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Simplifying No-till Livestock Integration with Virtual Fence

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Daniel Bonacker – Owner/operator of Big River Grain and Cattle

Outline of today's talk

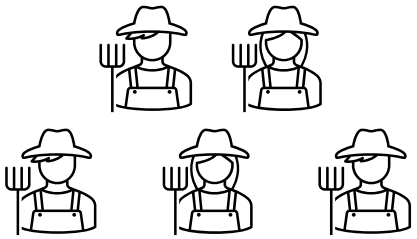
- CRA Virtual Fence Program
- Introduce Virtual Fence
- Virtual Fence Companies
- Virtual Fence Utilization
- Hear from a producer using virtual fence
- Questions

Bringing virtual fence to Missouri producers

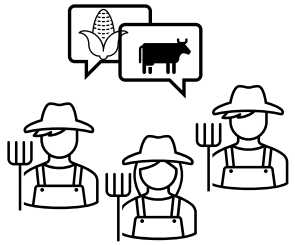
Project Goal

Increase the adoption of cover crop grazing across Missouri and introduce virtual fence as a tool to over come common grazing challenges like physical fence limitations.

Project Components



5 Missouri Producers who have experience grazing cover crops were selected to test virtual fence on their operations

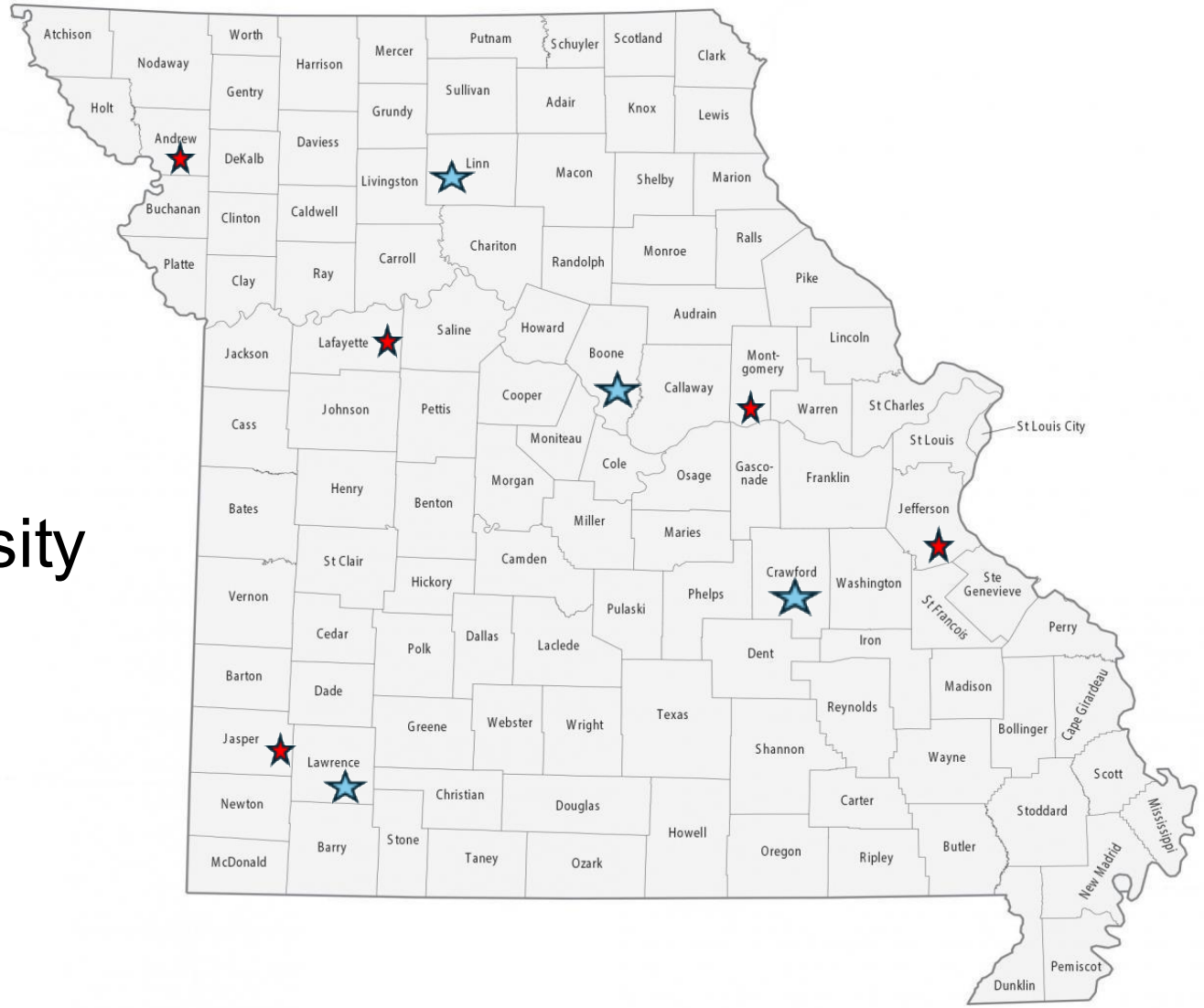


Create a farmer-to-farmer network where producers can go to each other for questions and ideas when implementing cover crops

Host Educational events and field days showcasing virtual fence and the 5 producers experience with the technology

