COLORADO STATE UNIVERSITY
EXTENSION

TRACKING LIVESTOCK MOVEMENT FOLLOWING EAST TROUBLESOME FIRE GRAND COUNTY, CO

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PROJECT INTRODUCTION

Fitch Ranch, located in Grand County, Colorado, maintains a cattle operation with over 100 adult cattle. The ranch produces high-quality beef for many local restaurants and has many other customers around the state at large. Fitch Ranch grazes their cattle on their own property, along with on the Bureau of Land Management (BLM) and Forest Service allotments they hold. In 2020, the East Troublesome Fire burned just under 200,000 acres in Grand County. Parts of Fitch Ranch and its allotments were included in this burn area, along with sections of fencing in these zones.

In June of 2021, Fitch Ranch began the use of virtual fencing technology on their cattle herd. The virtual fencing system that Fitch Ranch is utilizing was produced by Vence, a company based in San Diego. The system consists of collars that go on the adult cattle and GPS base stations. Vence allows users to control cattle movement and grazing through the creation of virtual paddocks, which can be made on both mobile and desktop applications. When cattle get too close to the boundary of a virtual paddock, they are warned with a sound stimulus through their collar. If they continue to move toward the virtual paddock boundary, their collar gives them a shock stimulus.

INTERNSHIP GOALS

There were multiple goals for this internship over the course of the summer. The first goal of this internship was to provide interns with first-hand experience in cattle and land management, allowing them to learn all the complexities of ranching in the Rocky Mountain West. Another goal was for the interns to get the virtual fencing system up and running. Lastly, it was an objective of the interns to monitor the movement of the cattle and study the effectiveness of the virtual fencing and GPS tracking applications.

HOW DOES THIS APPLY TO YOUR EDUCATION

As an Ecosystem Science and Sustainability major, I have a large focus on how industries can affect the health of the environment and what steps could be taken in making their practices more sustainable. The benefit of a GPS-based collar is that ranchers have a better idea of their cattle's grazing patterns. Virtual fencing technology has the potential to create a more sustainable ranching industry in the future where the land is better managed.

Additionally, Fitch Ranch also requested the creation of maps of their property and allotments, which allowed me to utilize skills from my Geospatial Information Science (GIS) minor.

WHAT YOU DID

My summer with Extension had many different aspects. At the beginning of the summer, I worked one week with the Evangelista lab crew collecting burn data within the Cameron Peak Fire burn scar. This gave me a base knowledge of different burn severity measurements in case I were to be doing any analysis on the East Troublesome Fire.

When I began working at the ranch, the first goal was to set up the virtual fencing components and get the Vence system online. My fellow intern and I put together over 100 collars and built the second GPS base station, which increased the GPS accuracy and allowed for virtual fencing management throughout more of the ranch's property. I also created a small-scale experiment that was meant to examine the effectiveness of virtual fencing in keeping cattle out of unwanted areas, such as riparian zones and burn areas. I used the Vence collars and their extractable data to conduct this study.

The study compiled the daily number of sound stimuli, shock stimuli, and breaches that occurred per each cow on two different exclusionary zones. The two exclusions were located on a creek that runs through a main pasture on Fitch Ranch. These exclusions were put in place to protect the riparian vegetation and to protect cattle from getting stuck within the muddy riparian zone. The two exclusions covered areas of 0.6 and 1.0 acres, and both had shock and sound barrier widths of 5 meters. The two exclusions were active during two different time frames. The first time frame ("Training") consisted of three days that began 48 hours after the collars had officially been activated. The cattle were manually enclosed with the pasture that the exclusions were located in during this period. The second time frame ("Post") consisted of fifteen days and began just over one month after the training period had ended. However, unlike during the training period, the herd was allowed to freely move in and out of the pasture that the two exclusion areas were located in.

Figure 1.

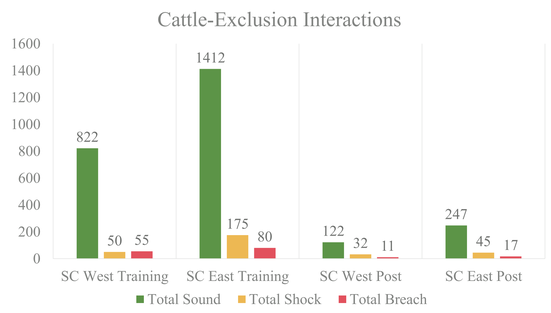

Figure 1. The total amount of received stimuli and breaches that occurred for all collared Fitch cattle in the East and West exclusions for both active exclusion periods.

WHAT YOU LEARNED

My ranching knowledge grew tenfold over the course of the summer. I learned that ranching in the Rocky Mountain West is no easy task. You must have a broad ecological knowledge and must be wary of predators and environmental hazards in order to keep cattle safe. I also learned about the applications of virtual fencing technologies, such as the GPS tracking abilities that make finding cattle in steep terrain areas much easier.

As for my Exclusion study, I had no conclusive results. However, I was able to make some initial findings that could possibly assist in future research approaches. I found that virtual fences prevent breaches to an extent. I also found that cattle are more likely to breach an exclusion if there is more pressure for them to, such as a need to obtain water or pressure from overcrowding.

Figure 2.

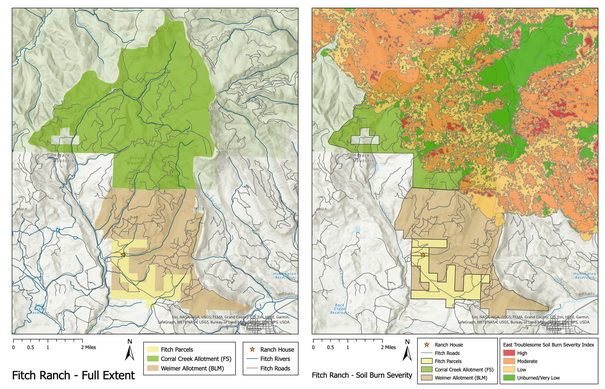

Figure 2. Two of the maps made for Fitch Ranch. Both maps tie together the Fitch's personal property and their Forest Service/BLM allotments. The map on the right also features the Soil Burn Severity Index of the East Troublesome Fire.

NEXT STEPS

More in-depth and longer-term studies on virtual fencing technology could be very beneficial to both the ranching and natural resource communities. These studies could potentially take place at Fitch Ranch or at other Colorado ranches that have recently integrated this technology.

In the upcoming years, Fitch Ranch will be grazing their cattle within the burn patches of the East Troublesome Fire. This also has the potential to serve as a case-study on the interactions between cattle and areas impacted by wildfire.