Lower Mississippian (Osagean) and older rocks

0 (sea level) -

Locations of the 30 x 60 minute quadrangles covering Kentucky. The location of the

Beaver Dam quadrangle is highlighted in blue.

This version of the geology of the Beaver Dam 30 \times 60 minute quadrangle was digitally compiled mostly from U.S. Geological Survey 7.5-minute geologic quadrangle maps (GQ's),

e U.S. Geological Survey and the Kentucky Geological Survey from 1960 to 1978. The stratigraphy of the Pennsylvanian coal measures of the Western Kentucky Coal Field was eed upon in the Kentucky-Illinois Agreement of 1991 (Greb and others, 1992). The stratigrap e Mississippian rocks has been described by Rice and others (1980) and Sable and Deve 990). The data files resulting from the digitization of the GQ's are part of a comprehensive elational and spatial data set being developed by the Kentucky Geological Survey. The data es will be available on the KGS Web site in the near future (Anderson and others, 1999). sers will have at their disposal a spatial database from which to select any map or particular ap themes to create custom maps and add supplemental oil, mineral, coal, or water information. s powerful database of geologic information can be used in a geographic information system GIS) for analysis or manipulation of data.

The 7.5-minute geologic quadrangle maps were digitally compiled using a semi-automated data-capture technique to convert hard-copy geologic maps into digital format. Compiling 7.5ninute maps into a 30 x 60 minute map required the resolution of significant problems, such as (1) correlating geologic formations across guadrangle boundaries, (2) resolving nonuniform structure-contour datums or intervals, and (3) resolving discrepancies in formation boundaries and inferred contacts. The metadata portion of the digital file provides detailed information abou he conversion process. Formation codes, which identify formations, were assigned using American Association of Petroleum Geologists' standard stratigraphic code (Cohee, 1967) which was modified by the Kentucky Geological Survey for state-specific use. Formations and ormation boundaries were not mapped the same way on each of the 7.5-minute quadrangle maps, since they were compiled by various authors between 1960 and 1978. Resolution of the lifferences between quadrangles was necessary for efficient topological analysis in a GIS environment. In addition, numerous small members mapped on individual 7.5-minute quadrangle naps are too small to be mapped at a scale of 1:100.000 on a 30 x 60 minute quadrangle map These problems were resolved by adhering to geologic, cartographic, and GIS standards appropriate for the scale of the map.

This map is a compilation of existing maps, and no additional geologic field work took place. When there were problems in stratigraphic correlation between quadrangles, the best current data available were used to resolve these differences.

GEOLOGIC SETTING AND STRUCTURAL GEOLOGY

of clay, silt, sand, and gravel deposits. Rough Creek Graben The dominant structural features in the Beaver Dam quadrangle are the east-west-trending Pennyrile Fault System, the northwest–southeast-trending splay faults associated with the Rough Creek Fault System (located north of the map area), the Rough Creek Graben, and the Moorman Syncline. The graben is considered to be the eastern arm of a triple-junction rift feature (Nelson, 1990) and is a north-dipping half graben over 100 mi long ranging from 25 to 45 mi wide. Paleozoic sediments up to 30,000 ft thick are common along the northern extent of the nalf graben (Drahovzal, 1994). The Moorman Syncline is 125 mi long and 10 to 35 mi wide. It s an asymmetrical syncline with a gentle dip from the south and a steep dip from the north. he boundaries of the syncline are the Rough Creek Fault System to the north and the Pennyrile ault System to the south. The Moorman Syncline approximately follows the Rough Creek

sediments followed (Bertagne and Leising. 1990). Continued deposition, combined with reactivation of the graben boundary faults by compressional stresses, resulted in reverse faults and flower structures. Some strike-slip displacement along some fault zones resulted from the compression. Later, extension and normal faulting took place, resulting in the Moorman Syncline Bertagne and Leising, 1990). The Rough Creek Fault System, the northern boundary of the bugh Creek Graben, is an east–west-trending fault system with many faults that bifurcate and anastamose. Much of the Rough Creek Fault System is located just north of the mapped area. however, in the adjoining Tell City 30 x 60 minute guadrangle. Along the northern margin and into the northeastern corner of the mapped area, associated faults splay off the fault system in an arcuate pattern to the southeast in Gravson. Edmonson, and Hart Counties, Most of the aults that affect Pennsylvanian rocks are post-Pennsylvanian and most probably post-Paleozoic Greb and others, 1992).

ooundary of the Rough Creek Graben. It is an east–northeast- to west–southwest-trending fault Bowling Green North, Brownsville, and Bristow 7.5-minute quadrangles.

