



Konza Prairie Biological Station

The tallgrass prairie, sometimes called bluestem prairie, or 'true' prairie, once extended from Ohio, throughout most of Illinois and Iowa, and much of the Dakotas, Nebraska, Kansas and Missouri. With the coming of the plow, the fertile prairie soils were turned into the most productive agricultural land on earth. Throughout most of this vast area, only a few, isolated prairie remnants survived. In the Flint Hills of Kansas, however, one can still experience this vanished prairie landscape. Here, the weathering of the rocks produced a flinty, gravelly soil which defied the plow. At the heart of the Flint Hills is Konza Prairie Biological Station, the 'Tallgrass Laboratory', the most intensively studied grassland on earth. Konza Prairie is divided into watershed-sized management units with various burning and grazing treatments designed to study the role of fire and grazing in the tallgrass prairie ecosystem.

The Flint Hills are a dissected upland with chert and flint-bearing limestone rock layers alternating with layers of softer shale. Ridges are typically flat-topped with shallow rocky soils. Hillsides are steep, with limestone outcrops. Elevations range from 1050 to 1300 feet. The climate is strongly continental, with an average frost-free period of 176 days. Precipitation averages about 32 inches per year.

The underlying rocks were laid down beneath an ancient sea, during the Permian Period some 250 million years ago. Water readily penetrates the fractured limestone layers, but because the underlying shale is relatively impervious to water, seeps and springs arise beneath the limestone ledges. Along these limestone 'breaks' shrub thickets gain a foothold, primarily rough-leaved dogwood, fragrant sumac, and elm.

The tallgrass prairie includes many different plant forms, in addition to the dominant grasses. About 600 plant species occur on Konza, but only about 60 of these are grasses. The prairie contains an abundance of broad-leaved wildflowers, called forbs, as well as woody plants like the New Jersey Tea and sumac, as well as the inconspicuous prairie bryophytes, algae, and lichens. The prairie supports a teeming variety of animal life, ranging from bison, prairie chickens, rodents and shrews, to microscopic invertebrates, fungi, and microbes beneath the surface of the soil.

The lower reaches of Kings Creek and Shane Creek, the two major streams on Konza Prairie, are forested in a narrow strip, called a gallery forest. This forest community of oak, elm, hackberry, walnut, and hickory trees lends a greater variety of habitats to the Konza Prairie landscape, increasing the diversity of species found here. About 6% of Konza Prairie is wooded.

Origin of the Name 'Konza'

In donating the funds which made possible the purchase of Konza Prairie, Katherine Ordway requested that the area be given an American Indian name. It was decided to name the property for the Kansa Indians (after whom the state of Kansas is named), whose principal village was located at the junction of the Blue and Kansas rivers. The early French and English explorers spelled the name of the Kansa more than 80 different ways. Some felt that 'Kansa' might be mistaken for a typographical error for 'Kansas', and so another frequently used spelling, 'Konza' was adopted.

A Short History of Konza Prairie

The need for a prairie field station for ecological research, to complement the prairie areas then being used for rangeland research, was first discussed by several KSU faculty members in 1956. Chief among them was Dr. Lloyd C. Hulbert, whose vision was to become the reality that is today Konza Prairie.

A survey was made of the northern Flint Hills for a suitable location, and several potential sites were selected. After unsuccessful attempts to obtain funds from several different sources, a narrow strip of land containing 916 acres in Geary county, bordering on Interstate 70, was purchased for KSU by The Nature Conservancy, with funds provided by an anonymous donor. Title was transferred to the KSU Endowment Association (now the KSU Foundation) and the deed was filed in Junction City on December 30, 1971.

The area was named Konza Prairie Research Natural Area, (changed to Konza Prairie Biological Station in 2000) to reflect its unique character as both a prairie preserve and a laboratory for scientific research. A management plan was developed, which involved the burning of watershed-sized units at prescribed intervals, beginning in 1972. The Nature Conservancy began negotiations in 1975 for purchase of the adjoining 7220 acre Dewey Ranch in Riley county. The transaction was successfully concluded in January 1977. Once again the donor wished to remain anonymous. This portion of Konza Prairie, encompassing all but the original 916 acres, is leased by Kansas State University from The Nature Conservancy for an annual payment which equals the taxes (which The Nature Conservancy pays), and insurance.

