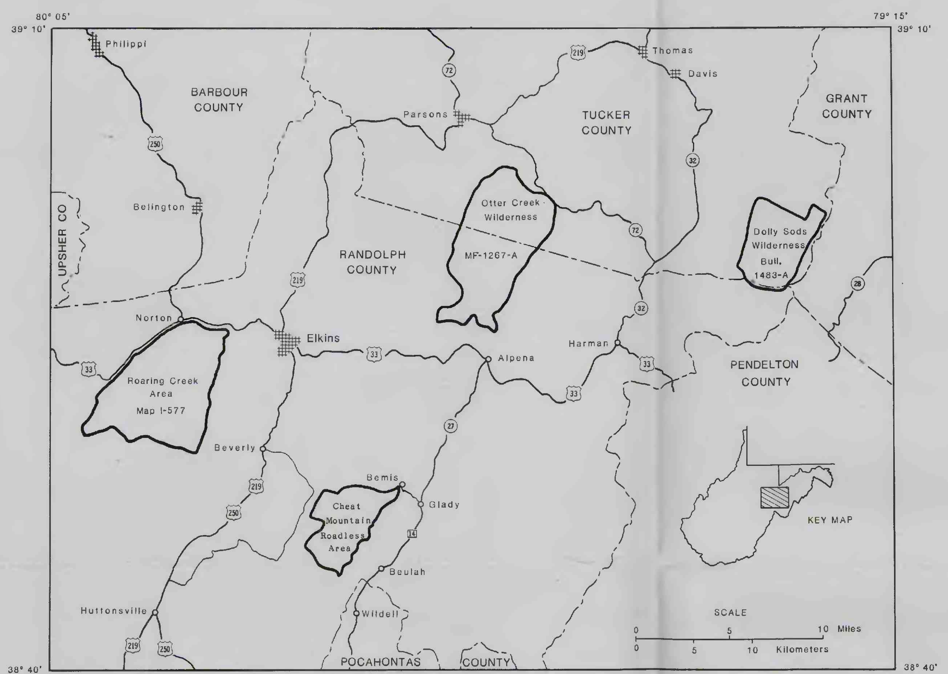
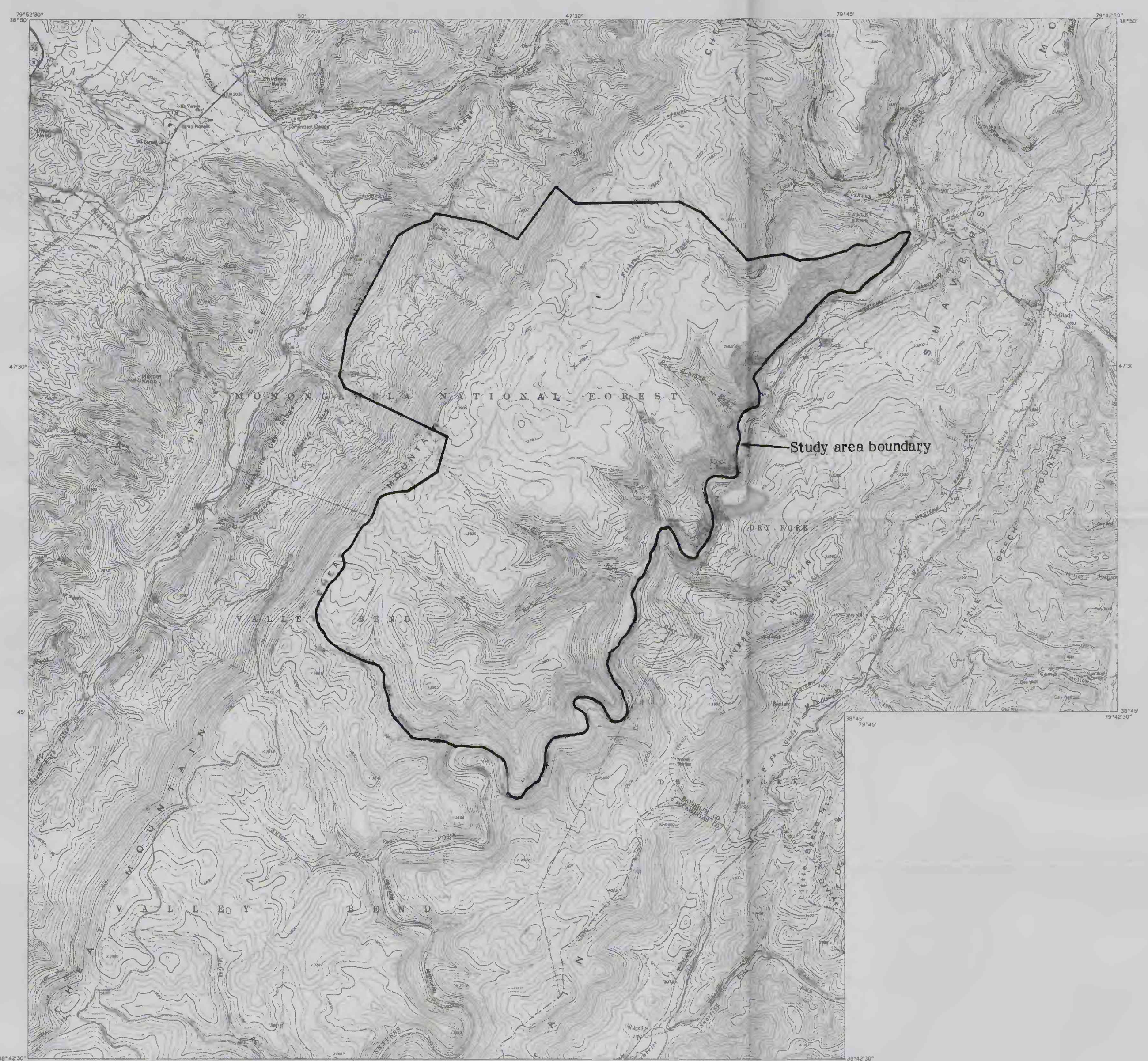


Figure 1.—Index map showing location of Cheat Mountain Roadless Area.



