Konza Prairie Long Term Ecological Research

Konza Prairie Biological Station

Facilities available at KPBS include the 4,650 ft^2 Hulbert Center, which hosts a library/conference room, classroom, offices, teaching laboratory, reference herbarium and animal collections, and dormitory-style housing for 15 visitors. Two 2-bedroom cottages can house an additional 10 visiting researchers. The 2,400 ft^2 Ecology Laboratory includes 2 analytical labs, a soil and root processing lab, a computer room, and researchers' shop. Other facilities include a fire station and shop/maintenance building, storage for research equipment, materials, and archived samples, and a residence for on-site staff. All KPBS buildings have T1 Internet connectivity and wireless access is available over much of the site. Other equipment and instrumentation includes eddy flux towers for quantifying ecosystem-level carbon flux, four weirs and associated stream gauging equipment, 46 wells for monitoring groundwater levels and chemistry, numerous TDR probes and neutron access tubes for soil water measurements. On-site monitoring instrumentation includes a CIMEL Sun Photometer, a USGS stream monitoring station, Climate Reference Network (CRN) weather station, and wet (NADP) and dry-deposition (CASTNet) monitoring facilities.

Cross Site and Network Level Activities

The Konza LTER program has matured to the point where syntheses of long-term datasets is contributing to a more in-depth understanding of grassland ecology, and to a broader understanding of ecological patterns and processes in a variety of different ecosystems. Konza LTER researchers are active in many cross-site, network, and international collaborative activities. Recent examples include studies of grassland responses to rainfall across LTER sites representing a range of climates, cross-site studies of stream nitrogen dynamics, and comparative studies in North American and southern African grasslands.

Education and Outreach Activities

The Konza LTER Program includes educational opportunities for students at the K-12, undergraduate and graduate levels, as well as teacher training and outreach activities for the public. Undergraduate and graduate student training is an important component of our LTER program. In addition to providing support for local students, the Konza Prairie site is used by graduate students from many institutions around the U.S., and from other countries. The Konza LTER program also offers research experiences for a large number of undergraduate students through the Research Experience for Undergraduates (REU) program, and has provided research experiences for minority students through the Strategies for Ecology Education Development and Sustainability (SEEDS) program of the Ecological Society of America. Increasingly, results from Konza studies are used in undergraduate and graduate ecology texts, as well as extension and management related outlets.

The Hulbert Center includes a library/conference room, offices, and classroom and laboratory space for the on-site education program.

Konza Prairie

www.konza.ksu.edu

Konza Prairie LTER Program
Division of Biology, Kansas State University
Manhattan, KS 66506
Tel: 785-587-0441

For more information about the LTER Network, see: www.lternet.edu

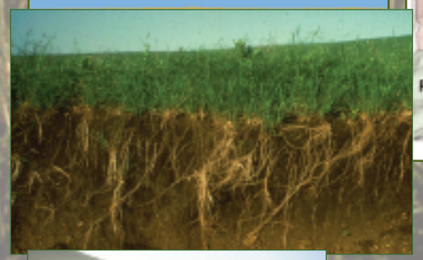
LTER Long Term Ecological Research

Konza Prairie Long Term Ecological Research

The Konza LTER Program addresses the responses of grassland ecosystems to key environmental and anthropogenic drivers at a variety of scales, from site-based watershed- and plot-level experiments to regional studies of changing land-use and land-cover, hydrology and water quality.

The Konza Prairie LTER program provides a platform for comprehensive ecological research, education and outreach, all centered around one of the most productive grasslands in North America – the tallgrass prairie. Tallgrass prairies are complex and dynamic ecosystems, offering unique opportunities for ecological study in the context of human-driven environmental change. Historically, tallgrass prairies covered a large portion of the Central Plains grasslands, but much of the original extent of tallgrass prairie has disappeared, largely due to agricultural conversion, making this one of the most endangered ecosystems in North America. However, extensive areas of tallgrass prairie remain in its western range, especially in the Flint Hills of eastern Kansas. Tallgrass prairie occurs at the transition zone between wetter deciduous forests and drier shortgrass steppe, and is influenced by large-scale gradients in temperature and precipitation. As a result, these grasslands may show the first signs of climatic- or other human-induced environmental changes, or be especially sensitive to such changes. The occurrence of tallgrass prairies in this 'tension zone' also makes them vulnerable to changes in land cover, including increased cover of woody plants.

