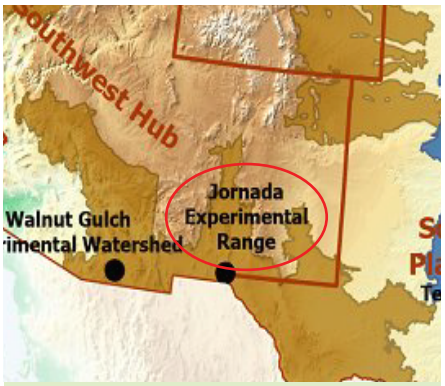
JORNADA EXPERIMENTAL RANGE (JER)



LTAR Network and USDA Climate Hubs are working to develop knowledge and technology for sound resource management **via research with partners.** The goal is to ensure **sustained crop and livestock production and ecosystem services** from agroecosystems, and to forecast and verify the effects of environmental changes, public policies, and emerging technologies.

Location and Climate

The Jornada Experimental Range (JER) lies within the Chihuahuan Desert and is within the USDA Southwest Climate Hub region. The climate is typical of semidesert grassland, the most arid of the North American grassland regions.

Historic Temperature

Historic average annual temperature in Dona Ana County (1901-2000) is 60°F. Since 1993 average annual temperature was larger than the long-term average. Mean maximum temperature is highest in June (96°F). Mean minimum temperature is lowest in Jan (24° F).

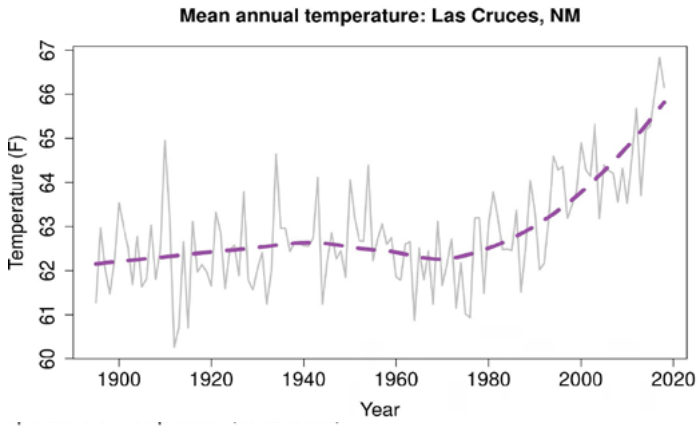
Historic Precipitation

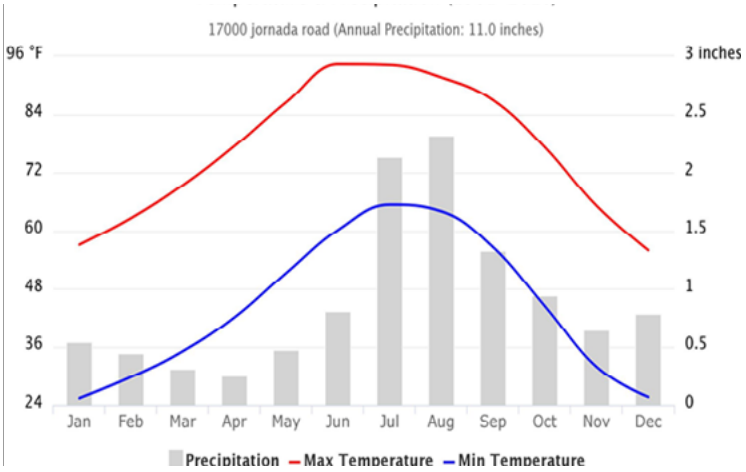
Long-term average ranges from 21cm to 35cm, depending upon elevation. Summer rains occur primarily in July, Aug, and Sept. Monsoonal precipitation (July to Oct) provides more than 60% of total annual precipitation. More than half of rainfall events last less than 1 hour.

Growing Season

The effective growing season, when both precipitation and temperature are favorable, is normally July through September.

Average annual temperature variation as compared with mean temperature trend (1895-2018).





Monthly mean precipitation, minimum and maximum temperature, 1981-2010 (credit: Climate Toolbox).

Measuring Weather and Climate

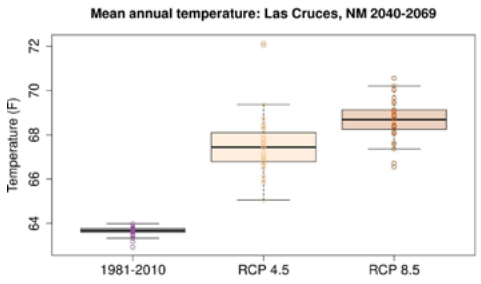
The arid to semi-arid Jornada is a land of extremes with high intensity, shortduration thunderstorms and wide diurnal temperature fluctuations. Winter frontal storms originate over the Pacific Ocean and are characterized by gentle, lowintensity precipitation that covers wide areas and may last for several days. Summer precipitation originates in the Gulf of Mexico and occurs as intense, convective thunderstorms that are highly localized and of short duration.

