

From home  
on the  
range...



...to homes  
on the  
range...

**United Country**  
PREMIER BROKERS

**FOR SALE**  
**719-530-1000**  
Tim Hiser, Broker  
245 E. HWY 50 SALIDA

Available Summer 2002  
**WELDON CREEK**

- 10 TO 50 ACRE LOTS ON 1,300 ACRES
- BORDERS STREAM, GREEN BELT, GOV'T LANDS
- PAVED ROADS, BIKE & JOGGING TRAILS
- HORSEBACK TRAILS TO NAT'L FOREST

**STARTING IN THE \$200,000's**

For ranching  
to be  
sustainable...



...it must be  
profitable and  
enjoyable



People are  
leery of fossil  
fuel-intensive  
management...



...and interested  
in healthy foods  
and lifestyles.





We have tried  
repeatedly to  
alter landscapes  
to suit animals...



We have done  
little to modify  
animals to fit  
landscapes...



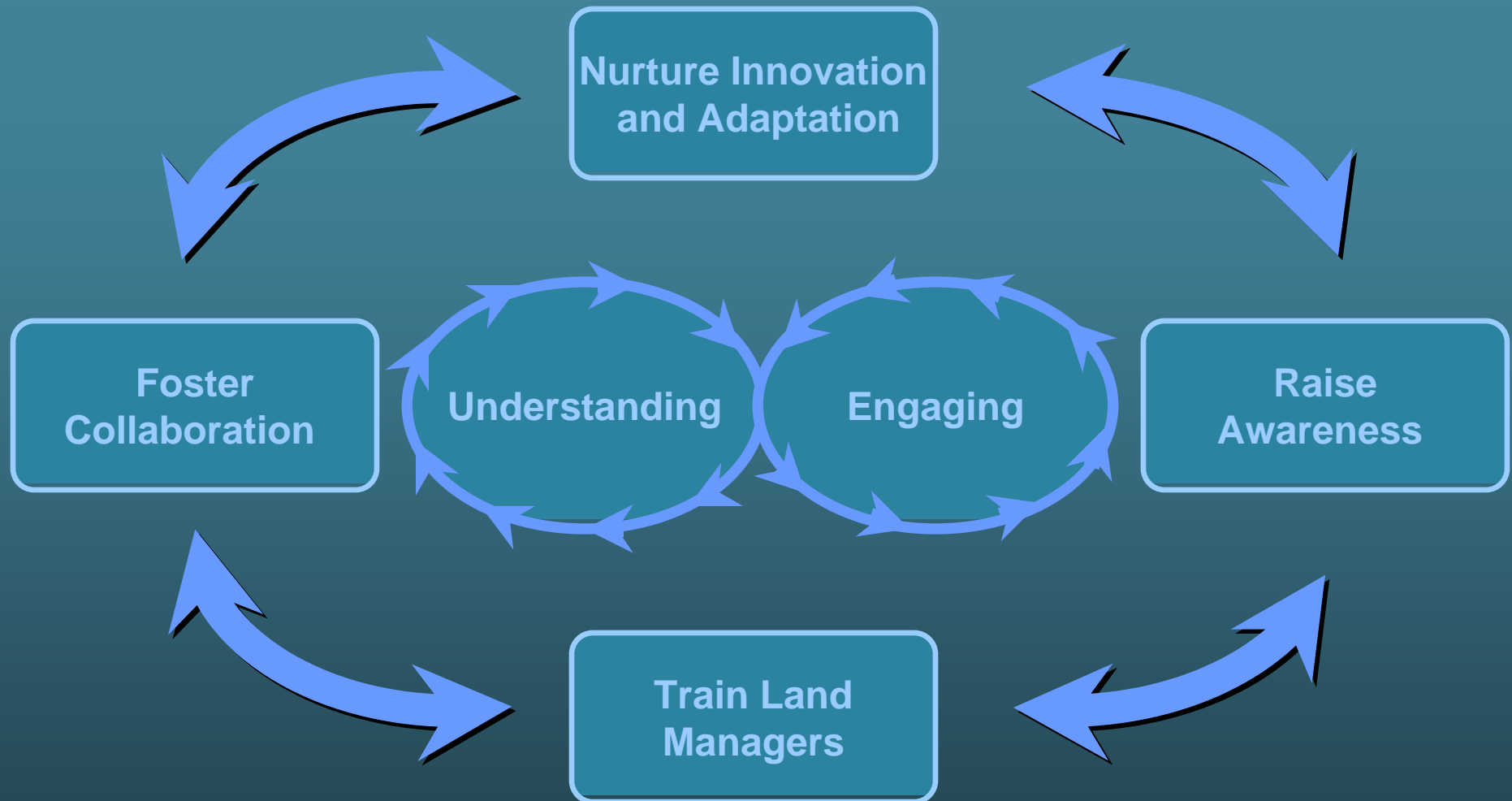
Social

Biophysical

Individual

Genome

F. Deboisievre



BEHAVE is dedicated to integrating understanding of behavioral principles and processes with indigenous knowledge to enhance social, economic and environmental values of rural communities and landscapes

Select for  
Locally-Adapted  
Creatures

Graze to Enhance  
Biodiversity

Enable  
Individuality

How can we work with nature?



# Selecting for Locally-Adapted Animals

What does  
it mean for  
creatures...



...to be locally  
adapted to a  
landscape?



Kit Pharo

Pharo Cattle Company

- Manage Grazing
- Match Animal Needs to Available Forage Seasonally
- Select for Locally Adapted Animals





