

From: [Christine Paige](#)
To: [Fox, Trevor T](#)
Subject: [EXTERNAL] Fwd: Bison fence notes
Date: Thursday, July 13, 2023 8:58:14 AM
Attachments: [Wildlife Crossing Suggestions for Grizzly Ridge Bison Fence.pdf](#)
[ATT00001.htm](#)
[Bison Fence specs.pdf](#)
[ATT00002.htm](#)

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Docs sent to Matt.

Sent from planet Earth.

Begin forwarded message:

From: Christine Paige <wanderofftrail@gmail.com>
Date: July 7, 2023 at 3:49:09 PM MDT
To: Matt Hogan <Matt_Hogan@fws.gov>
Subject: Bison fence notes

Hi Matt,

Great to chat with you and I hope I can be of some help if the timing for a followup visit to Grizzly Ridge Ranch works out.

For what it is worth, here is a link to an article about the wildlife crossings placed in Rickett's Jackson Fork Ranch bison fence in Bondurant, Wyoming. I can reach out to WYGF for more information if you would like. It's a somewhat similar crossing design. They modified 5.5 miles of fence with 25 crossings (so about every 0.25 mile or so). I wasn't aware of this work until a few months after consulting on Grizzly Ridge.

<https://wgfd.wyo.gov/Regional-Offices/Pinedale-Region/Pinedale-Region-News/G-F-Partners-with-Ranch-to-Facilitate-Big-Game-Mig>

Last December, Morgan reached out again for a drawing and notes on the fence design — I had thought they had it all in hand when we wrapped up the meeting and he didn't ask for documentation then, but subsequently they wanted something from me. So I sent him the attached PDF to summarize my recommendations. You may want to keep this in your records. I did share it with Trevor Fox at the time as well.

I've also attached the handout I brought to the Grizzly Ridge Ranch meeting. It is simply a short summary of wildlife friendly fence standards and design ideas that might work for bison fence. I hoped it would inspire ideas and discussion. I passed out several copies among everyone there.

As for specific agreements, I didn't keep hard notes. I do recall Morgan agreeing to share a map of existing fences with all parties so suggestions could be made on crossing locations — I don't know if that was ever done. I also recall that the tribe was interested in having the crossings monitored with cameras, but I'm unsure who was supposed to provide and maintain the trail cams. There did seem to be informal agreement in the field that the input of locals' knowledge of wildlife movement was important, both from the tribe and the ranch.

If you have any other questions, please reach out. Will stand by to hear about a followup visit.

All best,
Chris

Wildlife Crossing Suggestions for Grizzly Ridge Bison Fence

I was invited to visit the Grizzly Ridge Ranch in October, 2022 to tour the ranch bison fences and consult with the owner's agent, ranch manager, and tribal representatives on fence solutions to enhance wildlife movement. The visit resulted in a plan by Grizzly Ridge to modify fences with multiple wildlife crossings.

The current perimeter fences are 5- to 7-foot field fence supported by metal posts. Given this fence design, the most efficient crossing design would be to use 2 or 3 metal pipes as rails, welded or otherwise fastened securely to the metal posts (see photo).

Install crossings in fence sections at:

- 1) sites known by residents/locals to be wildlife movement areas;
- 2) sites with wildlife trails, tracks, or evidence of fence conflict;
- 3) riparian corridors and ridgelines;
- 4) fence corners, and
- 5) at regular intervals (e.g., 1/8 to 1/4 mile) along long stretches of fence.

Final placement of crossings will depend on topography and the needs of ranch operations.



Spacing for 3 rails:

- 1) Place bottom rail at least 18" above ground level to allow wildlife to pass under (especially young ungulates and mule deer).
- 2) Normally, the recommended top rail height for deer and elk is 40" to 42", with middle rail at 30" to allow 12" between middle and top to prevent leg entanglements. However, this top height may not be suitable in all locations for bison fence.
- 3) If a higher top rail is necessary for bison, I suggest spacing rails at 18" bottom, 36" middle, and 48" to 54" top. This allows an 18" gap between the bottom and middle rail for animals to crawl through, and 12" to 18" between middle and top rail.
- 4) *I especially recommend at least 18" between the bottom and middle rail for moose calf crossing.*

In addition, Andrew Pettibone (USFWS, Choteau, MT, Andrew_pettibone@fws.gov), who was part of the tour, suggested a trial for a moose calf crossing with a moveable middle rail that will float as an animal pushes between the bottom and middle rail. This could be easier for moose calves to negotiate – see illustration.

