BCarbon Stakeholder Meeting

April 6th, 2023

Agenda

- Introductions with Jeff Cohen
- Review of Living Shoreline protocol with Jim and Jeff
- Gauging Living Shoreline protocol consensus
- Presentation from Three Creeks
- Closing thoughts

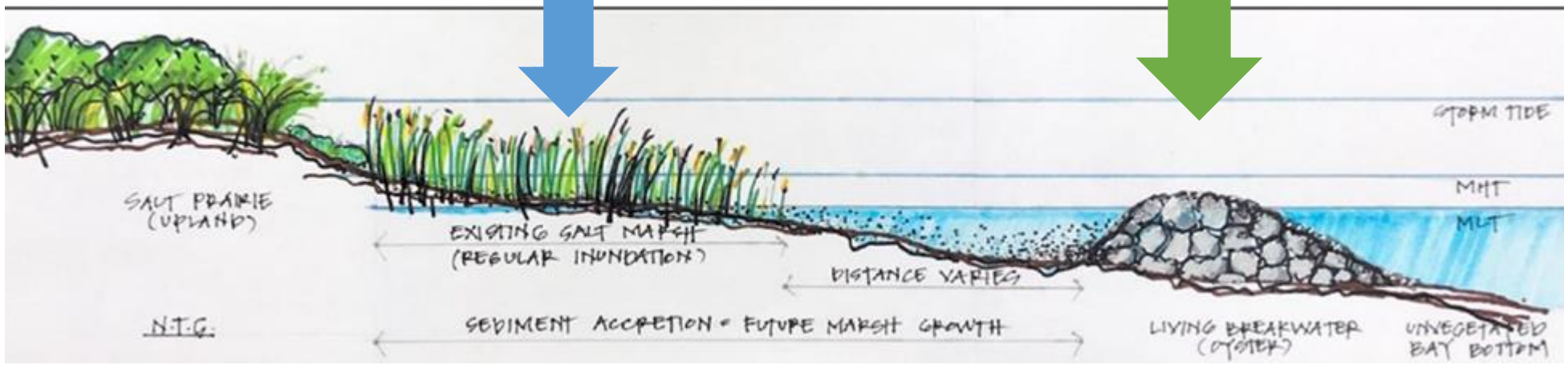
Unique Features

- Living shorelines – the basis of the credits – insured
- Clear additionality from construction of living shoreline
- Potential local benefits to companies with TX coastal presence
- 50-year maintenance term
- Oyster integration and potential seagrass
- Growth of a long-term database for Texas coastal wetlands
- Designed for digital MRV

Conceptual Graphic

Ongoing carbon sequestration via marsh grass after Living Shoreline Construction:
Sequestration & Generation Credit

Living Shoreline construction prevents marsh die-off due to Sea-Level Rise:
Regeneration & Protection Credit



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Two types of Blue Carbon Credits

1. Regeneration & Protection Credits

The GHG emissions that are projected to be avoided over 50 years by the Living Shoreline's protection of the organic carbon stored in the wetlands within the Project Area.

2. Sequestration & Generation Credits

Atmospheric CO_2 that is removed and sequestered in regenerating wetlands within the Project Area, by new net soil accretion, and in some cases, new plant growth, and/or new oyster reefs. Associated credits can be awarded on an annual basis following Living Shoreline construction.

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Foundational Data

HRI SLAMM

The Harte Research Institute (HRI)'s 2 m resolution run of SLAMM for the Texas Coast, created by the General Land Office (GLO) for the Texas Coastal Resiliency Master Plan (TCRMP). The HRI SLAMM scenario uses 2100 NOAA data regressed to 2075 for the high sea-level rise scenario. Due to its very fine resolution and the parameters used by HRI, the model is also usable for site-specific analysis. This SLAMM is used throughout the Protocol and shall also be used by Developers working with BCarbon. The HRI SLAMM will be made available to Developers and will be updated on a yearly basis by BCarbon to reflect the most recent data.

Texas Blue Carbon Database

BCarbon's Texas Blue Carbon Database (BCD) is used to calculate the number of tons of CO_2e, and thus the number of credits, a project is eligible for under the Living Shoreline protocol. This database was the outcome of years of government-funded and privately funded research by diverse teams of scientists from across the country, led by BCarbon stakeholder Dr. Rusty Feagin, Professor in the Department of Ecology and Conservation Biology and the Department of Ocean Engineering at Texas A&M University (TAMU).

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Protocol Highlights

4.1 Digital MRV Recording

Each Project will be assigned a Unique ID upon project registration, which allows access to “digital MRV” (d-MRV) and asset data that records:

- the complete crediting “lifecycle” of the Project including the Project Boundary, Wetlands Boundary, and Project Area determinations under Section 4.2, credit issuances, transfers and retirements;
- relevant information from field monitoring, emission factors, data refinements, verifications, and other relevant inputs;
- the complete profile of physical and environmental attributes of the Project including the environmental conditions determined from the site analysis outlined in Section 4.3;
- the environmental performance of the Project over time including the credits for “Regeneration and Protection Credits” and “Sequestration and Generation Credits” and relevant metrics representing biodiversity, habitat resilience, water quality, and other performance indicators.

4.1 Digital MRV Recording

“Roles-based” access to d-MRV asset data is provided through a 3rd party registry that is integrated with BCarbon to participants in the generation and market application of the BCarbon credits including owners of primary data (e.g., landowners, Project Developers) and secondary data (e.g., environmental monitoring systems), data refiners, and 3rd party auditors.

5.0 Demonstrating Additionality

The physical structure of the Living Shoreline provides inherent additionality, in that its construction, and thus the resultant wetland protection, would not have occurred in absence of the Protocol and its associated carbon credits. Project Developers must also demonstrate that:

- pertinent laws and regulations have been reviewed and that none mandate the project activities;
- no compensatory mitigation credits or other carbon offsets have been generated from restoration, creation, enhancement, and/or preservation of the wetlands and connected upland areas or other natural resources in the Project Area.

5.0 Demonstrating Additionality

In cases where a local government agency or a public-private partnership has or is intending to initiate a wetland mitigation project or other shoreline protection activity in the Project Area, even if funds have been authorized, the Project may still meet the Additionality requirement provided that implementation funding has not been appropriated.

7.1 Maximum Inland Extent (MIE) Determination

The MIE represents the inland extent of the wetlands within the Project Area. These wetlands are projected to be lost – either submerged or in the process of fragmenting and being submerged in the year 2075 in the absence of a Living Shoreline project. The MIE is determined by the Project Developer and verified by BCarbon from simulations of the High sea-level rise scenario in the HRI SLAMM. Where the MIE extends more than 2 miles inland, the MIE boundary will be set at the two-mile mark.

