DESCRIPTION OF MAPPED UNITS

AREA NORTH AND WEST OF PINE MOUNTAIN

quartz, sandstone, limestone, siltstone, and shale.

BREATHITT GROUP—The Breathitt was mapped as a formation on

e 7.5-minute geologic quadrangle maps, but Chesnut (1992) elevated

he Breathitt to group status and divided the group into formations

based on regionally widespread shale members with marine fauna.

and limestones. All formations in the Breathitt Group are lithologically

Sandstone, fine- to coarse-grained, poorly sorted, guartzose, micaceous,

ounded quartz pebbles, thin-bedded to massive, crossbedded, and

90 percent quartz), which occur in the lower Breathitt beneath the

Betsie Shale; and more common, arkosic and sublitharenitic sandstones

60 to 80 percent quartz, 2 to 15 percent feldspar, and lesser amounts

of mica, opaque minerals, and rock fragments). Some sandstones are

shale, micaceous, locally carbonaceous and calcareous, thin-bedded,

paly partings on some bedding planes. The marine shale members

Betsie, Kendrick, Magoffin, Stoney Fork) at the base of each formation

rk gray to black limestone or sideritic sandstone with common marin

ossils at their base. Basal shales grade upward into laminated, dark

saucer-shaped carbonate concretions, and scarce fossils. Silty shales

coarsen upward into thin-bedded, often bioturbated siltstone interbedded

with fine-grained, ripple-bedded sandstone and shale; the siltstone-

bedded sandstone, which may truncate the coarsening-upward profile arsening-upward shale members are overlain by several coal zones.

Each zone consists of multiple coals that may split laterally or grade

into carbonaceous shales and rooted seat rocks. Coal zones are

FOUR CORNERS FORMATION—Siltstone, shale, sandstone, and

coal. Unit mapped as part of the Breathitt Formation on most 7.5

separated by shales, siltstones, and sandstones, and generally exhibit

minute quadrangle maps, and as the Hignite Formation in the Jellico

West (Englund, 1969) and Ketchen (Englund, 1966) guadrangles.

of the Stoney Fork Shale Member, which does not occur in the Corbin

Renamed Four Corners Formation by Chesnut (1992) for strata betwee

the base of the Magoffin Shale Member (Morse, 1931) and the base

HYDEN FORMATION—Siltstone, shale, sandstone, and coal. Unit

previously mapped as part of the Breathitt Formation on most 7.5-

minute quadrangle maps and as the Catron and upper part of the

ngo Formation in the Jellico West (Englund, 1969) and Ketchen

992) for strata between the base of the Kendrick Shale Member

son, 1919) and the base of the Magoffin Shale Member (Morse,

1). Because the Kendrick was not mapped on the 7.5-minute

geologic quadrangle maps in the Corbin quadrangle, the formation

ninute geologic quadrangle maps. Coals include, in descending order,

PIKEVILLE FORMATION—Shale, siltstone, sandstone, and coal. Unit

ninute quadrangle maps and as lower part of the Mingo Formation

and the Hance Formation in the Jellico West (Englund, 1969) and

r strata between the base of the Betsie Shale Member (Rice and

ners, 1987) and the base of the Kendrick Shale Member (Jillson,

9). The Betsie Shale was not mapped on previous 7.5-minut

clude, in descending order, the Amburgy zone (Jordan), Upper Elkhorn

GRUNDY FORMATION—Shale, siltstone, sandstone, and coal, Unit

andstone to the base of the Betsie Shale, and mapped as part of the

e Formation on most 7.5-minute geologic quadrangle maps. In thi quadrangle, the unit also includes the upper part (9 to 61 m; 30 to 200

t) of the Bee Rock Sandstone as defined by Chesnut (1992). Unit as

and Marsh Creek Sandstone Member occur in the upper half of the

napped contains four thick sandstones. The Corbin Sandstone Membe

The lower two sandstones are unnamed on most 7.5-minute geologic

in some 7.5-minute quadrangles as Member G, and informally called

he Hazel Patch Sandstone (Kilburn, 1956; Greb and Chesnut, 1989

is quartzose, argillaceous, thin- to medium-bedded, often ripple-t

uadrangle maps or designated with a letter and are not mapped on

e Corbin map at this scale. Sandstone in lower to middle part mapped

nar-bedded, locally massive to crossbedded, and may be bioturbated.

