



**Sustainable
Southwest Beef**
knowledge and tools for ranch and
rangeland resilience

Sustainable Southwest Beef CAP Newsletter **April 2020**

A Message From The Leadership

Hello all:

How things change in a month. In the February newsletter we shared information about all of the exciting activities that the Sustainable Southwest Beef CAP project had engaged in since we were established, including exciting face to face meetings in Las Cruces and Amarillo. Now we are learning more than we ever wanted to know about “social distancing” as we adjust to life in the era of the COVID-19 virus.

Our project faces new challenges, but we are well positioned to continue to advance. Our campuses and schools and K-12 Education Centers are closed but our students continue learning on-line and our team continues to support their education goals. Many of our team are working from home, but fortunately, much of the work we need to do can continue via our computers, phones, virtual meetings, and social media. Indeed, that was how much of our work has been conducted from our inception as a team. Our research projects face challenges to keep moving forward while protecting our team members health, but our institutional leaders are providing guidelines for how to do

that as well as possible. We are highly concerned for our ranching colleagues and stakeholders as their livelihoods face severe challenges from disruptions to income and markets. We rededicate ourselves to providing new technologies and tools that support their needs for adaptive management in the face of tough trade-offs.

Some things we don't have great work-arounds for, like travel restrictions and limitations to group meetings. Read more in the articles below about how our research, extension, and education team members are focusing their efforts on what they can do now to prepare for when we can again fully engage among ourselves and with our stakeholders.

Thank you to everyone for your dedication and flexibility in the face of these challenges. As always, please let us know if there are ways we can better support you in your work. It is very important in this era of "social distancing" that we focus on physical distancing only and use our creativity and imaginations to maintain social contact with each other.

Precision Ranching

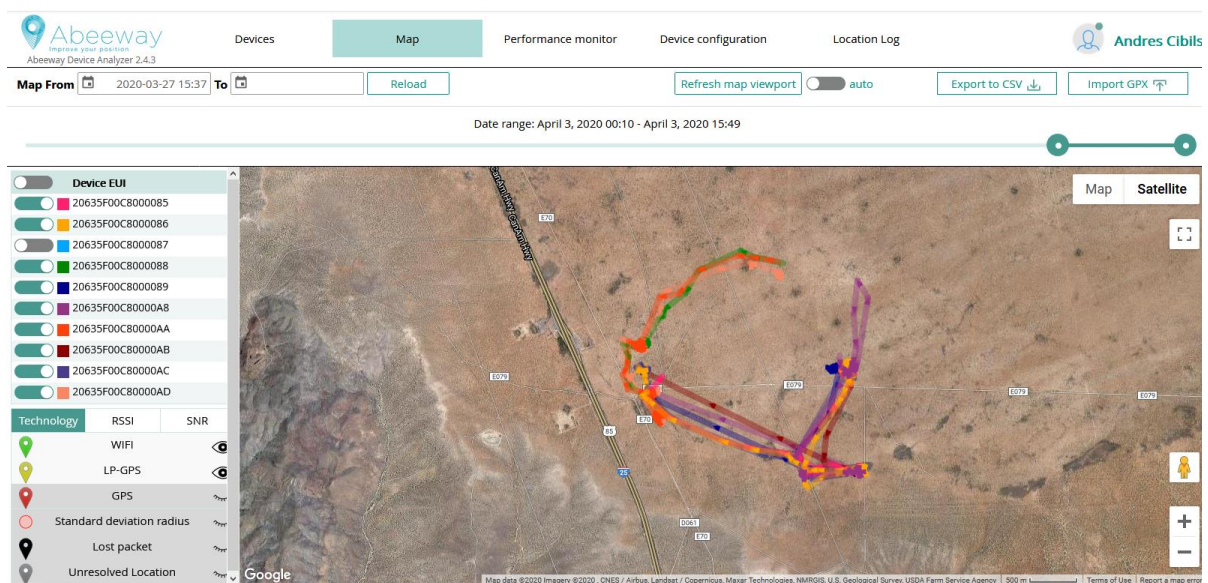


Precision technology tests were launched at CDRRC

Our precision ranching system sensors are up and running! The network and sensor system are now in full swing collecting data on cattle movement, rainfall (eventual), and water trough levels. Each morning, prior to checking cows, Andrew Cox (CDRRC Superintendent and SW Beef CAP advisory board) is able to pull up the GPS sensor dashboard, see where the cows are grazing, and drive straight to them.

