

Utilization and Response of Native Browse Species to Long-term Cheatgrass Control with Indaziflam



Jim Sebastian and **Joe Swanson**
Boulder County Parks and Open Space

Cheatgrass Competition

- Accumulation of fine fuel loads.
- Increase in wildfire potential.
- Decreased in diversity.
- Decrease in productivity.
- Decrease in wildlife health.



Cheatgrass fueled wildfires

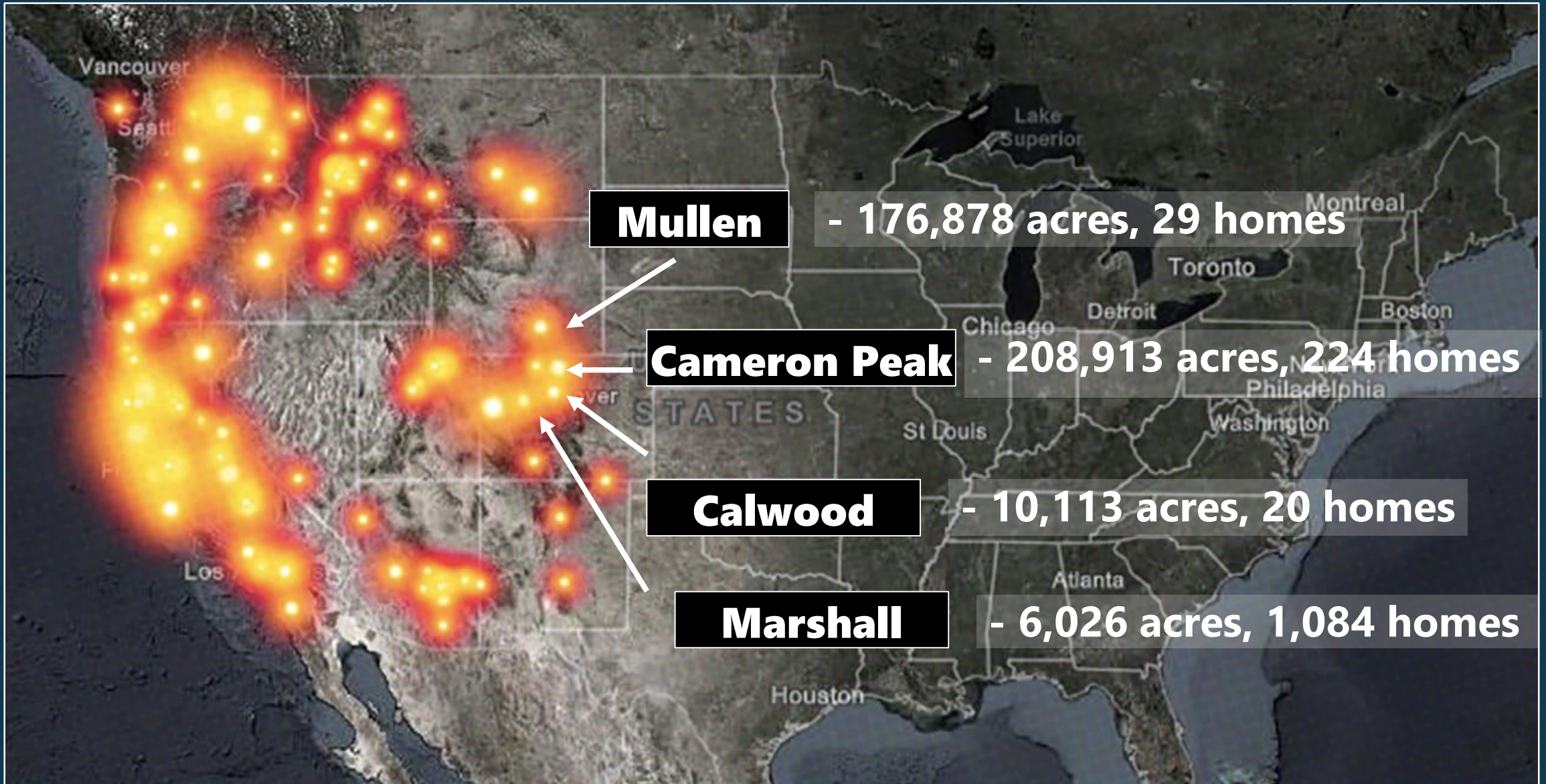


High Intensity burn – Calwood Fire



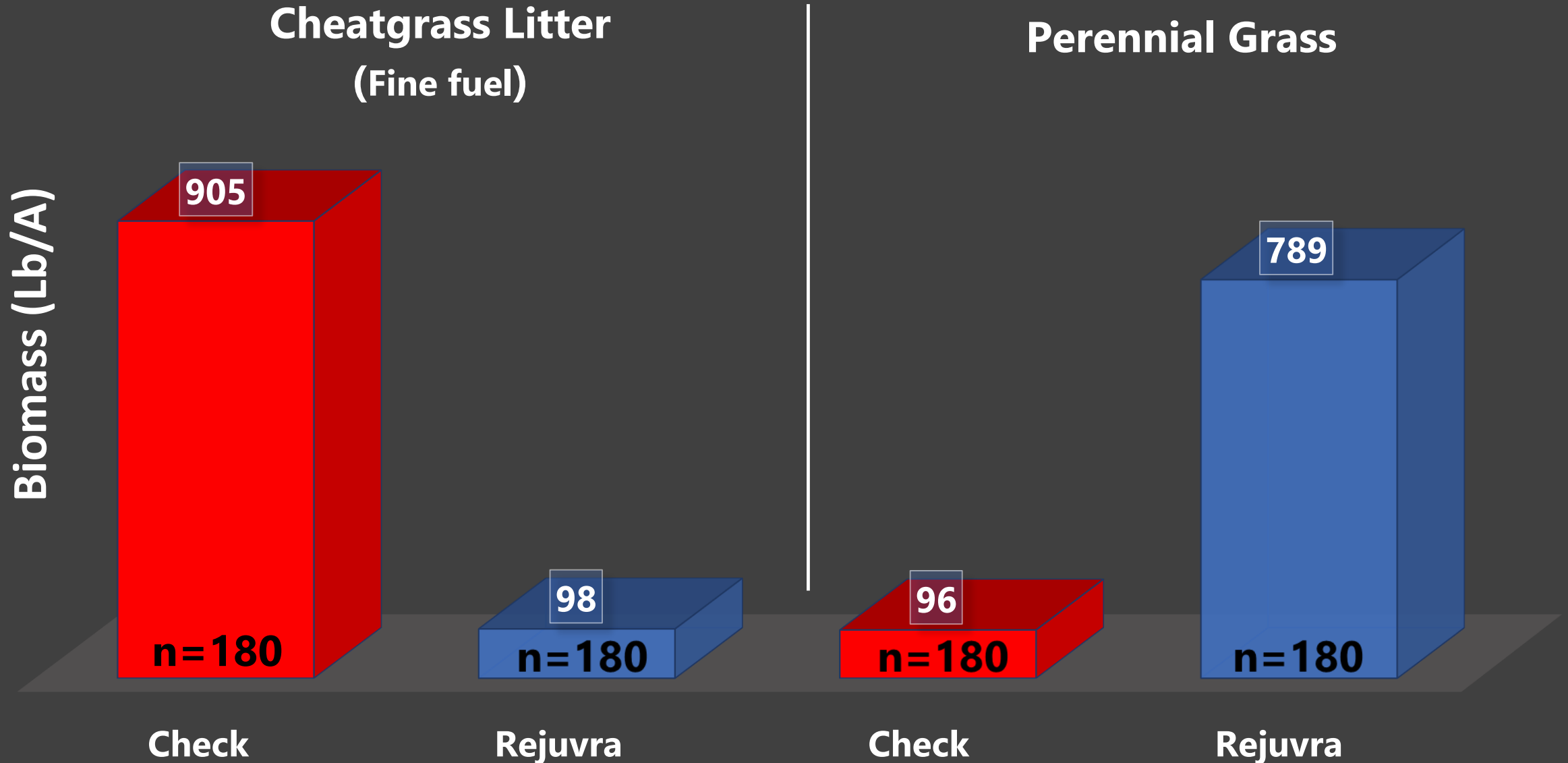
- **Loss of browse species with frequent and high intensity burns across the Western US.**
- **Immediate re-invasion of cheatgrass after wildfires.**