Mammoth Cave National Park is located in the southeastern part of the Beaver Dam quadrangle.

HYDROGEOLOGY ts 52,830 acres lie primarily within the Nolin Lake, Cub Run, Brownsville, Rhoda, and Mammoth

The groundwater resources of the Beaver Dam quadrangle are relatively good (Table 2). Over napped cave system in the world, at over 365 mi of mapped passages to date. Much of the water, and in Butler and Edmonson Counties, public water access is 90 percent or greater. For park is underlain by limestone that ranges from 330 to 460 ft thick and dips at a 3° angle those not on public water, the groundwater resources can vary from inadequate to excellen which enhances the rate of chemical weathering (Currens, 1992). Major passageways were or large solution openings (Carey and Stickney, 2002, 2004, 2005, a-g). Further information at or just below regional base level at the time of formation (White and others, 1970). Most can be found in the U.S. Geological Survey's Hydrologic Atlas Series, which was published bassageways in the Mammoth Cave system follow the same bedding planes and rarely cut cooperatively with the Kentucky Geological Survey. across beds (Palmer, 1981). Multiple passageways have formed as a result of changing regional base levels through time (Currens, 1992). The Mammoth Cave system is developed in the Girkin, Ste. Genevieve, and St. Louis Limestones (Sable and Dever, 1990).

s cited in the references. The GQ's are products of a cooperative mapping project betwee

egions of the quadrangle as the "Corniferous." The producing horizons in the Corniferous nclude the Dutch Creek Sandstone Member of the Jeffersonville Limestone, Clear Creek

The geology of the Beaver Dam 30 x 60 minute quadrangle consists of sedimentary rocks of Mississippian through Pennsylvanian age and unconsolidated sediments of Quaternary age. he quadrangle contains the southeastern part of the Western Kentucky Coal Field and includes an escarpment on the Caseyville Formation sandstones, along the edge of the Illinois Basin. he cyclic depositional sequences in rocks of Pennsylvanian age generally coarsen upward Greb and others, 1992) and consist of onshore channel, swamp, and marsh deposits and offshore deltaic, bar, and marine deposits. These deposits vary in thickness laterally (Greb and others, 1992). Mississippian limestones formed in shallow carbonate seas. The dominant rock ypes for the mapped area are limestone, sandstone, shale, siltstone, and dolomite for the ssissippian strata, and sandstone, shale, limestone, siltstone, and coal for the Pennsylvanian strata; Quaternary sediments are mainly unconsolidated or semiconsolidated, and are composed

Graben basement (Greb and others, 1992). Two major fault systems, the Rough Creek and Pennyrile, bound the half graben. Initial tectonic activity resulted in normal, listric faults. Deposition of Lower and Middle Cambrian siliciclastic

The Pennyrile Fault System is part of the surface faults that compose part of the southern

system. The southern boundary of the graben consists of a series of subsurface high-angle

Coal, oil, gas, limestone, rock asphalt, and gravel are the principal mineral resources in the Beaver Dam quadrangle. Numerous coal mines are operating in the quadrangle and many oil nd gas fields have been discovered. Rock asphalt or tar sands have been mined in the past and will be an important economic resource in the future.

Major coal mining has occurred in significant areas of the northeastern part of the Beaver am quadrangle. The primary productive bed was the Springfield coal (No. 9), but the Baker . 13) and Herrin (No. 11) have also been recovered from surface mines (G.R. Weisenfluh entucky Geological Survey, personal communication, 2005). Other coals that have been mined are, from youngest to oldest, the Davis (No. 6), Mining City split (No. 4a), Mining City (No. 4), unbar. Elm Lick. Aberdeen. Amos and Foster. Main Nolin. and Mud River. In addition. many small, unnamed coal beds have been mined in other quadrangles, and occasionally mined jus or local use. In the past, coals were both strip mined and deep mined. Beds that have beer nined most recently are the Baker, Herrin, Springfield, Mining City, and Main Nolin. The Kentucky epartment of Mines and Minerals reported two active coal operations in the Beaver Dai quadrangle during 2000. Near Aberdeen in Butler County is a surface operation mining a 19 n, seam of No. 4 coal, which produced 16,665 short tons in 2000. Near McHenry in Ohio Coun s an auger-surface operation mining a 60-in. seam of the Springfield coal, which produced In the northwestern part of the quadrangle, the Elm Lick is the thickest coal bed. The western part of the quadrangle has had mining in the younger coals (No. 13, No. 11, and No. 9) and the west-central part has had mining in the Mining City, No. 4a, and No. 4 coals. In the central which might be sinkholes. The caves and solution openings primarily occur in the Ste. Genevieve part of the quadrangle, the Aberdeen, Foster, and Amos coals have been mined. In the east- and St. Louis Limestones. The southeastern part of the quadrangle is underlain by one of the