Base from U.S. Geological Survey 1:24,000
Beverly East, 1969; Glady, 1968 (photorevised 1976);
and Wildell, 1977

SCALE 1:50 000
0 1 2 MILES
0 1 2 KILOMETERS

Topographic map of the Cheat Mountain Roadless Area, W.Va.

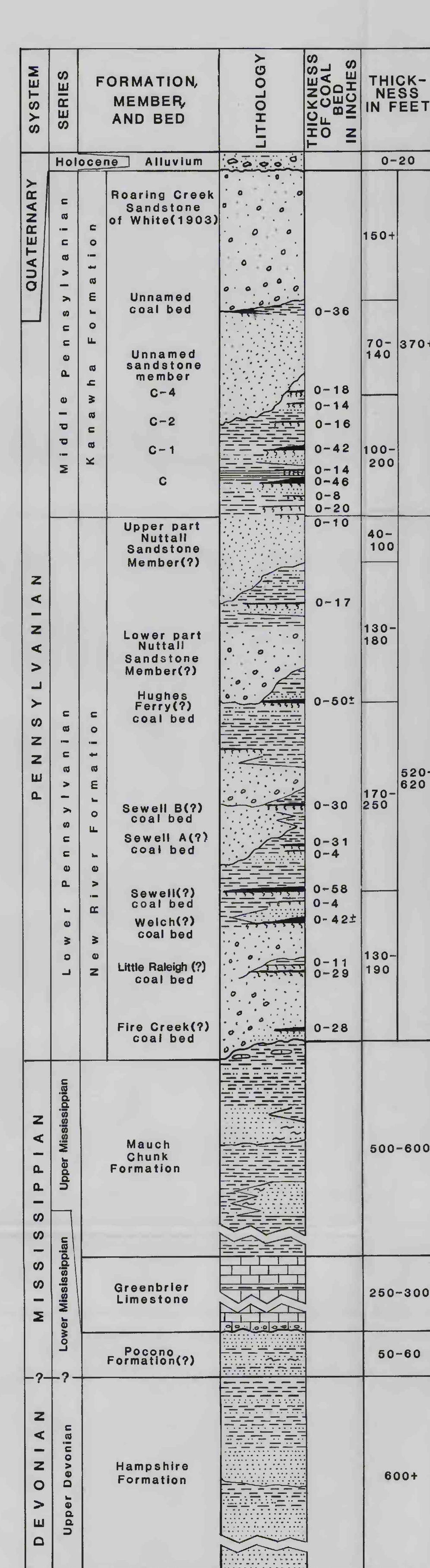


Figure 2.—Generalized stratigraphic section of exposed rock formations in the Cheat Mountain Roadless Area (modified from Englund and others, 1980).

EXPLANATION

- Area where coal is absent or less than 14 in. thick
- Area underlain by estimated coal resources 14-28 in. thick
- Area underlain by estimated coal resources 28-42 in. thick
- Area underlain by estimated coal resources 42 in. thick
- ---- Outcrop of coal bed, dashed where approximately located
- —14-- Coal thickness line, approximately located, dashed where eroded. Interval 14 in.

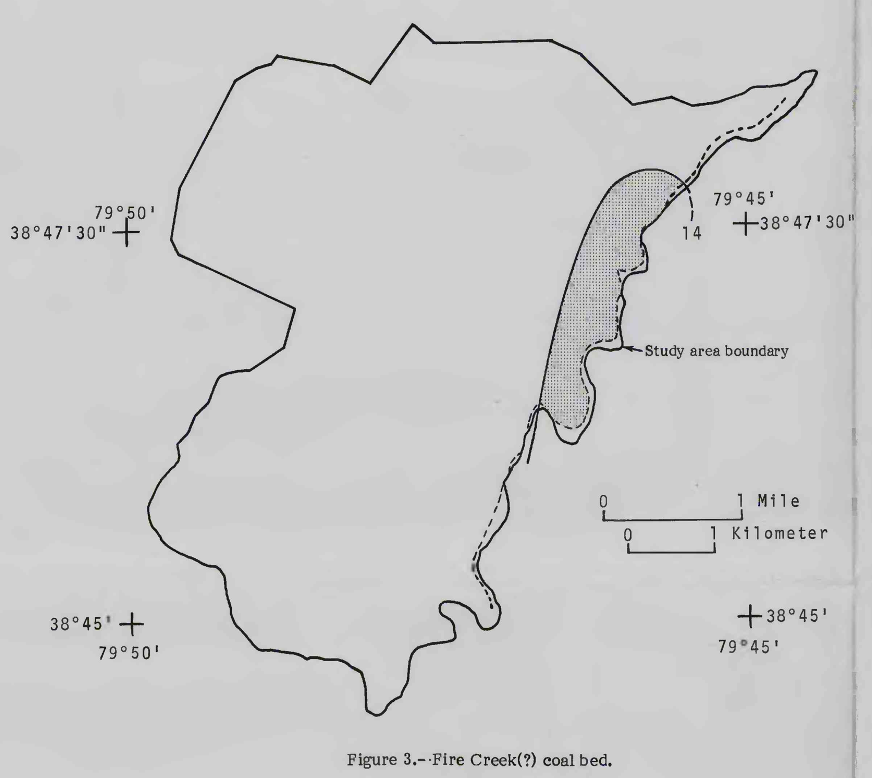


Figure 3.—Fire Creek(?) coal bed.