ne lower part of the unit also contains Sandstone K, informally known

as the Pine Creek Sandstone (Greb and Chesnut, 1989), which is part

the Bee Rock Sandstone, but not correlated extensively enough i

e Corbin quadrangle to be used as a reliable formation boundary

ne Pine Creek sandstone is quartzose, lenticular, fine- to medium-

ained, thin-to medium-bedded, contains sparse quartz pebbles at

e base, and is as much as 39 m (130 ft) thick. Each of the sandstone

andy siltstone and shale. Coals include, in descending order, the Lily

ORBIN SANDSTONE MEMBER, GRUNDY FORMATION—

ne- to medium-grained. locally coarse-grained, medium- to thick

ounded quartz pebbles as much as 2 cm (3/4 in.) in diameter. Pebbles

steep cliffs. Locally composed of two tongues of identical lithology tha

merge in the Hollyhill and Whitley City 7.5-minute quadrangles. Top of

he weathered surface creates broad upland plateau or bench and

slope topography. Base of unit is unconformable and locally cuts as

much as 12 m (40 ft) into underlying strata (Smith, 1963). Unit was

napped as a member of the Lee Formation on 7.5-minute geologic

quadrangle maps, and reclassified as member of the Grundy Formation

MARSH CREEK SANDSTONE MEMBER, GRUNDY FORMATION

Sandstone, conglomerate, and minor shale. Sandstone, quartzose,

sparsely conglomeratic, with rounded white quartz pebbles less that

ne- to medium-grained, locally coarse-grained, thickly crossbedded

cm (0.5 in.) in diameter. Contains thin shale lenses locally: friable

ut locally contains thin well-cemented ferruginous seams. Generally

rms cliffs or steep slopes. Defined locally as first cliff-forming, thick-

OCKCASTLE SANDSTONE MEMBER. BEE ROCK SANDSTONE—

ine- to coarse-grained, commonly conglomeratic with white, rounded

an 1 cm (3/8 in.) in diameter (Smith, 1963), thin- to thick-bedded,

quartz pebbles as much as 13 cm (5 in.) in diameter, generally less

locally massive, prominently crossbedded, with sparse giant crossbeds.

Jnit generally fines upward. Forms steep cliffs, especially in th

mberland River Valley. Forms ledge of waterfall at Cumberland Fa

ate Resort Park, and numerous natural arches (McGrain, 1955

th, 1963). Unit was mapped as a member of the Lee Formation on

5-minute geologic quadrangle maps, and was made part of the Bee Rock Sandstone by Chesnut (1992). Base of unit is sharp and uncon-

formable with underlying strata, but generally covered by colluvium

VY CREEK FORMATION—Shale, siltstone, sandstone, and coal.

fine-grained siltstone and sandstone. Siltstone, clayey to sandy;

thin- to thick-bedded, fine-grained; commonly contains ferruginous stringers. Sandstones, generally thin (less than 6 m; 20 ft), lenticular,

quartzose and micaceous; often argillaceous, fine- to medium-grained;

ase unconformable, with channels cut into underlying Parago

Barthell (Pomerene, 1964) and Cumberland Falls (Smith, 1963) 7.5

n this quadrangle, the unit is equivalent to strata between the top of e Mississippian and the base of the Rockcastle Sandstone Member

Where units equivalent to the Rockcastle were not mapped, the

boundary between the Alvy Creek and overlying Grundy Formation

nas been estimated. Coals include, in descending order, the Beaver

Creek and individual beds in the Stearns zone (No. 2 and No. 1 coals).

RAGON FORMATION—Unit consists of rocks assigned to Penningto nation during U.S. Geological Survey-Kentucky Geological Surve

perative mapping project, 1960–78 (Ettensohn and others, 1984

Shale, sandstone, limestone, dolomite, and siltstone. Shale, clayey,

plastic; locally calcareous; rarely fossiliferous. Sandstone, very fine-

adational with siltstone. Limestone, micrograined to coarse-grained,

oclastic, fossiliferous; locally oolitic; locally silty and sandy. Dolomite

ery finely crystalline, silty, calcareous, with mineral-lined and minera

illed vugs. Siltstone, locally calcareous; commonly gradational with

sandstone. Common erosional thinning of Paragon by post-Mississippian

BANGOR LIMESTONE AND HARTSELLE FORMATION,

www.uky.edu/kgs

grained, quartzose, micaceous, partly calcareous, in par

minute quadrangles, and was renamed Alvy Creek by Chesnut (199

sually thin-bedded. Unit commonly weathers to gentle slopes. Base nconformable, but generally covered by colluvium from overlying cliffs

rmation. Unit was mapped as part of the Lee Formation on most

i-minute geologic quadrangle maps, the Beattyville Shale in the

carbonaceous, sandy; fragments of fossil plants common; grades

stone, conglomerate, and minor shale. Sandstone, quartzose

pedded sandstone stratigraphically below the Corbin Sandstone Member

n the Hollyhill 7.5-minute quadrangle (Loney, 1967).