Western US Wildfires September 2020 and 2021



Fine fuel and Perennial Grass Biomass

6 sites and 10 x 1 meter² quadrats – 1 YAT



Comparing burn intensity in cheatgrass fueled vs. cheatgrass treated areas

(Sprayed ~1 year before Calwood Fire)



Antelope Bitterbrush Complex



5201 St. Vrain Rd., Longmont CO 80504 303-678-6200 BoulderCountyOpenSpace.org



Photo Credit: BCPOS Employee

Community Description

Consists of: Antelope Bitterbrush (*Purshia tridentata*), Fringed Sagebrush (*Artemisia frigida*), Needle-and-Thread Shrubland (*Hesperostipa comata*)

Antelope Bitterbrush (*Purshia tridentata*), Mountain Muhly Shrubland (*Muhlenbergia montana*).

Designation: The Colorado National Heritage Program classifies the Antelope Bitterbrush/ Mountain Muhly Shrubland as G2/S2 and the Antelope Bitterbrush/ Prairie Sagewort/ Needle-and-Thread Shrubland as G1/S1S2.

Biotic: Antelope bitterbrush is the dominant shrub in these rare communities, with fringed sagebrush, needle-and-thread grass, and/or mountain muhly present as codominant species.

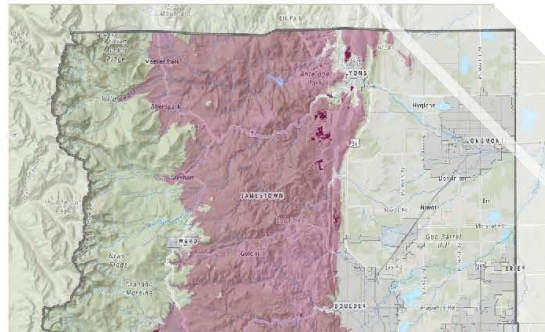
Abiotic: These communities usually occur on south-facing slopes in an elevational range between 5,800 – 9,000 ft. Soils where these two communities are present are loamy and sandy in texture, and there is

Background

The Antelope Bitterbrush/ Fringed Sagebrush/ Needle-and-Thread Shrubland and Bitterbrush/ Mountain Muhly are rare shrubland communities of Boulder County. They are either imperiled or threatened by conversion, resulting from overgrazing.

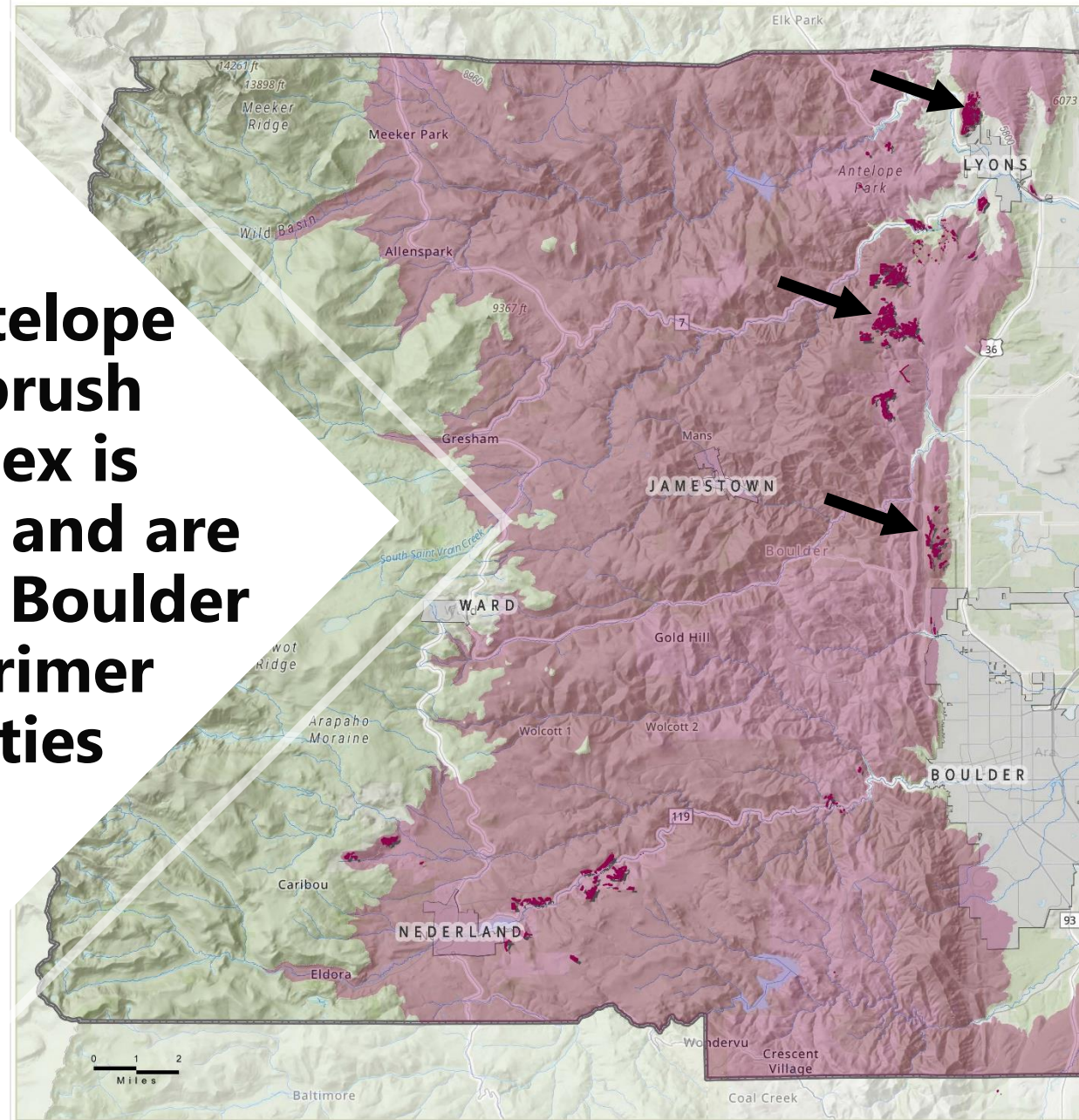
D.

