SYMPOSIUM ON ECOHYDROLOGY AND CLIMATE CHANGE AT KANSAS NATURAL AREAS AND RESEARCH STATIONS

Saturday, April 5, 2014
Kansas Academy of Science Annual Meeting
Emporia State University
Emporia, Kansas

SYMPOSIUM HIGHLIGHTS

Presentations on research and education at natural areas and biological research stations in Kansas focusing on ecological-hydrological interactions and climate change.

Types of sessions:

- **Overviews of larger research and education programs (oral and poster).**
- **Presentations on individual projects (oral and poster).**
- **Panel for discussion of potential collaborative work at different sites.**

Symposium Organizers and Contacts

Donald Whittemore, Kansas Geological Survey, University of Kansas
donwhitt@kgs.ku.edu 785-864-2182

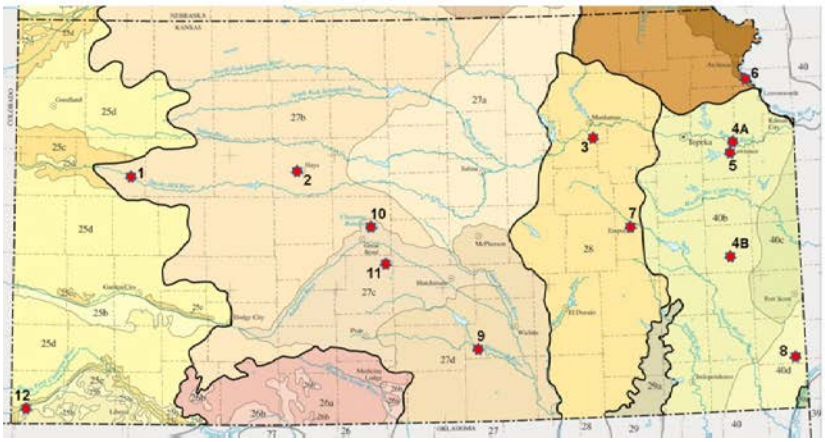
Dean Kettle, Kansas Biological Survey and Kansas University Field Station, University of Kansas
kettle@ku.edu 785-864-1540

Background

In 1987 the symposium “Natural Areas of Kansas” was held during the 119th Annual Meeting of the Kansas Academy of Science (KAS). The symposium provided an overview of Kansas natural areas, with a focus on locations used for research and higher education. The proceedings were published as a special issue of the KAS Transactions in 1988. Twenty-two years earlier, the KAS published “A Plan for Natural Areas in Kansas” (Trans. vol. 69, 1966). This article resulted from work of the KAS Committee on Conservation that met during the 1960s. The Committee also drafted legislation adopted in 1974 known as the “Natural and Scientific Areas Preservation Act”, which was passed by the Kansas legislature.

Symposium Description

The symposium planned for the 146th Annual KAS Meeting will concentrate on research and education activities conducted at natural areas and research stations in Kansas that focus on ecological-hydrological interactions and climate change. These topics are of importance for understanding current and projected ecological changes related to variations in temperature, precipitation, evapotranspiration, atmospheric carbon dioxide, soil moisture, streamflow and other hydrologic factors associated with climate change. Presentations will include overviews of the research and education programs conducted at Kansas sites that encompass these topics, along with reports on specific studies. Future cooperative research at the different sites will then be discussed.



Ecoregions of Kansas
(from U.S. Geological Survey,
ftp://ftp.epa.gov/wed/ecoregions/ks/ksne_eco_pg.pdf

Natural Areas and Research Stations in Kansas
(Examples in different ecoregions of Kansas;
red star with number)

1. Smoky Valley Ranch (The Nature Conservancy)
2. Fort Hays State University Natural Area
3. Konza Prairie Research Natural Area (Kansas State Univ.)
4. University of Kansas Field Station (A & B)
5. Baker University Natural Areas
6. Wetlands & Wildlife Restoration Area (Benedictine College)
7. Emporia State University Natural Areas
8. Southeast Kansas Biological Station (Pittsburg State Univ.)
9. Wichita State University Biological Field Station
10. Cheyenne Bottoms (KS Dept. of Wildlife, Parks, & Tourism)
11. Quivira National Wildlife Refuge (US Fish & Wildlife Service)
12. Cimarron National Grasslands (Forest Service, USDA)

Content of Presentations

Presentations on research and education at natural areas and biological research stations in Kansas focusing on ecological-hydrological interactions and climate change.

Natural areas and biological stations include designated college and university sites, as well as wildlife refuges and reclaimed areas, and parts of parks and private lands left natural or where natural processes are managed (such as prairie burning and pool water levels) and where access for scientific purposes is possible.

- Environmental factors are broadly considered, for example, temperature, precipitation, evapotranspiration, soil moisture, streamflow, spring flow, shallow groundwater table levels, stream-aquifer interactions, wetland extent, and atmospheric carbon dioxide. Studies considering interaction of factors with ecological systems across all scales – including individual organisms, populations, communities – and across diverse taxa, are encouraged.
- Effects of changes in the above factors caused by climate change.

Student presentations are especially encouraged.

Examples of Current and Recent Work on Ecohydrology and Climate Change in Kansas

Research Stations: Studies of Water, Carbon and Energy Fluxes

The Ecosystem Research Group at KU is a consortium of researchers who seek to understand how diverse ecosystems function. ***Field research stations*** are particularly appropriate for their research. For example, N. Brunsell studies land-atmosphere interactions using micrometeorological techniques to address the spatial and temporal variability of water, carbon and energy fluxes. This improves use of local measurements in modeling impacts of regional climate change and land use patterns. Brunsell has instrumented towers at KU and KSU sites 4 and 3, respectively (see ecoregions of Kansas map).

Cross-site Comparisons: Soil Moisture Variability and Microbial Community C and N Use[1]

Study of the influence of physiological stress on microbial communities in grassland ecosystems under different moisture conditions, and implications to climate change with increases in precipitation variability. Work conducted at four grassland locations on above map: 1, general vicinity of 2 (grassland at KSU Agricultural Research Center), 3, and 4B. ([1]L.K. Tieman and S.A. Billings, *Soil Biology & Biochemistry,* 2011 and 2012)

Techniques for Estimating Evapotranspiration from Narrow Riparian Zones

Determination of riparian evapotranspiration over a stream reach using water balance and atmospheric measurements; a collaborative project of the University of Colorado, University of Kansas (Kansas Geological Survey), and the University of Iowa. Work conducted at a riparian reach kept natural for well over a decade at the western edge of the Flint Hills in Butler County west of El Dorado. (KGS PIs: D. Whittemore and J. Butler, Jr.)