/ Chesnut (1992). Unit mapped near top of the Grundy, pinches out

ost common toward base. Unit generally fines upward. Locally forms

bedded, massive, and prominently crossbedded, contains scattered

stone, conglomerate, and minor shale. Sandstone, quartzose,

units is cliff-forming. Upper parts of sandstones grade laterally into

River Gem, Swamp Angel), Gray Hawk, and Barren Fork.

named by Chesnut (1992) for strata from the top of the Bee Rock

(etchen (Englund, 1966) quadrangles. Unit named by Chesnut (1992

geologic guadrangle maps but the base of the member occurs just

above the Lily (River Gem) coal, which was extensively mapped. Coal

previously mapped as part of the Breathitt Formation on most 7.5-

he Fire Clay rider (Big Mary), Fire Clay (Windrock), and Whitesburg

ndary is projected from its stratigraphic position on adjacent 7.5

lund, 1966) quadrangles. Unit named Hyden Formation by Chesnut

quadrangle. Coals include the Hazard (Braden Mountain) bed.

sandstone-shale unit in turn coarsens upward into massive to cross

gray, silty shale with abundant siderite laminae and nodules, elliptical

generally contain a thin, black to dark gray clay shale and discontinuous

locally extensive and useful as stratigraphic markers. Siltstone and

forming. Two types of sandstones occur: quartzarenites (more than

with feldspar and rock fragments, occasionally contains sparse, well

The Breathitt Group contains sandstones, siltstones, shales, coals

area. Mapped along Lake Cumberland.

small to be displayed at this scale.

similar and are described below.

considerable lateral variability.

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Kentucky Geological Survey

UNDIVIDED—Combined unit (individual rock units not mapped separately for this quadrangle). See descriptions below. BANGOR LIMESTONE—Limestone and shale. Limestone, very fineto coarse-grained, bioclastic, fossiliferous; partly argillaceous; partly sandy and silty; rarely cherty. Shale, in thin partings, mainly in upper part of formation. In eastern part of outcrop area, combined with ınderlying Hartselle Formation during the U.S. Geological Survey– Kentucky Geological Survey cooperative mapping project, 1960–78. HARTSELLE FORMATION—Shale and sandstone. Shale, clayey, plastic; partly calcareous, partly silty. Sandstone, very fine- to mediumgrained, quartzose; slightly micaceous; partly argillaceous; locally calcareous; rarely fossiliferous. Sandstone content decreases eastward across outcrop area. In eastern part of outcrop area, combined with Geological Survey cooperative mapping project, 1960–78.

Paleozoic erosion.

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ALLUVIUM—Silt, sand, clay, and gravel. Silt, commonly sandy. Sand, KIDDER LIMESTONE MEMBER. MONTEAGLE LIMESTONE fine to coarse-grained. Clay, partly sandy. Gravel composed of chert, Limestone, minor siltstone, and shale, Limestone, micrograined to nedium-grained, bioclastic, commonly oolitic; thin- to thick-bedded, nassive; in part crossbedded and silty; some calcareous siltstone and FERRACE DEPOSITS—Gravel, sand, clay, and boulders. Gravel nin clay shale interbeds. Contains abundant fragments of brachiopods, composed of well-rounded pebbles of quartz. Sand, fine- to coarseblastoids, and crinoids; three correlative crinoid-rich zones commonly grained. Clay in seams, beds, and blebs. Locally includes boulders of present. Basal contact placed at top of limestone and chert breccia sandstone and chert 8 to 15 cm (3 to 6 in.) in diameter in Mill Springs f underlying Ste. Genevieve Limestone Member. GENEVIEVE LIMESTONE MEMBER, MONTEAGLE COLLUVIAL BLOCKS—Rectangular, house-size blocks of sandstone MESTONE—Limestone and chert. Limestone, micrograined to and conglomerate derived from Rockcastle Sandstone Member of Bee nedium-grained: commonly oolitic. sandy and silty: thin- to thickock Sandstone. Mapped in southern part of quadrangle along the bedded, commonly crossbedded. One or more beds of limestone and tributaries or banks of the South Fork of the Cumberland River. Too ert breccia present in upper part of unit. Black chert nodules 8 to

> reccia 0.3 to 1.8 m (1 to 6 ft) thick correlative to Lost River Chert of Elrod (1899). Limestone contains abundant microfossils, brachiopods, horn corals, crinoids, colonial corals, and blastoids. ST. LOUIS LIMESTONE—Limestone, dolomite, shale, and sandstone. mestone principal lithology in upper part; dolomite dominant in middle and lower parts. Limestone, micrograined to coarse-grained, bioclastic, herty fossiliferous. Dolomite microcrystalline to very finely crystalline; artly silty and argillaceous; in part brecciated with quartz bodies nale, commonly calcareous. Sandstone, very fine-grained, calcareous; ncluded in basal part of formation in northwestern part of quadrangle he upper cherty, fossiliferous limestone unit is named the Burnside Member and the lower dolomite-dominated unit is named the Bronston. Member (Dever and Moody, 2002). SALEM AND WARSAW FORMATIONS—Limestone, siltstone, shale, and sandstone. Limestone, fine- to coarse-grained, bioclastic, fossiliferous; partly argillaceous, sandy, and cherty. Siltstone, calcareous;

