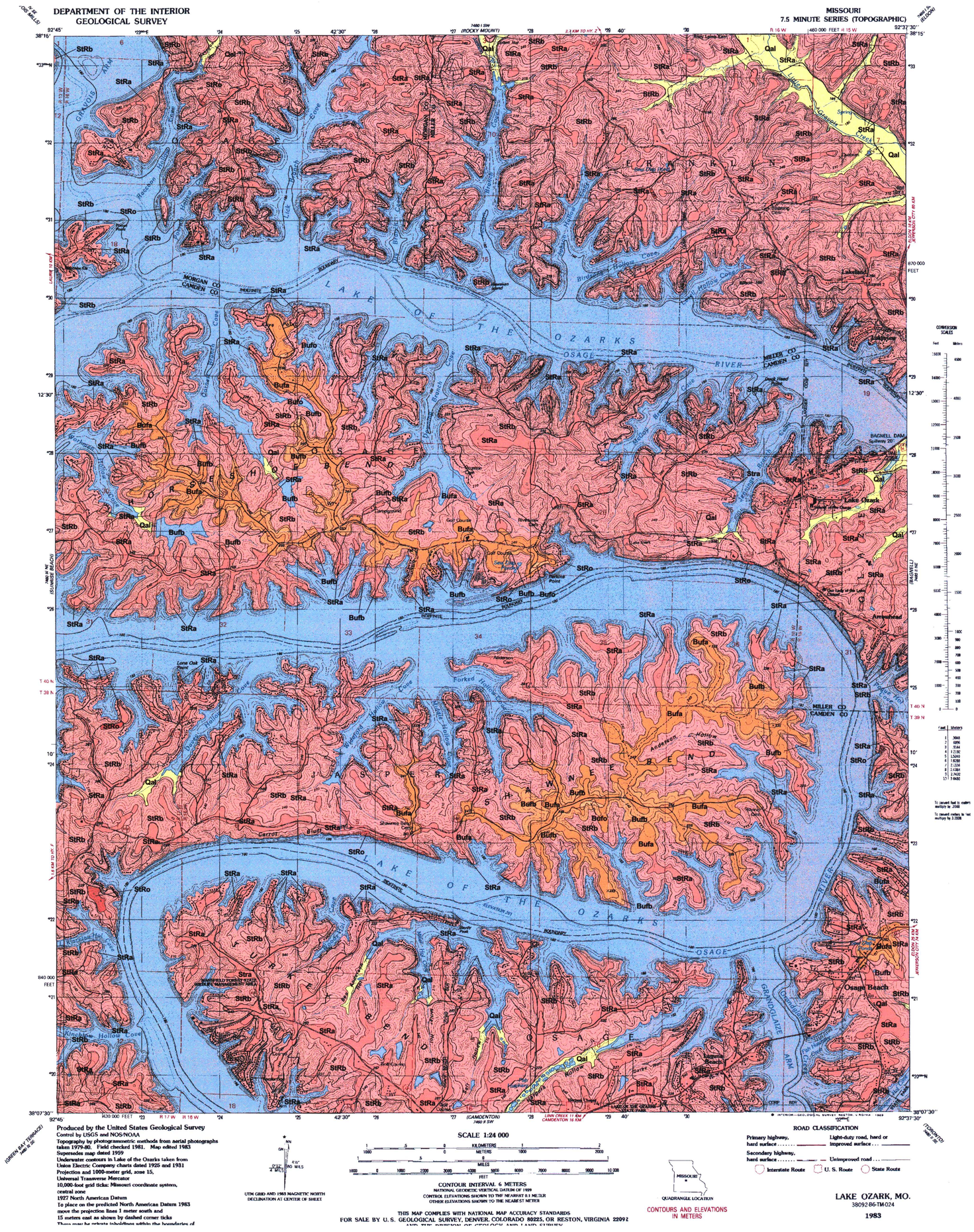

SURFICIAL MATERIAL GEOLOGIC MAP OF THE LAKE OZARK 7.5' QUADRANGLE CAMDEN, MILLER, AND MORGAN COUNTIES, MISSOURI

Geology and Digital Compilation
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PHYSIOGRAPHY