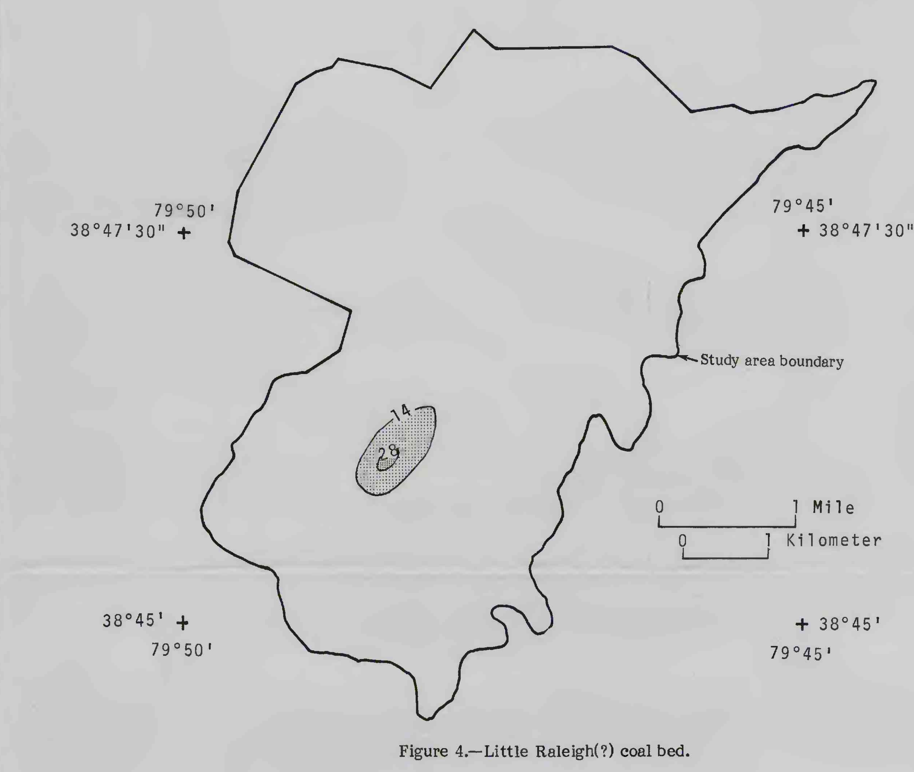


Figure 4.—Little Raleigh(?) coal bed.

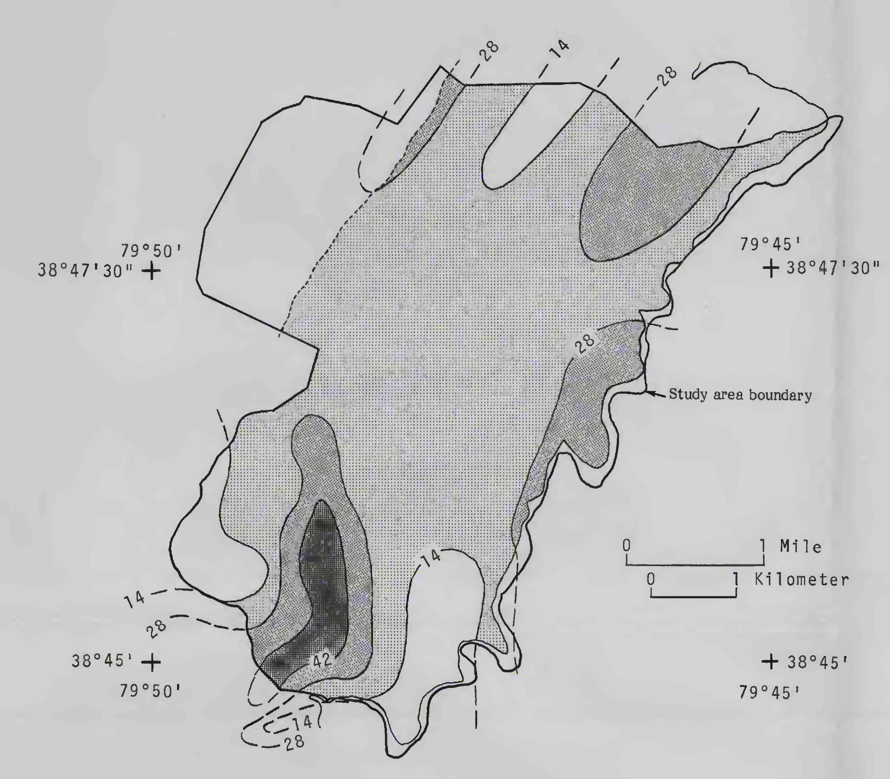


Figure 5.—Sewell(?) coal bed.

