3rd ANNUAL BISON WORKER SAFETY & HERD HEALTH ROUNDTABLE

October 13-14, 2021

RAPID CITY, SOUTH DAKOTA

INTERTRIBAL BUFFALO COUNCIL

AgHealth Central States Center for Agricultural Safety and Health

ROUNDTABLE PARTICIPANTS

Randy Amayo, Stevens Village
Scott Anderson, Flandreau Santee Sioux Tribe
Ferin Anderson, Shakopee Mdewakanton Sioux Community
Milton Around Him, Oglala Sioux Parks & Recreation Authority
Fred Auginash, Red Lake Buffalo Ranch
Erin Barnes, The Peoria Tribe of Indians of Oklahoma
Jason Belcourt, Chippewa Cree Indians of the Rocky Boy's Reservation
Kevin Belt, Oglala Sioux Parks & Recreation Authority
Melissa Berns, Sitkalidak Island Bison Herd
Kelly Brink, Deer Creek Ranch - Gordon, Nebraska
Kevin Burnison, Sac and Fox Nation of Missouri in Kansas and Nebraska
Danielle Buttke, National Park Service
Dario Caraveo, Pueblo of Pojoaque Bison Program
Ervin Carlson, Blackfeet Nation
Cody Considine, Nachusa Grasslands
Megan Davenport, InterTribal Buffalo Council
Betsy Davenport
Gaimi Davies, Turner Ranch
Shannon Dennison, Denver Mountain Parks
Moritz Espy, 777 Bison Ranch
Tom "Al" Fast Wolf, Oglala Sioux Parks & Recreation Authority
Lindsay Forepaugh, Rocky Hollow Buffalo Company
Greg Fredricks, Yankton Sioux Tribe
John Gilbert, CSU
Murton Gillis, Turtle Mountain Band of Chippewa Indians
Robert Goodman, Oglala Sioux Parks & Recreation Authority
Mack Hawkins, Independent
Troy Heinert, South Dakota State Senate, Intertribal Buffalo Council
Jennifer Hickman, Denver Zoo
Mimi Hillenbrand, 777 Bison Ranch
Greg Holm, Grand Canyon National Park (NPS)
Kathy Hommerding, Double H Bison Ranch
Arlo Iron Cloud, Diné and Oglala Lakota Nations
Lisa Iron Cloud, Oglala Lakota Nation
Lee Jones, U.S. Fish and Wildlife Service
Bryan Kaplan
Kerman Kills Small, Oglala Sioux Parks & Recreation Authority
James Kingbird, Red Lake Buffalo Ranch
Willow Kipp, Blackfeet Nation
Kelsey Kuhn, Denver Zoo
Luke Lester, Sitkalidak Island Bison Herd
Kimberly Lester, Alutiiq Tribe of Old Harbor
Taylor Littlewhiteman, Oglala Sioux Parks & Recreation Authority
Jennifer Malaterre, InterTribal Buffalo Council

ROUNDTABLE PARTICIPANTS CONTINUED

Eric Malmberg, Deer Creek Ranch - Gordon, Nebraska
Misha Mazurkewycz, Ponca Tribe of Nebraska
Calvin McBride III, Yankton Sioux Tribe
Karena Miller, Sisseton Wahpeton Oyate
Stacy Miller, Sisseton Wahpeton Oyate
Shawn Milligan, Forest County Potawatomi
Michael Perez, Nambe Pueblo
Dell Perkins, Red Lake Band of Chippewa Indians
Jessica Post, UNMC Animal Behavior Core
Eric Pulis, Northern State University
Chaz Racine, Blackfeet Nation
Risto Rautiainen, UNMC CS-CASH
Tim Reid, Yellowstone National Park
Paul Roghair, National Park Service
Joseph Rupnick, Prairie Band Potawatomi
Skye Salganek, National Park Service
Mystera Samuelson, UNMC Animal Behavior Core & CS-CASH
Fayelynn Scheideman, Denver Mountain Parks
Justin Selke, 777 Bison Ranch
Joe Shepard, Forest County Potawatomi
Trey Siegrist, Peoria Tribe of Indians of Oklahoma
Cody Smith, 777 Bison Ranch
Michael Snyder, Seneca Nation of Indians Agriculture Department
Bronc Speak Thunder, Fort Belknap Indian Community
Cherilyn Spears, Red Lake Nation Band of Chippewa Indians
Tharen Stillday
Kalon Strickland, Santee Sioux Tribe
Joanna Studt, InterTribal Buffalo Council
Miranda Terwilliger, Kaibab Plateau Herd/ Grand Canyon National Park
Michael Thompson, Oglala Sioux Parks & Recreation Authority
Justin Tolman
Phil Viarrial, Pueblo of Pojoaque Bison Program
Ronald Wahweotten, Prairie Band Potawatomi
John Wehling, Timber Ridge Bison Ranch
Sarah Wehling, Timber Ridge Bison Ranch
Andrew White, White Buffalo Ranch
Don Woerner, DVM, American Bison Research and Education Center
Todd Wyatt, UNMC CS-CASH
Ilana Xinos, National Buffalo Museum

ROUNDTABLE AGENDA

University of Nebraska Medical Center
BREAKTHROUGHS FOR LIFE.

