

● County Seat Hydrology Kansas Highway US Highway Lake County



30 15 0 30 Miles

Kansas Water Office, February 2008

Figure 1.

General Description

The [Cimarron Basin](#) covers nearly 6,800 square miles of the southwest corner of Kansas. Nine 8-digit [Hydrologic Unit Codes](#) (HUCs) make up the basin. The basin includes all or parts of 14 counties. The major river in the basin is the Cimarron. There are no major federal reservoirs in the basin. Principal tributaries of the Cimarron River in Kansas are the North Fork Cimarron, Crooked Creek, Bluff Creek and, on occasions of high runoff, Bear Creek.

The Cimarron River has its source in Union County, New Mexico. It flows across the Oklahoma panhandle and the southeast corner of Colorado and enters Kansas nine miles northwest of Elkhart in Morton County. The Cimarron River leaves the state in the south-central portion of Meade County and reenters 30 miles east in Clark County. The river leaves the state for the last time in Comanche County and eventually joins the Arkansas River near Tulsa, Oklahoma.

Population and Economy

There were an estimated 54,300 residents in this basin in the year 2000.⁽¹⁾ According to the Kansas Division of Budget,⁽²⁾ the total [population](#) of the 14 counties that are

contained in whole or in part in the Cimarron basin had a population of 104,067 in 2000. By 2040, the county population is projected to decrease to 101,257.

This basin illustrates major demographic changes which are taking place in Kansas. In the past 40 years, two trends have dominated the state and the basin: 1) Rural counties have lost population, sometimes more than 10% every decade; and 2) Urban counties, particularly in the greater Wichita area and Kansas City areas, are gaining population at an even greater rate.

In the Cimarron Basin, counties with meat packing plants in the immediate vicinity are gaining population. Ford County, for example, went from a population 20,938 in 1960 to 33,268 in 2000. Other counties, however, are losing population. Comanche County, with a population of 3,271 in 1960, had a population of 1,636 in 2000.

The economy of the basin is very dependent on agricultural production. [Crops](#) grown include wheat, corn, grain sorghum, soybeans, forage sorghum and alfalfa.⁽³⁾

Seward County Community College offers opportunities for higher education.

Livestock production is an important component of the basin's economy. Beef cattle are the predominant livestock produced in the basin. Large cattle feeding operations are common. Beef processing is also a major economic factor in the basin.⁽³⁾

Gas and oil production is widespread and very important to the basin's economy. The first gas wells were drilled in the Hugoton field in the early 1920's, which remains a major national gas producing area. Other minerals are of minor importance to the basin.

Recreation is an increasing part of the economics of the basin, as is industry. The state parks and associated recreation and wildlife areas draw hunters to the area. The growing industrial contribution to the basin economy is primarily related to energy production, including ethanol. As of December 2008, an ethanol plant is permitted in Grant County and one ethanol plant is operational in Seward County. In 2007, Abengoa Bioenergy, a Spanish energy company, announced that Hugoton Kansas would be the site of the state's first cellulosic ethanol plant.



Drilling rig, Anadarko Oil and Gas, Seward County.
Photo courtesy Kansas Geological Survey.

within the basin is comprised of residential, commercial/industrial and municipal use, open water and barren ground.

The Cimarron basin has the second lowest stream bank miles, 13,950, of the twelve major river basins in Kansas.

Within a 100-foot corridor along each bank, about 67% of the riparian area is pasture/grassland followed by cropland (25%).⁽⁴⁾

Climate

The climate of the basin is characterized by moderate to low **precipitation**, relatively high wind velocities, fairly rapid rates of evaporation, a wide range of temperatures and abrupt, sometimes violent changes in weather (Table 1).

Drought is a naturally recurring feature of this climate as exemplified by the Dust Bowl of the 1930s and the drought of 1952-1957. It is perhaps the most pervasive natural hazard affecting Kansas and other agricultural areas of the central United States. Kansas has been impacted by severe drought periodically throughout the present decade.

