

Prairies of Kansas

Gerald W. Tomanek

Kansas is a prairie state, representative of the grasslands of the Great Plains, varying from the Short Grass Prairies in the west to the Tall Grass Prairies in the east. The four most important environmental factors affecting prairie vegetation in Kansas are precipitation, geology, soils and topography.

Based solely on precipitation there are only four principal prairie types: Short Grass Prairie, Mixed Prairie, True Prairie and Tall Grass Prairie. The Short Grass Prairie or the northern and southern Grama-Buffalograss Prairie (Fig. 1) is found primarily in the 15-19 inch precipitation zone. The Mixed Prairie or Bluestem-Grama Prairie is found throughout the 20-24 inch rainfall zone and in the western portion of the 25-29 inch zone. The True Prairie (Bluestem Prairie) occupies most of the rest of Kansas except for a thin band of Tall Grass Prairie alternating with the Oak-Hickory Forest in the extreme eastern part of the state. Grasses can be generally classified according to height even though their heights vary from season to season due to variable environmental conditions. Generally short grasses are from six inches to one and one-half feet, mid grasses from three to five feet and tall grasses over five feet.

Originally Kansas was truly a prairie state. The forested area in eastern Kansas is much more extensive than it was before the coming of the settlers. Prior to settlement, wild prairie fires confined the forested areas to the extreme southeast and northeast corners of the state and along the major streams. Even along the streams fire destroyed the timber up to the stream banks. With fires controlled by the settlers the forest spread into the more moist areas of the prairie.

The Short Grass Prairie, more often called the Short Grass Plains, has two principal dominants, blue grama and buffalograss (Fig. 2). Western wheatgrass is found in the moister locations, particularly in the northern portion of the area. Blue grama is more common in the northern prairie while buffalograss is more abundant in the southern portion. The climate varies greatly on the Great Plains with dry, wet and mixed periods of precipitation. During wet periods the mid and tall grasses tend to become more noticeable but during drought years there is nothing apparent but the drought-resistant short grasses. In the severe drought and dust storms of the 1930's more than 90% of the grass cover was killed and only small patches of blue grama and buffalo grass remained. After the drought the rapid growth of buffalograss stolons covered the bare soil within a year or two.

Within each of the major grassland types there are smaller areas that support different plant communities because of differences in geology or soils. A good example can be found in the Short Grass Plains normally dominated by the two short grasses with only a few mid grasses and tall grasses confined to the moist lowlands. However there are areas in the northwest where the mid and tall grasses are more abundant due to the extension of loessial soils extending into Kansas from the vast loessial hills of Nebraska. Here the bluestems, sideoats grama, and western wheatgrass are more common than the short grasses. It is a mixed prairie in a short grass climatic zone. However, when this area is heavily grazed it reverts back to short grass. Similarly there are areas of alkali soils, almost too small to be mapped, that support an alkali sacaton community dominated by alkali sacaton, salt grass and western wheatgrass (Fig. 1). The calcareous soils of the rough, eroded, limestone breaks found along the Smoky Hill river and a few other scattered locations support a mixed prairie type vegetation in a short grass climate. Such an area is the Chalk Flats Prairie dominated by the midgrasses sideoats grama and little bluestem along with the short grasses. Rather extensive areas of sandy soils are found along the Arkansas and Cimmaron Rivers. The rapid infiltration of the limited rainfall supports a variety of taller grasses like sand bluestem, little bluestem, big bluestem, sand reedgrass, sand dropseed and considerable sand sagebrush. This sandsage prairie is the only community in the state with a significant shrub component.

There are other variations, too small to be mapped, affected by topography. Although western Kansas is considered to be quite level there are many hills away from the main highways. The steeper hills are often eroded down to the rocky, calcareous subsoils where the bluestems and sideoats grama dominate. On some of the hills the direction of the slope-face dictates the kinds of grasses in the plant community. For example the south- and west-facing slopes are the driest and are dominated by the short grasses while the more mesic east- and north-facing slopes support some mid and tall grasses. The position on the slope is also important. The upper slopes are most xeric because of rapid runoff while the lower slopes have more run-over water and thus more opportunity to absorb it. Therefore, the upper slopes have primarily short grass while the lower slopes have some mid and tall grasses. Although there are numerous variations from the short grass type they are relatively minor in size.

Much of the original short grass prairie has been cultivated because of the comparatively level topography and fertile soils. Because of a ready supply of sub-surface water, a large portion of the sandhills has been broken and planted

Author is Emeritus President and Professor of Biology, Fort Hays State University, Hays, Kan. Current address is 1136 E. Butterfield, Olathe, Kan.

