



Virtual Fencing



What is virtual fencing?

Virtual fencing is a new technology that controls the distribution and movement of livestock without physical barriers. Livestock are fitted with GPS equipped collars that keep the animal in a pre-determined area using two forms of cues – auditory and electrical. As livestock approach a virtual fence boundary, the collar will beep to notify that the animals are getting too close to that virtual boundary. Once the livestock have gotten too close, the collar will emit a short electrical cue. Cattle, sheep, or goats can quickly learn to respond to auditory cues to stay within the virtual boundary.

Who can use it?

Anyone willing to learn the software, putting time into training their animals to virtual fence, and managing their livestock through the software can use the technology. There is a bit of a learning curve, but no more than learning other new technologies.

Users of virtual fences do need an internet connected computer, tablet, or smart phone to connect with the collars and create virtual fences. Software provided by the manufacturers may be used on computer or smartphones. Building fences may be easier on a computers or tablet, while smart phone applications may include real-time pasture adjustments, locating livestock or lost collars

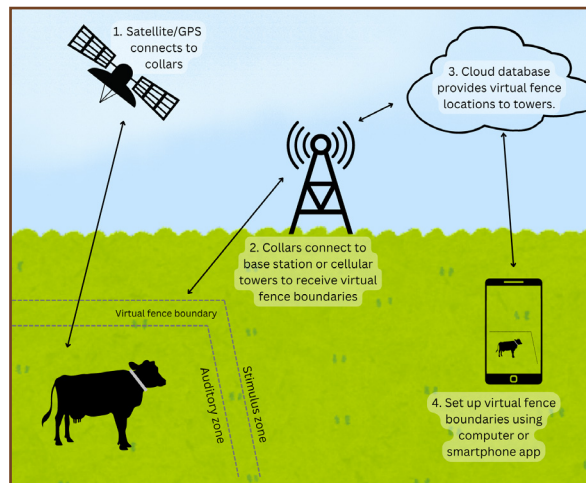
When can it be used?

Virtual fencing can be used now! Many manufacturers of virtual fencing are in the marketplace, with more developers coming online.

Although virtual fences can be used year round, it is best used during the grazing season.

rechargeable battery within the collar may run down faster than if there is strong cellular service.

Base-station systems use a stationary tower to “talk” with the collars. This system can cover various terrain when positioned at certain locations on the ranch. Although, depending on the topography and size of a ranch, multiple base-stations may be needed.



Schematic of how the virtual fence system works.

Where can I use virtual fencing?

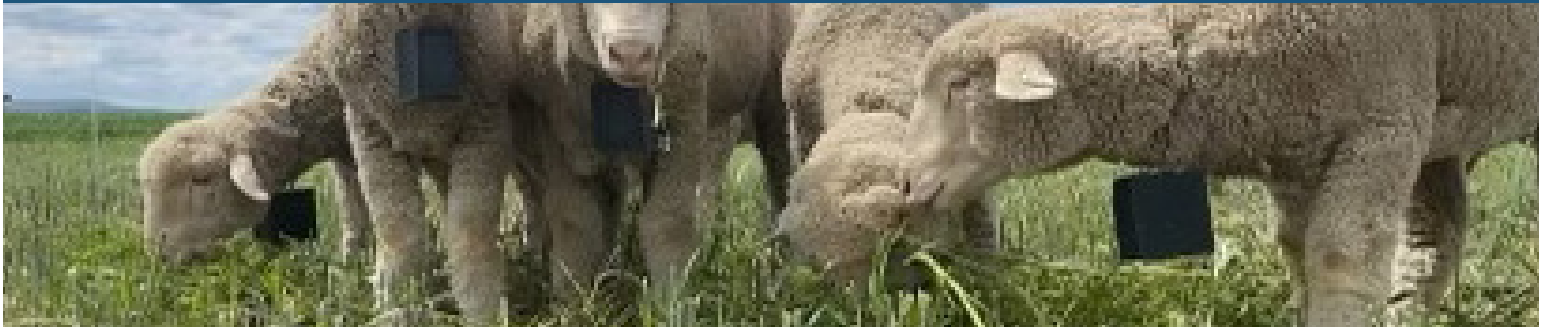
There are two types of virtual fence systems: base-station based or cellular based.

The cellular based systems use the cellular service to ‘talk’ with the collars. The cellular-type collars can be used anywhere with good cellular service. If service is spotty, the

Why should it be used?

- Management flexibility
- Manage areas where fences are not feasible such as leased or rented land.
- Monitor large pastures where cross fences are not present.
- Track animal movements and locations over time.
- Exclude livestock from sensitive areas, such as riparian corridors
- Reduced time fixing fence.
- Fewer fences improve wildlife mobility across the landscape.
- Target graze to manage invasive species.
- Integrate livestock on previously ungrazed land to improve nutrient cycling and soil health.
- Incorporate multi species grazing where proper infrastructure is lacking.
- Reduce understory fuels and create firebreaks.





The main benefit of this technology is the ability to better manage areas that may not be utilized because of distance from water, topography, size of pasture, etc.

How should it be used?

Virtual fences should be used to provide more value to an operation. This could be through better managed pasture, less labor or time (e.g. moving cattle, fixing fence, etc.), or accessing forages that were otherwise inaccessible.

Virtual fencing should not be used in situations where livestock are tightly managed in very small paddocks or areas. Virtual fences are typically more of a gradual boundary, versus a sharp line, so very small pastures may not work well. Further, smaller pastures increase the likelihood that collars will interact with the virtual fence, thereby drawing down the battery.

Virtual fencing should not be used for managing cattle where no management will occur, adversely, where management is already providing adequate utilization of pastures and there would be no added value to managing cattle virtually.

Considerations when purchasing virtual fencing technology

Virtual fencing is a new technology, but there are already many manufacturers in the marketplace. When considering



Example of a base station being protected by cattle panels. (Photo by Emily Rohrer).

what type of virtual fence provider to go with consider the following:

- Type of livestock (some providers only work for cattle).
- Type of service (cellular or base-station).
- Does the land being managed have good cellular service?
- Battery life of product and warranty of product.
- Cost of product and software and ease of use of the software.
- Ability to access manufacturer help desk when questions occur.

Considerations when installing virtual fence technology

Most virtual fence pioneers have found that certain animals respond to the collars, while others will not. With that in mind, a boundary or perimeter fence for the grazing area is a must for those animals that get out of the virtual fence.

When drawing the virtual fence boundaries, utilize natural boundaries when possible. Don't put the fence boundary on the other side of a hill that an animal would naturally just continue walking down – use ridge tops as boundaries or similar.

Try not to use 90° angles when building virtual fences. This can cause confusion, especially with sheep, and may lead to 'break outs' or just no movement at all.

Make sure to design virtual paddocks with water accessibility in mind.

For more information about virtual fence visit:

<https://extension.sdstate.edu/virtual-fencing-emerging-companies-functionality-and-benefits>

<https://extension.sdstate.edu/range-roundup-virtual-fencing-project-takes-place-cottonwood-field-station>

<https://rangelandsgateway.org/virtual-fence>