# The Last Ranch

## Sam Bingham

### Reviving the Old Sheep Cycle

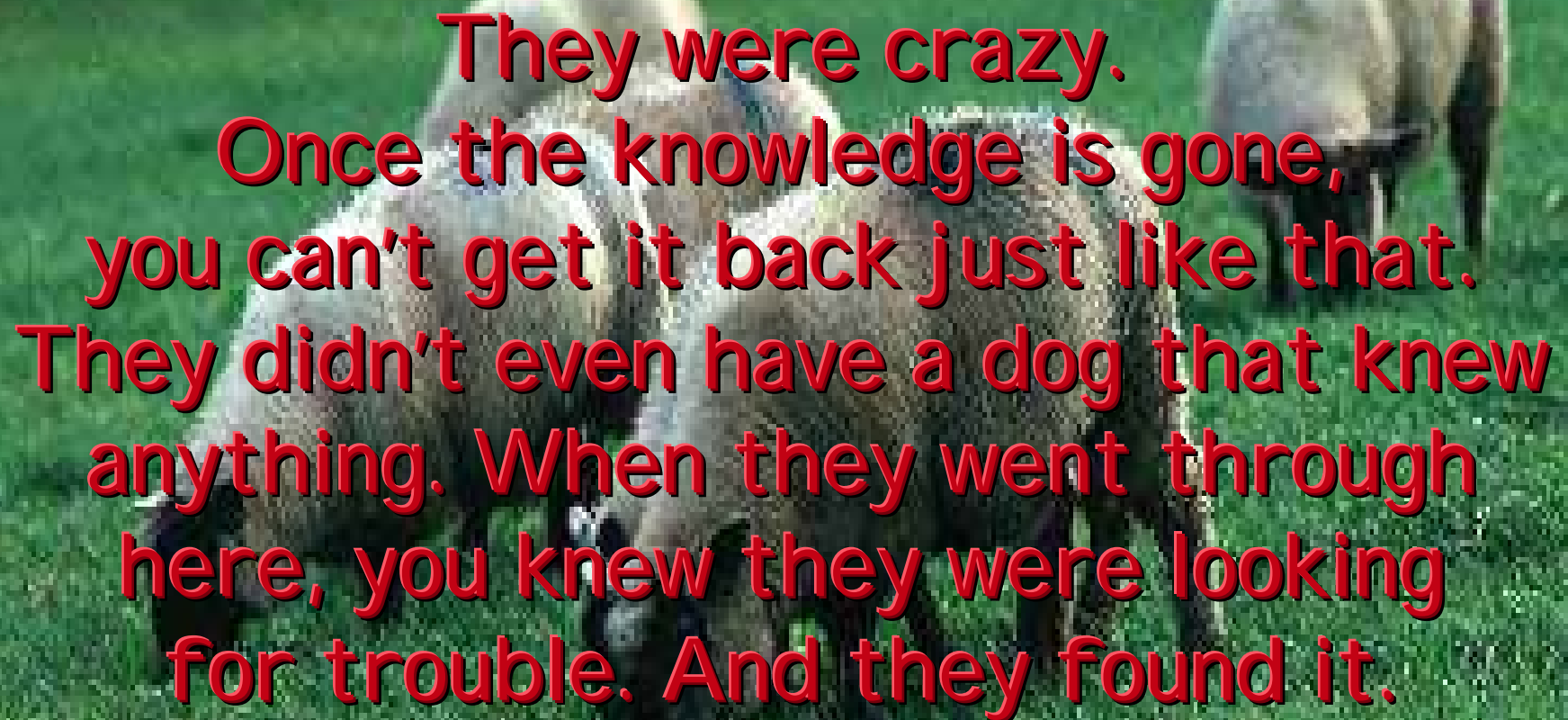
# San Luis Valley

1935: 75-lb lambs, cull ewes with twins

1985: 90-lb lambs, 150% lamb crop

Our ewes were strong and as well muscled as deer, and yours wouldn't last a day where ours went.

George Whitten

A photograph of three sheep in a green field. The sheep are white with dark faces and legs. They are standing in a grassy field with a dark background. The text is overlaid in red, bold, sans-serif font.

They were crazy.  
Once the knowledge is gone,  
you can't get it back just like that.  
They didn't even have a dog that knew  
anything. When they went through  
here, you knew they were looking  
for trouble. And they found it.

George Whitten



Experiences  
early in life  
have...



...life-long  
influences on  
food and habitat  
selection



# Cows and Straw





# Experience Early in Life Influences Performance

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Body weight	*	*	*
Body condition	*	*	*
Milk production	*	*	-
Post-partum interval	*	*	-



# Changes in Management

System Performance



Time

# Ray Bannister



## Diet Selection

Bob  
Budd



Habitat  
Selection



Old dogs learn new  
tricks, young dogs  
learn them quicker...



