

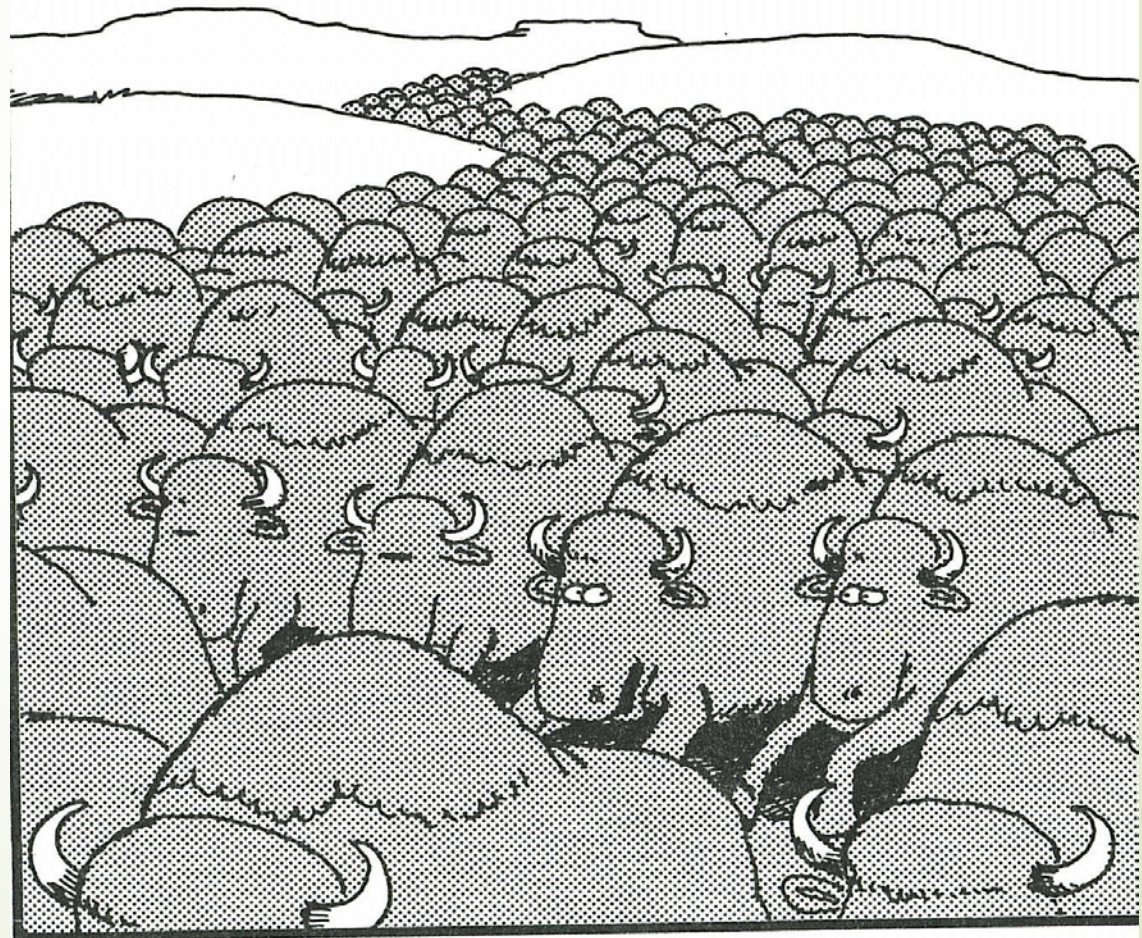
Vaccination Protocols for Bison



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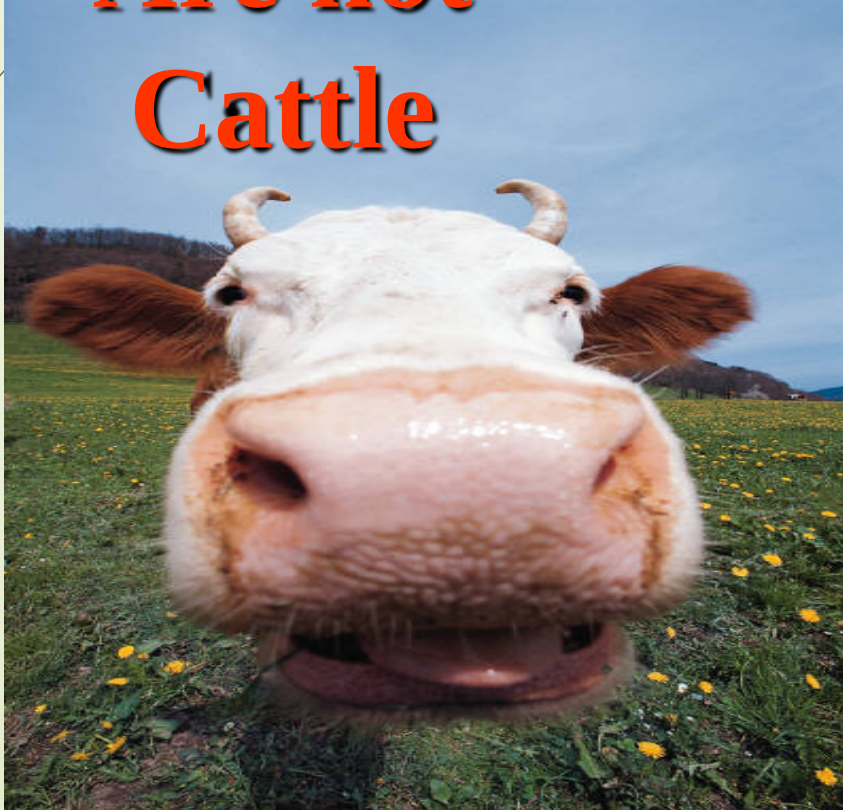
What the
“Bloody Hell”
Are
We
Doing ?



“As if we all knew where we’re going.”



Bison Are not Cattle



- Catabolic and Anabolic cycles
- Rumen volume
- Rumen Turnover
- Energy and Nutrients
- Disease resistance and vaccine responses
- Don't handle stress
- Domestication
- Eurasian species
- Energy and Nutrients
- Breeding selection
- Disease susceptibility
- Human stressors have Minimal Impact