The Antelope Bitterbrush complex can be found in Hall Ranch, Mountain, Caribou Ranch, and Heil Valley. eastern slopes of the Front Range in Colorado in Boulder and Larimer counties. Other out-of-state locations have been identified. Boulder County Parks & Open Space has identified remnants of this significant natural complex in Hall Ranch, Mountain, Caribou Ranch, and Heil Valley.



The Antelope Bitterbrush Complex is imperiled and are limited to Boulder and Larimer Counties

Conservation and recovery plan



Utilizing Ground and Aerial Applications



- Less cost/acre for application
- Spray with higher rates of water (greater penetration)



- Spray steep/rocky terrain
- Spray large areas in short time

Concentrating efforts on high priority mule deer areas

- **Dense cheatgrass stands with remnant desirable forbs and shrubs.**
- **Winter ranges with high deer concentration and less palatable browse.**



Rabbit Mountain prior to 2021 aerial application (1,000 acres)



Fall 2021 - Baseline transect cover, diversity, leader growth, and game camera data collected

Mule Deer Browse Seasonal Preferences

- **Spring:** Fresh native forb and grass growth.
- **Fall:** New shrubs leader growth, forbs, and sub-shrubs.
- **Winter:** Higher dependance on shrubs.

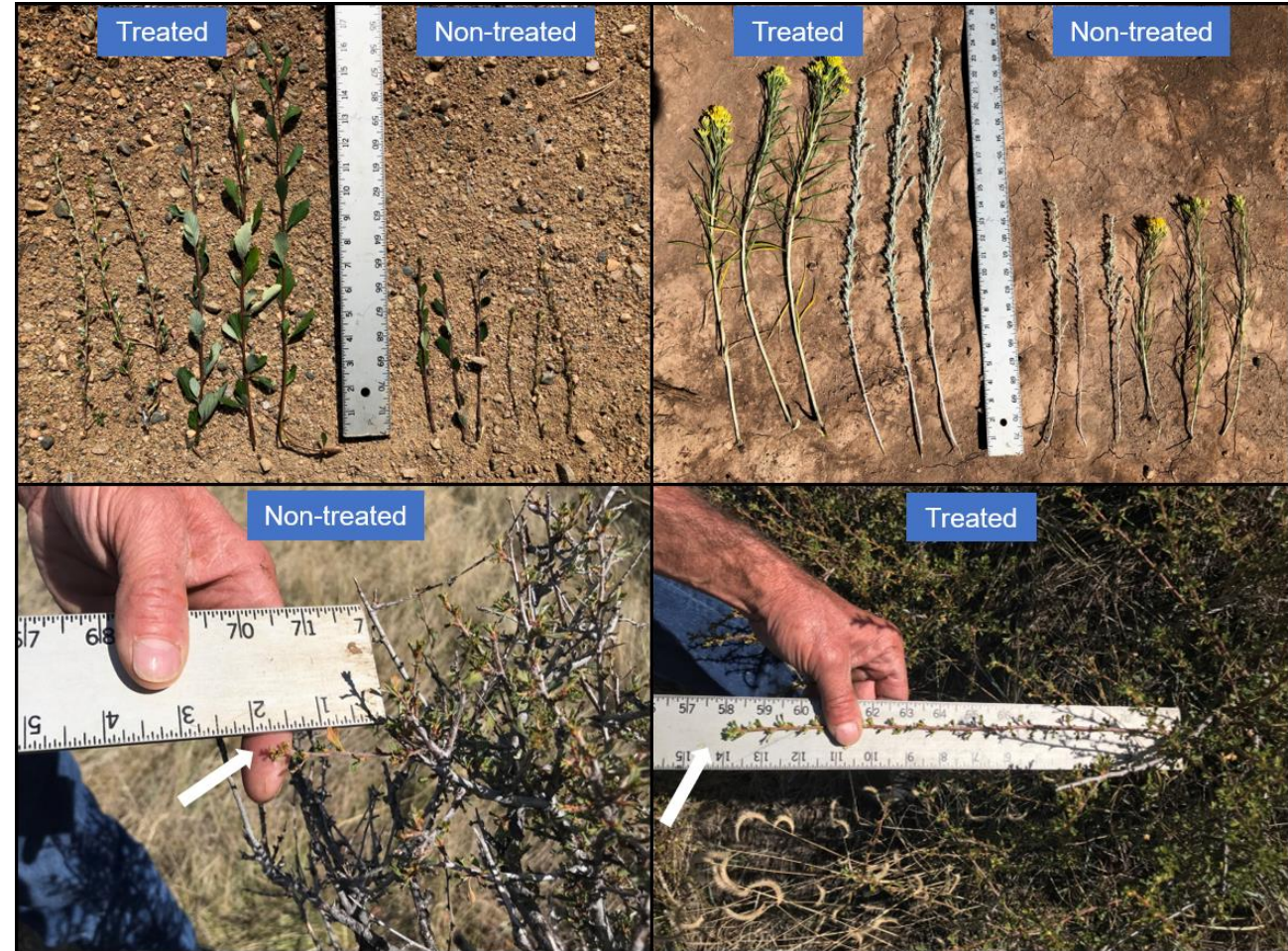
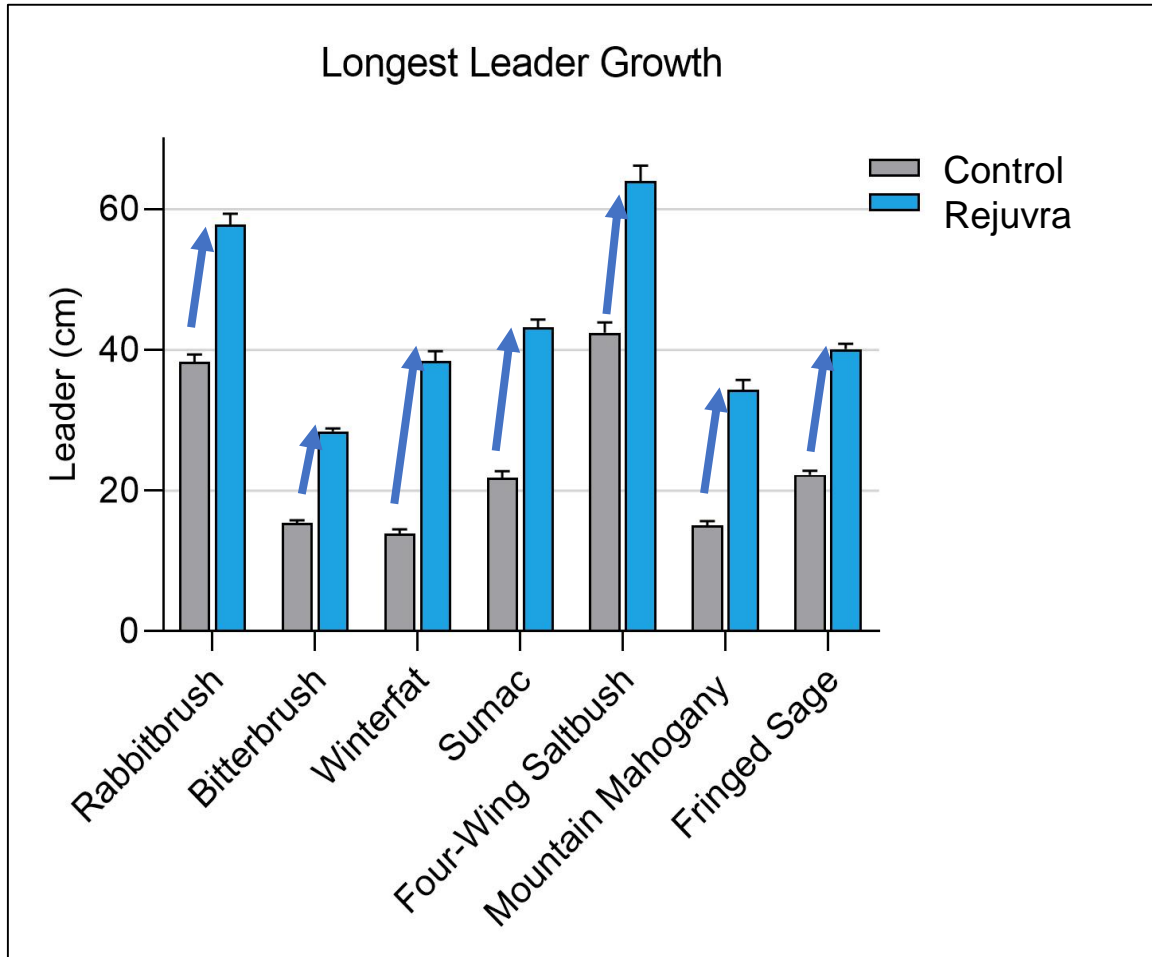


Negative Cheatgrass Impacts on Browse

- **Decline in forage quality and quantity**
- **Produces fewer leaders**
- **Cell walls thicken and become less digestible**
- **Produces secondary compounds that reduce palatability** (volatile oils, tannins, alkaloids, or lignin that reduces or eliminates palatability).



Initial Research Findings: Removing cheatgrass increases critical winter range browse