3rd Annual Bison Worker Safety & Herd Health Roundtable

October 13-14, 2021

Holiday Inn Rushmore Plaza, Rapid City, SD or Via Zoom

Agenda – Wednesday October 13, 2021

Time	Topic	Presenter
8:00	Welcome Breakfast Rushmore Holiday Inn	**Mystera Samuelson** UNMC, Director - Animal Behavior Core
8:30	Opening Prayer	**Chester Whiteman** Cheyenne and Arapaho Tribes
8:40	Introductions	**Mystera Samuelson**, **Risto Rautiainen** UNMC, Director Central States Center for Ag Safety and Health (CS-CASH) **Megan Davenport**, ITBC Acting Executive Director
9:00	**Break**	
9:15	Disaster Preparedness	**Megan Davenport** and **Joanna Studt,** ITBC Technical Services
10:00	Field Stress Assessments & Practical Problem Solving	**Mystera Samuelson**
10:45	The Heart of Low Stress Handling	**Lee Jones** Wildlife Biologist, U.S. Fish and Wildlife Service
11:30	Lung Health for Bison Workers	**Todd Wyatt** UNMC CS-CASH Deputy Director
12:15	**Lunch**	
1:15	Bison Health & Worker Risks A One Health Perspective	**Danielle Buttke** One Health Program Lead, Veterinarian National Park Service
2:00	Bison and Range Parasites: Risks & Prevention	**Eric Pulis** Asst. Professor, Biology, Northern State Univ., SD
2:45	Transportation Safety 2.0	**Troy Heinert** ITBC, South Dakota Senator
3:30	**Break**	
3:45	Group Workshop Discussion: Training & Infrastructure Needs & Practical Solutions	Facilitator: **Mystera Samuelson**
4:45	Concluding Remarks/Surveys & Evaluation	**Mystera Samuelson**

ROUNDTABLE AGENDA CONTINUED

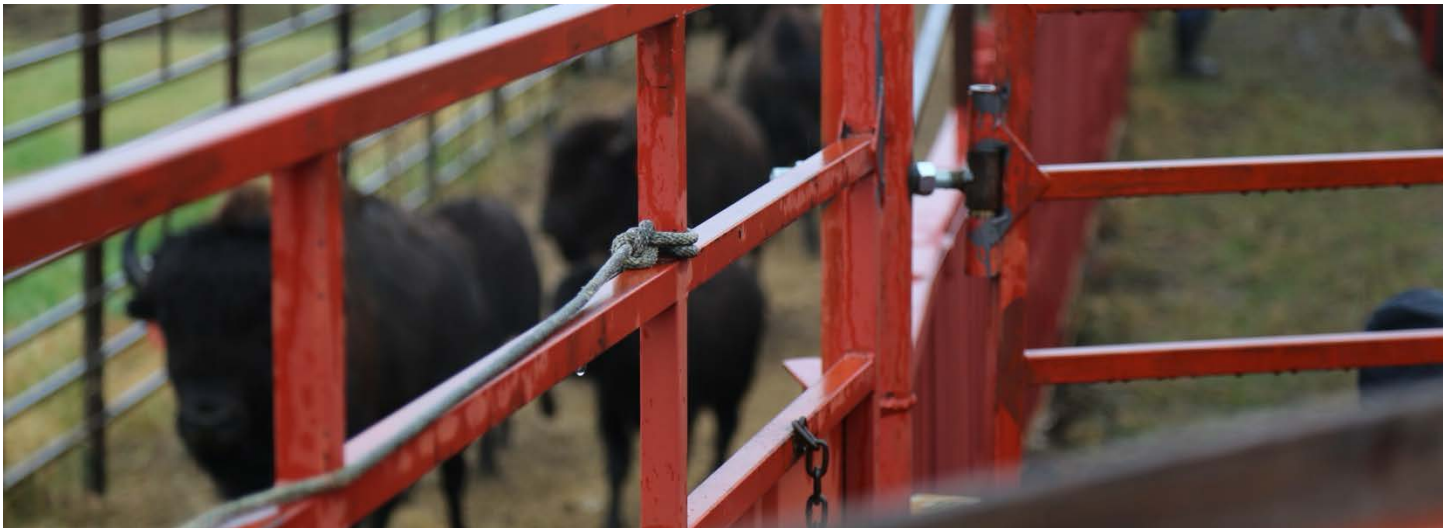
University of Nebraska Medical Center
BREAKTHROUGHS FOR LIFE.

Agenda – Thursday October 14, 2021

Time	Topic	Presenter
8:00	Welcome Breakfast Rushmore Holiday Inn	
8:30	Safety Considerations - Field Harvest and Processing	**Lisa Iron Cloud** Community Member, Oglala Lakota **Arlo Iron Cloud Senior** Community Member, Diné and Oglala Lakota
10:00	Break	
10:45	Preparing Wasna "The Lakota Super Food of Plains Cuisine"	**Lisa Iron Cloud** Community Member, Oglala Lakota **Arlo Iron Cloud Senior** Community Member, Diné and Oglala Lakota
12:00	Box Lunch and Final Discussions	**Risto Rautiainen**

INTERTRIBAL BUFFALO COUNCIL

AgHealth Central States Center for Agricultural Safety and Health



Thank you to all who presented and participated at the 3Rd Annual Bison Worker Safety and Health Roundtable. During this meeting enduring partnerships were established, and best practices that were discussed can be implemented to protect the safety and health of bison herd workers and their animals.

ROUNTABLE PRESENTATIONS AND DISCUSSION

Introduction and Welcome

Mystera Samuelson
UNMC Animal Behavior Core, CS-CASH

Risto Rautiainen
UNMC CS-CASH

Megan Davenport
Intertribal Buffalo Council

Virtual Attendance Facilitated by:

Ellen Duysen
CS-CASH

Presentation of Ernie - Doc Warner

- Ernie is a unique bison mount which is used for educational outreach.
- Erne features the lateral view of the skeletal structure on one side of the animal, and the external physiology of the bison on the other side.
- Ernie, with help from Don "Doc" Woerner and other bison experts at the roundtable, was instrumental in explaining veterinary conditions and safe butchering techniques throughout the meeting.

Ernie

Doc Woerner presenting Ernie

Megan Davenport
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Joanna Studt
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DISASTER PREPAREDNESS

What types of disasters may impact buffalo programs?

- Fires, drought, tornadoes, winter storms, diseases, thunder/lightning storms, pests/invasive species, predation, injury, fence failure, floods, exposure to environmental toxins, and earthquakes
- Disasters can be natural or manmade or combinations of both.