Evolutionary Morpho-physiological Feeding Types

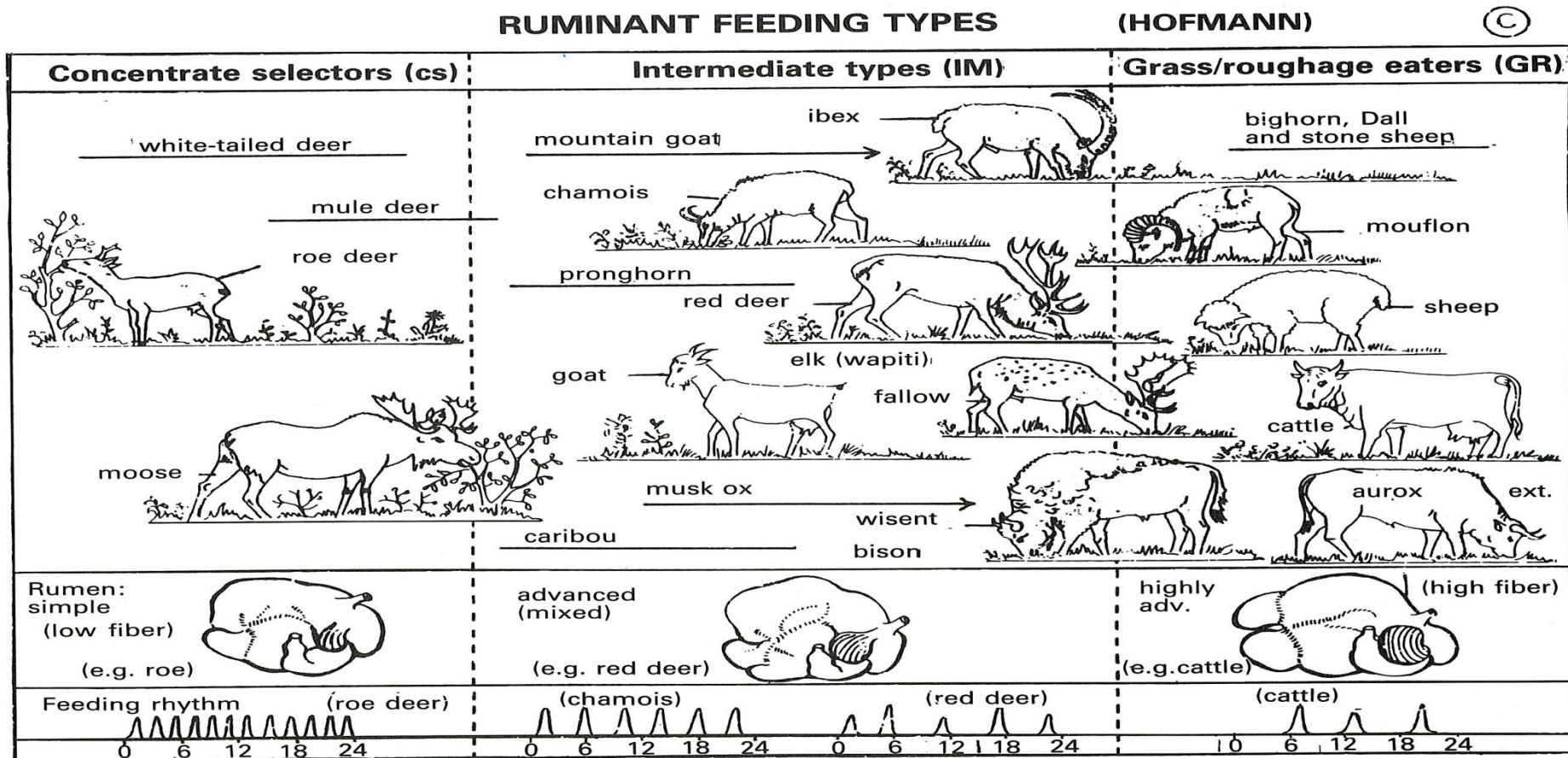
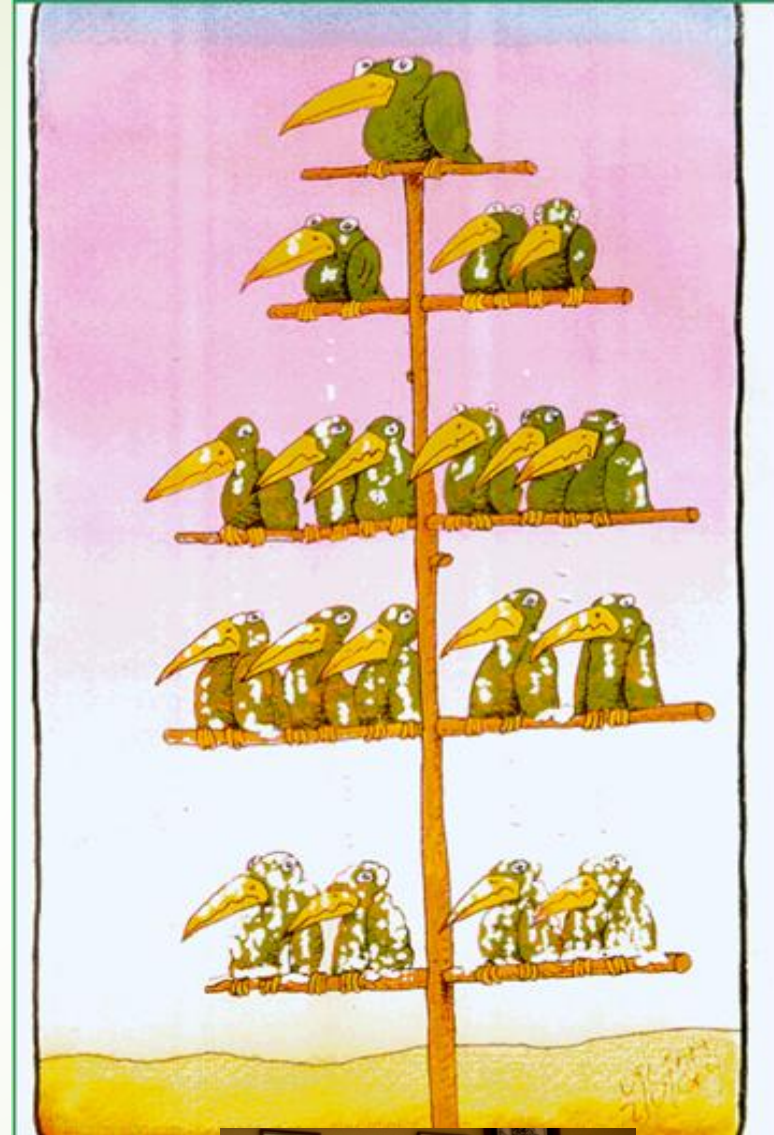


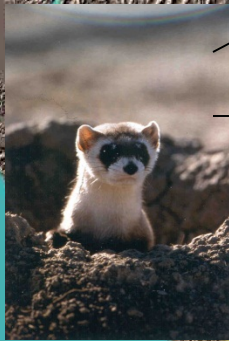
Figure 2-1. Position of European and North American ruminant species within the evolutionary system of morpho-physiological feeding type. The further the baseline of a species extends to the right, the greater its ability to digest fiber in the rumen, which has concurrently advanced. Selection for plant cell content implies shorter feeding intervals as the simple rumen of CS has fewer food passage delay structures than that of GR.

