PRELIMINARY SURFICIAL GEOLOGY OF THE HARPER QUADRANGLE, HARPER COUNTY, KANSAS

by Jon J. Smith

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

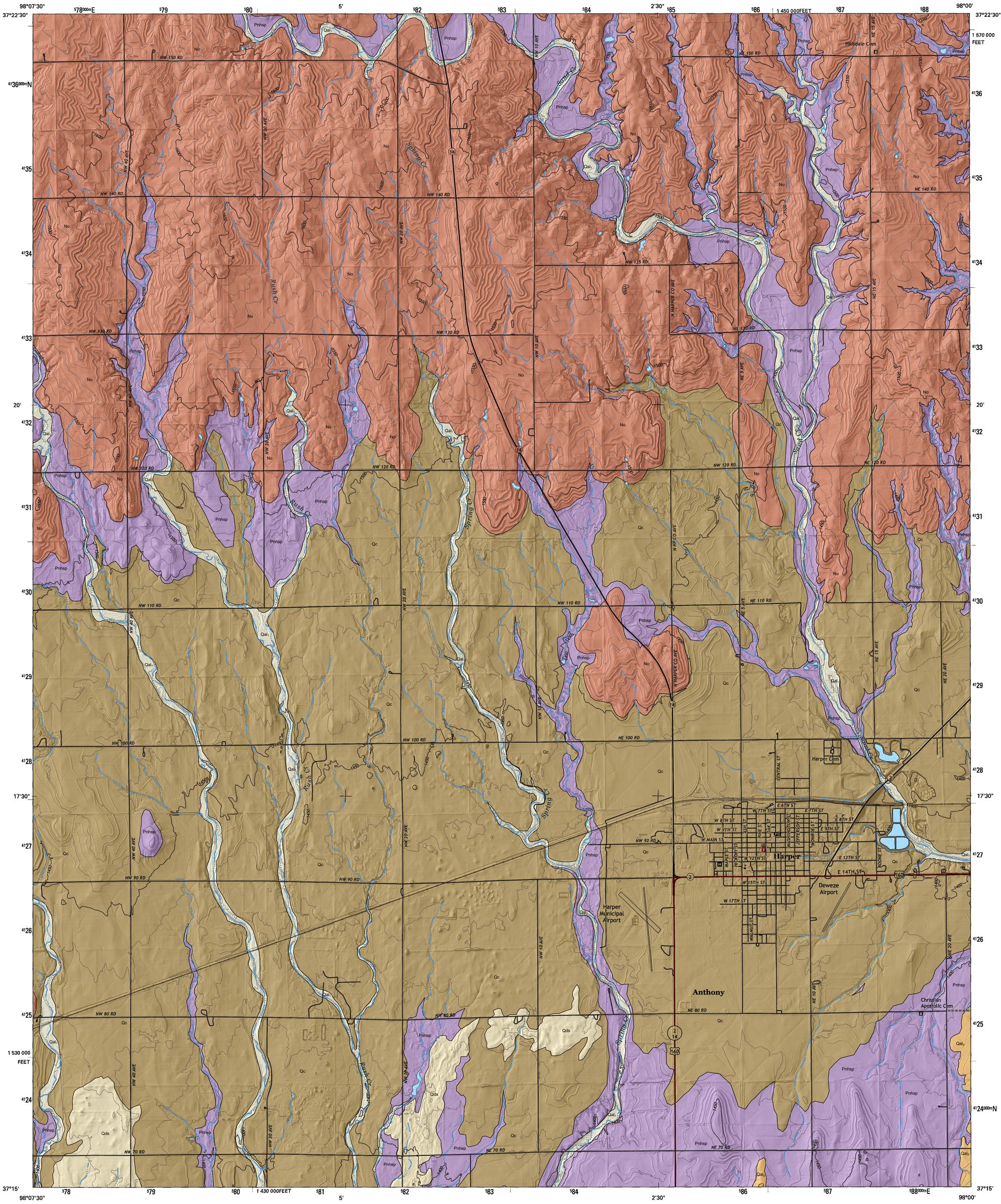
The National Map US Topo

HARPER QUADRANGLE
KANSAS - HARPER COUNTY
7.5-MINUTE SERIES

KU KANSAS GEOLOGICAL SURVEY
The University of Kansas

Open-File Report 2022-20

Funded in part by the USGS National Cooperative Geologic Mapping Program



GEOLOGIC UNITS

CENOZOIC

Quaternary System
Holocene

Qal_1 — **Undifferentiated floodplain alluvium**

Qds — **Dune sand**

Qc — **Colluvial apron and alluvial fan deposits**

Qal_2 — **Upland alluvium**

Neogene System

No — **Ogallala Formation and undifferentiated overlying Quaternary alluvium**

PALEOZOIC

Permian System
Leonardian Series
Nippewalla Group

Pnhsp — **Harper Sandstone and Salt Plain Formation**

EXPLANATION

Geologic Unit Boundaries

——— Observed contact

SOURCES

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

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Norton, G. H., 1939, Permian redbeds of Kansas: Bulletin of the American Association of Petroleum Geologists, v. 23, n. 12, p. 1,751-1,819.

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.

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Zambito, J. J., Benison, K. C., Foster, T. M., Soreghan, G. S., Soreghan, M. J., and Kane, M., 2012, Lithostratigraphy of Permian red beds and evaporites in the Rebecca K. Bounds core, Greeley County, Kansas: Kansas Geological Survey, Open-File Report 2012-15, 45 p.

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 2010 and 2012 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. U.S. Department of Agriculture – Farm Services Agency (USDA-FSA) National Agriculture Imagery Program (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, downsampled to 2-meter resolution, 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, award number G20AC00241 (FY2020).

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.

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, 1995 -	2021
Hydrography	National Hydrography Dataset, 2006 -	2018
Contours	National Elevation Dataset,	2017
Boundaries	Multiple sources; see metadata file 2019 -	2021
Public Land Survey System	BLM,	2018
Wetlands	FWS National Wetlands Inventory 1985 -	1985

MN
GN
3°58' 71 MILS
0°34' 10 MILS
UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
NG
Grid Zone Designation 14S

SCALE 1:24 000

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

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.

KANSAS
QUADRANGLE LOCATION

1 Spivey
2 Rago
3 Adams
4 Crystal Springs
5 Danville
6 Attica
7 Anthony
8 Bluff City NW
ADJOINING QUADRANGLES

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

HARPER, KS
2022

SUGGESTED REFERENCE TO THE MAP

Smith, J. J., 2022, Preliminary surficial geology of the Harper quadrangle, Harper County, Kansas: Kansas Geological Survey, Open-File Report 2022-X, scale 1:24,000, unpublished.

Last updated 6/22/22