## Role of learning in local adaptation

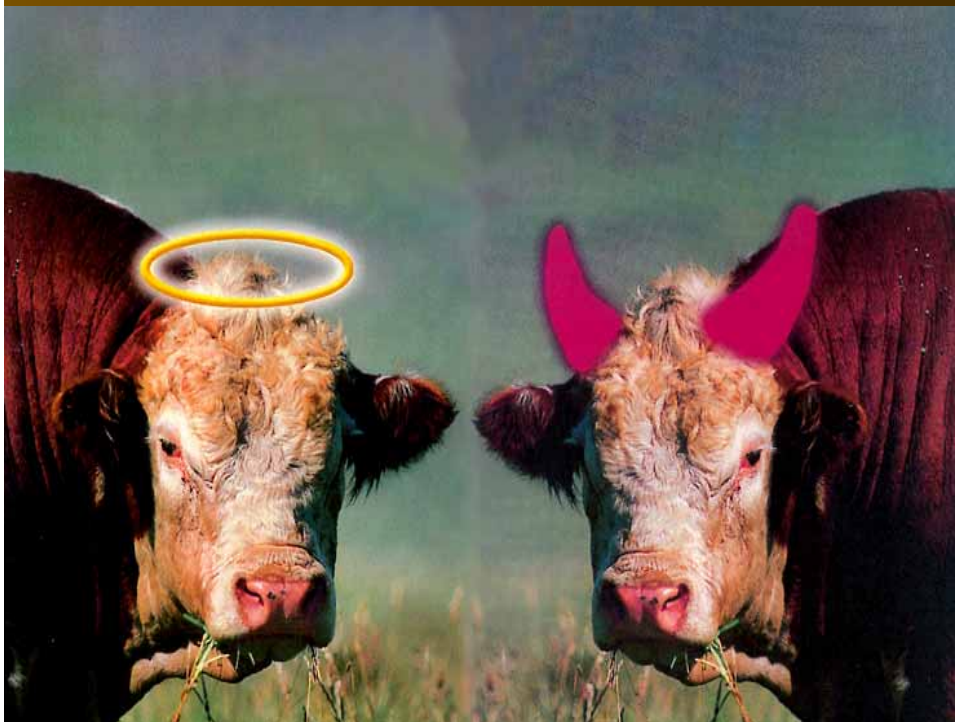


Importance of  
learning in re-  
locating animals



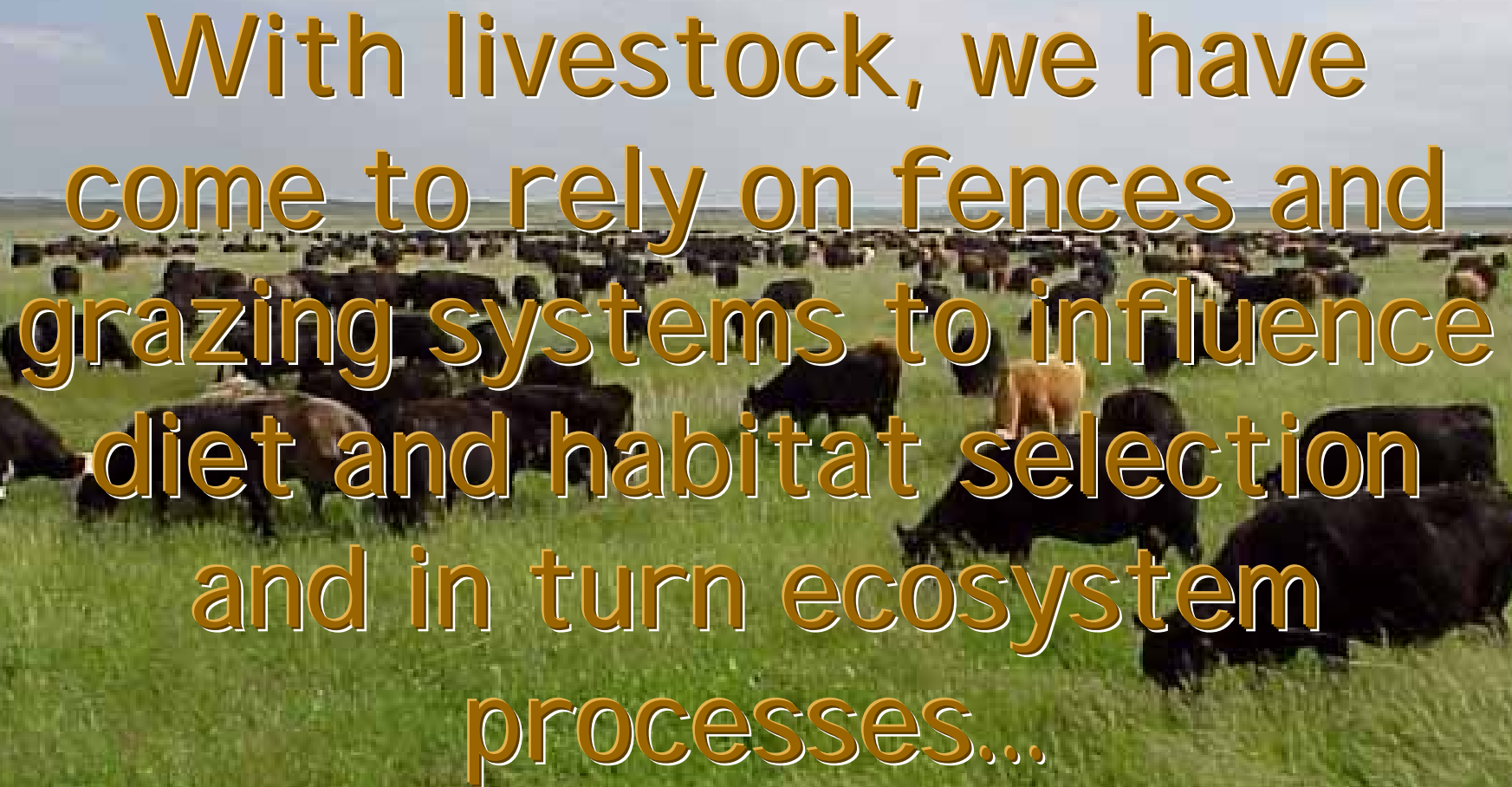


How might pre-historic grazing have differed...




from grazing during this past century?





With livestock, we have  
come to rely on fences and  
grazing systems to influence  
diet and habitat selection  
and in turn ecosystem  
processes...

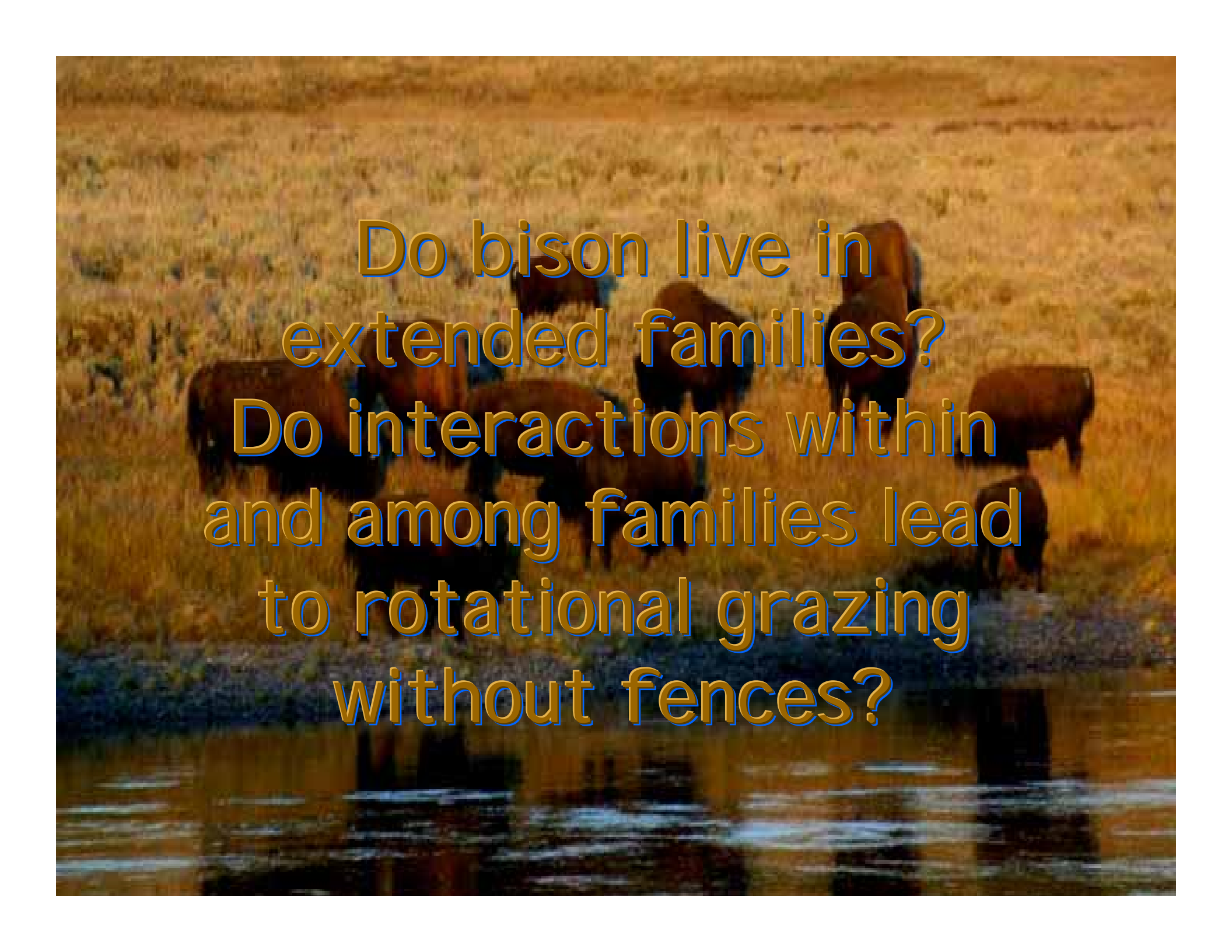
A photograph of a herd of bison in a grassy field, serving as the background for the text. The bison are dark brown and are grazing on the grass. The field is filled with tall, dry grass. The background is slightly blurred, focusing attention on the bison and the text.

Social organization  
and culture typically are  
not considered in studies  
of ecosystem processes

**In livestock, extended families  
form when calves, lambs, and  
kids aren't weaned**





A photograph of a herd of bison in a natural setting. In the foreground, there is a body of water reflecting the scene. The bison are in a field of tall, dry grass. The text is overlaid on the image in a stylized font.

Do bison live in  
extended families?  
Do interactions within  
and among families lead  
to rotational grazing  
without fences?

# Benefits of French Herding

Individuals have choices

meet needs for nutrients

regulate intake of toxins

More plant species used

maintain biodiversity

F. Deboisieu

What does  
it mean...




...to be a  
matriarch?





Rather than fence, can we use low-stress techniques to move cattle in circuits that increase their use of weeds?

# Enhancing Biodiversity

The background image shows a wide, open landscape with rolling hills and sparse vegetation. The foreground is filled with dry, brownish grass and some small, dark shrubs. The middle ground shows a mix of green and brown patches, suggesting a mix of different plant species or perhaps a mix of different land uses. The background features rolling hills under a clear, light blue sky. The overall scene is a vast, open landscape, likely a savanna or a similar natural environment.

How can livestock  
enhance and maintain  
landscapes - soil, water,  
wildlife, biodiversity -  
for society?



Can we get  
a handle on  
weeds...



...through  
grazing, and  
if so, how?

To use animals  
successfully, we must  
change our thinking from  
animals as tools to animals  
as an ongoing part of  
managing systems.