7.1.1 MIE Verification and Reconciliation

Because each Project Area has specific characteristics that will influence how living shorelines and wetlands will be affected by sea level rise, BCarbon will verify the HRI SLAMM assessment of protected carbon stocks for each project and, where necessary, reconcile the HRI SLAMM projections with the known environmental conditions of the site.

7.1.1 MIE Verification and Reconciliation

On a case-by-case basis, BCarbon may use site-specific data to modify the MIE that is projected by HRI SLAMM where:

1. The HRI SLAMM excludes open water areas because they were already transitioning to open water at the end date of the model run. An example of this type of habitat would be very shallow water mud flats inside an otherwise intact wetland.
2. The HRI SLAMM excludes “fragmenting” coastal wetlands, as defined by the 2019 National Wetland Inventory dataset, that have a submerged to un-submerged areal ratio above 10% as modeled by the HRI SLAMM High Sea Level scenario.
3. The HRI SLAMM includes upland areas which are separated from the coast by major topographic, hydrologic, or anthropogenic changes, including lakes, dams, highways, or roadways.

7.1.1 MIE Verification and Reconciliation

In cases where the MIE determined by the Project Developer and BCarbon differ, BCarbon will review the differences and determine what if any adjustments are appropriate to reconcile the two determinations.

7.0 Quantification of Protected Wetland Carbon

$$RPC_y = (MIE_y \cdot WCS_y) - PE_y$$

Where:		UNITS
RPC_y	Regeneration and Protection carbon in Project Area *y*	CO_2e
$MIE_{i,y}$	Maximum inland extent in wetland *i* within Project Area *y*	acres
$WCS_{i,y}$	Wetland carbon stock in wetland *i* within Project Area *y*	CO_2e/acre
PE_y	Project emissions for Project *y*	CO_2e

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7.3 Project Emissions

Project emissions are GHG emissions that result from the construction and operation of the Living Shoreline. For this protocol, GHG emissions associated with the transport of stone, concrete, sand, rubble/debris, oyster shells, or other materials used to construct the Living Shoreline are included in the Project Emissions calculation outlined below in Equation 2.

Other potential sources of GHG emissions including extraction/mining of the materials, construction equipment, monitoring equipment, and maintenance and repairs, are considered to have impacts - however, they are excluded from project emissions quantification in this protocol. Subsequent reviews of the protocol will assess including these other potential sources based on available data.

Assessment of Impacts

- Could protect **100,000+ acres** of wetlands on Texas coast
- Carbon credits
  - Protect **30 million+ tons** of stored carbon
  - Allow the future sequestration of **10 million tons** of carbon dioxide
- Ecosystem services
  - Wetlands value of from $25,000 to $35,000 per acre per year, totaling **$25 to $35 billion per year**
  - Help ensure the future of the Texas coastal fishery
  - Conserve habitat of wetland-dependent avian species including threatened Black rail and endangered Whooping crane

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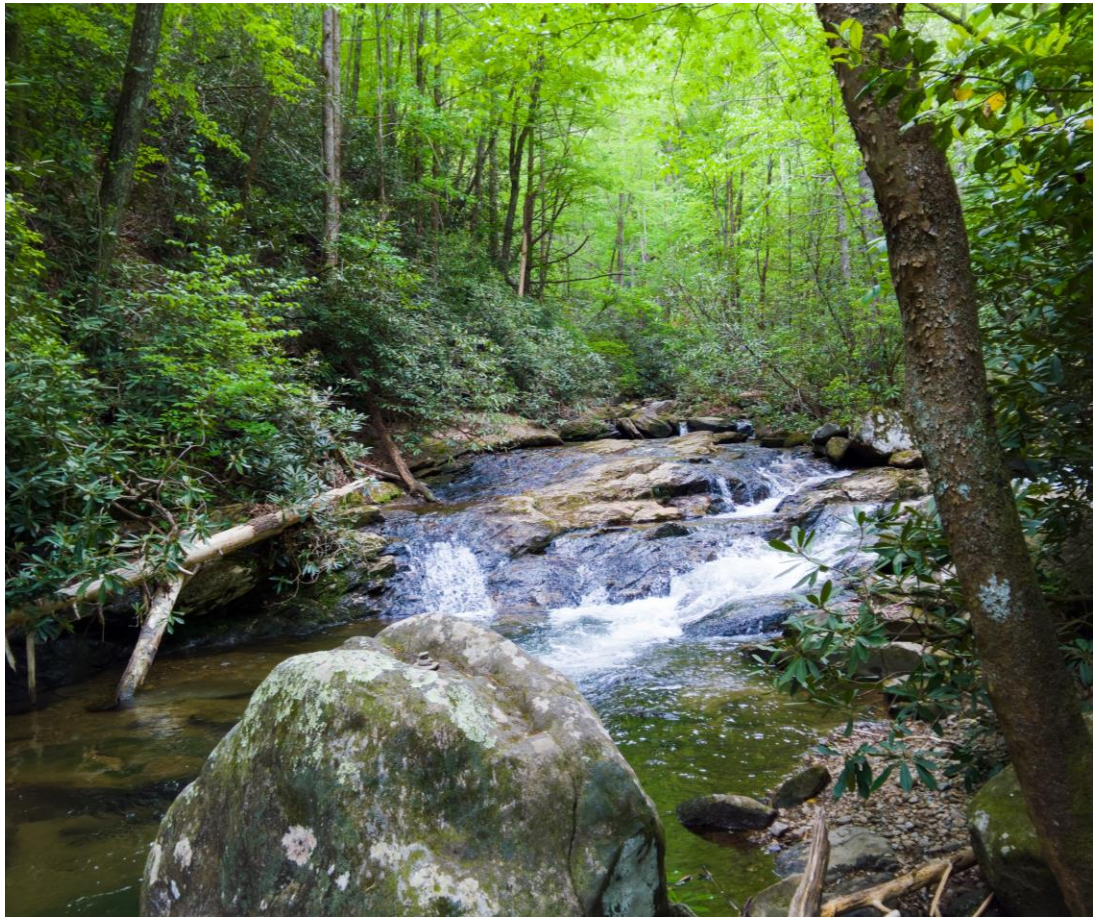
Gauging Consensus

Upcoming Meetings



- Stakeholder Working Group – Thursday May 4, 9 AM CT
- Subgroup meetings pending – will send via email as needed

The Three Creeks Grazing Project

UT Department of Agriculture & Food

Taylor Payne

Working Lands Conservation

Dr. Kris Hulvey

Dr. Megan Nasto

Jessie Danninger

Working Lands Conservation

Western SARE Sustainable Agriculture Research & Education

USDA United States Department of Agriculture National Institute of Food and Agriculture

