Base from U.S. Geological Survey
1:125,000, 1971

Scale 1:250,000

CONTOUR INTERVAL 200 FEET

TRANSVERSE MERCATOR PROJECTION

Map of Pennsylvania showing area mapped

INTRODUCTION

This map was prepared to show areas where environmental effects of coal mining may pose problems of significance to regional planning. Such effects include surface subsidence and dewatering of aquifers above or adjacent to underground mines, earth disturbance resulting from surface (strip) mining, and discharge of mineralized water from mine workings. The map also affords a very general overview of the remaining coal resource of the area.

PREPARATION OF THE MAP

Data used in preparing the map are tabulated from individual maps at the same scale of each of the 13 principal coal beds of the region (Sholes and Skema, 1974). These maps treat separately the Upper Mercer, Brookville, Clarion, Lower Kittanning, Middle Kittanning, Upper Kittanning, Lower Freeport, Upper Freeport, Pittsburgh, Redstone, Sewickley, Waynesburg, and Washington coal beds. The map for each coal bed shows: (1) areas mined, largely by underground methods, but including some areas mined at the surface; (2) areas underlain by measured or indicated coal resources more than 28 inches (.6 m) thick; (3) areas underlain by measured or indicated coal resources less than 28 inches (.6 m) thick; (4) areas underlain by inferred coal resources; and (5) areas where the coal bed has been eroded away.

Measured, indicated, and inferred coal resources are conventional terms that are defined as follows (Averitt, 1975, p. 26-27):

Measured coal resources are those for which the quality and tonnage are computed within a margin of error of less than 20 percent from sample analyses and measurements that are closely spaced and geologically well known.

Indicated coal resources are those for which the quality and tonnage have been computed partly from sample analyses and measurements and partly from reasonable geologic projections.

Inferred coal resources are those for which estimates and size are based on geologic evidence and projection.

The summary map was prepared by combining data from the 13 coal-bed maps in the following order, with minimum adjustment or alteration. Areas shown as mined on all the maps were combined and plotted; then areas with remaining measured and indicated coal resources thicker than 28 inches (.6 m) that did not coincide with mined areas were combined and plotted. Areas with measured and indicated coal resources less than 28 inches (.6 m) thick, and areas in which coal is inferred were then combined into a single category. These beds were plotted where they did not coincide with the first two combinations. The remaining area shown on the map is not underlain by any of the 13 principal coal beds.

If the information of the 13 maps were considered in the opposite order, with emphasis on inferred coal resources, a map showing target areas for regional coal exploration would result.

COAL-BED DISTRIBUTION

Most of southwestern Pennsylvania is underlain by more than 5 of the 13 principal coal beds. Adjacent to areas where all the coal beds have been removed by erosion, fewer than 5 beds commonly are present, most notably near the northern edge of the map. In contrast, almost all of Greene and Washington Counties and large parts of Allegheny, Fayette, and Westmoreland Counties are probably underlain by 9 or more of the coal beds; most of Greene County and half of Washington County probably are underlain by all 13 principal coal beds.

The 13 principal coal beds are distributed irregularly in the geologic column (fig. 1), interlayered with sedimentary rocks, largely shale, sandstone, siltstone, and limestone. For example, the lower 8 coal beds are separated stratigraphically from each other by thicknesses of rock ranging from about 30 to 100 feet (9-30 m); the thickness of rock separating the upper 5 coal beds ranges from about 50 to more than 200 feet (15-61 m). In contrast, more than 600 feet (182 m) of rock containing no important coal beds separate the Upper Freeport and Pittsburgh coal beds. The total thickness of rock between the Upper Mercer and Washington coal beds averages more than 1,500 feet (450 m). In central Greene County, where the Washington coal bed locally is overlain by as much as 500 feet (152 m) of rock, the depth from ground surface to the Upper Mercer coal bed is about 2,000 feet (600 m).