Real life examples were discussed as a group and are listed below:

- Torrential Rains: Rains always have the potential to cause flooding, leading to downed fences. When this has happened in the past large numbers of buffalo have escaped, taking months to get the animals back. Herd loss occurred because of injuries, the shooting of animals by community members, and other actions.
  - Mitigation: plan for herd movement prior to and during rain events, check fencing prior to and immediately following rain events, and community-based discussions/planning with neighbors, law enforcement, and others to establish a mitigation plan for escaped animals.
- Wildfire whips through pastures trapping animals.
  - Mitigation: techniques such as constructing fire lines, retention ponds, etc. are useful but require the appropriate funding. Caution was emphasized for the use of retention ponds, as these may be a source of harmful algae.
- Infectious diseases: 2 animals die with similar symptoms > no supplies for necropsy > panic and suspect disease
  - Mitigation: an established relationship with a veterinarian who can assess the risk to workers in conducting a necropsy and provide advice remotely, if needed. Keep a necropsy kit on hand and refer to the necropsy guide prior to touching/opening the animal.
  - Herd managers can organize a necropsy training with a veterinarian to prepare in advance, allowing them to identify the warning signs of harmful diseases ahead of time.
  - Ensure proper PPE is on site to avoid exposure to harmful diseases.
- Global pandemic > loss of staff > creates need to cut corners > can lead to injuries among other possible disasters
  - Mitigation: training guides for workers to understand and implement exposure mitigation, access to PPE.
  - Managers should have a priority plan in place to help workers plan for staffing shortages, collaborations can be facilitated through ITBC to develop a collaborative worker exchange – allowing us to come together to provide experienced assistance during these times.
- Plan for the big snowstorms and fences being covered
  - Mitigation: need a stock of hay ahead of time.
  - Assistance can be facilitated through the ITBC when needed.

Four phases of emergency planning:

- Preparedness:
  - Good practices: plan, determine hazard risk/ maintain inventory, records, ID alternate resources, evacuation (if feasible), establish a safe environment, have a veterinarian on-call, establish your chain of command – know who to call first in the event of an emergency
- Response (What can I do immediately following a disaster?)
  - What does the herd need: food, water, shelter, etc.
  - Call a vet/necropsy
  - Carcass disposal
  - Relocate animals if needed

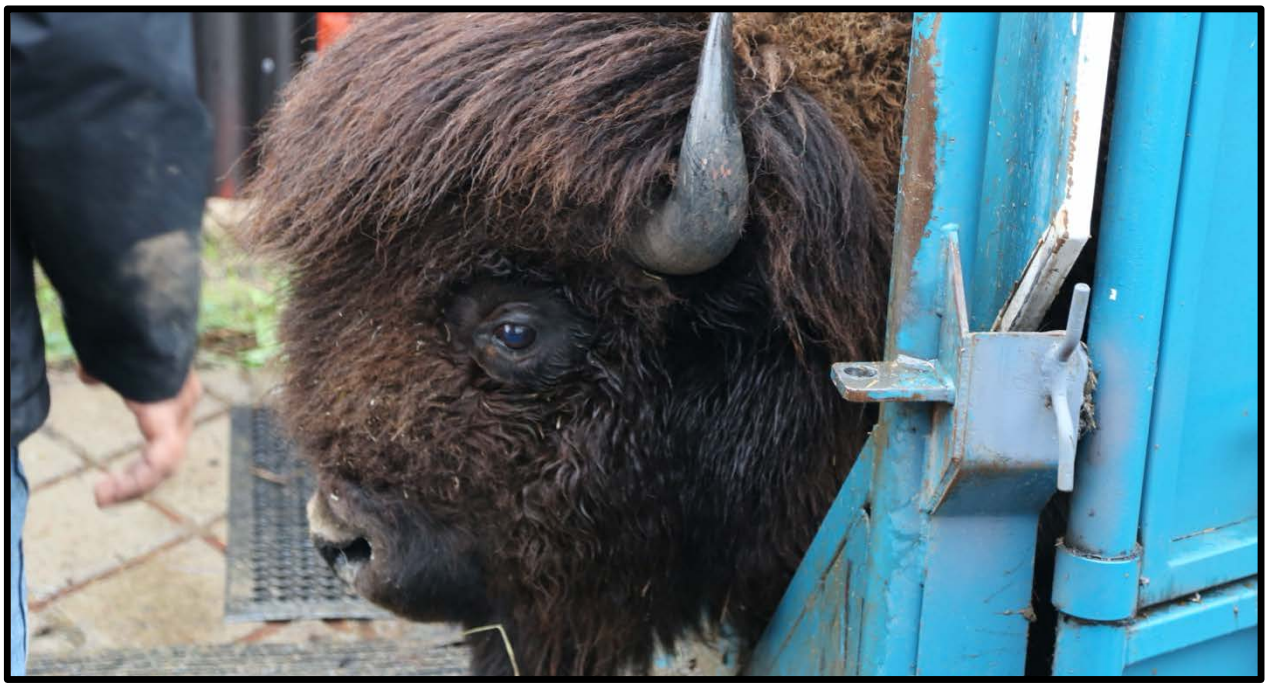
- Recovery
  - What types of resources are available?
    - USDA Disaster Assistance Programs, ITBC has resources on their website as well as an emergency fund, FEMA, nonprofits, organizations, donations
- Mitigation (What can I change going forward?)
  - Steps to prevent or reduce the cause, impact, and consequences of a disaster
  - Re-assess emergency/disaster effects
  - Maybe look at: insurance, infrastructure maintenance (fences), herd health management

Creating an emergency plan:

- Write down as many emergencies you can think of.
- Think through the questions you would need to ask to prepare yourself for each one:
  - Do I have supplies to necropsy on hand?
  - Do I have emergency contacts for each of my workers?
  - Do I have corrals/trailers/horses ready to move buffalo?
  - Do I know who to contact for water testing?
  - What is the status of my communication devices? (ex. radio, walkie talkies, etc.)
  - How often do I check my fences?
  - How often does extreme weather hit my area?
  - Do EMS know our roundup operations are occurring?
  - Do I have extra folks I can call for help?
- Organize and use this as the basis for your emergency management plan

RESOURCES

- List provided in PowerPoint on zoom recording.
- Books (Bison Diseases Field Guide and Bison Field Necropsy Guide) passed around to in person group and emailed to virtual group.
- Contact companies for things running through the property (ex. railroads, underground pipelines, etc.), they already have emergency plans that can be incorporated into your plans.
- Notify hospitals or emergency workers about what things you have been working with should an accident occur.
- Wilderness first aid courses.



