Long-term Research on Grassland Dynamics 18th Annual Konza LTER Meeting and LTER VI Planning Workshop







Our goals for the workshop...

- Background & context for the Konza LTER Program and LTER VI renewal proposal
- Highlights of research activities and accomplishments
- Overview of ongoing and continuing LTER studies
- Introduction to new potential initiatives ("core" LTER and LTER-related projects)
- Outline "next steps" in the planning process



AND – H.J. Andrews Experimental Forest

- **ARC** Arctic Tundra
- BES Baltimore Ecosystem Study
- **BNZ** Bonanza Creek Experimental Forest
- **CAP** Central Arizona-Phoenix
- CCE California Current Ecosystem
- **CDR** Cedar Creek
- **CWT** Coweeta
- FCE Florida Coastal Everglades
- GCE Georgia Coastal Ecosystem
- HBR Hubbard Brook
- HFR Harvard Forest
- JRN Jornada Basin

LTER Sites



KBS – Kellogg Biological Station **KNZ** – Konza Prairie LUQ – Luquillo Experimental Forest **MCM** – McMurdo Dry Valleys MCR – Moorea Coral Reef **NWT** – Niwot Ridge **NTL** – North Temperate Lakes **PAL** – Palmer Station **PIE** – Plum Island Ecosystem SBC – Santa Barbara Coastal Ecosystem **SEV** – Sevilleta **SGS** – Shortgrass Steppe VCR – Virginia Coast Reserve

LNO – LTER Network Office, University of New Mexico

Mission of the LTER Network

- Understand long-term ecological processes and patterns at multiple spatial and temporal scales for a diverse array of ecosystems
- Conduct major synthesis and theoretical efforts
- Create well-designed, documented databases that are accessible to the broader scientific community
- Create a legacy of long-term experiments, observations and archives of samples and specimens for use by future generations
- Provide knowledge to address complex environmental challenges

LTER sites share a common commitment to long-term research on the following core topics:

- Pattern and control of primary productivity
- Spatial and temporal distribution of populations selected to represent trophic structure
- Pattern and control of organic matter accumulation in surface layers and sediments
- Patterns and movements of inorganic inputs through soils ground- and surface waters
- Patterns and frequency of disturbance



Our conceptual view of this grassland recognizes *fire, grazing, and climatic variability* as essential and interactive factors responsible for the structure and function of this ecosystem...





Konza Prairie Experimental Design





Konza LTER Research History

- **LTER I**: Fire extremes (burned vs. unburned)
- LTER II: Fire -- Spatial heterogeneity & temporal variability
- LTER III: Grazing & plot-level mechanistic studies
- LTER IV: Fire/Grazing/Climate Interactions; New landuse and climate change experiments; New regional and cross-site studies

LTER V: Global Change and Grassland Dynamics



The Konza LTER Program addresses the responses of grassland ecosystems to key drivers at a variety of scales...



Integration of LTER Research at Konza Prairie



How are we doing?



Konza-Related Theses and Dissertations



cumulative theses/dissertations

Non-LTER Konza-Related Research



Use of the Konza LTER site and data in cross-site and network-level synthesis

BioScience

Generality in ecology: testing North American Generanty in ecology: testing North Americ grassland rules in South African savannas

Effects of Precipitation Change

Use of Konza LTER studies for undergraduate and graduate education





manipulative experiments at those grant scales at three and space. Ecologies are, however, incrusingly making use of longer terms and large-scale natripulative experlements bore Box 120.3 One example of such a study in the long-term study of prairie ecology at the Konan Paritie Beenarth Natrum Jannin (Konans), begins by Japit Helbert in 1991 Okrapp et al. 1990. The specce-is-divided burning in

to a series of large patches, which are subjected to diftent series of large patches, which are subjected to diftent contributions of controlled burning at various membrouls and grang by bison or auth of tigrer 12. Large-scale manipulative experiments are often limal by the marge of possible transment, however, for Contract in a



Fire is an imported stochastic abiets fasture in and I. Interactic with graving to detension (the (the (consuming, (Ploto by Joorf History) sporter agrees



Tallgran Prairie, Biom, and Fire-A Spellenii

, competition, and their interacts to determine the true of this community (Barger et al. 1999), there is it is the strength of strength of the strength of the strength of the strength of strength of the strength of the strength of the strength of strength of the stren



Control Reveal Uty Depart on Participant



The second secon

PAGINE 13.5 Concentrations of nation in groundwater moving from unmenteries permit (top, sold line), instrue in Kingy Cerek, Kanasa Uhoromi, and darkarge in Kingy Creck. High nitrate is related to input of groundwater from under fertilized crephend that dominates during periods of low discharge, not nitrate variations in groundwater from under perine (data courtes) of Konas Prairie Long-Term Ecologial Research site).

tion of intrate in streams can be large, given the complex interaction berevent precipition and groundwater sources (Fig. 13.25), whereas concentrations in groundwatters may be more stable. Understanding processes that control nitrate in streams generally requires understanding nitrogen dynamics in the surrounding terrestraid ecosystem. For example, ripatian zones decrease isorgasic attragen and increase the ratio of NN4, "2NO₃" in watersheds of the Anazon (McChini et al., 1994).





Challenges as we move into LTER VI...

- Getting the renewal proposal funded!!!
- Integration of new experiments and new investigators
- Synthesis, cross-site comparisons, and the development & testing of ecological theory
- Increased, and novel, uses of long-term datasets
- Maintaining effective communication and interactions among investigators
- Increasing relevance of Konza results for addressing regional-to-global issues
- Continue to evaluate LTER sampling and data collection
- Increasing non-LTER funding to support new research

Purpose of today's workshop...

- Review past LTER accomplishments
- Suggest research priorities and cross-cutting themes for LTER VI
- Introduce new investigators, and possible new research initiatives

The next steps...

- Finalization of research theme(s) for LTER VI
- Requests for investigator input from group leaders
- Written summaries of past research accomplishment
- Development / refinement of research plans
- Integration of group input into a draft proposal