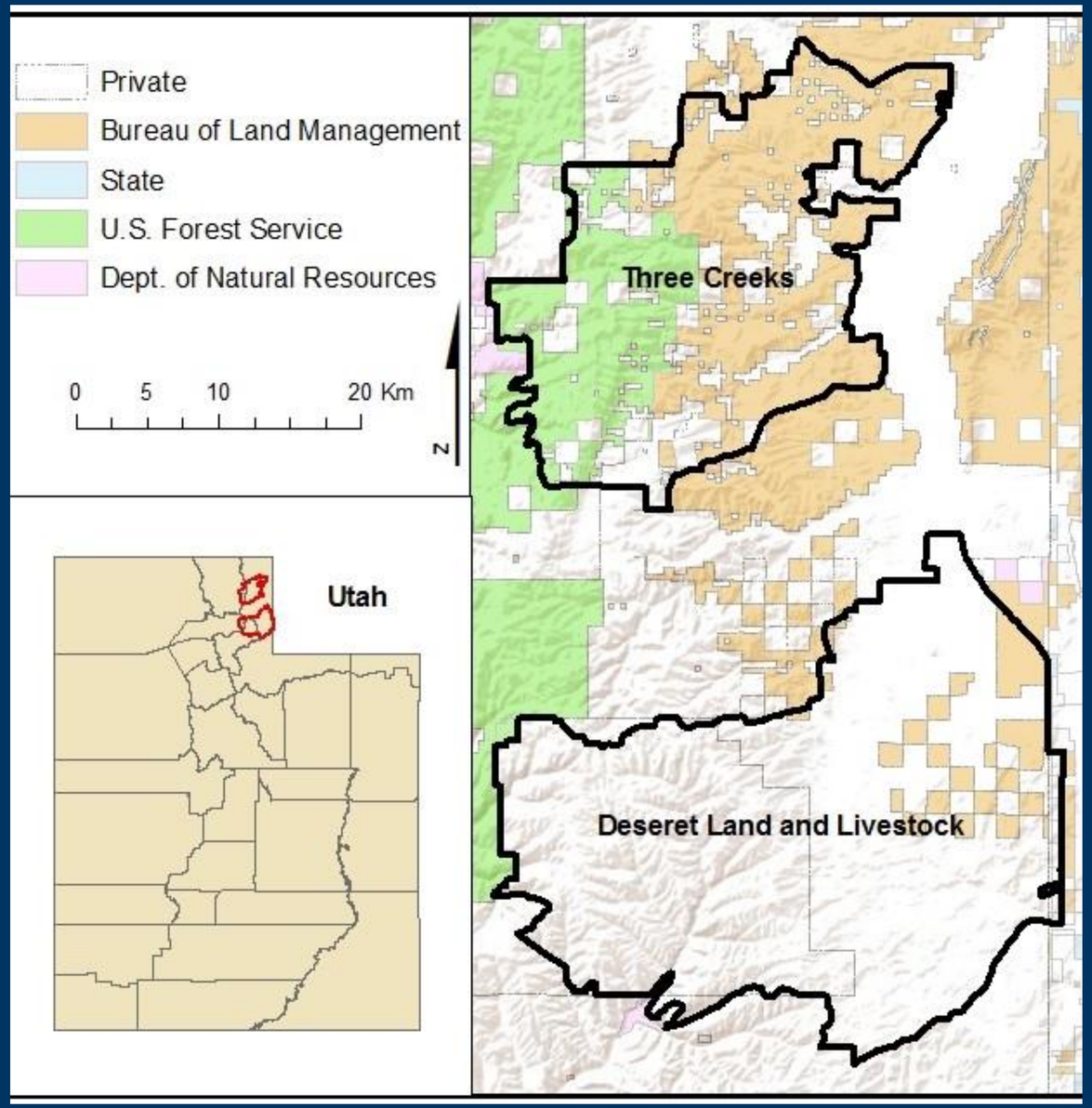
U.S. Department of the Interior Bureau of Land Management

Three Creeks Allotment Consolidation Introduction

- Individual allotments operators were concerned about their next permit renewals on public ranges.
- Had issues with water quality, riparian health; weren’t meeting standards.
- Grazing management needed to be fixed with time, timing, and intensity-not just reducing numbers.

Neighbors with Experience

- Three Creeks was patterned from a rest-rotational grazing management style after Deseret Land and Livestock.
- Deseret changed their grazing in 1984 and documented improvements ever since.
- Three Creeks had to adapt their plan with multiple land owners and many operators.



New Ideas to Work on the Same Ol' Problems

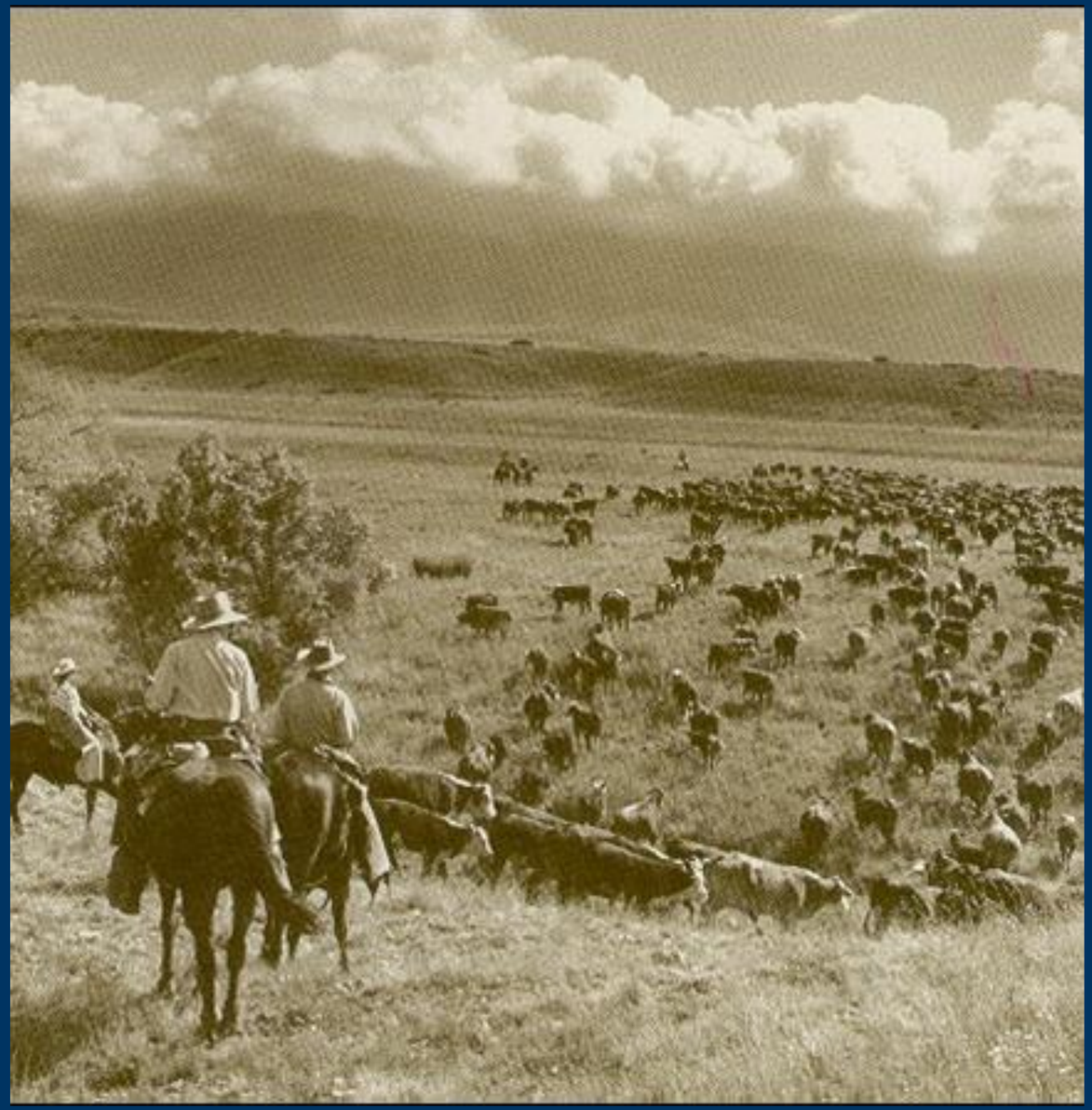
- Demonstrate good land stewardship through switching to rest rotational grazing across 136,000 acres, 10 allotments, multiple land owners. 38 permittees. Cows, horses, sheep

