Sustainable Southwest Beef
knowledge and tools for ranch and rangeland resilience

Sustainable Southwest Beef CAP Newsletter
October 2021

A Message From The Leadership

Hello all:

The breed comparison and precision ranching teams at the CDRRC faced serious challenges during the first two years. We were able to get 3 months of data during the first year due to some timely spring rains, but when drought conditions worsened and forage became scarce, we decided to move the cow herds to Clayton. We joined forces with the Clayton team to 1) continue testing wearable animal sensors/LoRa animal tracking system originally slated for the CDRRC, and 2) examine the behavior of desert-adapted Criollo and Brangus cows grazing wheat pasture for the first time. We planned to return the herds to Las Cruces in the fall of 2021, but a severe drought continued through June. Though the monsoon season was good to us (>2 to ~5 inches of rain at various locations across the ranch) and a nice flush of annuals occurred, recovery and growth of key perennials (black grama, dropseeds) was almost nonexistent. To protect our study pastures in the long term, we deemed it necessary to leave the cows at Clayton until next year to allow the pastures more time to recover. When the cows return to our desert pastures, we will examine how they re-adapt to our harsh conditions and sparse vegetation after being “spoiled” on high quality forage.

Welcome!

The Supply Chain Team has three new students – welcome to Lara Macon who works with day-to-day operations on the Jornada with the Precision Ranching and Breed Comparison research; Zachary Hurst who is working with Supply Chain Options on development of indicators for evaluation of sustainable strategies across five domains.

Dr. Jose Castano-Sanchez has assumed a post-doctoral research position with Al Rotz to conduct Integrated Farm System Model scenario analysis of modeling supply chain options.

Welcome to Dr. Marco Palma, Texas A&M University, who will join the Supply Chain team to evaluate consumer preferences for heritage, grass-finished, and conventionally produced beef. He will work the Drs. Sheri Spiegal, Rhonda Miller, Cindy Tolle, and others.

Updates

“Curious About Cows?” Workshop Brings Criollo Research and Education to Teachers

After a full day of teaching 3rd-grade students, 19 teachers from nine towns in all parts of New Mexico chose to expand their knowledge by attending the “Curious About Cows?” teacher workshop hosted by the Asombro Institute for Science Education on September 15 (Figure 1). We introduced teachers to the Sustainable Southwest Research Project’s three research themes and then focused on the Rarámuri Criollo and criollo crossbreds.

Figure 1. Teacher workshop hosted by Asombro Institute for Science Education.

On anonymous evaluations, teachers gave the workshop rave reviews. On a scale from 0 (very strongly disagree) to 10 (very strongly agree), the average response was 9.7 on the prompt: “I plan to use one or more activities I learned today with my students” and a perfect 10.0 on the prompt, “The material in this workshop was presented clearly.” Their knowledge of Criollo, sustainable ranching in the southwest, and activities to teach about cattle all increased dramatically (Figure 2).

Figure 2. Post-workshop evaluation results.

One teacher wrote, “This was so wonderful! The information was clearly presented and accessible to use right away in the classroom! Thank you so much J” We are excited to hear these teachers’ reports on student learning; there will be hundreds of New Mexico 3rd graders learning about sustainable ranching in the southwest in upcoming weeks!