**So, when health
problems arises,
where does
the Vet fit in?**



Here





The Immune System

An animal's immune system protects its body from intruders: bacteria, viruses, parasites, toxins, cancer cells, etc. An immune system is present especially within the vertebrates. Animals have both non-specific and specific defense mechanisms to fight invaders.

Non-specific mechanisms (Not immune related)

- perspiration, skin oil, saliva, tears, respiratory cilia
- Inflammatory response – fever





Immunity

Immunity is the ability to “remember” foreign substance previously encountered and react again, promptly. There are two kinds of immunity: **active immunity**, when the body is stimulated to produce its own antibodies, and **passive immunity**, where the antibodies come from outside the person’s body. Active immunity may be permanent, and can be induced due to actual illness or vaccination. **Passive immunity** is not permanent because the antibodies are introduced from outside the body, thus the B-cells never “learn” how to make them.

Herd Immunity

A **level of resistance in a herd** or flock which is sufficient to prevent the entry of a particular disease into, or its spread with the herd.

The resistance may be **genetically based** immunity or,

Acquired as a result of previous exposure to the particular agent or vaccination.

BUT, the term relates to prevention of spread of an infection to an epidemic level.

BUT II, in a herd in which there are 70 – 80% of animals that are immune, there may be sporadic cases but the prevalence is unlikely to be significant.



With Settlers came Domesticated Eurasian livestock

- **Their domestic livestock were also little biological packages**
 - **Stow-away Pathogens**
 - **Viruses - BVD, IBR, BRSV, PI3**
 - **Bacteria - Brucellosis, TB, Johne's Disease, Pasteurella, Leptospirosis, Fusobacterium, Staph, Strep, Anthrax, Clostridium and Mycoplasma**
- **Correlation or Causation between increasing Eurasian livestock and decreasing North American native (and naïve) wildlife populations?**

Changing Numbers of Wildlife

➤ **1907**

@ 400 bison remained

➤ **1920's**

@ 300,000 White-tailed deer

➤ **1922**

@ 90,000 Elk

➤ **1991**

➤ **18,462,000 White-tailed deer**

➤ **5,032,000 Mule and black-tailed deer**

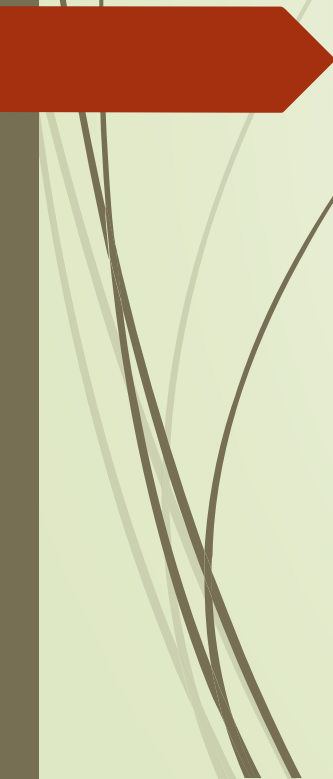
➤ **714,000 Elk**

➤ **32,509 Moose**

➤ **556,718 Pronghorn**

Approximately 25,000,000 free-ranging ruminants

Death loss in the Feedlots is “killing” Us (and them)



Vaccinations to prevent disease loss in the commercial feedlots are needed to protect our bison from endemic pathogens passed from other animals! That is a given !!!!

But, what vaccines and against what pathogens are we vaccinating our bison with before shipment?

Are vaccines even safe and efficacious in bison?

Vaccines for Bison Herds

Here is where it gets iffy...

What are we vaccinate for?

What are we vaccinating against?

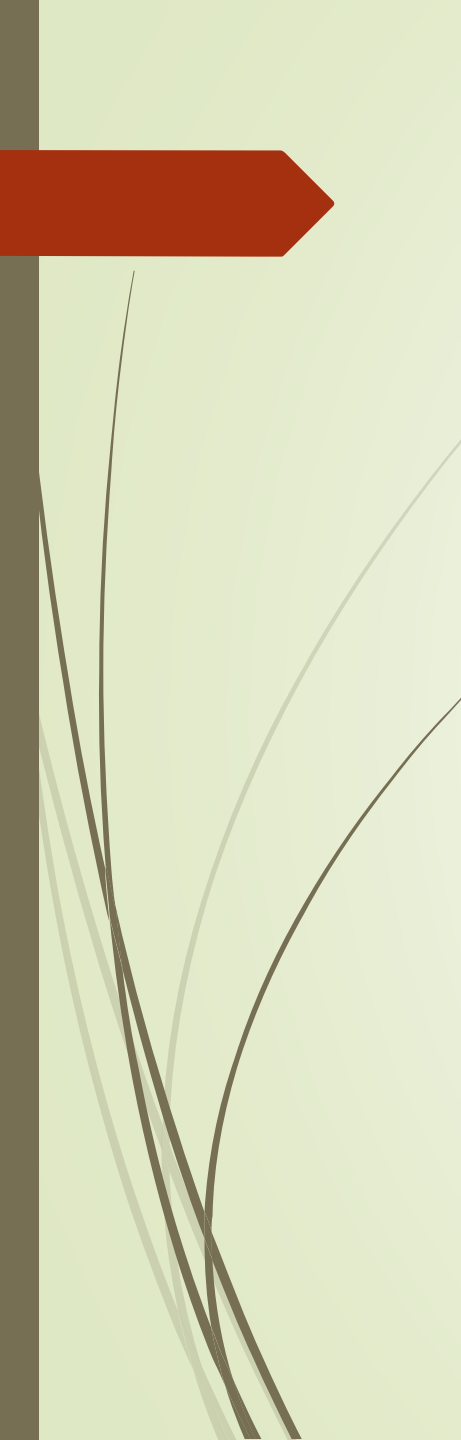
What product should we use?

How often do we vaccinate?

