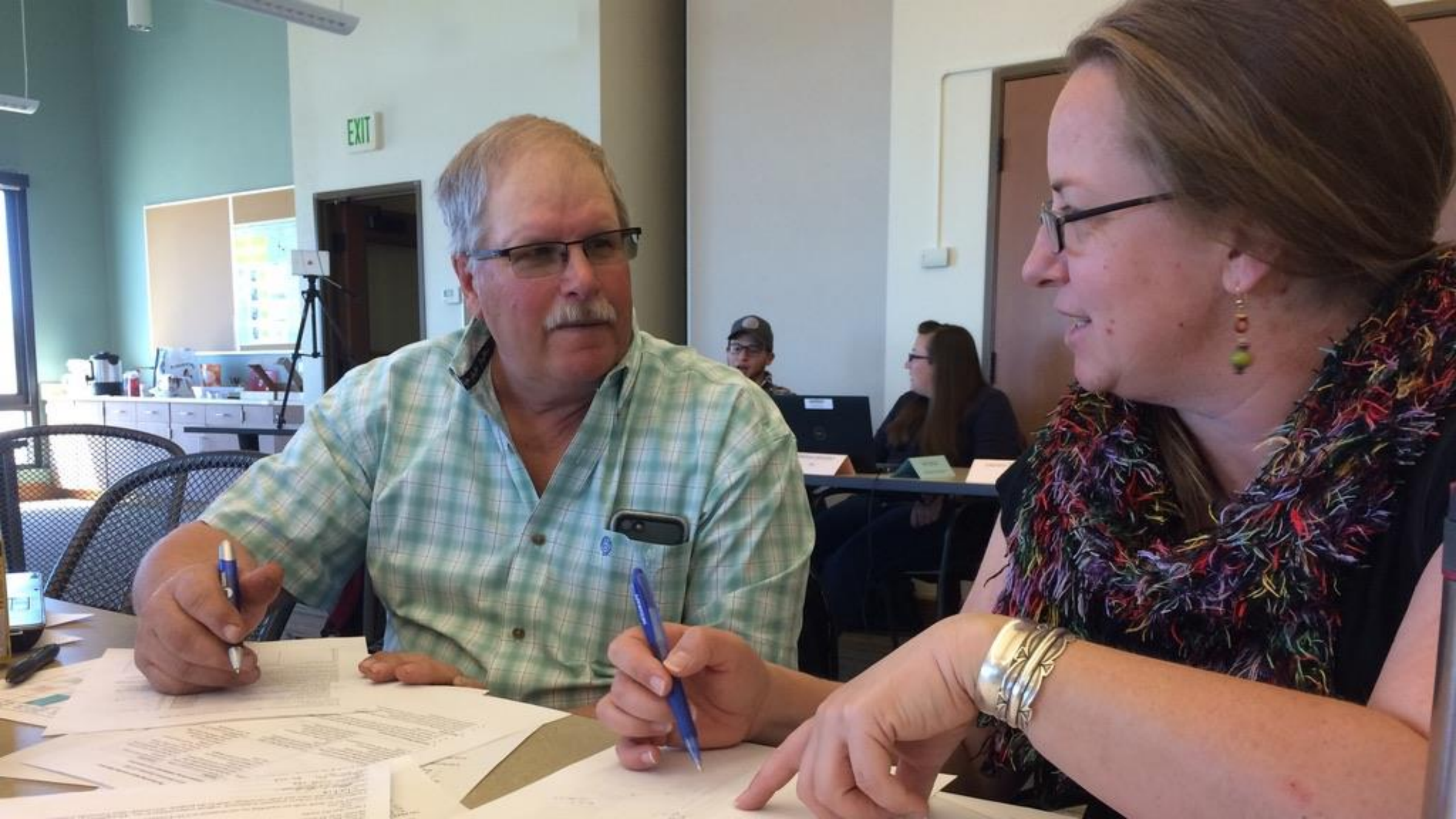
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Expanded Ethical Principles for Research Partnership and Transdisciplinary Natural Resource Management Science

Hailey Wilmer [✉](#), Alison M. Meadow, Amanda Bentley Brymer, Stephanie Russo Carroll, Daniel B. Ferguson, Ibrahim Garba, Christina Greene, Gigi Owen & Dannele E. Peck