Learned  
Preferences  
Aversions

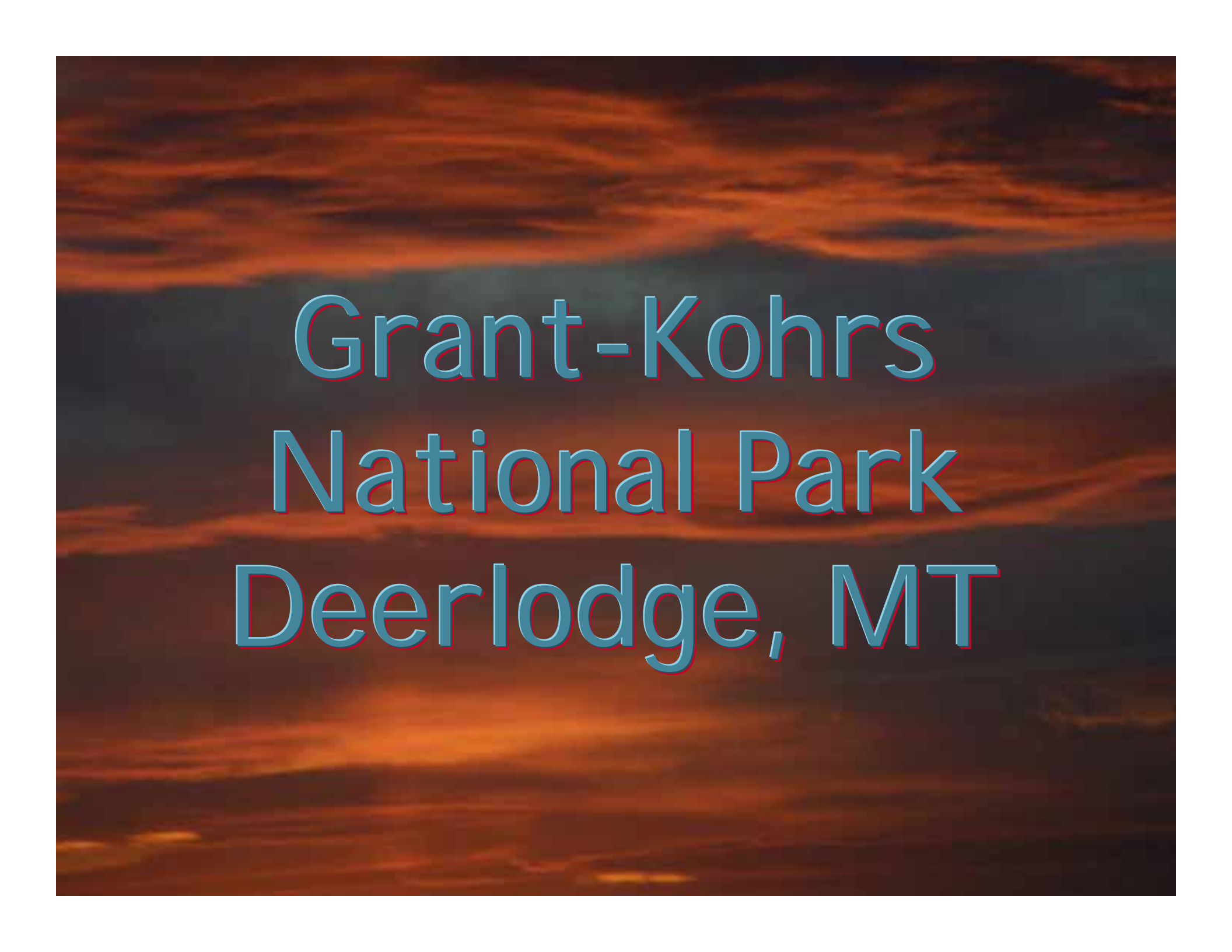
Medicines

Nutrients

Enhancing Biodiversity



Animals can be  
trained...



# Grant-Kohrs National Park Deerlodge, MT

Cattle can be  
trained to eat  
leafy spurge,  
knapweed,  
thistle...





Sheep can be  
trained to avoid  
eating grape vines  
in organic orchards



Medicines help...





All plants contain  
secondary compounds...





glucosinolates



cyanogenic glycosides



glycoalkaloids



tomatine alkaloids





Secondary compounds  
limit intake, and cause



animals to eat a  
variety of foods

A photograph of a white goat standing in a forest. The goat is facing left, with its head slightly turned towards the camera. It has a thick white coat and small, dark horns. The background is filled with green foliage and trees, creating a natural, outdoor setting. The text "Animals self-medicate with secondary compounds, clays, and charcoal" is overlaid on the image in a green, stylized font with a drop shadow effect.

Animals self-medicate  
with secondary compounds,  
clays, and charcoal





# Flint Hills Kansas

Supplementing  
cattle with  
polyethylene  
glycol...



...can reduce  
the abundance  
of sericea

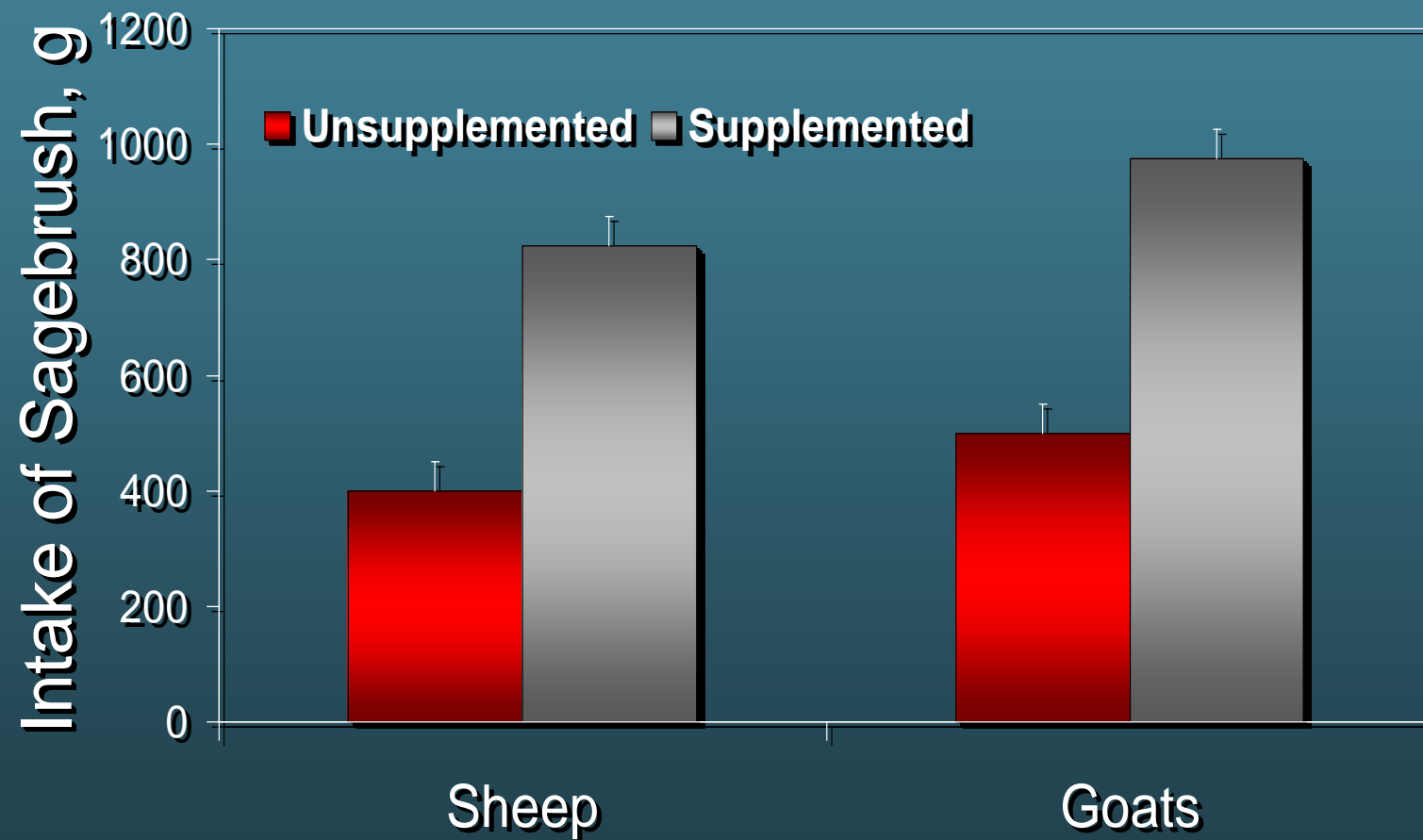
Nutrients help too...



