USDA Agricultural Research Service

The Jornada
http://jornada.nmsu.edu
Rangeland Research Programs

Jornada Experimental Range Research Updates, May 2025

Dear stakeholders and collaborators,

Please find below brief updates on six research objectives at the Jornada. We also include a new fact sheet about the USDA-ARS Jornada Experimental Range at the bottom of the newsletter. Don't hesitate to reach out to me for more information on this research and any problems that interest you.

Brandon Bestelmeyer, Research Leader

Our mission: *Leverage new technology to enable rural communities to respond to agricultural challenges and develop tools to help ranchers and land managers make science-informed decisions.*

- **Precision technologies and artificial intelligence to manage animal health**. The sustainability of thousands of ranches across the arid Western U.S. is at risk due to drought and rising input costs. New technologies are needed to support livestock production and natural resource stewardship in the face of drought. ARS scientists at the Range Management Research Unit in Las Cruces, NM in collaboration with New Mexico State University are linking virtual fencing to artificial intelligence-driven estimates of forage availability and animal behavior via a new computational platform. The platform allows rapid adjustments to grazing pressure and detection of animal welfare concerns that reduce ranch input costs and optimize the use of variable rangeland resources.

- **Precision information on rangeland conditions**. Site-specific effects of drought, invasive species, wildfire, and soil erosion are difficult to detect in a timely manner in rangelands. Ground-based rangeland monitoring provides precise information, but it is expensive and unavailable for most users. ARS scientists at the Range Management Research Unit in Las Cruces, NM are developing the Rangeland Analysis Platform (RAP) that uses remote sensing and artificial intelligence to estimate vegetation cover and production at high resolution across the United States. RAP can quickly detect drought and fire disturbances or the spread of invasive species. RAP is now used by thousands of ranchers, agencies, businesses, and researchers to improve rangeland agricultural production and address threats to food security.

- **Dust storm prediction and management tools.** Wind erosion is a major environmental challenge across the western US, impacting air quality and the

productivity of rangelands and croplands. Erosion degrades soils and dust is transported to snowpack in the southern Rocky Mountains, where it can accelerate snowmelt timing by up to 50 days. Together, these processes are disproportionately impacting agricultural communities, especially those that are sensitive to irrigation water availability from the Colorado and Rio Grande Rivers. ARS scientists at the Range Management Research Unit in Las Cruces, NM are leading the development of wind erosion and dust storm prediction models and decision-support tools. The tools will enable managers to better mitigate wind erosion across the Southwestern US and improve predictions of water resource availability to agriculture that are critically impacted by dust-on-snow.

- **Strategies to re-use nitrogen and phosphorus nutrients**. Dairy and feedlot beef manure is both a national waste problem and a potential resource to improve soil health. Strategies to use composted manure to improve soil fertility could solve two agricultural problems at once. ARS scientists at the Range Management Research Unit in Las Cruces, NM are developing analysis tools that connect nutrient providers to nutrient consumers and new technologies for composted manure applications in rangelands that could result in the use of dairy manure for rangeland restoration across the West. Strategies to re-use nitrogen and phosphorus nutrients from animal manure in rangelands and croplands could save the US billions of dollars per year spent on commercial fertilizers.

- **Providing solutions for using land for both agriculture and energy production**. Agrivoltaics, the dual use of land for agricultural and solar energy production, has gained momentum in recent years. While planning and installation of solar PV systems are rapidly moving forward, there is limited information on their impacts on crop and rangeland production, benefits and detriments to landowners, and best practices in the arid West. ARS scientists at the Range Management Research Unit and Cotton Ginning Research Unit in Las Cruces, NM are teaming up to develop optimized agrivoltaic installations, best management practices, and decision support tools for crop and rangeland systems and agricultural processing systems that will provide assistance to producers, ease land-use conflicts, and support economic benefits in Western rural communities.

- **Strategies for ranchers and farmers to document the costs and benefits of their management approaches**. Most farm and ranch management approaches come with both costs and benefits, but no standardized knowledge system exists to measure and track the tradeoffs. ARS scientists at the Range Management Research Unit in Las Cruces are developing analysis tools for producers to systematically measure the performance of their management approaches against their management goals. The benchmarking system evaluates a suite of performance indicators of interest to producers related to their goals for production, economic efficiency, family and rural communities, and natural resources. Six ranchers across the US Southwest are testing the system with unit scientists. Agricultural operations and commodity organizations across the U.S. have expressed interest in its use.

Fact sheet on the USDA-ARS Jornada Experimental Range research area

USDA Agricultural Research Service Range Management Research Unit/Jornada Experimental Range, Las Cruces, NM. Contact for more information: Brandon.Bestelmeyer@usda.gov

The USDA-ARS Range Management Research (known as the Jornada) is one of two USDA laboratories in New Mexico, both associated with New Mexico State University (NMSU) in Las Cruces to collaborate on agricultural and natural resources research.

Phone: (575) 646-4842
Our mailing address is:
USDA/ARS JORNADA EXPERIMENTAL RANGE
PO BOX 30003, MSC 3JER, NMSU
Las Cruces, NM 88003