The killer reason,

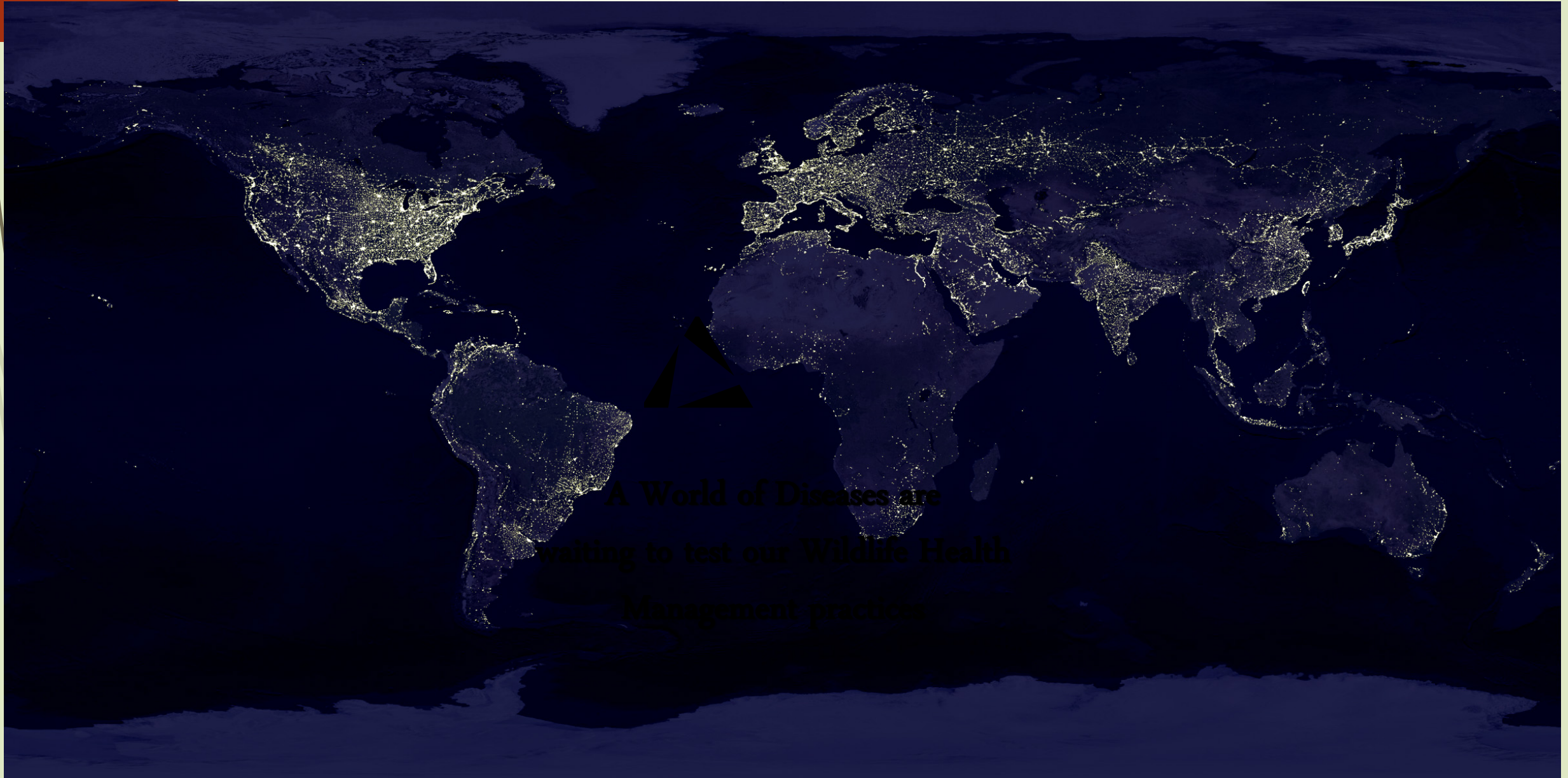
“Everybody knows”





Factor	Disease examples
Regional history of pathogen	Anthrax, parasites, brucellosis, TB, other
Proximity of bison to potential disease sources	Malignant catarrhal fever, bovine tuberculosis, brucellosis, Johne's disease, bovine viral diarrhea, bluetongue, EHD, foreign animal diseases (e.g., foot-and-mouth)
Weather patterns and environmental suitability	Anthrax, parasites
Presence and abundance of mechanical or biological vector(s)	Anaplasmosis, Blue-tongue, EHD, pink eye
Bison population density (concentration) affecting level of infectious contacts)	Most infectious
Season	Diseases with unique transmission patterns (e.g., brucellosis, blue-tongue, EHD, Pinkeye
Nutritional and other environmental stresses to bison	Infectious diseases that capitalize on depressed immunity (e.g., respiratory viruses)
Geographic location and climate	Pathogens capable of surviving climate extremes

Question everything



A World of Diseases are
waiting to test our Wildlife Health
Management practices

Are the Vaccines we use safe for use in Bison?

Pharmaceutical companies are granted license to produce and sell vaccines.

These companies must assure the vaccine is safe when administered to those species which is has been granted a license.

Efficacy and dosage must be proven, but only in those species granted by license.

No testing by these pharmaceutical companies for bison.

When used in bison the producer or veterinarian assumes total risk for any problems or losses.

So, even though safe, do these vaccines produce a protective immune response (antibodies) in bison?



No trials have been done in bison to prove immune stimulation or response on a cellular or humoral level.

Dose and/or frequency of re-administration (same as cattle?).

What if we were able to find an immune response, is it protective?

If Bison are proven to produce antibody, are they protected?



Vaccines that produce immune responses in animals against specific bacteria or viruses **do not necessarily protect the vaccinated animals** against these field pathogens.

Protection is only proven by clinical trials i.e.

- two groups of animals – one group vaccinated, the other no vaccine
- then introduce the pathogen and vaccinated animals should remain disease free

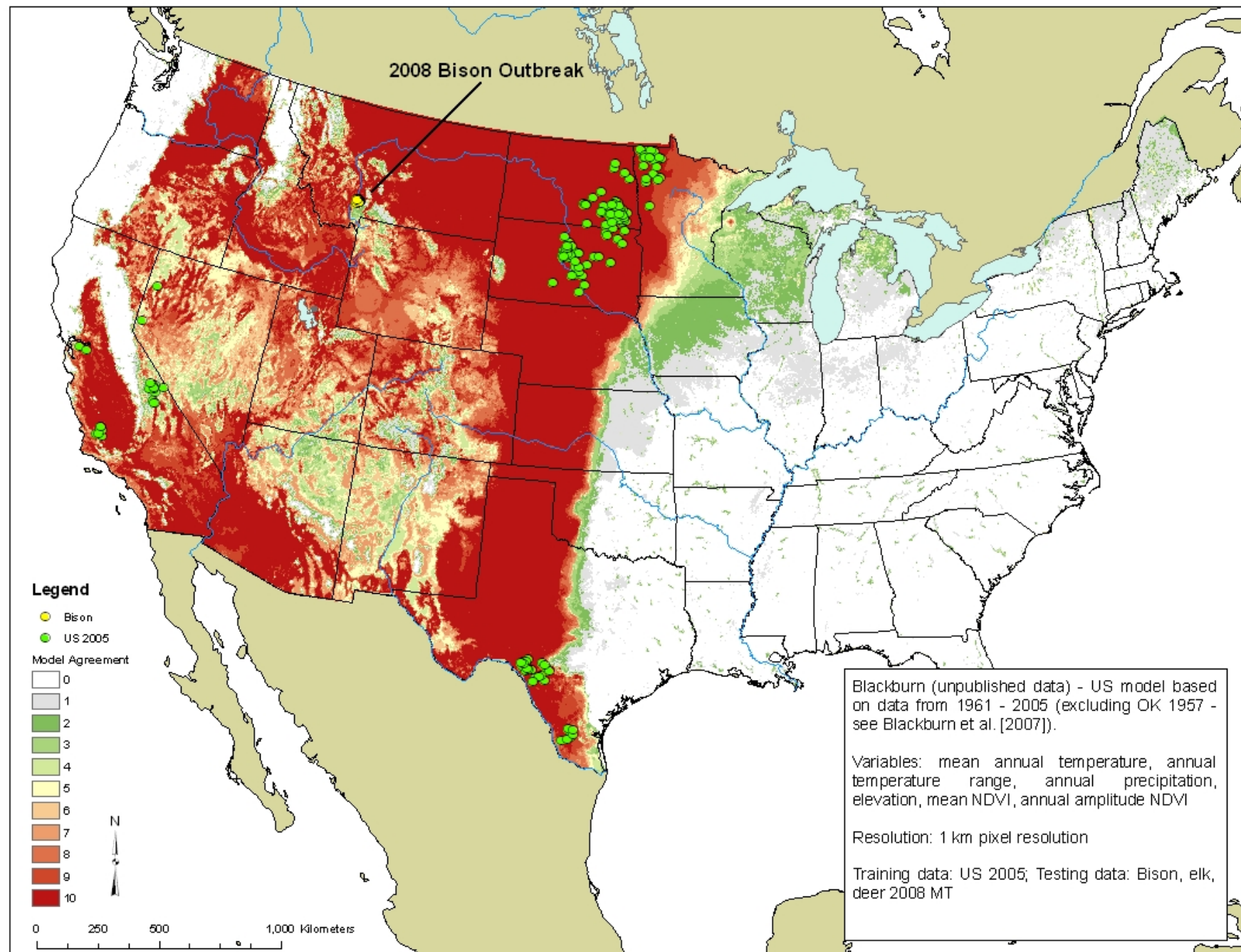
Bison are not involved in these clinical trials.