Land surface characteristics in this area have resulted from the solution-weathering of carbonate rocks of the Gasconade Dolomite, Roubidoux Formation, and Jefferson City Dolomite, and the erosional and depositional action of the Osage River and its tributaries. All the terrain is part of the Interior Highlands Division, Ozark Plateau Province, Springfield-Salem plateaus section, (Gamble,1997). Deeply entrenched meanders characterize the course of the Osage River (Lake of the Ozarks). All of the surface of the quadrangle drains to the Lake of the Ozarks or directly to the Osage River below the dam. The highest elevation of approximately 288 meters is east of Downing Branch Cove on the Horshoe Bend peninsula. The lowest elevation of approximately 180 meters can be found below Bagnell Dam and where Little Gravois Creek exits the map to the east. The total relief for the quadrangle is approximately 108 meters. This total relief is expressed locally near Downing Branch Cove (section 22, T40N, R16W), from the highest elevation to the bottom of the lake, but the lake covers the lower 20 meters.

SURFICIAL MATERIAL

Except for alluvium, the surficial material units are based on the parent bedrock formation (Baker, 2002). The Buffalo Unit is derived from the weathering of rocks of the Jefferson City Dolomite. The St. Robert Unit is derived from weathering of rocks of the Roubidoux Formation and Gasconade Dolomite. Some detritus and small exposures of a sandstone of undetermined age are also present within the St. Robert unit. Three subunits or facies of these surficial materials are present on the Lake Ozark Quadrangle: (a) - the residual facies, (b) - the colluvial facies, and (o) - the outcrop facies.

The residual facies occurs on level to gently rolling landforms, crests of ridges, knobs, benches and upland plains. This subunit consists of clay, silt, sand, and rock fragments that are left behind as an insoluble residue after the carbonate rocks are weathered away by dissolution and disintegration. The upper part of the residual facies commonly consists (in ascending order) of a clay pan of illuviated residuum, a layer of concentrated rock fragments and a thin cover of loess. Stratiform remnants of chert or sandstone beds may be present locally within the unconsolidated material.

The colluvial facies is located on slopes and in the upper reaches of tributaries down to the edge of the alluviated valleys. This facies has been partially inundated by the lake. It consists of unconsolidated materials that have been moved downslope by slope wash, creep, or the mass wasting of landslides and slumps. Materials from overlying subunits may creep past and cover lower subunits, and mingling of materials is common. Ledges and bluffs may be included in this facies where they lack sufficient areal extent to be mapped with the outcrop facies. The colluvium is generally thinner than the residual facies, although thick accumulations may be present at the toe of slopes or where talus forms at the base of bluffs.

The outcrop facies is found where bedrock is exposed or is close to the surface. It occurs as glades, ledges, and bluffs, with cedars being a characteristic part of the vegetation. This subunit is most common where carbonate rocks are the predominant constituent of the strata. In glades, the material consists mostly of clay, silt, and loose slabs and chips of dolostone that have been weathered in place with little downslope movement. Chert and sand are minor components. The residual material on the glades is generally little more than a thin veneer over bedrock. In contrast, the material draped between bedrock ledges along steeper slopes is similar to the colluvial facies, but generally thinner.

The surficial material occupying the floor of the broader valleys consists of clay, silt, sand, and gravel deposited by streams and is mapped as the Alluvia Unit. This unit includes materials of the floodplain, channels and terraces.

DESCRIPTION OF MAP UNITS

BUFFALO UNIT - On this quadrangle, this unit is derived from weathering of dolostone and chert of the Jefferson City Dolomite. It is present within grabens that cross the Shawnee Bend and Horshoe Bend peninsulas (Baker, 2002) and on highlands in the city of Osage Beach. It consists of yellowish-brown, silty clay with minor amounts of chert and sandy residuum, with a chert content ranging up to 10 percent, and is typically thin.

Bufa The Buffalo (a) subunit is composed of yellowish-brown, silty clay with generally minor amounts of chert. Thickness is variable with a maximum of about 3 meters.

