

USING VISUALIZATIONS CREATED FROM HISTORICAL AERIAL PHOTOGRAPHY TO EXPLORE FOREST COVER CHANGE WITHIN THE PRAIRIE FOREST ECOTONE

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ABSTRACT

The prairie biome, which once covered a vast expanse of the American Midwest, is now greatly diminished. Along the prairie-forest ecotone it is well documented that woody species can invade grassland habitats that are not burned, grazed, cultivated or mowed. It has been suggested that forest expansion into the grasslands of this region has occurred within the last 100 years. In this work, aerial photographs collected approximately every 10 years from 1941 through 2000 were used to explore the continuous human-land interactions impacting the eastern deciduous forest and tallgrass prairie ecotone in a 65 square-kilometer study area in northeastern Kansas, USA. The high-resolution multi-temporal dataset was classified using object-oriented image analysis to delineate the forest cover boundaries through time. Landscape metrics and spatial analysis were performed to quantify the structure and spatial arrangement of forest cover throughout the 60-year study period. To complement these quantitative results, realistic animated computer visualizations were created using the forest cover data to drive the correct placement of vegetation on the landscape through time. Taken together, the numerical landscape metrics and qualitative visualization products provide a complete picture of the changing quantity and structure of forest cover within this dynamic environment.