- A grazing company was created to operate as a single entity, called Three Creeks Grazing, LLC. This entity uses a board of directors to manage the grazing operation and make all business decisions.

- 38 owners of the grazing company

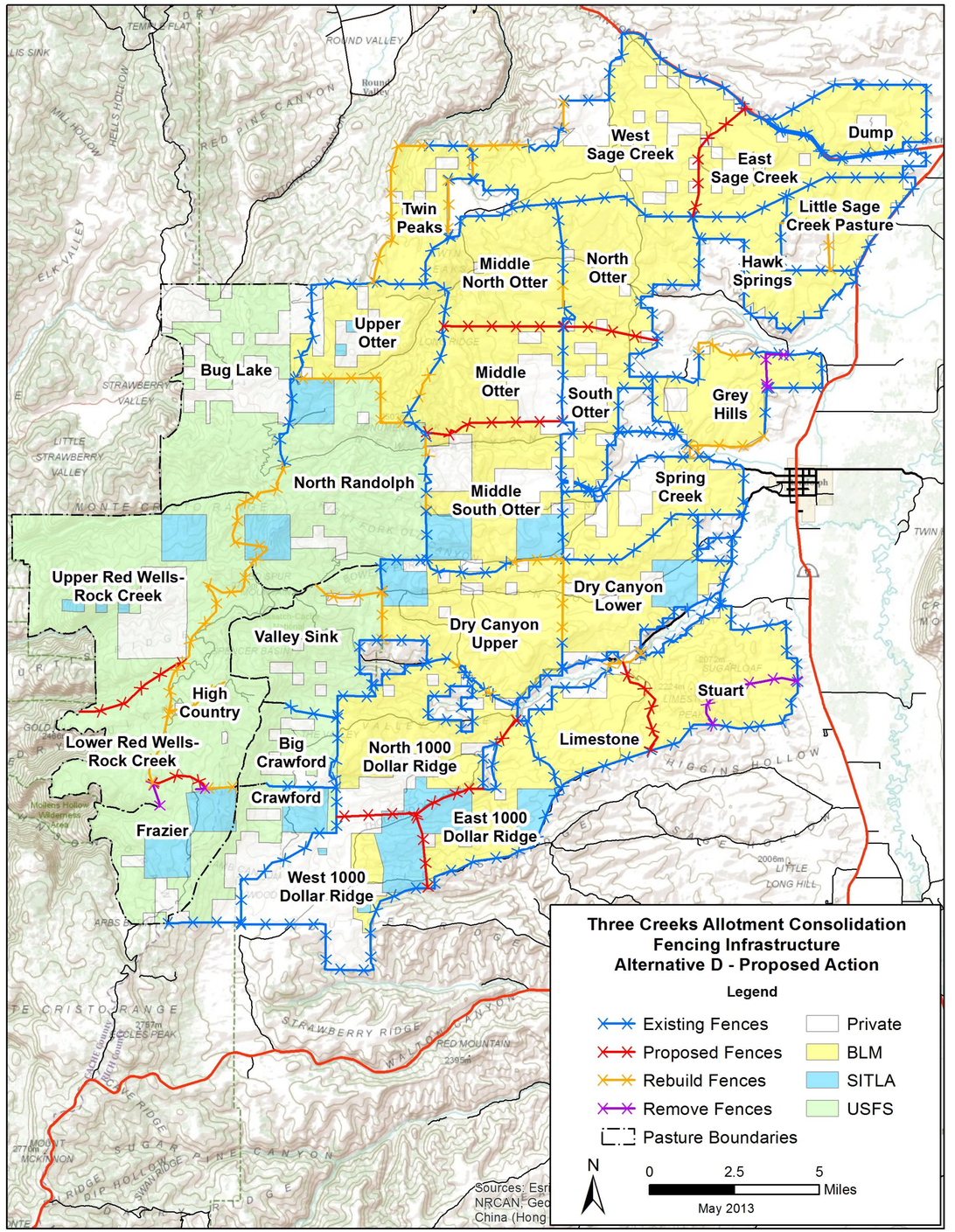
Proposed Plan for Livestock

- Consolidate the cows-operate as 2 herds of ~1600 cows each.
- Facilitate running 3 summer bands of sheep in high country
- Facilitate running 4 winter bands of sheep.
- ~19,259 Animal Unit Months (AUMS) total
- Rest approx. 20% of range annually



Developed a new Pastures Rotation

- Created a pasture rotation across the landscape that focuses on changing the time and timing of grazing.
- 30 pastures total to rotate between