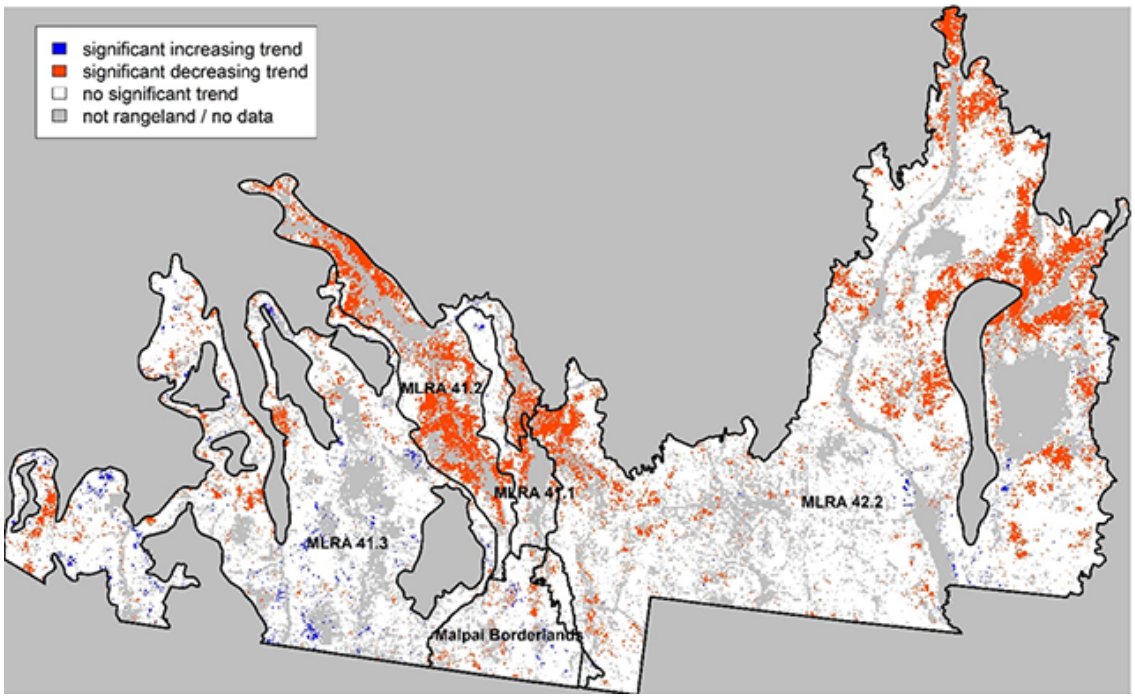
Assessing Sustainability Goals Using Big Data

Sustainable Southwest Beef project member Brandon Bestelmeyer led a team in to evaluate the long-term effects of agricultural practices used in extensive rangelands managed by a collaborative conservation group, the Malpais

Borderslands Group. The Malpai Borderlands Group is a collective effort lead by ranchers who live and work primarily in southeast Arizona and southwest New Mexico. http://www.malpaiborderlandsgroup.org/.

A grassland-dominated landscape in the Malpai Borderlands. Photos by Brandon Bestelmeyer.

In the study, scientists used spatial and statistical models to evaluate the effects of coordinated agricultural management and conservation activities used over the last 25 years by the Malpai Borderlands Group. Scientists used information available on ranch ownership alongside data obtained from remote sensing technologies (such as satellites and aircraft) to compare climate, vegetation coverage, and land conversion of rangeland across thousands of square miles surrounding the Malpai Borderlands region. Scientists found that despite its high aridity, the landscape managed by the Malpai Borderlands Group is comparatively productive and healthy.



An analysis of changes in rangeland productivity from 1994-2018 based on data provided by the US Forest Service's Rangeland Production Monitoring Service, one of the open access datasets used in this study. Red and blue colors indicate areas of significant declines or increases (respectively) in rangeland productivity. Image obtained from Malpai Borderlands Group Newsletter, December 2020

This approach made it easier to understand the effects of conservation strategies used within the 800,000-acre Malpai landscape. Due to conservation easement agreements, land conversion due to urban developments was limited compared to the surrounding landscapes. This allows Malpai managers to successfully use specific agricultural techniques, such as prescribed fire, to control woody plant encroachment to a much greater extent than in surrounding areas. These insights are essential to help ranchers and managers identify and promote a suite of sustainable management practices.

The methodology developed in this study can be used to evaluate management in other rangelands at broad scales across the United States and to monitor rangeland resilience in the face of climate change – which is a core goal of the Sustainable Southwest Beef Project.

This news item is based on a USDA-ARS news release, https://www.ars.usda.gov/news-events/news/research-news/2021/a-data-driven-approach-to-measuring-agricultural-sustainability-in-large-landscapes/ and the Bestelmeyer et al. (2021) article.

Kudos

Congratulations and best wishes to Dr. Mark Musumba as he moves to a new position in the private sector.

New Position

Following departure of Mark Musumba, Sheri Spiegal will recruit a NMSU Research Scientist will design and conduct research using data mining, information management and analysis, and spatial modeling to forecast the effects of alternative agricultural supply chains on environmental and socioeconomic outcomes at multiple scales. The position announcement will be circulated when open for applications.

Reaching Out

Jean Steiner attended the Sustainable Ranchlands Roundtable meeting in Tucson, Arizona, on September 21-23. She presented an overview of our project's Framework for Supply Chain Analysis and participated in discussions of sustainability indicators.