PETROLEUM AND NATURAL GAS The two deepest oil or gas wells in the Beaver Dam quadrangle were drilled in the Spring Lick Formation, which are susceptible to slope failure, slumping, and landslides. The permanent 5-minute quadrangle in Grayson County. Both reached the Cambrian Eau Claire Formation. he deepest is the Texas Gas Transmission No. 1 Herman Shain well, drilled in 1974. The total ranges from 490 to 515 ft; however, the pool may rise to a maximum of 560 ft for flood-control epth was 13,551 ft and it had shows of oil and gas. The second deepest is the Conoco No. purposes (U.S. Army Corps of Engineers, 2002). I Isaac Shain well, drilled in 1994. Its total depth was 12,622 ft; shows of oil and gas were also

Exploration has occurred in all 32 of the 7.5-minute quadrangles within the Beaver Dam 30 x 60 minute quadrangle. The major producing horizons in the different parts of the Beaver Dam Northwest: Ste. Genevieve Limestone (McCloskey sand), Salem Limestone, Fort North-central: Bethel Sandstone (Benoist sand), Salem Limestone, New Albany

Northeast: Fort Payne Formation, Clear Creek Formation, Brownsport Group, Southwest (the major oil-producing area in the quadrangle): Tar Springs Sandston Glen Dean Limestone, Hardinsburg Limestone (Jones sand), Big Clifty Sandstone Member of the Golconda Formation (Jackson sand), Ste. Genevieve Limestone South-central: Big Clifty Sandstone Member of the Golconda Formation, Cypress Sandstone (Barlow sand), Salem Limestone, Warsaw Formation, Jeffersonville Limestone, Clear Creek Formation, Brownsport Formation Southeast: Fort Payne Formation, Warsaw Formation, Sellersburg Limestone, effersonville Limestone, Clear Creek Formation, Decatur Limestone, Leipers

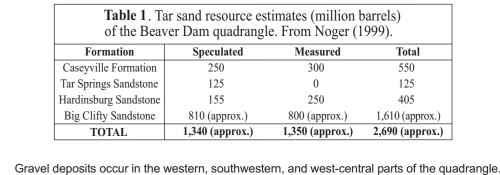
Drillers often refer to a major production zone in the south-central, northeastern, and southeastern

formation, Decatur Limestone, Brownsport Group, Dixon and Lego Members of the Louisville Limestone, Laurel Dolomite and Brassfield Dolomite (Schwalb and others, 1972). The New Albany Shale also produces gas in the quadrangle and the Lower Mississippian limestones such as the Ste. Genevieve, Salem, and Warsaw produce both oil and gas. The Upper Mississippian limestones and sandstones, Benoist Sandstone, Tar Springs Sandstone, and Hardinsburg Limestone also produce oil and gas. Many wells that are still operating throughout the quadrangle have low production levels, after initial high production rates. Many minor oil fields also occur in the Beaver Dam quadrangle. The two largest gas fields are the Shrewsbury Field, located in the Leitchfield, Ready, Bee Spring, and Caneyville 7.5-minute quadrangles, and the Bowling Green Field in the Hadley and Bowling Green North quadrangles. More than 200 gas wells are in the Shrewsbury Field, which

produces from the Ste. Genevieve Limestone, Salem Limestone, Warsaw Formation, and New Albany Shale. The major zones of production in the Bowling Green Field are the St. Louis Limestone, Warsaw Formation, and Corniferous beds, including the Clear Creek Formation Significant numbers of gas-producing wells have either been abandoned or shut-in and are used only locally. Many minor gas fields also occur in the Beaver Dam quadrangle. Limestone for construction aggregate, road metal, riprap, building stone, and agricultural

roducts has been mined from the Tradewater Formation, Leitchfield Formation, Glen Dean Limestone, Golconda Formation, Girkin Formation, Ste. Genevieve Limestone, and St. Louis Limestone. Active mining occurs in the Glen Dean Limestone, Girkin Formation, and Ste Genevieve Limestone. One active quarry is in Butler County, two are in Grayson County, and two are in Warren County (Stone and others, 2001).