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PRACTICAL PROBLEM SOLVING IN LARGE ANIMAL MANAGEMENT

Think in a species-specific context to adjust low stress handling for the animals you are working with.

- Informed by evolutionary history and sensory capabilities.

Bison sensory capabilities discussed:
Hearing:

- Relatively acute hearing with range focused in the lower frequencies.
  - Bison can hear things we can't in the lower frequency ranges (ex. train tracks are a low frequency that propagates through the ground for miles, tractors).
- Vocalizations: bellows and grunts are known to carry for 3-5 miles depending on weather and environmental characteristics.
  - High frequency sounds are less likely to be perceived by bison (ex. powerlines).

Vision:

- Relatively poor vision: can perceive a rider on horseback at about 0.5 mi.
- Visual cues can still be as important as in animals with high visual acuity.
- Don't let your guard down, as they may still react defensively.
- Think about things like color and movement (ex. white tee shirts).
  - They tend to cue off movements of other ungulates with white coloring

Scent:

- Very acute sense of smell used to detect:
  - predators
  - sexual cues in the herd

Picturing the Roundup:

- Visual Cues
  - Color of stationary vs moving objects
  - Shadows
  - Indicators of unsure footing
    - Can illuminate with lights if needed to reduce these areas
- Sound cues
  - Low frequency sound producers: vehicles/tractors/ATVs, power tools, etc.
- Scent cues
  - Ammonia (key element of urine of large predators, prey species hard wired to pay attention to that)
  - Hormone-based (synthetic or natural) materials (found in cologne and perfume)
    - Can interfere with animals esp. during breeding season
    - Soy-based products (has synthetic estrogens)

Structured behavioral assessments

- Think in individual and herd mentality to try to avoid adverse reactions of the animals.
- Bison hard wired to pay attention to certain cues, but they are adaptable and can learn to react certain ways to cues they are exposed to regularly.

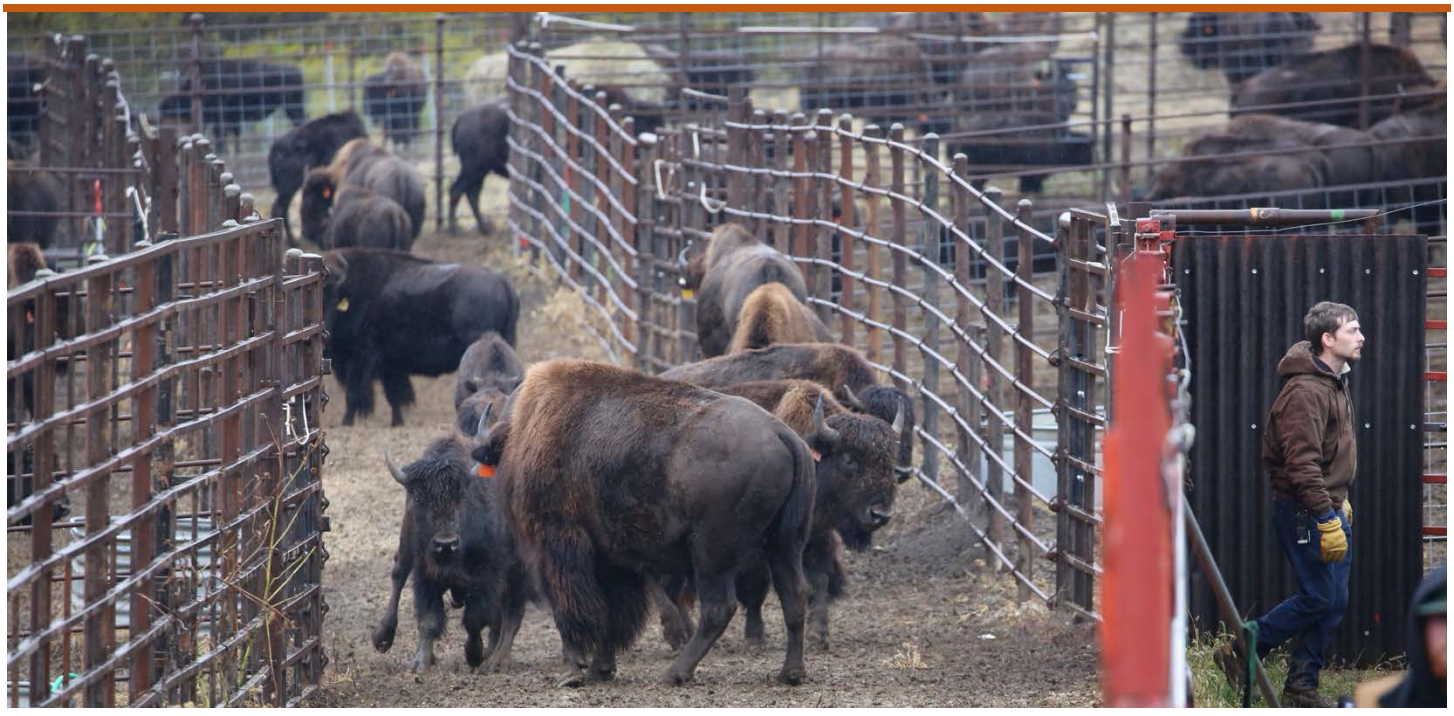
Applied behavior analysis

- Originally developed for non-verbal people but can be applied to wildlife, zoo animals, etc.
- Antecedent: What happens before the behavior, cause of behavior?
  - Don't know all the antecedents for bison.
- Behavior: target behavior concerned about

