PRELIMINARY SURFICIAL GEOLOGY OF THE RUSSELL SPRINGS NE QUADRANGLE, LOGAN COUNTY, KANSAS

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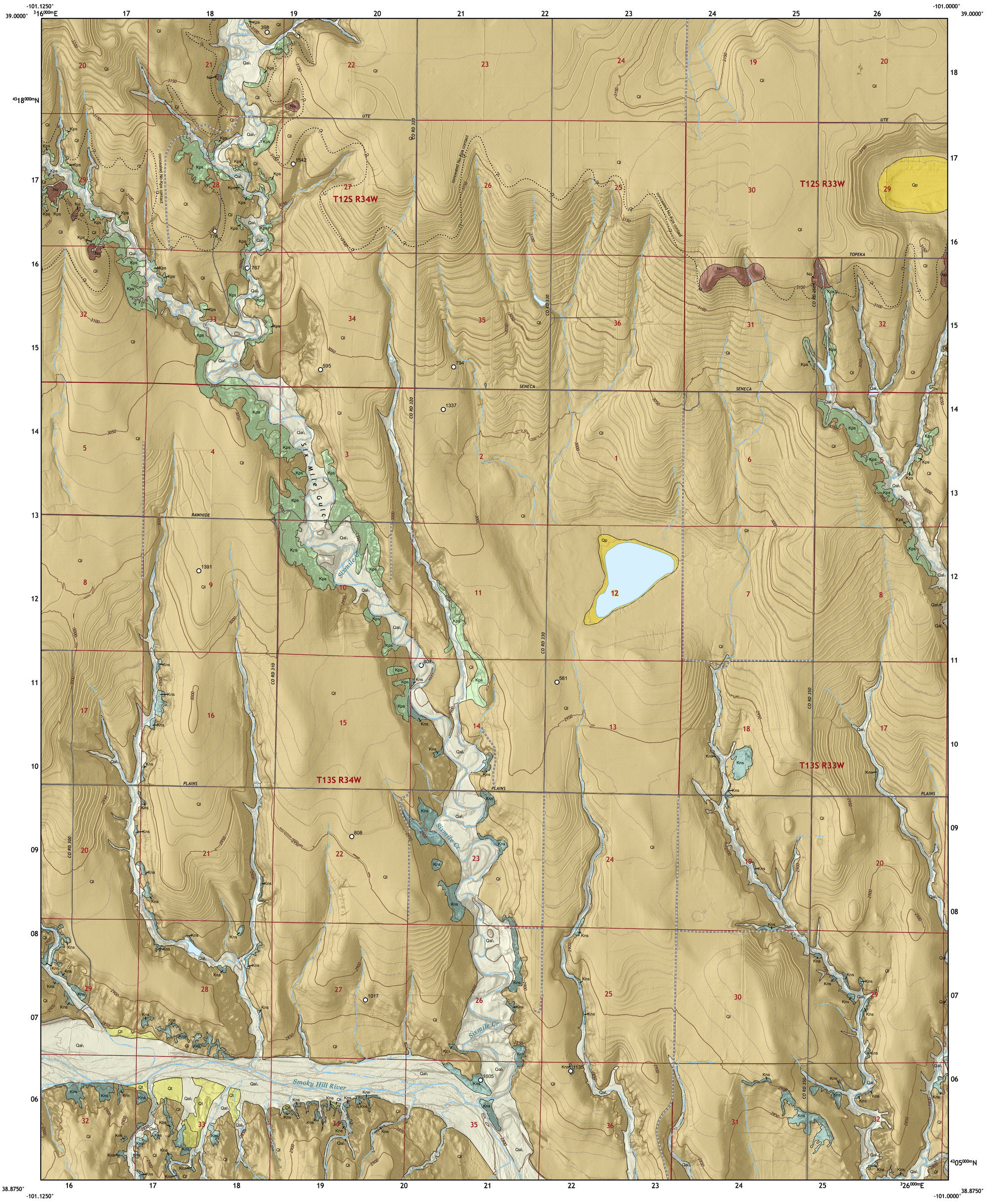
The National Map US Topo

