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CONTACT: Stan Wise, Communications Coordinator

PHONE: 605-368-4091

EMAIL: stan.soilhealth@sdconservation.net

Virtual fences can make a real difference

By Stan Wise

South Dakota Soil Health Coalition

PIERRE, SD – Moving livestock is an inescapable part of a rancher’s life, and it can be labor intensive, especially if a producer uses a rotational grazing system designed to improve rangeland and soil health.

But what if it doesn’t have to be?

Enter virtual fencing, a system in which livestock wear special collars designed to keep them inside boundaries marked by lines on a GPS map instead of by wires and fenceposts. Producers using a virtual fence system can mark off a grazing area on a computer or smartphone. Animals wearing the collars will hear a tone as they approach boundaries of that grazing area. If they get too close to those boundaries, the collars deliver a small electric pulse to encourage the animals to stay within the grazing area.

The potential labor savings can be huge. Ranchers can move livestock from one pasture to another within seconds using their phone, tablet or computer.

Does it work in the real world? Recent research and producer experience is showing that it does.

North Dakota State University Associate Professor and Livestock Environmental Stewardship Specialist Miranda Meehan has been involved with virtual fencing research conducted at three sites across North Dakota and another site in Nebraska. The research, which is just entering its third year, includes both rangeland grazing trials, which are intended to promote biodiversity in pastures, and strip grazing trials, which involve grazing annual forages in the fall. Strip grazing is a method where animals are confined to a small, narrow strip of land for a short time, with the fence moved regularly to provide access to fresh forage and allow the grazed area to rest and recover.

Containment

So far, the collars seem to be doing a good job of keeping the animals within the designated grazing area. “We’ve seen over 90 percent (containment) across both trials,” Meehan said.

When animals escape the virtual fence, it’s usually not a large concern for producers. “Because of the social herding behavior, they go back into the rest of the herd. They’re not out for an extended period of

time, usually,” Meehan said. “As we structure our grazing system, we also structure it so that the water is within that area, and so there's something drawing them back into that area, not just the rest of the herd.”

A few escapes shouldn't be anything new to ranchers. “I think virtual fence is similar to any other fence in terms that you're going to have animals that push it, but also your boundary fence, too,” Meehan said. “Some animals are going to respect, one or two wires of poly wire, and some animals aren't, just depending on what they're trained to.”

The collars allow producers to track which animals escape the grazing area. “We know that a lot of our escapes were the same animal,” Meehan said. “That would be something to consider in your culling criteria moving forward.”

Performance

The livestock performance in Meehan's trials doesn't seem to be affected by the virtual fence collars. “To date, we have not seen any differences in animal performance between [virtual fencing] and our other rotational grazing systems within the rangeland or within our other strip grazing systems within our cover crop,” Meehan said. “However, we were able to get additional grazing days on our three strip graze treatments, which include the virtual fence, a manual fence, and an automatic gate opener.”

While Meehan's research shows the advantage of strip grazing over continuous grazing, some producers have been reluctant to implement the practice.

“Just working with the ranchers that I've worked with here in North Dakota, there's a lot of resistance to strip grazing, not because they don't think it's effective, but because you have that extra labor. We're putting (fence) up and down every year, but also we have wildlife running through it. And, so, is it even going to stay up?” Meehan said. “So, I think (virtual fencing) is a really great option in those scenarios where we can more effectively use those annual forage resources without that hassle of putting up a fence just to take it down at the end of the grazing season.”

Payoff

Meehan noted that the collars are not labor-free. It can take some time to learn how to best use and apply the system. Also, depending on the system being used, it can take anywhere from four days to two weeks to train the animals to respond to the collars, Meehan said.

Despite the training time and the learning curve, the collars can be a labor solution for producers.

“Because the labor is a different type of labor,” Meehan said. “I think labor is an issue within our area, especially on our livestock operations, and so if we can reduce some of that manual labor, I think that helps our producers in the long run.”

Another advantage of the system is the data it provides.

“How can we use this data that we're getting in the platform to enhance our grazing management?” Meehan said. “For example, we get heat maps, so we can look at that to determine utilization. If there's places that are missing across that pasture and there are places that are getting used more heavily, maybe we need to adjust things a little bit.”

Virtual fencing also gives producers opportunities to graze areas that don't already have fences in place.

"There're some cost comparison calculators out there through the University of Arizona that compare the cost of our four different virtual fence vendors to putting up a traditional fence for an area, and it's really quite comparable," Meehan said. "And so I do think it's a great option to optimize and put in a rotational system, to use on a rented pasture where you can't or don't want to invest in that infrastructure."