AN UNEXPECTED PREDATOR

ANTHRAX



EasyDecon DF 200

Manufactured by Intelagard





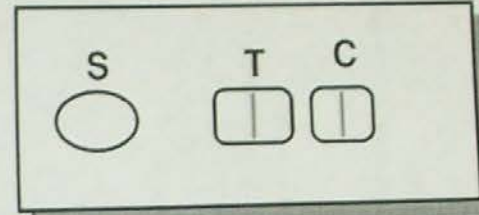
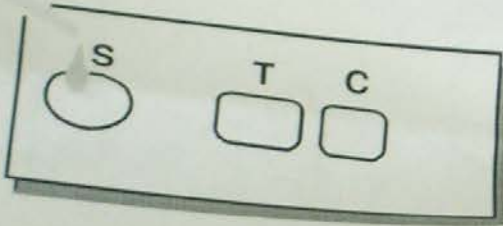


One Step Hand-Held Assay for BW Agent Detection

Sample Testing Instructions

Add Sample to Bottle,
Shake, and let settle for 5 minutes

5 Drops
from
bottle or
until S
well is
full



15 minutes

Positive



Positive
Fifteen Minutes

Environmental Samples Only

S = Sample
T = Test Line
C = Control Line

Note: Inspect foil package for holes or tears. Moisture packets must be in color. Assays and Sample Bottles must be retained at 4°C. Allow to come to room temperature before use.





Synopsis

- Total herd size 5,000+
- Two outbreaks – Main herd & Anceny
- Total died during outbreak – 298
- Highest death loss 39 bison August 6th
- Highest number of burials in one day – 59
- Days of Quarantine 42 each pasture
- Wildlife
 - 80 + Bull elk (no cows or calves)
 - 2 Whitetailed deer (one female, one male)
 - One black bear – suspect only



ANTHRAX VACCINATION

- Spore vaccine (Nonencapsulated Live culture)
- Vaccine developed in Africa @1930s
- Requires 2 doses, two weeks apart for protection
- Vaccine is only protective for @ six months
- Can not vaccinate within 42 days of slaughter

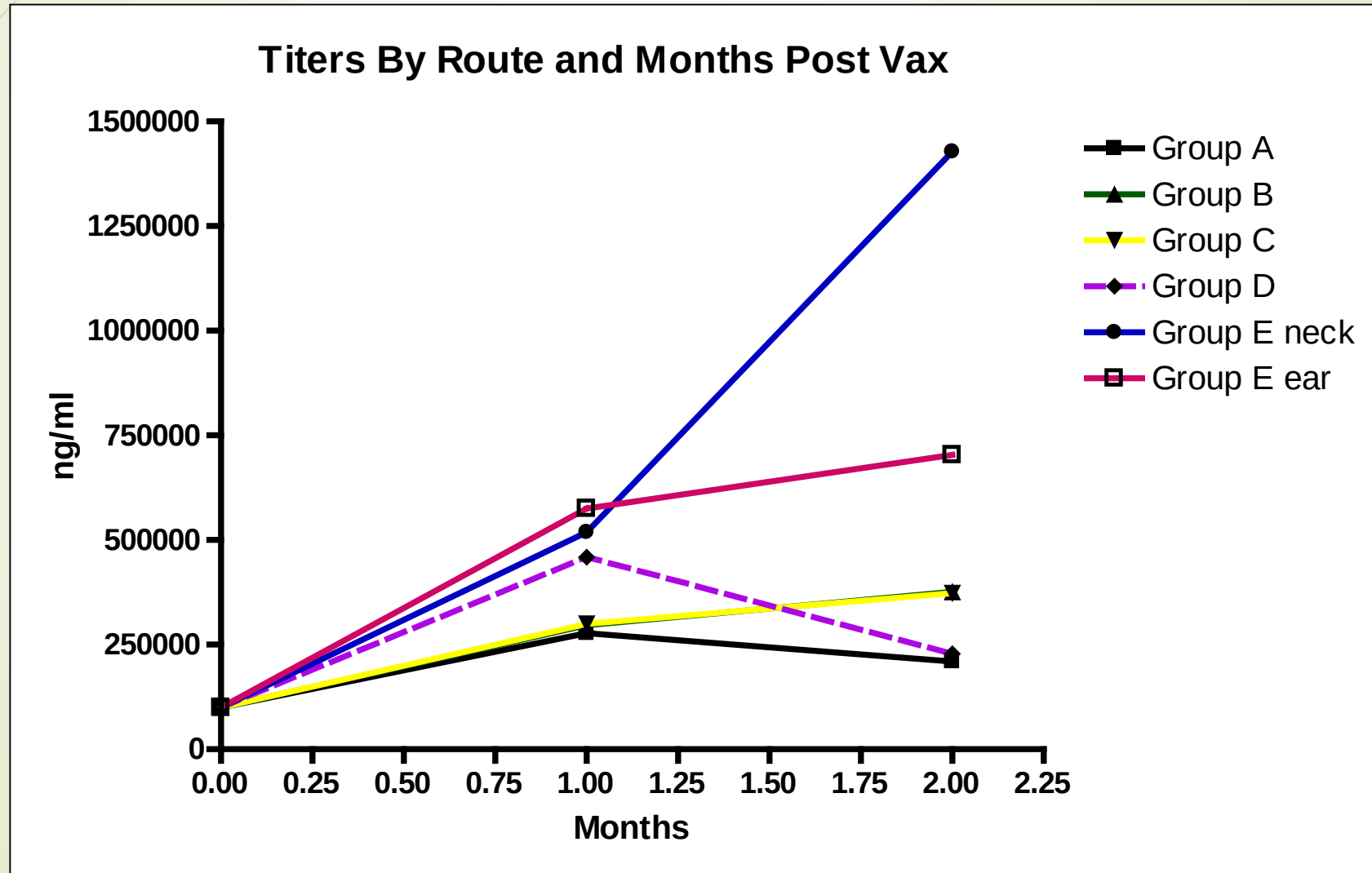
“Doesn’t work for us”

Two major reasons;

- Two shots - working our bison twice is unrealistic**
- Only protective for @ Six months - our works are in October and November**

Make it work!