The floating rail should be of durable non-metal material to avoid clanging. It should be held in place by U-channel or similar box shape to allow the rail to slide up and down but prevent it from popping out.

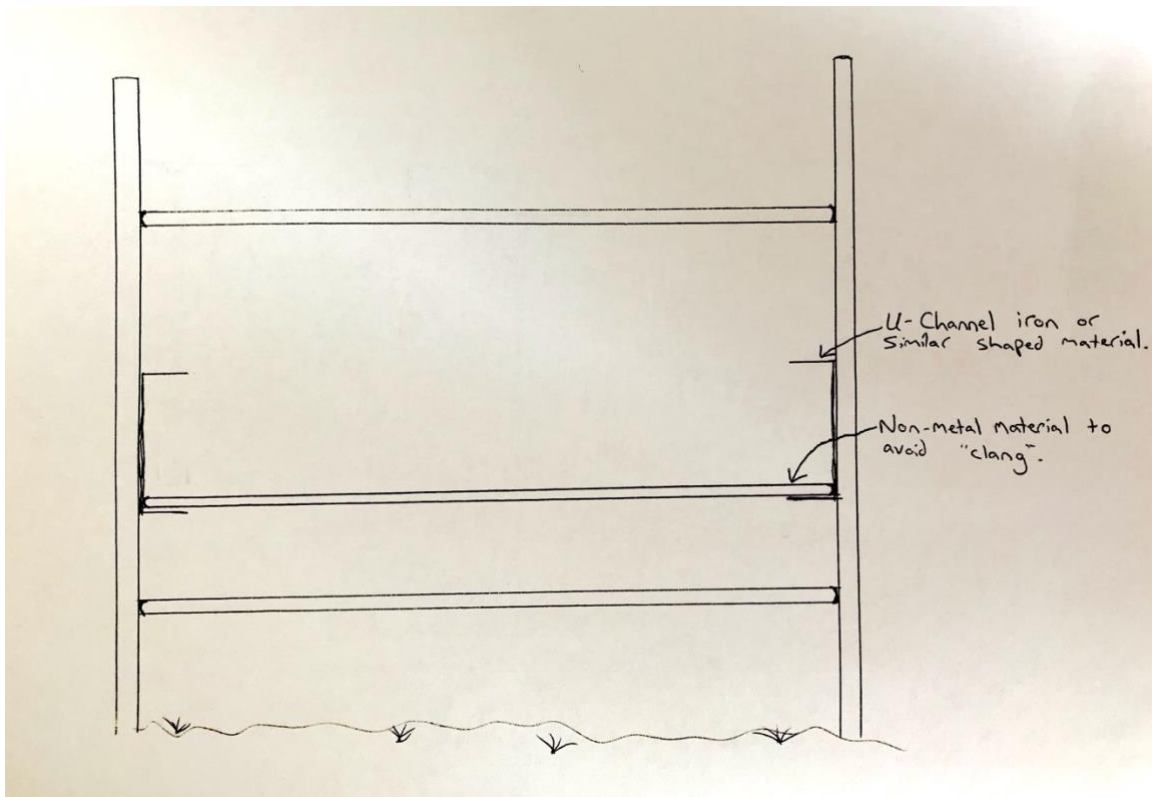


Illustration by Andrew Pettibone

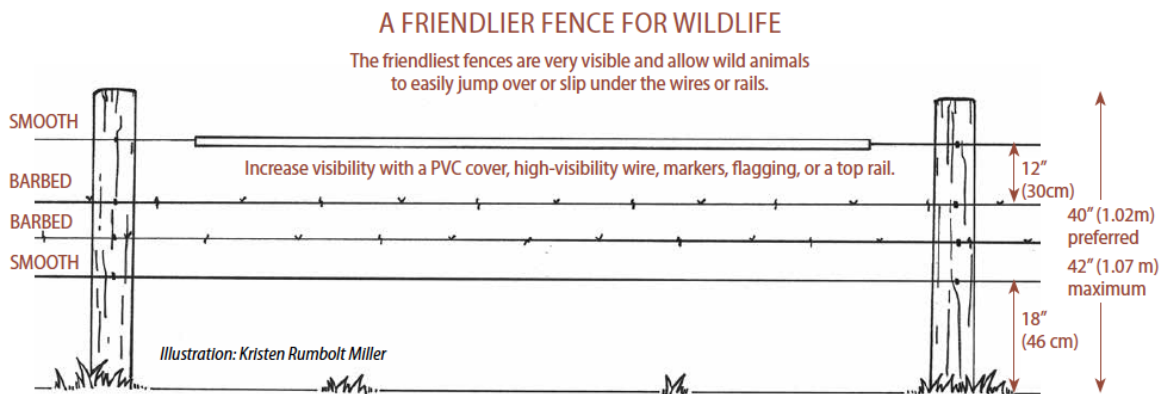
Note that these recommended crossing designs are experimental for bison fence, in determining rail spacing that will work for local wildlife species and bison behavior, and in trialing a floating rail. Ranch managers will need to adapt if designs do not meet expectations. I would very much appreciate hearing feedback on any lessons learned.

Contact:
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Wildlife Friendlier Fence

- Permeable and visible
- Low enough to jump safely
- Bottom high enough to slide under safely
- Won't entangle or cause injury
- Maintain daily and seasonal wildlife movements.
