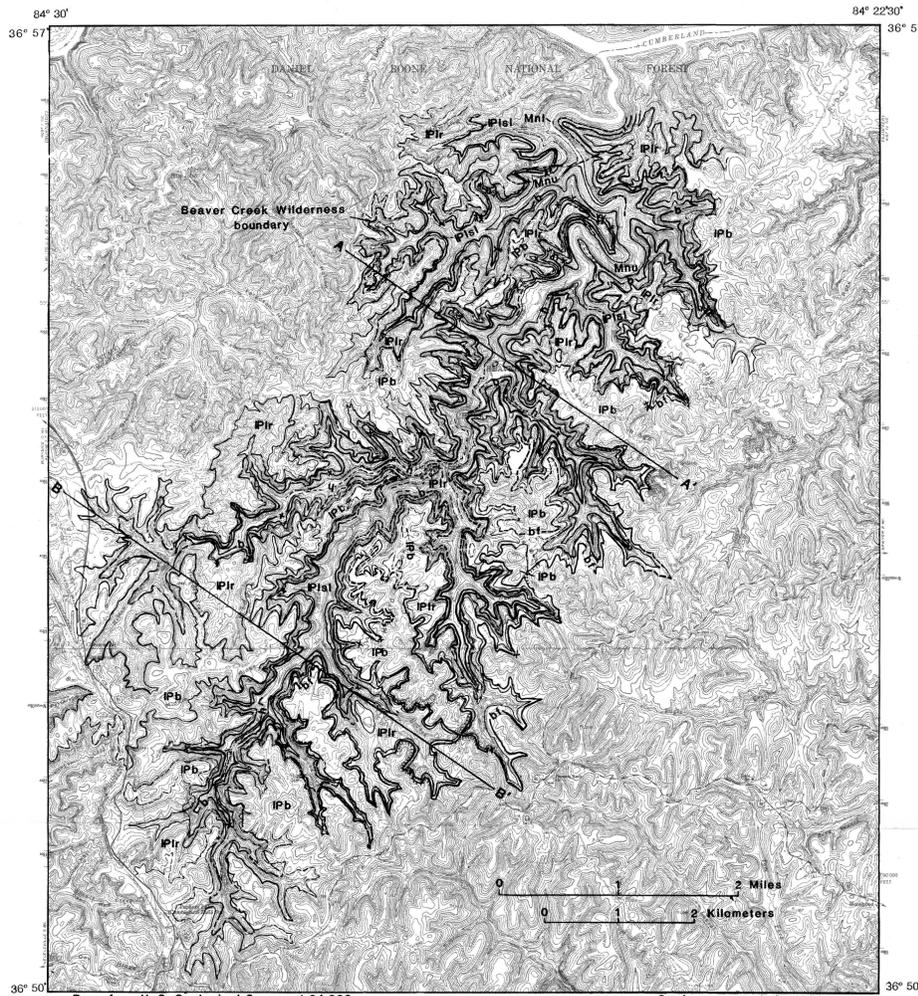
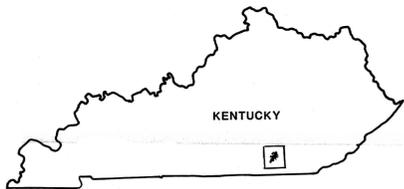


DESCRIPTION OF MAP UNITS

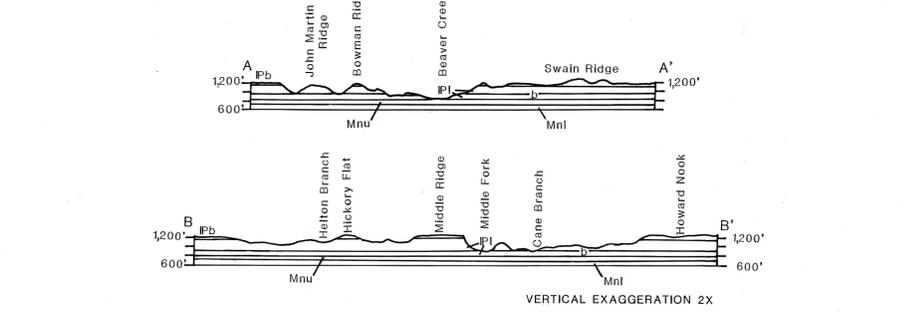
IPb BREATHITT AND LEE FORMATION (Middle and Lower Pennsylvanian)—Sandstone, siltstone, shale, coal, and underlay. Sandstone, mostly medium- to coarse-grained, light-gray to white, thin- to thick-bedded, massive, crossbedded, partly ripple-bedded; contains 50-90 percent quartz and minor amounts of white-weathering feldspar, mica, and dark mineral grains; occurs in several beds including the mapped, cliff-forming Rockcastle Sandstone Member (IPir) which contains abundant well-rounded quartz pebbles. Shale and siltstone, medium-gray to black, evenly to irregularly bedded, locally micaceous or pyritic; contains few plant fossils; occurs principally in the Breathitt Formation (IPb) and intercalated with other lithic units in lower shale member of Lee Formation (IPis). Coal, mostly bright attritus with bands of vitrain and dull attritus; occurs in five beds including the mapped Hudson (h), Beaver Creek (b), and Barren Fork (bf) coal beds. Underlay, medium-gray, clayey to silty; contains fossil rootlets.

