

Lidar data used to generate the percent-slope base map are from Bureau of Topographic and Geologic Survey, 2006. Other base-map features are from Pennsylvania Department of Transportation, variously dated. Albers Equal-Area Conic projection. North American Datum of 1983.

Mapped by Walsh and Walsh in March 2010 and April 2011. Edited by Zachary P. Younger. Cartography by D. Paul Mathieux.

### EXPLANATION OF MAP SYMBOLS

#### ABANDONED RAILROADS AND RELATED FEATURES

[Not all narrow-gauge rail lines were mapped; only the main lines associated with the coal industry are shown]

##### Rail trails (formerly major railroads)

- O&W Rail-Trail (Ohio and Western railroad)
- D&H Rail-Trail (Delaware and Hudson railroad)

##### Approximately located rail or tram lines

- Abandoned railroad or tram
- Carbondale Traction Company broad-gauge trolley line
- A.J. Hoole narrow-gauge line
- Hillside Coal & Iron Company narrow-gauge lines

##### Railroad turntable

##### Breakers and related features

- Location determined using a Global Positioning System (GPS) and verified in the field
- Approximate location inferred from historical documents (Walsh, 2015) and not verified in the field

##### OTHER FEATURES

- Active stone quarry—Not related to coal industry
- Site of photograph (fig. 3)—Tip of arrow at point of observation; arrow shows direction of view

##### BASE-MAP FEATURES

- Percent slope—Steeper slopes are darker
- Lackawanna River
- Stream
- State road
- Local road
- Township boundary

### INTRODUCTION

Abandoned railroads and infrastructure from the anthracite coal-mining industry are significant features in abandoned mine lands and are an important part of history; however, these features are often lost and masked by the passage of time and the regrowth of forests. The application of modern light detection and ranging (lidar) topographic analysis, combined with field verification, enabled the mapping of these historical features. Waste rock piles and abandoned mine lands from historical mining locally appear as distinct features on the landscape depicted on the percent-slope base map. Abandoned, and in many places demolished, infrastructure such as breakers, turntables, rail beds, water tanks, tram piers, and bridge abutments, for example, were identified in the field and located with a Global Positioning System (GPS) receiver. This percent-slope map shows the locations of many of the abandoned features from the coal-mining industry near Forest City, Pennsylvania, and preserves a time that was an important part of the industrial revolution and a way of life that has been quiet for over half a century.

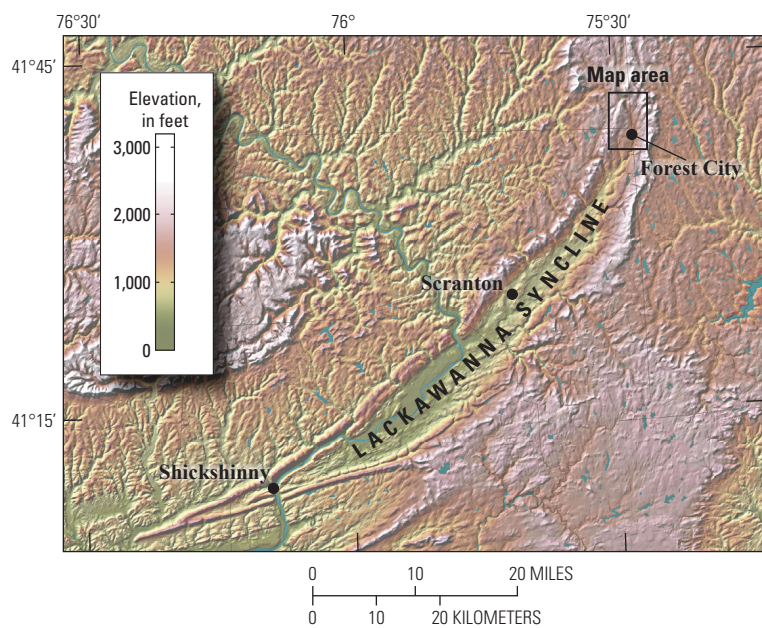
### DISCUSSION

The location of abandoned anthracite coal-mining infrastructure near Forest City, Pennsylvania, has, in many places, been lost to view by the demolition and removal of structures, the passage of time, and the regrowth of forest. The map area is located at the northern end of the canoe-shaped Lackawanna syncline (fig. 1) in the Valley and Ridge province of the Appalachian Mountains. This area encompasses part of a coal field called the Northern Anthracite field in Pennsylvania (fig. 2), which is the northeasternmost exposure of the largest anthracite deposit in the United States (Levine and Eggleston, 1992).

