

# PRELIMINARY SURFICIAL GEOLOGY OF THE ELKADER SW QUADRANGLE, LOGAN COUNTY, KANSAS

by David A. Sawyer

2023

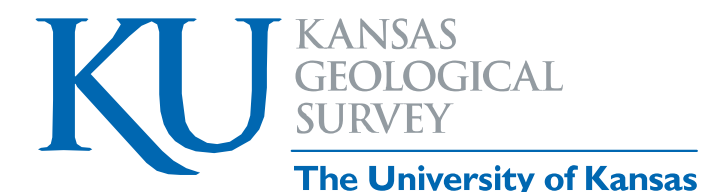
Computer compilation and cartography by Kolbe D. Andrzejewski



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



ELKADER SW QUADRANGLE  
KANSAS - LOGAN COUNTY  
7.5-MINUTE SERIES



Open-File Report 2023-12

Funded in part by the  
USGS National Cooperative  
Geologic Mapping Program

## GEOLOGIC UNITS

### CENOZOIC

#### Quaternary System

##### Holocene

Qal <sub>1</sub>	Undifferentiated floodplain alluvium
Qt	Alluvial terrace deposits
Qc	Colluvial apron and alluvial fan deposits
Ql	Loess

### PALEOZOIC

#### Permian System Leonardian Series Sumner Group

Kp	Pierre Shale
Kns	Smoky Hill Chalk

## EXPLANATION

Geologic Unit Boundaries	
—	Observed contact
- - -	Fault - identity and existence certain, location approximate
—	Fault - identity and existence certain, location accurate

## 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, Maxim K., 1931, The Geology of Wallace County, Kansas: Kansas Geological Survey Bulletin 18, 254 p.
- Gill, James R., Cobban, William A., and Schultz, Leonard 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.
- Hatlin, 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: 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 1/2 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.

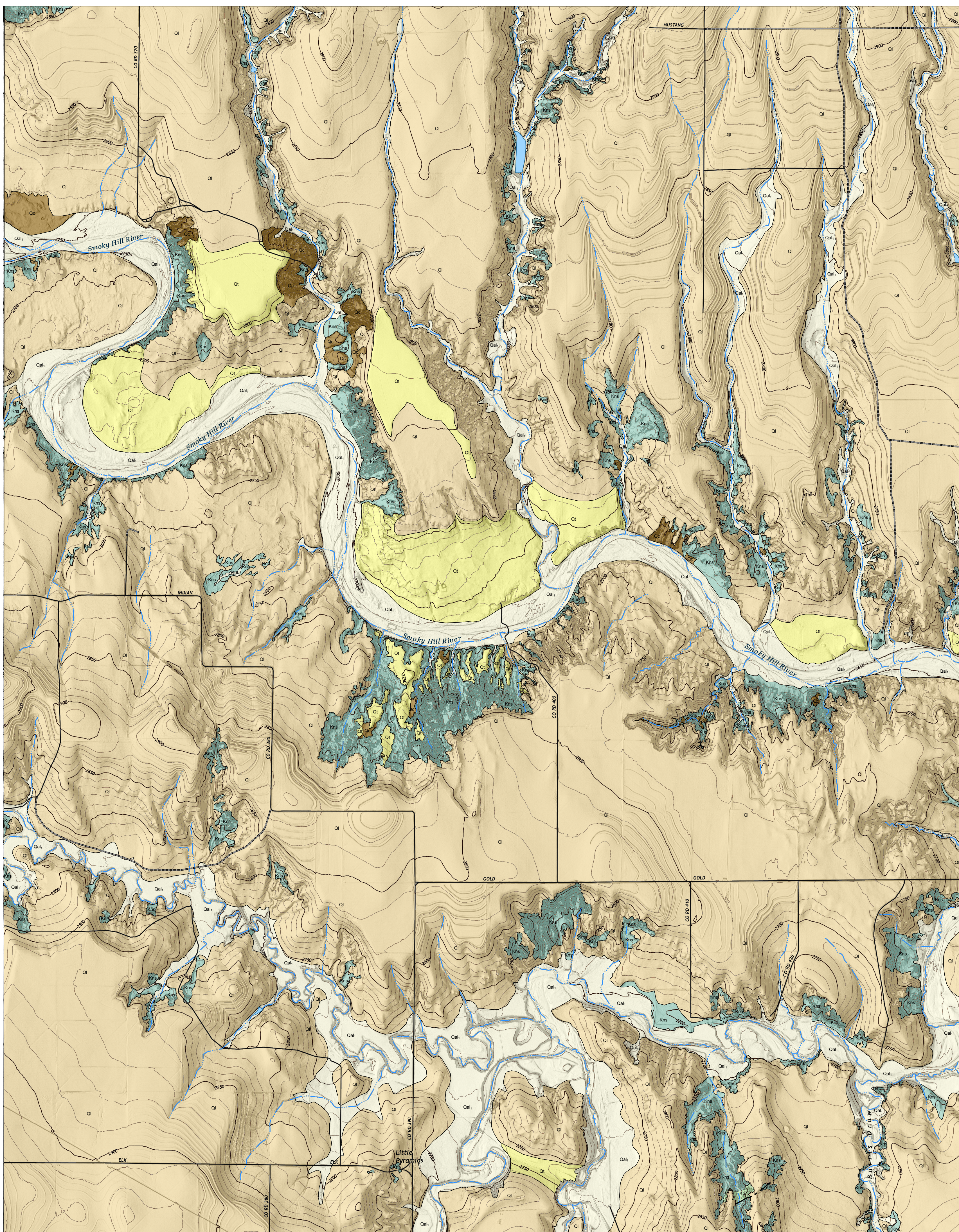
1-meter LiDAR hillshades and 1-meter 2020 U.S. Department of Agriculture - Farm Services Agency (USDA-FSA) National Agriculture Imagery Program (NAIP) digital imagery were used as references in the digital mapping. USGS 7.5-min 1:24,000-scale topographic maps, USDA Natural Resources Conservation Service (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.