After her death in 1979, it was disclosed that Katherine Ordway was the anonymous donor of the funds which made possible the purchase of Konza Prairie. In addition, her support enabled The Nature Conservancy to secure more than 31,000 acres in five states, which together constitute the Katherine Ordway Prairie Preserve System. Konza Prairie was officially dedicated in ceremonies in May 1980. Dr. Lloyd Hulbert served as Director of Konza Prairie until his death in 1986. Subsequently, Dr. Donald W. Kaufman, Dr. Ted Barkley and Dr. O.J. Reichman each served as KPRNA director. Dr. David C. Hartnett, Professor of Biology, has directed the Konza Prairie since January 1995.

Operation of the site, building upkeep, salaries, and costs of maintaining the management plan (e.g., burning treatments) are funded by the state through the Kansas Agricultural Experiment Station, and the University's Bureau of General Research. Scientific research is funded by extramural granting sources totaling approximately 1 million dollars per year.

Research on Konza Prairie has continued to expand and diversify into many different areas. The basic Konza Prairie research design offers scientists the unique opportunity to join in an "experiment in progress" which is supported and documented by almost 25 years of accumulated data on a wide range of population, community and ecosystem processes. A wide variety of individual research projects have been conducted on Konza Prairie over the years. Currently there are more than 100 research projects active on Konza Prairie. More than a third of these are conducted by non-KSU scientists. Half of the projects involved researchers from the KSU Division of Biology, while the remainder involved faculty from the KSU Departments of Agronomy, Animal Science, Biochemistry, Civil Engineering, Entomology, Geography, Geology and Plant Pathology.

Among the major research programs initiated on Konza Prairie are the National Science Foundation (NSF) sponsored Long-Term Ecological Research (LTER) project; the designation of the Kings Creek watershed as one of the US Geological Survey's benchmark streams; the NASA satellite land surface climatology project during the summers of 1987-1989; the introduction of native grazers in 1987 and USDA Bison/Cattle comparison studies initiated in 1922; and USGS studies of ground water and stream dynamics.

Konza Prairie LTER

Studies of the bison on Konza Prairie indicate that grazing is extremely patchy, which would have tended to make burns less uniform. This pattern of grazing would tend to increase the variety of species of plants and animals with different degrees of tolerance to fire and grazing.

The Headquarters Area

Konza Prairie was formerly part of the 10,000-acre Dewey Ranch, acquired by C.P. Dewey and his son, Chauncey Dewey, beginning in 1872. The large stone house and barn were constructed about 1912 out of native cottonwood limestone quarried from the ledge just south of the present bison corral. In addition, Dewey owned about 60,000 acres of land in northwestern Kansas. The famous "Dewey-Berry Feud" took place near Bird City, in Cheyenne County in 1903. The Riley County ranch was sold by Dewey in 1930, and went through several owners before being purchased by The Nature Conservancy in 1977.

The stone house served as ranch headquarters and as a residence for employees who worked on the Dewey Ranch. The rooms on the upper floor are currently used for visiting researchers. The middle floor houses the L.C. Hulbert Conference room, grassland library, and offices. A tallgrass prairie educational center has been developed on the lower floor. The reservoir or "swimming tank" on the hilltop west of the stone house has most recently been used to supply water for studies of runoff and erosion from rainfall in burned and unburned prairie.

The research laboratory building, located east of the barn, was formerly an open shed used for storage of farm machinery, and was renovated and converted to laboratories in 1988. The first floor of the barn contained horse stalls, a tackroom, and grain storage bins. The second floor was a large hay loft, where dances were sometimes held in former years.

Both the stone house and barn underwent major historical renovations in 1995. The lower level of the stone house was renovated as a prairie education and visitors center.

