PRELIMINARY SURFICIAL GEOLOGY OF THE KINGMAN COUNTY PORTION OF THE NORWICH QUADRANGLE, KANSAS

Geology by Jon J. Smith

GIS compilation and cartography by Kolbe D. Andrzejewski

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KANSAS GEOLOGICAL SURVEY
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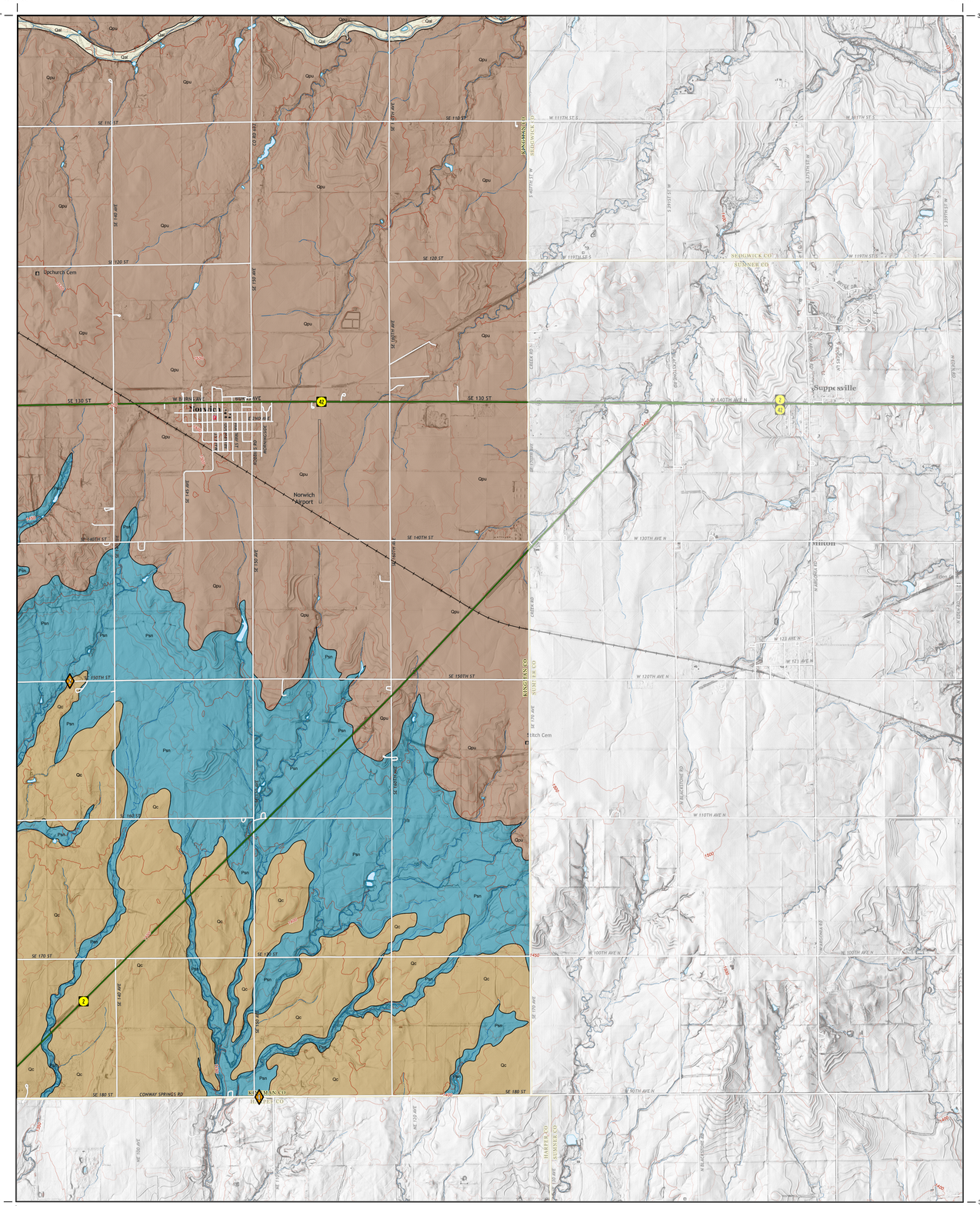
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

NORWICH QUADRANGLE
KANSAS
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 14S

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, July 2017 - September 2017
Roads..... U.S. Census Bureau, 2015
Names.....GNIS, 1984 - 2021
Hydrography.....National Hydrography Dataset, 2004 - 2018
Contours.....National Elevation Dataset, 2016
Boundaries.....Multiple sources; see metadata file 2019 - 2021
Public Land Survey System.....BLM, 2018
Wetlands.....FWS National Wetlands Inventory 1985

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

MN GN 3°48' 68 MILS 0°43' 13 MILS

U.S. National Grid
100,000 m Square ID "QJ"
NG PG
Grid Zone Designation 14S

SCALE 1:24 000

KILOMETERS 1 0.5 0 1 2
METERS 1000 500 0 1000 2000
MILES 1 0.5 0 1
FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard.