Program private farm locations

Program university farm locations



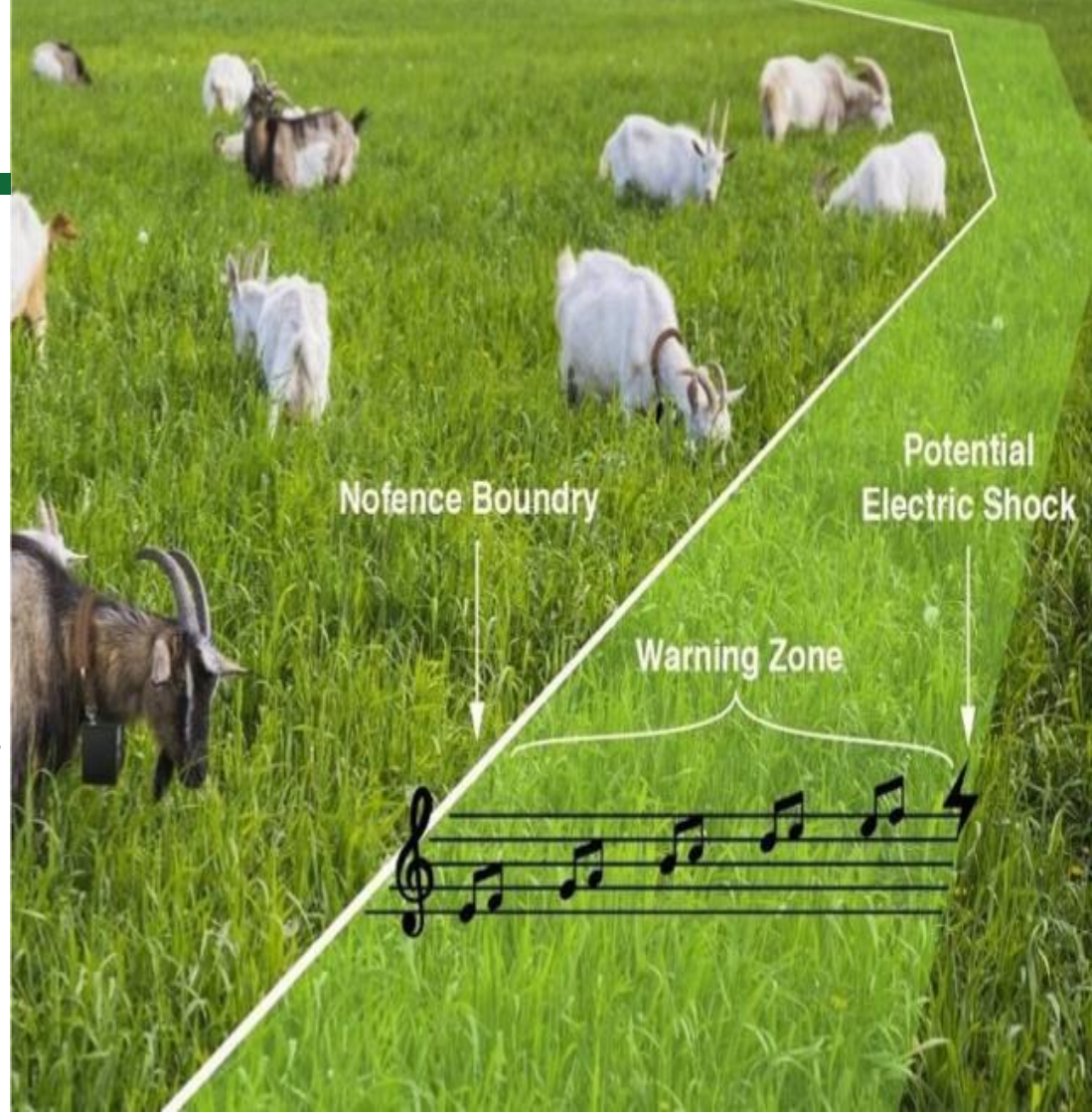
What is virtual fence?

New precision livestock technology that allows producers to track and manage livestock location without the need of physical fencing.

(physical fencing along roadways is always recommended)

The system utilize GPS coordinates to establish invisible virtual fence boundaries and livestock location

Each animal is equipped with a virtual fence collar that keeps the livestock in or out of an area by administering sensory cues such as vibrations, sound and electrical stimuli.

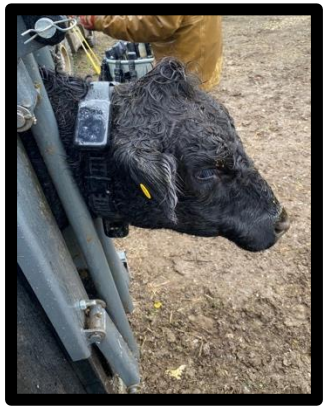


History of virtual fence

First virtual fence prototypes early 2000's

(Anderson 2007)

