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)
  - D&H Rail-Trail (Olean and Hudson railroads)
  - Lackawanna River
  - Icebreakers and tram or train lines
- Abandoned railroad or tram lines
- Railroad tunnel
- Breakers and related features
  - Location determined using a Global Positioning System (GPS) and verified in the field
- Approximate location inferred from historical documents
- Active stone quarry
- Site of photograph (fig. 3)—Tip of arrow at point of observation marks curved direction of view

BASE-MAP FEATURES
- Percent slope—Steeper slopes are darker
- Lackawanna River
- Stream
- Street
- 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 growth of forests. The application of modern light detection and ranging (lidar) topographic analysis, combined with field verification, enabled the mapping of these historical features. Walker took photos and abandoned mine lands from historical mining locally appear as distinct features on the landscape dependent on the presence of clearcut land cover. Abandoned, and in many places denuded, infrastructure such as breakers, tunnels, rail beds, water tanks, iron pipes, 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 provides a frame 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 project area is located at the northern end of the canoed-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 (Levy and Eggertson, 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 reported 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, 2013). Most mapped point locations show places where evidence remains of the past infrastructure related to the coalfields. 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 those former transportation corridors.

Historical mine sheets (Leaky and others, 1904) were an important source for names and locations of infrastructure. Historical maps and aerial photographs from 1939 and 1949 (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 (2013).

The mapped features are overlaid on the 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). Conversely, the gentler slopes appear as shades of lighter brown with white areas representing flat areas with zero percent slope (for example, peaks 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 Geographic 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 tons of anthracite were extracted during this period. The difficult and dangerous work of mining coal led to the loss of 282 men and boys; the names and ages of the casualties are documented in appendix A of Walsh (2015).

REFERENCES CITED

Scientific Investigations Map 3597

Percent-Slope Map Showing Historical Anthracite Coal-Mining Infrastructure at the Northern End of the Lackawanna Syncline, Wayne, Susquehanna, and Lackawanna Counties, Pennsylvania

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