



ANIMAL WELFARE ASSESSMENT CONTEST 2023



Bison Scenario

2023 Animal Welfare Assessment Contest

Prepared by: b greco and J Siegford
CC-BY-NC-SA 4.0: Wikimedia

Advisory

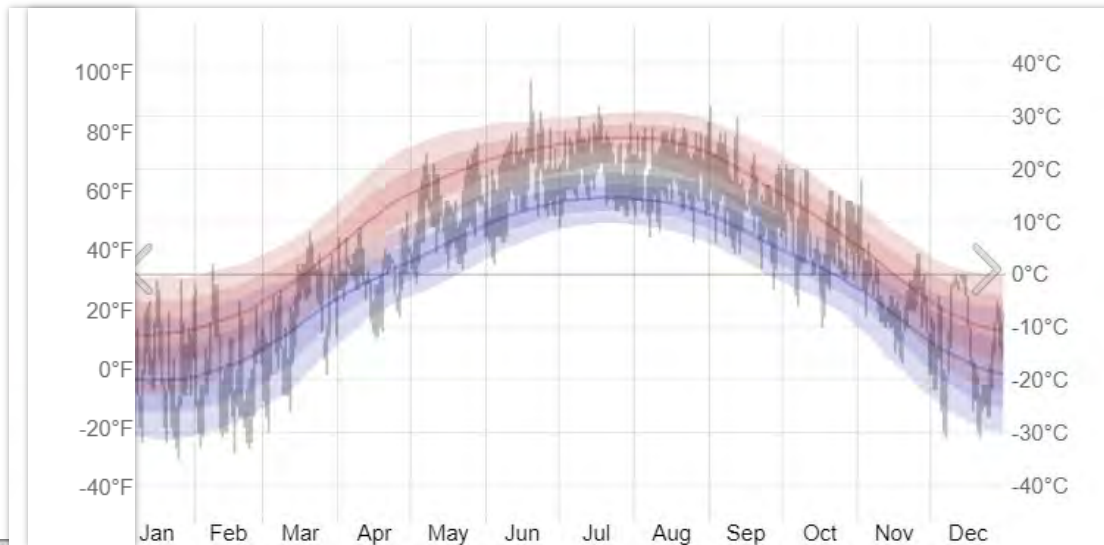
- THESE ARE FICTITIOUS ANIMALS AND SITUATIONS. They have been created using pictures and information collected from multiple sources to generate realistic, yet fabricated scenarios. Neither situation exists as presented here. To ensure scenarios are balanced across the competition, some information may be exaggerated.
- Please use the images provided throughout the presentation as well as text when making your assessment about welfare status.

Acknowledgement

- The American Bison (*Bison bison*) has long been a vital part of many indigenous cultures in North America, particularly the tribes of the northern plains. Bison were and continue to be central to Native Americans' cultural traditions, spiritual life, and survival; providing resources such as meat for food, hides for warmth and shelter, bones and horns for tools and utensils, and dung for fire. Traditionally, Native peoples did not manage bison according to Euro-centric definitions of farming or ranching; they hunted and lived alongside bison in sustainable ways and viewed the relationship as reciprocal.
- Understand that the scenarios presented here do not represent traditional Native approaches to living with bison. However, because the focus of these scenarios is on bison, we wanted to acknowledge the indigenous tribes and their deep and enduring relationship with this magnificent North American mammal.
- Native Nations of the Northern Plains are working to restore bison populations, re-establish traditional relationships, and bring healing to their communities. As one example, after many years of effort, the management and ownership of the former National Bison Range was restored to the Confederated Salish and Kootenai Tribal Nations in 2020. To learn more about the CSKT Bison Range and conservation efforts of tribal members beginning in the 1800s that were central to preserving bison from extinction, please visit <https://bisonrange.org/about/>

Pure Gill Valley

- ~240 bison [sex ratio 170 f : 70 m (mostly calves)]
- Major metropolitan area 50 miles (80 km) away
- 1550 acres (627 hectares)
- Established 1912
- Humid Continental: mild summer, wet all year

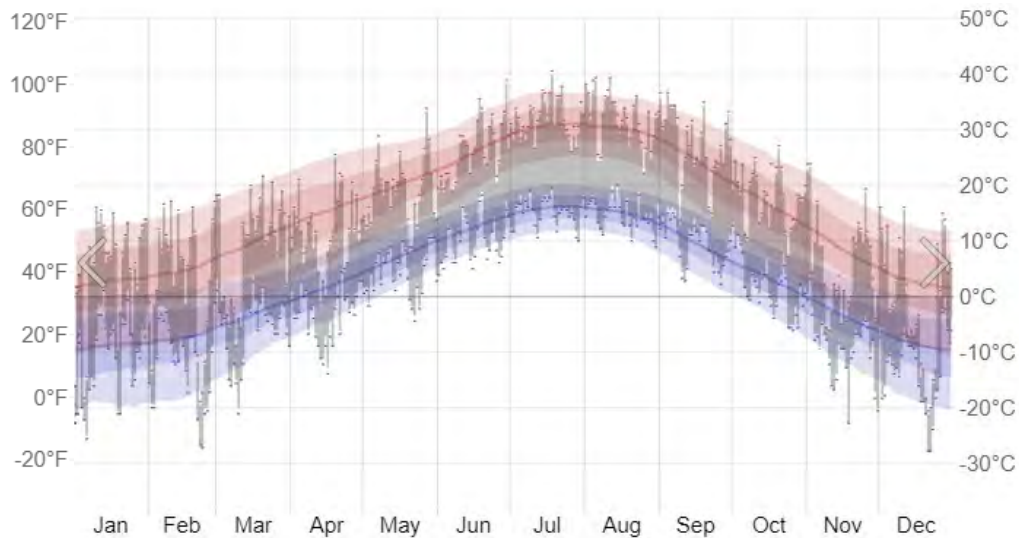


Weather Spark



Gun Dark Ridge

- ~680 bison [sex ratio 450 f : 230 m]
- Major metropolitan area 310 miles (500 km) away
- 95,000 acres (38,445 hectares)
- Established 1992
- Semiarid: low humidity, sporadic rainfall, hot summer