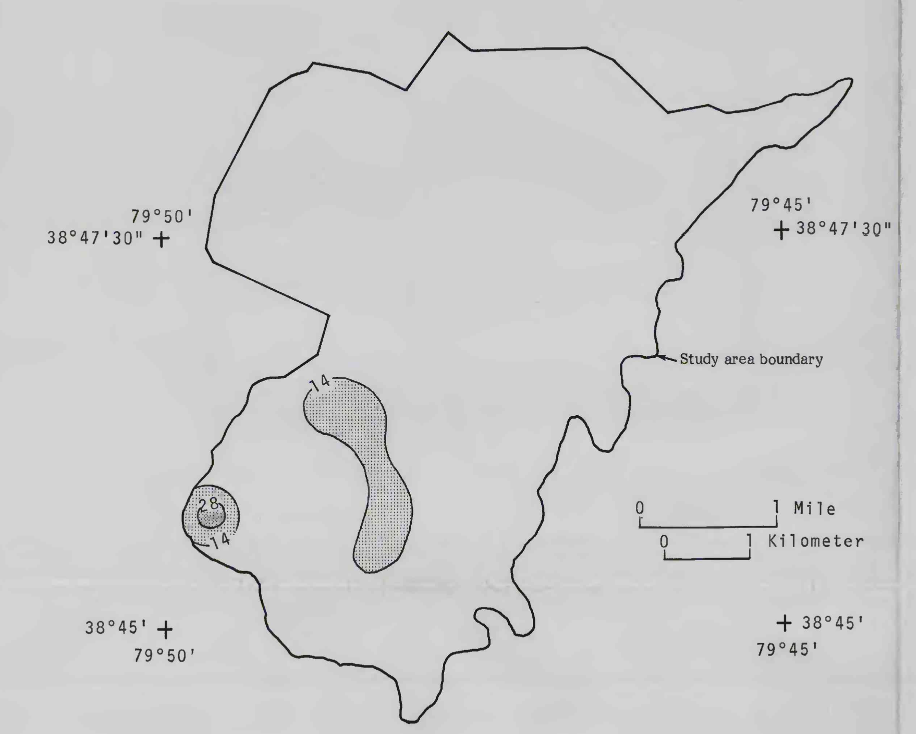


Figure 6.—Sewell A(?) coal bed.

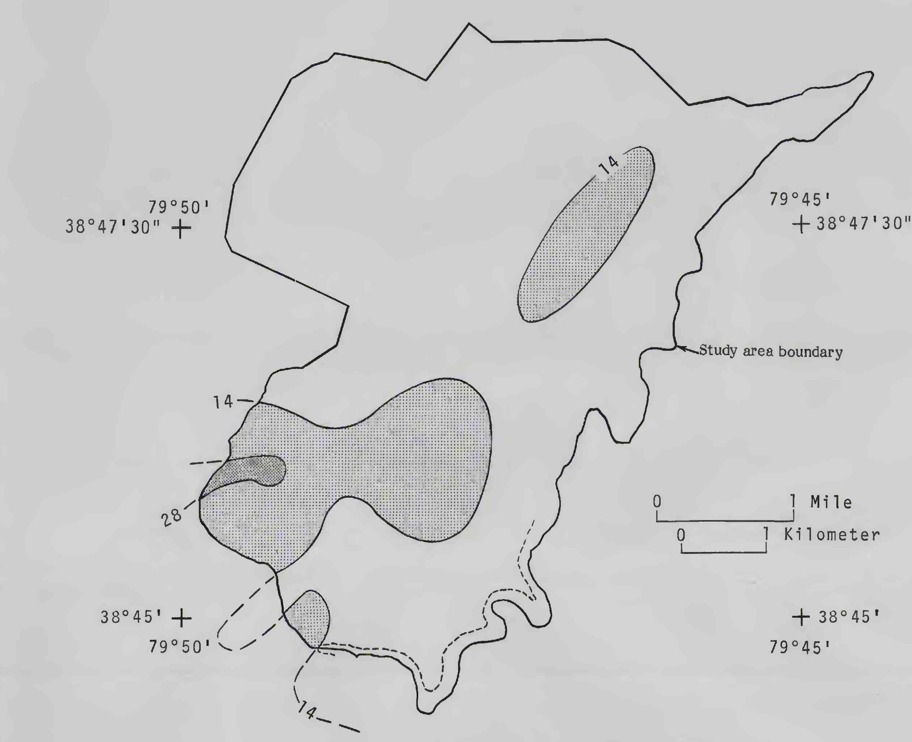


Figure 7.—Sewell B(?) coal bed.

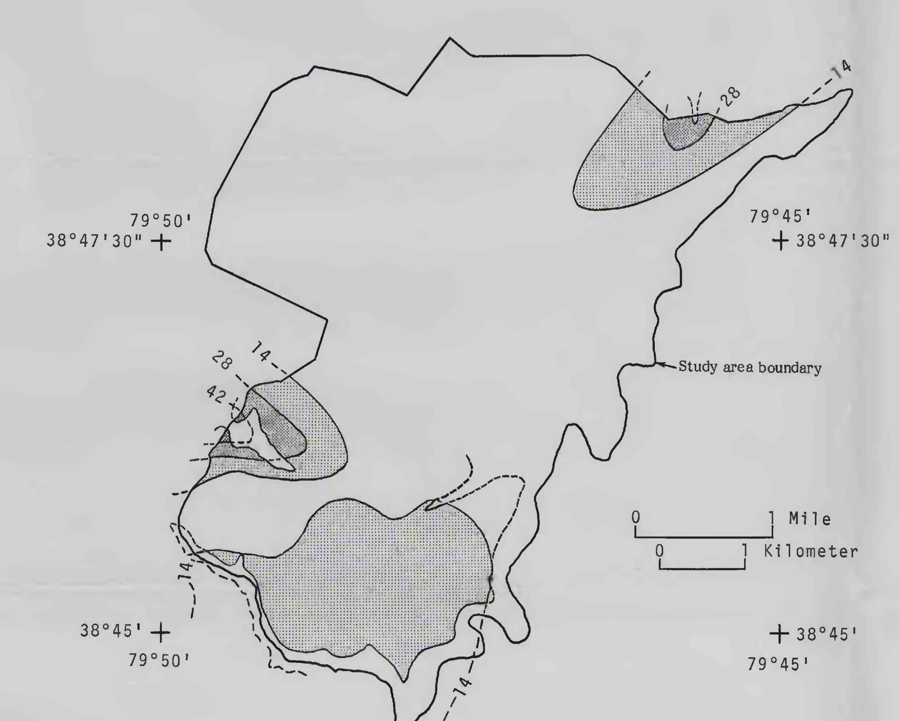


Figure 8.—Hughes Ferry(?) coal bed.