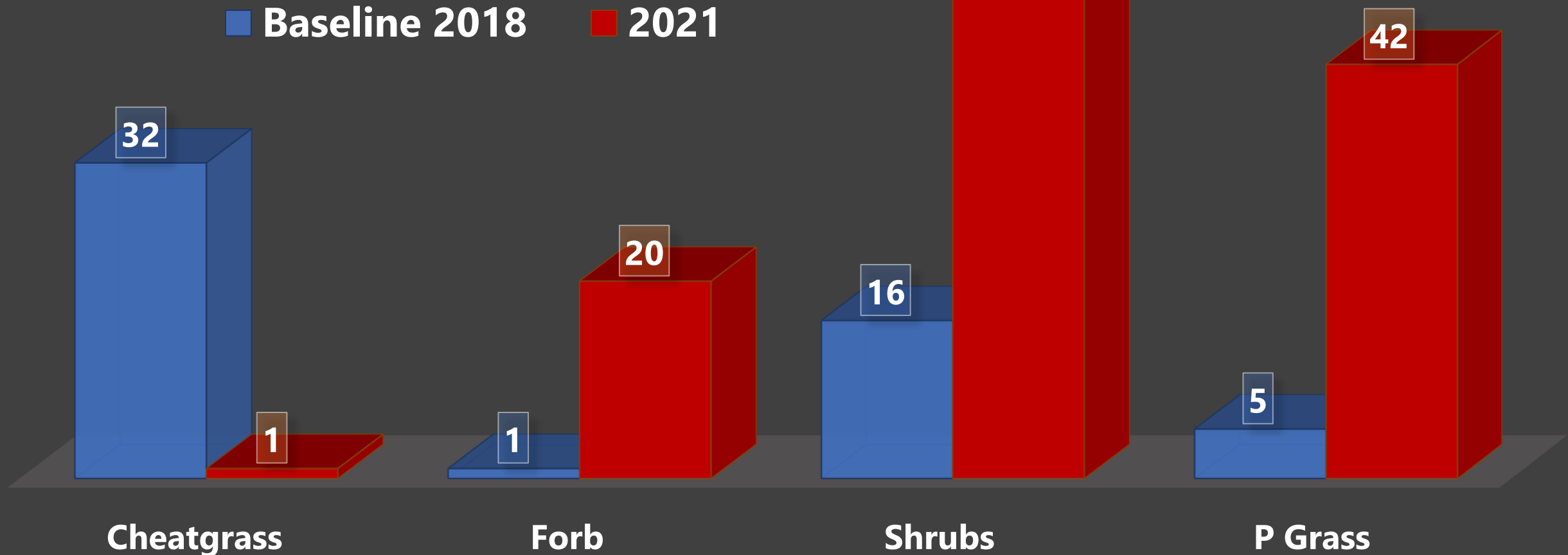


Rabbit Mtn Open Space

First Large-scale Aerial Rejuvra Application

2019- 200 acres

Line Intercept Transects (% Canopy Cover)



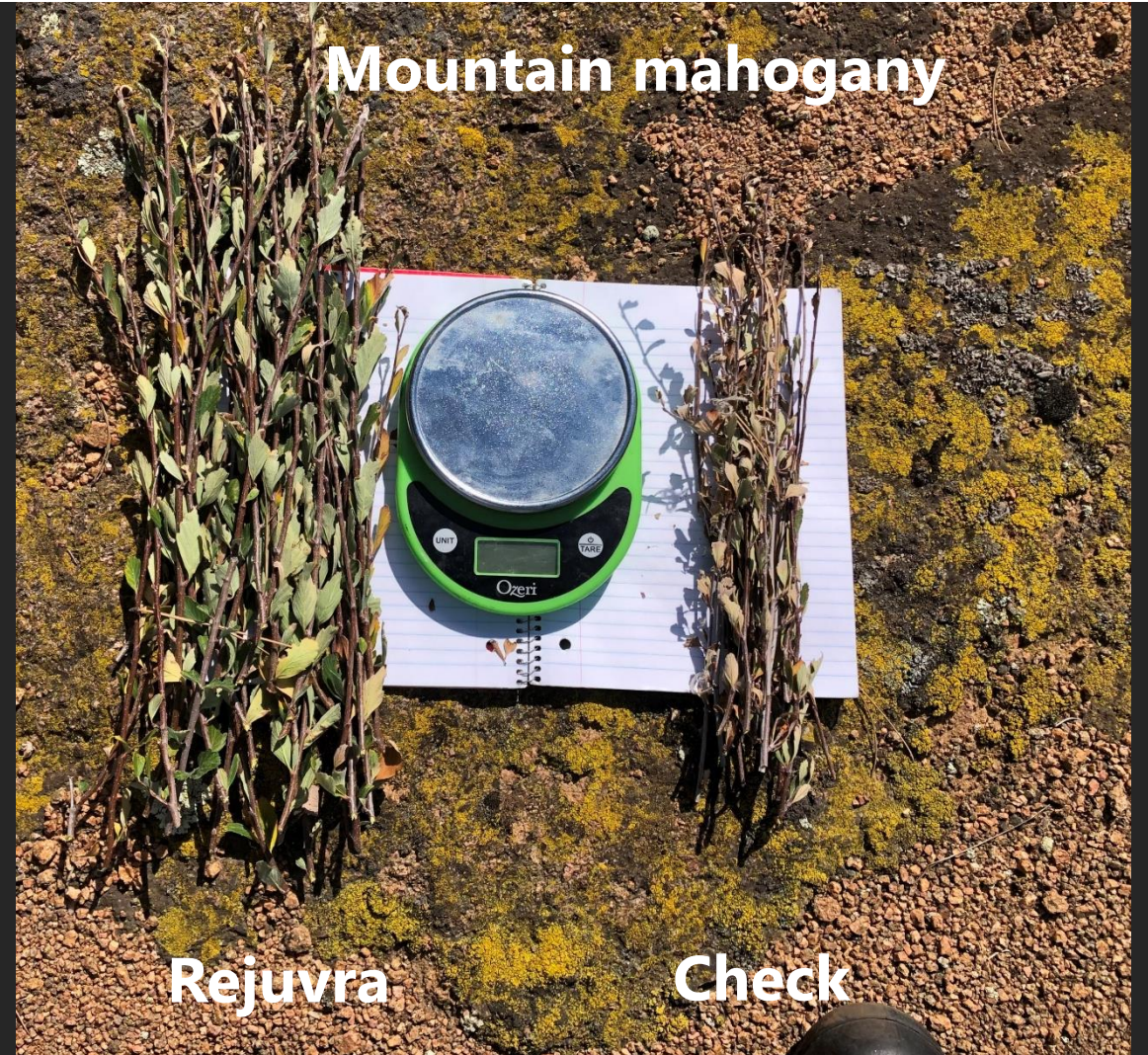
Hall Ranch Open Space - 2021

Removing cheatgrass revives old stands of antelope bitterbrush



Harvested 5 longest leaders/plant and 20 plants at each of 6 sites

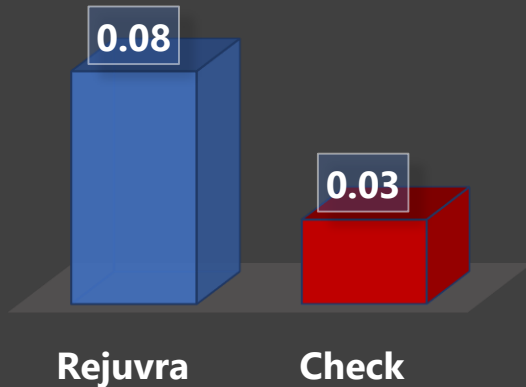
Treated and adjacent non-treated



Antelope Bitterbrush

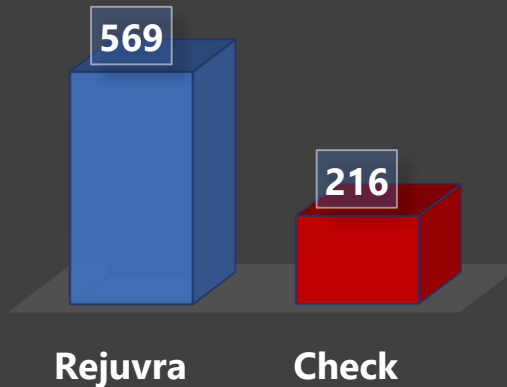
Total leader biomass per plant

Leader weight (oz)