Physical Characteristics

Geology and Soils

The High Plains portion of the Cimarron River basin is underlain chiefly by Pliocene and Pleistocene deposits of which the Ogallala is the principal water-bearing formation of the area. The Ogallala formation consists primarily of unconsolidated sand, gravel, and silt formed from the igneous rocks of the Rocky Mountains and the sedimentary rocks of eastern Colorado. These materials were carried into Kansas and deposited by streams. These Pliocene and Pleistocene deposits occur in thicknesses up to 700 feet and are thickest in the south-central part of the basin.

Land Use/Land Cover

Land use in the basin typically is dominated by cropland (52.7%) or grassland (33.5%) or Conservation Reserve Program Land (13.1%). Less than one percent of land

Table 1.

Location	Average Annual ¹		Freeze Dates (32 F.) ²		
	Precipitation (inches)	Temperature (F)	Last	First	Days Between
Elkhart	18.90	55.0	Apr. 17	Oct. 18	178
Coldwater	26.13	57.5	Apr. 15	Oct. 20	187

¹Source: National Climatic Data Center (1971-2000 data)

²Source: KSU Weather Data Library (1961-1990 data)

Wildlife and Habitat

The Cimarron River basin is located within the High Plains physiographic region which is comprised of rolling sand plains, rangeland, and cropland. Native vegetation in this region includes sand sagebrush, sand bluestem, prairie sandreed, little bluestem, blue grama, buffalo-grass, side oats grama, western wheatgrass, and scattered isolated sites with alkali sacaton and inland saltgrass.



“Point of Rocks”, Ogallala outcropping in Morton County.
Photo courtesy Kansas Geological Survey.

Numerous threatened and endangered species occur in the Cimarron Basin. Of these, one is an amphibian, ten are birds, two are mammals, four are reptiles and four are fish.

In April 2001, the U.S. Fish and Wildlife Service listed the Cimarron River in Clark, Meade and Seward counties, from U.S. Highway 54 bridge downstream to the Kansas-Oklahoma border, as critical habitat for the Arkansas River Shiner, a threatened species.

Southwest Kansas is a leading edge of the downstream movement of salt cedar. Salt cedar (also known as “tamarisk”), Russian olive and other invasive phreatophytes (a deep-rooted plant that obtains its water from the water table or the layer of soil just above it) have become a significant problem along the Cimarron River, Crooked Creek and other streams in the Cimarron basin.

Meade Lake State Park, located south of Meade, is the first state lake in Kansas.

Meade State Park was originally carved out of the Turkey Track Ranch in 1927. The location for the lake was chosen because springs fed by the Ogallala aquifer provided an adequate base flow. The state park and wildlife area comprise 803 acres of land and water.



Meade Lake State Park, Meade County.

Water Resources

The High Plains [aquifer](#) is the primary source of water in western Kansas. Nearly all of the reported water used in the Cimarron Basin is from ground water.⁽⁵⁾ The High Plains aquifer is composed of several hydraulically connected aquifer units of which the largest is the Ogallala. It has been intensely developed, mostly for irrigation, leading to significant ground water declines.

The Cimarron basin contains 6,421 miles of intermittent and 432 miles of perennial streams for a total of 6,853 stream miles. The density of 1.0 stream miles per square mile, places the basin last among the twelve major river basins.

The Ogallala portion of the High Plains aquifer (Ogallala-High Plains aquifer) is characterized by low recharge and high declines. The expected “usable life” of the aquifer, when the aquifer is no longer able to support the current high rates of pumping, varies widely due to differences in amount of saturated thickness, hydraulic conductivity, withdrawals and other variables. The total irrigated acres in the Kansas High Plains increased 2.4% from 1999/1993 to 2001/2003. During the same time period there was an increase in corn, alfalfa and soybeans, crops that are typically water intensive. There has also been a wide spread adoption of more efficient irrigation systems. Even with the improvements, though, the aquifer is still declining.

Cimarron Basin
2006 Reported Water Use by Type

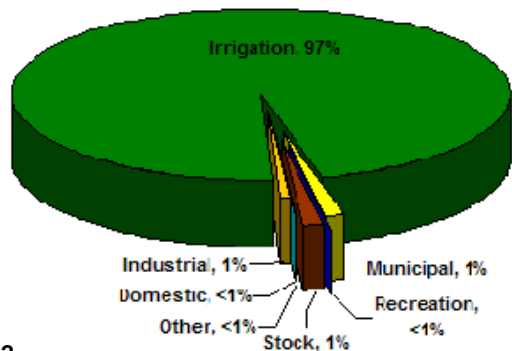


Figure 2.