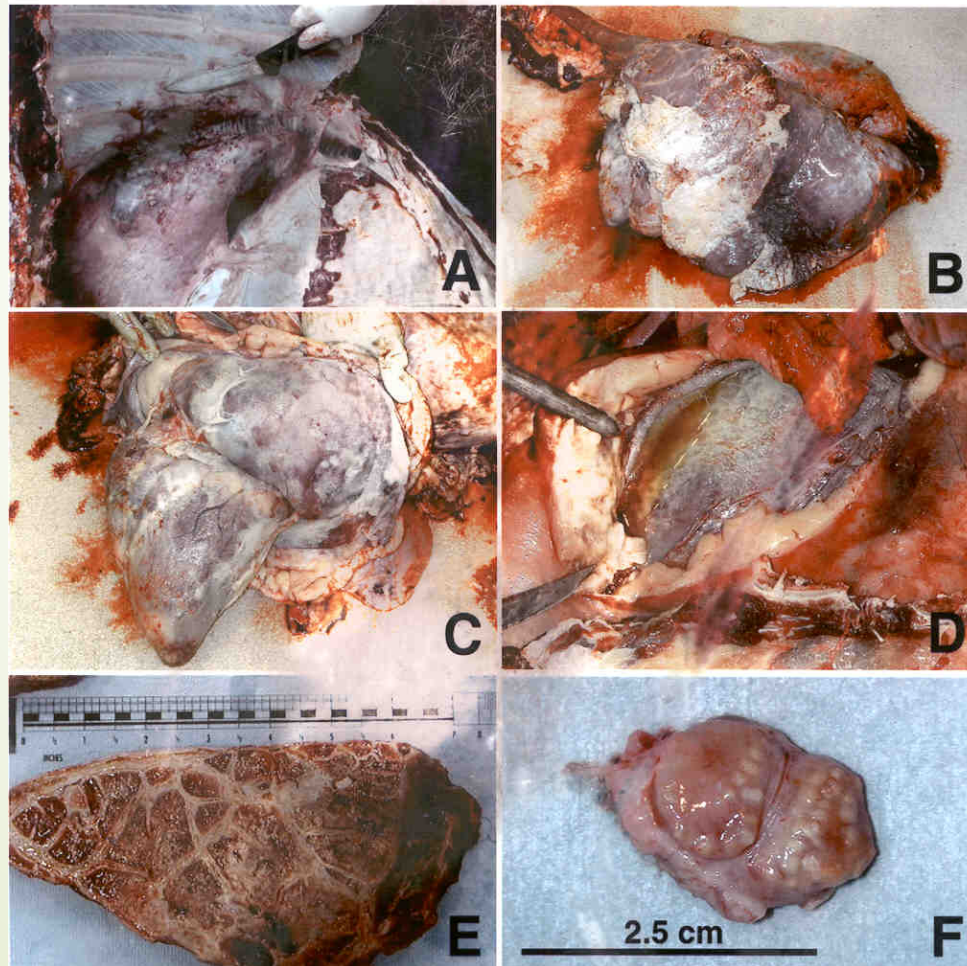
Anthrax Vaccine Study – Two Months





Mycoplasma – Anyone??

Our first case or sentinel animal .



MYCOPLASMA – ROUNDS ONE THROUGH FIVE ON TURNER RANCHES

- In **1999** the Snowcrest Ranch lost @ 20% of their yearling bison to mycoplasma -The yearlings were the only portion of the herd to suffer losses
- In **2004** at the Vermejo Park Ranch older herd of production females died of Johne's and mycoplasma Populated before Johne's program implemented
- In **2009** at the Spikebox Ranch Started with prime breeding females - Spread to both ends of age curves lost 300 cows
- In **2011** on the Flying D Ranch a major death loss started after rut (August 15th) and continued until December – breeding age cows and bulls were lost only a few calves

**NO OTHER PATHOGENS WERE IDENTIFIED IN ANY OF
THE OUTBREAKS**

Turner Vaccine – Mycoplasma

Newport Laboratories

15 years worth of samples 7 sent

Two found from these epidemics

This year one additional strain included (from two different ranches)

Criteria

Safe

Antibody production - ?

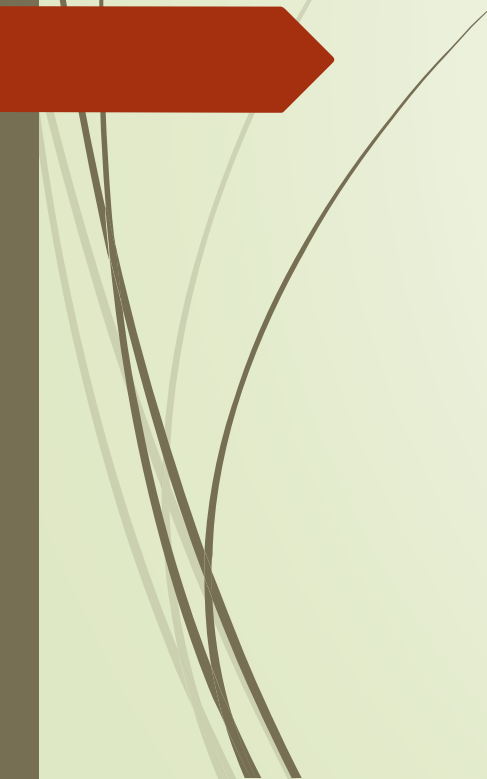
Protection - ?

Now available for all bison producers in the U.S.

Turner herds with no outbreaks

DOES IT IMPART PROTECTION TO BISON ?