- Allow passage for all species in all seasons, including young/injured/pregnant animals and other small to medium-sized wildlife.
- Visibility important for birds and for animals under stress or gauging ability to cross.

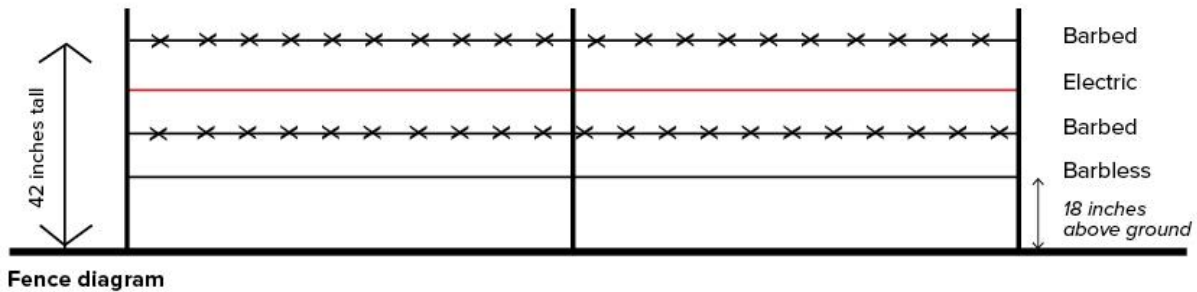
Wildlife friendlier cattle fence:



American Prairie Reserve Bison Fence

Approximately 150 miles of fence for 31,000-acre range. Low pressure situation.

- Top wire at 42", barbed
- 12" gap between top and 2nd wire
- 2nd wire HOT – high-tensile smooth wire at 30"
- 3rd wire barbed
- 4th wire double-stranded smooth at 18" to 20"



Energizers placed every 10 to 15 miles – bison avoid the hot wire.

Grouse markers used for visibility near sage-grouse leks and where collisions observed with sharp-tailed grouse.

Studies with game cameras show ease of passage for elk, mule deer, and pronghorn.



Source: Damien Austin, APR Vice President and Superintendent
<https://www.americanprairie.org/project/fences>

