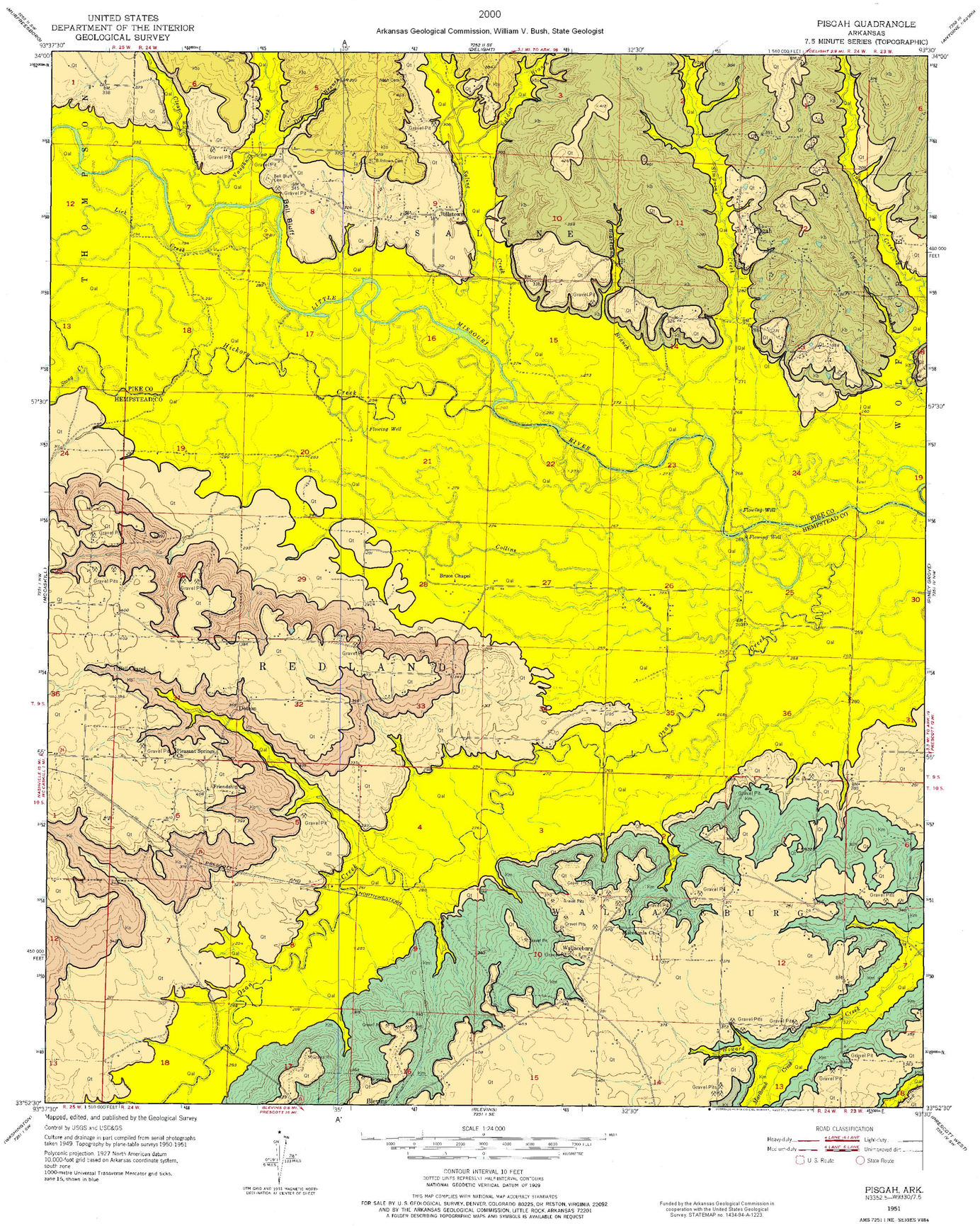
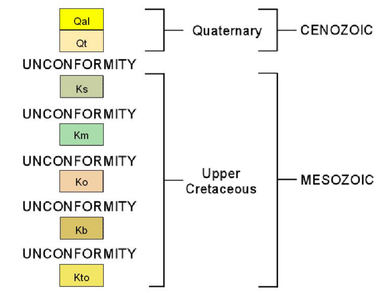
DIGITAL GEOLOGIC MAP OF THE PISGAH QUADRANGLE, HEMPSTEAD AND PIKE COUNTIES, ARKANSAS