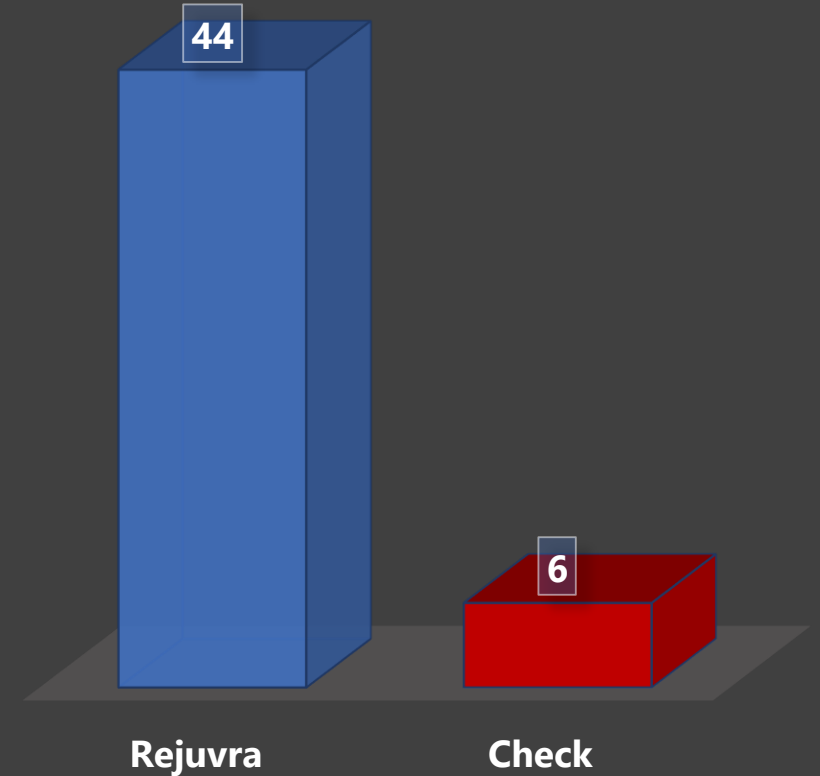
X

Leaders/plant



=

Total Leader wt/plant (oz)



Rejuvra Treated = 2.7X

Rejuvra Treated = 2.6X

**Rejuvra Treated = 7.3X or
86% increase in total leader
weight per plant when
cheatgrass was removed**



Curt Gowdy State Park Operational Case Study

Cheyenne, WY

- Application Sept 2020
- Shrub measurements taken before and 1 YAT
- 4 treated transects and a non-treated (100 data collection points for each)



Results

(1 year after treatment)

Antelope bitterbrush leader growth **increased by 28%**

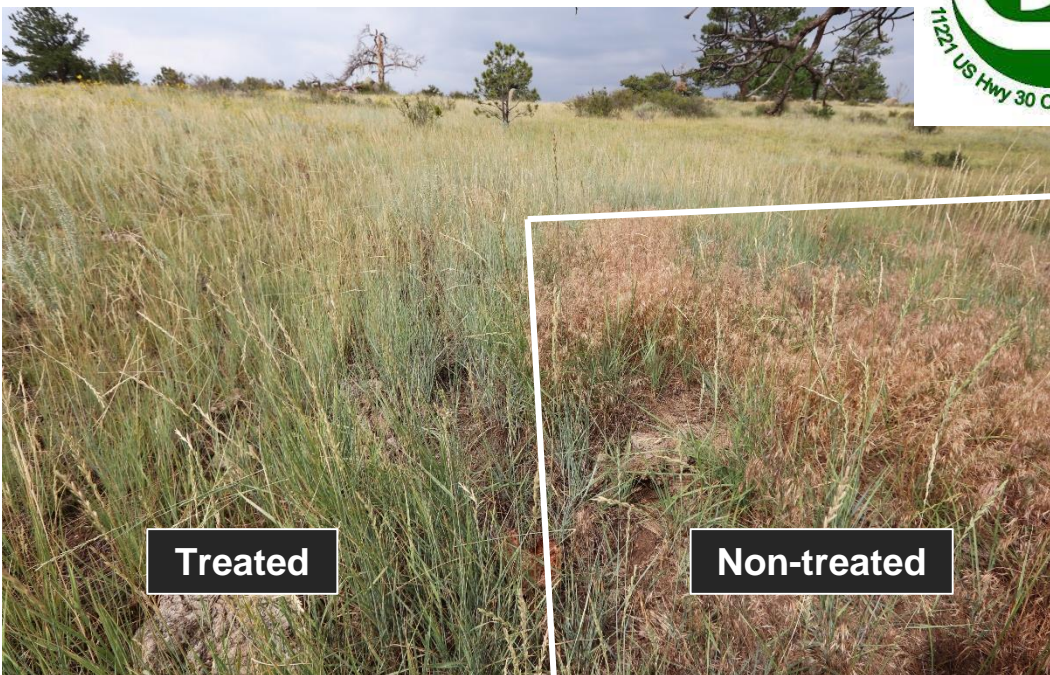




Rex Lockman
Laramie County Conservation District



**Bitterbrush mortality from years of
cheatgrass competition. Drove
treatments to save existing shrubs.**



Summary

Cheatgrass negative browse impacts

- Annual leader growth cut in $\frac{1}{2}$.
- # leaders/plant cut in $\frac{1}{2}$.
- Fresh leader biomass cut by 86%.
- Less palatable and nutritious woody browse.



What is the forage preferences of mule deer?