# Sagebrush Steppe



# Supplemental Energy/Protein



In 2001  
Low Stock Densities  
and Inadequate  
Supplement

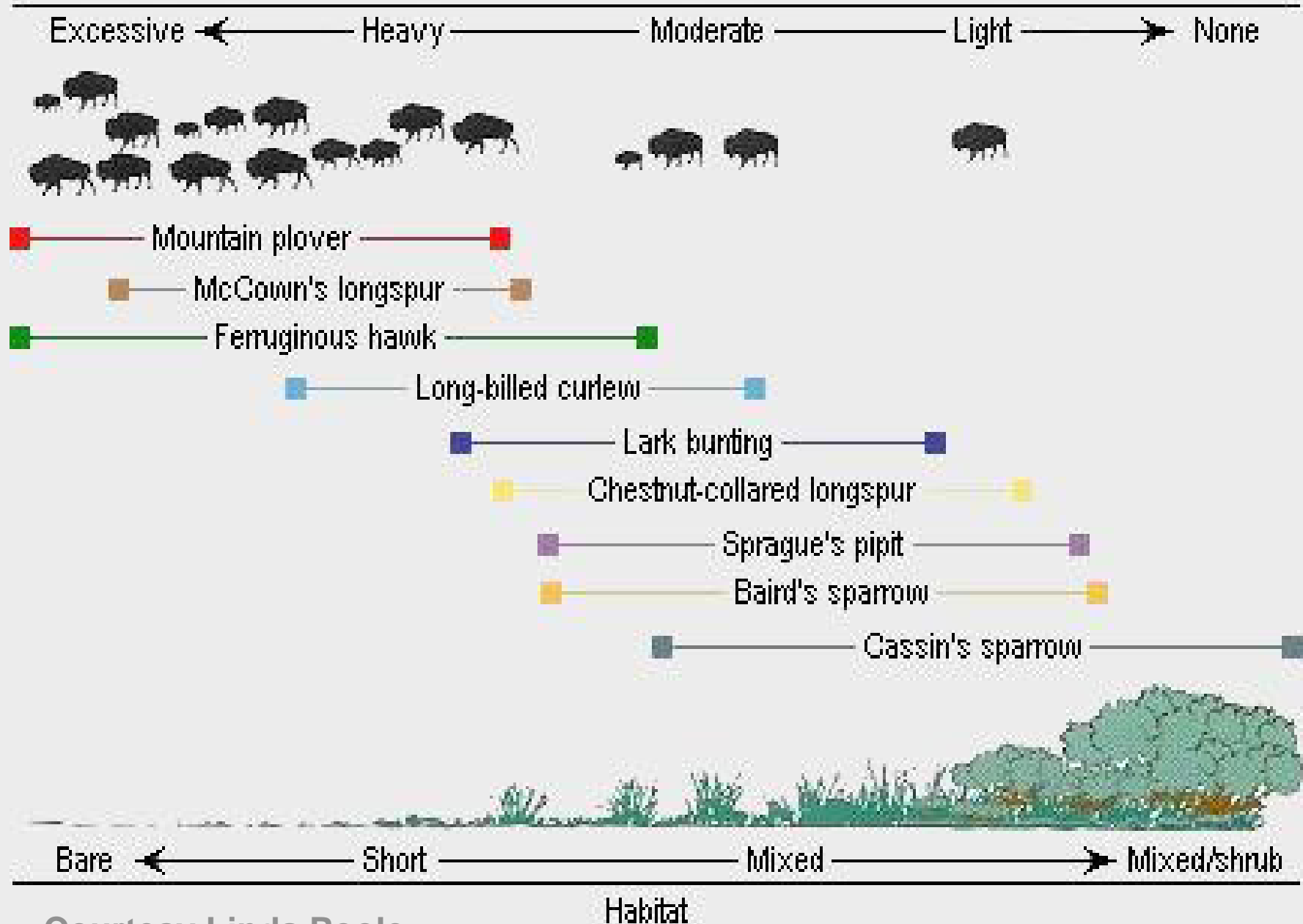


In 2003  
High Stock Densities  
and Adequate  
Supplement





# Grazing pressure



Courtesy Linda Poole,

TNC

# Individuality Biodiversity



A photograph of two cows standing side-by-side in a field. The cow on the left has a yellow halo around its head. The cow on the right has a red heart shape superimposed on its head. The text is overlaid on the image.

# Everybody's Different

Fingerprints and odors

Organs (brain, stomach, liver)

Endocrine glands (appetites, emotions)

Number of Individuals





# Biodiversity Matters

Biochemical diversity enables individuals to regulate intake of nutrients and toxins



# Pastures



Plant diversity  
can enhance  
performance...



...health, and  
profitability  
on pastures...



A photograph of a lush green field with numerous small yellow flowers scattered throughout. The text is overlaid in the center.

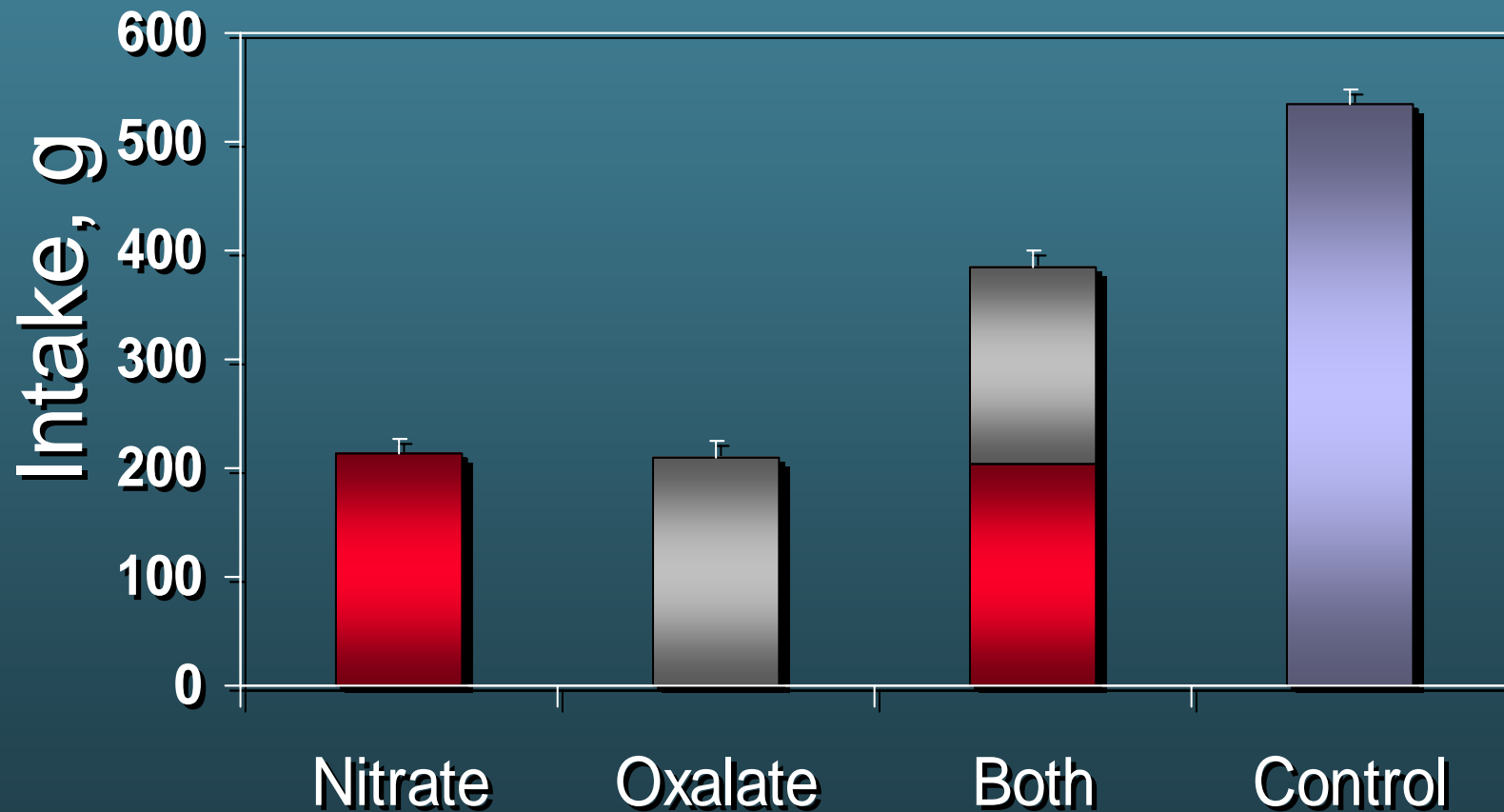
# Complementarities and health benefits of secondary compounds in plant mixtures