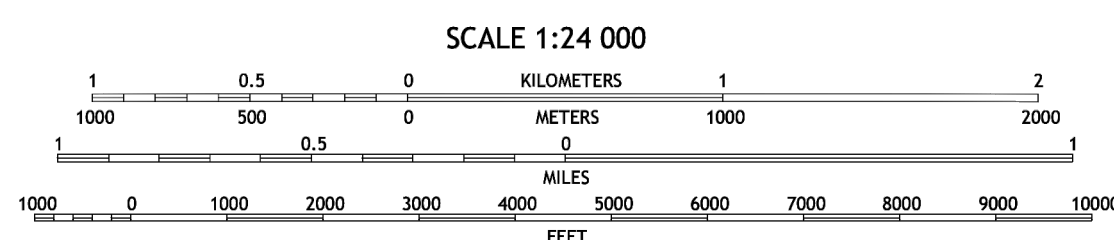
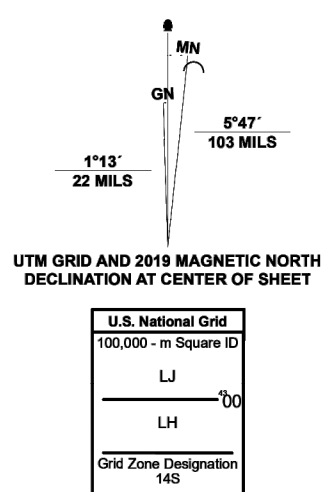
This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program, award number G21AC10803 (FY2021).

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  
Names: National Hydrography Dataset, 2006 - 2016  
Hydrography: National Hydrography Dataset, 2006 - 2016  
Contours: National Elevation Dataset, 2010  
Boundaries: Multiple sources; see metadata file 2019 - 2021  
Public Land Survey System: BLM, 2018  
Wetlands: FWS National Wetlands Inventory, 1985



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.



1	2	3
4	5	6
7	8	

ADJOINING QUADRANGLES

- Russell Springs NE
- Elkader NW
- Elkader NE
- Russell Springs SE
- Elkader
- Perce
- Lake Scott
- Lake Scott NE

ELKADER SW, KS  
2022

## SUGGESTED REFERENCE TO THE MAP

Sawyer, D.A., 2023, Preliminary surficial geology of the Elkader SW quadrangle, Logan County, Kansas: Kansas Geological Survey, Open-File Report 2022-12, scale 1:24,000, unpublished.