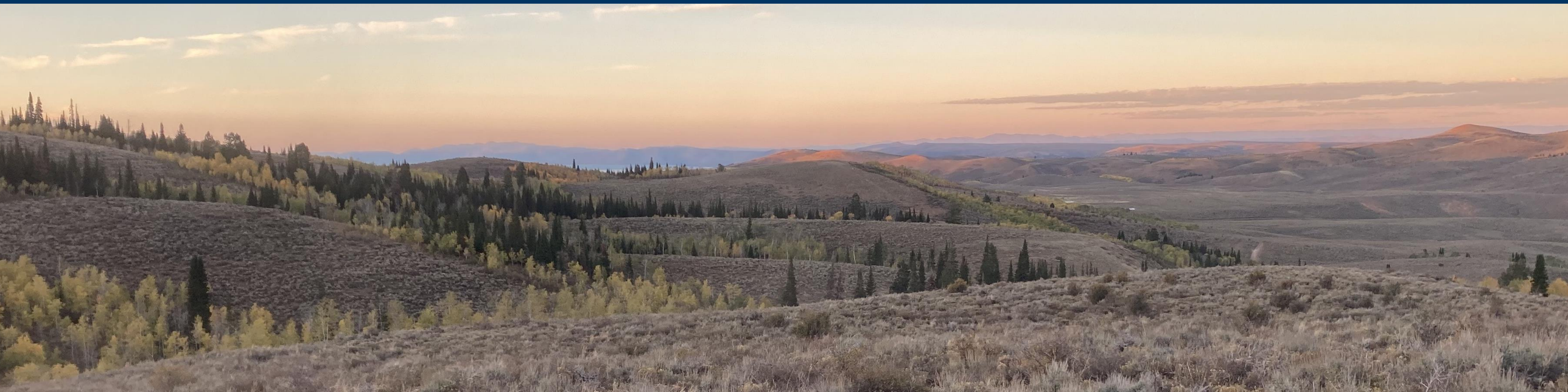


Economic Analysis from USU

- The current “Three Creeks” area contributes $2 million to the Rich County economy As-Is. Multiplier effects increase this contribution to $3.2 million or 6% of the county’s economy.
- About 25% of the livestock in Rich County operate on Three Creeks.
- Research has shown from our local grazing project that 1 AUM relates back to $100 of economic impact. (Ward et al)

Our Rangelands

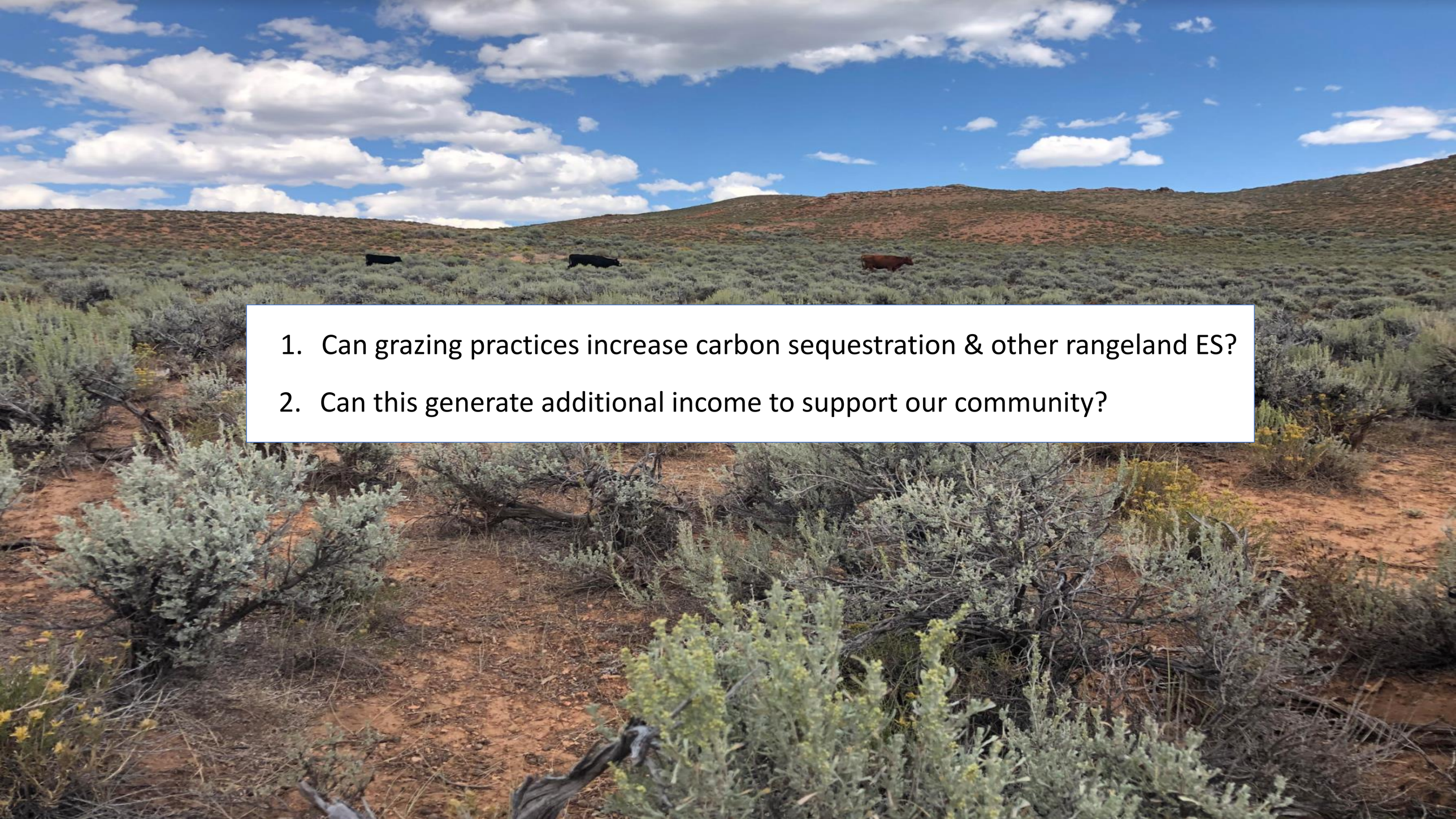
- Mixed private and public lands
- Elevation gradients that provide Shrub Steppe Communities with bunch grasses, woodlands, and forests
- Varying amounts of riparian areas with live streams



Three Creek's Investments Lead To:

Stacked Benefits with Better Management

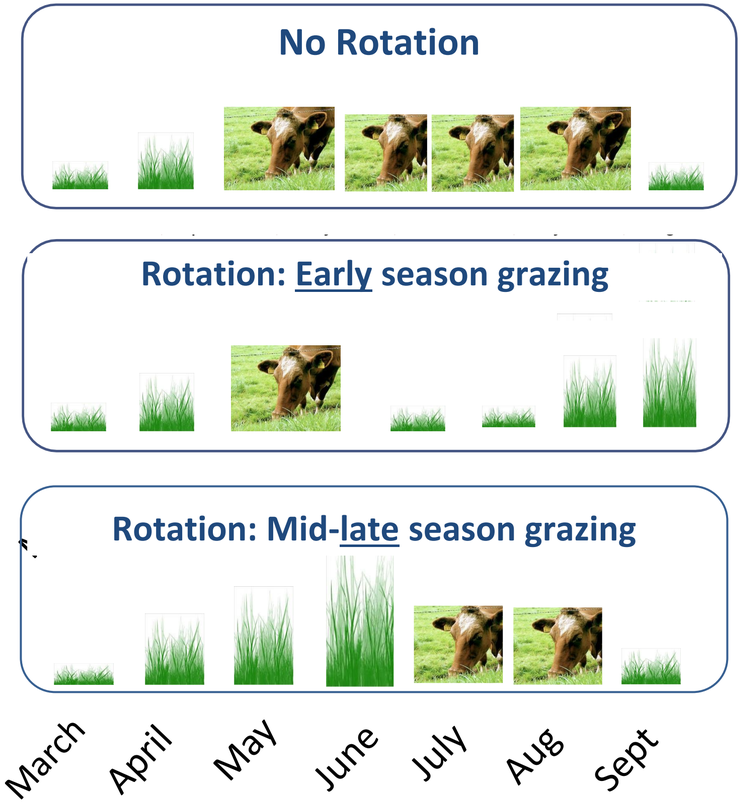
- Improved Grazing Management System
- Improved Water Quality
- Expected Improvements to Soil Health and carbon sequestration increases.
- Improved to a better business model for the grazing operators.



1. Can grazing practices increase carbon sequestration & other rangeland ES?
2. Can this generate additional income to support our community?

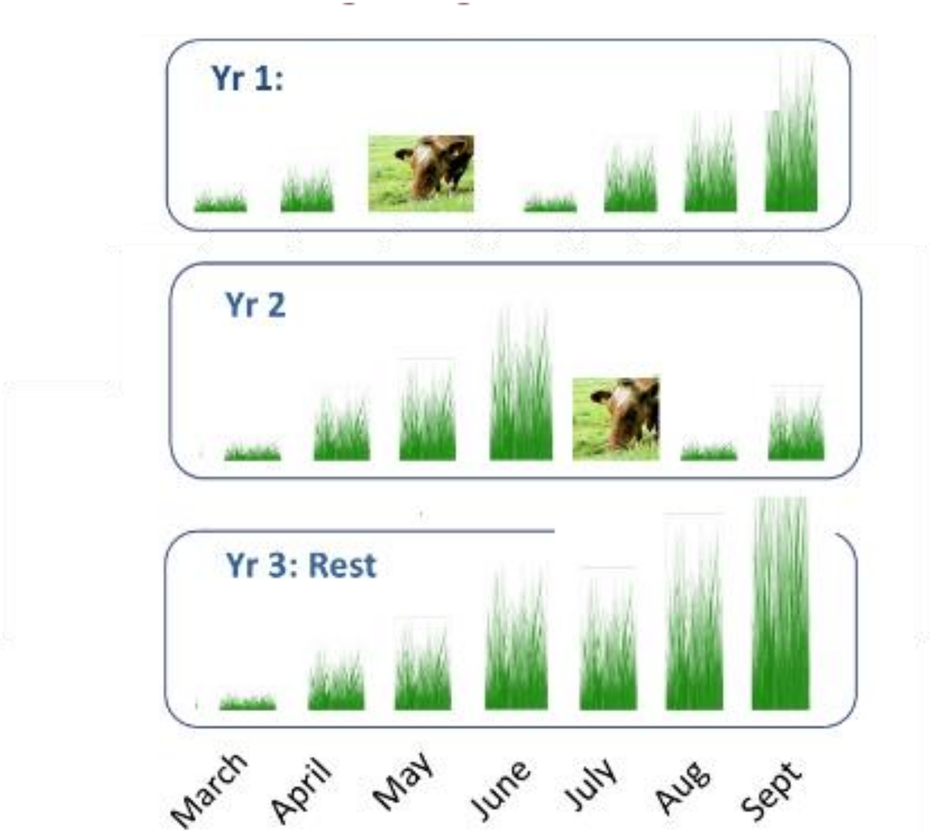
Historical Management

- Livestock run on 10 allotments
  - 2 main grazing practices



The New Management Plan

- Consolidated into a single allotment
- Combine herds, Shorten grazing duration
- Rest ~20% of land each year



Target Ecosystem Services

- Soil health
- Carbon storage

- Water quality
- Water quantity

- Forage production & recovery
- Sage-grouse habitat quality
- Streambank stability
- Plant composition (diversity)

Target Community Metrics

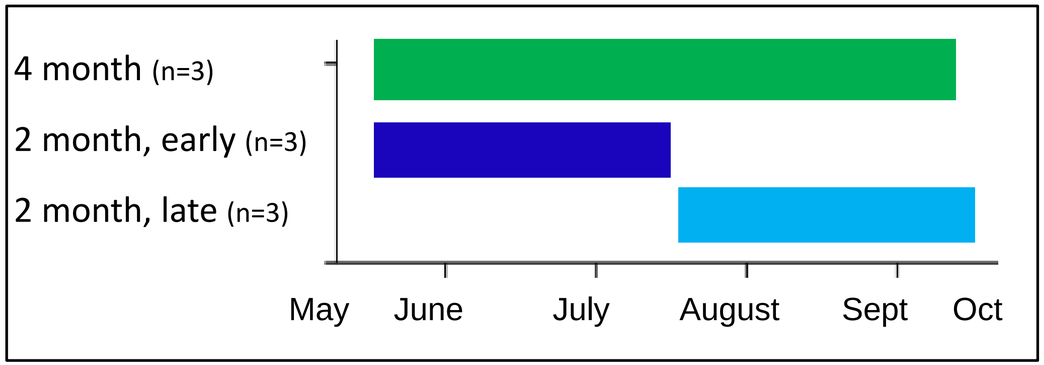
- Economic stability
- Satisfaction with new grazing system