Rock asphalt deposits, also known as tar sands, occur in the south-central, east-central, and ortheastern parts of the Beaver Dam quadrangle. Five units contain lenticular deposits of rock asphalt, which have some heavy oil. They are, from youngest to oldest, the Bee Springs and Kyrock Sandstone Members of the Caseyville Formation, Tar Springs Sandstone Member o the Leitchfield Formation, Hardinsburg Sandstone, and Big Clifty Sandstone of the Golconda Formation. The Bee Springs and Kyrock Sandstone Members are sometimes undifferentiated and sometimes separated by the Main Nolin coal bed. The heavy oil resources were estimated in 1984 by the Interstate Oil Compact Commission (Noger, 1999) (Table 1). In the past, this rock asphalt has been used for paving roads; in the future it could be a source for oil (Noger,



ney are generally found in terrace deposits or at the base of the Tradewater and Caseyvi

Formations. They have been used in the past for secondary roads. Most of the pits are abandoned but some are mined sporadically. Other potential economic resources include unexploited clay deposits in the Riverside and normal faults that coincide with the Pennyrile Fault System and the unnamed fault system farther south in the Bowling Green 30 x 60 minute quadrangle. Reverse faulting has been observed in outcrops and in borehole sections. Some of the faults also have some lateral movement Velson, 1990). In addition, the Pennyrile Fault System roughly traces the outcrop boundary have been used for health and therapeutic benefits. Siderite, limonite, and ferruginous sandstone between Pennsylvannian rocks to the north and Mississippian rocks to the south. This fault were mined in the Nolin Lake, Bee Spring, and Paradise 7.5-minute quadrangles in the 1840's system was mapped in the Rochester, South Hill, Morgantown, Riverside, Hadley, Reedyville, and 1850's. Both the Nolin Reservoir, in the Nolin Lake and Cub Run 7.5-minute quadrangles, and Mammoth Cave National Park, in the Mammoth Cave 7.5-minute quadrangle, generate

5. S-minute quadrangles. The park contains many karst features, including the longest 80 percent of the people in the counties of the Beaver Dam quadrangle have access to public orthwestward toward the Green River. The limestone around Mammoth Cave is relatively pure, The best yielding wells are generally near perennial stream levels and penetrate sandstones

> Table 2. Groundwater resources of the Beaver Dam quadrangle.
> Deposit or Formation Measured High-End Yields 100 gal/min Near rivers ck sand or gravel deposits Thin alluvium < 100 gal/day Inadequate Anvil Rock Sandstone < 125 gal/min At base of McLeansboro Grou < 30 gal/min Carbondale Formation sandstones Curlew Sandstone 10 gal/min Mineralized with depth Aberdeen Sandstone 20 gal/min Mineralized with depth Caseyville Formation sandstones < 100 gal/day Salty or mineralized with depth 5–250 gal/min; > 500 gal/day | Springs/wells at stream levels Golconda Formation Girkin Formation 5–250 gal/min; 500 gal/day | Springs/large solution openings 10–1,500 gal/min; 50 gal/min | Springs/large solution openings 10->2,000 gal/min; 50 gal/min | Springs/large solution openings St. Louis Formation Salem, Warsaw, and 5 gal/min Harrodsburg Formations Solution openings

Geologic hazards were noted on three of the GQ's, but these hazards also apply to some of

the surrounding quadrangles. Numerous caves and solution openings below the surface are in the Bowling Green North, Mammoth Cave, and Rhoda 7.5-minute guadrangles, Engineering entral part of the Beaver Dam quadrangle, the Main Nolin has been the primary source of coal. most extensive sinkhole plains in Kentucky. Sinkholes create hazards for construction, as well as livestock. The other major geologic hazard mentioned on the GQ's is in the Nolin Lake guadrangle, where areas near the lake are underlain by shale and siltstone of the Leitchfield pool elevation of Nolin Reservoir is 490 ft. During seasonal periods of high precipitation, elevation

REFERENCES CITED

Bertagne, A.J., and Leising, T.C., 1990, Interpretation of seismic data from the Rough Creek Graben of western Kentucky and southern Illinois, *in* Leighton, M.W., Kolata, D.R., Oltz, D.F., and Eidel, J.J.,