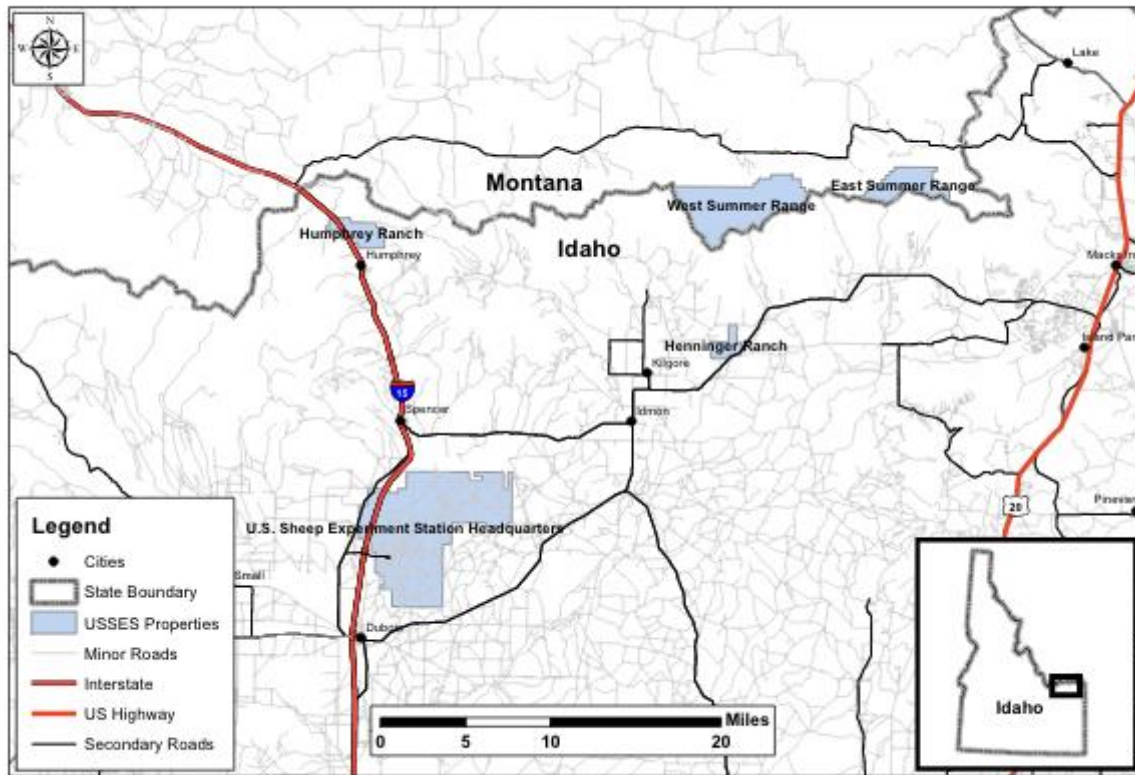
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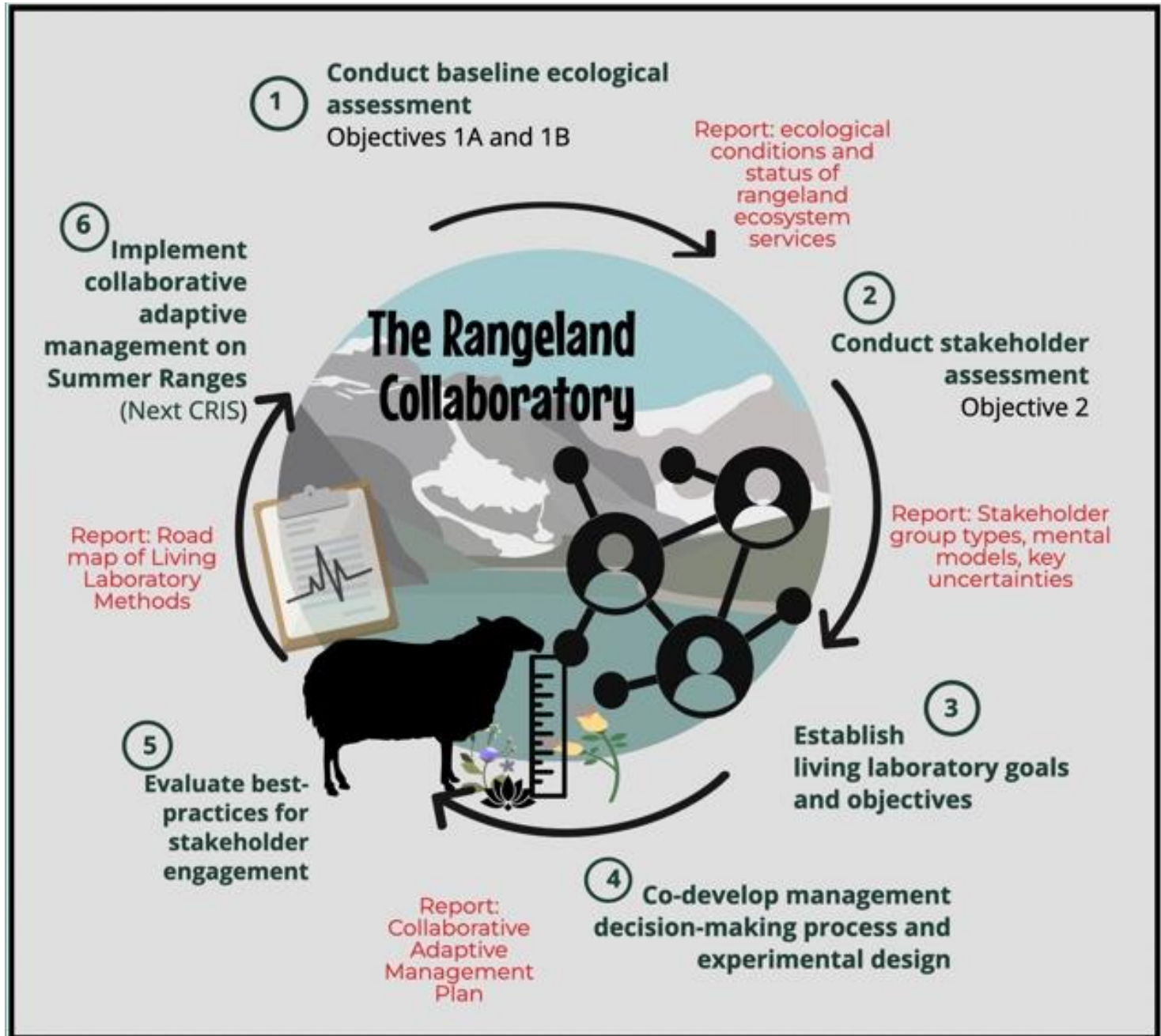
Now, can we take this to a new context?

