EXPERIMENTAL APPROACH
MICRO-CATCHMENTS

The impact and feedback between land management and key ecosystem services, such as runoff and groundwater recharge, are important components in the Coupled Human and Natural Systems (CHANS) framework to address climate variability and adaptation issues. Experimental approaches of directly quantifying runoff under different vegetation types using micro-catchment studies are essential for understanding vegetation-induced changes in hydrological mechanisms. Soil moisture and streamflow data are critical for calibrating hydrological models for a regional application.

INSTALLATION EXPANSION

At the beginning of the Oklahoma NSF EPSCoR project, several micro-catchments built in grasslands and loblolly pine plantations already existed at various locations in Oklahoma. NSF EPSCoR funding allowed an expansion of this line of work by constructing three new micro-catchments in the oak forests at the OSU Cross Timbers Experiemental Range. Additionally, aging instruments at existing micro-catchments were upgraded in both the grasslands and loblolly pine forests.

EPSCoR-funded postdoc and graduate students participate in the construction of a micro-catchment at the OSU Kiamichi Forestry Research Station

KEY FINDINGS

- Micro-catchments provide an accurate water balance control for novel landscapes, such as areas with eastern redcedar encroachment.
- Preliminary results show a conversion of grassland to eastern redcedar woodland would substantially reduce streamflow at the regional scale.

FROM OBSERVATION TO CALIBRATION

The micro-catchments constructed as part of this project have been fully functional since November 2015. Their purpose is to quantify runoff and soil-water dynamics within differenting landscapes (pine, oak, grassland). Data from these micro-catchments (including the H-flume and soil moisture monitoring stations) are used by EPSCoR researchers, including Drs. Chris Zou, Lei Qiao and Phillip Alderman, to calibrate hydrological models. Once calibrated, these models can be integrated into the socio-ecological framework and used by any EPSCoR researcher and the broader research community to understand climate and land use impacts on water quality and quality.

FOR MORE INFORMATION

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