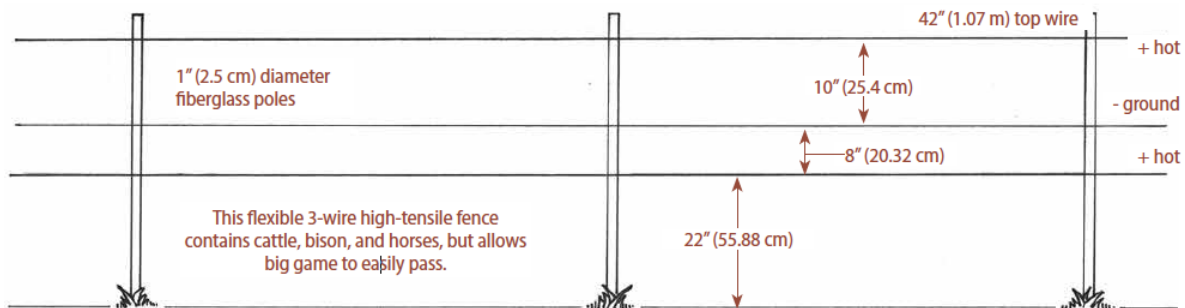
Electric High Tensile 3-Wire Fence

Research in Wyoming found 3-wire high tensile effective for bison, as well as separating cattle bulls and cows. Easy for wildlife to pass through – deer and elk are usually not shocked due to their hollow hair.

Cons: difficult to see, especially for running animals, although visibility markers reduce collisions. Must be regularly checked – vegetation and heavy snow can cause faults.

3 WIRE HIGH TENSILE ELECTRIC FENCE

Illustration: Kristen Rumbolt Miller



Source: Karhu, R. and S. Anderson. 2006. The effect of high-tensile electric fence designs on big-game and livestock movements. *Wildlife Society Bulletin* 34(2)293-299.

Snowcrest Ranch 4-Wire High Tensile Bison Fence

Regenerative grazing operation: 40,000 deeded and leased acres, 1400 bison.

Over the years, their fence design evolved from 8-wire to 4-wire smooth high tensile electric. Use 7/8" fiberglass posts – 40' span between posts. Energizers every 4 miles.

- 44" top wire - HOT
- 2nd wire - cold
- 3rd wire - HOT
- 18" bottom wire – cold

Similar 3-wire high tensile:



Add vinyl “sage-grouse” markers/flags – white and black – for visibility on top wire – this drastically reduces wildlife damage. Use crimps to keep markers in place on the smooth wire.

Easy for deer, pronghorn to crawl under, most elk to go over. High wildlife use – 1000 elk during hunting season seek refuge on ranch, also pronghorn, white-tailed and mule deer, black bear, grizzly, wolves, mountain lion. No carnivore conflicts ever observed.

Prior to hunting season, collapse wires on 50' to 75' spans (wires gathered with carabiners) to allow elk through and reduce fence pressure. Elk move on shortly after hunting season.

To manage grazing on pastures, use temporary 2-strand moveable electric fence with Razor Grazer trailer unit with reels and solar charger (<https://www.rangeward.com/>).

Bison readily adapt to electric fence. “Once bison are taught, especially at a young age, they don’t test the fence.”

Source: Billy Salada, Snowcrest Ranch manager, Turner Enterprises, Alder, MT

Wildlife Crossings in Woven Wire Fence -- 777 Bison Ranch, Rapid City, SD

28,000 acres, 2200 bison, regenerative grazing – 100% grass-fed.

Use 5' high tensile woven wire fence and 6-strand barbed wire (62" top wire, 18" bottom wire)

Wildlife crossings are installed in 5' woven-wire fence every 1/8 mile: 4 rails of 2 1/8" pipe.

72" top, 18" bottom, 18" rail spacing.

Crossings are 20' wide or 10' wide at fence corners.

Prior to install, flagged game trails and crossings based on wildlife behavior in different seasons – draws, game trails on hillsides, etc. "Mule deer and pronghorn will step through."