Weather Spark



Personnel

Pure Gill Valley

Ranch family: 2 adults and 2 teenage children

- Primary goal is raising animals for meat
- Switched from cattle to bison 7 years ago
- Family attends events on managing bison and low stress handling
- Member of national bison association
- One parent competes in biathlon

Local vet serves primarily cattle and sheep ranches in area

- Graduated 26y ago
- Previously worked family's cattle operation
- Member of association of bovine practitioners

Gun Dark Ridge

Owner has several bison properties in the region

- Manages land primarily for conservation
- Collaborates with nearby indigenous tribes

Foreman has been on ranch for >15 years

- BS in animal and range sciences

4 year-round employees with training in bison

- 3 focus on managing bison and maintenance
- 1 does remote monitoring systems and other IT
- Extra crew of 4 helps with annual processing

Veterinarian is board certified in beef and is a member of the association of wildlife veterinarians

- Present for all days of processing and culling



Topography and Cohabiting Megafauna

Pure Gill Valley

- Managed grasslands/prairie
- Predominantly flatlands
- One river and marshlands form a border on the south-east side of the property
- Maximum elevation change: 10 ft/mile | 3m/km

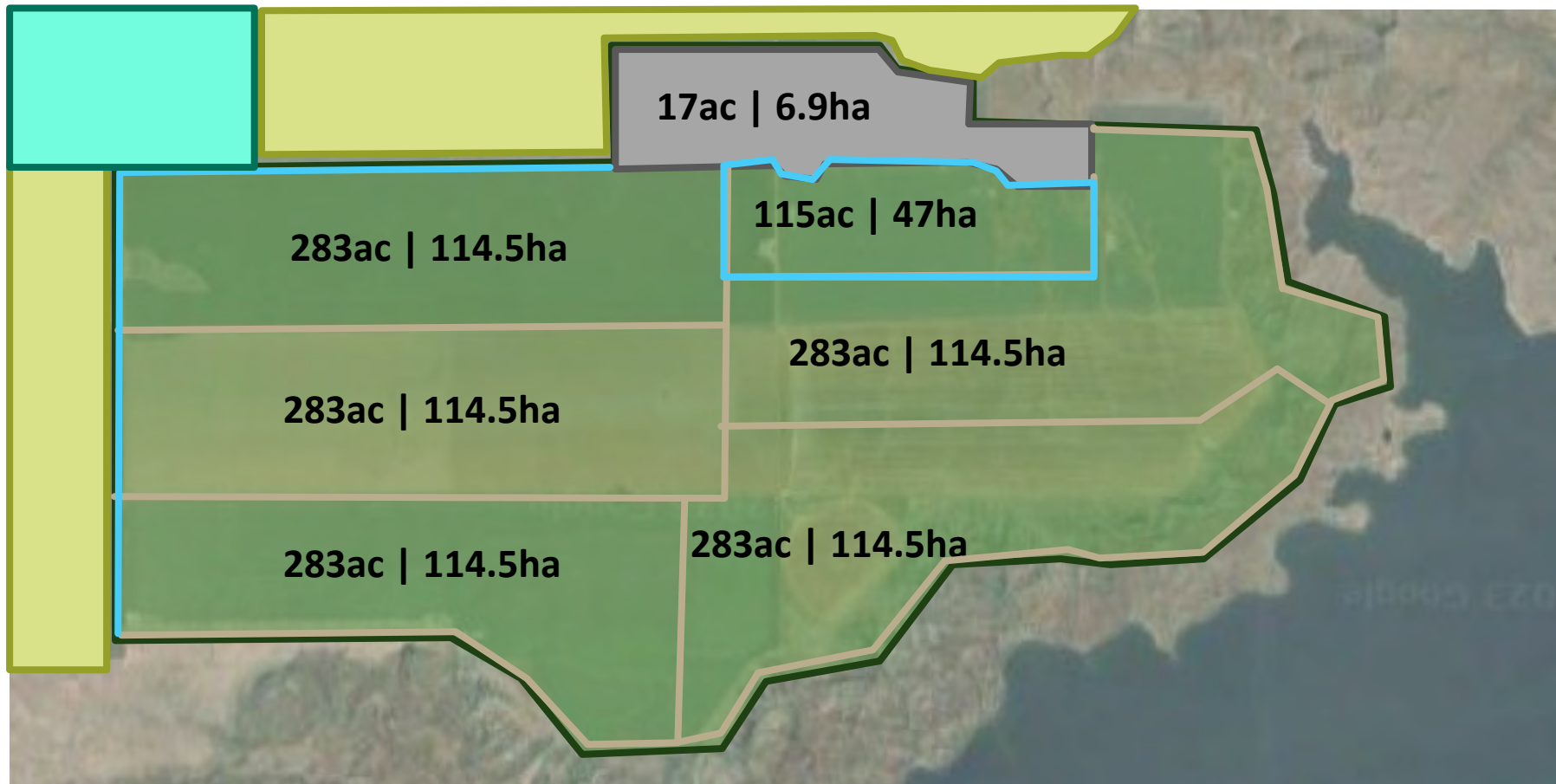
- Whitetail and mule deer often seen on the ranch
- Two cattle ranches and a goat/sheep farm border 3 sides of Pure Gill Valley