- Consequences: reward of the behavior
  - Ex. see horse > run > get away from horse (reward)
- Tools for analysis: Notebook/form, pen, camera
  - Record: Date, location, time of day, sex, age classification (calf, subadult, adult), what happened just before the behavior, what was the observed behavior, and what happened after the behavior
    - Ex. walked up to gait > stopped (sniffing, looking around, turned around, etc.) > remove or change stimulus > animal moves through shoot no problem
- Reviewing notes (what to look at and prioritize)
  - Severity of the behavior (prioritize more dangerous behaviors)
  - Frequency of the occurrence
  - Note any patterns:
    - Time of day?
    - Sex and age classification?
    - Is the precursor transient (ex. train going through) or constant (ex. people talking, tractors, etc.)?
  - Continued monitoring and information sharing is essential!
    - May not fix everything or anything the first couple times, but knowledge of things to look for can help fix things
  - Document Precursors
    - Posturing, certain vocalizations, hesitation, and pacing are all indicators of stress
    - When indicators of stress routinely occur in response to the same stimuli, fear behaviors are likely imminent (ex. stampeding).
- Recognize stressors > note what is specific to the ranch (ex. shadows, horses, dogs, tractors or ATVs, etc.)

Worker education, workplace culture and safety

- Workers need to feel empowered to build their knowledge base, but also discuss challenges openly.
- Workers and managers need to keep an open mind regarding bison management and variations from practices applied to bison.
  - Need to have an environment where people are not afraid to come to the managers with issues or observations for everyone's safety (animal and people).
- Worker injuries and reporting
- Need to be adaptable when things change and/or equipment breaks.



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THE HEART OF LOW STRESS HANDLING

Stockmanship Journal online – paper as well as videos on low stress handling
Consider how the animal perceives the facility.

- Paint color, lighting, angles of corners, what makes noise?

Consider how the animal perceives the people in the facility
Keep the bison in a normal, thinking frame of mind

- Evaluate surrounding and options, make a decision and implement it

People are the "traffic signals" or "signs" in the facility. Bison get confused with too many people – too much stimulus.

- Bison move quickly from normal thinking to fight or flight.
- To a prey species we can appear as predators.
  - We hunt in packs > circle our prey > attack straight on > chase
- By the time they get to the end of the facility animals are stressed out of their minds.
- Fewer people (predators) can help reduce that stress as there are fewer for the animal to keep track of.
  - Too many people can significantly increase the stress.

"Low -stress bison handling" is an **animal-centered**, behaviorally correct, psychologically oriented, ethical, and humane method of working animals which is based on communication, not coercion.

- Make it so the animals want to do the behavior on their own.
- It's not so much the animals as how we handle them.
- It's not so much the facility as the skill level of the people.
- Patience and time for the animal to observe and evaluate then make the decision to move on their own (ex. give them a chance to see the open gate).
- Take responsibility – most of the time something we did pushed the animal out of a normal frame of mind.
- It feels slower but takes less time (sometimes half a day to a day earlier). It takes more time to deal with a stressed or upset animal and change their mind if they want to go back.
- Less stress on the animal, less risk of injury to both animals and humans, less damage to the facility.

Start by figuring out your behavior and how the animals respond to your behavior.

- Will be different for everyone as animals, people, and facilities are all different.

Some things to think about:

- Portable corrals and handling systems. An investment in flexibility.
- Food supplement in the pen several days ahead of time. They follow the food. Easier to entice them into the pen.
- Loose salt on the tailgate of truck, esp. if had it scattered across the range during the summer.

Deescalating a situation:

- Know what it looks like, catch it early.
- If animal doesn't absolutely have to be in let them out > try not to gather animals, you don't want/need.
- Small groups > no more than 10 at a time. Possibly split out cows, calves, and bulls.
- Let animals spread out, if possible, but don't get in and split them if they are calm. Big flag used as a portable gait.
- Let problem animals get into a separate pen if possible until they calm down again. Best if not in the center of the activity. If animals need to be separated – do it quickly.

Animals showing stress in the pen

- How quickly animals calm from stress shows how stressed they are, they can move at a quick speed even if not stressed. Don't stampede. Don't lollygag either. Want them thinking about moving forward. Give them space with zero stimuli

Getting animals into a truck: Bud box concepts. Move animals with some energy, keep them moving

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LUNG HEALTH FOR BISON WORKERS

Three of the top 10 causes of death in 2020 are lung diseases
Air we breathe is not always pure

- Estimates that we breathe over 1 billion small particles a day
  - manmade (deasil trucks, exhaust, etc.) or natural (dust, smoke, etc.)
  - 25% exhaled > 50% stuck in nose > 25% get into lungs

The airways and the lungs

- Trachea > Bronchi (23 branches – big to small) > Alveolae (sacks where oxygen enters the bloodstream)
  - Fine particles can make it all the way down to the alveolae.
- Specialized cells secrete mucus to trap particles and move the trapped particles out of the lungs and down into the digestive system via swallowing.

Industrial animal production pollutants (particularly indoor and confined animals):

- Gases, allergens, pesticides, inorganic dusts
- Airborne dusts rich in bacteria and other microbes
  - Once inhaled, react with the lungs to cause inflammation and injury.

Respiratory problems in livestock workers: having preexisting lung issue will make this worse.

- 60-70% Nasal Rhinitis
- 33% Lung Symptoms

Diseases:

- Asthma
- Bronchitis
- Organic Dust Toxic Syndrome
  - Single dust inhalation event can cause it
  - Symptoms: high fever, ache, pain, headache, lethargy
- COPD (Chronic obstructive pulmonary disease)
  - Airways physically occluded by damage and diseases

Exposures:

- Industrial toxins:
  - Metals: metal fibers get into the lungs and don't go anywhere
  - Smoke
  - Pesticides: all can have negative or toxic effects in the lungs
- Off job lifestyle issues:
  - Smoking/second-hand smoke
  - Alcohol increases lung pneumonia
  - Malnutrition: esp. zinc deficiency
    - Supplement: zinc supplements, leafy greens
    - We don't readily absorb zinc so need to take a lot of supplements or eat lots of vegetables.
  - Obesity: associated with asthma and poor lung function
- Breathing organic dust can lead to or accelerate bone loss and joint diseases.