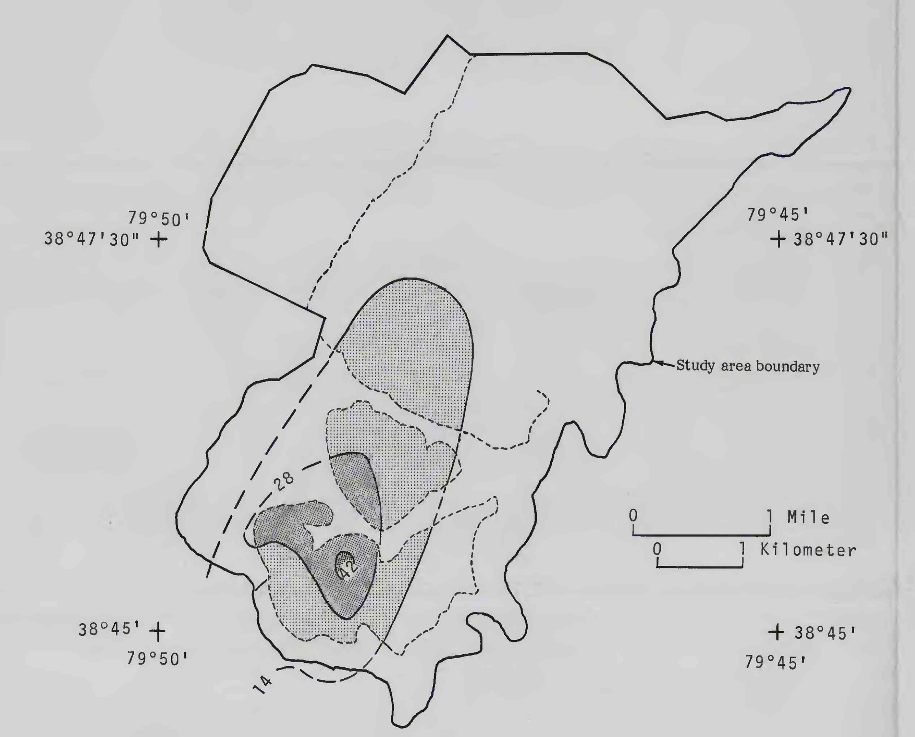


Figure 9.—C coal bed.

Figure 10.—C-1 coal bed.

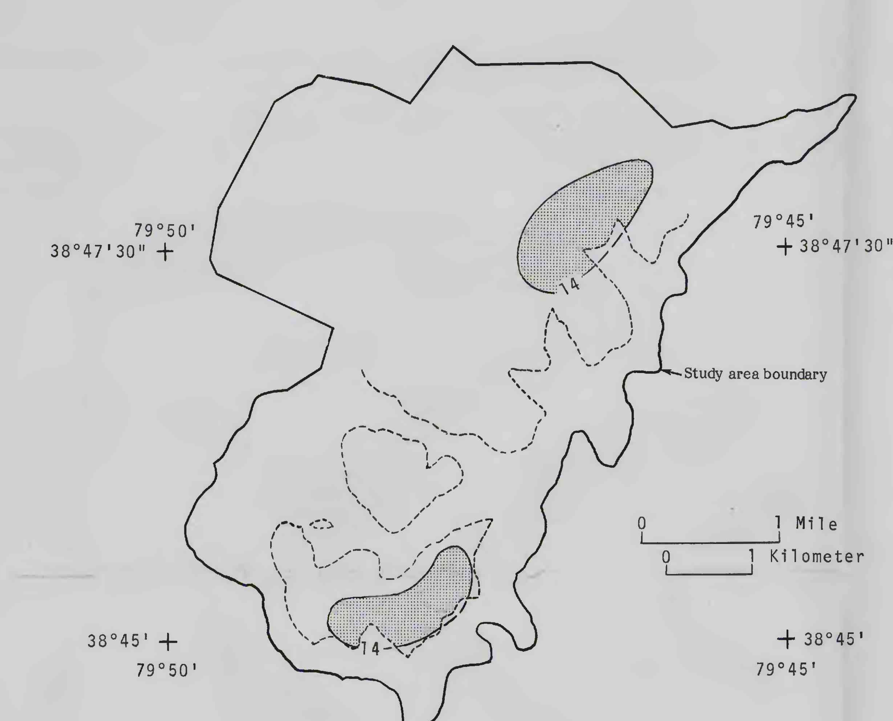


Figure 11.—C-2 coal bed.

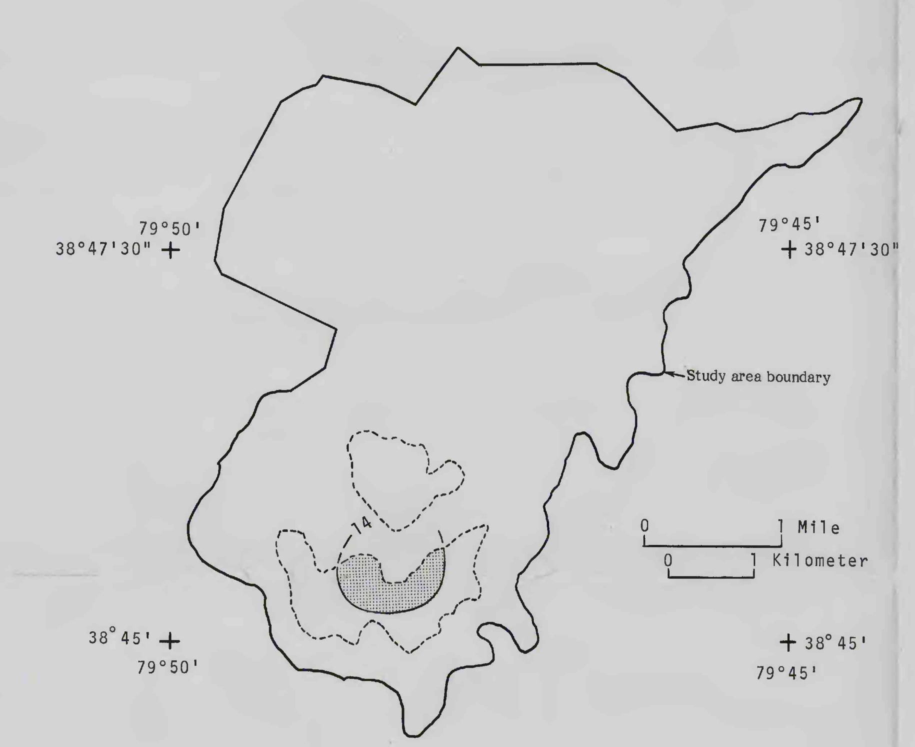


Figure 12.—C-4 coal bed.