This plethora of vaccines available for cattle – trial and error for our bison going to feeders



Mycoplasma
7 way Clostridial
Titanium 5
Express 5 + PHM
Nasalgen ****
Presopnse HM
Plumo-Guard

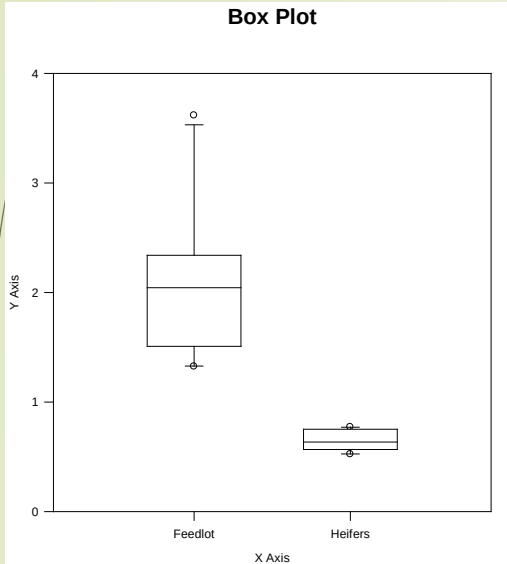
This year will add;

Inforce 3

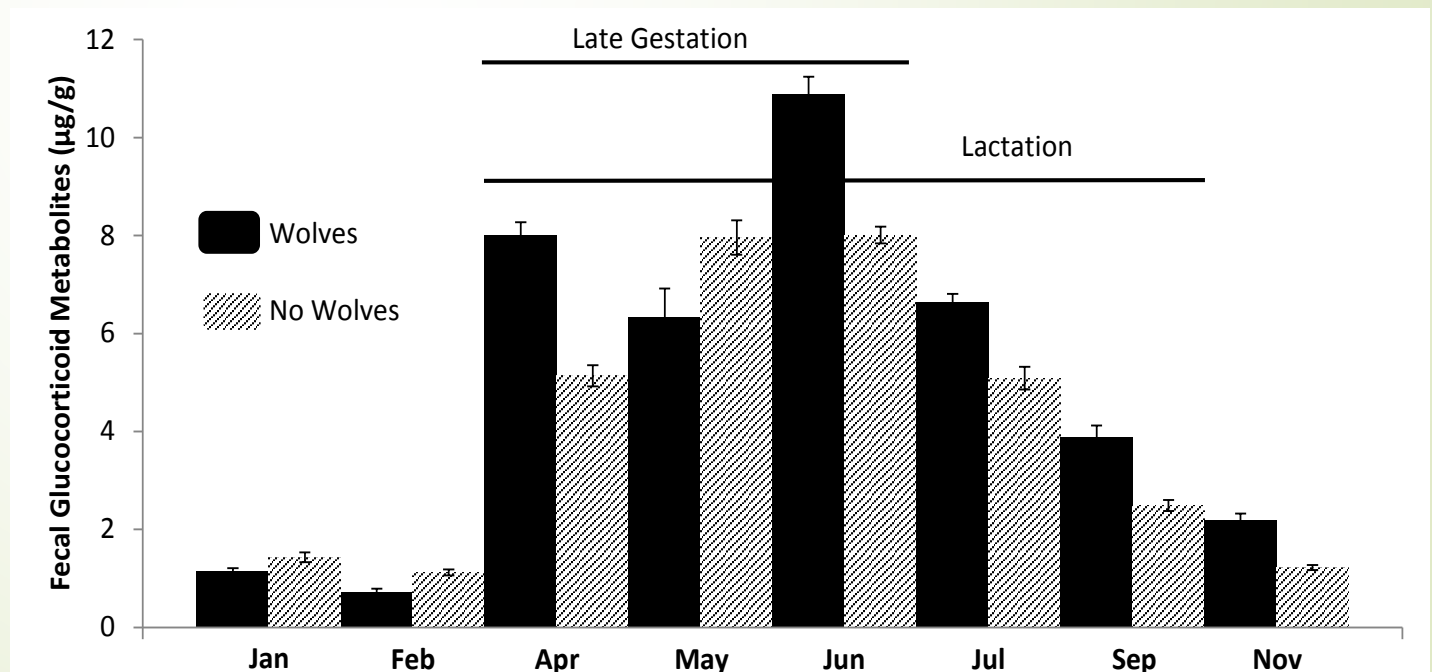
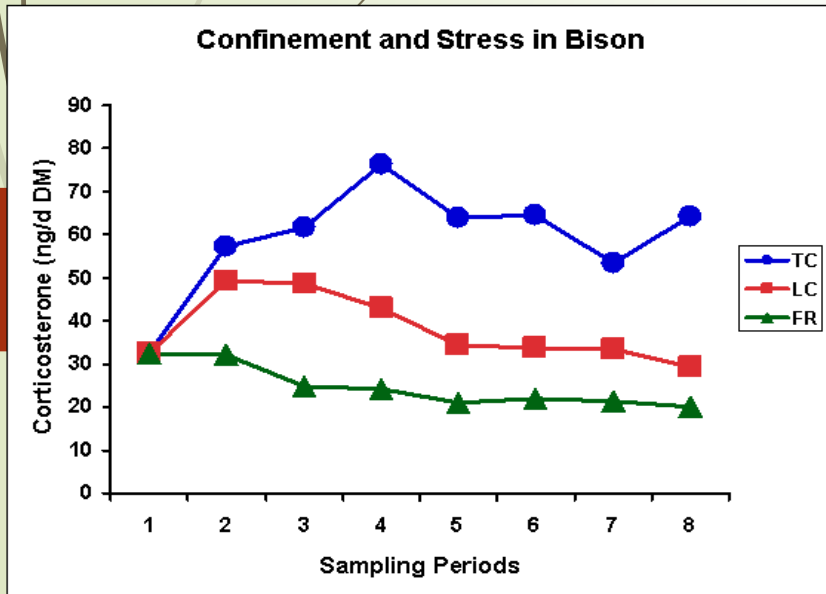
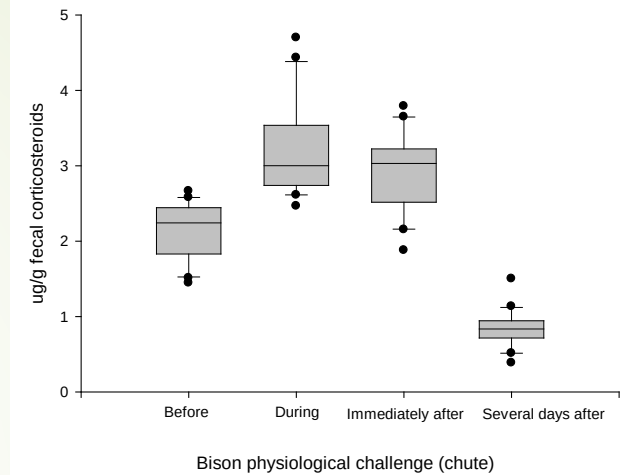
+ Histophilus somni (formerly Haemophilus somnus)

Triangle 4 + Type II BVD
Bovahield Gold 5
Pyramid 4 + Type II BVD
ViraShield
Triangle (Several variants)
Nuplura
Anthrax

Stress



Mean (SEM and min max) concentrations of fecal corticosteroids in bison before, during and after running through a chute system



Misconceptions about vaccines



Difference between Active vs. Passive immunity

Stimulate the immune system with a specific vaccine and you will get protection against other pathogens

Shot-gun approach – vaccinate against everything – risk reduction



Why are our bison dying at the Feeders?