Today's virtual fencing collars 2025



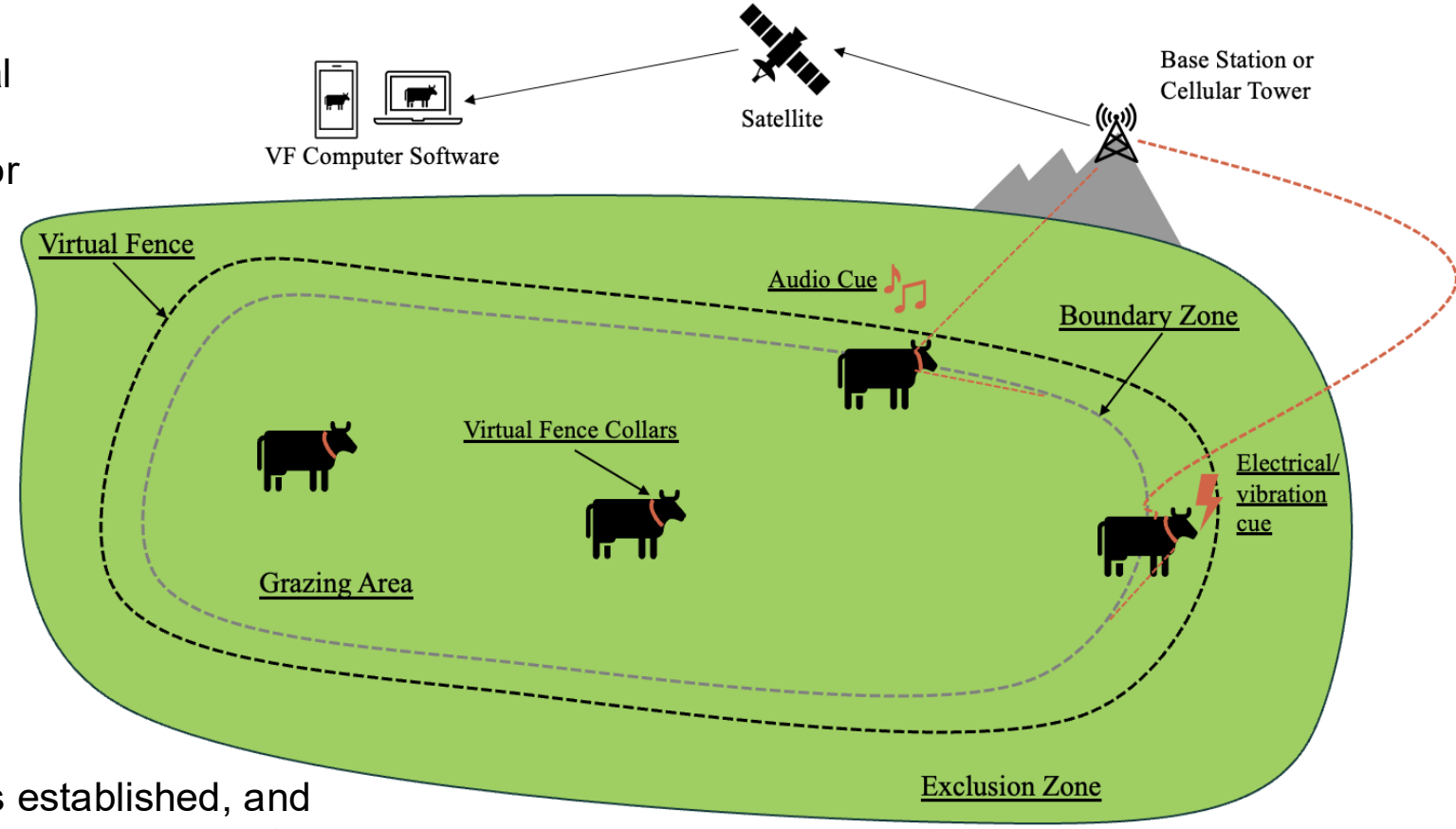
Virtual Fence: How it works

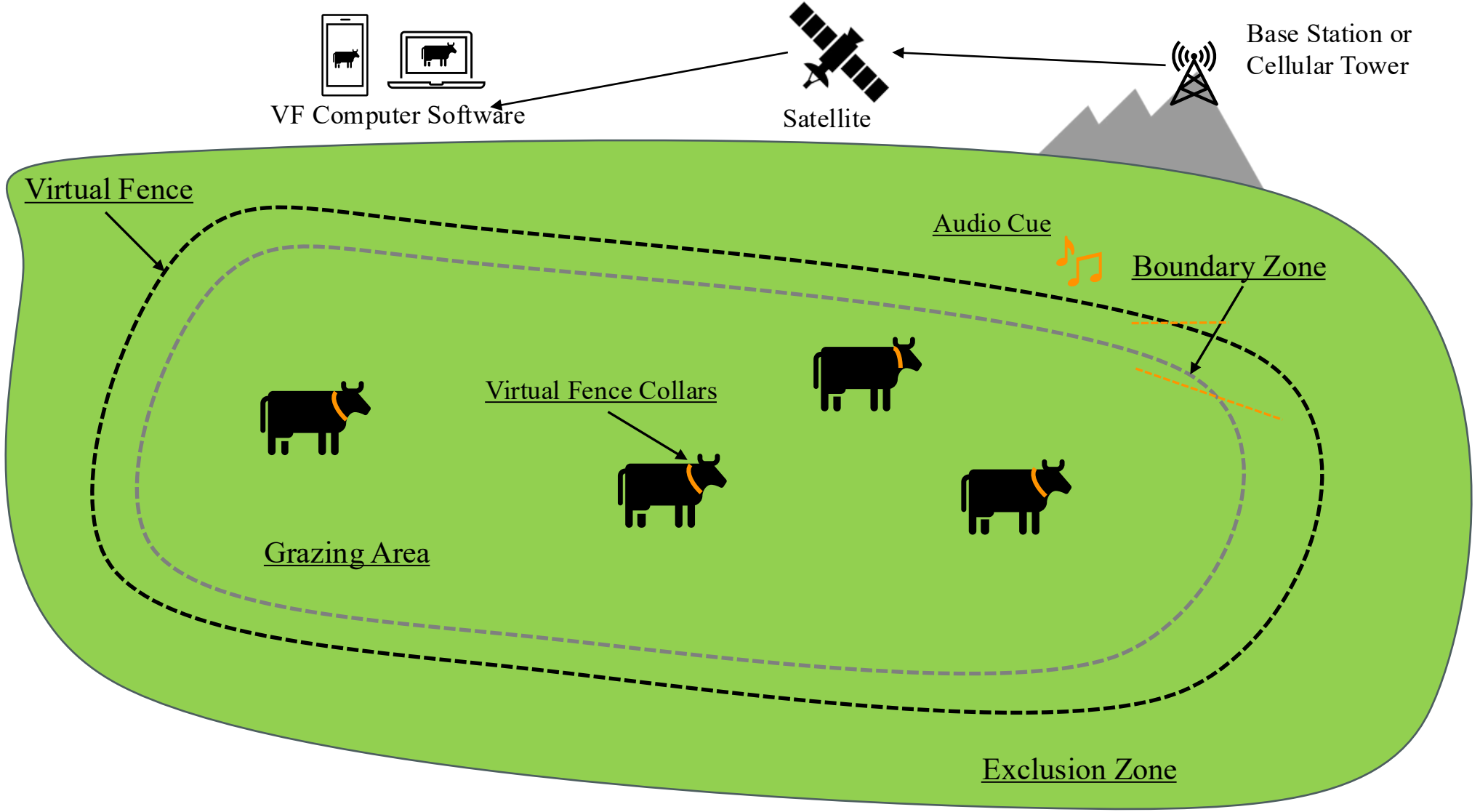
Each animal is equipped with a virtual fence collar

