

Collaborative Adaptive Rangeland Management (CARM) in the Western Great Plains



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Motivating Factors



Lack of stakeholder involvement in the scientific process

Motivating Factors

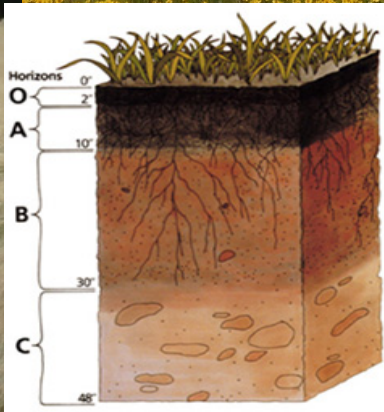


**Disconnect between manager
experience and scientific evidence**

Motivating Factors



Ecosystem goods and services



Adaptive Management

- **Application of experimentation to the design and implementation of resource management.**
- **Management is designed BOTH to achieve management objectives AND increase learning.**

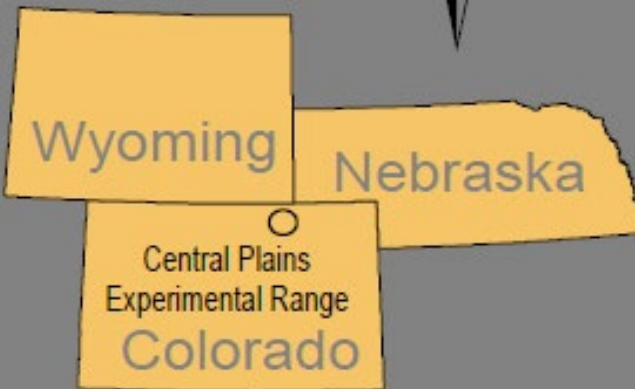
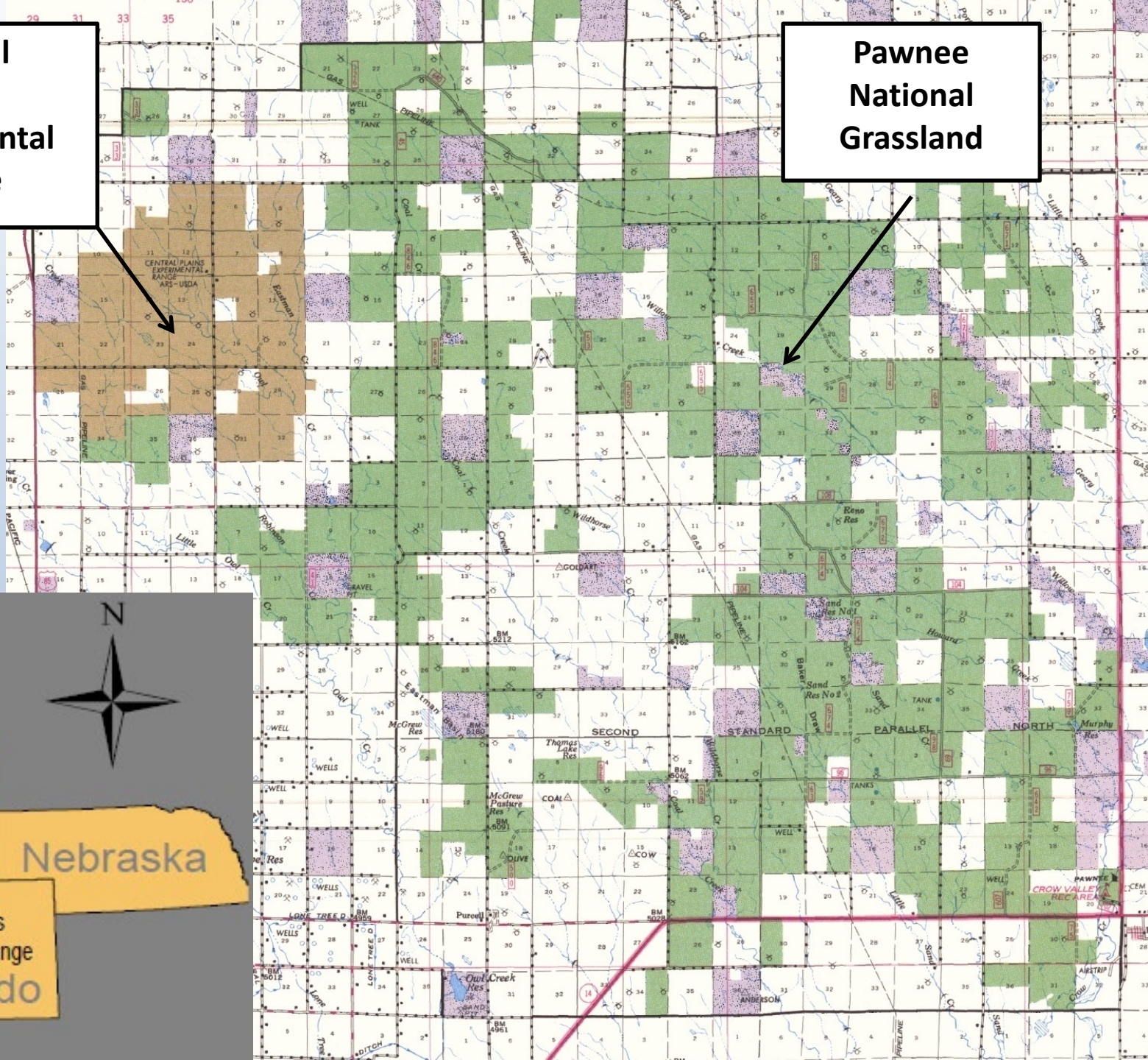
Collaborative Adaptive Management



