USDA-ARS-Grazinglands Research Laboratory Research Watersheds: Three scales for multi-objective agroecosystem investigations

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Abstract

The USDA-ARS Grazinglands Research Laboratory (GRL) operates four research watersheds at three spatial scales representing a gamut of topographic, physiographic, vegetative, or agricultural conditions characteristic of the Southern Great Plains (SGP). The mission of GRL is to address "agricultural sustainability, climate change, ecosystem services, and conservation of natural resources at the watershed or landscape scale"— a primary objective of the USDA-ARS Conservation Effects Assessment Project (CEAP) and the Long-Term Agro-Ecosystem Research (LTAR) network. Assessment of the impacts of conservation practices in agricultural watersheds requires long-term research sites of varying size due to differences in scales required to codify and evaluate the collection of water and soil data. The two larger (> 600 km2) watersheds provide primarily observational data collected for use in hydrologic modeling and large-scale investigations. Modeling is used to quantify benefits of conservation and best management practices to meet selected environmental endpoints. The Little Washita River (LWREW) and Fort Cobb Reservoir (FCREW) experimental watersheds are located in southwestern Oklahoma, USA, and have been part of the GRL research catchment portfolio since 1961 and 2004, respectively. The two smaller catchment areas are located on the grounds of the GRL in Central Oklahoma and are a collection of eight plot-scale watersheds, The Water Research and Erosion Units (WRE) and ten farm-scale watersheds the Grazinglands Research agroEcosystems and the ENvironment (GREEN) Farm that allow replicated manipulative and/or process-based investigations. The WRE, established in 1976, consists of eight contiguous 1.6 ha sized plots. The GREEN Farm comprises 162 ha. Both catchments contain alternative agricultural systems that are evaluated for intensification, sustainability, resiliency, minimization of environmental impact, and profitability in anticipation of climate shifts and extremes. Measurements collected across the four watersheds includes but are not limited to components of water balance, soil erosion, runoff, water quality, nutrient and water use efficiency and soil health.

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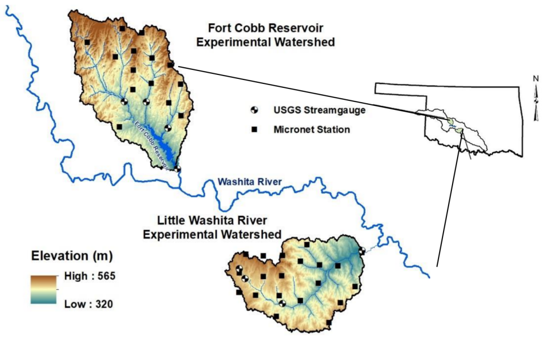
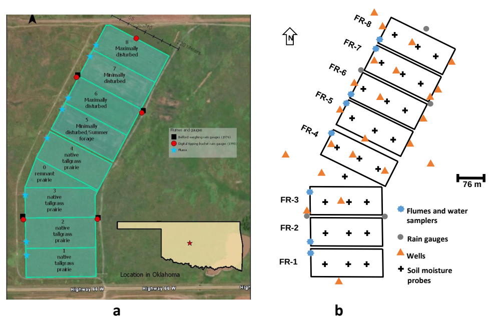
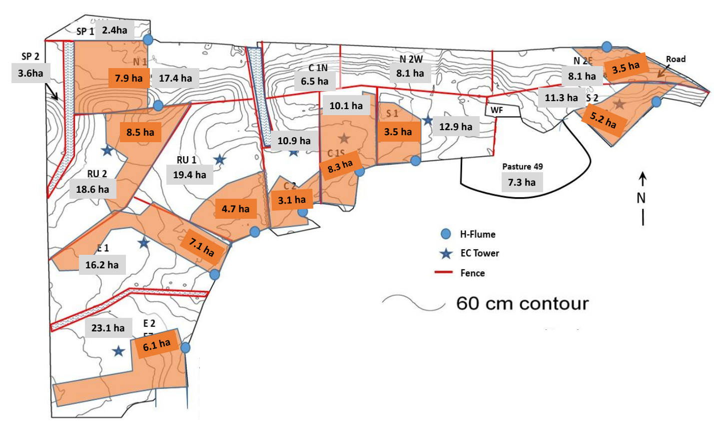
`DATA NOTE_Hydro Process_Starks et al.pdf` available at https://authorea.com/users/364088/articles/484631-usda-ars-grazinglands-research-laboratory-research-watersheds-three-scales-for-multi-objective-agroecosystem-investigations


Fort Cobb Reservoir
Experimental Watershed
USGS Streamgauge
Micronet Station
N
Washita River
Little Washita River
Experimental Watershed
Elevation (m)
High : 565
Low : 320


Location in Oklahoma
FR-8
FR-7
FR-6
FR-5
FR-4
FR-3
FR-2
FR-1
N
76 m
Flumes and water samplers
Rain gauges
Wells
Soil moisture probes
a
b


SP 1
2.4ha
SP 2
3.6ha
7.9 ha
17.4 ha
C 1N
6.5 ha
N 2W
8.1 ha
N 2E
8.1 ha
3.5 ha
Road
11.3 ha
S 2
5.2 ha
10.1 ha
S 1
3.5 ha
12.9 ha
WF
8.5 ha
10.9 ha
RU 1
19.4 ha
RU 2
18.6 ha
8.3 ha
Pasture 49
7.3 ha
4.7 ha
3.1 ha
N
E 1
16.2 ha
7.1 ha
H-Flume
EC Tower
Fence
60 cm contour
23.1 ha
E 2
6.1 ha