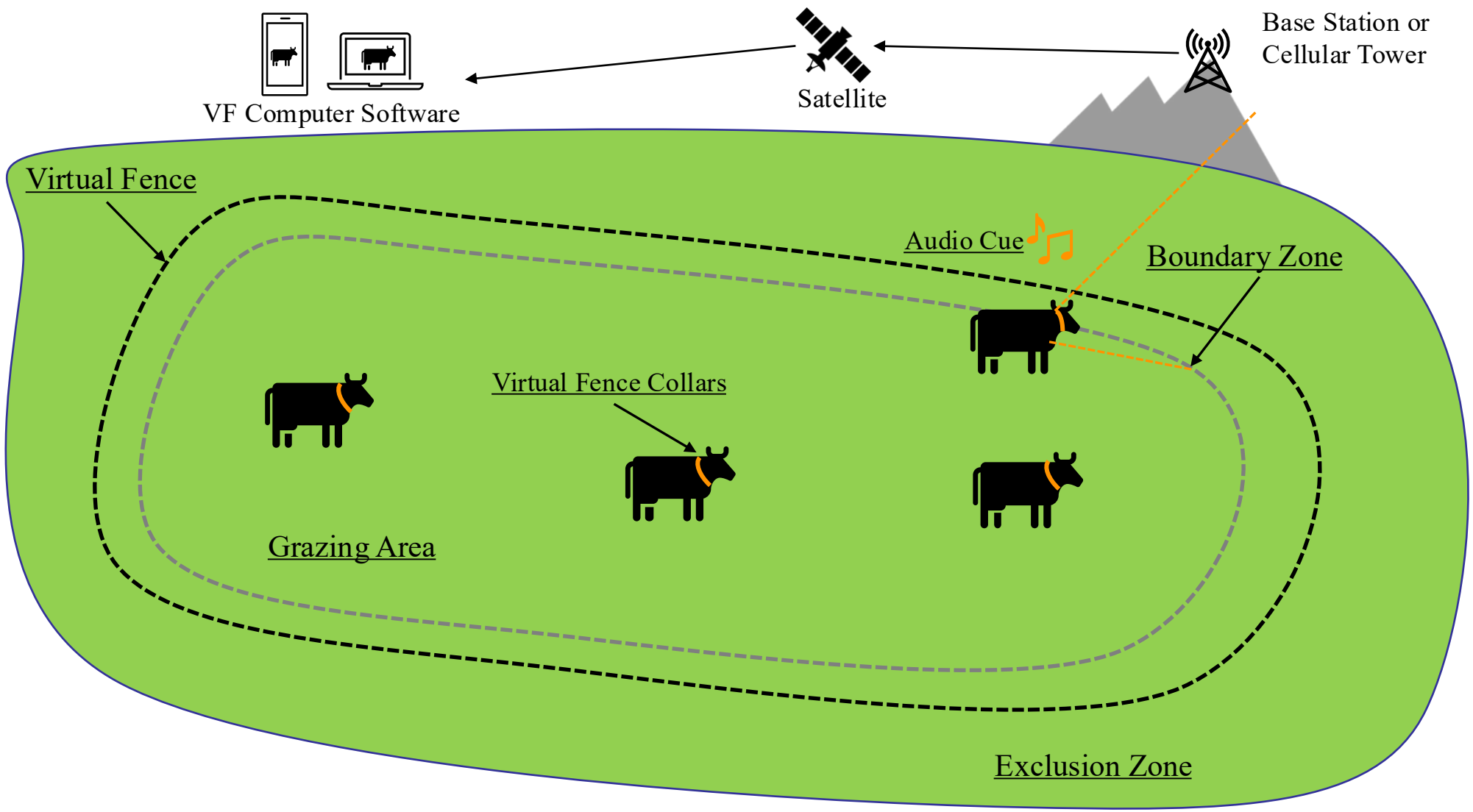
Producers draws virtual fence boundaries on phone app, computer or tablet