RUSSELL SPRINGS NE QUADRANGLE
KANSAS - LOGAN COUNTY
7.5-MINUTE SERIES



GEOLOGIC UNITS

CENOZOIC

Quaternary System
Holocene

- Qal_1 — **Undifferentiated floodplain alluvium**
- Qt — **Alluvial terrace deposits**
- Qp — **Upland intermittent lake (playa) deposits**
- Ql — **Loess**

Neogene System

- No — **Ogallala Formation**

MESOZOIC

Cretaceous System
Upper Cretaceous Series
Colorado Group

- Kps — **Pierre Shale**
- Kns — **Smoky Hill Chalk**

EXPLANATION

Geologic Unit Boundaries

- Observed contact
- Concealed contact (questionable)
- Exploration drill hole

SOURCES

Arbogast, A.F., and Johnson, W.C., 1996, Surficial geology and stratigraphy of Russell County, Kansas: Kansas Geological Survey, Technical Series 7, 45 p.

Bell, E.L., 1964, Soil survey of Logan County, Kansas: U.S. Department of Agriculture, Soil Conservation Service, 78 p.

Elias, M.K., 1931, The geology of Wallace County, Kansas: Kansas Geological Survey Bulletin, 18, 254 p.

Gill, J.R., Cobban, W.A., and Schultz, L.G., 1972, Stratigraphic and composition of the Sharon Springs Member of the Pierre Shale in western Kansas: U.S. Geological Survey Professional Paper 728, 55 p.

Hattin, D.E., 1982, Stratigraphy and depositional environment of Smoky Hill Chalk Member, Niobrara Chalk (Upper Cretaceous) of the type area, western Kansas: Kansas Geological Survey, Bulletin 225, 108 p.

Johnson, C.R., 1958, Geology and ground-water resources of Logan County, Kansas: Kansas Geological Survey, Bulletin 129, 177 p.

Johnson, W.C, and Arbogast, A.F., 1993, Geologic map, Phillips County: Kansas Geological Survey, Map M-29, scale 1:50,000, 47 x 42 inches.

Johnson, W.C., 1993, Surficial geology and stratigraphy of Phillips County, Kansas, with emphasis on the Quaternary Period: Kansas Geological Survey, Technical Series 1, 66 p.

Johnson, W.C., and Arbogast, A.F., 1996, Geologic map of Russell County, Kansas: Kansas Geological Survey, Map M-37, scale 1:50,000, 42.5 x 45 inches.

Neuhauser, K.R., and Pool, J.C., 1988, Geologic map, Ellis County, Kansas: Kansas Geological Survey, Map M-19, scale 1:53,870, 48 x 39 inches.

Neuhauser, K.R., Wilcox, T.M., and Schumacher, B.A., 1996, Geologic map of Ness County, Kansas: Kansas Geological Survey, Map M-47, scale 1:50,000, 40 x 40 inches.

Zeller, D. E., ed., 1968, The stratigraphic succession in Kansas: Kansas Geological Survey, Bulletin 189, 81 p.

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 G22AC00574 (FY2022).

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.

Last updated 08/21/23

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 - 2018
Names.....GNIS, 2015 - 2017
Hydrography.....National Hydrography Dataset, 2006 - 2018
Contours.....National Elevation Dataset, 2018
Boundaries.....Multiple sources; see metadata file 2019 - 2021
Public Land Survey System.....BLM, 2018
Wetlands.....FWS National Wetlands Inventory 1985 - 1985

MN
GN
1°18' 23 MILS
5°62' 104 MILS
UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
LJ
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 MILES 1
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.

QUADRANGLE LOCATION

1 2 3
4 5
6 7 8

1 Winona
2 Monument
3 Oakley SW
4 Russell Springs
5 Elkader NW
6 Lone Butte
7 Russell Springs SE
8 Elkader SW

ADJOINING QUADRANGLES

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

RUSSELL SPRINGS NE, KS
2022

SUGGESTED REFERENCE TO THE MAP

Sawyer, D.A., 2023, Preliminary surficial geology of the Russell Springs NE quadrangle, Logan County, Kansas: Kansas Geological Survey, Open-File Report 2022-36, scale 1:24,000, unpublished.