EXPLANATION

Transportation
- Paved road
- State highway
- Railroad

Hydrology
- Perennial stream
- Intermittent stream
- Waterbody

Topography
- Index elevation contour (50 feet)
- Elevation contour (10 feet)

Geology
- Observed contact
- Photo location

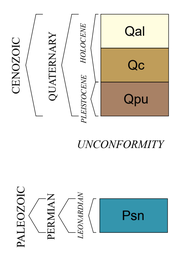
SUGGESTED REFERENCE TO THE MAP

Smith, J. J., 2026, Preliminary surficial geology of the Kingman County portion of the Norwich quadrangle, Kansas: Kansas Geological Survey, Open-File Report 2026-17, scale 1:24,000, unpublished.

GEOGRAPHY

Kingman County is located in south-central Kansas and has a total area of 876 square miles (2,250 km2). The county seat and the largest city is Kingman, which is located in the north-central portion of the county. The Chikaskia River drains to the southern portion of Kingman County, while the Ninnescah River and its tributaries cross and drain the northern half of the county. Smoots Creek and Nester Creek are large tributaries of the Ninnescah River that drain the northeastern corner of the county. Kingman County is mostly within the High Plains physiographic region of Kansas, while portions of the eastern third are within the Wellington-McPherson Lowlands. The surficial geology primarily consists of Quaternary alluvium and eolian deposits (floodplains and terraces), erosional remnants of the Ogallala Formation, and Permian bedrocks of the Sumner and Nippewalla Groups.

CORRELATION OF UNITS



The following descriptions consist of a compilation of several sources; including field notes and measured sections, U.S. Department of Agriculture Natural Resources Conservation Service databases, and lithologic and other data in Swineford (1955), Lane (1960), and Zeller (1968).

GEOLOGIC UNITS

Qal

Undifferentiated floodplain alluvium

Holocene alluvial deposits make up the modern floodplains in most of the principal streams in Kingman County. The main stems of streams in the county underwent deep incision during the latest Holocene and have recently re-established floodplains within the incised channels in some areas. Floodplain alluvium is composed of silt, sand, and gravel and is relatively thin, probably no more than 20 ft (6 m) in thickness.

Qc

Colluvium and alluvial fan deposits

These deposits moved downslope and accumulated on river valley walls between Pleistocene alluvium and Paleozoic rocks in upland areas and ancient alluvial terraces along the margin of the Chikaskia floodplain. They consist of reddish-brown to dark gray, poorly sorted silt, sand, and gravel with angular fragments of chert and limestone and are generally less than 20 ft (6 m) thick.

Qpu

Alluvial and eolian deposits (upland)

Mixed alluvial and eolian (loess) deposits are found on interfluve uplands well above and often distant from modern stream floodplains. Composed chiefly of Pleistocene silt, sand, and gravel, upland alluvium is generally reddish-brown in color and contains rounded to angular rock fragments with various provenances, including locally derived chert and limestone. This unit is the principal source of groundwater in Kingman County and supplies sufficient water to support center-pivot irrigation systems where it reaches thicknesses of up to 150 ft (46 m).

Psn

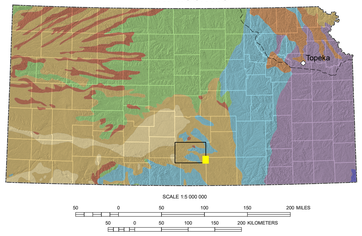
Ninnescah Shale

The oldest rock unit exposed in Kingman County is the Ninnescah Shale of the Permian Sumner Group. The Ninnescah is composed mostly of blocky, brownish-red dolomitic or calcareous, silty shale but also contains some gray shale, argillaceous limestone and dolomite, and calcareous siltstone. The different colors of the beds give the outcrops a banded appearance. The unit's maximum thickness is 450 ft (137 m), but probably only the upper 100 ft (30 m) crops out in eastern Kingman County. The Ninnescah Shale is marked at the top by the Runnymede Sandstone Member, an approximately 8 ft (2.5 m) thick, very fine-grained, gray to grayish-green siltstone and sandstone. To the north of Kingman County, the upper limit of the Ninnescah Shale is demarcated at the base of the Stone Corral Formation, though this unit is absent in the mapped areas. In eastern Kingman County, near-surface portions of the Ninnescah Shale yield good quality water to domestic and livestock wells, though strong mineralization has been reported in the southeast corner of the county.

Figure 1. Approximately 3 m of Permian Ninnescah Shale (Psn) exposed in roadcut consisting of red-brown and gray streaked, blocky shale. Photo credit: Jon J. Smith, University of Kansas.

Figure 2. Brown-gray, poorly sorted colluvium/alluvium in shallow roadcut (Qc). Photo credit: Jon J. Smith, University of Kansas.

MAP LOCATION



GENERALIZED GEOLOGY OF KANSAS

QUATERNARY SYSTEM
Holocene - Pleistocene Series
- Loess and river-valley deposits
- Sand dunes
- Glacial-drift deposits
- Limit of glaciation in Kansas

NEOGENE SYSTEM
Pliocene - Miocene Series
- Ogallala Fm

CRETACEOUS SYSTEM

PERMIAN SYSTEM

CARBONIFEROUS SYSTEM
- Pennsylvanian Subsystem
- Mississippian Subsystem

SOURCES

Bayne, C. K., 1960, Geology and ground-water resources of Harper County, Kansas: Kansas Geological Survey, Bulletin 143, 183 p.