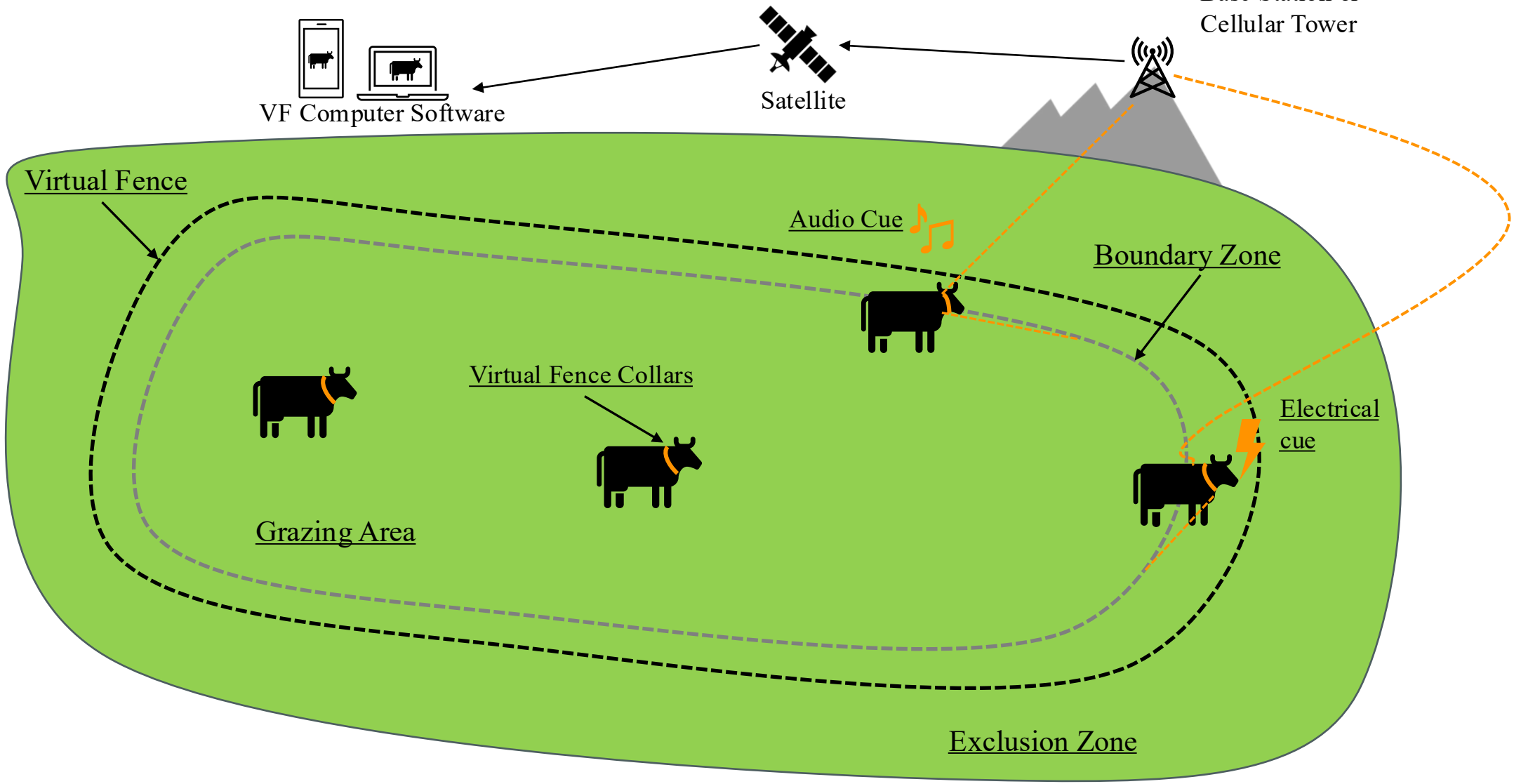
GPS coordinates are sent to virtual fencing collars via on the ground base station or cellular tower