South of the barn in the bison corral, (rebuilt in 1998) a system of pens and alleyways leads to a squeeze chute where individual animals can be restrained. The entire bison herd is processed through this facility once each year. At this time the animals are examined and blood tested, the current year's calves are given identifying ear tags.

A memorial to the late Dr. Lloyd Hulbert has been erected a short distance east of the experimental burning plots which he established in the early 1980's. Surrounded by native prairie grasses and forbs, the simple block of native limestone bears a bronze plaque which reads "To the memory of Lloyd C. Hulbert, 1918-1986, Ecologist and Founder of the Konza Prairie Research Natural Area." The plots were renamed the Hulbert Fire Demonstration Plots in 1988.

Public access to Konza Prairie is restricted because disturbance might inadvertently affect research being conducted here. A self-guided Nature Trail and additional hiking trails have been established through funds from private foundations to provide visitors with an introduction to the prairie environment. If you have any questions about Konza Prairie, please contact us at (785) 587-0441 or write:

Konza Prairie Biological Station
Division of Biology, Ackert Hall
Kansas State University
Manhattan, KS 66506.

The National Science Foundation is supporting research on long-term ecological phenomena at a national network of sites, through the Long-Term Ecological Research program (LTER). Konza Prairie is one of 22 LTER sites nationwide, each located in a principal North American biome. The program acknowledges that many ecological processes occur on time scales of decades or centuries, and that long-term trends in natural ecosystems were not being systematically studied on the North American continent. If ecological experiments are performed without sufficient knowledge of year-to-year variability in the system, interpretation of results may be difficult. Existence of the LTER network also has the potential for comparative studies of ecosystem processes between sites.

The focus of Konza Prairie LTER is "Fire, Grazing, and Climate Interactions in Tallgrass Prairie", and involves the collection and maintenance of 70 data sets. Another goal of Konza Prairie LTER is the development of a research database to address scientific questions ranging from local to global scales. Computer capability has been expanded to include remote sensing from satellite data, much of it obtained during a major NASA experiment on Konza Prairie, and ecosystem modeling.

The Native Grazers

For almost two decades, research on Konza Prairie focused chiefly on the effects of fire on the prairie. The original 916-acre area was considered too small for the introduction of native grazers, and plans to include studies of the effects of grazers, and the interaction between fire and grazing were reluctantly abandoned. With the addition of the Dewey Ranch and Thowe land in 1977, 10 contiguous management units, totaling 2,442 acres, were designated as the "Native Grazer Area". Construction of a suitable fence proved to be a major undertaking, since post holes needed to be drilled four feet into solid rock. The first section of fence was completed in 1987, and bison were introduced in October of that year. The bison herd now numbers over 200 animals. Plans call for the eventual reintroduction of elk and pronghorn antelope at a later date. Cattle units were added in 1992 to allow comparative studies of effects of native and introduced grazers on the tallgrass prairie ecosystem.

Why the Prairie is Burned

Fire is a natural part of the prairie ecosystem; in fact, the absence of fire is considered a disturbance, since it allows the encroachment of woodland species. Prairie plants evolved with fire, and are adapted to withstand its effects. Major treatment units on Konza Prairie are burned at 1, 2, 4, 10 or 20 year intervals and in all four seasons. These areas range in size from 10 to over 400 acres. Mowed fireguards mark the boundaries between the large treatment areas.

Burning increases the amount of water reaching the soil, since the standing dead grasses and litter intercept and re-evaporate almost twice as much water as is lost in burned prairie. A dense litter layer also inhibits the resprouting of grasses in the spring, and as a result the new growth is weakened and productivity is drastically reduced. Following a fire, soil temperatures are increased, stimulating early spring growth of the grasses.

Natural fires probably occurred every 3-5 years. More frequent burning tends to decrease the diversity of species of both plants and animals. Long intervals between fires allow the invasion of non-prairie species. Natural prairie fires could have occurred in any month of the year, but we do most of our experimental burning in April, the season when fuel (dry, dead grasses from the previous year's growth) is greatest, and spring storm systems sweep across the plains.