Gun Dark Ridge

- Grasslands/prairie (82%), forest (15%), wetlands (3%)
- Mix of flatlands and rolling hills (~40% is hilly)
- Several large lakes and surrounding marsh lands are within and around ranch
- Maximum elevation change: 175ft/mile | 53m/km

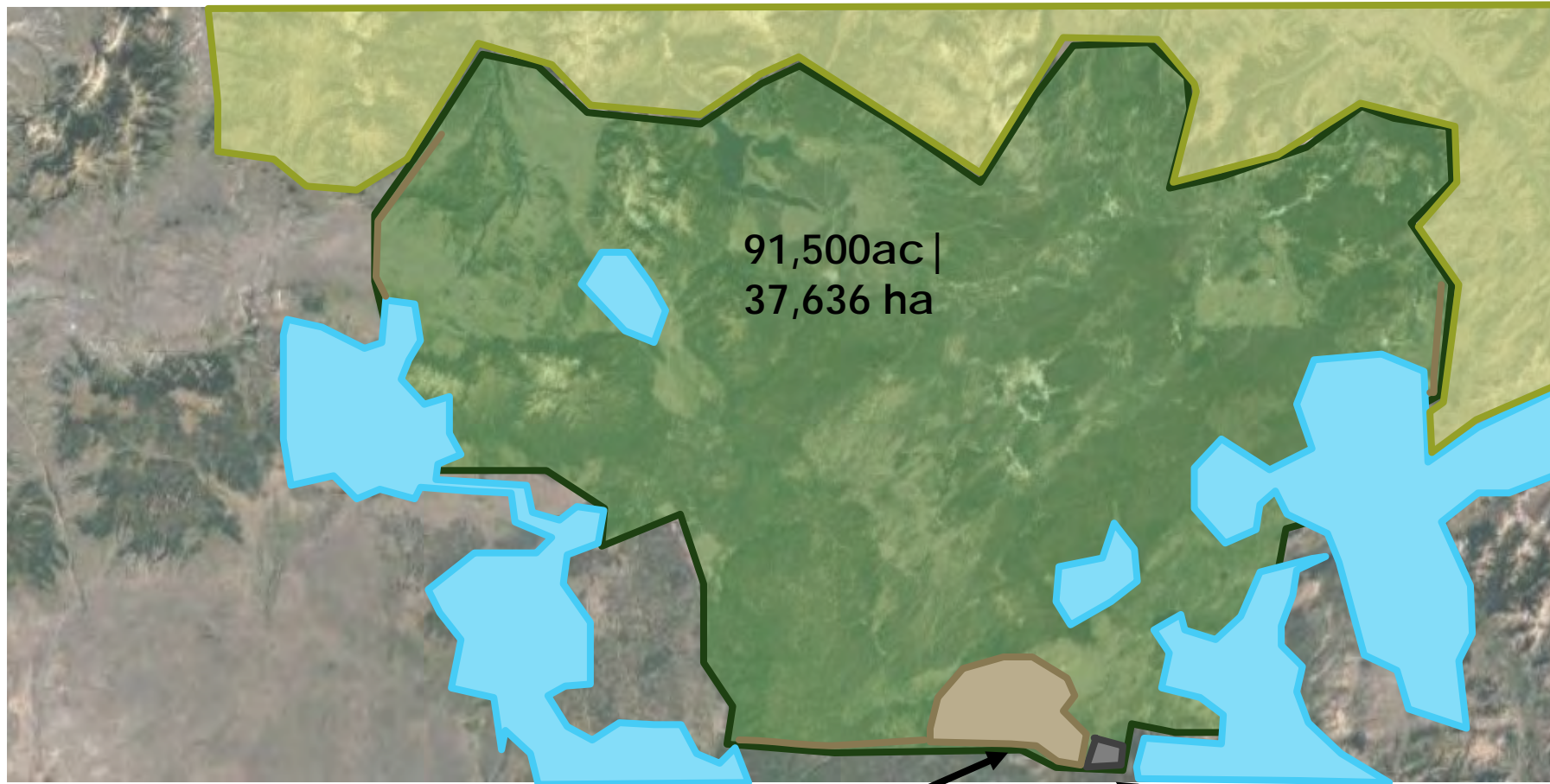
- Whitetail, mule, pronghorns, and elk common on range
- Wolves, black bear, mountain lions, and coyote prey on or scavenge ~1% of bison calves annually

Range Characteristics: Pure Gill Valley



-  Total: 1550ac | 627 ha
-  Property border
-  5-strand barbed wire fence (6ft | 1.8m tall)
-  5-strand electric fence (6ft | 1.8m tall)
-  Holding pens, offices, feed and equipment storage, living quarters
-  Cattle ranches
-  Sheep and goat farm

Range Characteristics: Gun Dark Ridge



- Total: 95000ac | 38,445 ha
- Property border
- 6-woven wire fence. High tensile top wire is Marked with yellow flags (fence 7 ft | 2.1 m)
- Mountain barriers
- Lakes and marsh land
- Preprocessing collection pasture
- Holding pens, offices, feed and equipment storage, living quarters