The best way to make a virtual fencing system cost effective, Meehan said, is to find a way to fully integrate it into your grazing system.

"How does it complement or enhance your existing grazing plan? If you can't quite figure out a natural way for it to fit in, then I don't think it's worth that investment at this time," Meehan said. "If it's something that you can find a way to use across multiple grazing seasons, so you are utilizing it for most months of the year, it will pay for itself faster."

Targeted grazing

Rancher and retired Natural Resources Conservation Service Area Rangeland Specialist Lealand Schoon has found a novel way to use a virtual grazing system to improve his rangeland. He runs cattle, sheep and a few goats on 2,000 acres of grassland near White River, SD.

Concerned about the loss of grazing lands to encroachment from woody plants, Schoon started using goats for targeted grazing to control undesirable species like eastern red cedar, chokecherry, snowberry and buckbrush in early 2024. He started by containing 10 goats in a corral with a diameter of approximately 30 feet surrounded by a strand of poly wire to prevent escapes.

The problem was that he had to move the corral and the goats every day.

"What we had been doing was just so labor intensive that we always considered virtual fence," Schoon said. "What finally made us make the decision was attending a grazing conference down in Tucson, Arizona, and hearing a rancher panel discussion. There were both representatives of the virtual products and producers that told their story. When I heard a producer talk about (virtual fencing) and how well it worked with their goats, it was then I was able to make a positive decision. As a producer, I was thinking to myself that it takes so much labor away, it might be worth the investment to get the virtual fence instead of the panels, dragging them around every day. We made our virtual collar purchase in mid-December of 2024, and we've been using them since."

Schoon said that after 10 days of training he felt comfortable using the collars to contain the goats. "We trained them within the corrals that were secure so they couldn't escape if they saw a visual boundary," he said. "Once they were trained to that, we turned them out to where there's no visual boundary. It was fun to see that they pretty well stay in."

Schoon said he's seen savings in money and time as well as an increase in the targeted grazing season for his goats because he's able to move the goats virtually during the winter when weather and snow conditions would prevent him from being able to move the corrals.

"We figured, with the panels, moving the goats every day probably cost one person about \$52 a day to manage that. With the (virtual fence), it's somewhere between \$38 and \$48 a day because we don't

have to go to the goats every day. When we break that down, it's somewhere between \$3 to \$4 per day savings,” Schoon said. “On a per day basis, that doesn't sound like much, but when we first thought we would target graze brush and trees with goats for maybe six months out of the year, it's opened it up to a 12-month browsing period. At \$4 a day times 365, that's \$1,400 savings plus allows time to do something else. For the investment that we put into it, we'll have the collars paid for in less than two years. It's freed up a lot of time, and I think we're more effective right now as far as targeting the species we want.”

Schoon said that the virtual fencing collars give him another tool to help him improve his land.

“A big reason why we're wanting to use virtual technology and goats is just for the integrity of the rangeland,” Schoon said. “We're losing grasslands to urban environment, to cropland, and whatever else, but woody encroachment is just another measurement of loss. A big part of it is my passion for native rangeland and maintaining the integrity and the openness of the grasslands.”

For additional information about targeted grazing and virtual fencing, contact the nearest Natural Resources Conservation Service office or contact the South Dakota Soil Health Coalition at sdsoilhealth@gmail.com or 605-280-4190.



SD Soil Health Coalition photo

North Dakota State University Associate Professor and Livestock Environmental Stewardship Specialist Miranda Meehan explains her research with virtual fencing livestock collars at a workshop in Leola, SD, in March 2025.

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Courtesy photo

Research conducted by North Dakota State University shows that virtual fencing livestock collars can achieve over 90 percent containment of animals within a designated grazing area. The virtual boundary between grazed and ungrazed areas can be seen behind these cattle.

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Courtesy photo

White River, SD, rancher Lealand Schoon began using goats to combat encroachment by woody plant species through targeted grazing early in 2024. He initially used corrals to contain the goats. These corrals had to be moved daily to allow the goats to access new forage.

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Courtesy photo

In mid-December 2024, White River, SD, rancher Lealand Schoon began using virtual fencing collars to manage the goats in his targeted grazing program to combat encroachment by woody plant species. The use of these collars allowed Schoon to keep the goats grazing throughout the winter when weather conditions would have made it difficult to move corrals for the goats on a daily basis.

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