Carey, D.I., and Stickney, J.F., 2005a, Groundwater resources of Butler County, Kentucky: Kentucky Geological Survey, ser. 12, County Report 16, www.uky.edu/KGS/library/gwatlas/Butler/Butler.htm County, Kentucky: Kentucky Geological Survey, ser. 12, County Report 31, www.uky.edu/KGS/library/gwatlas/Edmonson/Edmonson.htm [accessed 8/15/07] County, Kentucky: Kentucky Geological Survey, ser. 12, Count Report 43, www.uky.edu/KGS/library/gwatlas/Grayson/Grayson.htm

Carey, D.I., and Stickney, J.F., 2005d, Groundwater resources of Hart County, Kentucky: Kentucky Geological Survey, ser. 12, Count Report 50, www.uky.edu/KGS/library/gwatlas/Hart/Hart.htm [accessed] County, Kentucky: Kentucky Geological Survey, ser. 12, Coun Report 71, www.uky.edu/KGS/library/gwatlas/Logan/Logan.ht

County, Kentucky: Kentucky Geological Survey, ser. 12, County Report 89, www.uky.edu/KGS/library/gwatlas/Muhlenberg/Muhlenburg.htm [accessed 8/15/07] eport 92, www.uky.edu/KGS/library/gwatlas/Ohio/Ohio.htm [ad

Currens, J.C., 1992, Caves, in Kleber, J.E., ed., The Kentucky Encyclo-Davidson, S.T., 2006a, Spatial database of the Bowling Green North Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-234, scale 1:24,000. Davidson, S.T., 2006b, Spatial database of the Mammoth Cave quadrangle, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorize Geologic Quadrangle Data DVGQ-351. Adapted from Haynes, D.D. 1964, Geology of the Mammoth Cave quadrangle, Kentucky: U.S

Sable, E.G., and Dever, G.R., Jr., 1990, Mississippian rocks in Kentucky: U.S. Geological Survey Professional Paper 1503, 125 p. Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-417. Adapted from Moore, F.B., 1965, Geology of the Millerstown quadrangle, Kentucky: U.S. Schwalb, H.R., Wilson, E.N., and Sutton, D.G., 1972, Oil and gas map Geological Survey Geologic Quadrangle Map GQ-417, scale

Smith, P.C., 2006a, Spatial database of the Leitchfield quadrangle, Grayson County, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1316. Adapted from Gildersleeve, B., 1978, Geologic map of the Leitchfield quadrangle, Grayson County, Kentucky: Ŭ.S. Geological Survey Geologic Quadrangle Map GQ-1316, scale 1:24,000. Smith, P.C., 2006b, Spatial database of the Spring Lick guade

ser. 10, scale 1:250,000.

uadrangle Map GQ-1049, scale 1:24,000

Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-237. Adapted from Rainey, H.C., III, 1963,

ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1040. Adapted from Gildersleeve, B., 1972, Geologic map of the Morgantown quadrangle, Butler and Warren Counties, Kentucky: U.S.

ological Survey Geologic Quadrangle Map GQ-1040, scale

s., 1975, Geologic map of the Ready quadrangle, western Kentucky: J.S. Geological Survey Geologic Quadrangle Map GQ-1263, scale

and Ohio Counties, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ- 1180. Adapted from Moore, S.L., 1974, Geologic map of the South Hill quadrangle, Butler and Ohio Counties, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1180, scale 1:24,000.

entucky: Kentucky Geological Survey, ser. 12, Digitally Vectoriz eologic Quadrangle Data DVGQ-225. Adapted from Miller, T

the Paradise quadrangle, Muhlenberg and Ohio Counties, Ke

Noger, M.C., 1999, Tar-sand resources of western Kentucky: Kentucky

Palmer, A.N., 1981, A geological guide to Mammoth Cave National Park: Teaneck, N.J., Zephyrus Press, 196 p.

Plauché, S.T., 2006, Spatial database of the Rosine quadrangle, western

Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-928, scale 1:24,000.

Rice, C.L., Sable, E.G., Dever, G.R., Jr., and Kehn, T.M., 1980, The

Kentucky: Kentucky Geological Survey, ser. 11, Reprint 5, 32 p.

of Kentucky, sheet 2, west-central part: Kentucky Geological Survey,

Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized

Geological Survey, ser. 11, Reprint 45, 27 p.