Avoidance:

- Propper PPE: eye protection, ear protection, respirator mask. Different types of respirators to help protect against particles and gases.

Lung function and mechanical defenses decrease as you age. Masks make a profound difference in lung health!

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BISON HEALTH & WORKER RISKS: A ONE HEALTH PERSPECTIVE

Disease is only a tiny part of what health is.

Tuberculosis

- Bovine tuberculosis confirmed on 10/8/21 in a cow from Blaine Co.
- Old disease that has likely been present in bison for quite some time.
  - Paper finding it in bison from 17,000 years ago (Rothschild et al. 2001).
- Slow growing > takes about 10 years to develop clinical signs.
  - Important to track animal movements.
- Bovine tuberculosis is the most infectious (Human, avian, and bovine can all infect bison and humans).
  - Can pass very easily from one infected cow to another > spreading through herds and to humans.
    - Can pass from bison to humans and humans to bison.
  - Long environmental persistence in feed (18-334 days).
  - Close, prolonged contact is key to transmission (feedlots are greatest risk).
    - Often see spread from humans to animals in dairy systems.
  - Human infections are endemic in many countries.
    - Often from consumption of unpasteurized dairy products.
    - Most likely to manifest as extrapulmonary TB.
    - Symptoms: problems with digestion, skin infections (particularly with hunters).
    - See ~230 cases annually in the US (<2% of all cases).
    - Diabetics, smokers, steroid use, and crowded populations present higher risk.
- Prevention:
  - Pasture management – organism cannot live in sunlight for long.
  - Disease risk analysis for all animal movements particularly into the herd.

Brucellosis

- One of the most common diseases thought of when thinking of bison.
- 100-200 human cases reported in the US > not the strain associated with bison.
  - Majority from unpasteurized dairy products.
  - Exposure: consumption, contact, inhalation, accidental vaccination (live virus vaccine), slaughter associated cases
  - Symptoms: fever (often relapsing), lethargy, night sweats, joint pain, abdominal pain, indigestion, cough, headache dizziness (last four associated with route of exposure), spondylitis/spondylosis common in chronic infection
  - Relapses occur in 5-15% of cases treated with antibiotics.
    - Can be particularly hard to treat if it gets in the bone.
- Prevention:
  - Improved ventilation at slaughter.
    - Field harvest for slaughter better because of excellent ventilation.
  - Consider risks from conspecific animals (elk strain and swine strain, feral swine everywhere).
  - Disease risk analysis for animal imports.

Anthrax

- Can take out huge numbers of a herd at a time. Very deadly disease even for humans.
- Creates spores which can stay dormant in the soil for years.
  - When eaten by an animal, the spores become active and start to grow creating bacteria.
  - Active growing bacteria cannot be transmitted between animals or humans, only the spores.
- Routes of transmission:
  - Inhalation of spores > most deadly as disease progress is rapid and kills quickly.
  - Eating or drinking contaminated food or water.
  - Getting spores into an open wound > can be treated with antibiotics if caught early.
- Once found on a premise it will always be a risk.
  - Spores live for >50 years.
  - Drought, flooding, soil disturbance risks.
  - Historic migratory corridors more prone to outbreaks.
- Recognizing anthrax:
  - Blood coming from orifices (are biting midges present? If not, really consider anthrax).
  - Non-clotting blood (usually blood clots within 20 min but definitely by a couple hours).
  - Opening carcasses carries extreme risk.
    - Potential for spores to become aerosolized.
  - Can kill predators as well > see dead predators in the area as well consider anthrax.
- Prevention:
  - Vaccination available and highly recommended in endemic areas.
  - Bury carcasses of affected animals.
  - Vaccination and anti-toxin if you are exposed.

SARS CoV2

- Cattle are capable of being infected and shedding the virus.
  - Cattle in study had a prior coronavirus infection which may have influenced study.
- Wild whit-tailed deer infect and spread the infection.
- Not a lot known yet, but caution is best.

Disease Risk Analysis

- Systematic way of evaluating disease importation risks.
  - Hazard identification, risk assessment, risk management, communicate risks.
- Evaluates both economically and ecologically important health risks.

When animals are healthy, when the environment is healthy, we are healthy.
Zoonotic rodent and insect born vector diseases increased risk rates.

Safe work practices and proper PPE:

- PPE for field necropsies: try to have others help and not open an animal if known disease.
  - Ventilation: work upwind of animal
  - Working outside
  - Working on a sunny day
  - Gloves, dedicated clothes, splash guard
- Cards to be able to give to a health care provider with possible zoonotic diseases the card carrier may be exposed to.
  - Work and stay places are unique. Diseases are unique to the environments.

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BISON AND RANGE PARASITES: RISK & PREVENTION

Parasites are animals that live at the expense of an, in, or on another, usually larger, animal.

- Not rare but can decrease health over time.
- Most don't want to kill their hosts.
- Large infections can be detrimental.

Parasites often have complex life cycles, which offers the ability to break the life cycle.
Most individual hosts have no parasites while a few hosts have many parasites.

