

REFERENCES | Flint Hills Map Exhibit

for our "Remaining Flint Hills Tallgrass Prairie - Flint Hills Map"

Provided by J. W Dunham, Compiler

Background

The following discussion of the Flint Hills ecoregion is summarized from Chapman et al. (2001):

The Flint Hills ecoregion is the largest remaining intact tallgrass prairie in the Great Plains. Located along the western edge of the Great Plains historic range, the ecoregion is characterized by rolling hills composed of shale, cherty limestone, and rocky soils. These surfaces and steep slopes are difficult to plow; consequently, the region historically has supported very little cropland agriculture. The natural tallgrass prairie is intact in most of the ecoregion and is used for range and pasture land. However, some of the land in river valleys and along the periphery of the Flint Hills has been converted to cropland, especially in the northwest corner where the topography is more level. The ecoregion's climate is marked by humid, wet summers and average annual precipitation of 28 to 35 inches.

Ecoregions-geographic areas that encompass similar ecosystems and environmental resources-constitute a framework for mapping, studying, assessing, managing, and monitoring the ecosystems and ecosystem components within their borders (Chapman et al., 2001). Ecoregion boundaries are established by identifying similarities among patterns of geology, physiography, vegetation, climate, soil, land use, wildlife, and hydrology (Wiken, 1986; Omernik, 1987, 1995).

The following discussion of the Flint Hills physiographic region is summarized from Kansas Geological Survey (1999):

The Flint Hills were formed by the erosion of Permian limestones and shales. During the early Permian Period (252-299 million years ago), shallow seas covered much of the state, as they did during the earlier Pennsylvanian Subperiod (299-323 million years ago). Unlike the Pennsylvanian limestones to the east, however, some of the Flint Hills limestones contain numerous bands of chert, or flint. Because chert is much less soluble than the surrounding limestone, weathering has produced a clayey soil full of cherty gravel that covers the rocky uplands and slows erosion. Most of the hilltops in this region are capped with this cherty gravel. The tall grasses in this region are mostly big and little bluestem (*Andropogon gerardii*, *Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and Indiangrass (*Sorghastrum nutans*). Except along river and stream bottoms, trees are rare. The streams in the Flint Hills have cut deep, precipitous channels. Streams cut in chert-bearing strata produce narrow, boxlike channels, whereas those cut in more easily eroded shales create wider, more gently sloping valleys.

Though there is some disagreement about the boundaries of the Flint Hills, particularly along the western and eastern edges, most geologists agree that the Flint Hills run from northern Kansas (Marshall County) into northern Oklahoma, where they are known as the Osage Hills. For this map, a southern Flint Hills boundary in Oklahoma was constructed with input from geologists at the Kansas and Oklahoma geological surveys.

The following discussion of the identification of prairie regions is summarized from The Nature Conservancy, Osage Plains/Flint Hills Prairie Ecoregional Planning Team (2000):

As a tool for assessing the long-term viability of conservation targets in ecoregional conservation, landscape-scale areas of natural or semi-natural vegetation (generally greater than 38 square km) were identified in the Osage Plains/Flint Hills ecoregion from interpretation of Landsat Thematic Mapper (TM) satellite imagery. These areas were classified as either (1) areas with largely intact natural or semi-natural vegetation or (2) fragmented areas with a concentration of natural community remnants. Hardcopy printouts of Landsat TM scenes were visually interpreted to delineate these two conservation categories, then digitized and assembled into a geographic information system (GIS) data layer.

Cited References

Chapman, S S., Omernik, J. M., Freeouf, J. A., Huggins, D. G., McCauley, J. R., Freeman, C. C., Steinauer, G., Angelo, R. T., and Schlepp, R. L., 2001, Ecoregions of Nebraska and Kansas (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey, scale 1:1,950,000.

[Kansas Geological Survey, 1999 \(PDF\)](#), Flint Hills: Rocks and Minerals: Geofacts from the Kansas Geological Survey.

Omernik, J. M, 1987, Ecoregions of the conterminous United States (map supplement): Annals of the Association of American Geographers, v. 77, no. 1, p. 118-125, scale 1:7,500,000.

Omernik, J. M, 1995, Ecoregions-a framework for environmental management, in, Biological assessment and criteria-tools for water resource planning and decision making, W S Davis and T. P. Simon, eds.: Boca Raton, Florida, Lewis Publishers, p. 49-62.

[The Nature Conservancy](#), Osage Plains/Flint Hills Prairie Ecoregional Planning Team, 2000, Ecoregional Conservation in the Osage Plains/Flint Hills Prairie: Minneapolis, Minnesota, The Nature Conservancy, Midwestern Resource Office, 48 p.

Wiken, E B., 1986, Terrestrial ecozones of Canada: Ottawa, Environment Canada, Ecological Land Classification Series no. 19, 26 p.

Other Information Provided by Map & Exhibit Designers

Flint Hills Remaining Intact Tallgrass Prairie Data

[The Nature Conservancy, Osage Plains/Flint Hills Prairie Ecoregional Planning Team \(PDF\)](#). 2000. Ecoregional Conservation in the Osage Plains/Flint Hills Prairie. The Nature Conservancy, Midwestern Resource Office, Minneapolis, MN. 48 pp. + 73 appendices.

Locator Map - Three Prairie Regions

Boundaries of these regions are variously defined in different sources. Here is one:
Pieper, R. D. 2005. Grasslands of Central North America. In Suttie, J.M., Reynolds, S.G. and Batello, C. (eds). Grasslands of the World. Plant Production and Protection Series No. 34, pp. 221-263. Food and Agriculture Organization.

Other Sources

Sampson, Red and Knopf, Fritz, "[Prairie Conservation in North America](#)" (1994). Other Publications in Wildlife Management. Paper 41.

Larrabee, Aimee and John Altman. Last Stand of the Tallgrass Prairie. New York: Friedman/Fairfax Publishers, 2001.

Citing the Flint Hills Map Exhibit

Suggested Reference to Flint Hills map on Flint Hills Map and Education Program Exhibit (this is also located at the bottom of the map legend):

Dunham, J. W (compiler), 2015. The Flint Hills with prairie areas: Kansas Geological Survey, Open-file Report 2016-1, scale1:325,000.