Source: Mortiz Espy, 777 Bison Ranch manager, <https://777bison.com/>

Alberta Bison Fence on Public Lands

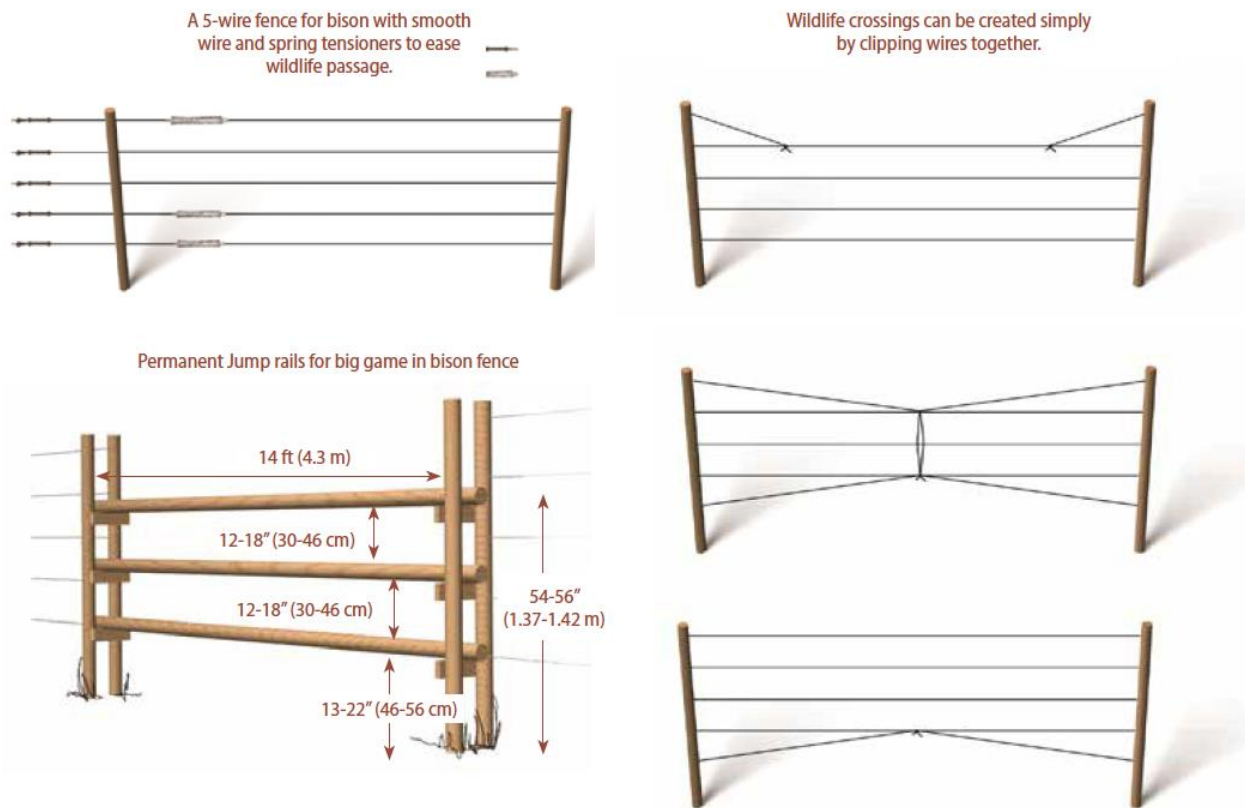
Perimeter fence with five smooth, taut wires.

Top wire at 60" (5')

Bottom wire at 18 to 20"; allow 12" between bottom wire and 4th wire.

Install spring tensioners on the top, bottom, and second to bottom wires to allow wires to give if wildlife push through or jump over.

Provide wildlife crossing structures at 1/4-mile intervals, at known crossings, in movement corridors and near water. Crossings can be made by pulling the top two and/or bottom two wires together with quick clips. To build a wildlife jump rail, place top rail at 54 to 56", bottom rail at 18" to 20", and allow at least 12" between the bottom and center rail. Most adult elk and moose can clear the top rail and younger animals can crawl under or through.



Illustrations from Gates 2006 used with permission of the author.

Source: Gates, C. Cormack. 2006. *Fencing guidelines for bison on Alberta public lands with wildlife and access in mind*. Faculty of Environmental Design, University of Calgary, Calgary, Alberta, Canada. 8 pp.

