Virtual Fence – A potential new tool for grazing lands management in Florida

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Published in *The Florida Cattleman and Livestock Journal*, March 2024

Virtual Virtual fencing is a new technology that allows ranchers to control livestock distribution in grazing lands without physical fences. Livestock wear collars (Figure 1) that contain both GPS and radio frequency transceivers that communicate with reception towers to keep them within a specific area designated by the land manager. When the livestock reach the limit of the virtual fence, auditory stimuli (often a series of loud beeps) emit from the collar. If livestock pass the fence limit, they receive a benign shock. Cattle have demonstrated the ability and tendency to rapidly learn the virtual fencing cues, eventually responding to the audio cue alone. Usually, a 4-day training period is all that is required before cattle are turned out to pasture or rangeland with the virtual fence boundaries. In addition, the GPS technology tracks the exact location of cattle in real time, allowing the manager to identify unusual behavior of cattle movement within the property. The control and set up of the boundaries and cattle monitoring is managed by software that can be installed on a computer or smartphone (Figure 2).

The technology has been particularly effective to manage cattle in rangelands with large land areas and remote access. It may be not practical nor economical to build fences to manage grazing in some areas due to the vegetation, topography, and hydrology. For example, federal agencies in the western states have tried to exclude grazing from partially burned areas with the construction of fences. However, the procedure is costly, may not be implemented in a timely manner, and may cause unintended negative effects on wildlife and ecosystem services.

Virtual fencing has been effective to control grazing and allow managers to make decisions on stocking densities and grazing methods. It has been reported that uncontrolled grazing may cause deleterious effects on rangelands such as the encroachment of undesirable species, decreased population of forage species with better nutritive value, deleterious effects on soil properties, and loss of wildlife habitat. It can also exclude cattle from riparian areas, environmentally sensitive areas, and recently burned areas. In Florida, virtual fence may be of special interest and used to drive and track cattle to safe areas before and after periods of extreme weather conditions, such as hurricanes and flooding. It has been reported that virtual fencing can reduce labor costs by over 25% and there is potential to reduce the investment in building and maintaining fences by 30% (Vence – Merk Technology, personal communication).

The virtual fence system is not known to have any negative effects on livestock. A series of studies have been conducted in Oregon testing the effects of virtual fence on animal behavior and stress. The results indicated that cattle subjected to virtual fence did not change their behavior and there was no difference in the blood metabolites indicators of stress before and after the placement of the collars and training of the animal using the audio and shock stimulus.

A pilot project with virtual fence has been conducted at the Blackbeard Ranch in Myakka City, FL by Mr. Jim Strickland (Figure 3). The objective of the project has been to test the effectiveness of the technology in maintaining cattle in the designated areas and moving cattle to other paddocks in pastures and rangelands. The preliminary data showed that 96% of the cows were kept in the designated area and only 3% of the cows moved to undesignated areas.

A new research project has been initiated at the University of Florida/IFAS - Range Cattle Research and Education Center by the Long-Term Agroecosystem Research (LTAR) group with the objective to test the use of virtual fence to compare rotational and continuous grazing methods on animal performance, plant characteristics, and ecosystem services in rangelands. Additionally, the effects of different grazing methods on carbon sequestration and greenhouse gas emissions will be evaluated. The cows have access to approximately 200 acres (continuous) or grazing is restricted to 1/3 of the area and animals have access to a different paddock every 35 days (rotational). The grazing period is from January to April. The preliminary grazing maps indicated that animals have explored the areas with rotational grazing more uniformly (Figure 3) and there was no detrimental effect on animal performance due to the use of virtual fence.

Currently, the approximate cost to install the tower and collars is approximately $200 / head / year and it has been used by some producers, state, and federal agencies in the USA, Europe, and Australia. However, the technology is evolving, and several improvements have been made to the collars and software, which may decrease the cost for producers.

If you have any questions about the virtual fence, please contact Joe Vendramini at jv@ufl.edu.

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Upcoming Event

March 12, 11:00 – 11:45 a.m. Join us for the Ona Highlight ‘Invasive Grasses’ with Dr. Brent Sellers and Mark Frank with Invasive Plants at the Florida Museum in Gainesville. See our website calendar (link below) to register for the Zoom broadcast or register to attend in person by calling 863-735-1001.

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UF/IFAS Range Cattle REC - 3401 Experiment Station Rd., Ona - http://rcrec-ona.ifas.ufl.edu/

Figure 1. Cows wearing the virtual fence collars at the Blackbeard Ranch in Myakka City, FL.

Figure 2. Screen of the Vence software used to manage the herd using a virtual fence at the Range Cattle Research and Education Center. The yellow highlighted area represents the limits of the virtual fence.

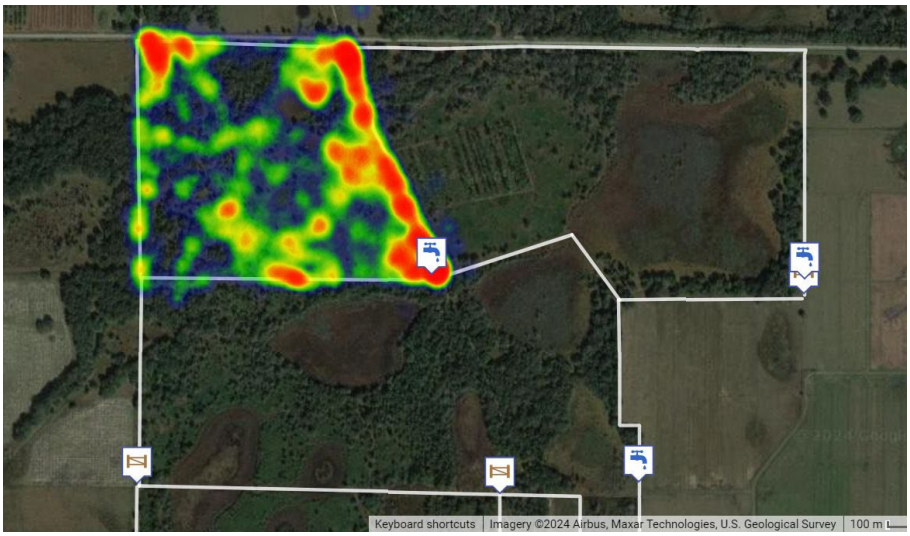

Figure 3. Rangeland with the grazing area restricted by virtual fence (rotational grazing). The areas indicated in red have greater frequency and yellow and green lesser frequency of the cows during the 30-day experimental period.

Figure 4. Rangeland with the grazing area restricted by virtual fence (continuous grazing). The areas indicated in red have greater frequency and yellow and green lesser frequency of the cows during the 30-day experimental period.