Monitoring: Before vs. After Design

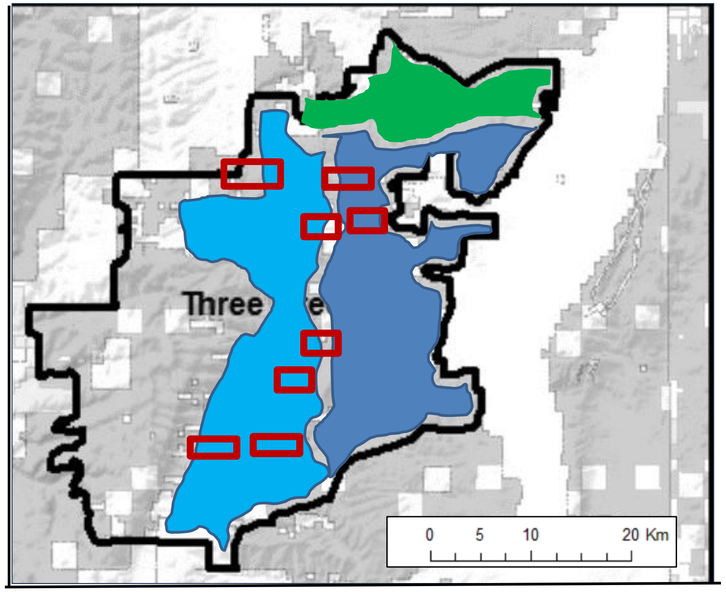
Three Creeks began shorter durations & variable timing in 2022

Historical Grazing systems

- 3 grazing durations
- 2 timings



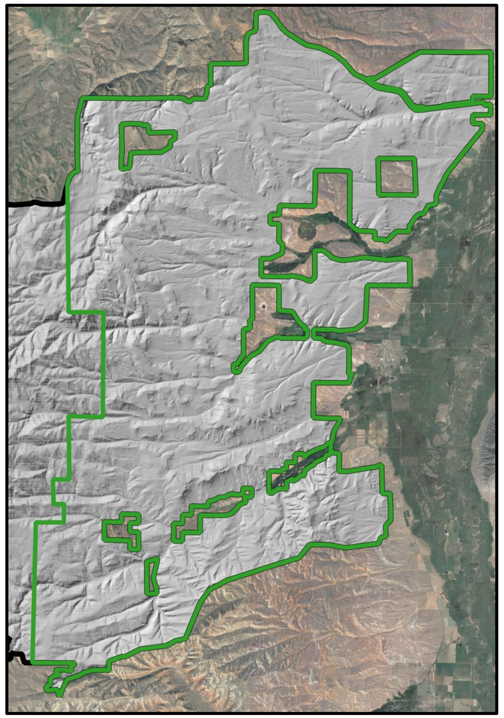
Exclosures (no-grazing)



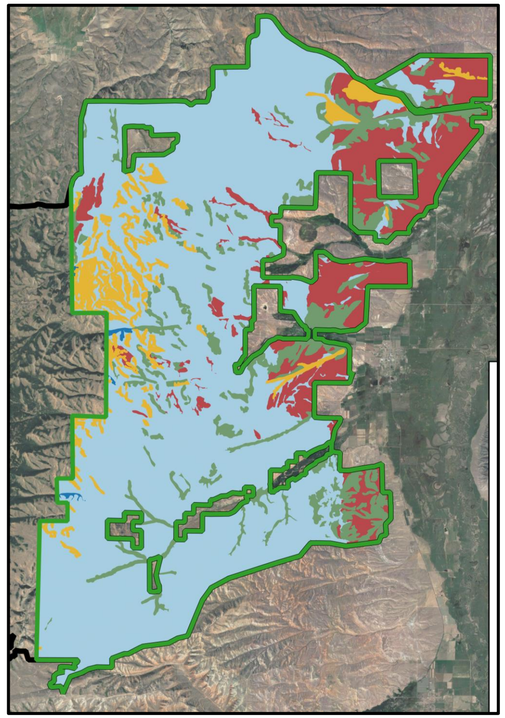
Stratification for soil sampling

Historical grazing system + Ecological site

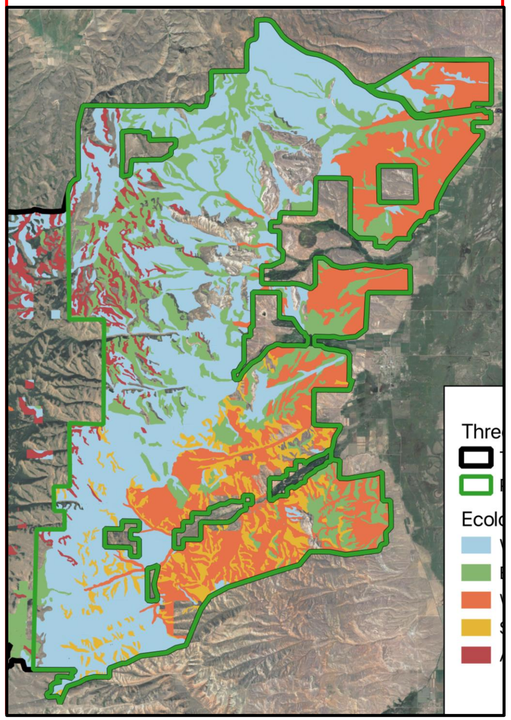
Topography



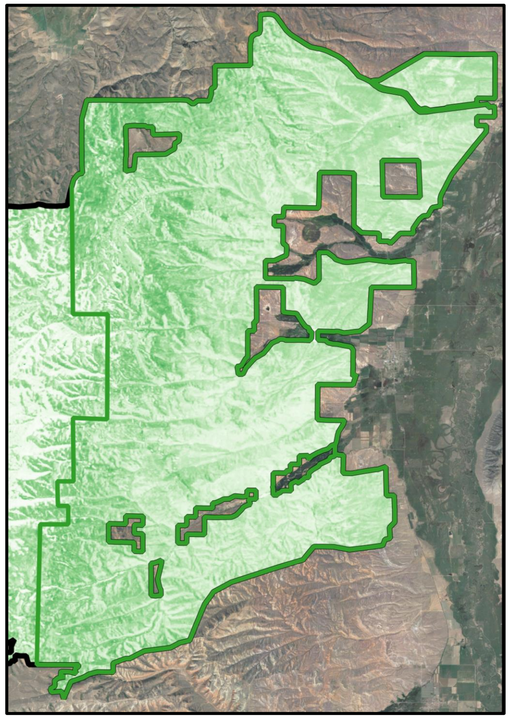
Soil Texture



Ecological Site



Shrub Cover



Can we detect increases in ecosystem services?