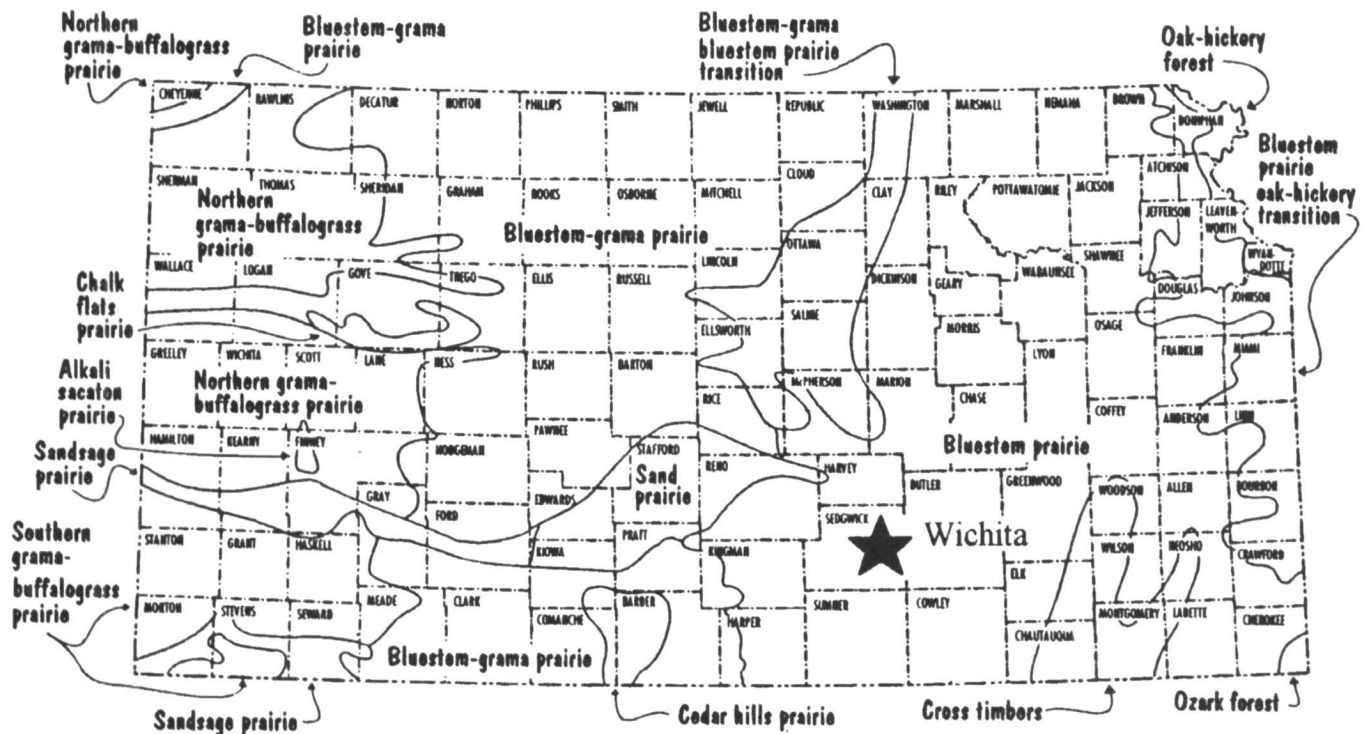


Fig. 1. Vegetation Map of Kansas from Kuchler (1974).

to circular fields of corn and other crops irrigated by center-pivot sprinkler systems. If the supply of groundwater for irrigation water is ever depleted, a desert could result.

Variations also occur in the other prairie types from changes in soils, topography or geology. The Mixed Prairie (Bluestem-Grama Prairie) gets its name from having a mixture of short grass, mid grass and tall grass dominants (Fig. 3). The principal dominants are blue grama, sideoats grama, little bluestem and big bluestem. In the Mixed

Prairie the more drought-resistant short grasses occur on the heavier soils and on the drier upper and south-facing slopes. Conversely, the mid and tall grasses are found on the open rocky and sandy soils and on the more mesic lower slopes and lowlands. The more mesic north- and east-facing slopes support mostly mid and tall grasses while larger amounts of short grasses are found on the drier south- and west-facing slopes. For example, the sand prairie supports mostly tall grasses such as big bluestem,