Irrigation accounted for more than 97% of [all reported water pumped](#) or diverted. Municipal use accounted for less than one percent of water used in the basin; industry, recreation, stockwater and other uses combined equal less than three percent (2006).⁽⁵⁾

The High Plains aquifer is highly variable in Kansas. The amount of water in storage, the depth to water, the hydraulic conductivity (how readily the water moves through the sediments in the aquifer), the amount of withdrawals and the recharge rates all vary significantly throughout the basin.

Water Management

A majority of the basin is [closed or restricted](#) for new water appropriations. The State Chief Engineer's action on Southwest Groundwater Management District No. 3 (GMD3) rules took effect November 21, 2002. All the townships that were previously closed to new water development remain closed. Several additional townships were also closed and seventeen townships remain open to new appropriations.

Applications filed prior to the effective date for water from townships open at the time of application will be processed under the planned depletion standards. Applications for water after that date in any of the still open townships will be processed subject to the state-wide safe yield standard.

Minimum desirable streamflow (MDS) has not been set at any sites in the basin. No watershed districts have been organized in the basin.

The county conservation district is the primary local unit of government responsible for the conservation of soil, water and related natural resources within the county boundary. Each county within the Cimarron River basin has a county conservation district. Two Resource Con-

servation and Development (RC&D) districts serve the counties of the Cimarron basin: the Santa Fe Trail RC&D and the Coronado Crossing RC&D. The RC&Ds are designed to help community leaders develop rural economies by improving and conserving local natural, human and economical resources.



Center Pivot Irrigation near Elkhart, Morton County. USGS.

Resources

1. US Census data, 2000
2. Kansas Division of Budget 2007. County population estimates,
3. U.S. Department of Agriculture, Kansas 2006-2007 County Farm Facts, Agricultural Statistics and Ranking.
4. Wilson, Brownie, Assessment of Riparian Areas Inventory, State of Kansas, 2003. <http://www.kgs.ku.edu/Hydro/Publications/ofrIndex.html>
5. Kansas Department of Agriculture-Division of Water Resources, December 13, 2007. Water Right Information System Database.
6. USDA-Natural Resources Conservation Service, Resource Conservation and Development Information. <http://www.ks.nrcs.usda.gov/partnerships/rcd/>
7. Kansas Water Office. 2003. *Kansas Water Plan*, Cimarron Basin and Water Quality Sections.
8. Kansas Water Resources Board Water Plan Studies Cimarron Unit. June 1962.

Cimarron National Grassland

The longest stretch of publicly-owned riparian habitat in Kansas is located within the Cimarron National Grassland in Morton and Stevens counties. The Grassland, administered by the USDA Forest Service, covers approximately 108,175 acres in the southwest corner of the Cimarron River basin.

Rock cliffs, cottonwood groves, grassy fields, yucca and sage brush are scattered throughout the land. Elevation ranges from 3,150 to 3,540 feet. Seasonal variety is provided by native grasses and riparian vegetation along the Cimarron River. The geology of the area is sandstone, shale, limestone, sand and gravel.

The third highest point in the basin of Kansas is located on the Grassland, Point of Rocks, at 3,540 feet. From this elevation, Colorado and Oklahoma are visible on clear days. Point of Rocks and other land features within the Grasslands were important landmarks for travelers on the Santa Fe Trail, which stretches across the Grasslands forming the longest publicly owned portion of the Trail in the country.

The drought of the 1930's left the land in poor condition. Under Bankhead-Jones Farm Tenant Act in 1938, the federal government began purchasing the devastated



Cimarron National Grassland, blooming wildflowers.

land to restore it. Originally known as Land Utilization Projects, the lands were renamed Cimarron National Grassland in June 1960. Today the land is managed for wildlife, water conservation, livestock grazing, recreation and mineral production.