Virtual Fencing for Western Slope Producers

A practical guide based on four years of on-the-ground producer experience

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What is Virtual Fencing?

Virtual fencing (VF) replaces physical wire fencing with a GPS-enabled collar on each cow and a network of base stations (often called "towers"). Producers draw boundaries on a computer or phone app; as a cow approaches the line, the collar emits an audio warning, and a mild electrical stimulus if the boundary is crossed. The collars also send location data, so cattle can be tracked in near real time.

VF is best understood as a management tool that supplements, not replaces, traditional infrastructure, water development, and stockmanship.

AT A GLANCE (details vary per vendor)

- **Setup:** Requires collars, base stations and cellular coverage*, and 2+ weeks of cattle training
- **Yearly Collar Cost:** $18 - $96 per collar
- **Infrastructure Cost:** $4,500 - $12,500 per tower/base station
- **Collar Battery:** Solar or replaceable one-time use
- **Lifespan:** 5-10 years per collar

** Satellite based systems are in development*

Benefits Producers Observed

Producers consistently emphasized that benefits varied by terrain, herd behavior, and level of engagement with the technology. The following represent the most commonly observed advantages.
Please note: *All producers interviewed used Vence as the vendor.*

Benefit	What Producers Observed
Real-time location of cattle	Universally cited as the single most useful feature — saves trips, helps locate strays, shortens fall gathers, and allows producers to check cattle locations before riding. Particularly valuable in large or rugged allotments where cattle are difficult to find.
Better grazing management and rest-rotation	Producers used VF to hold cattle in targeted areas longer, improve distribution, and rest sensitive or overused areas. Most effective when paired with existing grazing plans and where water availability supports distribution goals.
Access to areas that would otherwise be off-limits	VF enabled grazing on properties where physical fencing is not feasible or permitted, and in some cases supported more flexible permit negotiations with BLM and USFS.
Excluding cattle from problem areas	Effective for reducing use in large or moderately attractive areas such as poison plant patches, burned areas, or recreation corridors. Less reliable for small, high-attractant areas (e.g., water sources or lush forage).
Heat maps and grazing data	Many producers found grazing data more valuable than the fencing itself. Heat maps reveal actual livestock use patterns, informing water development, fence placement, brush management, and conversations with land managers.
Time and labor savings	Reduces time spent locating cattle and coordinating gathers. Supports more proactive management, though savings may be offset by monitoring and system management time.
Improved ability to respond to changing conditions	VF allows producers to adjust grazing patterns quickly in response to drought conditions, forage availability, and water distribution.
Learning tool for better long-term management	Producers reported that VF helped them better understand how cattle use the landscape, where pressure is concentrated, and what management changes are actually effective.

Limitations to Understand Before You Start

Producers emphasized that limitations varied by terrain, herd behavior, and level of engagement with the system. The following constraints were consistently observed across operations.
Please note: *All producers interviewed used Vence as the vendor.*

Limitation	What Producers Observed
VF is a tool, not an autopilot	VF does not replace physical infrastructure, riding, or stockmanship. Successful use requires consistent operator engagement. Many VF benefits are achieved in concert with traditional range practices.
Rugged terrain reduces effectiveness	Performance is highly dependent on terrain. Coverage is often inconsistent in canyons, dense timber, and ravines. Movement fences are generally ineffective in steep or complex terrain but can work in flatter areas.
GPS is not pinpoint accurate	Virtual boundaries are not precise enough for small exclusion zones. "Postage-stamp" areas (e.g., small riparian zones or individual water sources) are difficult to protect reliably. Producers recommend maintaining buffer zones (often several hundred feet) between VF boundaries and sensitive areas. ***This may vary depending on the vendor.***
Collar reliability declines through the season	Producers reported collar loss or failure (due to collars falling off, battery depletion, or malfunction), commonly ranging from 10–30% collars affected, and in some cases higher by late season. Collar retention on bulls is particularly unreliable. ***This may vary depending on the vendor.***
Time-lag on commands	Fence updates are not instantaneous and may take an hour or more to reach all collars. Grazing moves require advance planning rather than real-time response.
Software learning curve	Most producers experienced a steep learning curve, particularly in the first year. Time requirements can be significant during setup, and is ongoing throughout the season.
Animal behavior varies	Cattle response is not uniform. Younger or previously trained animals tend to adapt more quickly, while older or experienced cattle may push through virtual boundaries when motivated by water, preferred forage, or familiar areas.
Limited system feedback and diagnostics	Producers reported difficulty identifying which collars were functioning properly. System feedback is often incomplete, making decision-making more difficult.

What Producers Learned

Training is foundational to success
Many producers recommend training cattle in a small pasture or hayfield for several weeks prior to turnout and retraining new animals each season.

Local knowledge is critical
VF is most effective when paired with a strong understanding of the landscape. Terrain features such as ridges, drainages, and vegetation patterns influence how cattle respond to virtual boundaries.

Consistent monitoring improves outcomes
Producers who incorporate VF into a daily routine (regularly checking herd locations and system status) reported better results than those who engaged less frequently. VF requires active, ongoing management.

Fence placement must work with terrain, water, and animal behavior
Successful placement depends on understanding cattle behavior. Boundaries placed along ridgelines or natural barriers were more effective, while downhill placement often led to cattle pushing through. Producers found that when VF placement did not work with the terrain, cattle learned to break through boundaries, reinforcing unwanted behavior that could take time to correct, and reducing battery life.

