# Long-Term Agro-Ecosystem Research in the Southern Plains: The USDA-ARS Grazinglands Research Laboratory Partnership

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Long Term Agro-Ecosystem Research Network

## Introduction:

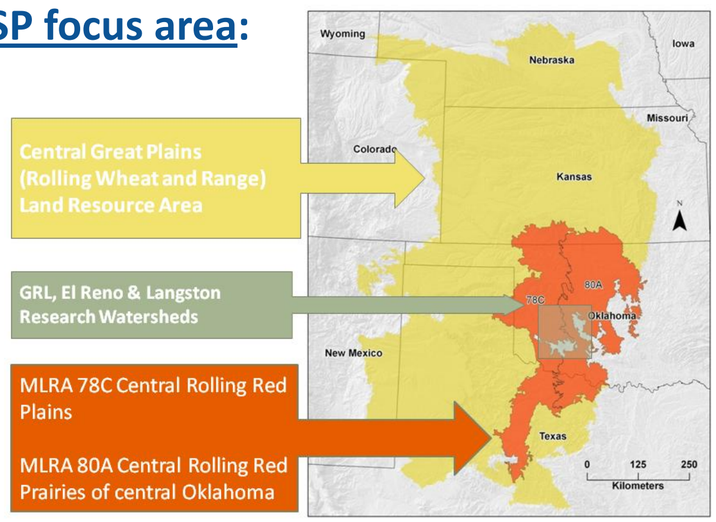
LTAR: The USDA Agricultural Research Service (ARS) is coordinating 10 research sites as a Long-Term Agro-ecosystem Research (LTAR) Network. The goal of the LTAR is to support the capacity for foundation science activities that result in 1) new knowledge, 2) alternative management practices and technologies, 3) improved models, and 4) transparent and accessible data that lead to 1) changes in agricultural management systems, 2) forecasts of outcomes of alternative policies or practices, 3) linkage to other research networks, and 4) education of the next generation of researchers, educators, agricultural producers and consumers.

LTAR-SP: The LTAR Southern Plains (SP) site is led by the Grazinglands Research Laboratory (GRL) in El Reno, Oklahoma. Research across a spectrum of cropland, pastureland, and prairie characteristic of SP landscapes is needed to identify sustainable and resilient forage-based production systems that are adaptable across enterprise types.

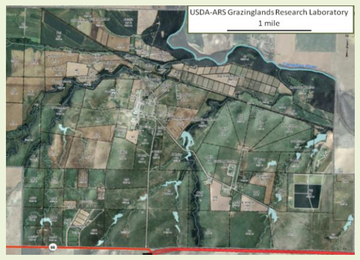
Developing knowledge and tools to support the diverse SP agricultural systems in the face of complex interactive ecological, climate, policy, and economics drivers requires transdisciplinary science conducted over decades to provide understanding that is scalable in time and space.

Anticipated outcomes include production systems that support vibrant rural economies, promote biological diversity (soil, plant, and animal), and reduce greenhouse gas emissions, with positive impacts on carbon sequestration, water and air quality, and agricultural sustainability.

## LTAR-SP focus area:



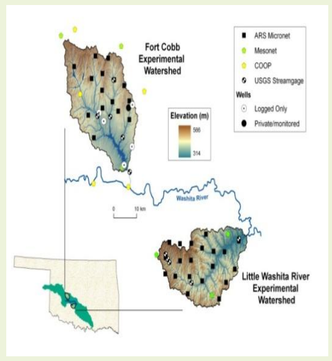

## Basis of LTAR-SP Site Selection:




The 2700-ha GRL includes native prairie, introduced pastures, annual crops, and forages with known management histories and grazed by cow-calf and stocker beef cattle herds.

- The GRL, established in 1948, focuses on sustainability of beef-forage grazing systems.
- Multidisciplinary teams address complex soil-plant-animal-climate-human interactions over long time periods.