Mnu NEWMAN LIMESTONE (Upper Mississippian)—Limestone, shale, and sandstone. Upper Member (Mnu) is mostly shale, greenish-gray with few medium-gray and grayish-red beds, evenly bedded, partly calcareous, contains beds of very fine- to fine-grained, ripple-bedded sandstone and light-olive-gray limestone and argillaceous limestone. Lower Member (Mnl) is limestone, light-olive-gray to olive-gray, finely to coarsely crystalline, thin- to thick-bedded, faintly crossbedded, oolitic and bioclastic detritus. Marine invertebrates common throughout formation.

- Contact—Dashed where approximately located
- - - Coal bed—Dashed where approximately located
- - - Approximate Wilderness boundary
- ▬▬▬▬▬▬ Contour strip mine
- > Caved adit
- x Prospect or outcrop



Base from U. S. Geological Survey, 1:24,000
Hall, 1963 and Wiborg, 1963
Geology mapped in 1980
by K.J. Englund and N.K. Teaford 84° 22'30"



VERTICAL EXAGGERATION 2X
Figure 2.--Geologic map and cross sections of the Beaver Creek Wilderness.

SYSTEM	SERIES	FORMATION, MEMBER, AND BED	LITHOLOGY	THICKNESS OF COAL BED IN INCHES	THICKNESS IN FEET
PENNSYLVANIAN	BREATHITT FORMATION	Barren Fork coal bed	[Lithology symbol]	0-48	20+
		Rockcastle Sandstone Member	[Lithology symbol]		100-225
		Beaver Creek Rider coal bed	[Lithology symbol]	0-28	35-60
	LEE FORMATION	Beaver Creek coal bed	[Lithology symbol]	3-62	
		Stearns No. 11(?) coal bed	[Lithology symbol]	0-5	
		Lower shale member	[Lithology symbol]		80-110
LOWER AND MIDDLE PENNSYLVANIAN	Hudson coal bed	[Lithology symbol]	0-24	20-40	
MISSISSIPPIAN	UPPER MISSISSIPPIAN	Upper member	[Lithology symbol]		120-135
		Lower member	[Lithology symbol]		30+
		NEWMAN LIMESTONE			165+

Figure 3.--Generalized stratigraphic section of exposed rock formations in the Beaver Creek Wilderness.

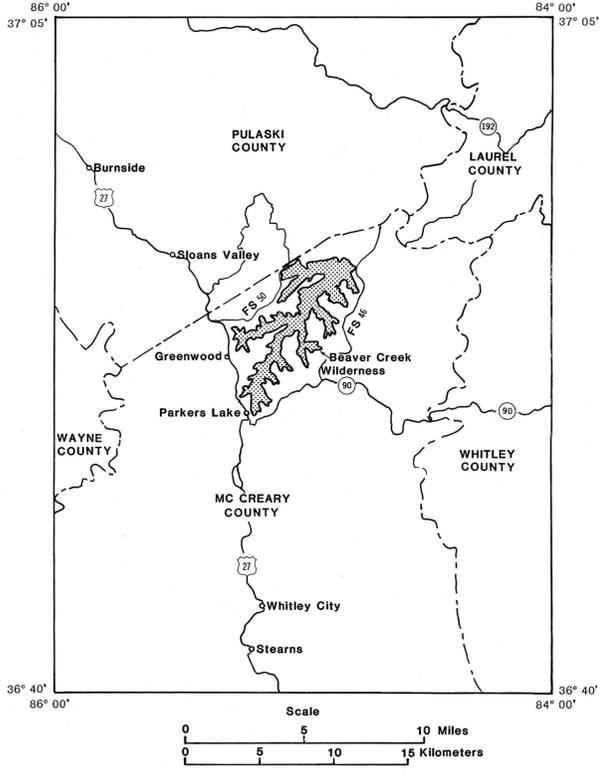


Figure 1.--Index map showing location of the Beaver Creek Wilderness.