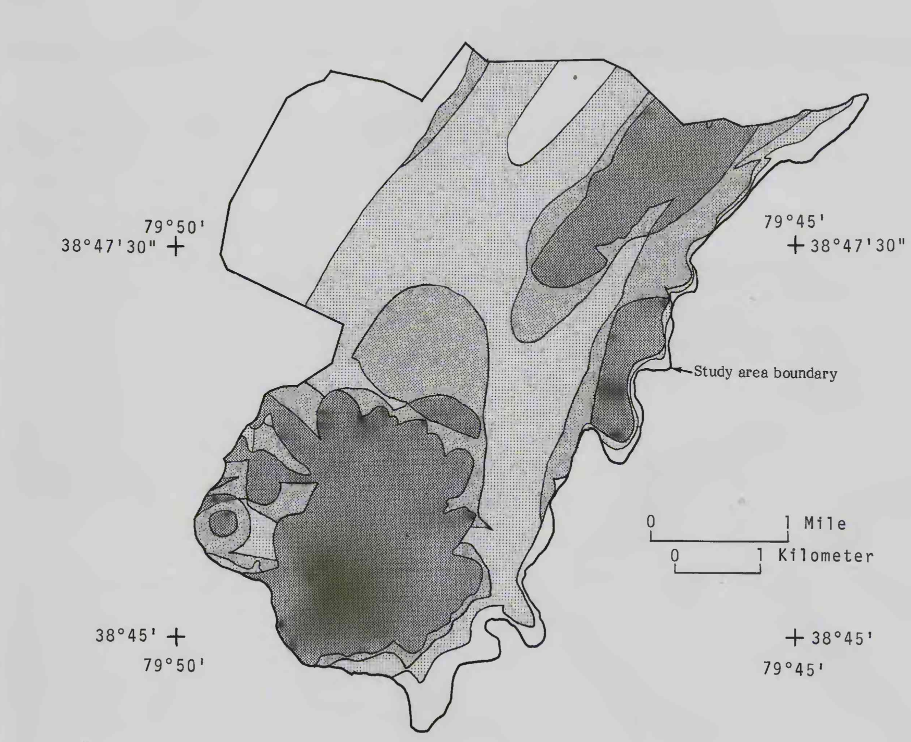


Figure 13.—Known cumulative coal-resource distribution of all beds in the Cheat Mountain Roadless Area.

Studies Related To Wilderness

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and 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 mineral survey of the Cheat Mountain Roadless Area in the Monongahela National Forest, Randolph County, West Virginia. The area was designated as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

SUMMARY

Approximately 44 million tons of coal are contained in the ten major coal beds located in the Cheat Mountain Roadless Area (table 1). Of the estimated original resources, 74 percent is in the 14-28 in. category; 22 percent is in the 28-42 in. category; and 4 percent is in the greater than 42 in. category. The Sewell (?) coal, the thickest and most persistent bed, contains an estimated 23 million tons of coal, or 52 percent of the total calculated for the entire study area. Coal resources for all of the principal beds are mostly in the southwestern part of the area and in a north-trending belt coincidental with the axis of the North Potomac syncline (fig. 13).

Chemical analyses (table 2) of coal from different beds at several localities in the study area indicate that the rank of the coal is medium- to high-volatile A bituminous. Accurate rank determination of each coal bed could not be made due to the lack of sufficient samples from the area and the weathered or oxidized condition of coal near the outcrop. Available samples indicate that the rank of the Sewell (?) is medium-volatile bituminous, on an as-received (AR) basis, and that the bed has a relatively low sulphur content, ranging from 0.4 to 1.1 percent. The ash content of the Sewell (?) coal, an important criterion affecting the quality of coal, ranges from about 6.4 to 34.4 percent, as received (table 2). The high ash content of the Sewell (?) coal in sample SF-11-3 is related to the occurrence of cannel coal at this locality.

INTRODUCTION

The Cheat Mountain Roadless Area contains approximately 7,720 acres in the Monongahela National Forest, east-central West Virginia (fig. 1). It is located in Randolph County, about 10 mi southeast of Elkins, W. Va. and is accessible from there via U.S. 219-250 to Beverly, W. Va., and then southeastward along an improved country road. From the east, the area can be reached via U.S. 33 and by a paved country road that extends from Alpena to Bemis near the northeastern corner. Unimproved Forest Service roads, abandoned logging railroad grades, and primitive trails provide access by foot or horseback into the interior of the area.

Physiographically, the area is in the Allegheny Mountain section of the Appalachian Plateaus province and is situated at the eastern edge of the Appalachian coal region. Cheat Mountain, a northeast-trending, linear ridge bordered on the west by tributaries of the Tygart River and on the east by Shavers Fork, is the source of the area name. Altitudes range from about 2,550 ft at Bemis to more than 3,965 ft on Cheat Mountain.