Processing Facility: Pure Gill Valley

Holding Pens



8 ft | 2.4 m tall metal cattle fence w/ catwalk and solid metal walls

Transfer chutes include straight and gently curved sections



No-contact handling – flags and rattle paddles in flight zones. Horses may be used with calves



Squeeze



Hydraulic head and tail gate



Processing Facility: Gun Dark

Holding Pens



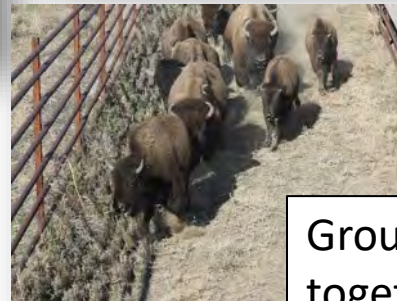
Post and cross beam fence gaps filled w/ tarp screens (7ft | 2.1 m fencing)

Transfer alley 11ft | 3.4m tall fencing w/ poly pipe cross beams

Movement encouraged with vehicles, flags, push boards, and rattle paddles. Handlers sometimes contact animals



CC-BY-NC-SA 4.0: flickr/USFWS



CC-BY-NC-SA 4.0: flickr/USFWS

Squeeze



CC-BY-NC-SA 4.0: flickr/Forest Service

Custom squeeze allows processing of cow and her calf (<8mo) in tandem

Groups of 15-25 Cow | calf pairs moved together into holding pens and then processed squeeze

Pasture Management

Pure Gill Valley

- Intensively managed reclaimed agricultural land – native and non-native grasses (graminoids) and forbs (wildflowers) predominate
- Bison groups rotated to new pasture in June and again in late October following annual culling
- One pasture is always left without bison to allow for regrowth and supplemental planting

Gun Dark Ridge

- Natural rangelands with minimal pasture management – grasses (graminoids), forbs (wildflowers), and shrubs predominate
- Water from natural sources (i.e., streams within range and lakes at borders)
- Every 5 years, team does controlled burns in collaboration with regional indigenous groups and state rangeland ecologists

Supplemental Nutrition

Pure Gill Valley

- Supplemental water in each pasture via gravity feed stock tanks. Emptied and cleaned w/ 10% bleach twice annually
- Each pasture includes four salt lick stations w/ two (250lb | 113kg) blocks per station
 - Blocks composed of NaCl, cobalt, iodine, iron, zinc, copper, molybdenum, and manganese
 - Blocks medicated with dewormer – covers 33 different internal and external parasites
- During finishing and winter: 80% rolled barley grain ration is broadcasted into popular grazing areas during rut (July – August) and the coldest parts of winter (Dec-January)
- During winter months (November-April) animals are offered dry grass hay

Gun Dark Ridge

- 25 (250lb | 113kg) NaCl, cobalt, and iodine lick stations set up in popular grazing and wallowing areas across range
- Pelleted cattle feed and alfalfa hay used to lead animals to and entice animals into preprocessing collection pasture and holding pens at the processing facility



Herd Management

Pure Gill Valley

Group management dictated by the ranchers

Non-breeding Season (September – June)

- Cows and calves are divided into three groups of ~40 animals. One group per pasture
- 15 breeder bulls (2-8 yrs old) managed in a bachelor group in separate pasture

Breeding Season | Rut (July – August)

- Five bulls mixed with each cow-calf group
- Bulls allowed to compete for mates
 - Bulls are selected for size vigor, gain on feed, and meatiness (wide rump)

Gun Dark Ridge

Animals choose how to group together

Non-breeding Season (September – June)

- Form multiple smaller mixed-age cow-calf groups and separate bachelor groups of bulls

Breeding Season | Rut (July – August)

- Cow-calf groups aggregate into bigger herds; bulls join them and compete for mates



Herd Management

Pure Gill Valley

New Arrivals:

- New animals acquired through livestock auction or directly from other bison ranches
- Approximately 10-15 bison per shipment (10ft² | 3m² space per animal)
- New animals are ID tagged, vaccinated, and dewormed, then managed in small groups (2-5) in the temporary processing corral
- New animals quarantined for 15-18 days, then individually sorted into new groups

Calving:

- Cows calve without assistance
- Orphaned calves brought to processing facility. Decision to reintroduce or euthanize is made

Gun Dark Ridge

New Arrivals:

- New animals acquired through the national bison preservation program. Related animals purchased together
- Approximately 15-20 bison per shipment (12ft² | 3.7m² space per animal)
- New animals are ID tagged and vaccinated
- New animals quarantined together for 10 days, then introduced to the range in one group

Calving:

- Cows calve without assistance
- Orphaned calves are culled and slaughtered on the range

