

## KANSAS ECOLOGICAL RESERVES—AN OVERVIEW

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The Kansas Ecological Reserves (KER) is the collective name for seven tracts of land, 690 ha (1700 acres) in total, used for environmental research and education by The University of Kansas. Fitch (1965) and Fitch and Kettle (1988) should be consulted for additional information on specific KER sites.

### Habitats and Use

There are a variety of habitats represented on KER due, in part, to their location in the transition zone (ecotone) between the eastern deciduous forest and tallgrass prairie biomes. Remnant tracts of native (unplowed) prairie and relatively undisturbed forested stands are represented on KER. Most of the habitat on KER, however, has been disturbed through human activity (beginning largely with the agricultural practices of the early settlers of European origin in the 1850s). Therefore, in addition to the native prairie and forested habitats, there is land in various stages of ecological succession following disturbance (e.g., woodland, shrubland, and old field), as well as land maintained through active management (e.g., burning or mowing). Aquatic habitats are represented by constructed impoundments, springs, and intermittent streams.

All KER tracts are assigned to one of two broad categories for research use; nature reserves or experimental areas. Nature reserves are protected from direct human disturbance and manipulation. Research or other use on these tracts must be of minimal impact. By contrast, on portions of experimental areas where no rare communities or populations are present, experimental manipulation of the environment is permitted. It is also on these areas where research and support facilities are developed.

### Location

The KER tracts are located in two geographic areas, those south of the Kansas River approximately 16 km (10 miles) south of Lawrence, Kansas and those north of the Kansas River roughly 6-10 km (4-6 miles) north-northeast of Lawrence (Figure A, Introduction). Three KER tracts (Breidenthal Biological Reserve, Rice Woodland, and Roy and Eleanor Wall Woods) in the southern grouping are referred to collectively as Baldwin Woods. Of the four tracts in the northern area, the Robinson Tract is partially within the Kansas River floodplain. The remaining three KER tracts (Fitch Natural History Reservation, John H. Nelson Environmental Study Area, and Rockefeller Experimental Tract) are in a contiguous grouping. These three tracts occupy portions of Leavenworth, Douglas, and Jefferson counties and are referred to as the Tri-County area.

### Synopsis of Tracts

About one-half of the KER land is set aside in the nature reserve (non-manipulation) category. The largest tract in this category is the 240 ha (590 acre) Fitch Natural History Reservation (FNHR). The FNHR, established in 1948, was a former farm of the first governor of Kansas, Charles Robinson. Ecological succession has been allowed to proceed without disturbance since 1948, and many of the formerly open fields and pastures are now wooded. These successional changes in plant and animal populations have been studied since 1948. Other KER tracts treated exclusively as nature reserves are those in the Baldwin Woods area; these forested tracts were acquired between 1965-1974.

Acquisition of KER land that could be experimentally manipulated, and where facilities could be constructed, greatly expanded the range of research possibilities. The Rockefeller Experimental Tract was acquired in 1956 to determine the impact of different management practices (burning, mowing, grazing, or no treatment) on prairie vegetation (Fitch and Hall 1978). These treatments have been underway since 1962, and research on management effects on soils and vegetation has involved use of advanced remote sensing technologies. The John H. Nelson Experimental Study Area (NESA), established in 1970, permitted development of new experimental facilities for ecological research. Major research facilities located on NESA include those for aquatic research with experimental ponds and a 4 ha (10 acre) reservoir, fenced enclosures for small mammal research, a biotic succession facility, irrigated garden areas, tree plantation, and a meteorological station. Additionally, vegetation at some research sites on NESA can be manipulated to address specific ecological questions. It is also on NESA where many support facilities are located including laboratories, caretaker residence, maintenance shop, and equipment.

## Research and Education

There are currently about 25 faculty and staff from the University of Kansas and several other universities who conduct research at KER. Those from KU come from several areas including the departments of Systematics and Ecology, Botany, Civil Engineering, Entomology, Geography, Geology, as well as from the Environmental Studies Program, Museum of Natural History, Kansas Applied Remote Sensing Program, Kansas Biological Survey, and Kansas Geological Survey. In addition, there are about 20 students conducting research for graduate degrees, and several undergraduates are also conducting research. Several university classes visit KER each semester as do various other groups (e.g., elementary schools and civic groups).

Since 1948 there have been more than 400 publications and 100 theses and dissertations describing research conducted entirely, or in part, on KER tracts. Ongoing research at KER is varied, with many of the studies interdisciplinary in nature. Current initiatives include aquatic ecology, especially the interactions of agriculture and aquatic ecosystems; small mammal population biology and ecology; reptile ecology; insect ecology; plant ecology, population biology, and ecophysiology; and community ecology. Other research has involved use of remote sensing and geographic information systems to measure ecosystem attributes, examination of atmospheric and soils conditions and characteristics using sensitive monitoring equipment; and long-term monitoring and experimental studies on aquifers. Financial support for this research comes from a variety of sources including the University of Kansas, the National Science Foundation, Environmental Protection Agency, Kansas Water Resources Research Institute, and the United States Department of Agriculture.

## Administration

All research, teaching, and management of KER is coordinated through the Experimental and Applied Ecology Program at KU. The Program also maintains databases and materials that augment research use of KER. Data sets include land use history, reference literature, meteorological data, and various biotic inventories. Small synoptic collections of plants and animals are available, as are aerial photographs (from as early as 1937), maps, and other archived materials.

Literature Cited

- Fitch, H.S. 1965. The University of Kansas Natural History Reservation in 1965. Univ. Kansas Publ., Mus. Nat. Hist. Misc. Publ. 42:1-60.
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- Fitch, H. S. and W. D. Kettle. 1988. Kansas Ecological Reserves (University of Kansas natural areas). Trans. Kan. Acad. Sci. 9(1-2):30-36.