Geology by William D. Hanson, Benjamin F. Clardy, and Jennifer R. Perkins
Digital Compilation by William D. Hanson and Jennifer R. Perkins

2000
Arkansas Geological Commission, William V. Bush, State Geologist



CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qal — **Alluvium (Quaternary)** - Variably sized gravel overlain by unconsolidated sand, silt, and clay comprises this unit.This unit occurs in the floodplains of streams and rivers. The sediments form a rich loam and are excellent for agriculture. Gravels, primarily novaculite, originated in the Ouachita Mountain region and from local Cretaceous formations. Thickness varies from 0 to 25 feet. Areas of alluvium are presently receiving sediment deposition.

Qt — **Terrace Deposits (Quaternary)** - Terrace deposits generally grade from basal gravel to silt and clay at the top. Gravels, primarily novaculite, originated in the Ouachita Mountain region and from local Cretaceous formations. Thicknesses are generally less than 50 feet. Terraces are topographic features which are former floodplains of nearby streams and/or rivers. The sediments form a rich loamy soil. The basal gravel is sometimes utilized for water-well production and gravel-mining operations.

Ks — **Saratoga Chalk (Upper Cretaceous)** - The Saratoga Chalk is a fossiliferous, hard, glauconitic chalk with beds of marly chalk and chalky sand. It is blue-gray when freshly exposed and weathers white, light gray, and light brown. The Saratoga Chalk is 30 to 40 feet thick in the mapped area. Fossils found in the unit include sponges, bryozoa, echinoderms, annelids, bivalves, gastropods, cephalopods, crustaceans, and fish teeth. The Saratoga Chalk rests unconformably on top of the Marlbrook Marl (Upper Cretaceous).

Km — **Marlbrook Marl (Upper Cretaceous)** - The Marlbrook Marl is a uniform chalky marl that is blue-gray when freshly exposed and weathers white to light brown. The unit is moderately fossiliferous in the upper part and slightly fossiliferous in the lower part. Notable fossils include *Exogyra*, *Gryphaea*, and *Ostrea* oyster species and reptile remains. The unit is approximately 160 feet thick in the mapped area. The Marlbrook Marl rests unconformably on top of the Ozan Formation (Upper Cretaceous).

Ko — **Ozan Formation (Upper Cretaceous)** - The Ozan Formation consists of sandy marl, marl, and a sandy glauconitic marl in the lower part of the formation. The unit is fossiliferous, micaceous, and weathers to a yellow-brown sticky clay. The basal sandy glauconitic marl, known as the Buckrange Sand Lentil, contains shark teeth and phosphate nodules. The lentil ranges up to 15 feet in thickness. Notable fossils are the *Exogyra ponderosa* and *Gryphaea*. The outcrop belt extends from west of Arkadelphia, southwest to the Arkansas-Oklahoma state line, and dips approximately 80 feet per mile to the south. The approximate thickness in the quadrangle is 40 feet. The unit was deposited in a nearshore marine environment and rests unconformably on the Brownstown Marl (Upper Cretaceous).

Kb — **Brownstown Marl (Upper Cretaceous)** - The Brownstown Marl consists of dark-gray calcareous clay, marl, and sandy marl. The unit is fossiliferous and weathers yellow to gray in color. Notable fossils are the *Exogyra ponderosa* and *Inoceramus*. The outcrop belt extends from east of Arkadelphia, southwest to the Arkansas-Oklahoma state line, and dips approximately 80 feet per mile to the south. The approximate thickness in the quadrangle is 100 feet. The unit was deposited in a nearshore marine environment and rests unconformably on the Tokio Formation (Upper Cretaceous).