Coal in the Cheat Mountain area is medium- to high-volatile A bitmuninous rank and is found in at least 19 beds in the New River and Kanawha Formations of Early and Middle Pennsylvanian age, respectively. Of these beds, ten are of sufficient thickness, extent, and quality to contain identified coal resources. Development of the coal is limited to several small abandoned underground and surface mines located beyond the eastern and northeastern edges of the study area.

Nearly all of the coal is banded with dull and bright attritus and with lesser amounts of vitrain and powdery fusain. Cannel or canneloid coal was noted in the Sewell(?) coal bed in drill core from the southern part of the study area. Partings of impure coal, shale, and underclay are common in most beds, and finely disseminated pyrite is in some beds. The stratigraphic position and range of thickness of each coal bed, and the thickness and lithologic characteristics of the intervening strata, are presented in figure 2.

METHODS OF STUDY

Field investigations by the U.S. Geological Survey consisted of reconnaissance geologic mapping and data collecting, including the measurement of stratigraphic sections and the tracing of coal beds and resistant sandstone units. Additional subsurface information was obtained from the logs of several core holes drilled in or near the study area.

The coal resources of the Cheat Mountain Roadless area have been calculated according to standard procedures and categories, as follows:

1. Measured resources were computed for areas where the thickness and extent of the coal beds are well defined by measurements 0.5 mi or less apart. They generally extend in a belt 0.25 mi wide adjacent to an outcrop or point of measurement.

2. Indicated resources were computed where observation points are 1.5 mi apart and for areas that extend in a belt as much as 0.75 mi beyond the limit assumed for measured coal.

3. Inferred resources were compiled for areas where observation points are 3.0 mi apart and the continuity of the coal is supported by geologic evidence. Inferred coal extends as a 2.25-mile-wide belt 0.75-3.0 mi from a measured point.

In addition to these reliability categories, bed maps with thickness intervals of 14-28 in., 28-42 in., and > 42 in. were used to estimate the total coal resources of the area. Resources for coal beds less than 14 in. thick were not determined.

COAL RESOURCES

Coal resources have been estimated for the Fire Creek (?), Little Raleigh (?), Sewell (?), Sewell A (?), Sewell B (?), and Hughes Ferry (?) coal beds in the New River Formation, and for four unnamed coal beds in the overlying Kanawha Formation (fig. 3-12). Usage of these coal-bed names generally follows that of previous geologic investigations (Reger, 1931). However, because of the local nature of the Cheat Mountain Roadless Area study, queries were added to the bed names to indicate that correlations with the type areas were not confirmed.

The Fire Creek (?) coal bed is approximately 10 to 15 ft above the Mississippian-Pennsylvanian boundary and crops out along the lower valley slopes of Cheat Mountain near the eastern edge of the study area (fig. 3). The coal is exposed locally and measurements made at prospects and outcrops indicate that it ranges from 0 to 28 in. in thickness. The bed splits into two or more benches to the north and is thin or absent to the south and west. The Little Raleigh (?) coal bed is some 65 ft above the Fire Creek (?) and ranges from 0 to 29 in. in thickness. The coal is of limited extent and resources occur only in the south-central part of the area (fig. 4).

The Sewell (?) coal bed is about 150 ft above the Fire Creek (?) and underlies most of the study area (fig. 5). The bed ranges from 0 to 58 in. in thickness and is thickest in three distinct pods along a north-trending belt across the area. The Sewell (?) is the major coal resource in the local area and at least 20 prospects, adits, and trenches are present locally along the lower slopes of Cheat Mountain.

The Sewell A (?) coal bed lies some 45 ft above the Sewell (?) coal bed and ranges in thickness from 0 to 31 in. This coal has a limited distribution and attains its maximum thickness in the south-central part of the study area (fig. 6). The Sewell B (?) coal bed is approximately 90 ft above the Sewell (?) and ranges from 0 to 30 in. in thickness. Outcrop and core-hole data indicate that the bed is thickest in the southwestern corner of the study area (fig. 7).

The Hughes Ferry (?) coal bed, lying some 200 ft above the Sewell(?), ranges from 0 to approximately 50 in. in thickness. Much of the bed appears to have been eroded prior to the deposition of the overlying Nuttall Sandstone Member (?), and distribution of this coal is limited to three distinct pods in a north-trending belt across the area (fig. 8).

Four unnamed coal beds in the lower part of the Kanawha Formation contain resources in the central part of the study area (figs. 9, 10, 11, & 12). These beds occur in a coal zone ranging between 430 to 530 ft above the Sewell (?) coal bed and appear to be of limited areal extent. The most extensive beds, the C and C-1 coals, attain maximum thickness of 46 in. and 42 in. respectively.

REFERENCES

Englund, K. J., Sigleo, W. R., and Teaford, N. K., 1980, Geologic map of the Cheat Mountain Further Planning Area, Randolph County, West Virginia: U.S. Geological Survey Miscellaneous Field Studies Map MF-1271-A.

Reger, D. B., 1931, Randolph County: West Virginia Geological Survey (County Report), 989 p.

U.S. Forest Service, 1973, Coal Analaysis Reports, Shavers Fork Area. U.S. Forest Service Open-File Report.