In late February, the LoRaWAN gateway and antenna were installed at Camp Well a central location on the 61,000-acre College Ranch (CDRRC) just north of Las Cruces. Andrew Cox, Dave Thatcher (USDA-ARS Jornada Experimental Range), Matt McIntosh (SW Beef CAP, NMSU PhD student), NMSU ACES IT staff, and field helpers were instrumental in the installation and launch of our LoRaWAN system network. They ably mounted the antenna atop a telephone pole and installed a low cost WiFi repeater that is transmitting data from the gateway to the cloud, via a computer at our CDRRC headquarters.

On March 7, members of the Precision Ranching, Breed Comparison, and Supply Chain teams; as well as members of the Advisory Board came together at the College Ranch to help deploy 43 LoRaWAN collars on Brangus and Raramuri Criollo cows that will be part of the breed comparison study. The collars have been working well so far, recording cow locations and collar temperatures at 15 minute to 1 hour intervals. Our solar-powered gateway is working wonderfully and is allowing us to track animals in real time on a computer dashboard. As the tests progress we are studying the data to address some problems with LoRaWAN coverage in our more distant pastures. We hope to solve these issues soon by placing two additional gateways in strategic locations. Most cows in the breed comparison study will begin calving in the coming weeks and we are hoping the GPS sensors will help us document calving behavior, that will allow us to develop target movement parameter values to set up our proposed rancher dashboard.



A few days ago, we installed two new LoRaWAN sensors, one of them will record rainfall (a tipping bucket rain gauge) and the other will monitor water level in one of the cattle drinkers. With help from our able NMSU ACES IT staff, Matt McIntosh and Andrew Cox were able to get both sensors installed. Each

sensor is currently yielding good data at 15 min intervals that we can view on their corresponding dashboard.

We are excited to have the core components of our basic precision ranching system operational and on-line (literally!). We are learning a lot each day as we fine tune details having to do with the electronics as well as data storing and processing. Qixu Gong and Huiping Cao (Precision Ranching team) are working tirelessly to help us safely store all sensor data on a local NMSU server. We are optimistic that by the time we get ready to roll the system out to our participating ranches, we will be in excellent shape to hit the ground running!



Extension

Factors Influencing Bull Management and Calf Marketing Decisions on Southwest Ranches

The Sustainable Southwest Beef CAP Project Extension team is working to identify factors that drive decisions for breed selection on southwestern ranches and barriers ranchers perceive when evaluating breed changes. Fortuitously, a research team in California led by Dr. Zach McFarlane, Cal Poly San Luis Obispo, had similar questions. Dr. McFarlane's group generated a large survey to distribute in California with hopes of eventually applying the

survey across the West. The Sustainable Southwest Beef CAP Project collaborated by adapting Dr. McFarlane and associates' survey questions to address project specific questions and include options that are relevant to southwestern beef production systems.

Besides rain, calf price is the major driver of ranch profitability. As such, the survey also evaluates how producers market their calves and determine if they currently partake in retained ownership, direct marketing, or value-added programs. Lastly, the survey attempts to quantify the extent producers utilize Extension, USDA, ARS, NRCS, or other educational opportunities. Ultimately, decision data will be correlated with those educational programs to determine if educational programming is effective at driving bull management or calf marketing decisions.

The survey has been completed and approved for distribution. At this time, Dr. Craig Gifford and Keegan Taylor in collaboration with New Mexico State University Extension personnel are working to get the survey in an online format. Initial plans were to also distribute paper copies at events throughout the spring, but the COVID-19 crisis has caused cancellation of most events through May. Nonetheless, once online, the survey will be distributed and data collection started. It is anticipated that the survey will be online by late April.

Supply Chain Options

US beef production is a complex system ranging from pasture to feedlot to plate, usually with long distances between each component. In the Southwest, a typical beef production approach entails raising cow-calf herds and exporting weaned calves to the Ogallala Aquifer region for finishing and marketing. Alternatives include finishing cattle on rangeland, either in the Southwest or high-productivity grasslands farther north. Adopting ranching

innovations such as heritage cattle and precision ranching can affect the sustainability of the overall supply chain. Accordingly, as the project's Breed Comparison and Precision Ranching teams are quantifying the environmental and economic effects of adopting agricultural innovations on pastures and ranches, the Supply Chain Options team is investigating how these and other management approaches affect sustainability outcomes along the entire supply chain.