0 cm (3 to 4 in.) in diameter common. Basal unit consists of chert

partly sandy and geodiferous. Shale, clayey; partly calcareous and ty. Sandstone, very fine- to medium-grained, calcareous, silty in orthwestern and southwestern parts of quadrangle; includes Garrett Mill Sandstone Member (not mapped in this quadrangle). FORT PAYNE FORMATION—Siltstone, shale, limestone, chert, and sandstone. Siltstone, partly calcareous, thick-bedded to massive, olomitic, shaly, and geodiferous; sparsely fossiliferous. Shale ommonly silty, partly calcareous, dolomitic, geodiferous and cherty parsely fossiliferous; clayey, with phosphatic nodules, in lower part imestone. fossiliferous. thick-bedded to massive. crossbedded: locall eodiferous. Chert, dark gray, secondary; locally in layers as much s 12 m (40 ft) thick. Sandstone, very fine-grained, silty, calcareous; cally fossiliferous. Limestone bodies mapped separately as "reef nestone"; sandstone mapped separately as Jabez Sandstone Member (see descriptions below). REFF LIMESTONE. FORT PAYNE FORMATION—Limestone. Discrete

arsely crystalline, thick-bedded to massive biohermal or reef-like

estone bodies mapped separately in Fort Payne Formation. Unit

and marcasite common: phosphatic nodules in upper part. Present

only in the Wolf Creek and Faubush Creek areas along the Lake

mberland shoreline near the northern border of the Corbin

very fossiliferous with crinoid stems, bryozoans, and large brachiopods; commonly crossbedded, dips steeply to the south. Grades into sandstone and shale units of Fort Payne. JABEZ SANDSTONE MEMBER, FORT PAYNE FORMATION— Sandstone, very fine- to coarse-grained, well-sorted, friable where weathered: fossiliferous in places. Mostly low-angle crossbeds, evenly bedded in places; sandstone body dips to southwest. Unit grades laterally into limestone and shale units of Fort Payne. BORDEN FORMATION—Siltstone, shale, and clay. Unit slightly calcareous, thinly laminated, even-bedded; contains pyrite and lauconite grains. Present only in subsurface. CHATTANOOGA SHALE—Shale, dark brown to black, carbonaceous, silty, medium- to thick-bedded, fissile, laminated, fossiliferous; pyrite

AREA ALONG AND SOUTH OF PINE MOUNTAIN ■ GRUNDY FORMATION—Siltstone, shale, sandstone, and coal. Siltstones, often sandy, gradational with shales and sandstones. Shale, sandy to clayey. Sandstones, arkosic to sublitharenitic, micaceous, fine- to coarse-grained, thin- to massive-bedded. Unit was previously mapped as part of the Hance Formation (Rice and Newell, 1975) and renamed Grundy Formation by Chesnut (1992). Unit present betweer the top of the exposed section to the Bee Rock Sandstone in the Saxton-Jellico East 7.5-minute quadrangle. Coals generally thin and

conglomeratic sandstone, and siltstone in small thrust fault segments ong the northern foothills of Pine Mountain. Unit previously mapped undivided Lee Formation, and redefined as lower part of the Breathitt roup (Chesnut, 1992) when Lee Formation was formally dropped BEE ROCK SANDSTONE UPPER PART OF BEE ROCK SANDSTONE (NAESE SANDSTONE

LOWER PART OF BREATHITT GROUP—Undifferentiated sandstone,

MEMBER) and LOWER PART OF BEE ROCK SANDSTONE-Sandstone, conglomeratic sandstone, and siltstone. Sandstones, uartzose, fine- to coarse-grained, medium- to massive-bedded rossbedded, contains quartz pebbles as large as 2.5 cm (1 in.) in diameter toward base. Siltstones, often sandy, thin-bedded and radational with sandstones; more common in lower part of unit. Forms sistant ledges along south slopes of Pine Mountain. Chesnut (1992 levated unit to formation status and included the immediately overlying aese Sandstone Member, previously mapped separately from the Bee Rock (Rice and Newell, 1975). IENSLEY MEMBER (ALVY CREEK FORMATION)—Shale, siltstone,

> rained, thin-bedded to massive. Unit previously mapped as Hensley Member of the Lee Formation (Rice and Newell, 1975), made a nember of the Alvy Creek Formation by Chesnut (1992). SEWANEE AND WARREN POINT SANDSTONES—Conglomeratic sandstone, sandstone, siltstone, and shale. Sandstone, quartzose fine- to coarse-grained, massive to crossbedded, conglomeratic with vell-rounded quartz pebbles. Shale and siltstone, light to dark gray, adational with sandstone. Crops out on south slope of Pine Mountain four or five resistant ledges separated by swales underlain by iltstone and shale. Lowermost sandstone generally forms crest o ne Mountain. Unit previously mapped as Middlesboro Member of the Lee Formation (Rice and Newell, 1975), but renamed Sewanee

and sandstone. Shale and siltstone, light to dark gray, locally micaceous

nd carbonaceous. Sandstone, quartzose, very fine- to medium-

and Warren Point Sandstones by Chesnut (1992). Base is sharp and undulating, probably unconformable with underlying units. PENNINGTON GROUP—Sandstone, siltstone, shale, and limestone. Sandstone, fine- to medium-grained, partly quartzose, partly micaceous; nit more massive in upper part. Siltstone, partly micaceous; common in lower part. Shale, locally carbonaceous. Limestone, fine- to coarse rained, partly fossiliferous. Exposed in cliffs along northwest slope Pine Mountain; elsewhere locally forms crest. Mapped as two units on earlier 7.5-minute quadrangle maps, combined for this quadrangle.