- **Involves multiple stakeholders**
- **Draws on all types of knowledge**

Central
Plains
Experimental
Range

Pawnee
National
Grassland



CARM Stakeholders

**Crow Valley Livestock Cooperative
(4 Ranchers)**

Bird Conservancy of the Rockies

Environmental Defense Fund

The Nature Conservancy

Colorado State Land Board

USDA Forest Service

**USDA Natural Resources
Conservation Service**

Colorado State University Extension



Research Collaborators:



**WARNER COLLEGE OF
Natural Resources**



**UNIVERSITY
OF WYOMING**

UC DAVIS
UNIVERSITY OF CALIFORNIA

**Long-Term Agroecosystem
Research Network**



**TEXAS A&M
UNIVERSITY**



**Agricultural
Research
Service**

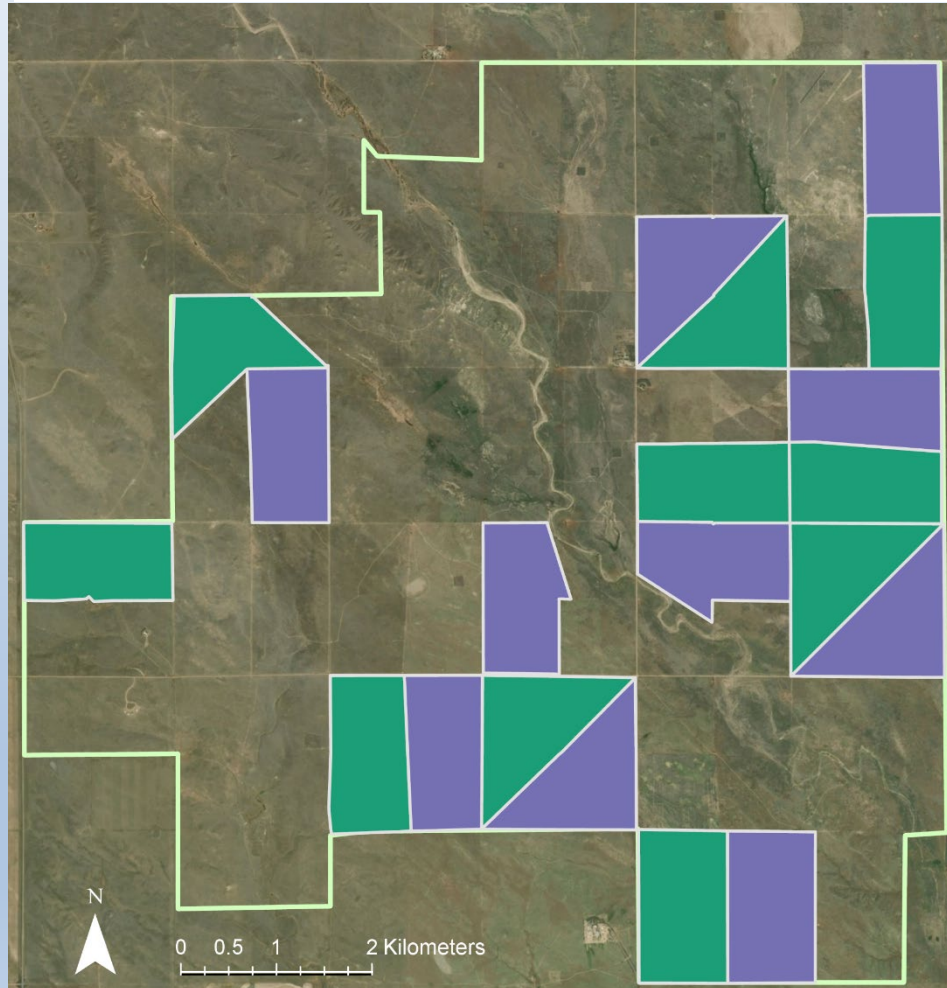
Bird Conservancy of the Rockies

Our mission is to conserve birds and their habitats through an integrated approach of science, education and land stewardship.

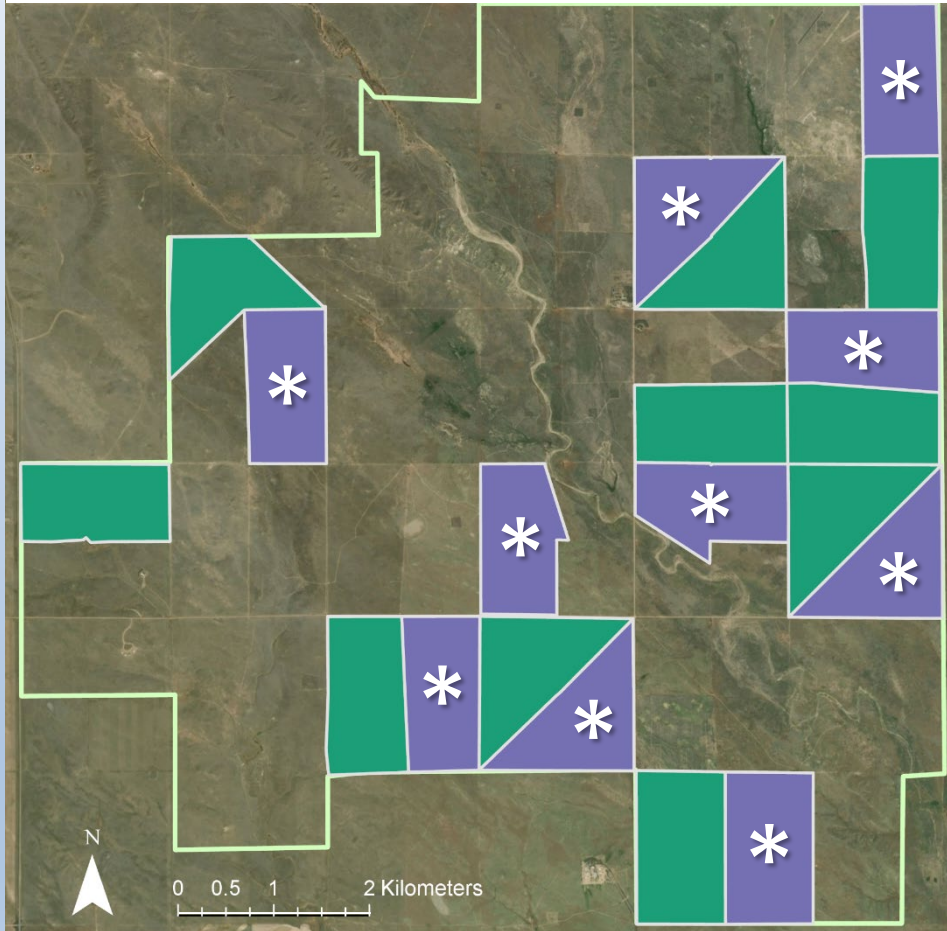
We work in 16 US western states, Canada and Mexico for full annual life cycle approach to bird conservation, and have **12 Private Lands Wildlife Biologists** working with farmers and ranchers in USDA: Natural Resource Conservation Service offices.



