

Remaining Resources of the Herrin Coal

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Introduction

The Herrin coal bed (W. Ky. No. 11) is one of the most important coal resources in the Illinois Basin. In 2009, the Herrin coal had an estimated 10 million tons of production in Kentucky, and remained the second largest producer in the Western Kentucky Coal Field. The Herrin is known for its regionally extensive "blue band" rock parting, and, in Kentucky, its close association with the overlying Providence Limestone Member and Paradise coal (W. Ky. No. 11) (see, for example, Greb and others, 1992). In fact, the Herrin and Paradise coal beds were so closely spaced in some areas along the southern margin of the basin that they were mined together. Like most coals in western Kentucky, the Herrin is a medium-sulfur product. Because of relatively lower mining costs compared to Appalachian coals, the Herrin coal is increasingly in demand for electric power plants with sulfur-reduction capability. Scrubbed power plants can use higher-sulfur coals for fuel because the scrubbers remove almost all of the sulfur dioxide produced by combustion of sulfur compounds in the coal from the emission stream. This recent demand has resulted in a significant increase in western Kentucky coal production since 2003, all of which is supplied by mining of the Herrin and Springfield coal beds.

Map Compilation

The outcrop area of the Herrin coal bed was digitized from 1:125,000-scale Mylar compilations that were generalized from U.S. Geological Survey 1:24,000-scale geologic quadrangle maps. Data for coal-thickness contours were compiled from the coal borehole database at the Kentucky Geological Survey (kgs.uky.edu/kgsweb/DataSearching/coalsearch.asp). Some of the boreholes were drilled during KGS projects, but most data were submitted to KGS by coal companies and other government agencies. The data were entered into the database, and coal beds were manually correlated and tagged. Seam height, parting thickness, and elevation from 2,707 boreholes were extracted from the database for manual contouring. Mine outlines were derived from multiple sources. The first source is digitized polygons compiled by the Kentucky Revenue Cabinet from mine maps submitted to the Office of Mine Safety and Licensing (minemaps.ky.gov). Some older mine information, especially for surface mines, came from assessments of coal availability conducted in the late 1990's (Weisenfluh and others, 2001).

Coal Thickness

Unlike the Springfield coal (see, for example, Weisenfluh, 2010), the Herrin coal does not extend throughout the Kentucky portion of the Illinois Basin. Two distinct areas of mineable coal occur—one along the southern margin of the field, and a second on the western side of the field (Union and western Henderson Counties). The Herrin coal is between 42 and 84 in. throughout the majority of the mineable area, although it ranges from 0 to 132 in. thick regionally. The extensive area of thin coal in the central and northeastern part of the coal field contains small islands of thicker coal, but none apparently extensive enough to support underground mining. Thickness reduction along the margins of the known coal bodies is typically abrupt and associated in places with a brecciated and oxidized coal and interbedded limestone sequence (Hower and others, 1987).

Mining

Most of the historical Herrin mining in Kentucky occurred in extensive area-surface and underground-drift mines along the southern limit of the coal field. Fewer mines have been developed in the western coal body because the coal is somewhat thinner and lacks outcrop access, which would require slope and shaft development. Coal north of the east-west-trending Rough Creek Fault System occurs at shallower depths compared to the remaining coal south of the faults. Unlike with the Springfield coal, however, all of the remaining Herrin resources are shallower than 1,000 ft, and therefore theoretically accessible to underground mining with current technology. Very little remaining coal is accessible to surface-mine methods. Currently only seven mines are active in the Herrin coal in Kentucky (Table 1). These produce roughly 10 million tons of coal annually. The new River View Mine in Union County was in limited production in 2009, and will soon contribute to a significant increase in annual Herrin production. Several of the mines are cut by faults that bring the Herrin in proximity to the Springfield coal. Some underground mines alternatively produce from one or the other bed as they cross fault blocks. Therefore, coal production from each bed is not consistent from year to year.

Coal Resources

Original and remaining resources by thickness category are shown in Table 2. Of the original 5.2 billion short tons of Herrin coal resources, nearly 73 percent remains (3.8 billion short tons). Of the remaining coal, however, only 56 percent is greater than 42 in. thick. A large percentage of the remaining coal lies in the western coal body north of the Rough Creek faults and would only be accessible by underground shaft mines.