Lane, C.W., 1960, Geology and ground-water resources of Kingman County, Kansas: Kansas Geological Survey, Bulletin 144, 173 p.

McCauley, J. R., 2007, Geologic map of Barber County, Kansas: Kansas Geological Survey, Map M-106, 1 sheet, scale 1:50,000.

Norton, G. H. (1939) Permian redbeds of Kansas: Am. Assoc. Petroleum Geologists, Bull., v. 23, p. 1751-1819.

Sawin, R. S., Franseen, E. K., West, R. R., Ludvigson, G. A., and Watney, W. L., 2008, Clarification and changes in Permian stratigraphic nomenclature in Kansas; in, Current Research in Earth Sciences: Kansas Geological Survey, Bulletin 254, part 2. http://www.kgs.ku.edu/Current/2008/Sawin/index.html.

Swineford, A., 1955, Petrography of upper Permian rocks in south-central Kansas: Kansas Geol. Survey, Bull. 111, p. 1-178, fig. 1-13, pl. 1-24.

Zeller, D. E., ed., 1968, The stratigraphic succession in Kansas: Kansas Geological Survey, Bulletin 189, 81 p., http://www.kgs.ku.edu/Publications/Bulletins/189/index.html.

Elevation contours are presented for general reference. Used in the U.S. Geological Survey's current US Topo 1:24,000-scale topographic map series, they were generated from hydrographically-improved 1/3 arc-second National Elevation Dataset (NED) data and smoothed during processing for use at 1:24,000 scale. In some places, the contours may be more generalized than the base data used for compilation of geologic outcrop patterns. Outcrop patterns on the map will typically reflect topographic variation more accurately than the associated contour lines. Repeated fluctuation of an outcrop line across a contour line should be interpreted as an indication that the mapped rock unit is maintaining a relatively constant elevation along a generalized contour.

1-meter LiDAR hillshades and 1-meter 2020 U.S. Department of Agriculture – Farm Services Agency (USDA-FSA) National Agriculture Imagery Program (NAIP) digital imagery were used as references in the digital mapping. USGS 7.5-min 1:24,000-scale topographic maps, USDA Natural Resources Conservation Service (NRCS) soil surveys, and other geologic maps and bulletins were used to supplement the mapping. Roads and highways are shown on the base map as represented by data from the Kansas Department of Transportation (KDOT), U.S. Census Bureau, and other sources. USDA-FSA NAIP imagery also was used to check road locations.

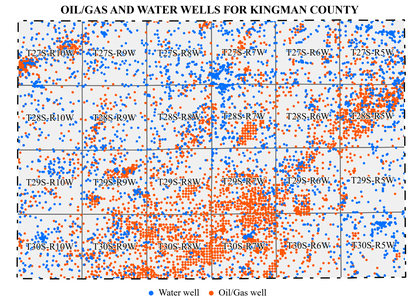
Shaded relief is based on 1-meter hydroflattened bare-earth DEMs from the state of Kansas LiDAR database. The DEM images, in ERDAS IMAGINE format, were mosaicked into a single output DEM and reprojected to decimal degrees. The output DEM was then converted to a hillshade, a multidirectional shaded-relief image using angles of illumination from 0°, 225°, 270°, and 315° azimuths, each 45° above the horizon, with a 4x vertical exaggeration.

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program, STATEMAP award number G25AC00518 (FY2025).

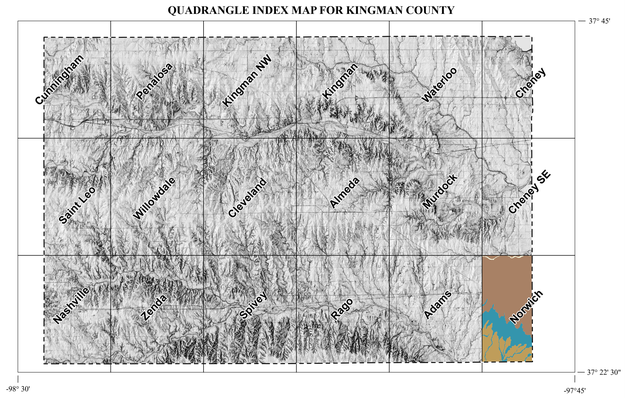
This map was produced using the ArcGIS system developed by Esri (Environmental Systems Research Institute, Inc.).

This map is a preliminary product and has had less scientific and cartographic review than the Kansas Geological Survey's M-series geologic maps. The KGS does not guarantee this map to be free from errors or inaccuracies and disclaims any responsibility or liability for interpretations made from the map or decisions based thereon.

OIL/GAS AND WATER WELLS FOR KINGMAN COUNTY



QUADRANGLE INDEX MAP FOR KINGMAN COUNTY



Last updated: 9/2/2026