NEWMAN LIMESTONE—Limestone, shale, dolomite, and chert. Mapped in two units, upper part of Newman Limestone and lower part of Newman Limestone and Fort Payne Chert, combined (see below). UPPER PART OF NEWMAN LIMESTONE—Limestone and shale Limestone, fine- to coarse-grained, thin- to medium-bedded, commonly fossiliferous, partly argillaceous, Shale, thin-bedded, calcareous nterbedded with limestone. Unit occurs on northwest slope of Pine Mountain; poorly exposed. DWER PART OF NEWMAN LIMESTONE and FORT PAYNE ERT—Limestone, dolomite, and chert. Mapped as a combined nit. Lower part of Newman Limestone, fine- to coarse-grained

medium- to massive-bedded, crossbedded, fossiliferous, argillaceous, artly oolitic, sparsely sandy. Combined with Fort Payne Chert, chert nd dolomite. Chert, light gray to brown, thin-bedded to nodular; ■ GRAINGER FORMATION—Siltstone and shale. Siltstone, grayish green to dark red, thin- to medium-bedded. Upper part interbedded iltstone and shale; lower part dominantly shale.

EXPLANATION

→ 800 → Structure contour, feet

Anticlinal axis

Synclinal axis

Concealed coal bed

Active stone quarry

Active pit; sand

X Abandoned pit; clay

Inferred coal bed

Coal bed

Datum horizon boundary

Abandoned stone quarry or mine

Abandoned inclined shaft; coal

Mine dump or mine spoil

— -- State boundary

····· City boundary

······ Concealed fault

D, downthrown side)

Concealed contact

Inferred contact

NOTE: cross section is diagrammatic

vertical exaggeration 6x

0 (sea level)

Normal fault (U, upthrown side;

Overthrust fault; sawteeth on upper

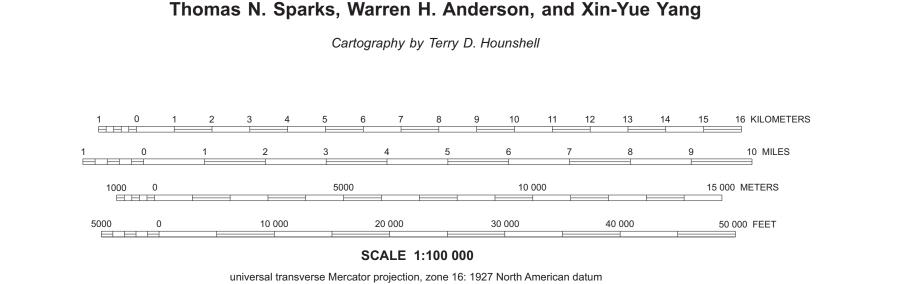
Contact

Madison Falmouth Maysville Ironton

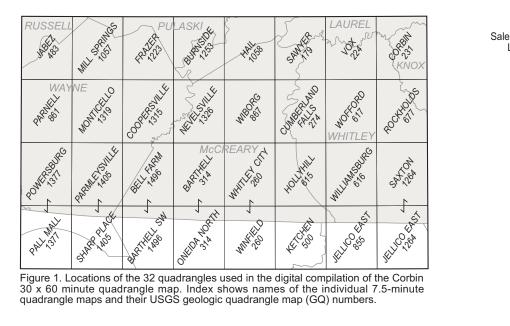
ocations of the 30 x 60 minute quadrangles covering Kentucky. The location of the Corbin quadrangle

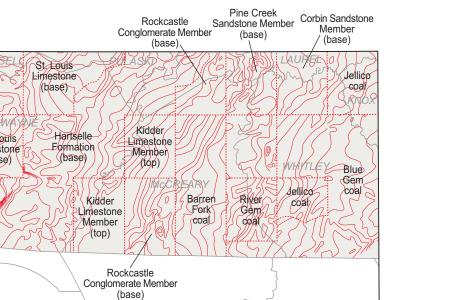
is highlighted in blue.

GEOLOGIC MAP OF THE CORBIN 30 x 60 MINUTE QUADRANGLE, SOUTH-CENTRAL KENTUCKY



TOPOGRAPHIC CONTOUR INTERVAL 50 METERS





geologic map as thin red dashed lines. Contour interval is 40 ft with index contours a

1990 field conference): Kentucky Geological Survey, ser. 11, 53 p Drahovzal, J.A., and Noger, M.C., 1995, Preliminary map of the structure Survey, ser. 11, Map and Chart 8, 1 sheet plus 9-p. booklet. Duncan, R.S., 2006a, Spatial database of the Coopersville quadrangle, Wayne and McCreary Counties, Kentucky: Kentucky Geologic Geologic map of the Coopersville quadrangle, Wayne and McCreary Counties, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1315, scale 1:24,000.

