

SYSTEM	SERIES	GROUP	FORMATION	SYMBOL	SECTION	THICKNESS (IN FEET)	MINOR DIVISIONS	CHARACTER OF MINOR DIVISIONS	GENERAL CHARACTER OF DIVISIONS	TOPOGRAPHY	HYDROLOGY
QUATERNARY	Pleistocene and Recent		Alluvium	Qal		0-96			Alluvium Alluvium in the Ohio Valley is composed of a layer of silt, clay, and some sand underlain by a layer of silt, sand, and gravel. Alluvium in valleys tributary to the Ohio Valley is fine-grained sand, silt, and clay.	Alluvium Forms narrow flood plains and terraces of varying width along streams. At least one well-developed terrace is generally present.	Alluvium Yields more than 500 gpd to nearly all wells drilled into the alluvium along the Ohio River. Reported to yield as much as 360 gpm to large industrial wells. Yields more than 100 gpd to most wells dug in the alluvium of valleys tributary to the Ohio River. Probably will yield as much as 20 or 25 gpm to wells drilled and screened in the alluvium of the Big Sandy River and its Tug and Levisa Forks.
			High gravel deposits			0-45			High gravel deposits (unnamed) Silt, fine sand, and gravel containing boulders of quartz and chert as much as 12 inches in diameter	High gravel deposits (unnamed) Underlies area of low relief marking an ancient drainage channel about 700 feet above sea level.	High gravel deposits (unnamed) Yield to wells is unknown.
PENNSYLVANIAN			Conemaugh formation	Pcm		0-600	Morgantown(?) sandstone member ¹	Morgantown(?) sandstone member Sandstone, very massive in places; averages 50 feet in thickness.	Conemaugh formation Variegated siltstones and claystones with massive sandstones in the lower part. Contains a few thin coals and limestones.	Conemaugh formation Forms hilly area of moderate relief in Boyd County, western Carter and Greenup Counties, and northern Lawrence County.	
							Ames limestone member ¹	Ames limestone member Limestone, siliceous and highly fossiliferous; 8 to 10 feet thick.			
							Buffalo sandstone member ¹	Buffalo sandstone member Sandstone, very massive in places; averages about 45 feet in thickness.			
							Brush Creek limestone member ¹	Brush Creek limestone member Limestone, silty, fossiliferous; locally contains abundant layers and nodules of fossiliferous chert; about 2 feet thick.			
							Mahoning sandstone member ¹	Mahoning sandstone member Sandstone, locally conglomeratic and massive, maximum thickness 100 feet.			
							Vanport limestone member ¹	Vanport limestone member Limestone, light-gray, massive. Contains marine fossils and is replaced in a few localities by fossiliferous chert. The member is 2 to 5 feet thick.			
			Breathitt formation	Pbt		475-1300±	Homewood sandstone member ²	Homewood sandstone member Sandstone, coarse-grained and massive, ranging in thickness from a few feet to 100 feet.	Breathitt formation Siltstone, sandstone, and claystone. Minor constituents are coal, clay, ironstone, limestone, and chert. Siltstones are gray and micaceous. Sandstones are gray, "dirty," and of the subgraywacke type; some are feldspathic. Claystones are dark and light gray and may contain ironstone concretions. Plant fossils are common in all the clastic rocks. Ironstones occur in discontinuous beds. Clays with rootlets commonly underlie coal. Calcareous rocks make up a very small part of the formation; several zones contain thin beds of limestone while others include silty or sandy limestone concretions. Cherts are fossiliferous and occur in bands or nodules.	Breathitt formation Forms rounded hills and caps many ridgetops along the western margin of the area. Underlies valleys and forms the rugged hills of the entire eastern portion of the area with the exception of western Carter and Greenup Counties, and northern Lawrence County. Sandstones form narrow valleys and cliffs or steep slopes on hillsides. Tops of hills and ridges commonly are capped by sandstone. Shales form wide valleys and moderate or gentle slopes on hills.	
							Magoffin beds ³	Magoffin beds Siltstone containing marine fossils or, in the northern part of the area, a thin limonitic "ore bed". In the southern part of the area the unit is an argillaceous or arenaceous limestone containing abundant marine fossils. Spheroidal concretions or lentils of concretionary limestone are common at the top. The unit is 0 to 15 feet thick.			
							Fire clay coal	Fire clay coal Coal containing a flint or semi-flint clay parting. The parting is more common in the southern part of the area than in the northern parts.			