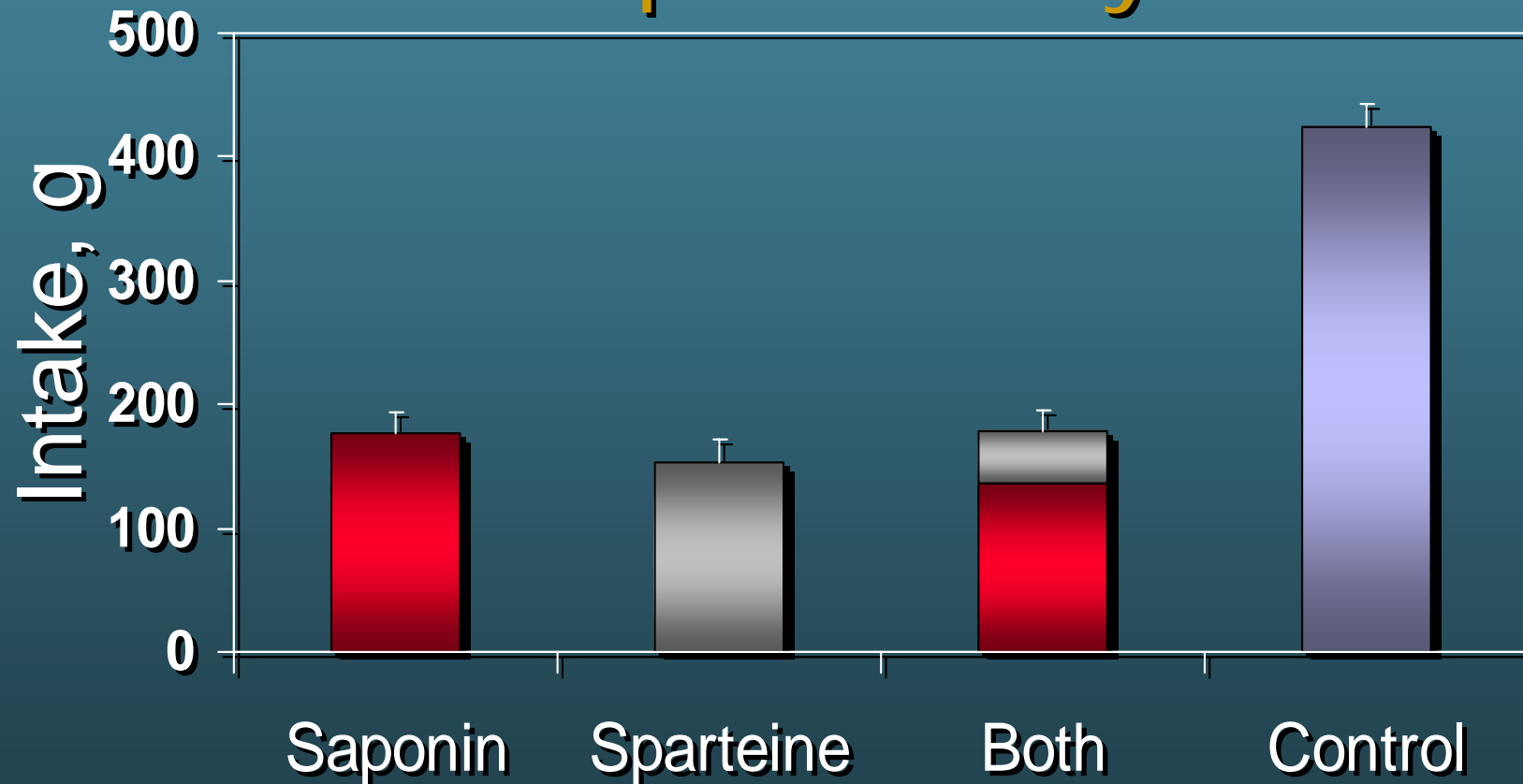


Mule deer eat more of a combination of sagebrush and juniper (12 g/kg BW/d) than of either sagebrush (4 g/kg BW/d) or juniper (8 g/kg BW/d) alone

# Some Compounds are Complementary



# Some Compounds aren't Complementary







Cyanogenic  
Glycosides

Alkaloids

We have much to learn  
about health benefits  
and complementarities

Tannins

Terpenes

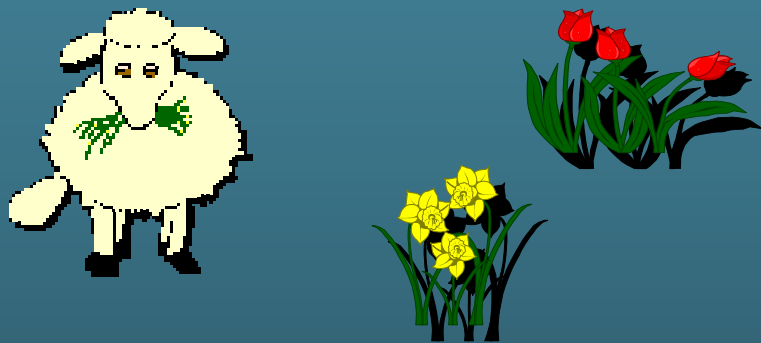
A scenic landscape photograph showing a mountain range under a clear blue sky. The mountains in the background have patches of snow on their peaks and slopes. In the foreground, there are rolling hills with dry, golden-brown grass and some evergreen trees. The word "Rangelands" is overlaid in a large, blue, serif font with a white outline.