- Influenced by contact rates, susceptibility, nutritional status

Bison are very similar to cattle in that most of their parasites are shared

- Helminths, Parasitic Worms
  - Flukes, Tapeworms, Nematodes
    - Nematodes are most likely to be detrimental.
  - All "steal" nutrition, some eat tissue or blood > these will be most pathogenic.
  - Brown stomach worm (Ostertagia spp.) is ingested on forage.
    - Symptoms: loss of appetite, diarrhea, anemia, weight loss, poor coat, mortality
    - Treatment: encysted worms are resistant (need to catch when moving around)
      - Susceptible to several parasiticides avermectins/benzimidazoles
    - Control: calves have a little immunity, pasture rotation, good nutrition
  - Cooperia spp.
    - Symptoms: loss of appetite, possible calf mortality, worse in conjunction with other species
    - Treatment: Not often needed, but susceptible to several parasiticides benzimidazoles, there is some resistance
    - Control: pasture rotation, good nutrition
  - Consider the parasite's free-living stage for control (eggs and larva live outside the body).
    - Ostertagia does best in cool, moist weather, overwinter in freezing.
    - Cooperia does best in warm, moist weather.
  - Liver fluke (Fasciola hepatica)
    - Liver and intestinal damage while migrating.
    - Adults can damage liver.
    - Symptoms: can see bloody urine on occasion
    - Control: seasonal treatment, snail control, herd management
- Anaplasmosis Bacteria > usually vectored by ticks
  - Intracellular blood parasite, often high seroprevalence in bison.
  - Symptoms: anemia, jaundice, emaciation
  - Treatment: Tetracyclines
- Tick Diseases
  - Tick paralysis – acute ascending paralysis of mammals
    - Usually occurs when tick embeds at base of skull
    - Salivary fluid prevents normal movement
    - Host loses coordination
    - Almost immediate recovery after removal
  - Otobius spp. – live and molt in ear canal
  - Transfer disease agents: bovine babesiosis, tick fever, rickettsial diseases
  - Control: Acaricides, dense hair and self-grooming

- Blue Tongue Virus and Epizootic Hemorrhagic Disease
  - Symptoms: often subclinical, oral lesions, fever, swelling, mortality
  - Vectored by midges
    - Larva in mud with organic content.
    - Can transmit several diseases including virus, Apicomplexa, nematodes
    - Control: Identify larval sites, insecticide ear tags
- Warbles – Bot Fly
  - Not common, but still exists in US.
  - Breathing holes in skin damage hides leading to secondary infections.
  - Limited by dry sites for pupation.
  - If found, **DO NOT SQUEEZE!** Cause a severe allergic reaction including anaphylaxis.
  - Treatment – systemic insecticides
- Coccidiosis – not common in bison
  - Symptoms mostly in calves: diarrhea
  - Pathology from disruption of intestinal cells
  - Control: feces management, food source, dry environments are better for control

Factors affecting Parasitism

- Grazing density: more animals = more potential transmission
- Climate – temperature and moisture
- Maturity – partial immunity in older animals
- Nutrition – the better condition of the animal the better the immune system and ability to cope with infection

Parasite/Vector Management

- Don't need to eliminate, just keep below production loss.
- Which parasites are of most concern: biological, physical, and chemical treatments?
  - In many cases, exposure to drugs/treatments may be more harmful than the insects/parasites which can impact bison. Instead, thoughtful herd management can be sufficient to mitigate problems – IF you have enough land to rotate herds during calving season. If you don't, it may be necessary to treat for parasites.
- Acquired partial immunity

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TRANSPORTATION SAFETY 2.0

Where am I going?
How long will it take to get there?

- Animals can stay in the truck for 26 hours before they must be unloaded.

What are the demographics?

- Cows, old bulls, calves will all be different.

What are the road/weather conditions?
Is my equipment suitable for the job?

- Last thing you want is to be broken down with a load of buffalo!
- Visual inspection of the rig:
  - Adequate power and brakes
  - Enough room?
    - Making sure the animals are comfortable but can't fight
  - Sliding or rolling rear door is preferred
  - Slam latches are preferred
  - Solid top
  - Adequate ventilation?
    - Buffalo can overheat easily and take time to recover
  - Biosecurity
- Spare tires and tools
- Ropes, wire, padlocks, water buckets, hay
- Knowledge of the laws governing the transportation and relocation of buffalo
- Paperwork

Loading the Truck

- Attach ropes to close gates from outside of the trailer where possible
  - Avoid being in the trailer when buffalo are in there – it can go bad quickly
- Place knowledgeable assistants in key areas prior to loading
  - Can be truck or alley, wherever there may be problem areas
  - Not sure where the key areas are:
    - People on offsides
    - Keep head down so your eyes aren't directly looking into theirs, watch but don't look at them
- Give them as straight a shot as possible
- Ensure trailer is adequately illuminated
  - They will resist going into a dark hole
- Avoid entering trailer or loading alone, if possible
- Bring them as a group that will fit in designated compartment
  - Don't haul adult bulls with cows
  - 3 and younger can haul bulls and cows together
  - Try to get them to come as a single unit to avoid animals trying to come back out
    - If they come back out, you just have to try again. Do so with patience.

Get moving once loaded

- Often, they will settle and lay down when moving, waiting is when they get agitated.
- Triple check that all gates and latches are secure
- Stop as minimally as possible
- Inspect them at stops without being invasive
  - Don't bother or move them if they are laying down
- Avoid unloading until destination, if possible
  - Most places are not equipped to handle buffalo
  - Fewer people to help reload
- Have hay and water available for longer trips, especially for younger animals
  - Can help relax them

Unloading

- Try to unload in the daylight
  - At night if they don't come out go back to the truck
  - Provide a ramp
  - Shine lights into corral rather than trailer
  - Turn animals into corral before letting them be with the herd
    - When time to turn out into pasture, open gate and walk away, let them come out on own
- Open cut gates from outside of the trailer when possible
- Give them a clear view of where they are going
- **BE PATIENT!!!**

Prepare for the worst and hope for the best and you will usually land somewhere in the middle.
Learn the warning signs of buffalo.
Always have an emergency plan.
Transporting buffalo requires focus and patience.

- It is a stressful job, most buffalo don't get handled or moved a lot, remember they are still wild animals.

Have confidence in your abilities.