During the past few months, the Supply Chain Options team has interviewed three ranchers about the inputs used on their places, such as supplemental feed, veterinary services, and water. Dr. Alan Rotz of USDA-ARS will use the interview data – and more collected in the future – as inputs into the Integrated Farm System Model (IFSM), to estimate the environmental footprints and net returns of two production systems: range-finishing in the Southwest, and range-finishing Southwestern calves in Northern Plains grasslands. We will compare those outcomes with those of the “business as usual” approach of exporting weaned calves to Ogallala Aquifer feedlots. Thanks to rancher and project advisory board member Cindy Tolle for her work on the interviews.

In addition, we hired Dr. Mark Musumba as a consultant. Mark and Dr. Sheri Spiegel have been working to describe and quantify the linkages between the Southwest and Ogalla Aquifer regions, in terms of flows of cattle and social networks in the bi-regional agricultural system. To do so, they are using a telecoupling framework to build a database of linkages between the two regions connected by beef production. Stay tuned for a new look at the flows of cattle from New Mexico Livestock Board Districts to out-of-state counties. Coming soon!



Welcome!

- Dr. Mark Musumba joined the Supply Chain team in January. He will work with Sheri Spiegel on the telecoupling and tradeoffs research.
- Qixu Gong is a doctoral student working with Dr. Huiping Cao.
- Emilia Linley, Science Educator at Asombro Institute.
- John Ragosta joined the team in March, working on data management.
- Ericha Courtright joined the team as our webmaster.
- Intern Hannah Morris was at the Jornada in Jan-Feb 2020 and learned about range monitoring, rancher decision-making, social network analysis as it relates to telecoupling. She is a University of Georgia a student in the ICON PhD program.

Kudos

- A big thank you to two of our project collaborators, Corta Madera Ranch and The Nature Conservancy who donated funds to boost support for graduate students.

- Thank you to the El Reno Public Schools (El Reno, OK) who provided supplies for student research projects.
 - Congratulations to Andres Cibils who received the Outstanding Achievement Award from the Society for Range Management.
 - Congratulations to Jean Steiner who was appointed by Governor Laura Kelly to a 4-year term on the Kansas Water Authority.
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Reaching Out

- Andres Cibils gave a presentation about our project for New Mexico Congresswoman Xochitl Torres Small. College of ACES, February 20.
 - Tony Waterhouse presented a special seminar at NMSU "What might the future be for precision beef farming technologies?" February 25.
 - Andres Cibils spoke about Raramuri Criollo cattle and climate change in the desert southwest at the 8th Natural History of the Gila Symposium, February 28.
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Publications

Abstracts and Presentations:

- Cibils, A. Can precision technologies help ranching systems adapt to change? 73rd Annual Meeting Society for Range Management, Denver, CO, February 16-20, 2020.
- McIntosh, M., A. Cibils, S. Nyamuryekunge, R. Estell, A. Cox, A. Dawes, T. Waterhouse, J. Holland. A test of LoRaWAN real time GPS tracking on beef cattle in desert pastures. 73rd Annual Meeting Society for Range Management, Denver, CO, February 16-20, 2020.

- McIntosh, M., D. Duni, A. Cibils, R. Estell, A. Gonzalez, S. Nyamuryekunge, M. Redd, M. Duniway, Sheri Spiegel. Late fall landscape use by heritage vs. conventional beef cattle on Colorado Plateau rangelands: a case study. 73rd Annual Meeting Society for Range Management, Denver, CO, February 16-20, 2020.
 - Nyamuryekunge, S., A. Cibils, R. Estell, A. Gonzalez, M. McIntosh, S. Spiegel, F. Continanza. Vegetation selection of heritage vs. conventional beef cows grazing Chihuahuan Desert rangeland. 73rd Annual Meeting Society for Range Management, Denver, CO, February 16-20, 2020.
 - Nyamuryekunge, S., A. Dawes, M. McIntosh, A. Cibils, R. Estell, A. Gonzalez, S. Spiegel. Influence of rainfall events on drinker visitation patterns by beef cows on desert rangeland. 73rd Annual Meeting Society for Range Management, Denver, CO, February 16-20, 2020.
 - Spiegel, S., Ecosystem service tradeoffs associated with agricultural intensification of Grazinglands. 73rd Annual Meeting Society for Range Management, Denver, CO, February 16-20, 2020.
 - Waterhouse, T. Real-Time Monitoring Technologies for Free-Ranging Sheep and Cattle Management. 73rd Annual Meeting Society for Range Management, Denver, CO, February 16-20, 2020.
 - Cibils, A., R. Estell, S. Spiegel, A. Gonzalez, S. Nyamuryekung'e, M. McIntosh. 2020. Raramuri Criollo cattle and climate change in the desert southwest. 8th Natural History of the Gila Symposium, February 28. http://gilasyposium.org/?page_id=209).
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