Duncan, R.S., 2006b, Spatial database of the Corbin quadrangle, Wilson, E.N., and Sutton, D.G., 1973, Oil and gas map of Kentucky, Survey Geologic Quadrangle Map GQ-231, scale 1:24,000. Flrod M.N. 1899. The geologic relations of some St. Louis group. caves and sinkholes: Indiana Academy of Science Proceedings, Englund, K.J., 1966, Geologic map of the Ketchen quadrangle, Tennessee Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-500, scale 1:24,000. Englund, K.J., 1969, Geologic map of the Jellico West quadrangle, Kentucky-Tennessee: U.S. Geological Survey Geologic Quadrangle

984. Slade and Paragon Formations—New stratigraphic nomenin Kentucky: U.S. Geological Survey Bulletin 1605-B, 37 p. Greb, S.F., and Chesnut, D.R., Jr., 1989, Geology of Lower Pennsylvanian

The geology of the Corbin 30 x 60 minute guadrangle was digitally compiled mostly

Coal production and reserves from U.S. Geological Survey 7.5-minute geologic quadrangle maps (GQ's), as cited in

The Corbin quadrangle encompasses the southern margin of the Southwestern Coal the references. The original GQ's are products of a cooperative mapping project between Reserve District. Coal has been mined in that area since the early 1800's by surface the U.S. Geological Survey and the Kentucky Geological Survey from 1960 to 1978. The and underground methods. The most prolific coal resources in Whitley County are the conversion into digital format has been another USGS-KGS cooperative program funded Manchester (known locally as Lily or River Gem), Blue Gem (Lower Elkhorn) zone, and through the National Cooperative Geologic Mapping Program (STATEMAP). Additional

Jellico. Elsewhere in the quadrangle, coals have been mined below the Corbin Sandstone; funding for digitizing was provided in cooperation with the Kentucky Transportation the Barren Fork is the most important coal bed in McCreary County, whereas the Stearns Cabinet to assist with the planning and development of the proposed Interstate 66 corridor zone (Stearns No. 2) has been mined in Wayne County. Total coal production from the across southern Kentucky. Recent geologic investigations on regional stratigraphy (Lewis three counties in the quadrangle is summarized in Table 1. and Potter, 1978; Sable and Dever, 1990), stratigraphy and structure (Chesnut, 1991,

1992), basement structure (Drahovzal and Noger, 1995), and coal resources (Brant, Table 1. Cumulative coal production (million tons) by county and mining method 1983) have resulted in changes in the stratigraphic nomenclature and correlation, and (1827–2008). 28.496 41.025 92.091

information service (kgs.uky.edu/kgsmap/KGSGeology) (Weisenfluh and others, 2005). Source: Kentucky Geological Survey coal production database, kgs.uky.edu/kgsweb/ DataSearching/Coal/Production/prodsearch.asp [accessed 12/02/09]. The 7.5-minute quadrangle maps were digitally compiled using a semi-automated data-capture technique to convert hard-copy geologic maps into digital format. Compiling Resource studies by Brant (1983) calculated total remaining resources of more than 7.5-minute maps into a 30 x 60 minute map required the resolution of significant problems, 6.85 billion tons for the district, of which the three counties in the Corbin quadrangle such as (1) correlating geologic and cartographic quadrangle boundaries, (2) resolving made up about one-third of the total area. Remaining coal reserves for the coal-producing nonuniform structure-contour datums or intervals, (3) resolving discrepancies in Quaternary counties in the Corbin quadrangle have been tabulated in Table 2. alluvium boundaries and inferred contacts, and (4) determining necessary formation data

for topological analysis in a GIS environment, which was omitted during 7.5-minute

Table 2. Coal production and remaining resource reserves for major counties in the guadrangle mapping. The metadata portion of the DVGQ file provides detailed sources Corbin quadrangle (million tons), Southwestern District. of data and information about the conversion process. Formation codes were assigned using the American Association of Petroleum Geologists' standard stratigraphic code Cohee, 1967), which was modified by KGS for state-specific use. Formations and formation boundaries were not mapped consistently on each of the 7.5-minute maps as they were compiled between 1960 and 1978. Resolution of the differences between quadrangles was necessary for topological analysis in a GIS environment. In addition, numerous small members mapped on individual 7.5-minute maps are too small to be mapped at a scale of 1:100,000 on a 30 x 60 minute map. These problems were resolved by adhering to geologic, cartographic, and GIS standards appropriate for the scale of

provided additional coal information. The 7.5-minute quadrangles that make up the Corbin

The data files resulting from the digitization of the GQ's are part of a comprehensive

relational and spatial data set, being released as Digitally Vectorized Geologic Quadrangles

DVGQ's) by the Kentucky Geological Survey (Anderson and others, 1999). These

IVGQ data can prepare custom geologic maps by overlaying data using their own GIS

or CAD software. KGS has also developed an Internet map server where users can

prepare similar maps, without purchasing DVGQ's, via an interactive geologic map

sediments of Tertiary and Quaternary age (Fig. 2). These rocks extend across the eastern

silt, sand, and gravel deposits, some of which may be locally cemented.