LIMITATIONS OF THE MAP

Although some of the basic data used directly or indirectly in compiling the maps of the 13 coal beds were published almost 50 years ago, the areas shown as mined on the summary map can be considered as reasonable approximations of conditions as they existed in 1970. In addition, the scale of the map limits the precision with which boundaries are plotted. It should be understood that the map is a guide to expectable conditions as related to mining. The map is not intended to substitute for detailed studies of specific sites to determine whether the expectable conditions exist, and, if they do exist, to what degree they may affect human activities.

ADDITIONAL INFORMATION

The sources of data used by Sholes and Skema (1974) in preparing the maps of the 13 principal coal beds constitute the list of source references.

Information on the extent of recent and active underground mining is available from:

Division of Mine Subsidence Regulation
Pennsylvania Department of Environmental Resources
Donaldsons Crossroads
203 South Washington Road
McMurray, Pennsylvania 15317

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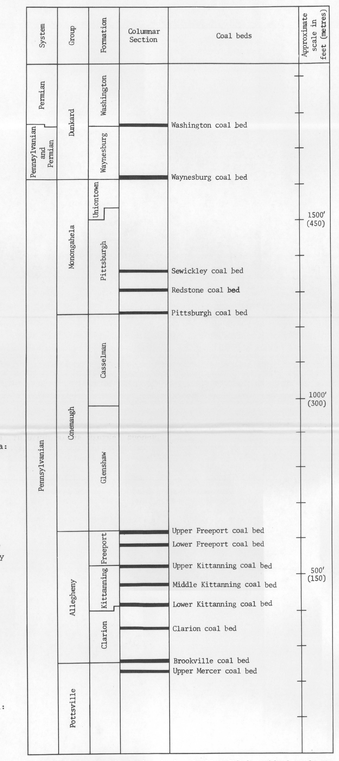

Figure 1. Stratigraphic section showing the 13 coal beds combined on the map (simplified from Edmunds, 1974, p. 545, fig. 4).

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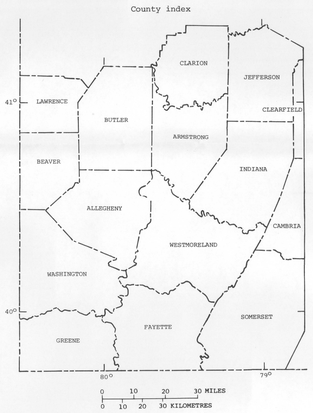

EXPLANATION

Boundaries are approximately located

Coal-mining status or potential	Significance to regional planning
Areas in which at least one coal bed has been mined Mining largely underground, but includes some surface mine areas. Locally two coal beds have been mined as in part of eastern Allegheny County. Some mined areas are underlain by one or more unmined measured or indicated coal beds thicker than 28 inches (.6 m) and thus potentially are subject to additional mining	Areas where mining-related environmental problems may be of current concern
Areas probably underlain by one or more mineable coal beds Measured or indicated coal more than 28 inches (.6 m) thick. Overlap of two mineable coal beds is fairly common; more than two, relatively rare	Areas in which mining is probable in the foreseeable future and where potential effects of mining should be taken into account in planning. Included are some areas where mining is an active process; in other areas mining, though predictable, may be years, perhaps decades, in the future
Areas known to be underlain by coal less than 28 inches thick Underlain by one or more measured or indicated coal bed(s) less than 28 inches (.6 m) thick or by inferred coal bed(s)	Areas where extensive mining is unlikely in the foreseeable future and where, for most short-term planning purposes, the effects of mining can be ignored, except for translatable effects such as drainage from adjacent mining areas
Areas in which principal coal beds have been removed by erosion	Areas in which the possibility of extensive coal mining at any time is so remote that it can be ignored, except for translatable effects

SUMMARY MAP OF MINED AREAS AND AREAS OF POTENTIAL COAL MINING, SOUTHWESTERN PENNSYLVANIA

By
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1976

Interior—Geological Survey, Reston, Virginia—1976

For sale by U.S. Geological Survey