Herd Monitoring

Pure Gill Valley

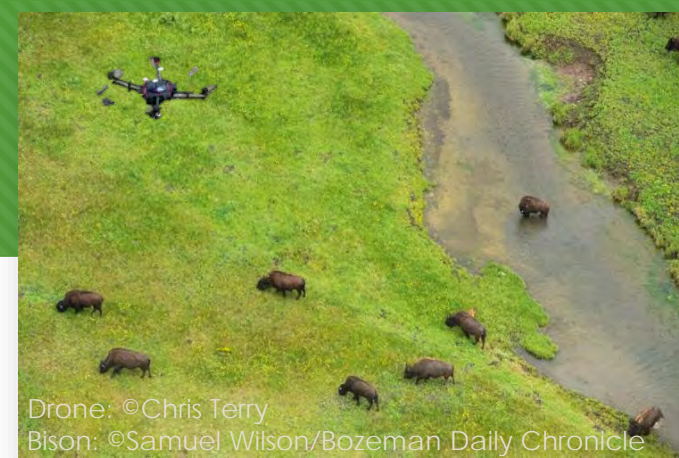
- Animals monitored 1x/day from trucks, ATVs, snowmobiles, horses, or on foot
- Animals suspected of being ill are corralled to holding pens for monitoring, treatment, and potential euthanasia
- Fences monitored daily for signs of damage or breaks
- Fences bordering cattle, sheep, and goat ranches inspected twice daily during rut



©Kathleen Reynolds

Gun Dark Ridge

- Daily drone monitoring. Goal is to observe all animals 2-3 x/week
 - 5 drones, equipped with visual and thermal cameras and a fecal collection probe for parasite analysis (> 50 samples/week)
- 10 live-stream solar powered trail cameras in high traffic areas
 - Connect to University's Citizen Science Bison Conservation website (CSBC)
 - Ranch receives health and safety check notifications from CSBC
- Digital systems supplemented by in-person monitoring via truck, ATV, snowmobiles, or horseback



Drone: ©Chris Terry
Bison: ©Samuel Wilson/Bozeman Daily Chronicle

Processing and Culling

Pure Gill Valley

Two annual processing events:

1. Post calving season (late June): all cow-calf groups. Calves vaccinated, ear tagged, and freeze branded
 2. October: cow-calf pairs and bulls for culling and vaccinations
- ~80% yearling calves culled for slaughter
 - ~10% female yearlings retained for replacements
 - All cows are pregnancy checked with ultrasound
 - Any cow who did not produce a calf this year or is not confirmed pregnant is culled
 - Bulls processed on as needed basis
 - Genetically overrepresented bulls culled for slaughter

Gun Dark Ridge

One annual two-week processing event in October

Cows and Calves

- Lured into 1500-acre pre-processing pasture
- Vaccines and parasite control delivered
- New calves (approx. <6mo) ear tagged and injected with subdermal RFID tags
- ~120 animals culled each season (65% bull calves, 30% heifer calves, 5% low BCS/sick/old cows)

Bulls and Non-Cooperative Cows

- Excluded from processing, permits sold to hunt
 - Permit criteria: rifled firearm and lung shot (87% success rate)
 - Foreman carries a .308 rifle while with hunter

Slaughter Procedures

Pure Gill Valley

- Culled animals transported 93 miles | 150km to beef cattle slaughter facility
- ~6 hours from intake to slaughter
- Rendered insensible with a pneumatic captive bolt gun (0.6% avg annual fail rate over last 5 years)
- Corneal reflex used to confirm insensibility
 - If insensible, exsanguination follows
 - If insensibility not achieved, second shot placed



Gun Dark Ridge

- Mobile abattoir
- Federal inspector and vet present
- ~3 hours from selection to slaughter
- Rendered insensible with inline captive bolt gun (2.3% annual fail rate over last 5 years)
- Righting reflex and loose lips/tongue used to confirm insensibility
 - If insensible, exsanguination follows
 - If insensibility not achieved, second shot placed



Preventative Health

Pure Gill Valley

Bulls, Cows, and Calves

- Parasite control via medicated salt licks
- Annual vaccinations: mycoplasma bovis and 4-way respiratory vaccine
- Heifers (<12mo) vaccinated against brucellosis
- Calves vaccinated with 7-way clostridial vaccine includes protection against blackleg sudden death
- Annual testing for Bovine Tuberculosis* (mycobacterium bovis) and Brucellosis*. Positive cases of both are culled
- Animals suspected of Johne's moved to medical pens for testing. Positive cases are culled

Gun Dark Ridge

Cows and Calves

- Parasite control via annual injection & dosing with pour-on. Covers 18 to 33 different internal and external parasites. Rotated to target most prevalent species detected in fecal samples
- Annual vaccinations: mycoplasma bovis and 4-way respiratory vaccine
- Calves vaccinated with 7-way clostridial vaccine includes protection against blackleg sudden death
- Annual testing for Bovine Tuberculosis* and Brucellosis*. Positive TB cases are culled
- Animals suspected of Johne's moved to holding pens for testing. Positive cases are culled

Euthanasia Protocols

Pure Gill Valley

Euthanasia Protocols:

- Suspected downer animals are monitored for 24 h. The veterinarian is consulted about next steps
- Cows suffering from dystocia are euthanized
- In field: double lung shot placed behind the elbow using a .30-06 (97% success w/ double shot) or an intercranial shot is placed behind the ear (100% success rate on first shot)
- Processing facility: rendered insensible with inline captive bolt gun (>99% success on first shot)

Carcass Disposal

- Removed from food production stream and composted

Gun Dark Ridge

Euthanasia Protocols:

- Downer or dystocia animals probed with drone. If no movement, approach on ATV and wave flags. If bison does not rise; euthanasia protocol used
- Orphaned calves are euthanized using shotgun
- In field: intercranial shot placed behind the ear using a 12-gauge shotgun (98% first shot success)
- Processing facility: rendered insensible with inline captive bolt gun (97% first shot success)