Expect adaptation over time
Most producers reported that success improved with experience. Initial challenges were common, but over time they successfully refined fence placement, cattle training, and management strategies.

Where Physical Fencing May Remain Essential

- **Boundaries with neighboring operations not using VF:** Livestock movement cannot be reliably controlled at shared boundaries due to imprecision of collar GPS locations.
- **High-value or high-risk areas:** Includes hayfields, corrals, headquarters, and crop areas where livestock are strongly attracted and the consequences of a breach are significant.
- **Public safety boundaries**: Areas along highways, roads, and subdivisions require reliable physical fencing, as even a single failure presents safety risks.
- **Small or tightly confined areas**: With some vendors, virtual fencing is not well-suited for small exclusion zones (e.g., individual structures, water sources, or narrow riparian strips) due to current GPS accuracy and minimum pasture size limitations.
- **Areas without adequate coverage or infrastructure**: Locations lacking sufficient connectivity or where base stations cannot be installed are not suitable for VF as a primary containment method.

Recommendations for Producers Considering Adoption

Treat the first year as a learning phase

Approach Year 1 as a training period. Set modest goals and expect a learning curve for both producers and cattle. Producers consistently reported early challenges; starting with simpler management plans, lower upfront investment of time, and a willingness to experiment generally led to more successful outcomes.

Evaluate fit with your operation

Virtual fencing is not one-size-fits-all. Producers emphasized that success depends on alignment with terrain, herd behavior, management style, and willingness to engage with the technology.

Plan for facilities and labor needs

Safe and efficient collaring requires appropriate infrastructure and labor. Producers reported needing adequate handling facilities and sufficient time for collar deployment. Improper application can lead to safety risks or equipment loss, as well as suboptimal system functionality.

Align timing with grazing schedules

Ensure collars and equipment are in place before turnout. Delays in funding decisions or equipment delivery can significantly reduce the usefulness of the system for that grazing season. Advance planning is critical in successfully training the herd to the technology before relying on it for management.

Anticipate a shift in workload

Virtual fencing changes how time is spent rather than eliminating work. Expect increased time spent on computer-based management and monitoring, balanced by reduced time locating and moving cattle. Consider who will be responsible for managing the technology and how this fits within existing roles and operations.

Learn from nearby producers

Engage with producers operating in similar terrain. Local experience can provide valuable insight into infrastructure needs (e.g., number and placement of base stations), coverage limitations, and practical management strategies that may not be evident from vendor materials.

Set realistic expectations for ecological outcomes

Virtual fencing can support improved grazing distribution and rest-rotation strategies, but changes in vegetation and range conditions occur over longer timeframes. Producers emphasized the importance of consistent management over multiple years (often 3–5+ or more) and noted that weather variability can influence short-term results.

Where Virtual Fencing Supports Conservation Goals

Conservation Application	How VF Supports Conservation Goals
Rest-rotation grazing at landscape scale	Enables rest-rotation systems on landscapes that are too large or rugged to cross-fence economically.
Wildlife movement	Reduces the need for new physical fencing, helping maintain movement corridors for species such as mule deer, pronghorn, and elk. May also reduce fence-related impacts in sensitive habitats.
Sensitive area exclusion at scale	Supports reduced use of large or moderate-priority areas such as recent burns, poison patches, recreation corridors, and larger riparian zones where adequate buffer space and alternative water sources are available.
Documenting management and outcomes	Heat maps and grazing distribution data from technology-associated app interfaces provided producers with defensible information to share with land managers and partners such as the BLM, USFS, NRCS, and other conservation partners.
Drought response and adaptive management	Allows producers to adjust stocking rate or grazing distribution in response to forage and water availability, supporting more flexible management given upcoming growing-season and interannual variability.
Reduced infrastructure footprint	Can reduce the need for new permanent fencing, lowering long-term maintenance and material inputs in some systems.

Key Questions to Ask Virtual Fencing Companies

- How many base stations do you recommend for my acreage and terrain, and what does the projected coverage map look like? Can a base station/tower be moved seasonally on a trailer?
- What is the minimum and maximum pasture size that works reliably with your system? How accurate is the GPS in practice?
- Who owns the location data, and who has access? What privacy protections are in place if NRCS, BLM, or Forest Service co-fund the equipment?
- What are the all-in costs (collar, battery, subscription, replacement, and base station hardware) and how do those compare year-over-year? (i.e. upfront cost breakdown and recurring annual costs).
- What is the expected battery life (if applicable) under fall mountain conditions, and what is the realistic collar retention rate at the end of a six-month grazing season?
- What does technical support look like — hours, weekend coverage, response time, and on-the-ground training? Is there a producer-friendly user manual?

Available Resources

- Natural Resources Conservation Service | Virtual Fence Systems for Managing Livestock
- Rangelands Gateway | Virtual Fence User Guide
- Vendor Comparison Guide

Interested in Virtual Fencing for Your Operation?

Contact your local NRCS office to learn about cost-share programs, technical assistance, and whether virtual fencing is a good fit for your operation.

This guide synthesizes insights from interviews (2022–2026) with Colorado producers involved in a virtual fencing trial led by the Eagle County Conservation District and Colorado State University Extension. The trial was supported by a Conservation Innovation Grant from the USDA Natural Resources Conservation Service, along with funding from the Foundation for America's Public Lands.