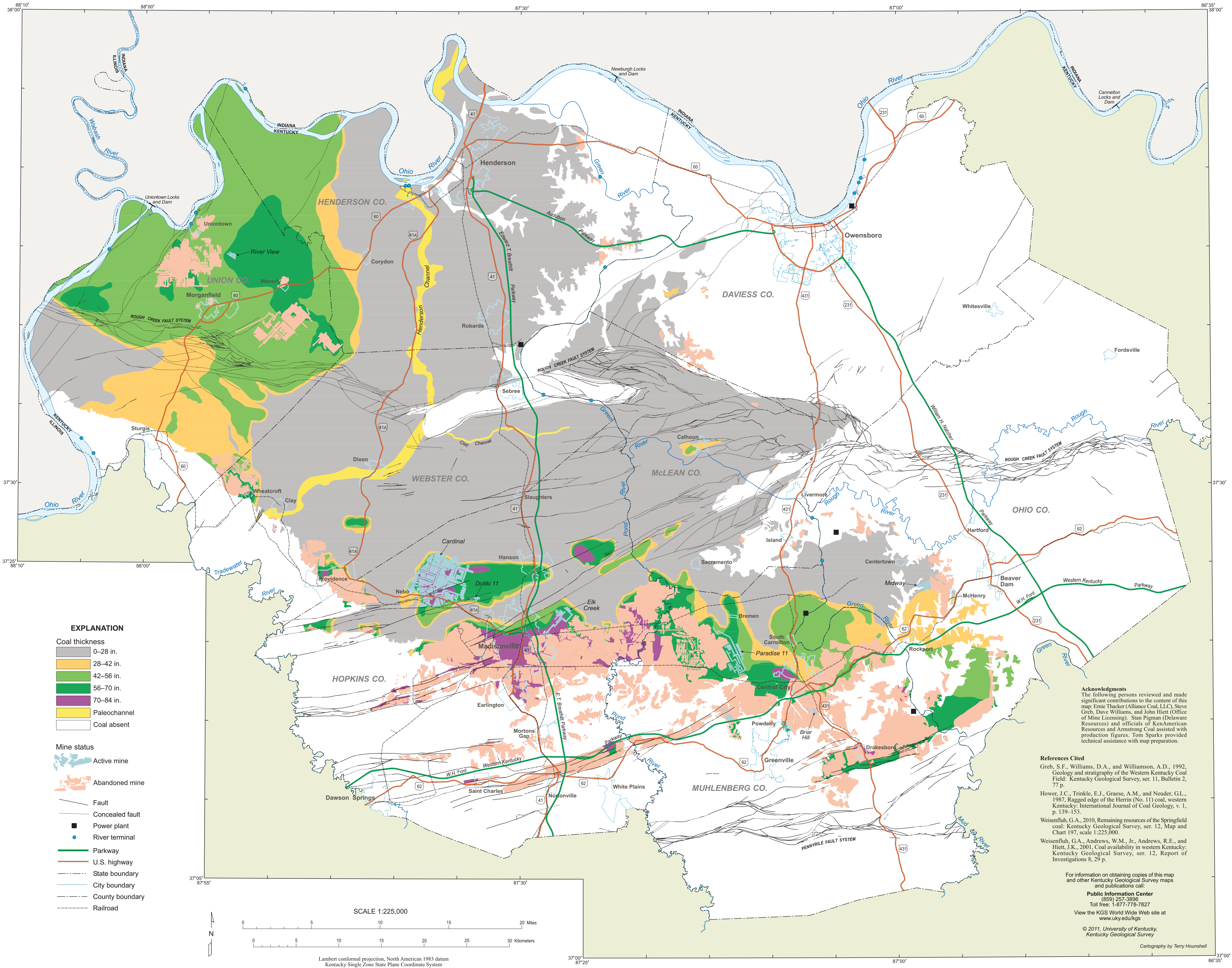
Table 1. Active mines within the Herrin coal in western Kentucky. SFN is the State identifier for the mine permit. Source: Office of Mine Licensing Annual Report Data, 2009 (minemaps.ky.gov).

County	Mine	SFN	Type	Operator	2009 Production (short tons)
Union	River View	18812	Underground	River View Coal	247,914 ¹
Hopkins	Cardinal	18144	Underground	Warrior Coal	6,124,206 ²
Hopkins	Elk Creek	18651	Underground	Hopkins County Coal	1,989,304 ³
Hopkins	Dotki 11	18987	Underground	Webster County Coal	NA ⁴
Muhlenberg	Paradise 9	18247-1	Underground	Kenamerian Resources	250,000 ⁵
Muhlenberg	Briar Hill	18367-1	Surface	Oxford Mining	955,062
Ohio	Midway	18748	Surface	Armstrong Coal	678,175 ⁶
TOTAL					10,244,663

¹ This is a new mine and not yet in full production.
² This mine also produces from the No. 9 coal. All of the 2009 production was No. 11 coal.
³ Total mine production is 3,987,607, 50 percent of which is No. 9 coal.
⁴ This mine is connected to the larger Dotki No. 9 Mine. Individual production data were not available.
⁵ Associated with Paradise 9 Mine, which produced 1.3 million tons in 2009.
⁶ Mined with the No. 13 and No. 13A coals.

Table 2. Original and remaining resources of the Herrin coal in western Kentucky. Data are in million short tons.

Thickness	Original	Mined-Out	Remaining (2009)
0-28 in.	1,292	24	1,268
28-42 in.	390	21	368
42-56 in.	1,456	158	1,298
56-70 in.	1,246	585	661
70-84 in.	800	633	167
Total Resource	5,184	1,421	3,762
Total < 42 in.	3,502	1,376	2,126

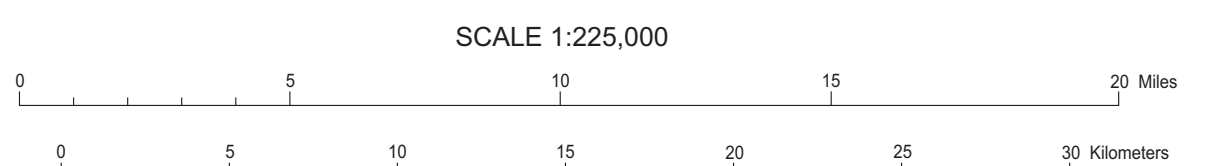


EXPLANATION

- Coal thickness**
- 0-28 in.
 - 28-42 in.
 - 42-56 in.
 - 56-70 in.
 - 70-84 in.
 - Paleochannel
 - Coal absent

Mine status

- Active mine
- Abandoned mine
- Fault
- Concealed fault
- Power plant
- River terminal
- Parkway
- U.S. highway
- State boundary
- City boundary
- County boundary
- Railroad



Lambert conformal projection, North American 1983 datum
Kentucky Single Zone State Plane Coordinate System

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