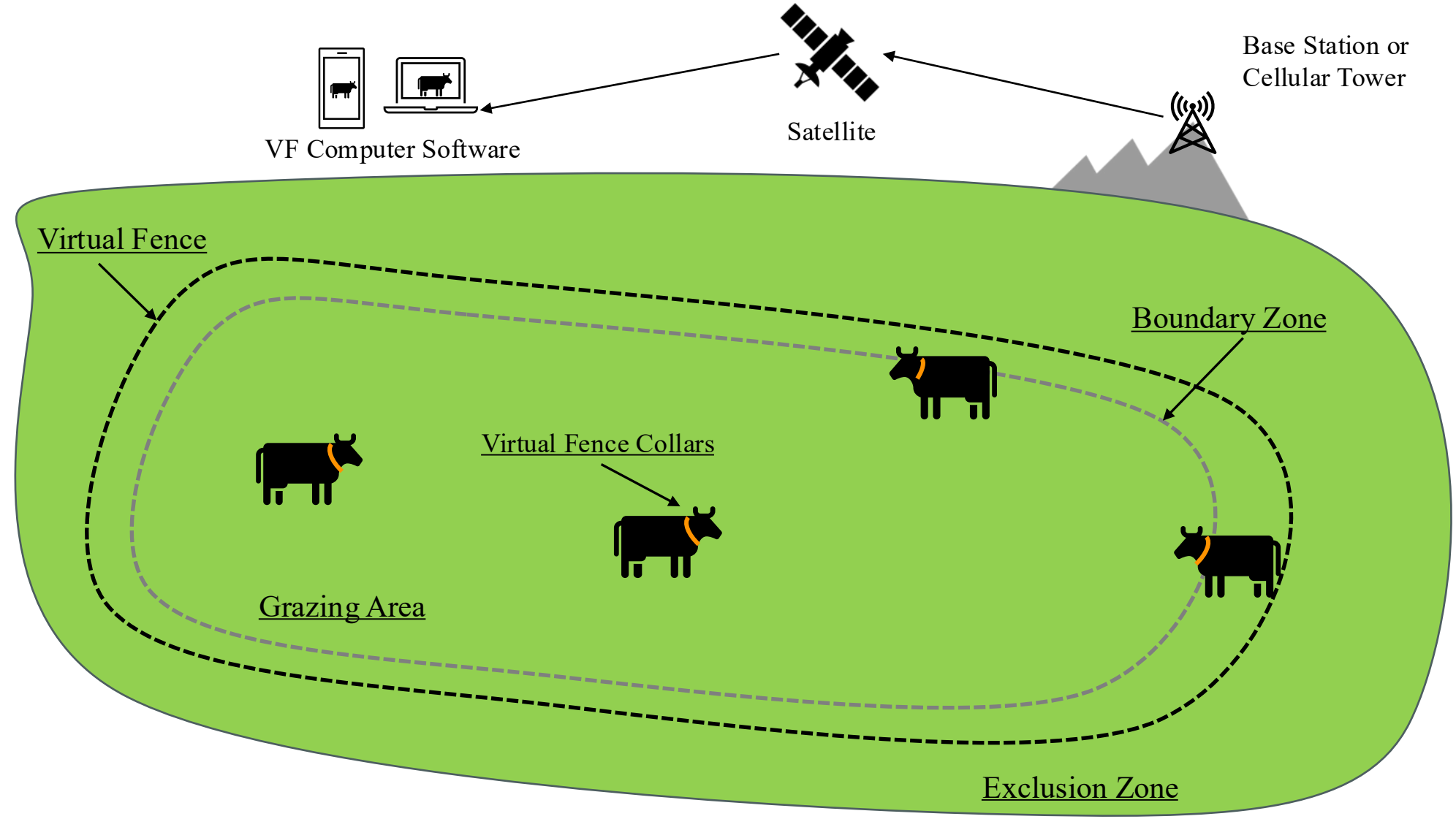
The virtual fence is established, and the livestock are met with stimuli if they try to exit the grazing area











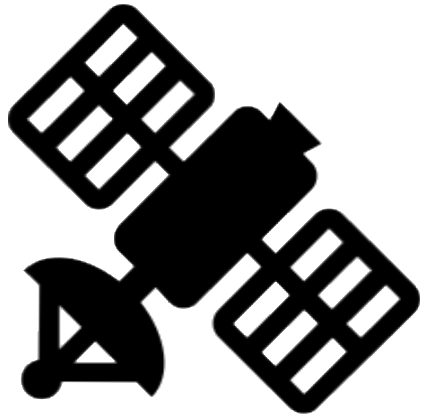
Training livestock to virtual fence

- Training is a key component to making sure your animal understands how to properly react to the system stimuli
- Virtual Fence is based on Associative Learning
- When training livestock for the first time don't be surprised to see strong reactions when exposed to the system stimuli
- Average training process takes 5-7 days

Key factor to consider!

Virtual fence is designed to act more as a cross-fencing system then a perimeter fence system a physical boundary fence is **always** recommended

Cellular vs Tower based systems



Collars use cellular networks to communicate directly with the collars and the app or web interface.

The base station acts as a relay passing information between the collars and the app or web platform by connecting to nearby cellular towers or another internet source

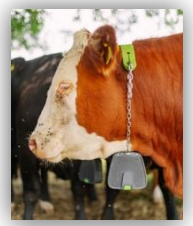
The Companies

Vence

Battery: Lithium Battery (Life expectancy 6 months -1 year)
Livestock: Cattle
System requires tower

Nofence

Battery: Solar Rechargeable Battery (Need swapped out periodically)
Livestock: Cattle, Sheep, and Goats
Cellular based system



Halter

Battery: Solar charged
Livestock: Cattle
System requires tower

eShepherd (Gallagher)

Battery: Solar charged
Livestock: Cattle
Choice between tower or cellular based system

Virtual Fence Company Cost Examples

This document isn't meant to be shared or posted on social media or public websites