Collaborative Adaptive Rangeland Management experiment



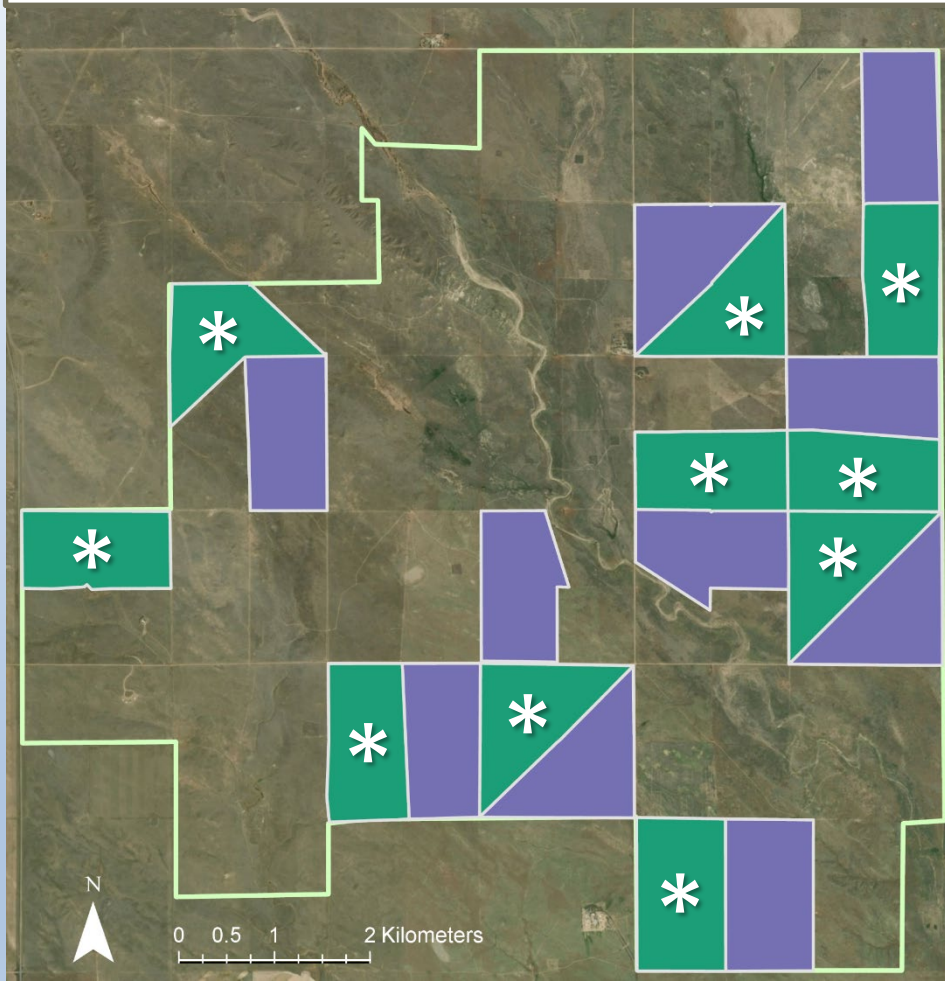
Treatment 1: continuous season-long grazing



Traditional Rangeland Management Treatment

Moderate, season-long stocking @ low stock density (20 – 24 steers per pasture; May 15 – Oct 1)

Treatment 2: CARM



Started with a
workshop; then
series of meetings

Goal: Manage the land in order to pass it on to future generations
-Economically
-Ecologically

Vegetation



Profitable ranching operations



Wildlife



Collaborative Learning



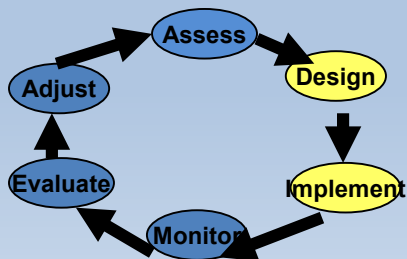
Adaptive Management Plan

One herd of 220 steers

2 rested pastures/yr
(grassbanks for dry
years)