1963, Geology of the Sugar Grove quadrangle, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-225, scale

Survey Geologic Quadrangle Map GQ-237, scale 1:24,000.

Thompson, M.F., 2006b, Spatial database of the Reedyville quadrangle western Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-520. Adapted from Shawe, F.R., 1966, Geologic map of the Reedyville quadrangle, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-278. Adapted from Glick, E.E., western Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-520, scale 1:24,000. 1963, Geology of the Clarkson quadrangle, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-278, scale 1:24,000. Mullins, J.E., 2006e, Spatial database of the Flener quadrangle, Butler hompson, M.F., 2006c, Spatial database of the Smiths Grove quadrangle Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-357. Adapted from Richards, P.W., 1964, Geology of the Smiths Grove quadrangle, Kentucky: and Ohio Counties, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1049. Adapted from Gildersleeve, B., 1972, Geologic map of the Flener quadrangle, J.S. Geological Survey Geologic Quadrangle Map GQ-357, scale llins, J.E., 2006f, Spatial database of the Hadley quadrangle, Kentucky:

Creek quadrangle, Butler and Grayson Counties, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1339. Adapted from Gildersleeve, B., 1976, Geologic nap of the Welchs Creek quadrangle, Butler and Grayson Countie entucky: U.S. Geological Survey Geologic Quadrangle Map G hompson, M.F., Toth, K.S., Mullins, J.E., and Andrews, W.M., Jr., 200 Spatial database of the Cromwell quadrangle, Butler and Ohic Counties, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1250. Adapted from Gildersleeve, B., 1975, Geologic map of the Cromwell quadrangle Quadrangle Map GQ-1250, scale 1:24,000. Toth, K.S., 2006a, Spatial database of the Bristow quadrangle, Kentucky

Kentucky Geological Survey, ser. 12, Digitally Vectorized Geolog Quadrangle Data DVGQ-216. Adapted from Gildersleeve, B., 196 Geology of the Bristow quadrangle, Kentucky: U.S. Geologics Survey Geologic Quadrangle Map GQ-216, scale 1:24,000. Toth, K.S., 2006b, Spatial database of the Cub Run quadrangle, Kentuc Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologi Quadrangle Data DVGQ-386. Adapted from Sandberg, C.A., an Bowles, C.G., 1965, Geology of the Cub Run quadrangle, Kentuck S. Geological Survey Geologic Quadrangle Map GQ-386, scale

Kentucky Geological Survey, ser. 12, Digitally Vectorized Geo Quadrangle Data DVGQ-290. Adapted from Miller, T.P., 1 Survey Geologic Quadrangle Map GQ-290, scale 1:24,000.

Toth, K.S., 2006d, Spatial database of the Hartford quadrangle, Ohi County, Kentucky: Kentucky Geological Survey, ser. 12, Digital Vectorized Geologic Quadrangle Data DVGQ-741. Adapted fror Goudarzi, G.H., 1968, Geologic map of the Hartford quadrangle Mullins, J.E., and Thompson, M.F., 2006, Spatial database of the Paradise quadrangle, Muhlenberg and Ohio Counties, Kentucky: Kentucky County, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-741, scale 1:24,000. Toth, K.S., 2006e, Spatial database of the Nolin Reservoir quadrang Nelson, W.J., 1990, Structural styles of the Illinois Basin, *in* Leighton, M.W., Kolata, D.R., Oltz, D.F., and Eidel, J.J., eds., Interior cratonic

Toth, K.S., 2006f, Spatial database of the Quality quadrangle, Butler and Logan Counties, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-673. Adapted from Gildersleeve, B., 1968, Geologic map of the Quality quadrangle, Butler and Logan Counties, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-673, scale 1:24,000. Toth, K.S., 2006g, Spatial database of the Rhoda quadrangle, Kentucky Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologi Quadrangle Data DVGQ-219. Adapted from Klemic, H., 1963 Geology of the Rhoda quadrangle, Kentucky: U.S. Geological Surve

Geologic Quadrangle Map GQ-219, scale 1:24,000. Toth, K.S., 2006h, Spatial database of the Riverside quadrangle, Butle and Warren Counties, Kentucky: Kentucky Geological Survey, ser 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-736 Adapted from Shawe, F.R., 1968, Geologic map of the Riverside quadrangle, Butler and Warren Counties, Kentucky: U.S. Geologic: Survey Geologic Quadrangle Map GQ-736, scale 1:24,000. Toth, K.S., 2006i, Spatial database of the Rochester quadrangle, wes Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1171. Adapted from Hansen, D.E., 1974, Geologic map of the Rochester quadrangle, western Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1171, scale 1:24,000.