CRA Virtual Fence Program Information

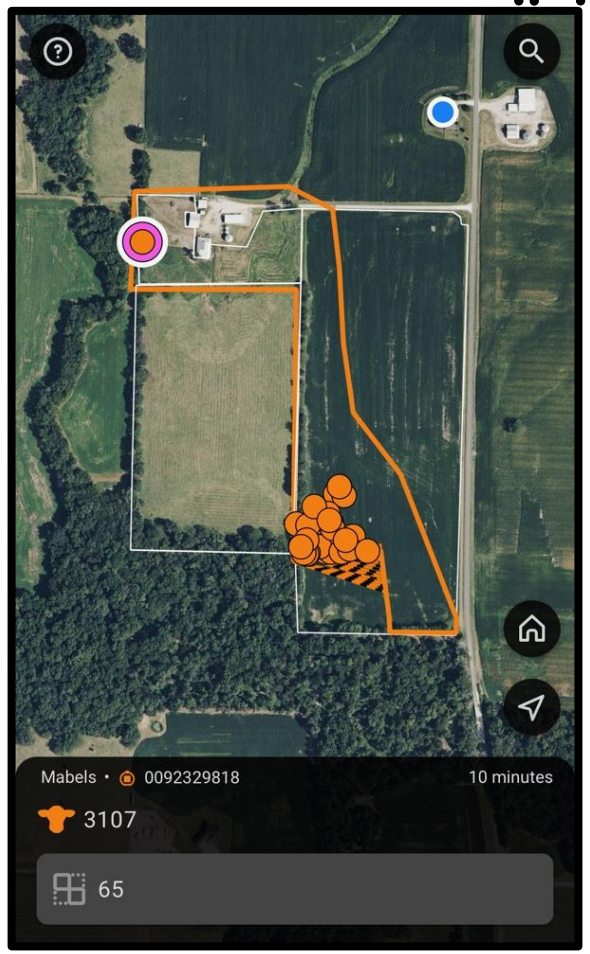
VIRTUAL FENCE COMPANY	LIVESTOCK	COST PER COLLAR	SUBSCRIPTION FEE *PER COLLAR*	ADDITIONAL INFRASTRUCTURE	BATTERY
HALTER	Cattle	No up-front fee	*(collars purchased)* (50- 99) $96 Annually (100+) $72 Annually	Tower $4,500 Monthly Internet fee $50	Solar Charged
ESHEPHERD	Cattle	*(collars purchased)* (<20) - $350 (20-59) - $300 (>60) -$250	Tower $1.50/Month or Cellular $2.00/Month	Tower $6000 Additional Towers $5,000 Cellular $0.00	Solar Charged
NOFENCE	Cattle, Sheep, & Goats	*(collars purchased)* Cattle: (5-49) $345 (50+) $331 Sheep & Goats: (5-49) $255 (50+) $241	After the first 12 months... (5-49) $45 Annually (50+) $32 Annually	Battery Chargers 1 charger per 10 collars. Cattle $49 Sheep/Goat $39	Solar Charged/ Rechargeable
VENCE	Cattle	No up-front fee	$40 Annually	Tower $10,000 Set up Fee $2,500	Replaceable $10 per battery

Center for Regenerative Agriculture
University of Missouri

Information as of August 2025 for the most up to date company information and pricing please see company website

What can virtual fence do for your operation?

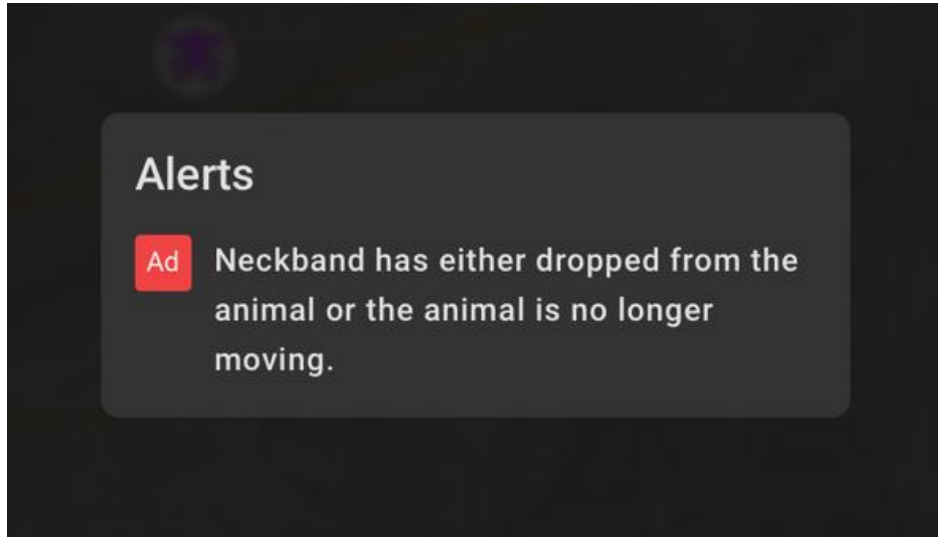
Real time livestock location tracking



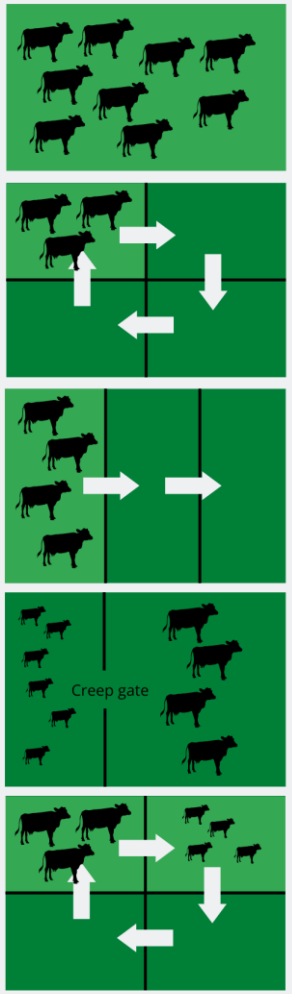
Protect sensitive areas

Image credit eShepherd

Cattle behavior alerts



Common Grazing Methods



Continuous Grazing
One pasture system where livestock is allowed to graze indefinitely.