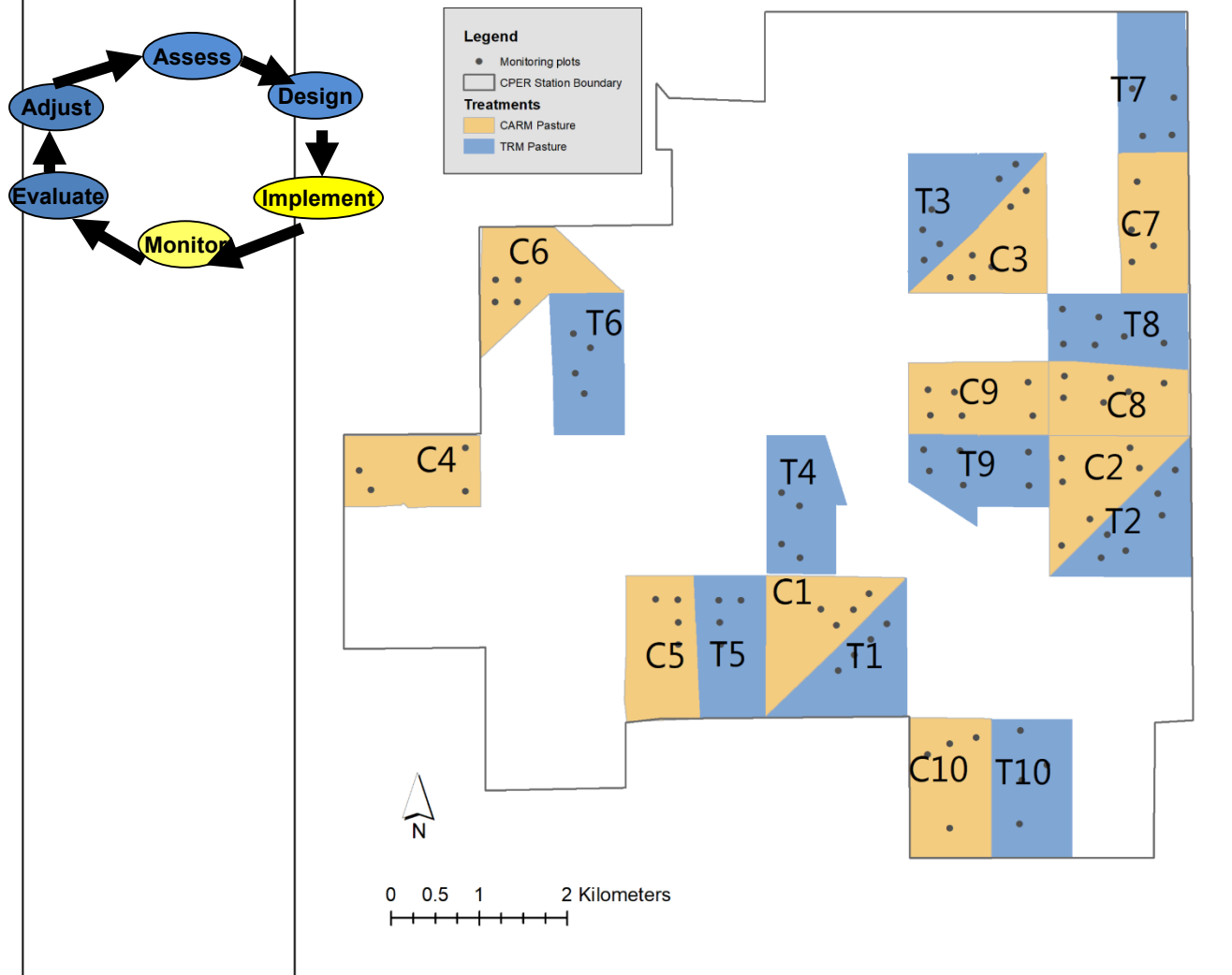
Movements will
consider:

- Precipitation
- Forage biomass
(visual obstruction)
- Species composition
- Seasonality



2013: Baseline Pre-treatment Monitoring

2014 – 2019: Annual monitoring of all objectives



Stakeholder – Scientist Meetings 3x per year: 2014 - 2019



Key components of collaborative meetings:

Engaged discussion of what monitoring results mean



Effective monitoring data (linked directly to specific objectives) is necessary, but getting the data is not enough. Time to analyze, engage with, and discuss results is essential

Key components of collaborative meetings:

Delving into mental models

Stakeholder interviews identified the speed of cattle rotations as a key uncertainty in the AGM experiment that limits beef production outcomes. This questionnaire helps us think through the effects of changing the rate at which cattle are moved in the AGM project on a number of project objectives. Specifically, we would like to know how you believe three rates of rotation impact cattle weight gain, vegetation, and wildlife objectives in average, wet and dry years.

