# United States Department of Agriculture
# Agricultural Research Service

## Conservation Effects Assessment Project (CEAP)

Grazinglands Research Laboratory, El Reno, Oklahoma May 2017

**Rationale:** Agriculture is the dominant land use in the Great Plains, cropland and grazingland management has a large effect on the region's streams, rivers, lakes, and groundwater. The USDA spends about $5 billion per year on agricultural conservation programs in order to help producers and land owners implement good conservation practices and systems on their land. However, the conservation programs have not had a monitoring component to determine the effectiveness of the conservation practices and program. Therefore, in 2003, the Natural Resources Conservation Service entered into partnership with ARS and many other partners to help quantify the environmental benefits and cost effectiveness of agricultural conservation.

**Objective:** Conduct watershed scale assessments of conservation practices in the Fort Cobb Reservoir Experimental Watershed (FCREW) and the Little Washita River Experimental Watershed (LWREW).

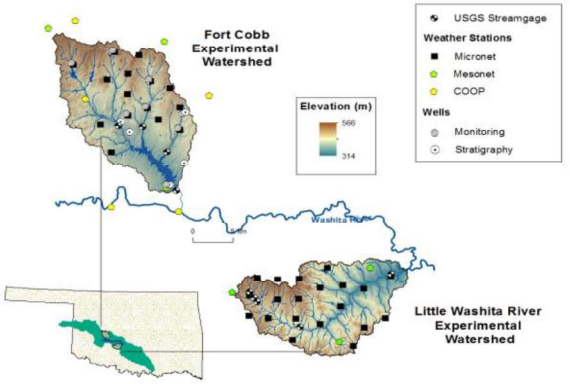
**What we are doing and studying:** 1) Collecting data for research studies, 2) Effects of land use and climate changes, and conservation on sediment, nitrogen and phosphorus transport within the watersheds, 3) Surface water quality, groundwater quality and quantity, riparian and channel conditions, and soil quality, 4) Determination of optimal timing and placement of a suite of conservation practices on the land surface and stream channels to minimize negative impacts on water quality and quantity, 5) Determination of projected climate and a suite of conservation practices to mitigate against the negative impacts.

## Outcomes:

- Management impacts soil and vegetation over years to decades, soil properties and vegetation have an immediate influence on hydrologic processes, and hydrology influences fate and transport of nutrients, chemicals, and organisms at the watershed and field scales.

- ARS researchers and collaborators published a collection of data and research papers describing long-term research (1961 to present) in the Upper Washita River basin of Oklahoma. This living history of research is presented to engage collaborative scientists across institutions and disciplines in further researcher related to water resources.

- Modeling results showed that high spatial precipitation data resolution had a significant and positive impact on the accuracy of simulated model outputs, suggesting that the use of high spatial and temporal rainfall resolution precipitation datasets provides more realistic modeling outcomes.




**Watershed-scale research is conducted in the Fort Cobb Reservoir and Little Washita River Experimental Watersheds to quantify environmental benefits of agricultural conservation implementation**

- Large differences in the simulated surface runoff and deep aquifer recharge values due to soils dataset resolution were noted, suggesting that significant differences in simulated soil hydrology affect simulated water quality components such as sediments and nutrients. Significant differences in simulated sediment and/or nutrient fluxes could lead to significantly different outcomes in terms of the impacts of a given conservation practice for studies like the Conservation Effects Assessment Project.

- Effective riparian practices have potential to significantly reduce sediment delivery to water bodies within the CEAP watersheds.

- Studies are underway to determine the impact of projected climate change on water quantity and quality and conservation practices to mitigate the negative impacts. Additional studies on streambank instability are ongoing through a collaborative effort funded by USDA NIFA.

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