WORKSHOP DISSCUSSION:

TRAINING AND INFRASTRUCTURE NEEDS & PRACTICAL SOLUTIONS

Facilitated by: Mystera Samuelson, UNMC

- Most common injuries
  - Falling
  - Gored animals
    - Most common: in holding pens during roundup
  - Horn caps get knocked off when in facility
  - Minor cuts

- Training needs
  - Opportunity to attend a roundup as an observer if never been
  - Presentations on maintaining small herds/high maintenance herds on small land bases (**Picuris Pueblo** ~100 acres)
    - Cost associated, fencing, nutrition, parasite treatments, overall management
  - Fecal floats workshop?
  - Socking rates (stocking rates?)
  - Differentiation between handling bigger groups on more land and keeping them wild vs. smaller groups on small areas where handling and people interaction will be more common by default
    - Behavioral management
    - Most folks have goal of trying to keep the wildlife feel and keeping them wild
      - Smaller herds on smaller areas have harder time (**Picuris Pueblo**)
        - Associate people with food
        - But can't go up and touch them, they are still skittish
        - Noise doesn't seem to bother them though
  - **Moritz Espy**: How do we grade ourselves on our standards of practice? Is there a standard practice that can be used for bison instead of just modifying cattle standards?
  - Recommendations on harvesting?
    - Harvest in field – esp. if no slaughterhouses that don't take bison, less stress on animals
  - Many want a buffalo program that is self-sustaining but also maintains the cultural component (**Troy Heinert**)

- Are electric fences necessary?
  - **Picuris Pueblo** – had grounding issues and they kept going off, so bison were getting through when they knew it was off, so went back to barbed wire fence
  - Might be beneficial if able to have good conductivity

- Where do you shoot them?
  - Behind the ear – saves the necessary parts, but loose some of the neck meat
    - Make sure line of fire is clear behind the animals to avoid injuring others
  - Use 308s (**Picuris Pueblo**) to shoot
  - Use horn as landmark, come down about an inch and back about 6 inches can effectively shatter vertebrae and damages least amount of meat

- What is recommended or what are weak spots in handling facilities?
  - Places where bison are running through the shoot need to be strong enough to handle bison running into them or trying to jump over them
  - Crash gate in front also needs to be strong
  - Railroad ties and posts with portable sheeted panels
  - Be sure about design if making a permanent one

- Should we be doing something with the bison? Don't do anything with them on their 80 acres
  - Parasite treatment if haven't done one
    - Fecal floats to check for parasites/how many/what kinds
  - Rotate pasture as much as possible in small area
  - Monitor them on a regular basis– make sure they aren't leaning on fences
    - Make sure they aren't dropping weight
    - Stay away from feed like alfalfa – don't need that much protein
    - Coats look good (in spring they look shaggy as they shed the winter coat)

- Disaster Preparedness
  - Exchange programs or workshops would be beneficial especially for new folks or newly developed herds (**Melissa Burns – Alaska**)
  - Providing gopros to be able to share videos that can be distributed for discussion/problem solving/troubleshooting
  - ITBC can help connect tribes with similar topography

- Have a person in charge and take charge of whole operation
  - Meet ahead of time and discuss – everyone assigned a task and reminded not to do things that would excite the animals (**Doc Woerner** about any activities including roundups)
  - Discussion afterward about what went right or wrong to troubleshoot and get better

- Mentorship program or something similar with groups that have been doing this for a long time (**Sarah Wehling**)

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SAFETY CONSIDERATIONS – FIELD HARVEST AND PROCESSING

Site selection: Ensure that you have selected an appropriate setting and have assessed the animal's behavior prior to harvesting. They should be calm, ensuring they are safe to approach, reducing the chance of negative outcomes.

Safety and preparation for harvesting buffalo in the field were discussed, including firearm safety and the preparation and use of butchering tools. Arlo emphasized the use of traditional butchering methods over the use of bone saws, etc. as it is safer and faster with practice. Arlo demonstrated on the bison skeleton, for example, how to remove the head using only a small knife instead of using a bone saw to get through the cervical vertebrae.

Traditional harvesting and traditional food preparation methods encourage the slow, and methodological approach rooted in respect for the animal and an understanding that injuries occur when we rush. Food preparation should be rooted in traditional methods, which use the whole animal. This promotes healthy eating, but also mitigates foodborne illness exposure as traditional preparation methods are rooted in safe food preparation in a field setting.

Consider animal behavior when harvesting, allow the herd to grieve and inspect the body of the harvested animal. This involves allowing humans present to have a safe place to wait while the buffalo inspect the fallen herd member, avoiding the potential for injury that may occur in this setting.

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PREPARING WASNA:
"THE LAKOTA SUPER FOOD OF PLAINS CUISINE"

Three core ingredients:

- Meat > low fat content, high protein
- Berry > choke cherry one of the superfood berries in the area
    - Traditionally, choke cherry was used as a medicinal. These properties are found in the pit, which you can keep and store for later use in this context if desired. This is discouraged by western medicine due to the small amount of cyanide found in the pit, so it is important to know how to prepare and use it properly if you are to use choke cherry pits for medicinal purposes.
- Fat > bison fat some of the most nutritious and best tasting fats
    - Packed with nutrients, including omega3

Preparation:

- Baked the meat (350 for 7 min), let it completely cool down, then pounding it
    - Need a rock and hard place
    - Take a tea towel to keep everything together or it will go flying all over the place
    - Can leave little pieces if desired
- Wild turnip dried then ground into a flour
- Dry the cherry with the pit, ground and put into a patty
    - Grinding is very important as it releases the toxin in the pit
- Separate out the fat
    - Collect the fat off when butchering
    - Kidney fat if need more > run through the grinder
    - Put it on low heat, put water in before adding the fat
    - Warm to medium until seeing little bubbles
    - Strain out the fat
- Combine all the ingredients in desired proportions into make the wasna. Add little bits at a time. Start with the berries, add the meat, then add third ingredient: fat, melt it down slightly before adding to mix
    - Some people don't want the fat while other add lots to make the wasna nice and moist
    - All personal preference, every person/family is different in their preferences
    - Taste it as you go along to make sure you are not adding too much of something and to make sure you have enough of everything
    - Take your time. If you don't have time to do it slow don't do it then, wait until you can take your time.

Please Plan on Joining Us for the
4th Annual Bison Worker Safety and Herd Health Roundtable

July 6 – 7, 2022

Pierre South Dakota

More Information Coming Soon!