Fast: Cattle rotate about every week. Each of 10 pastures would be grazed 2.5 times in the growing season.

Medium: Cattle rotate about every 2-3 weeks. Each of 10 pastures would be grazed once in the growing season.

Slow: Cattle rotate about every 4-5 weeks. More than 2 pastures would be rested in a growing season.

Fast - smaller pasture

1. What is the effect of different rotation speeds on cattle weight gains?
 - a. On the quality of diet intake?
Fast ↑↑ Medium ↑ Slow ↓ Smaller ↑↑↑
 - b. On the quantity of intake
no difference
 - c. On energy expenditure?
minor differences
 - d. Describe why there is a difference in a, b and c at different rotation speeds
rapid, growing plants being chosen
 - e. How would the speed of rotation impact cattle weight gains differently in wet years compared to average years?

Key components of collaborative meetings:

Sharing food and building community



What have we learned?

**“I think when we first started, everybody was kind of out for their own. All I really cared about was cattle gains, but after some heated conversations and getting to know all the objectives, now I look at it as I want to meet the cattle objective, but also the bird objective and the grass objective. I’ve learned a lot about inter-pasture heterogeneity ... and then how cows gain better because of other reasons not just cow triggers. So we have to come together and work for all those objectives.”—
Rancher Stakeholder**

Key outcomes of collaborative process:

- Increased trust and engagement among stakeholders and between stakeholders and researchers **is an early outcome of the CARM project.**
- Stakeholders appreciated working together to make decisions over a long (10-year) time frame.
- The importance of **participatory processes in facilitating trust** is key to project success.
- Conversations are evolving
 - “How many lbs/acre of grass does a McCown’s Longspur need?”

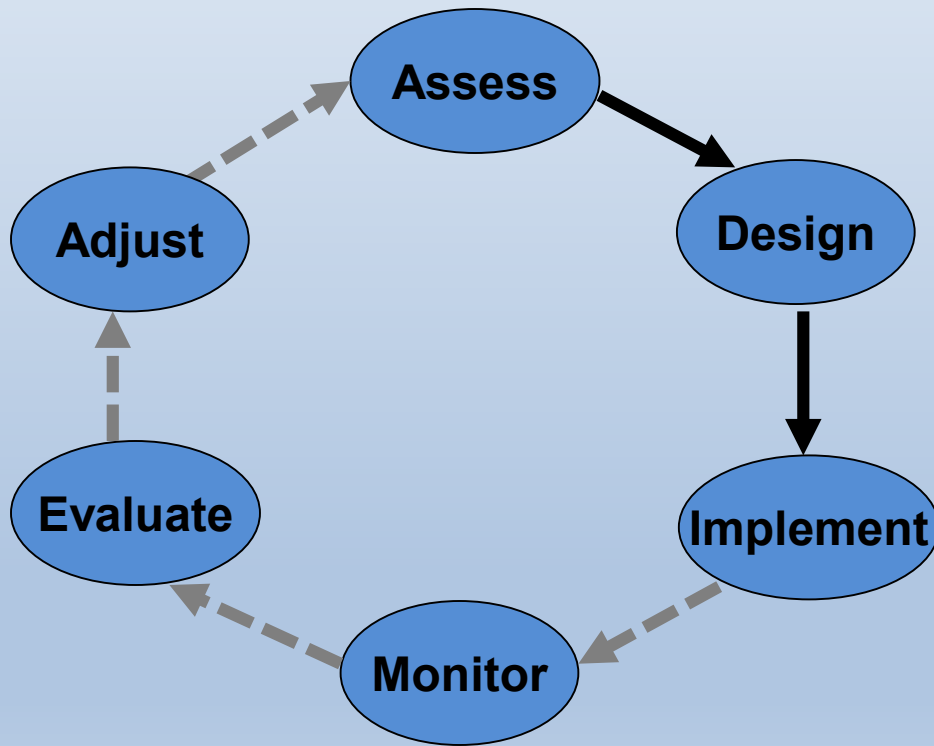


Key outcomes of collaborative process:

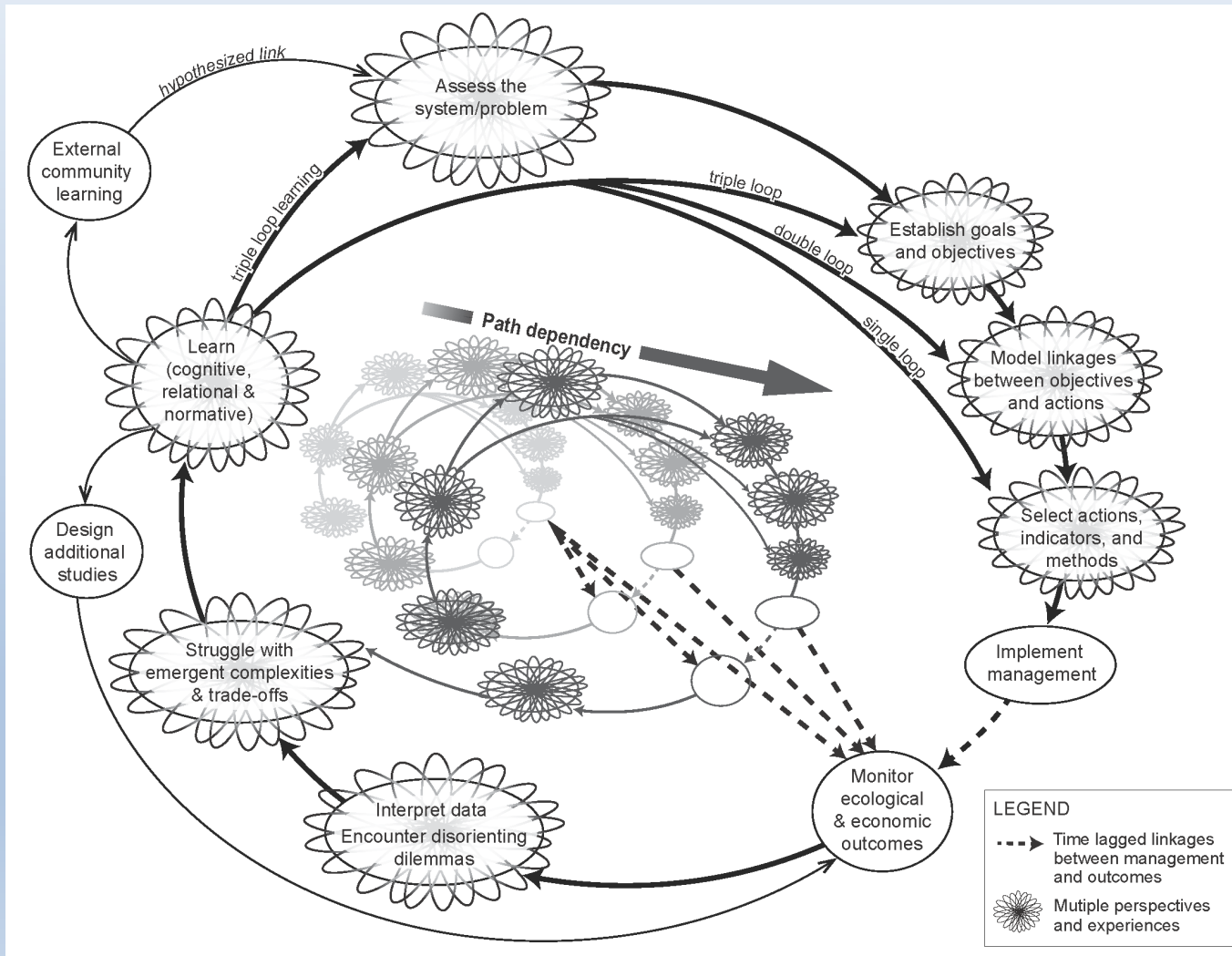
- Provided opportunity to develop understanding and respect for each other's worlds, ways of learning, and knowledge.
- Conservation NGOs gained understanding of how to integrate understanding of rancher livelihoods into bird conservation



Key Outcomes: CAM is not a circle, but rather a spiral. Path-dependency makes it impossible to repeatedly adjust a single system component in isolation.