# Rangelands



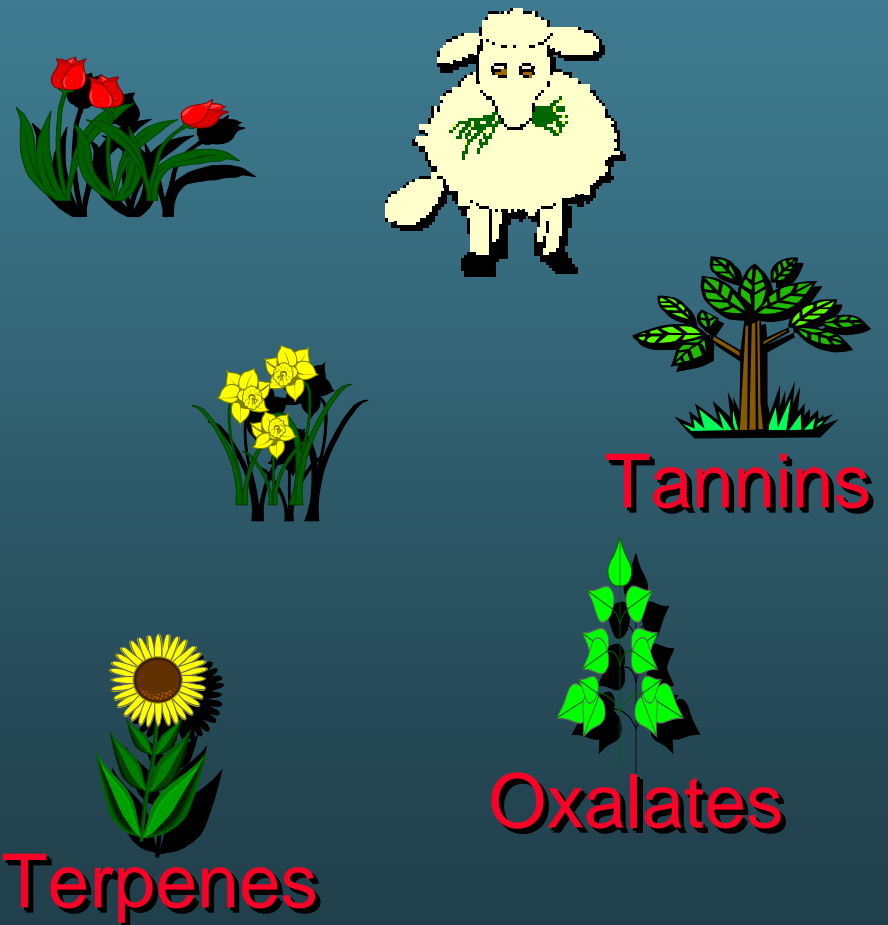
# Experience and Alternatives

## Inexperienced




The availability  
of alternative foods  
influences how readily  
animals learn to eat  
foods that contain  
secondary compounds

## Experienced

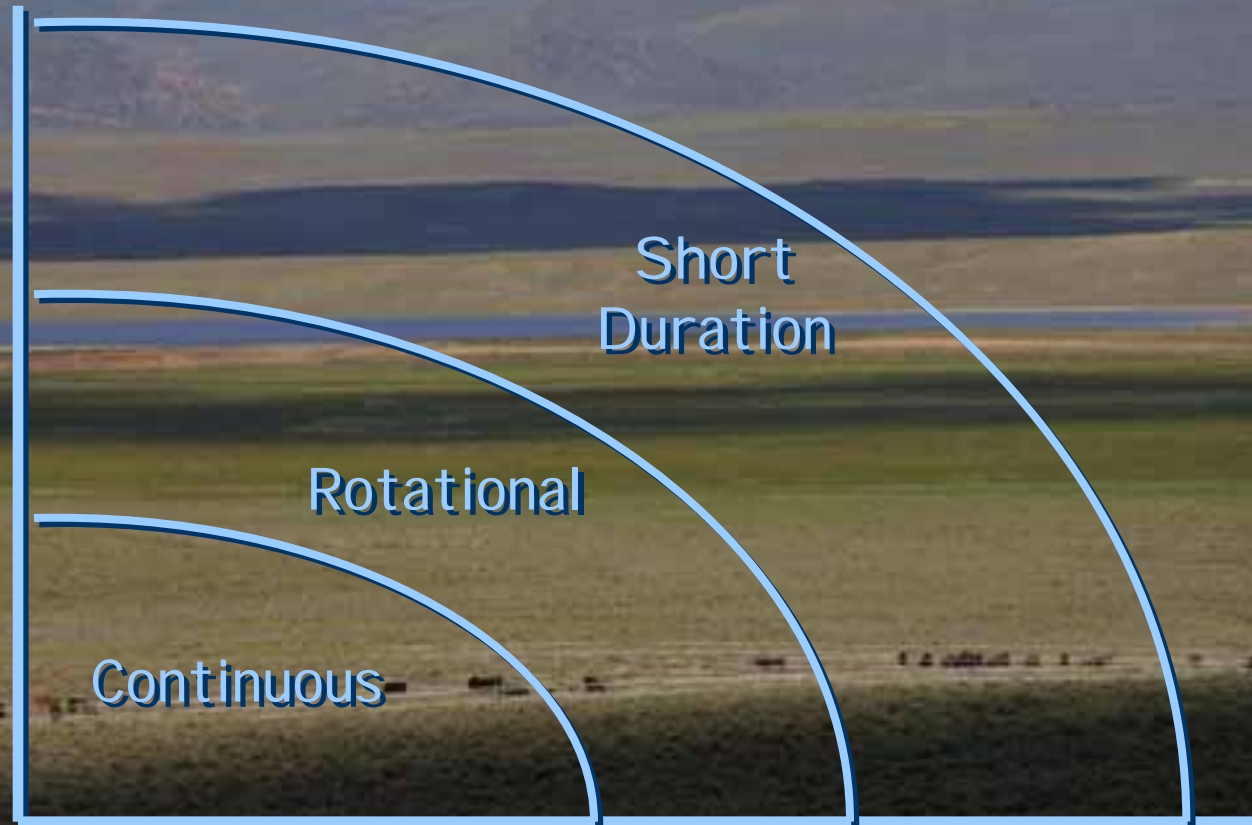




A landscape photograph showing a vast, green grassy field in the foreground. In the middle ground, there is a line of dark trees or shrubs. The background features rolling hills and mountains under a blue sky with scattered white clouds. The text is overlaid in the center of the image.

Grazing management  
influences the  
availability of  
alternatives, which  
influences diet breadth

Diet/Habitat Breadth



Low

Intermediate

High

Stock Density

A man wearing a blue long-sleeved shirt, blue jeans, and a tan baseball cap stands in a lush green field. He is holding a small, dark-colored animal, possibly a cat or a small dog, in his arms. The field is filled with tall grass, and the background shows a clear blue sky.

# Boom-Bust Grazing...



Ray's cattle  
learned to "mix  
the best with  
the rest"



Rather than  
"eat the best  
and leave the  
rest"

# Key Species



# Key Areas



Have we trained  
- inadvertently -  
generations of  
herbivores ...



... to “eat the  
best, and leave  
the rest”?



Sheep and  
goats eat  
leafy spurge



Can cattle  
learn to eat  
leafy spurge?