							Kendrick shale ⁴	Kendrick shale Shale, dark or sandstone with silty, ellipsoidal, calcareous concretions. Contains marine fossils.			
							Lee formation	Lee formation Sandstone and siltstone with lesser amounts of clay, claystone, coal, ironstone, and limestone. Sandstones are conglomeratic in places and quartzose. In the northern part of the area, the sandstones consist of one or two beds from 2 to 3 feet thick. In the southern part of the area sandstones in the Lee formation are massive, cliff-forming, and from 200 to 300 feet thick.			
							Sharon conglomerate member ¹	Sharon conglomerate member Conglomeratic sandstone, massive, ranging from 40 to 100 feet in thickness.			
MISSISSIPPIAN	Upper Mississippian		Glen Dean limestone			0-48		Glen Dean limestone Limestone, bluish gray, fine to coarsely crystalline, fossiliferous, thick-bedded. May be interbedded with black, gray, or greenish shale.	Glen Dean limestone Crops out as thin ledges, generally high on hills, as far north as Carter County.	Upper Mississippian rocks Yields more than 500 gpd to nearly three-quarters of the wells drilled in valley bottoms, and to most wells drilled on hills. Yields little water where overlain by Pennsylvania rocks. May yield more than 50 gpm to a few wells penetrating large solution cavities in limestone, the most common aquifer. Sandstone and shale yield water from fractures to a few wells. Waters generally are hard, and may be salty at shallow depth in a few places. Springs from solution cavities in limestone near stream level flow as much as 100 gpm.	
			Limestones of early Chester age			0-210		Warsaw limestone—limestones of early Chester age Limestone, bluish, coarse-grained, oolitic, thick-bedded or massive; contains a few shale partings. Underlain by oolitic limestone containing quartz pebbles and dark limestone containing chert.	Warsaw limestone—limestones of early Chester age Underlies valleys in south-central Carter and western Elliott Counties. Forms steep hillsides and cliffs in western Lee, Menifee, Wolfe, and Carter Counties, in northwestern Morgan County, and in a few places in western Greenup County. Massive limestones form cliffs and solution features such as sinkholes, caves, and hanging valleys. Carter and Cascade Caves in southwestern Greenup County are well-known tourist attractions.		
			St. Genevieve limestone								
			St. Louis limestone								
			Spargen limestone ⁶								
	Lower Mississippian	Borden ⁶		Muldraugh formation ⁷			340-600		Borden group Siltstone, containing beds of sandstone, claystone, and beds or lenses of limestone. Siltstones are dark, greenish, or yellowish gray to buff, and contain worm marks and <i>Taonurus</i> . Sandstones are fine to very fine grained and micaceous. Variegated shaly claystones are prominent in the uppermost part of the formation. Carbonate concretions are common throughout the section, but bedded limestones are prevalent only in the upper part. The limestones may contain beds, lenses, or patches of chert.	Borden group Underlies valley bottoms in Lee, Wolfe, and northwestern Morgan Counties. Underlies valley bottoms and lower hillsides in Carter and Greenup Counties. Forms hills and the bottoms of wide valleys in western Menifee County. Limestones and massive siltstones form ledges; shales produce dissected slopes.	Lower Mississippian rocks Yields more than 500 gpd (gallons per day) to almost half the wells drilled in valley bottoms, and smaller quantities of water to wells on hills. Maximum reported yield is 10 gpm (gallons per minute). Because shale makes up most of the unit, it is the most common aquifer; however, sandstone yields water to some wells and limestone to a very few. Water is supplied to wells chiefly through fractures. Commonly contains salty waters at depths less than 100 feet below the level of the principal valley bottoms.
	Floyds Knob formation ⁸										
	Brodhead formation ⁷										
	New Providence shale ⁸										

¹Member as used by Stockdale (1939)
²As used by Phalen (1912)
³Of Morse (1931)
⁴Of Jillson (1919)
⁵Of Crider (1913)
⁶As used by Stockdale (1939)
⁷Of Stockdale (1939)

GENERALIZED COLUMNAR SECTION IN BOYD, CARTER, ELLIOTT, GREENUP, JOHNSON, LAWRENCE
LEE, MENIFEE, MORGAN, AND WOLFE COUNTIES, KENTUCKY

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