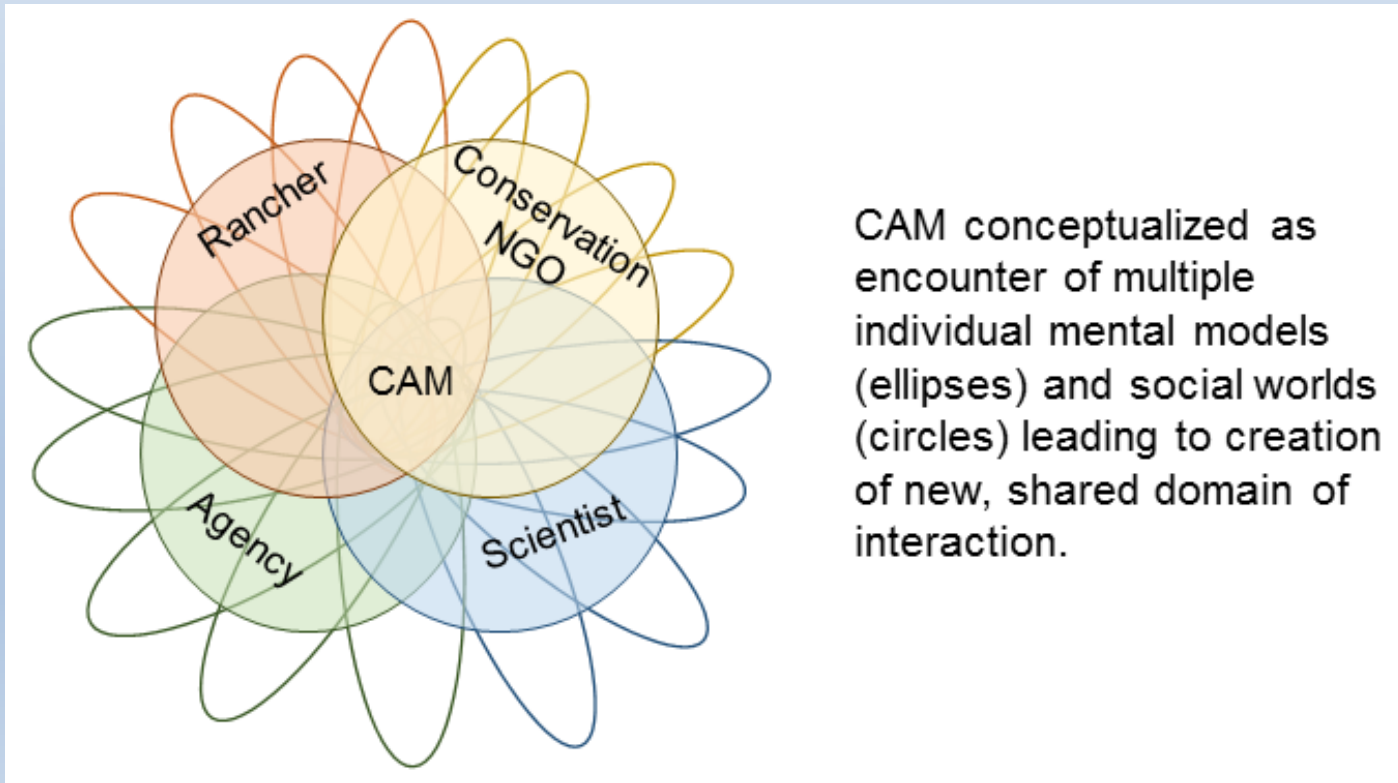


Time lags and complex tradeoffs impede “closing the loop”



Effective monitoring data (linked directly to specific objectives) is essential, but getting monitoring data is not collaboration

Key Outcomes: Public participation is not singular (i.e. there is no unitary “public”), but rather the intersection of many different mental models and social worlds. CAM makes visible, but does not reconcile, differences among stakeholder knowledge sources.



CAM conceptualized as encounter of multiple individual mental models (ellipses) and social worlds (circles) leading to creation of new, shared domain of interaction.

Key Outcomes: Stakeholder input is not external to, but inherently part of the CAM learning-doing spiral.



Stakeholders' knowledges will affect not only **decisions** made, but also:

- what **data** are collected and how,
- how data are **interpreted**,
- the scope of available management **options**,
- which data are **linked** to a given objective



Email us: David.Augustine@usda.gov
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Digital Fact sheet: <https://spark.adobe.com/page/cDD9u5v5ZeC88/>



🔍 ARS Adaptive Grazing Management