Table 1.--*Estimated original coal resources. In thousands of short tons, covered by less than 1,000 ft of overburden, as of December 31, 1980*

Formation	Coal bed	Original resources: Measured: In beds 14-28 in thick	In beds 28-42 in thick	In beds more than 42 in thick	Total	Indicated: In beds 14-28 in thick	In beds 28-42 in thick	In beds more than 42 in thick	Total	Inferred: In beds 14-28 in thick	In beds 28-42 in thick	In beds more than 42 in thick	Total	Total: In beds 14-28 in thick	In beds 28-42 in thick	In beds more than 42 in thick	Total
Kanawha	C-4	257			257	102			102					359			359
	C-2	644			644	654			654	19			19	1,317			1,317
	C-1	1,142	553		1,695	533	123		656					1,675	676		2,351
	C	1,670	1,498	56	3,224	1,570	64		1,634					3,240	1,562	56	4,858
New River	Hughes Ferry (?)	1.932	284		2,216	2,412	307		2,719	58			58	4,402	591		4,993
	Sewell B (?)	1,896	279		2,175	2,191	19		2,210	38			38	4,125	298		4,423
	Sewell A (?)	949	87		1,036	171			171					1,120	87		1,207
	Sewell (?)	2,925	3,387	1,382	7,694	10,837	3,124	389	14,350	770			770	14,532	6,511	1,771	22,814
	Little Raleigh (?)	248	66		314	78			78					326	66		392
	Fire Creek (?)	512			512	1,076			1,076	10			10	1,598			1,598
		12,175	6,154	1,438	19,767	19,624	3,637	389	23,650	895			895	32,694	9,791	1,827	44,312

Table 2.--*Chemical analyses of coal from the Cheat Mountain Roadless Area, W.Va.* [Results are in percent]

Sample[1]	Coal Bed	Ash Softening Temperature (F°)	Condition of Sample[2]	Proximate Analysis: Moisture	Volatile Matter	Fixed Carbon	Ash	Ultimate Analysis: Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	(Btu/lb)	Source [3]
SF-17-1	C-2	-	AR	2.0	24.7	60.5	12.8	4.7	74.7	1.2	5.7	0.9	13,100	U.S.F.S.
			MF	-	25.2	61.7	13.1	4.5	76.2	1.3	4.0	0.9	13,360	U.S.F.S.
			MAF	-	29.0	71.0	-	5.2	87.7	1.5	4.6	1.0	15,370	U.S.F.S.
SF-10-1	Sewell B (?)	2350	AR	3.8	27.2	57.3	11.7	4.7	72.2	1.0	6.9	3.5	12,920	U.S.F.S.
			MF	-	28.3	59.5	12.2	4.5	75.1	1.1	3.5	3.6	13,430	U.S.F.S.
			MAF	-	32.2	67.8	-	5.1	85.5	1.2	4.1	4.1	15,290	U.S.F.S.
SF-11-2	Sewell B (?)	2580	AR	2.4	27.3	59.2	11.1	4.8	75.3	1.1	5.7	2.0	13,290	U.S.F.S.
			MF	-	27.9	60.7	11.4	4.6	77.1	1.1	3.8	2.0	13,620	U.S.F.S.
			MAF	-	31.5	68.5	-	5.2	87.0	1.2	4.3	2.3	15,370	U.S.F.S.
SF-17-2	Sewell A (?)		AR	1.1	25.6	68.8	4.5	4.8	84.5	1.0	4.7	0.5	14,670	U.S.F.S.
			MF	-	25.8	69.7	4.5	4.7	85.4	1.0	3.9	0.5	14,830	U.S.F.S.
			MAF	-	27.1	72.9	-	4.9	89.4	1.1	4.1	0.5	15,530	U.S.F.S.
SF-10-2	Sewell(?)	2670	AR	1.6	29.7	64.3	4.4	5.1	82.2	1.2	6.0	1.1	14,480	U.S.F.S.
			MF	-	30.2	65.3	4.5	5.0	83.6	1.2	4.6	1.1	14,720	U.S.F.S.
			MAF	-	31.6	68.4	-	5.2	87.5	1.3	4.8	1.2	15,420	U.S.F.S.
SF-11-3	Sewell(?)	2060	AR	1.1	25.2	39.3	34.4	3.3	53.9	0.9	6.4	1.1	9,160	U.S.F.S.
			MF	-	25.5	39.7	34.8	3.2	54.5	0.9	5.5	1.1	9,260	U.S.F.S.
			MAF	-	39.1	60.9	-	4.9	83.6	1.4	8.4	1.7	14,190	U.S.F.S.
300	Sewell(?)	2417	AR	0.9	23.3	71.8	3.9	5.3	82.6	1.2	6.2	0.7	14,890	Reger, 1931
			AD	0.7	23.4	71.9	4.0	5.3	82.8	1.2	6.0	0.7	14,940	Reger, 1931
303	Sewell(?)	2459	AR	0.4	23.6	72.4	3.6	-	-	-	-	0.5	15,050	Reger, 1931
305	Sewell(?)	2635	AR	8.3	21.6	66.4	3.7	5.6	76.6	1.0	12.7	0.4	13,660	Reger, 1931
			AD	0.6	23.4	72.0	4.0	5.2	83.0	1.1	6.3	0.5	14,740	Reger, 1931
308	Sewell(?)	2750	AR	2.5	24.8	65.5	7.2	5.2	77.6	1.1	8.3	0.5	14,740	Reger, 1931
			AD	0.6	25.3	66.8	7.3	5.1	79.1	1.1	6.8	0.6	14,140	Reger, 1931
423	Sewell(?)	2860+	AR	0.7	22.6	67.1	9.7	5.1	77.2	1.3	6.2	0.7	13,960	Reger, 1931
			AD	0.3	22.9	67.1	9.7	5.1	77.7	1.3	5.6	0.7	14,040	Reger, 1931

COAL RESOURCE MAPS
By
Wayne R. Sigleo, Kenneth J. Englund, Peggy L. Foose, and Nancy K. Teaford

MINERAL RESOURCE POTENTIAL MAPS OF THE CHEAT MOUNTAIN ROADLESS AREA, RANDOLPH COUNTY, WEST VIRGINIA

By
Kenneth J. Englund, Wayne R. Sigleo, Peggy L. Foose, and Nancy K. Teaford, U.S. Geological Survey
and
Paul T. Behum and Richard W. Hammack, U.S. Bureau of Mines

1983

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