Before

OR



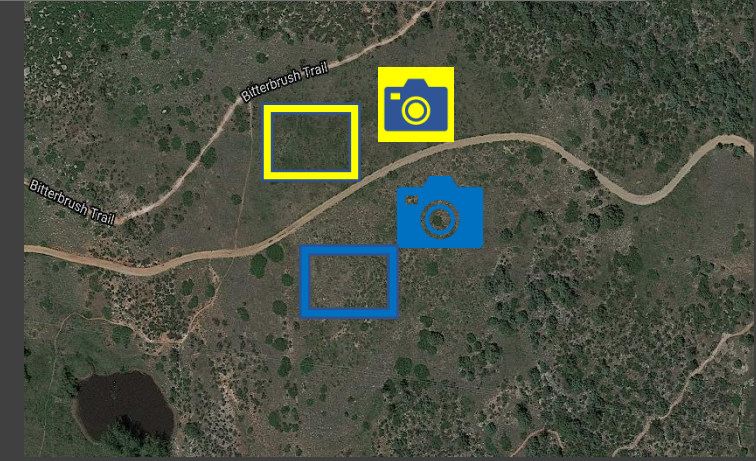
After

Using game cameras to monitor mule deer browse visitation and preference (3 paired sites)



Rejuvra

Check



Game Cameras



Exclosures

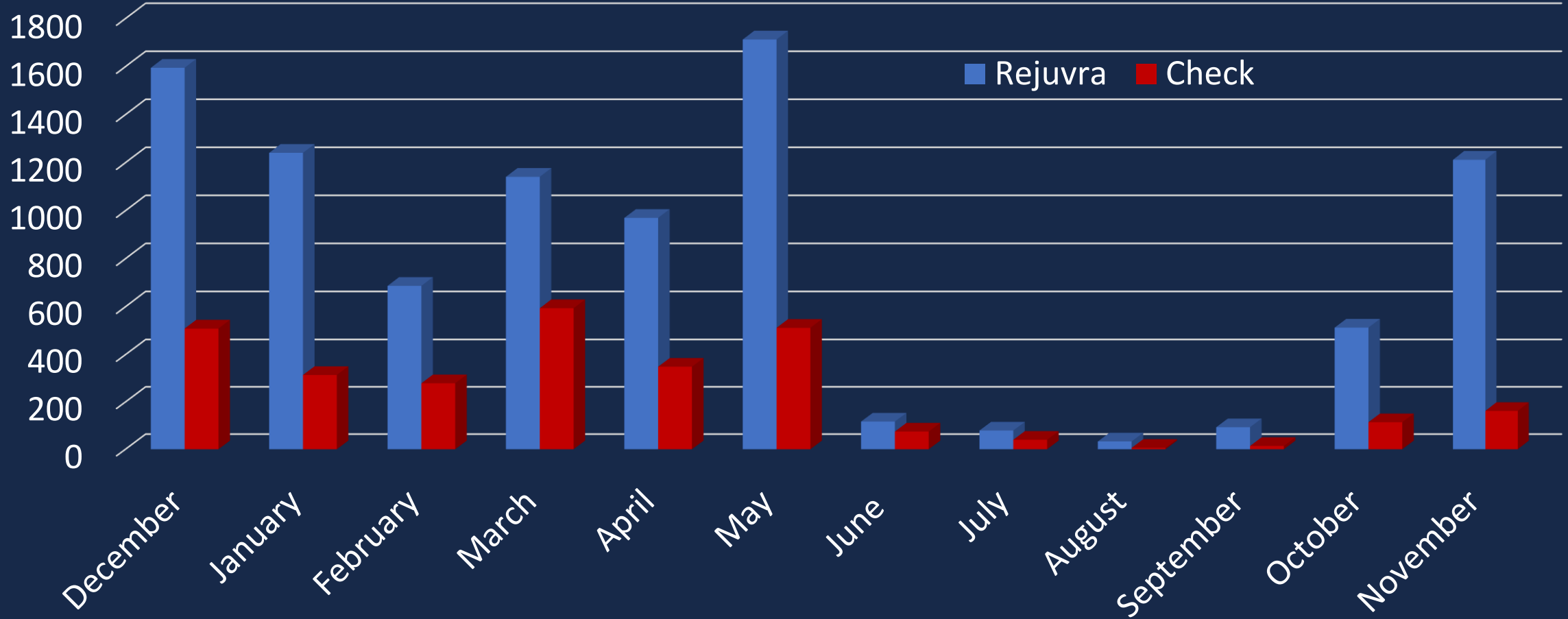




Game Camera Photos(2020-2021)