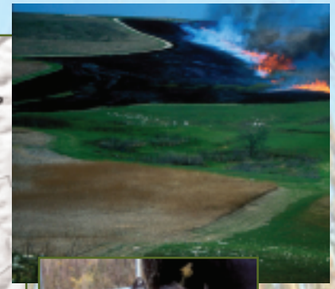
The Konza Prairie LTER research program began with a focus on three factors that affect ecological pattern and process in mesic grasslands worldwide: fire, grazing and climatic variability. However, because humans are directly (through management of grazing and fire) and indrectly (through changes in atmosphereic chemistry and climate) altering these drivers, the long-term research program initiated more than 20 years ago to understand the effects of "natural" disturbances in this grassland has new relevance for understanding and predicting the consequences of global change in the grasslands of North America and around the world. Our LTER research also addresses the role of numerous biotic interactions (competition, mutualism, predation, herbivory) that shape grassland communities and ecosystems.



Research Treatments at Konza

- N=Bison Grazing
- K = North Branch Kings Creek (ungrazed)
- C = Cattle Grazing
- HQ = Headquarters Area (small experimental plots)
- AL = Lowland Agricultural Land
- WP White Pasture
- THP = Texas Hog Pasture
- 1,2,4,10,20 = Years Between Burning
- A, B, C, D = Replicates of Similar Treatments
- W, Su, F, Sp = Burn Season (Winter, Summer, Fall, Spring)
- R = Fire Treatment Reversals

Konza Prairie experimental design and watershed-level fire and grazing treatments. Watersheds with bison ('N') are red, and cattle-grazed watersheds ('C') are blue. Other watersheds are ungrazed. Numbers in watershed codes designate fire return intervals for spring-burned watersheds, and the last letter of watershed codes (A,B,C,D) identifies replicate watersheds of the same treatment. Watersheds subject to different seasons of fire are highlighted in yellow, and the Fire Treatment Reversal ('R') watersheds are highlighted green. Many plot-level experiments are located at the headquarters area (HQ) in the northwest portion of the site.



The focal site for the Konza Prairie LTER program is the Konza Prairie Biological Station (KPBS), a 3,487 hectare native tallgrass prairie preserve owned by The Nature Conservancy and Kansas State University. KPBS is located in the Flint Hills region of northeastern Kansas (39°05'N, 96°35'W), and is operated as a field research station by the K-State Division of Biology. The site features a replicated watershed-level experiment, in place since 1977, which explicitly incorporates the major factors influencing mesic grasslands in a long-term experimental setting. Watershed-level treatments include manipulations of fire frequency (annual fire to fire exclusion), fire season, and grazing by native (bison) or domestic (cattle) ungulates. Within core LTER watersheds, permanent sampling transects are replicated at selected topographic positions, where ANPP, plant species composition, plant and consumer populations, soil properties, and key above- and belowground processes are measured. Groundwater wells, stream weirs and stream sampling stations are used to assess the hydrology and ecology of grassland streams. Watershed and stream studies are complemented by plot-level experiments focused on key processes and mechanisms underlying responses to changing fire, grazing and climatic regimes. Our current research builds upon a legacy of long-term studies to address the influence of multiple global change phenomena (changes in land-use and land cover, climate and hydrologic change, nutrient enrichment, biological invasions) on the sustainability and dynamics of grassland ecosystems, and contributes to the advancement of general ecological theory through synthesis and integration of data from long-term studies.