STUDIES RELATED TO WILDERNESS
The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal Lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geologic survey of the Beaver Creek Wilderness in the Daniel Boone National Forest, McCreary County, Ky. The Beaver Creek Wilderness was established by Public Law 93-622, January 3, 1975.

INTRODUCTION
The Beaver Creek Wilderness comprises approximately 4,800 acres and is principally within the cliffline bordering the Beaver Creek drainage basin in McCreary County, southeastern Kentucky. It is part of the Beaver Creek Cooperative Wildlife Management Area in the Daniel Boone National Forest, which is managed by the U.S. Forest Service and the Kentucky Department of Fish and Wildlife Resources. The wilderness is about 11 mi southeast of Burnside, Ky., and is accessible from the north and south via U.S. Route 27 and Forest Service Road 50, at its northwest border (fig. 1). From the east the area can be reached via State Route 90 and Forest Service Road 46, at the eastern edge of the wilderness. The interior is accessible by foot along an abandoned Forest Service road and by several primitive trails that extend along the major streams.

The Beaver Creek Wilderness is centrally located at the western edge of the Appalachian coal region and is within the highly dissected Cumberland Plateau section of the Appalachian Plateaus physiographic province (fig. 2). It is drained by Beaver Creek and its tributaries, which flow northeastward into Cumberland Lake, a reservoir on the Cumberland River about 1 mi north of the wilderness. Altitudes range from about 730 ft on the lower part of Beaver Creek to about 1,200 ft at its headwaters.

GEOLOGIC SETTING
About 555 ft of sedimentary rocks of Late Mississippian to Middle Pennsylvanian age crop out in the study area, and as much as 8,000 ft of older Paleozoic rocks may be present in the subsurface (fig. 3). The lowermost part of the exposed section consists of marine rocks assigned to the Newman Limestone of Late Mississippian age. Outcrops of this formation are limited to the lower valley slopes along Beaver Creek and its tributaries in the northeastern part of the wilderness. The rest of the exposed stratigraphic section consists mostly of coal-bearing continental rocks assigned to the Lee and Breathitt Formations, which also contain several brackish-water and marginal-marine beds. These formations underlie broad upland areas and crop out extensively along upper valley slopes. Unmapped surficial deposits consist of colluvium on lower valley slopes and alluvium along the valley floors.

The basal 155 ft of the exposed section are assigned to the Newman Limestone. It consists of a lower member of light-olive-gray, thin- to thick-bedded, medium- to coarse-crystalline limestone containing oolites and whole or fragmental marine invertebrate fossils. In this area, the lower member previously has been identified, in part, as the Bangor Limestone (Smith and others, 1973). Deposition of the lower member took

place in a subtidal to supratidal marine environment. It is conformably overlain by the upper member, which is 125 ft thick and consists of interbedded greenish-gray, grayish-red, and medium-gray shale, argillaceous limestone, and ripple-bedded sandstone. The upper member customarily has been referred to as the Pennington Formation by previous workers, including Smith and others (1973). The erroneous use of the name Pennington for the upper member of the Newman is common in parts of eastern Kentucky and Tennessee, as indicated by Englund (1968, p. 12). A few feet of the member, including a thin, ripple-bedded sandstone at the top of the Newman Limestone, may be equivalent to the Pennington, but these beds are too thin to be mapped separately. Deposition of the upper member in a tidal-flat environment was interrupted by brief marine transgressions indicated by thin beds of limestone containing marine invertebrate fossils.

The principal coal beds in the Beaver Creek Wilderness are in the Lee Formation of Early and Middle Pennsylvanian age, which disconformably overlies the Newman Limestone and typically includes thick beds of conglomerate orthoquartzite, such as its Rockcastle Sandstone Member. The formation is nearly 400 ft thick and also contains interbedded nonresistant sandstone, siltstone, shale, coal, and underlay. Its Rockcastle Sandstone Member forms precipitous cliffs as high as 200 ft at the periphery of the Beaver Creek Wilderness. For mapping convenience, the Lower Pennsylvanian coal-bearing beds beneath the Rockcastle Sandstone Member have been included locally in the Breathitt Formation (Smith and others, 1973). However, because these beds are laterally equivalent to the type Lee Formation in southwestern Virginia (Englund, 1968, pl. 5) and are not present in the type area of the Breathitt Formation in Breathitt County, Ky., they are included here in the Lee Formation. Locally, at the edge of the Beaver Creek Wilderness, the Rockcastle Sandstone Member of the Lee is overlain by underlay, coal, and shale that compose a tongue of the Breathitt Formation.

