



# Agricultural Experiment Station Chihuahuan Desert Rangeland Research Center

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## MISSION

The Chihuahuan Desert Rangeland Research Center (CDRRC) conducts educational, demonstrative, and experimental development with livestock, grazing methods, and range forage, including the investigation of the sustainability and management of natural resources and environmental ecosystems.

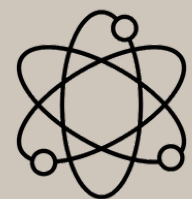
The 100 square-mile CDRRC hosts one of the longest running vegetation and grazing monitoring efforts in the southwestern US.



Faculty and graduate students from multiple NMSU departments, including the Department of Animal and Range Sciences, conduct research at the center.

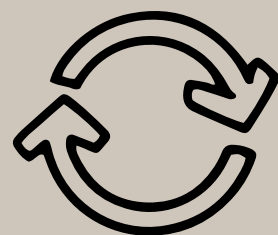


Much of the research is in conjunction with the Long-Term Ecological Research program, which is part of a nationwide program funded by the National Science Foundation.



### Value Added to New Mexico

- Solar and Geothermal Resources



The New Mexico State University Chihuahuan Desert Rangeland Research Center (CDRRC) is a cardinal research station within the New Mexico Agriculture Experiment Station system. The CDRRC (or more colloquially the “College Ranch”) serves as a model of sustainable ranch and rangeland research, teaching, and extension, composed of a robust working group of scientific collaborators whose goals are to identify sustainable management protocols for managing New Mexico rangelands.

## Ongoing Research

- Digital Ranching Research at the Chihuahuan Desert Rangeland Research Center, NMSU. The Sustainable Southwest Beef Coordinated project, funded under the initiative for Sustainable Agricultural Systems (USDA - National Institute of Food and Agriculture, Grant #2019-69012-29853), is developing Digital Ranching tools at the Chihuahuan Desert Rangeland Research Center that can improve ranch operational efficiencies and rangeland resilience in the Southwestern, United States. Information from high throughput sensors, including multi-sensor platforms mounted on herds of Heritage Criollo, Angus, Brahman, and Brangus cattle, field rain gauges, cattle drinking troughs, and water storage tanks is being monitored over 300 sq. miles of desert rangelands using Long Range Wide Area Network communication technology.

### ACES Pillars for Economic and Community Development

Food and Fiber Production and Marketing

Water Use and Conservation

Family Development and Health of New Mexicans

Environmental Stewardship

Foundational Education and Training

The College of Agricultural, Consumer, and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research and Extension programs.

- Oryx are an exotic antelope that have the potential to affect range use of livestock and other wildlife, through competition and possibly aggressive behavior. They are also a highly valued hunting trophy in New Mexico. Oryx studies on the CDRRC thus have 2 primary goals, first, to understand how co-distribution of oryx and cattle varies spatially and temporally at an ecologically meaningful scale (i.e., ranch or landscape scales). This includes interactions at key resources such as water sites, as well as identifying other influences that may affect distribution of large herbivores. Second, to develop monitoring protocols to assess oryx abundance or trend, distribution, and sustainable harvest to benefit wildlife enterprises. These vary from intensive approaches (e.g., aerial surveys) to more extensive camera-based techniques (e.g., mark-resight population estimation; photographs/camera-day trend indices; etc.). By validating a range of monitoring options, landowners can choose a method appropriate to the time and resources they desire to allocate to oryx management.
- Virtual Fencing instrumentation, a novel multi-sensor platform for livestock herding and tracking, has been incorporated recently to help ranchers and managers meet livestock grazing distribution needs or achieve land conservation management goals in desert rangelands. Virtual herding is a livestock management concept that ranchers can implement to prescribe precision grazing interventions on heterogeneous rangeland while relying on real-time information of animal behavior to monitor cattle performance and rangeland utilization. New innovations have taken virtual herding to a near commercial scale economically.



## Recent Impacts

- Historic research at the CDRRC established sustainable cattle stocking levels, grazing systems, and weaning weight adjustment protocols, which have been adopted by federal agencies including the US Forest Service and Bureau of Land Management, and stakeholder groups such as the Beef Improvement Federation.
- Several genetic and behavioral studies conducted at the CDRRC have identified cattle breed performance under varying stocking levels and forage regimes, and current research is aimed at evaluating ecological effects and production performance of heritage versus conventional cattle breeds

## Potential Impact(s)

- Precision Livestock and Digital Ranching technologies could help improve the sustainability of ranching and beef systems in New Mexico and across the Southwestern United States. Ability to monitor livestock, drinking water, forage, and rainfall in real-time could improve ranch planning significantly through a faster and better adaptation to increasingly variable climates, lower ranch monitoring costs and efforts, improved animal wellbeing and performance, and likely reducing the carbon footprint of ranching.

## Community Outreach

Teachers, researchers, and students from across campus benefit from the center. The CDRRC hosts field days to highlight research and provide information to a variety of stakeholders. Additionally, the CDRRC was a co-host for the Sustainable Southwest Beef annual meeting.

As an esteemed research facility, the CDRRC has become part of several notable partnerships including the USDA-ARS's Long-term Agroecosystem Research Network (LTAR) and the Long-Term Ecological Research program (LTER), as well as the Sustainable Southwest Beef Coordinated Agricultural Project, and the Pan-American Heritage versus Conventional Cattle Genetics Grazing study, in addition to others. These collaborative efforts have contributed to an integrative research program with a diverse set of research questions and goals which are all aimed at providing stakeholders with a toolbox for sustainable management.

### Chihuahuan Desert Rangeland Research Center

New Mexico State University

Location: State University Ranch Headquarters (Type in Google Maps)

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