Grenville Province). Although these deep-seated features are not directly apparent in

Q's áre available on CD-ROM, and can be purchased via the Internet. Users of the

30 x 60 minute quadrangle are shown in the index map (Fig. 1).

current data available were used to resolve these differences.

GEOLOGIC SETTING AND STRUCTURAL GEOLOGY

Source: Keystone Coal Industry Manual (2003) This map is a compilation of existing maps, and no additional field work was attempted.

When there were problems in stratigraphic correlation between quadrangles, the best
Industrial minerals and associated rocks

Traces of barite and strontianite were identified in the St. Louis Limestone in the western part of the quadrangle in Wayne County. Some cores have been drilled into the Knox Dolomite in parts of Wayne County in the search for lead and zinc. Several large The geology of the Corbin 30 x 60 minute quadrangle consists of southeast-dipping zinc bodies were discovered in the Knox Dolomite in Clinton and Cumberland Counties sedimentary rocks of Middle Devonian through Pennsylvanian age and unconsolidated (west of the quadrangle) and in northern Tennessee (Anderson and others, 1982).

Tank of the Cincinnati Arch, a structural uplifted feature that crosses from northwestern Petroleum and natural gas Ohio through central Kentucky to the Nashville Dome of central Tennessee, and along Several oil and gas fields are in the Corbin quadrangle (Wilson and Sutton, 1973; the western margin of the Eastern Kentucky Coal Field of the central Appalachian Basin. Nuttall, 1999; Kentucky Geological Survey oil and gas map service, kgs.uky.edu/kgsmap/ The western half of the quadrangle covers an area of the Cumberland Saddle, a structurally KGSGeology/viewer.asp [accessed 01/08/10]). Production data by field are not available, stable low area along the Cincinnati Arch between the Lexington and Nashville Domes. but cumulative hydrocarbon production since 1919 totals 3.99 million barrels of oil and The northwest part of the quadrangle shows the southern end of the Delmer Fault System, 60 billion cubic feet of gas for McCreary, Wayne, and Whitley Counties, according to the which may be the surface expression of the basement faulting associated with the KGS oil and gas production database (kgs.uky.edu/kgsmap/OGProdPlot/OGProduction.asp Cambrian Rome Trough (Dever and others, 1990; Dever, 1999). The southeastern corner [accessed 01/08/10]). The first oil well in Kentucky was drilled along the Big South Fork of the mapped area extends across the edge of the Pine Mountain Overthrust Fault, of the Cumberland River in southern McCreary County in 1818 (Jillson, 1952). which brings Mississippian and younger rocks northwestward over the Pennsylvanian

Reservoir rocks in this quadrangle are the Devonian black shale (Chattanooga Shale) and the Mississippian "Big Lime" (Newman Limestone/Slade Formation) in the Woodbine The dominant rock types for the mapped area are dark, organic-rich shale and dolomite and Williamsburg Fields of Whitley County. The "Beaver Sands," a drillers' term for a for the Devonian units; limestone, siltstone, and shale for the Mississippian section; limestone body at the base of the Fort Payne Formation, are relatively shallow, 200 to interbedded cyclic sandstone, siltstone, shale, coal, and limestone for the Pennsylvanian 600 ft in depth, and produce oil in the Cooper, Oil Valley, Parmleysville, and Steubenville strata; and terrace and alluvial deposits of the Tertiary and Quaternary. The Tertiary and Fields of Wayne County. The "Sunnybrook," Middle Ordovician (Lexington Limestone) Quaternary sediments are mainly unconsolidated or semiconsolidated, and contain clay, carbonates, produce oil in southwestern Wayne County. For more information on the geology and production of these fields, see McGuire and Howell (1963) and Nuttall

Residual soil is clavey and has low permeability. Its thickness is variable: it may rance