Carcass Disposal

- ID tags collected, blood sample collected, and carcass is left for scavengers

Behavior Outcomes During Processing

Corralling and Processing

Handlers Present					
Average Behavioral Intensity During Corralling Processing					
	Pure Gill	Gun Dark			
Movement Speed	Yellow	Yellow	Orange	High	
Alertness	Blue	Yellow	Yellow	Medium	
Fight/Flight Response	Blue	Yellow	Blue	Low	
Defensive Circle Formation	Blue	Orange			
Vocalization	Yellow	Yellow			

Handlers Absent					
Average Behavioral Intensity During Corralling Processing					
	Pure Gill	Gun Dark			
Movement Speed	Blue	Blue	Orange	High	
Alertness	Blue	Yellow	Yellow	Medium	
Fight/Flight Response	Blue	Blue	Blue	Low	
Defensive Circle Formation	Blue	Yellow			
Vocalization	Blue	Blue			

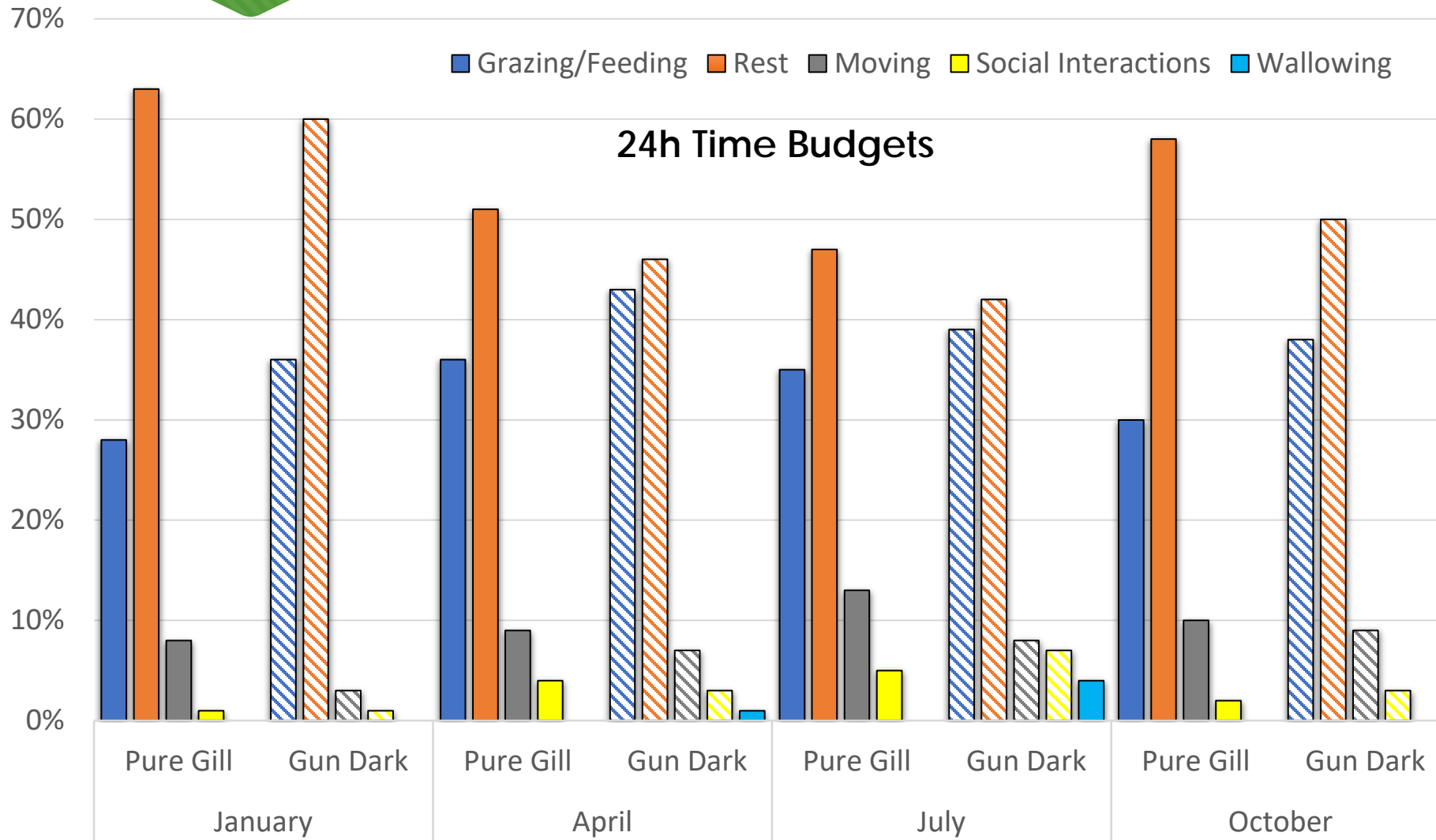
Squeeze

Average Cow Squeeze Behavioral Intensity					
	Pure Gill	Gun Dark			
Bellows	Orange	Yellow	Orange	High	
Stomps	Orange	Yellow	Yellow	Medium	
Kicks	Yellow	Blue	Blue	Low	
Breathing	Yellow	Blue			
Exit velocity	Orange	Yellow			