Impacts to Agriculture

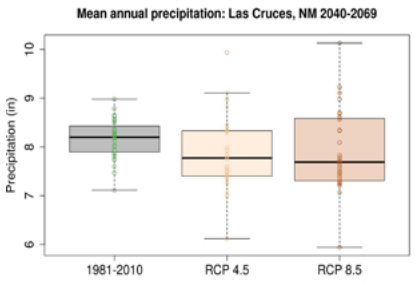
Ranching relies upon available forage, which can be highly variable on an annual and geographic basis. Producers are challenged by drought and increasing aridity. Localized overgrazing can accelerate grass and soil losses via both wind and water erosion. Shrub dominance and perennial grass loss is progressing, leading to fewer options for local agricultural producers. Drought duration and intensity are critical factors impacting regional production.

For more information visit https://ltar.ars.usda.gov/sites/jer/

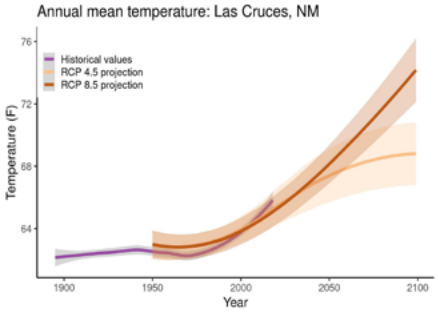
JORNADA EXPERIMENTAL RANGE (JER)



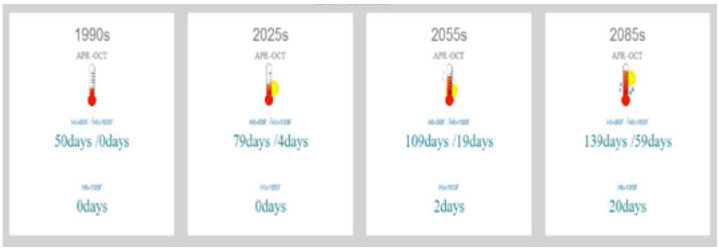
Projection of annual temperature 2040-2069 at the Jornada Experimental Range.



Annual Precipitation (in), 1981-2010 vs 2040-2069.



Mean historic and projected average annual temperature.



Future local climate projections of Heat Indices for Jornada (credit: Climate Toolbox).

Climate and Climate Change

Average and extreme temperatures are projected to increase at the Jornada while annual precipitation is projected to become more variable, with little change in mean precipitation. Despite greater uncertainty in annual precipitation totals, available water in the region will likely decline as increased temperatures lead to increased evaporation and evapotranspiration. The number of hot days (>100F) and length of the growing season are projected to progressively increase over time (MACA, RCP8.5).

To manage land sustainably, consider weather and climate.

Vegetation

- Over the last century, regime shifts in desert grasslands of the southwestern US have resulted in the expansion of shrublands dominated by mesquite and increased wind erosion (Webb et al. 2017).
- Increased aridity favors shrub establishment, but grass recovery within shrubland states produce novel ecosystems that provide important services and benefits. Management with awareness that not all land-types should provide similar services is key to maintaining these novel ecosystems (Bestelmeyer et al. 2018).
- Sequential wet years could support perennial grass reestablishment (Peters et al. 2012).
- Land types differ strongly in their responses to high rainfall and drought years, thus monitoring and management should be tailored to each land type category (such as an ecological site, see edit. jornada.nmsu.edu)

Water Resources

- Future water scarcity in the Rio Grande threatens surface supplies during dry periods. But novel, localized and strategic means to capture and conserve monsoonal precipitation could help during shortages (Elias et al. 2015).

Livestock

- Heat/drought adapted cattle may offer a path forward by minimizing climate impacts on both the animals and the environment. Cattle that can better utilize available forage could increase resilience in ranching communities (Spiegal et al. 2018).

Decision Support

- Applications for basic soil data and smart-phones provide landowners with localized information to identify management options under present and future climate conditions (Herrick et al. 2016, Salley et al.) https://landpotential.org/
- Grass-Cast provides range managers with an estimate of annual forage production grasscast.agsci.colostate.edu/

USDA Southwest Climate Hub
U.S. Department of Agriculture

For more information contact:
Site Lead:
brandon.bestelmeyer@usda.gov
Director, Southwest Climate Hub:
emile.elias@usda.gov