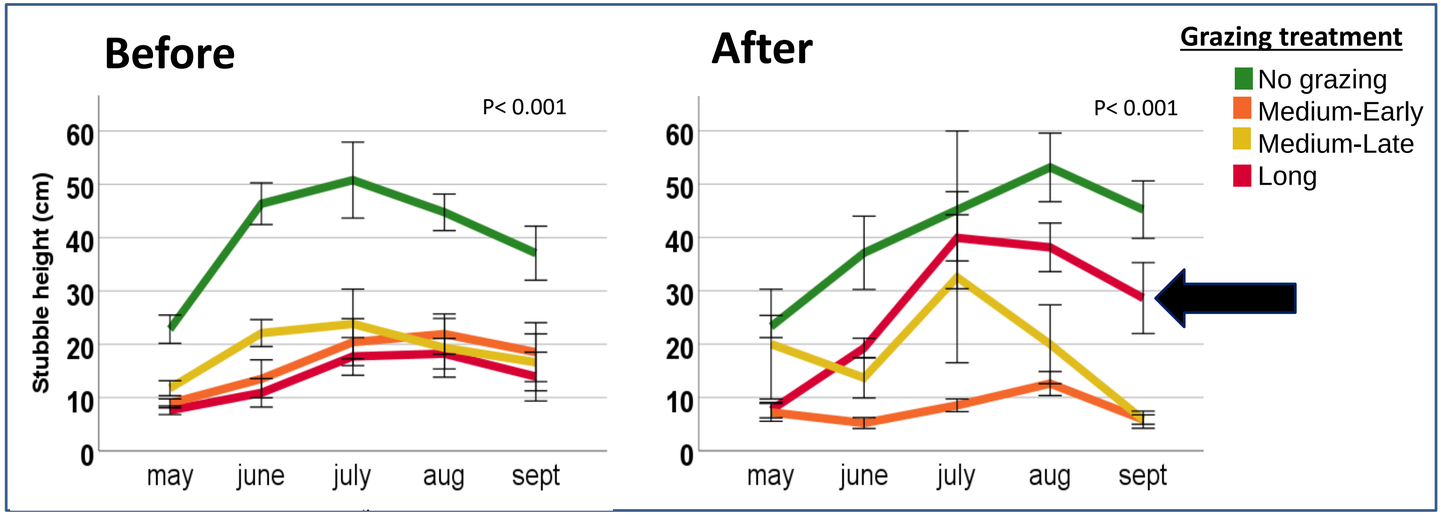
Ecosystem service improvements

No grazing

Medium-Early

Medium-Late

Long

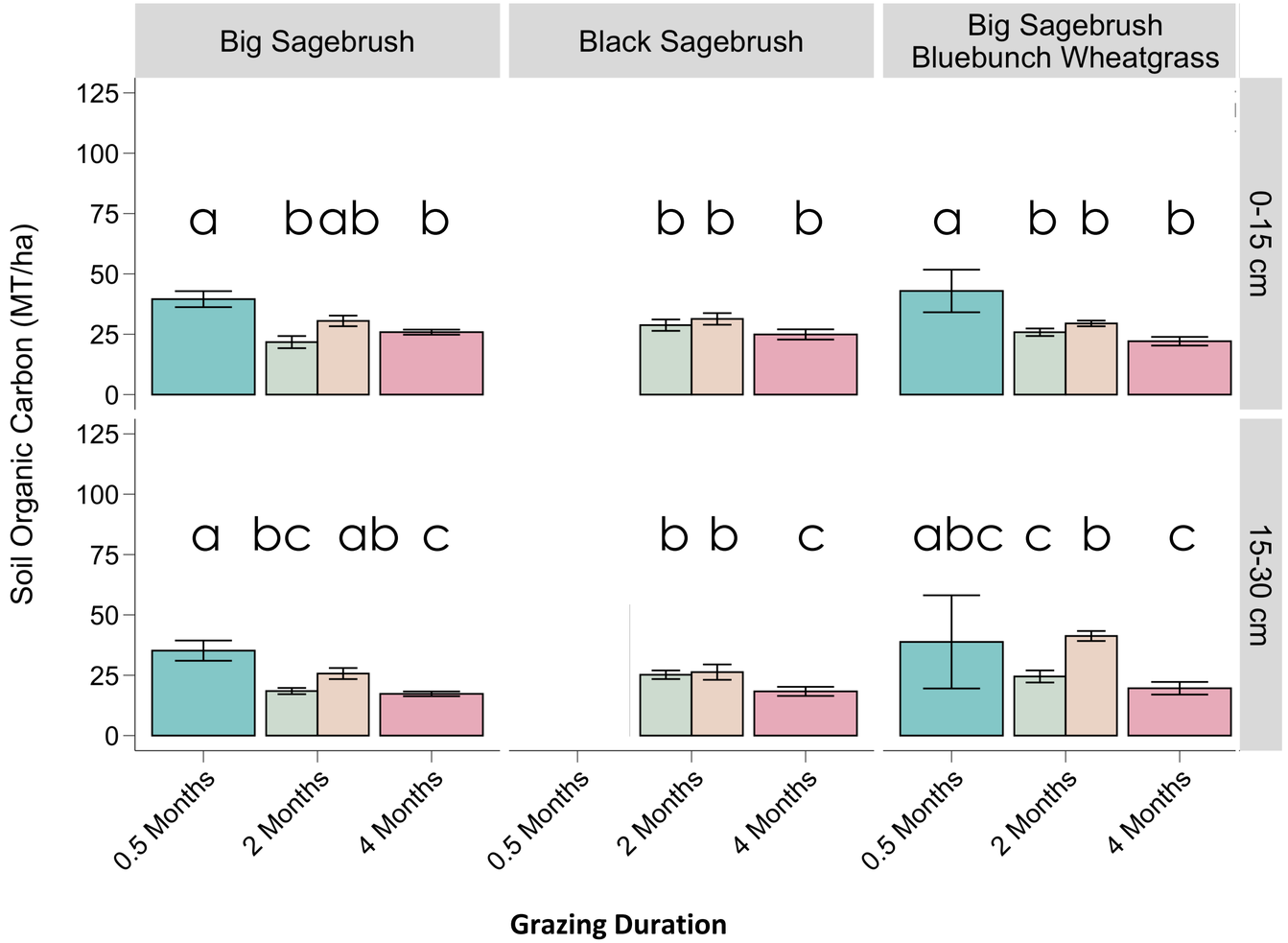


Increased productivity

+ improved habitat

+ improved water quality

Upland organic soil carbon stocks



- Don’t have before vs. after data yet
- Can compare Three Creeks to nearby ranch that uses shorter duration grazing
- Pastures with short duration grazing have larger soil organic carbon stocks

How might increased ecosystem services & carbon stored support our community?

Carbon sequestration
herbaceous productivity
habitat for wildlife
erosion control
water quality
biodiversity

Sold as a stacked addition to carbon offset

Incorporated in the price of cows/beef

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