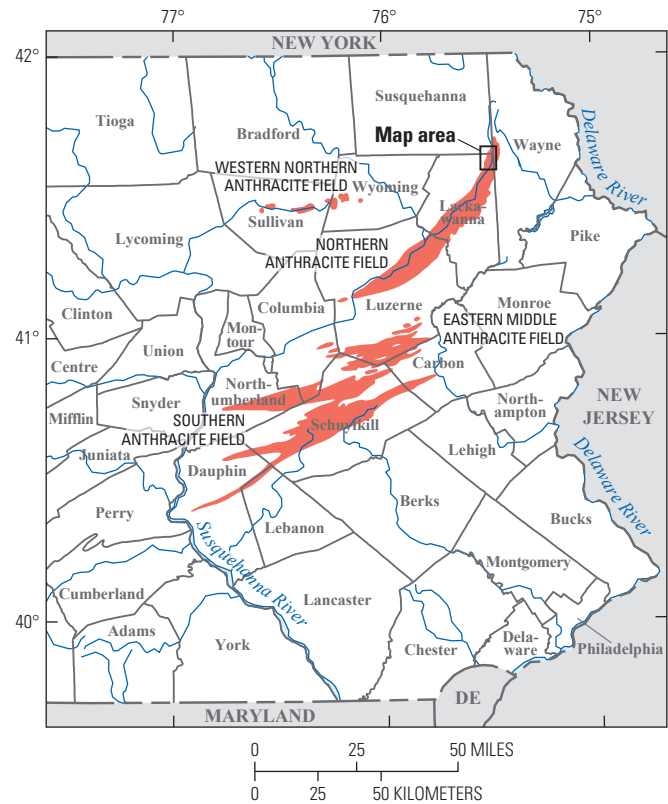
The Bureau of Abandoned Mine Reclamation of the Pennsylvania Department of Environmental Protection maintains a database of abandoned mine lands and that information is not updated nor repeated here on this map. Instead, this map shows the features identified during

field investigations that were conducted as part of historical research about the mining in the Forest City region (Walsh, 2015). Most mapped point locations show places where evidence remains of the past infrastructure related to the collieries. Additional information on each location can be found in appendix C of Walsh (2015). The locations of features that could not be verified during field work are indicated by open circles. Linear traces of most abandoned railroads and tramways are visible, to an extent, on the map; however, in some places the locations are inferred where subsequent surface mining removed these former transportation corridors. Historical mine sheets (Lesley and others, 1888) were an important source for names and locations of infrastructure. Historical black and white aerial photographs from 1939 and 1969 (Penn State University, 2008) were used to visibly check locations. Google Earth was also used for modern aerial imagery, but most features were not visible. Digital files for the mapped features are available from Walsh (2023).

The mapped features are compiled on this modern, lidar-derived base map that depicts steepness of slopes as percentages. This percent-slope map shows slope in a gradational scale from dark brown to white. The steeper slopes appear as shades of brown, with the darkest shades representing the steepest slopes (for example, steep cliffs or quarry walls).



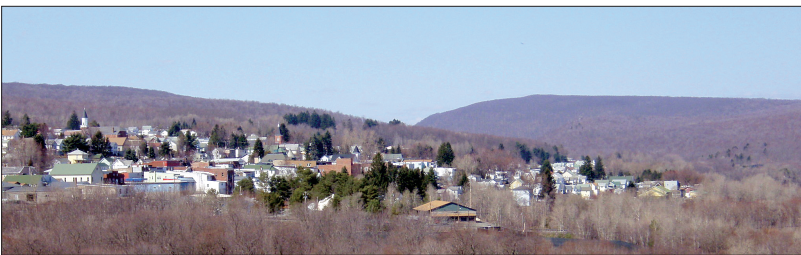
**Figure 1.** Shaded-relief map showing the map area within the Lackawanna syncline, a large, canoe-shaped fold. Figure modified from U.S. Geological Survey (1999).



**Figure 2.** Map of eastern Pennsylvania showing the map area, counties, and anthracite fields (shaded in red). Figure modified from Levine and Eggleston (1992, p. 3, fig. 2).

Conversely, the gentler slopes appear as shades of lighter brown, with white areas representing flat areas with zero percent slope (for example, ponds or level roads). The percent-slope base map was generated from a digital elevation model with 3.2-foot horizontal resolution (Bureau of Topographic and Geologic Survey, 2006), which was created from 2006–2008 lidar data.

A detailed history of coal mining in the area is described in Walsh (2015) and is briefly summarized here. In the Forest City area (fig. 3), underground mining took place from 1874 to 1945. During this time, coal companies and railroads were the largest employers in the region. Approximately 45 million net tons of anthracite were extracted during this period. The difficult and dangerous work of mining cost the lives of 282 men and boys; the names and ages of the casualties are documented in appendix A of Walsh (2015).



**Figure 3.** Photograph of Forest City looking north. The Lackawanna River enters the Lackawanna syncline through Stillwater Gap (center of the photograph) in the Moosic Mountains. Photograph by G.J. Walsh, U.S. Geological Survey.

### ACKNOWLEDGMENTS

We thank the members of the Rail-Trail Council of Northeastern Pennsylvania, the Forest City News, and the Forest City Area Historical Society. Local residents Tom Nogrask and David Racht assisted with the field identification of mapped features. Clifford Dodge and Gale Blackmer of the Pennsylvania Geological Survey and Jeffrey Mauk and Mary DiGiacomo-Cohen of the U.S. Geological Survey provided helpful reviews.

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Suggested citation: Walsh, G.J., and Walsh, M.C., 2023, Percent-slope map showing historical anthracite coal-mining infrastructure at the northern end of the Lackawanna syncline, Wayne, Susquehanna, and Lackawanna Counties, Pennsylvania: U.S. Geological Survey Scientific Investigations Map 3507, 1 sheet, scale 1:40,000, <https://doi.org/10.3133/sim3507>.

Associated data for this publication: Walsh, G.J., 2023, Database of historical anthracite coal-mining infrastructure at the northern end of the Lackawanna syncline, Wayne, Susquehanna, and Lackawanna counties, Pennsylvania: U.S. Geological Survey data release, <https://doi.org/10.5066/P992K6GB>.