- Watershed research established 1961
- Site of numerous remote sensing campaigns
- Data published on websites
- Expertise in climate, hydrology, remote sensing, modeling



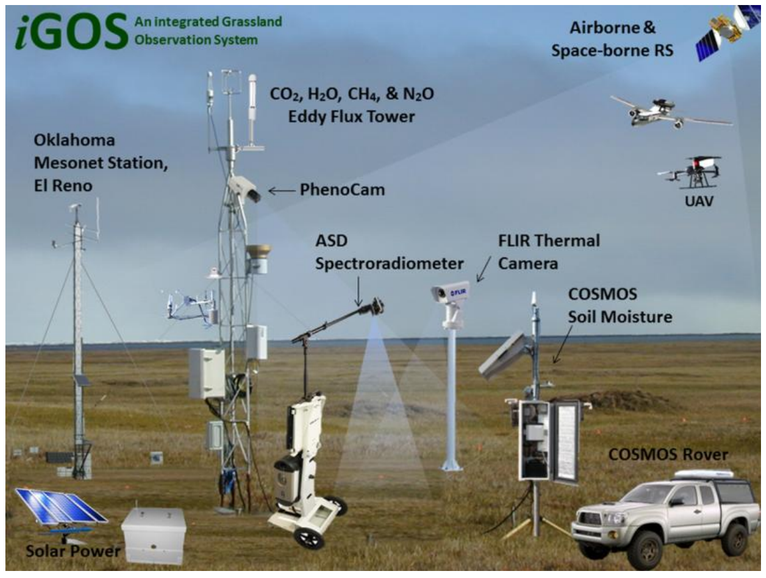

Upper Washita River Basin research in Little Washita River and For Cobb Reservoir Experimental Watersheds .

## Focus Areas of LTAR-SP research:

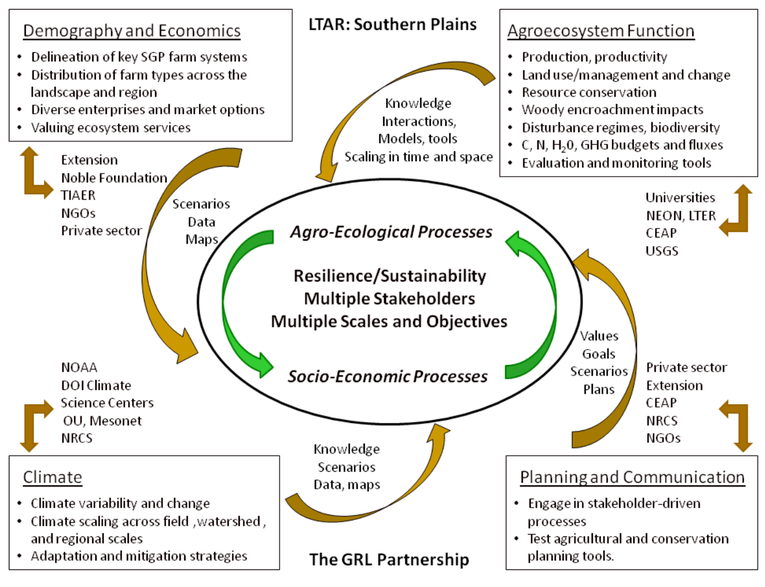
- Productivity and resilience of forage-grazing systems, multiple marketing options
- Agro-ecosystem impacts of climate variability and change at multiple scales
- Environmental impacts of conservation practices, protection of water resources, reduced greenhouse gas footprint
- Socio-economic ties to productivity, climate, and environment

## Key Partners and Collaborators

- Oklahoma State University – many departments
- University of Oklahoma and Oklahoma Mesonet
- South Central Climate Science Center
- Langston University
- Tarleton State University - TIAER
- Kansas State University
- Samuel Roberts Noble Foundation
- Oklahoma Conservation Commission
- Oklahoma Water Resources Board and USGS
- USDA-NRCS, numerous other federal agencies
- Numerous ARS locations
- Numerous international universities




## Schematic of the LTAR-SP Research:




***Acknowledgements: All GRL scientists contribute to this effort and GRL is working with LTAR Network leaders on development of the LTAR Shared Research Strategy.***