Toth, K.S., Thompson, M.F., and Andrews, W.M. Jr., 2006, Spatial database of the Horton quadrangle, Ohio County, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-915. Adapted from Johnson, W.D., Jr., 1971, Geologic map of the Horton quadrangle, Ohio County, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-915, scale 1:24,000. U.S. Army Corps of Engineers, 2002, Nolin Lake pool information: Louisville

the Spring Lick quadrangle, western Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1475, scale 1:24,000.

White, W.B., Watson, R.A., Pohl, E.R., and Brucker, R., 1970, The central Kentucky karst: Geographical Review, v. 60, p. 88–115. Thompson, M.F., 2006a, Spatial database of the Park City quadrangle

Carey, D.I., and Stickney, J.F., 2002, Groundwater resources of Barren County, Kentucky: Kentucky Geological Survey, ser. 12, County Report 5, www.uky.edu/KGS/library/gwatlas/Barren/Barren.htm Carey, D.I., and Stickney, J.F., 2004, Groundwater resources of Warr unty, Kentucky: Kentucky Geological Survey, ser. 12, Cour

Carey, D.I., and Stickney, J.F., 2005b, Groundwater resources of Edmonson Carey, D.I., and Stickney, J.F., 2005c, Groundwater resources of Grayson

Carey, D.I., and Stickney, J.F., 2005e, Groundwater resources of Loga Carey, D.I., and Stickney, J.F., 2005f, Groundwater resources of Muhlenburg Mullins, J.E., 2006i, Spatial database of the Sugar Grove of

Carey, D.I., and Stickney, J.F., 2005g, Groundwater resources of Ohio County, Kentucky: Kentucky Geological Survey, ser. 12, County Cohee, G.V., chairman, 1967, Standard stratigraphic code adopted by ciation of Petroleum Geologists Bulletin, v. 51, p. 2146-2151.

Geological Survey Geologic Quadrangle Map GQ-351, scale 1:24,000. Drahovzal, J.A., 1994, Basin-floor fan complexes: A new exploration strategy for the Rough Creek Graben: Proceedings of the Illinois Basin Energy and Mineral Resources Workshop, p. 7–8. Greb, S.F., Williams, D.A., and Williamson, A.D., 1992, Geology and stratigraphy of the Western Kentucky Coal Field: Kentucky Geological Survey, ser. 11, Bulletin 2, 77 p. Johnson, T.L., 2006, Spatial database of the Millerstown quadrangle,

Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-757. Adapted from Gildersleeve, B., 1968, Geologic map of

Mullins, J.E., 2006c, Spatial database of the Caneyville quadrangle, Grayson County, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1472. Adapted

SYNCLINE Glen Dean Limestone

Chattangoga Shale

Big Clifty Sandstone

Location of structure contours in the Beaver Dam 30 x 60 minute quadrangle. Inde

ives names of each mapped datum horizon. The horizon boundaries are shown on

geologic map as thin red dashed lines or faults. Contour interval is 40 ft with index

−0 (sea level)

–200 m, –656 ft

Salem and Warsaw Formations

Lower Mississippian (Osagean) and older rocks

Mullins, J.E., 2006a, Spatial database of the Bee Spring quadrangle, Edmonson and Grayson Counties, Kentucky: Kentucky Geological

the Bee Spring quadrangle, Edmonson and Grayson Counties, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-757, scale 1:24,000. Mullins, J.E., 2006b, Spatial database of the Brownsville quadrangle, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-411. Adapted from Gildersleeve, B., 1965, Geology of the Brownsville quadrangle, Kentucky: U.S.

Geological Survey Geologic Quadrangle Map GQ-411, scale

Stone, J.D., Glass, W., and Malone, V., 2001, Aggregate source book: Kentucky Transportation Cabinet, Department of Highways, Division of Materials, www.kytc.state.ky.us/materials/material.htm, 48 p.

p. 209–243.

western Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-1475. Adapted from Gildersleeve, B., and Johnson, W.D., Jr., 1978, Geologic map of

District, Ky., www.lrl.usace.army.mil/wc/map/gage/ nolin.html [accessed 1/17/02].

DISCLAIMER: Although this map was compiled from digital data that were successfully processed Government.

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