Rotational Grazing
Pasture is divided into paddocks and animals are rotated through paddocks.

Strip Grazing
Livestock is moved once or twice a day across a pasture in strips in a single direction.

Creep Grazing
Younger animals are given access to high nutrient forages.

Leader-Follower
Younger animals feed on high nutrient forage first followed by animals with lower nutritional requirements.

farmbrite

Grazing Method	Pros	Cons	Efficiency (percent of available forage utilized)
Continuous	• Simple • Cattle can selectively graze • Minimal management/input cost	• May lead to overstocking and overgrazing • Pastures not evenly utilized • Potentially lower herd performance	30-40 percent
Rotational Grazing	• Increased rest periods for forages • Improved nutrient distribution from manure • Flexibility in managing excess forage • Better matching of animal nutrient requirements • May decrease need for supplementation	• Increased initial input costs for fencing and water systems • Requires more labor for moving cattle and monitoring forage supply	Simple Rotation (3-4 paddocks) 50-60 percent Moderate Rotation (6-8 paddocks) 60-70 percent
Strip Grazing	• Ideal for stockpiled forage systems • Decreased animal selectivity	• Medium/high labor • Land needs to be broken into manageable units • May reduce animal performance • More management decisions	70-80 percent

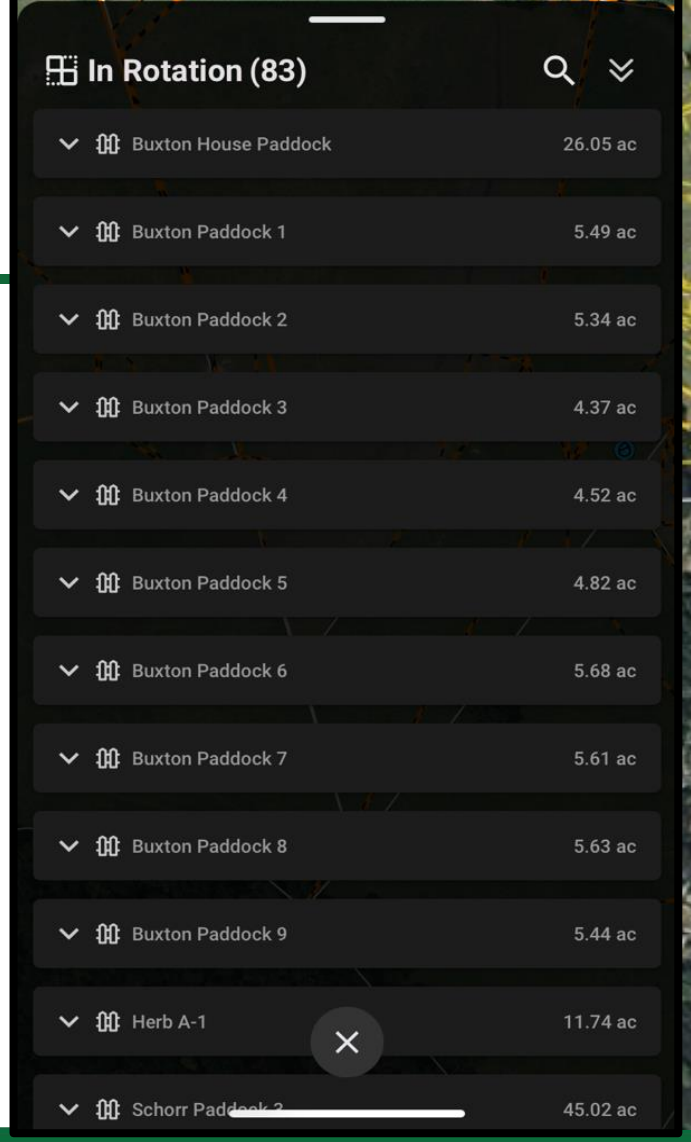
Table 1. Pros, cons and efficiency of continuous, rotational and strip grazing systems.

Table Credit: Institute of Agriculture, University of Tennessee

Virtual Fence Program Producer: Daniel Bonacker

Owner/operator of Big River Grain and Cattle in Cedar Hill, MO
Crops: regeneratively raises corn, soybeans and rye along with custom harvesting
Cattle: registered Charolais herd, commercial herd and does custom grazing
Utilizes adaptive grazing systems focusing on long periods of rest and native warm season grasses and forbs.
Integrates his livestock onto cover crop fields grazing both winter annual and summer annual cover crops

Rotational grazing using virtual fence



Strip grazing using virtual fence

Key virtual fence takeaways

- Enables producers to strategically manage livestock grazing more easily than physically moving cross fences.
- Virtual fencing is designed to function more like a cross-fencing system rather than a perimeter fence. A physical boundary fence is always recommended!
- Properly training livestock on virtual fence is important for livestock welfare.
- Virtual fencing is not suitable for every operation. It is important to analyze whether the technology is cost-effective and how it could benefit your operation.
- Virtual fencing should not replace physically checking cattle or monitoring cover crops, but it can be a valuable tool to make these tasks more time- and energy-efficient.

Questions?

The Center for Regenerative Agriculture's Virtual Fence Program is funded through the National Fish and Wildlife Federation Conservation Partners Program (grant # 2004.24.083173). Supporting funding for our cover crop educational programming related to virtual fencing is from the Walton Family Foundation (grant # 00110474).

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