USDA-ARS U.S. Sheep Experiment Station Lands



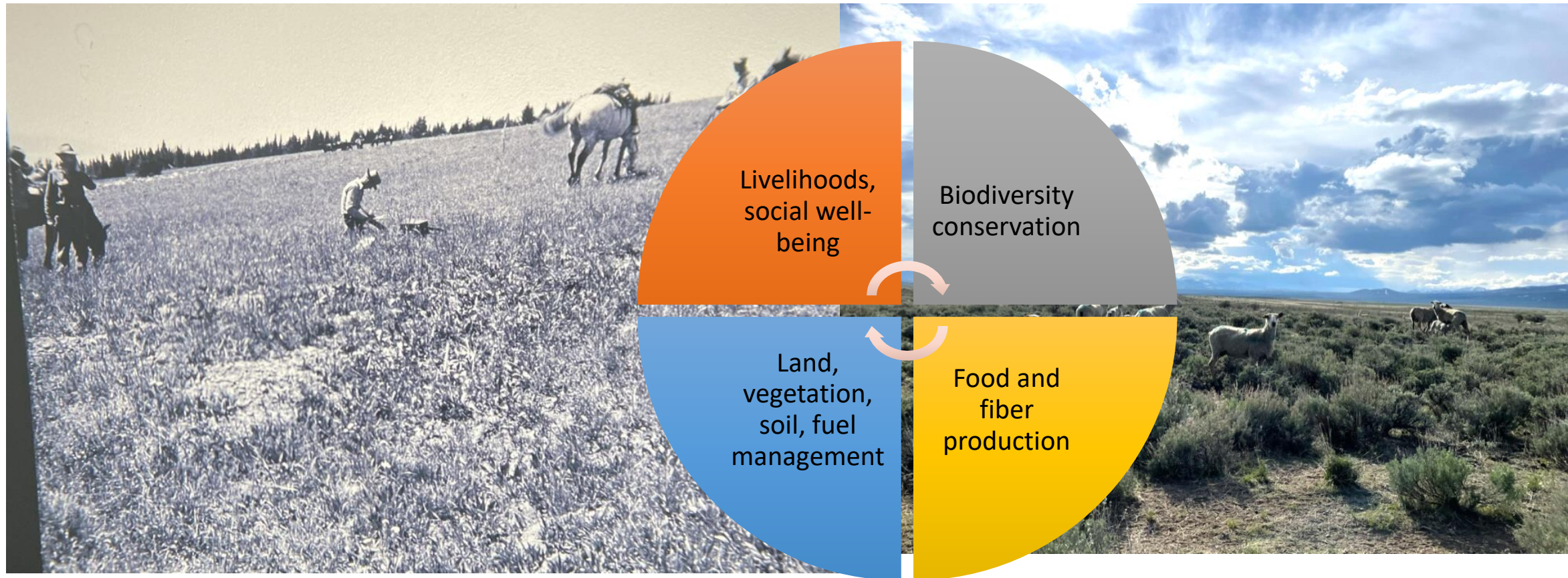
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Managers are already asked to integrate multiple disciplines and scales. The question is still...

Can science catch up?



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Thank you!