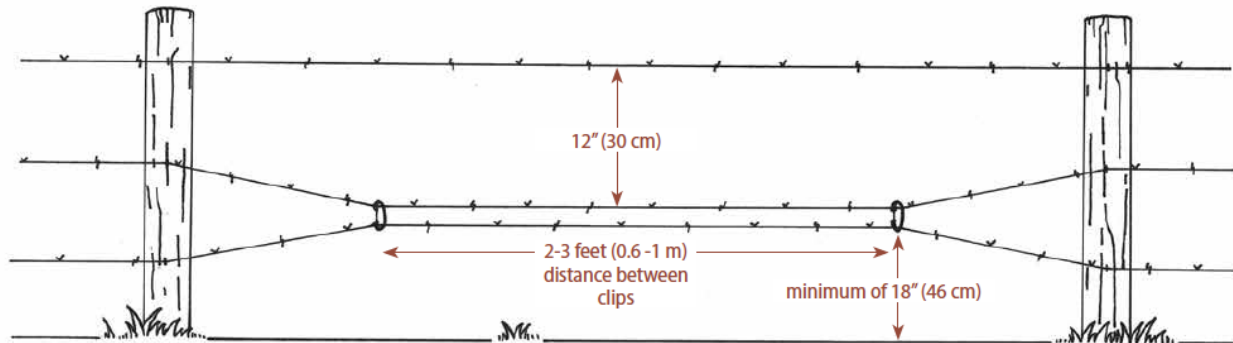
https://www.canadianbison.ca/application/files/7214/8778/3208/Fencing_guidelines_for_Bison_on_Alberta_Public_Land.pdf

Seasonal Alterations

Quick clips or staple locks to alter fence wires.