Kto — **Tokio Formation (Upper Cretaceous)** - The Tokio Formation consists of cross-bedded sand, gravel, gray clay, and volcanic ash. Basal cross-bedded gravels are approximately 30 feet thick. Minor sand and clay lenses occur within the gravel, while sand commonly fills the interstitial spaces around the gravel. Thinner beds (less than 1 foot in thickness) and lenses of gravel occur within the formation's sand intervals. The gravels range from pea-size to 6 inches in diameter and are composed of quartz, novaculite, sandstone, and quartzite. Iron-oxide-cemented conglomerates may be present locally. The cross-bedded sands are medium- to fine-grained quartz with minor amounts of heavy minerals, glauconite, iron-oxide concretions, and rip-up clasts of gray clay. Sands weather yellow to orange-red in color. Gray clays are lignitic, pyritic, fossiliferous, and may contain leaf imprints. The volcanic ash is light gray to white and has altered to kaolinitic clay. The source area for much of the formation's sediment was the Ouachita Mountain region. The formation outcrop belt extends from near Arkadelphia, southwest to the Arkansas-Oklahoma state line, and dips to the south at approximately 80 feet per mile. The approximate thickness in the quadrangle is less than 100 feet. The unit was deposited in a nearshore marine environment on an unconformable surface which separates it from the underlying Woodbine Formation (Upper Cretaceous).

SYMBOLS

Gravel and/or sand pit

Contact

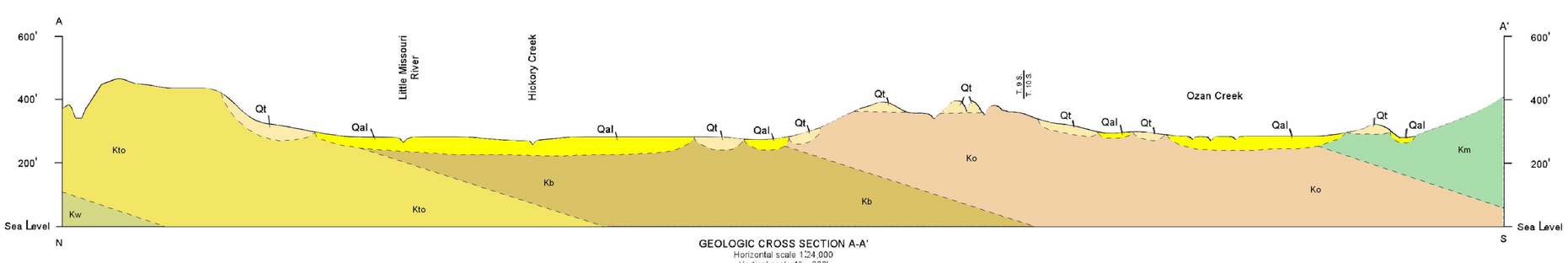
REFERENCES

Bush, W. V., and Clardy, B. F., 1971, Geologic Map of the Pisgah Quadrangle, Pike and Hempstead Counties Arkansas: Arkansas Geological Commission Open-File Report, scale 1:24,000.

Dane, C. H., 1929, Upper Cretaceous Formations of Southwestern Arkansas: Arkansas Geological Survey Bulletin 1, 215 p.

McFarland, John David, 1998, Stratigraphic Summary of Arkansas: Arkansas Geological Commission Information Circular 36, 39 p.

Miser, H. D., and Purdue, A. H., 1929, Geology of the DeQueen and Caddo Gap Quadrangles, Arkansas: United States Geological Survey Bulletin 808, 195 p.



GEOLOGIC CROSS SECTION A-A'
Horizontal scale 1:24,000
Vertical scale 1" = 200'