**Only cursory necropsies are done from the
Feedlots**



**Specific sampling at necropsy MUST be submitted
to a laboratory for analysis**

Need to Know

- Necropsies on all bison sick or dead from the ranches
- Laboratory confirmation
- No preconception from neighbors - “Everybody Knows”
- Decisions

Attempt to vaccinate?

Manage away from pathogens strengths?

Everyone looks for the one Silver Bullet

Owners

Feeders

Veterinarians

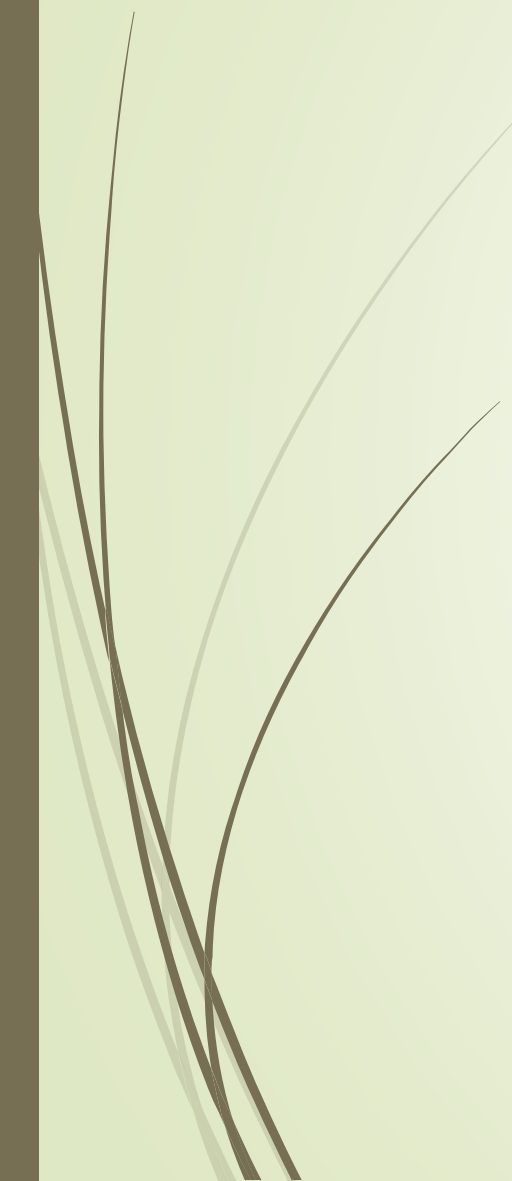
Biologists

***AND, WE END UP
TREATING THE SYMPTOM
(Clinical Sign) NOT
THE PROBLEM..***

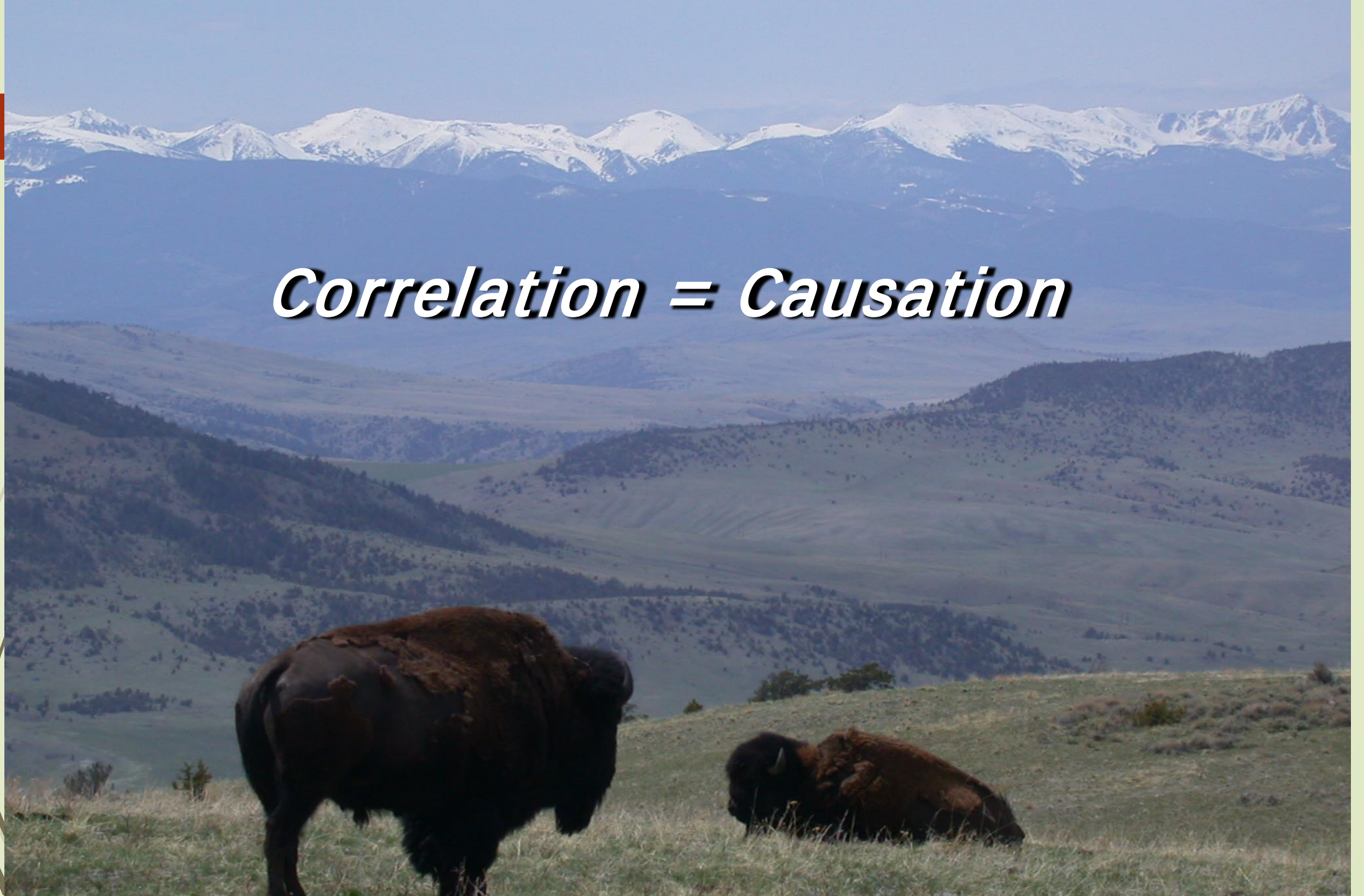




A MUST

- ➡ **Know the difference between correlation and causation**
 - ➡ **Learn to treat the problem, not the symptom (signs)**
- 

Correlation = Causation



Questions ?