Bufb The Buffalo (b) subunit colluvium is primarily silty clay that is buff to orange-brown, and contains some chert fragments. the size of the chert fragments is generally less than 10 centimeters in diameter. Larger chert boulders are present, but are rare. Thickness is generally less than 8 meters.

Bufo The Buffalo (o) subunit occurs locally as glades on Jefferson City Dolomite found in the graben areas (Baker, 2002). The surficial material is typically a yellowish-brown, thin, locally cherty, silty clay with bedrock exposures. It is generally less than one meter thick.

ST. ROBERT UNIT - This unit is developed from weathering of dolostone, sandstone, and chert of the Gasconade Dolomite and Roubidoux Formation. It consists of reddish-brown, sandy, silty, stony clay interbedded with relict layers of chert, sandstone, and minor amounts of dolostone. Varying amounts of sand and silt exist in the blocky, low density clay. Stony fragments of chert, sandstone, and dolostone typically comprise 20 to 70 percent of the total volume. Boulders and layers of chert, and some sandstone (varying from friable to orthoquartzite) are scattered over most of the land surface and locally exceed one meter thick. Natural bedrock outcrops occur as bluffs and ledges along the edge of floodplains, and locally in cedar glades along ridges or benches. The total thickness of the St. Robert Unit varies from less than 1 meter to more than 30 meters.

StRa The St. Robert (a) subunit is typically present on level to gently rolling landforms, including crests of ridges, knobs and benches. On most of the ridge tops of the map area, residuum is at the surface and can be recognized by the assortment of chert and sandstone boulders covering the ground. On some of the ridge tops, the reddish brown, stony residuum may be overlain by an illuviated residuum, layer of concentrated rock fragments, and loess in ascending order. The illuviated residuum is less than 60 centimeters thick, is typically stone-free, and commonly forms a fragipan/hardpan horizon. The layer of rock fragments is a residue of the illuviation process and is typically less than 30 centimeters thick. It consists of angular to subrounded chert fragments mixed with sandy silt. Where illuviated residuum and rock fragments are present they may be overlain by a thin cover of loess. Outcrops are very rare and typically consist of broken chert ledges. Most occur at the contact between the residual and colluvial facies near the slope break. It is generally not possible to discern bedrock from slabs or relict beds that are floating within the residuum. Total thickness of the St. Robert (a) generally exceeds 3 meters and may be more than 30 meters.

StRb The St. Robert (b) subunit is located on narrow ridges, slopes, and in the upper reaches of valleys. It typically consists of residual chert and sandstone detritus varying from small chips to boulders that are 1 meter or more in diameter. The matrix is a mixture of sand, silt, and clay and is typically reddish-brown. Minor amounts of weathered dolostone fragments may also be present in this mix of unconsolidated material that has moved downslope. Natural bedrock outcrops of Roubidoux are rare and are typically found at the boundary between the residual and colluvial facies along the slope break at the edge of ridge tops and benches. Gasconade outcrops occur within the colluvial facies where ledges and bluffs have been bypassed or incompletely covered by the debris. Thickness of the colluvium is generally from 1.5 to 10 meters. Where the colluvium has moved across and buried residuum on lower benches, the combined thickness of the colluvium and underlying residuum may be greater. The thickness may also be greater in accumulations at the toe of slopes and where talus has accumulated at the base of bluffs.

StRo The St. Robert (o) subunit is composed of thin residuum and/or colluvium with extensive bedrock exposures. Dolostone, chert, and sandstone strata are denuded by slope wash to form pavements and ledges. It is typically found as glades on benches that extend beyond the toe of overlying colluvial material, and as ledges on the slopes of benches and ridges where the crests are within the Gasconade Dolomite or have very little Roubidoux on top to shed detritus downslope. The thickness of surficial materials is characteristically less than 30 centimeters with a maximum of approximately one meter between ledges. Most St. Robert (o) areas are sparsely vegetated and can be recognized by the dominance of cedars.

ALLUVIA UNIT - This unit is located in stream valleys and consists of unconsolidated fluvial deposits. The alluvial material is generally derived from a combination of rock strata and consists of poorly sorted, rounded to subangular chert and sandstone gravel intermixed with varying amounts of sand, silt, and clay.

