West Virginia

Geological Survey

West Virginia Mine Pool Atlas

West Virginia

WEST VIRGINIA

West Virginia Mine Pool Atlas

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ABSTRACT

The West Virginia Mine Pool Atlas project was a two-year study by the West Virginia Geological and Economic Survey (WVGES) to evaluate abandoned coal mines as potential groundwater sources. This study was funded by the West Virginia Department of Environmental Protection (WVDEP). Although West Virginia receives an average of 44.31 inches of precipitation per year (SERCC, 2011) and is considered to have an abundant supply of water, much of West Virginia's precipitation runs off and leaves the state by way of its many streams. The remainder infiltrates the ground surface, but only a small fraction of this water recharges groundwater aquifers. One currently underutilized and frequently overlooked source of stored groundwater is abandoned coal mines. Recently, in the search for large water supplies to facilitate various processes, such as aquaculture, public supply, coal-to-liquid hydrocarbons, hydraulic fracturing water for gas wells, and power plant cooling, a realization has developed that these underground mine pools may be more of an asset than previously assumed.

This study, which addressed the potential for large volumes of groundwater storage based on mine void volume, was designed to facilitate prospecting for large volumes of water by identifying underground coal mines that have the potential to store large quantities of groundwater, especially those mines that are located below or near drainage. This study provides an initial attempt to locate all of the large mine pools in West Virginia stratigraphically and geographically and to estimate their potential volumes based on WVGES Coal Bed Mapping Program (CBMP) GIS data currently being developed to provide a modern, up-to-date picture of the State's coal resource base for various uses. These data include many mine maps that have been collected by the CBMP for many years.

Significant underground mining has taken place in 69 of 73 of West Virginia's mineable coal beds. Various information for the 69 coal beds, including mine polygons, coal cropline, structure contour of the elevation, and scanned mine maps, were visually examined to establish which areas had adequate data to determine the position of each mine relative to major drainage and to develop a tool to predict which mines could be partially or totally filled with groundwater.

Coal beds containing underground mines that were 500 acres or larger in area and located near or below drainage were considered major seams in this study, and 19 such seams were identified. Coal and mining information from the CBMP were used to generate maps and statistics about potential mine pools in these seams for the Mine Pool Atlas. As the individual CBMP data layers are dynamic rather than static, all results presented in this report are preliminary and are undergoing constant updating.

EXECUTIVE SUMMARY

The Mine Pool Atlas project was a two-year study funded by the West Virginia Department of Environmental Protection (WVDEP) to evaluate abandoned coal mines as potential groundwater sources. Although West Virginia receives an average of 44.31 inches of precipitation per year (SERCC, 2011) and is considered to have an abundant supply of water, much of West Virginia's precipitation runs off and leaves the state by way of its many streams. The remainder infiltrates the ground surface, but only a small fraction of this water recharges groundwater aquifers. One currently underutilized and frequently overlooked source of stored groundwater is abandoned coal mines. Recently, in the search for large water supplies to facilitate various processes, such as aquaculture, public supply, coal-to-liquid hydrocarbons, hydraulic fracturing for gas wells, and power plant cooling, a realization has developed that these underground mine pools may be more of an asset than previously assumed.

This study, which addressed the potential for large volumes of groundwater storage based on mine void volume, was designed to facilitate prospecting for large volumes of water by using available Coal Bed Mapping Program (CBMP) products to identify underground coal mines that have the potential to store large quantities of groundwater, especially those mines that are located below or near drainage. This study provides an initial effort to locate all of the large mine pools in West Virginia stratigraphically and geographically and to estimate their potential volumes based on the WVGES Coal Bed Mapping Program (CBMP) GIS data currently being developed to provide a modern, up-to-date picture of the State's coal resource base for various uses. These data include many mine maps that have been collected by the CBMP for many years.

Significant underground mining has taken place in 69 of 73 of West Virginia's mineable coal beds. Various information for these 69 coal beds, including mine polygons, coal cropline, structure contour of the elevation, and scanned mine maps, were visually examined to establish which areas had adequate data to determine the position of each mine relative to major drainage and to develop a tool to predict which mines could be partially or totally filled with groundwater

Coal beds containing underground mines located near or below drainage that were 500 acres or larger in area and located near or below drainage were considered major coal beds in this study, and 19 such coal beds were identified. CBMP coal and mining information were used to generate maps and statistics about potential mine pools in these coals for the Mine Pool Atlas.

The results of this investigation are summarized in this report; and maps and statistics potential mine pools of major coal beds reflect the status of CBMP work during the study. As the individual CBMP data layers are dynamic rather than static, all results presented in this report are preliminary and are undergoing constant updating.

The Mine Pool Atlas contains:

- General descriptions of major coal beds within each formation.
- Stratigraphic columns showing the position of all coal beds within each formation
- Tables showing the distribution of potential totally and partially flooded mines in each seam by mine footprint area and position with respect to drainage
- Tables showing the distribution of potential partially flooded areas of above and near drainage underground mines by coal bed
- Maps of coal beds in which potential partial and/or total flooding was present in mines that had areas of 500 acres or greater
    - Structure contour of elevation
    - Isopach (total bed thickness)
    - Seam overview
    - Extent of potential total flooding
    - Extent of potential partial flooding
- Overview tables for seams in which potential partial and/or total flooding were present in mines less than 500 acres in area

Much of the underground mining in the West Virginia has occurred above drainage. Examination of 9,539 mine polygons in 69 coal beds determined that 8,907 mines are above drainage; 325 near drainage, 178 are below drainage, and 129 are currently undetermined.