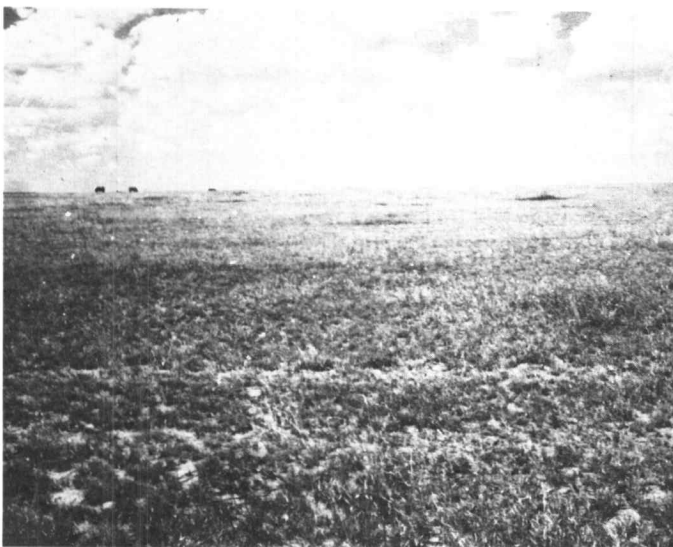


Fig. 2. Shortgrass Prairie dominated by blue grama and buffalograss.

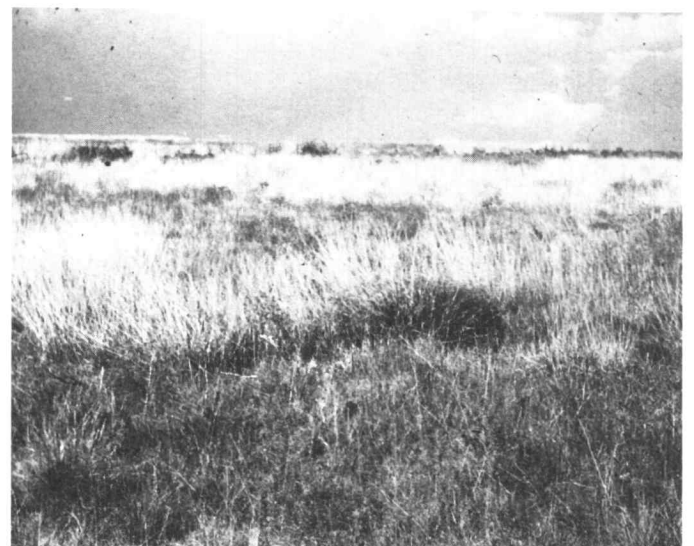


Fig. 3. Mixed Prairie (Bluestem-Grama Prairie) dominated by short grass, mid grass and tall grass.



Fig. 4. The Flint Hills of the Bluestem Prairie dominated by mid and tall grasses.



Fig. 5. Southern Bluestem Prairie showing Bluestem grasses and a ribbon of Cross Timbers (black jack and post oak) extending up from Oklahoma.

switch grass, Indian grass, sandreed grass and sand lovegrass. In the southern portion of the area an extension of the red soils of Oklahoma supports a scattering of red cedar on the Bluestem-Grama Prairie and is known as the Cedar Hills Prairie. Much of the Bluestem-Grama Prairie is found on soils derived from limestone while soils of the transition areas (Fig. 1) are derived from Dakota Sandstone.

The True Prairie or Bluestem Prairie includes the Flint Hills and a considerable portion of eastern Kansas (Fig. 1). The vegetation is dominated by mid and tall grasses such as little and big bluestem, Indian grass, switch grass, tall dropseed and sideoats grama (Fig. 4). The distribution of the grasses reacts to the effects of topography, soils and geology much like the other prairie sites. In the southern portion, on sandy soils, the Cross Timbers of Texas and

Oklahoma extends into the area forming a savannah of post oak and black jack oak and the prairie grasses (Fig. 5). More woody species are also found in the eastern portion of the Bluestem Prairie, especially on north-facing slopes and in the lowlands. The western portion of this prairie is covered by a large variety of mid and tall grasses although some short grasses are found on the drier, heavier soils, uplands and upper south-facing slopes.

Only a narrow part of extreme eastern Kansas is classified as Tall Grass Prairie. The Tall Grass Prairie does not differ much from the True or Bluestem Prairie except that all the grasses are tall. Even mid grasses like little bluestem and tall dropseed reach heights of five or six feet in the higher precipitation zone (Fig. 6). Much of the area has been taken over by forest due to protection from wild fires. The effects of topography on the distribution of vegetation in the Tall Grass Prairie is also apparent. Deciduous forests are found on the north-facing and lower slopes and in the lowlands while the tall grasses are more common on the upper and south-facing slopes. Much of the upland prairie and the lowlands have been broken and planted to crops. As stated earlier, only small areas of deciduous forest were found in northeast and southeast Kansas prior to the coming of the settlers.

Approximately 49% of Kansas still supports native vegetation and much more has been seeded to native grasses in the conservation reserve program. Hopefully the natural prairie and reseeded prairie will be maintained to enrich the soil, feed domestic livestock and feed and protect wildlife.



Fig. 6. A small area of Tall Grass Prairie surrounded by Oak-Hickory Forest.

Literature Cited

- Kuchler, A.W. 1974.** A New Vegetation Map of Kansas. *Ecology* 55:586-604.