

LCLUC Abstract

Land-cover Change in the Great Plains: Predicting Impacts of Regional Forest Expansion on Biogeochemical Processes

<<http://climate.konza.ksu.edu/general/nasalandcover/landuse.html>>

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Eastern Kansas (KS) has the largest expanse of tallgrass prairie remaining in the world and is second only to TX in livestock productivity. However, in the last several decades, forest cover has doubled in KS and may jeopardize future sustainability of these productive grasslands. This proposed study will quantify land-cover change in eastern KS and its consequences for ecosystem C and N dynamics and fluxes of CO₂, energy, and H₂O. Although this study is focused in KS, the results will help predict consequences of forest expansion also occurring throughout the Great Plains.

Land-cover change and vegetation shifts can be expected to:

1. profoundly affect the quantity, quality, and distribution of plant C input to soil
2. alter N availability and N cycling through vegetation-induced changes in C quality
3. ultimately affect long-term ecosystem C balance.

Furthermore, understanding relationships between changes in life-form and the abilities of terrestrial ecosystems to act as C sources or sinks is critical to predict potential responses under changing climate and land management scenarios.

The ultimate goal of this research is to evaluate the ecosystem consequences of observed and predicted land-cover change in the Great Plains. Without an understanding of the biogeochemical consequences of such major land-cover change as is occurring in the eastern Great Plains, we will lack the scientific foundation needed to insure sustainable use of our natural resources. To achieve this goal, we will use remote sensing imagery coupled with in situ process-level biogeochemical and ecosystem flux studies. We will link the biogeochemical studies to land-cover change using the MBL-General Ecosystem Model (GEM) and GIS techniques and ultimately predict long-term ecosystem changes on a regional scale.