Number of Mule deer in photos/month

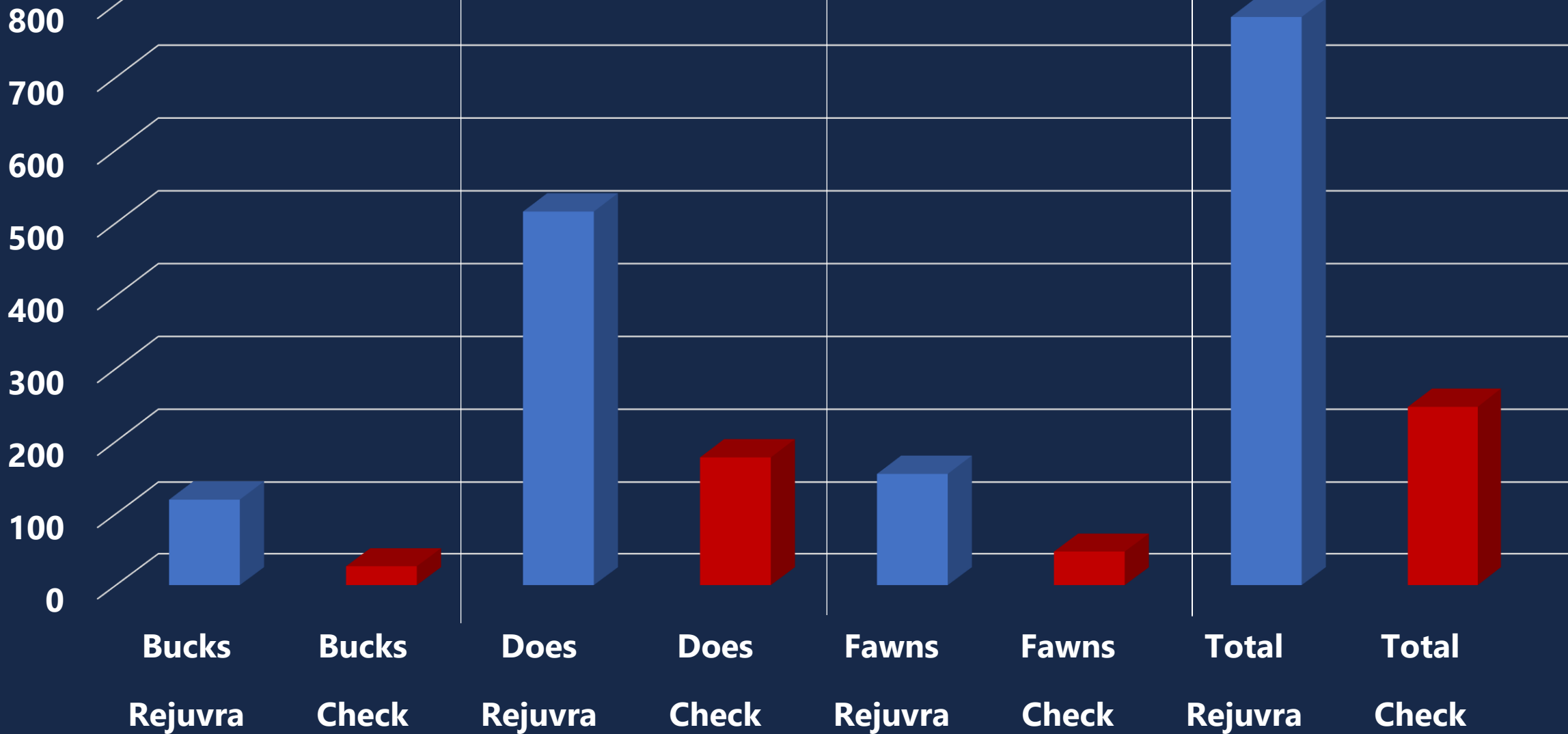
Mean of 3 Paired Sites





Number of Deer/Month

Mean of 3 locations

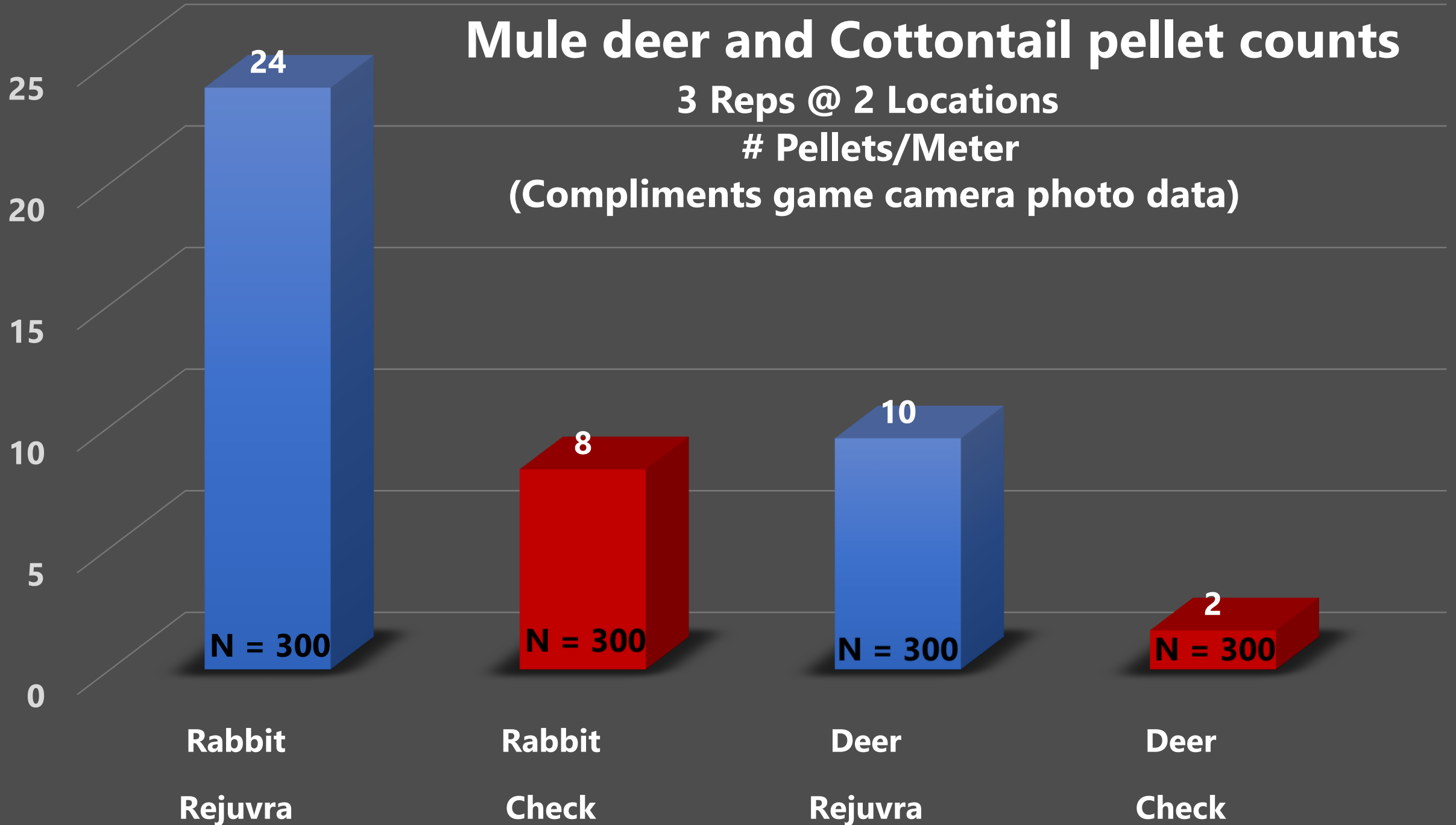


Mule deer and Cottontail pellet counts

3 Reps @ 2 Locations

Pellets/Meter

(Compliments game camera photo data)



Endozoochory?

- Deer are important seed dispersal vectors across landscapes.
- Deer enozoochory can potentially speed up recolonization and diversity of species in areas where monoculture of cheatgrass existed.
- A New York whitetail survey found 70 plant species seeds germinated in deer pellets.
- Seed dispersal determines plant community recruitment, diversity, and recolonization.
- Increases hoof activity to induce seed germination
- Digestive breakdown seed coats
- Fertilize seed



Summary

Cheatgrass negative forage impacts

- Species diversity cut in $\frac{1}{2}$.
- 50 to 75% loss of forb, sub-shrub, and grass biomass.
- High probability of high intensity wildfires.
- Mule deer prefer sites with lush, diverse native species growth.





Questions?

- **Welcome to set up personal tours to view properties sprayed with Rejuvra!**
- **jsebastian@bouldercounty.org**
- **jswanson@bouldercounty.org**