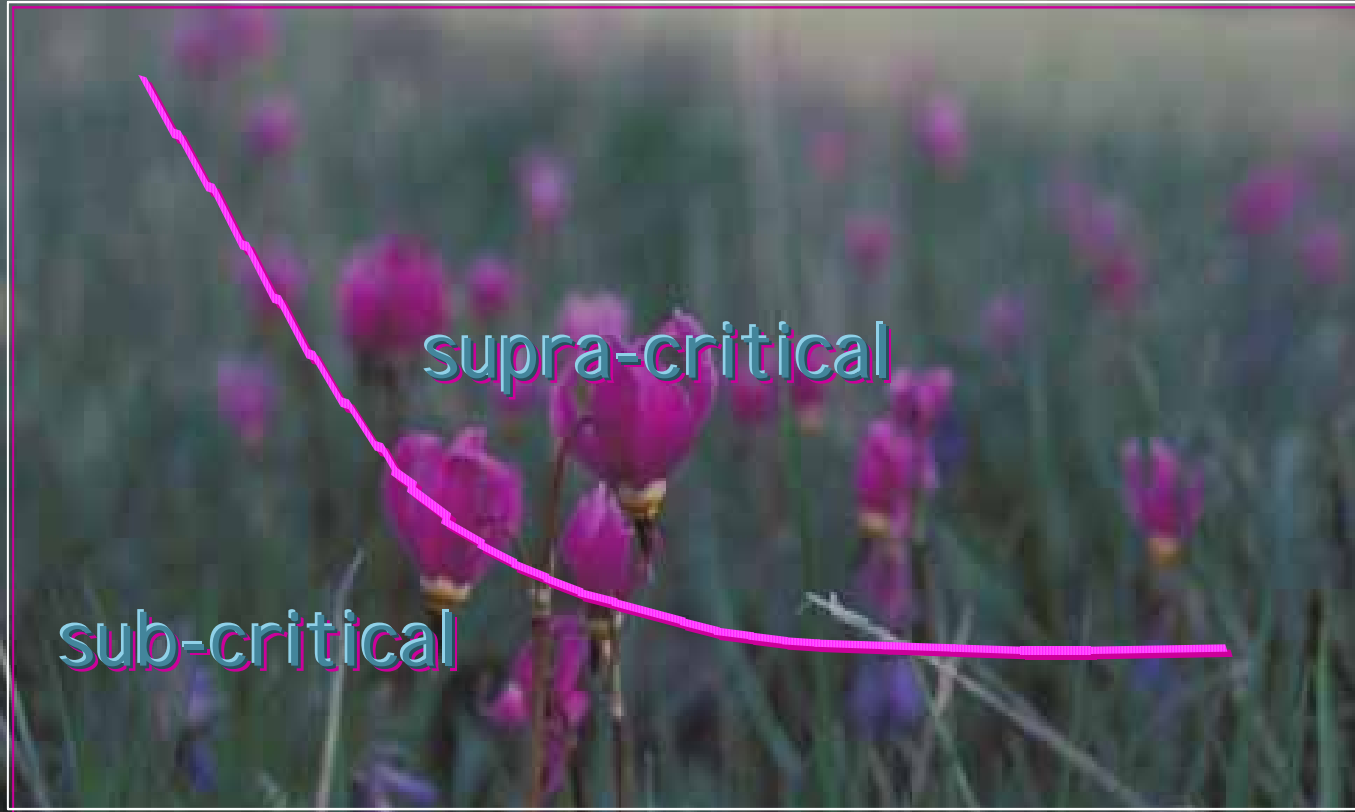
1. Rex Ranches use high stock densities for short periods to encourage cattle to eat a variety of plants.
2. Leafy spurge occurs in patches, it does not dominate the landscape, so cattle don't have to eat only spurge.
3. Other plants on the ranch complement leafy spurge biochemically, which better enables cattle to eat spurge.
4. They keep their replacement heifers so young animals learn to eat leafy spurge from their mothers – it has become part of the culture.

# Does diversity beget diversity?

Herbivore Knowledge

supra-critical  
sub-critical

Plant Biochemical Diversity





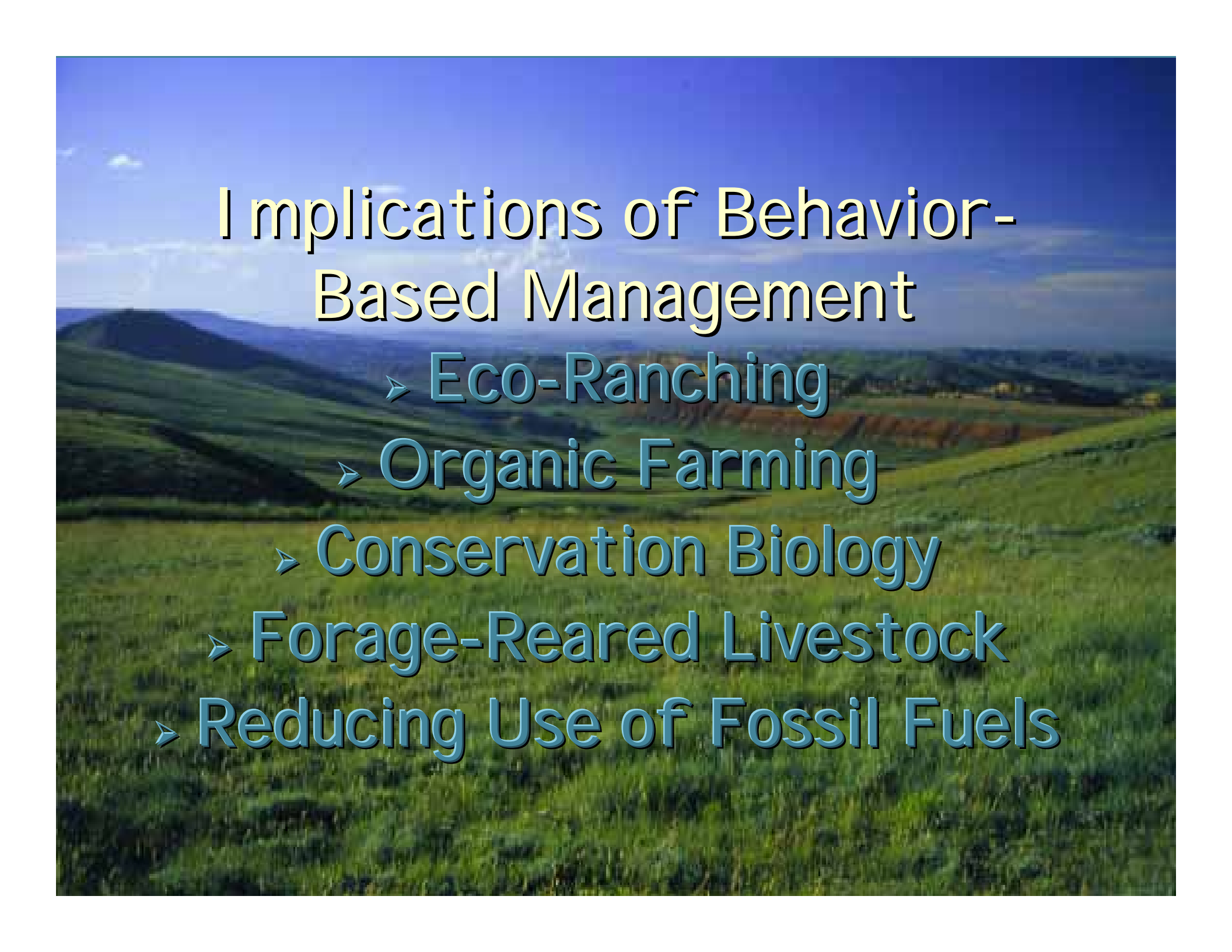
In Summary...

Social

Biophysical

Individual

Genome



# Implications of Behavior-Based Management

- Eco-Ranching
- Organic Farming
- Conservation Biology
- Forage-Reared Livestock
- Reducing Use of Fossil Fuels





[www.behave.net](http://www.behave.net)