Quaternary deposits consist of blocks of locally derived sandstone and conglomeratic sandstone in unmapped deposits of colluvium on the lower valley slopes and of gravel, sand, and silt in alluvium on the valley floors.

STRUCTURE
The Beaver Creek Wilderness is underlain by relatively flat lying rocks on the eastern flank of the Cincinnati arch. Structure contour lines drawn on the top of the Rockcastle Sandstone Member of the Lee Formation show that the easterly regional dip is less than 1° and is modified locally to a northeasterly direction (fig. 4). No evidence of faulting has been observed in the study area.

REFERENCES CITED
Englund, K. J., 1968, Geology and coal resources of the Elk Valley area, Tennessee and Kentucky: U.S. Geological Survey Professional Paper 572, 59 p.
Smith, J. H., Pomeroy, J. B., and Ping, R. G., 1973, Geologic map of the Hail quadrangle, McCreary and Pulaski Counties, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-1058, scale 1:24,000.

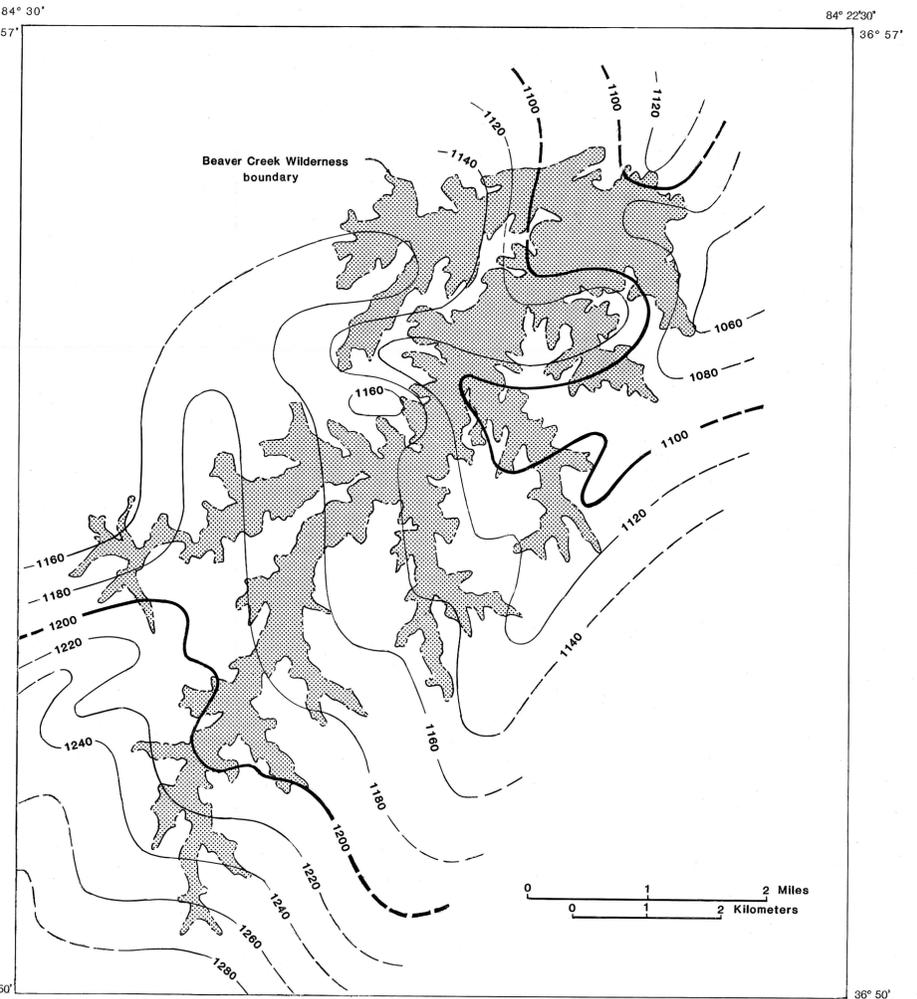


Figure 4.--Structure contour map of the Beaver Creek Wilderness and vicinity. Contours are drawn on top of the Rockcastle Sandstone Member of the Lee Formation and are dashed where projected from other beds. Contours are in feet above sea level.

GEOLOGIC MAP OF THE BEAVER CREEK WILDERNESS, MC CREARY COUNTY, KENTUCKY

By
Kenneth J. Englund and Nancy K. Teaford
1981