The Rome Trough, a Cambrian extensional feature, is a linear, asymmetrical, graben- (199) like basement structure in the quadrangle. The trough extends across eastern Kentucky northeastward through West Virginia and Pennsylvania and into southern New York The area underlain by the Paragon Formation presents potential construction and (Drahovzal and Noger, 1995; Harris and Drahovzal, 1996). Proprietary seismic data used engineering problems. The Paragon is dominantly varicolored plastic clay shale that is in conjunction with the mapping of the Rome Trough in previous studies indicate significant basement faulting in the southern part of this quadrangle. Seismic profiles indicate offset unstable, even on very low slopes. Surfaces, including those covered with vegetation, become unstable when disturbed: landslides, slumps, and soil creep are common. Shales in the hundreds to thousands of feet in the deeper subsurface strata. This basement faulting is not mapped in this quadrangle, but is implied in the offset (or flexures) of the Paragon Formation slump readily when wet, and any construction on them should surface structure contours (see Fig. 2.) and is thus below the cross section. The Greenwood be provided with adequate drainage. High-slope areas should be given careful engineering Anomaly, a major Proterozoic (late Precambrian) gravity anomaly, occurs in the central consideration. Oversteepening of slopes by artificial cuts is likely to result in the clay part of the quadrangle and is interpreted to be a body of mafic igneous rocks of a late shale flowing or sliding, particularly when saturated with water. Prior to road excavation Precambrian rift zone (Dever and others, 1990; Dever, 1999). The anomaly coincides and foundation construction, detailed on-site engineering studies should be made to along the edge of the Grenville Front (the western boundary of the Proterozoic metamorphic define problems and to determine remedial actions.

the near-surface geology, their presence influences the distribution and thickness of the from 0 to 20 ft within a horizontal distance of less than 10 ft. Closely spaced drilling is advised where it is important to determine an exact profile of the bedrock surface. If well drained, it is stable, even on moderately steep slopes. Limestone, coal, oil, gas, and clay are the principal mineral resources for the Corbin KARST FEATURES AND HYDROGEOLOGY The Corbin quadrangle is recognized as containing two of the four major karst regions guadrangle. The locations of industrial mineral resources, including limestone and other

nining operations, were mapped and described by Anderson and Dever (2001) and in Kentucky: the Eastern Pennyroyal and Pine Mountain karst regions (Currens, 2001a,b, 2002). The area contains some of the largest cave systems in the state; several have a length of 1 mi or more. One of these cave systems, the Sloans Valley Cave, southern Pulaski County, is very large and was partially inundated by the impoundment of Lake Limestone for construction aggregate and agricultural products is being guarried in Cumberland. There may be other large cave systems beneath the limestone plateau in Pulaski and Wayne Counties. High-purity limestone in the Monteagle Limestone crops the western part of the Corbin quadrangle. Because of the extensive development of out over large areas in the western part of the quadrangle and is a potential source of karst, cave systems, and solution of limestone bodies, prudent engineering evaluation chemical-grade limestone (McGrain and Dever, 1967). The St. Louis Limestone is less must be completed before any type of construction or excavation begins in order to avoid suitable for aggregate because it contains argillaceous dolomite and the upper St. Louis problems such as failure of structures or highways, and intersection of high-volume karst contains a large percentage of chert. The Burnside Quarry in Pulaski County produces aquifers. primarily from the Kidder Limestone Member of the Monteagle Limestone and the

The availability and quality of groundwater in this area is discussed in Kilburn and

overlying Bangor Limestone, whereas the Monticello Quarry (Wayne County) also others (1962), Lambert and Brown (1963), and Carey and Stickney (2004a-d). Most groundwater is obtained from wells between 30 and 100 ft deep in shallow alluvial or Underclavs from some of the coals have been mined as fireclays, and shale from the bedrock regolith, and many produce insufficient yields for domestic supply. Some wells Pikeville Formation was mined for common brick near Woodbine. A brick kiln was erected in alluvium near major streams may provide adequate water for farms or commercial in 1962 (Puffett, 1963). Siltstone and sandstone from the Breathitt and Lee Formations operations. Water produced from the deeper Ordovician rocks may have a sulfurous and Hartselle Formation may also have use as flagstone, quarry stone, and aggregate. odor or taste. Shallow wells into the noncarbonate rocks of Mississippian age are generally The Rockcastle Conglomerate was previously quarried for aggregate in McCreary unproductive. Exceptions are wells completed in weathered joints or a siltstone facies County. Sandstone, sand, and gravel were also mined from the eastern part of the in the Borden Formation, which act as an aquifer and produce sufficient water to supply quadrangle, but most operations are currently inactive. Flat, thin-bedded or laminated, most farm and home needs. The Mississippian carbonates, Monteagle and St. Louis fine-grained sandstone, used locally as dimension stone, has been quarried in McCreary Limestones, are karstic. Groundwater in karst aquifers occurs in solution-enlarged joints County. Pink sandstone of the Corbin Sandstone has been mined in the eastern part of and bedding planes, and in caves. Wells in these aquifers can yield hundreds of gallons the area for landscaping stone; for use in concrete walks, walls, and foundations; and per day. These conduits provide a relatively small target for water-well drilling, and several dry holes may be drilled before a well producing an adequate supply is found. Where favorably located, springs provide a more predictable supply. Water from all wells and springs in karst aquifers should be sanitized before human consumption. Water in the Pennsylvanian rocks, which underlie the eastern half of the quadrangle, generally contains undesirable amounts of iron, but some wells into sandstone units may have significant yields (over 500 gal/day).

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Limestone, sandstone, sand, gravel, and clay

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