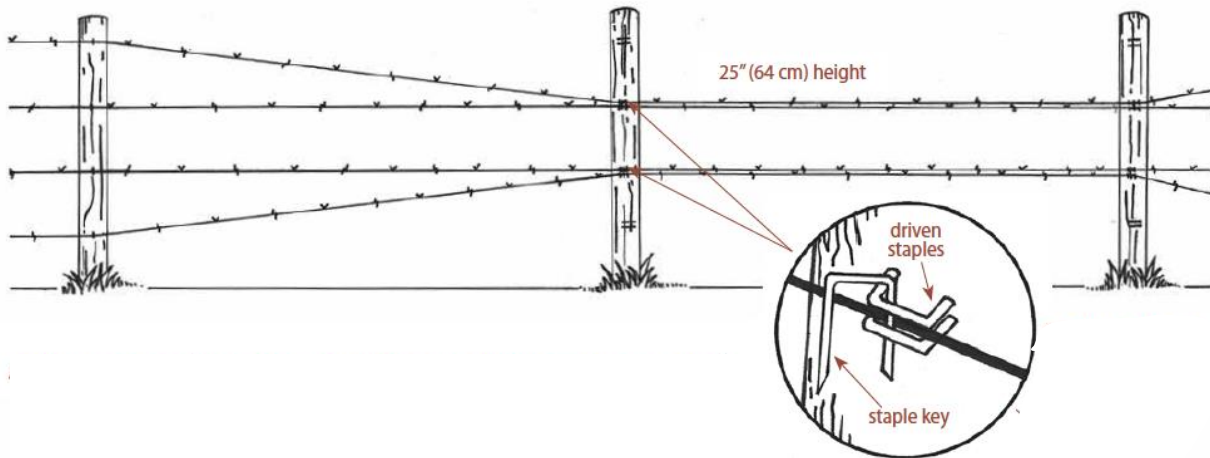
PRONGHORN UNDERPASS WITH QUICK CLIPS



Credit: Kristen Rumbolt Miller

ADJUSTABLE FENCE FOR SEASONAL WILDLIFE PASSAGE

Illustrations: Kristen Rumbolt Miller



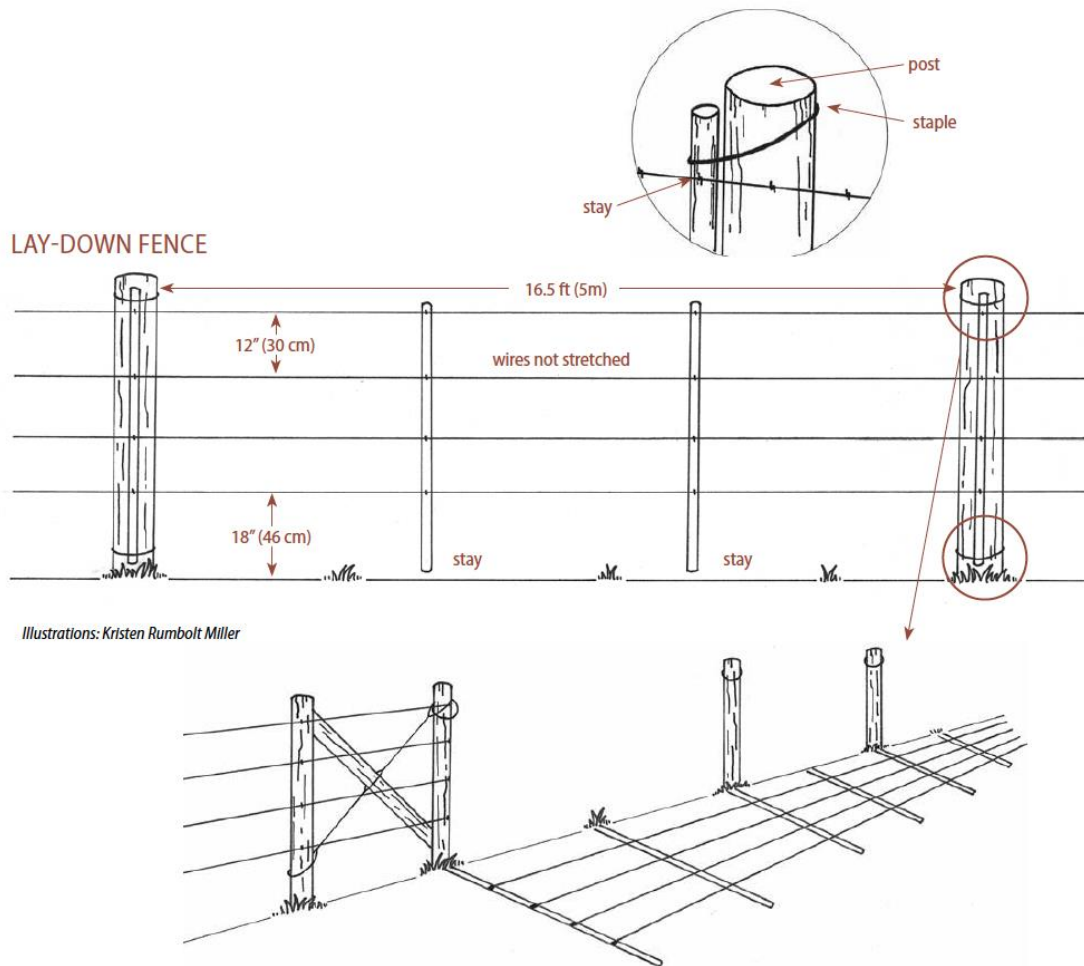
Fence clips or staple locks allow wire heights to be quickly adjusted to create seasonal crossings for wildlife.

Photos: tincupcreekfence.com



Lay-Down Fence

Easy for one person to lay down or erect seasonally when livestock are not present. Fence should lay flat to prevent tripping or entanglement. Do not use in areas of heavy brush.



Vence Virtual Fence

In production for cattle.

Note: This fall, Colorado TNC will begin testing the Vence system on their bison herd on the Zapata Ranch in San Luis Valley, contiguous with Great Sand Dunes National Park. The herd is approximately 1600 animals allowed to range freely on 48,000 acres. If successful, virtual fence would aid in forage management and preventing trespass onto the park.



Vence uses a lightweight tracker/monitor worn by the animal that is GPS driven, allowing ranchers to monitor their cattle's location and health from miles away.

The Vence smartphone app is used to define dynamic or static virtual boundaries as needed to dictate grazing behavior and movements.

“The collars' pressure functions begin with sound cues, which the animals quickly adapt to and learn to avoid, allowing for the remote management of the herd. The collar also has an animal-safe and humane shock stimulus which activates as an added pressure stimulus if the sound cues aren't pushing an individual animal from a virtual fence boundary.”

Claims:

- Monitor well-being of animals
- Collect data via on-animal sensors
- Manage cattle in real time
- Dictate grazing behavior
- Employ static or dynamic boundaries
- Specify protected areas and waterways

“Vence's technology has been proven effective on ranches as small as a few hundred acres and as large as hundreds of thousands of acres.”

Source: <https://vence.io/>; Info: info@vence.io, +1-619-393-3690

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