Webinars

- Sustainability Programs in Beef Supply Chains from Pasture to Plate - August 17, 2021

- Curious About Cows: Engaging NGSS Lessons on Current Criollo Cattle Research (3rd Grade Teacher Workshop) - September 15, 2021

Upcoming Webinars

- Terrific Technologies for Ranching: Bring Sustainable Solutions into the Classroom (High School Science and Agriculture Teachers) - January 15, 2022

Publications

Journal Articles (Published)

- Bestelmeyer, B.T., Spiegal, S., Winkler, R., James, D., Levi, M., Williamson, J., 2021. Assessing Sustainability Goals Using Big Data: Collaborative Adaptive Management in the Malpai Borderlands. Rangeland Ecology & Management 77, 17–29.
- Estell, R.E. 2021. The genesis of the Jornada Criollo cattle program. J. Arid Env. 193: 104563.
- McIntosh, M. M., A. F. Cibils, R. E. Estell, S. Nyamuryekung'e, A. L. González, Q. Gong, H. Cao, S. A. Spiegal, S. A. Soto-Navarro, and A. D. Blair. 2021. Weight gain, grazing behavior and carcass quality of desert grass-fed Rarámuri Criollo vs. crossbred steers. Livestock Sci. 249: 104511.
- Nyamuryekung'e, S., A. F. Cibils, R. E. Estell, M. McIntosh, D. VanLeeuwen, C. Steele, A. L. González, S. Spiegal, L. Avendaño Reyes, F. A. Rodríguez Almeida, and Martha Anderson. 2021. Foraging behavior and body temperature of heritage vs. commercial beef cows in relation desert ambient heat. J. Arid Env. 193:104565.
- Sawalhah, M.N., H. M. E. Geli, J. L. Holechek, A. F. Cibils, S. Spiegal, C. Gifford. 2021. Water Footprint of Rangeland Beef Production in New Mexico. *In Press – Water*

Conference Papers and Presentations

- Dorn, C. A Survey of Decision Support Tools for the Beef Cattle Industry. Society for Rangement Management 2021 Annual Meeting (virtual). February 15-18, 2021. (Presentation)
- Duni, D., A. F. Cibils, R. E. Estell, A. Cox, M. M. McIntosh, and S. Spiegal. 2021. Feeding habits of Brangus and Raramuri Criollo cows grazing Chihuahuan Desert rangeland. Proc. 74th Annual Meeting. Soc. Range Manage. Boise, ID (Abstr.). p. 119.
- McIntosh, M. M., J. L. Holechek, A. F. Cibils, R. E. Estell, and S. A. Spiegal. 2021. Long-term declining trends in Chihuahuan Desert forage production in relation to stocking rates and climate. Proc. 74th Annual Meeting. Soc. Range Manage. Boise, ID (Abstr.). p. 13.
- McIntosh, M. M., R. E. Estell, A. F. Cibils, A. Cox, S. Nyamuryekung'e, D. Duni, G. Duff, S. Spiegal, C. Brandani, S. Utsumi, and V. Gouvêa. 2021. Conventional vs Heritage cattle supplement intake, weight-gains, and body condition scores on Chihuahuan desert pasture. J. Anim. Sci. (Abstr.).
- Nyamuryekung'e, S., A. F. Cibils, R. E. Estell, A. L. Gonzalez, M. M. McIntosh, and S. A. Spiegal. 2021. Landscape use of Angus crossbred vs. Raramuri Criollo cattle on desert rangeland. Proc. 74th Annual Meeting. Soc. Range Manage. Boise, ID (Abstr.). p. 116.
- Simpson, C., S. Nyamurekung'e, A. F. Cibils, R. E. Estell, A. L. Gonzalez, M. M. McIntosh, and S. A. Spiegal. 2021. Dam-offspring pairing using proximity loggers fitted on Raramuri Criollo cows and calves grazing desert rangeland. Proc. 74th Annual Meeting. Soc. Range Manage. Boise, ID (Abstr.). p. 117.

Upcoming Events

- CDRRC will have a field day morning of October 8, 2021
- NM Cattle Growers Joint Stockman's Meeting, December 14-17, 2021
- Symposium on Sustainable SW Beef Project, SRM Meeting, Albuquerque, NM, February 2022

- Workshop on Precision Ranching, , SRM Meeting, Albuquerque, NM, February 2022

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