

# THE SOUTHERN PLAINS LTAR WATERSHED RESEARCH PROGRAM

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Water connects physical, biological, chemical, ecological, and economic forces across the landscape. While hydrologic processes and scientific investigations related to sustainable agricultural systems are based on universal principles, research to understand processes and evaluate management practices is often site-specific in order to achieve a critical mass of expertise and research infrastructure to address spatially, temporally, and ecologically complex systems. The USDA-ARS Grazinglands Research Laboratory (GRL) is host to the Southern Plains Long-term Agricultural Research site (SP-LTAR), and watershed research at the SP-LTAR began in the Upper Washita River basin of Oklahoma in 1961 and continues to present. The two primary research watersheds in this area are the 610 km<sup>2</sup> Little Washita River Research Watershed and the 800 km<sup>2</sup> Fort Cobb Reservoir Experimental Watershed. The size of these watersheds, coupled with the fact that 100 percent of land in both watersheds is privately owned, precludes meaningful manipulative experiments. However, research efforts in these two watersheds have made significant contributions in the areas of development of climate generators, model development and evaluation, remote sensing research, and sediment source tracking. Most of the data sets from these watersheds were highlighted in a special issue of the *Journal of Environmental Quality* and are publicly available. Eight unit source (1.6 ha) watersheds were established at the GRL in 1979 for the purpose of studying the effects of crop, crop management, grazing, and grazing management on water quality and quantity. Research from these watersheds has contributed greatly to our understanding of the impacts of crop type and crop and animal management on soil erosion and water quality. However, these small watersheds do not completely capture the dynamics and processes unique to agricultural production on larger land units. Thus, ten 16 ha production-level (P-L) watersheds are being established at the GRL to study the impacts of crop and livestock production and conservation practice effects on the local water budget and on water quality. Data from the unit source and P-L watersheds will be used to address issues related to Southern Plains agriculture, help improve field-scale hydrologic models, and address components of both the Pasture and Cropland Conservation Effects Assessment Program.

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