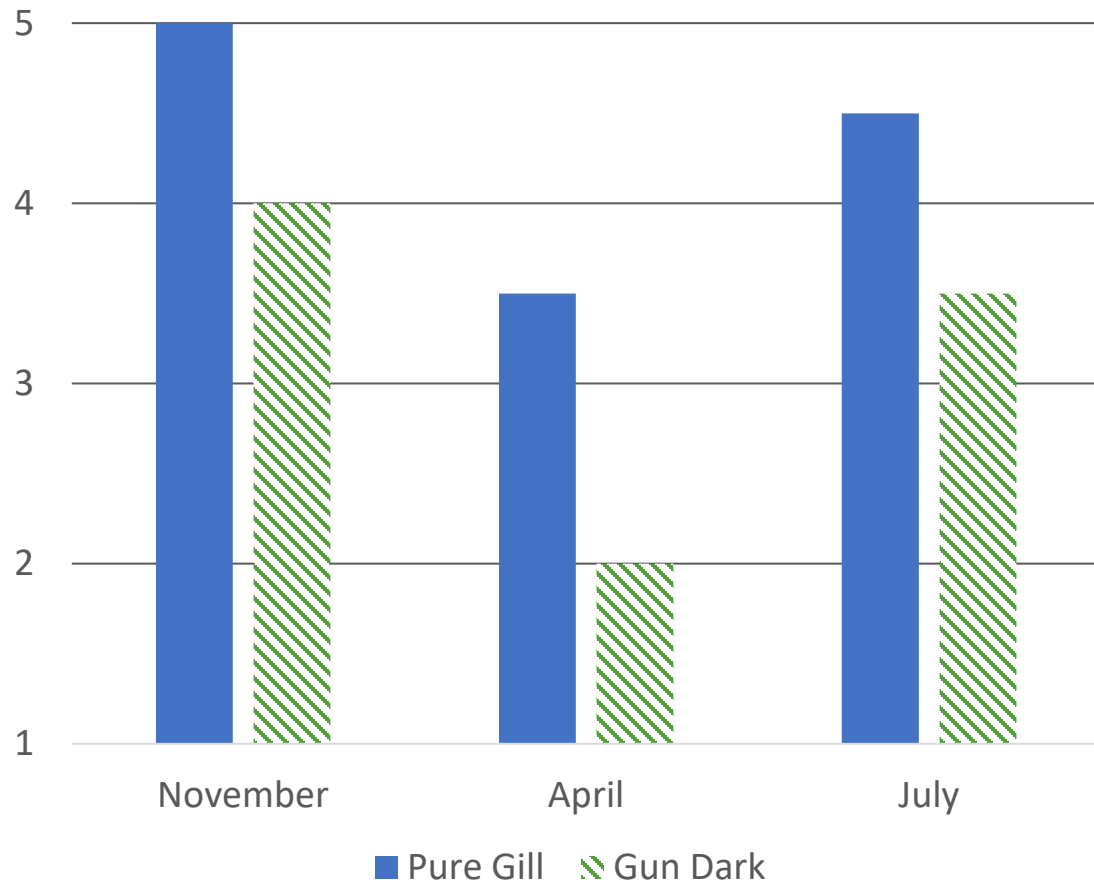


All images: CC-BY-NC-SA 4.0: flickr/NPS

Behavior Outcomes on Pasture/Range



Body Condition Score



BCS Scale	
1	Very Thin
2	Moderately Thin
3	Moderate
4	Moderately Fat
5	Fat

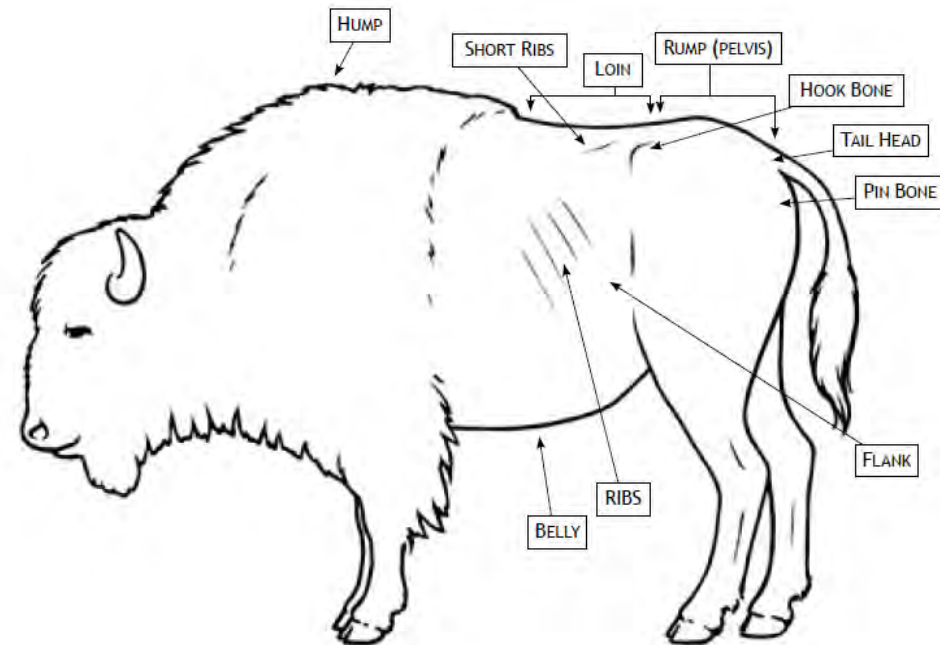
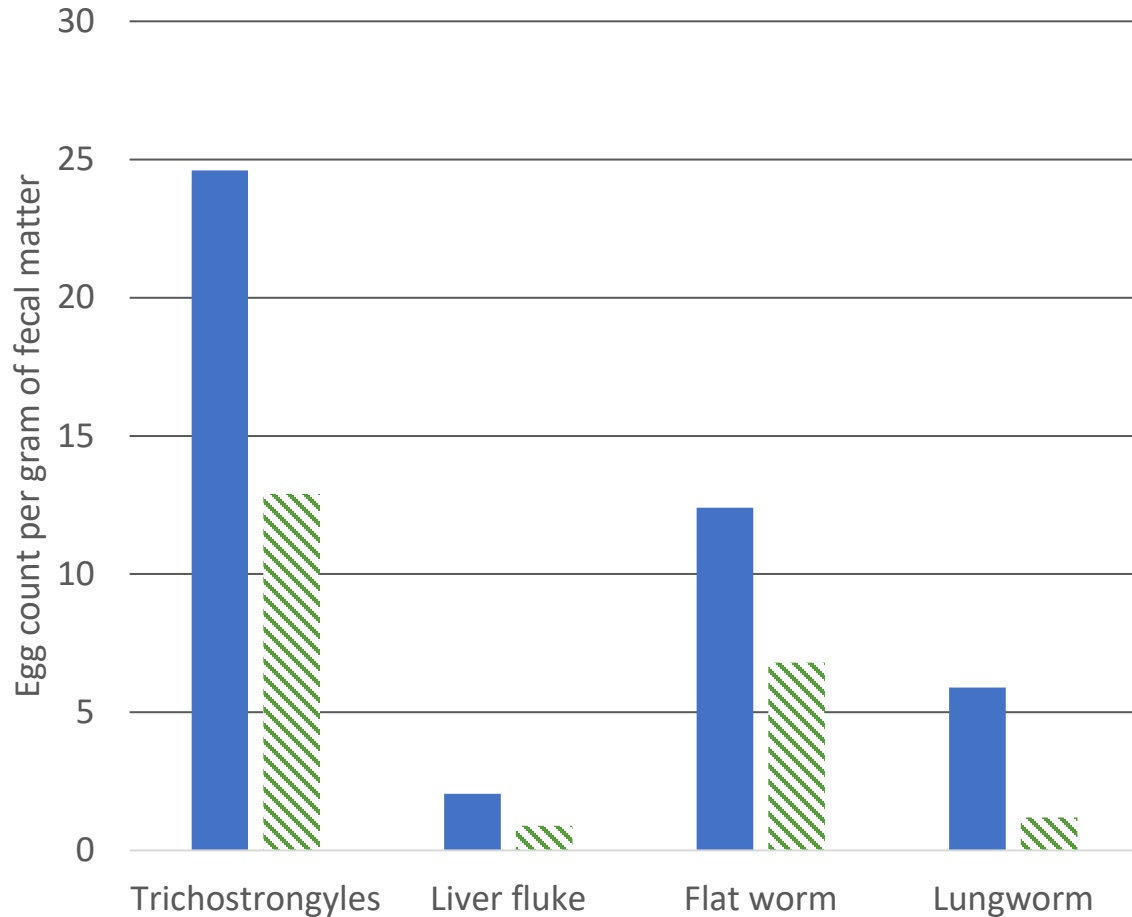


Photo attributed to "What's the Score: Bison"

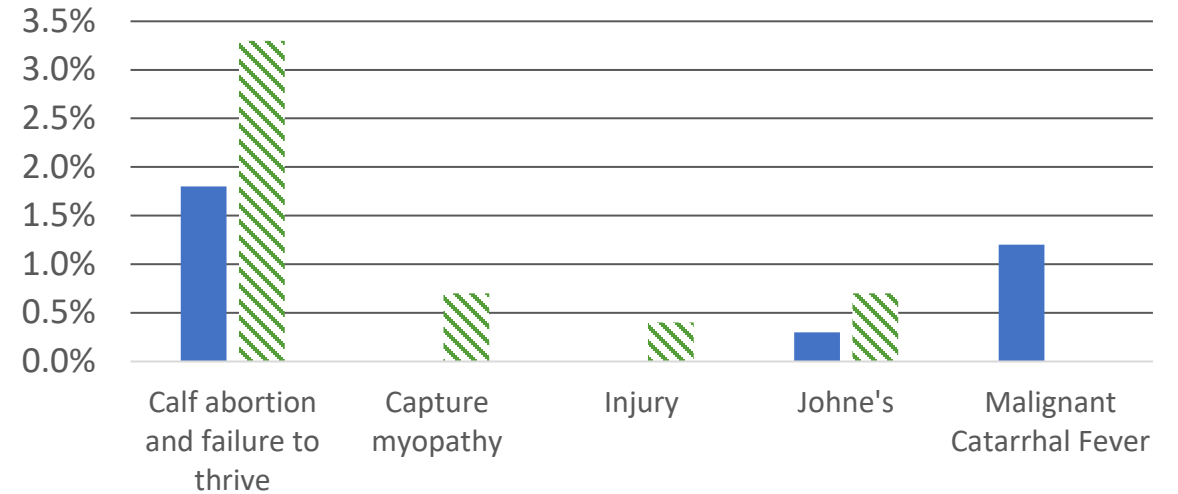
Health Outcomes

■ Pure Gill ▨ Gun Dark

Parasite Load



Mortality



Other Health Concerns	Pure Gill	Gun Dark
Brucellosis	Over the past 5 years, 2 culled animals per year have tested positive	~25% of the bison herd tests positive annually and is likely endemic in regional elk population
Chronic Diarrhea	4%	2.50%
Copper deficiency	0%	15%
Rumen acidosis	21%	0%