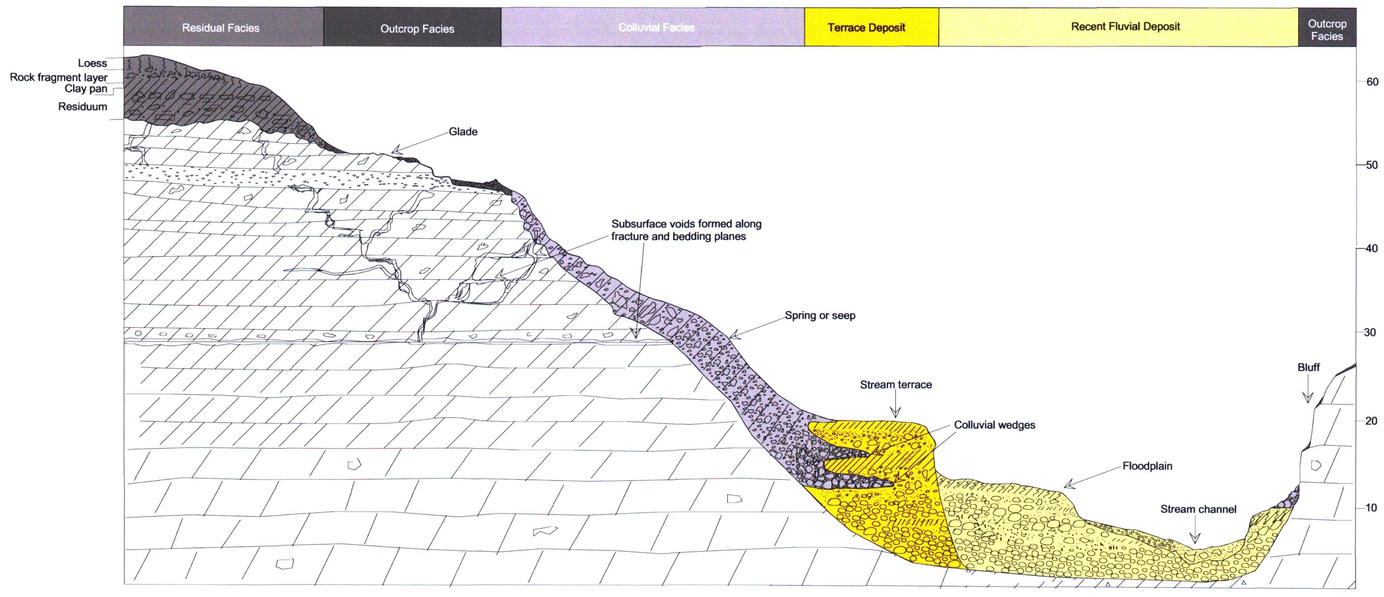
Qal The Alluvium subunit is immersed by the Lake of the Ozarks over most of the quadrangle. The thickest exposures are found downstream from the dam along the Osage River and along Little Gravois Creek. In these major exposed valleys, channel deposits are predominantly sand, silt and gravel, with overbank and flood plain deposits dominated by silt and clay. Most of the lower reaches of the smaller tributaries are immersed by the lake, and only the upstream reaches with their coarse material can be observed. These are dominated by boulders and cobbles of chert and sandstone with interstitial sand and silt. Thickness of the alluvium varies from a feather-edge on exposed bedrock in some creek beds up to several meters along the Osage River floodplain.

REFERENCES

Baker, H. W., 2002, Bedrock Geologic Map of the Lake Ozark 7.5' Quadrangle, Camden, Miller, and Morgan Counties, Missouri: Missouri Department of Natural Resources, Geological Survey and Resource Assessment Division, Open File Map - 02-419-GS.

Gamble, et al, 1997, Geomorphic Description System, National Soil Service Handbook, Part 629: United States Department of Agriculture, Natural Resources Conservation Service.

GENERALIZED SURFICIAL MATERIAL PROFILE



LEGEND FOR PROFILE MATERIAL