Study results showed that 99 mines, which exceed 500 acres in area, are generally located below drainage and are potentially totally flooded. These mines are located in 14 major coal beds:

- Pittsburgh coal in Ohio, Marshall, Monongalia, Marion, and Harrison counties
- Upper Freeport coal in Preston County
- Middle Kittanning coal in Preston and Barbour counties
- Coalburg coal in Wayne and Lincoln counties
- Peerless coal in Kanawha, Nicholas, and Mingo counties
- Number 2 Gas coal in Logan, Mingo, Boone, and Kanawha counties
- Powellton coal in Boone, Logan, and Mingo counties
- Lower Powellton coal in Mingo County
- Eagle coal in Nicholas, Fayette, Kanawha, Boone, Logan, and Mingo counties
- Sewell coal in Nicholas, Fayette, Raleigh, and Wyoming counties
- Beckley coal in Fayette, Raleigh, and Wyoming counties
- Pocahontas No. 6 coal in Raleigh County
- Pocahontas No. 4 coal in McDowell County
- Pocahontas No. 3 coal in Wyoming, McDowell, and Raleigh counties

Five hundred thirty-two mines exceeding 500 acres in area are potentially partially flooded; and 147 of these mines are located near drainage and 385 mines are above drainage. These mines are in 19 major coals. Fourteen of these coals also have mines that are potentially totally flooded and have been described above. These five coal beds have potentially partially flooded mines:

- Sewickley coal in Monongalia and Marion counties
- Bakerstown coal in Preston, Grant, and Tucker counties
- Number 5 Block coal in Braxton, Nicholas, Clay, Kanawha, Boone, Lincoln, Mingo, and Wayne counties
- Stockton coal in Braxton, Nicholas, Kanawha, Boone, Logan, Lincoln, and Mingo counties.
- Pocahontas No. 2 coal in Raleigh County.

Although efforts are made to use the best available data and locate mines as accurately as possible, mine locations should be considered approximate. The actual extent of mining may be unknown because final mine maps at the time of mine closure are not always available and not all underground mining has been documented by mine maps. The quality of mine maps is highly variable in the amount of detail and information presented. Some of the newer mine maps are available in digital form; however, many older mine maps have been photographically reduced from dimensionally unstable paper copies. Photographic reduction also introduced distortion due to lens geometry. Also, coal correlations may change with additional information. Active mines are not differentiated from recently closed mines in the CBMP database.

The extent of potential mine flooding is dependent on several factors, including mine orientation, mine entry location, proximity to other underground mines, and direction of groundwater flow. Groundwater pumping to enable underground mining can affect water levels in adjacent underground mines. The groundwater flooding potential for underground mines in one coal bed also may be affected by underground mining in stratigraphically lower coals. In general, once pumping ceases, the mines begin to flood.

The results of this study should be considered a "snapshot" rather than a finished product. New mines continually open in West Virginia and in adjoining states near the State's borders. In addition, newly obtained mining coverages are being constantly updated in the CBMP GIS as new information becomes available. All of these factors reinforce the need for detailed site-specific studies to determine the presence of adequate water resources.

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INTRODUCTION

Purpose

The Mine Pool Atlas project was a two-year study funded by the West Virginia Department of Environmental Protection (WVDEP) to evaluate the potential of abandoned underground coal mines to serve as a source of large volumes of groundwater. Although West Virginia receives an average of 44.31 inches of precipitation per year (SERCC, 2011) and is considered to have an abundant supply of water, much of West Virginia's precipitation runs off and leaves the state by way of its many streams. The remainder infiltrates the ground surface, but only a fraction of this water recharges to groundwater aquifers. One currently underutilized and frequently overlooked source of stored groundwater is abandoned coal mines. This study, which addressed the potential for large volumes of groundwater storage based on mine void volume, is designed to facilitate prospecting for large amounts of water by identifying underground coal mines that have the potential to store large quantities of groundwater, especially those mines that are located below or near drainage. Recently, in the search for large water supplies to facilitate various processes, such as aquaculture, public supply, coal-to-liquid hydrocarbons, hydraulic fracturing water for gas wells, and power plant cooling, a realization has developed that these underground mine pools may be more of an asset than previously assumed.

This study, which addressed the potential for large volumes of groundwater storage based on mine void volume, was designed to facilitate prospecting for large volumes of water by identifying underground coal mines that have the potential to store large quantities of groundwater, especially those mines that are located below or near drainage. This study provides an initial attempt to locate all of the large mine pools in West Virginia stratigraphically and geographically and to estimate their potential volumes based on the West Virginia Geological and Economic Survey (WVGES) Coal Bed Mapping Program (CBMP) GIS data currently being developed to provide a modern, up-to-date picture of the State's coal resource base for various uses. These data include many mine maps that have been collected by the CBMP for many years.

Previous Work

The initial concept for this project was developed from a map showing estimated mine pool data for the Pocahontas No. 3 and Pocahontas No. 4 seams in southern West Virginia prepared by West Virginia Department of Environmental Protection (WVDEP, 2008). Several recent reports (Ziemkiewicz and Vandivort, 2004, Ziemkiewicz et al., 2004, and Donovan, 2004a, 2004b) have studied the extent of Monongahela Basin mine pool flooding based on water-level measurements within specific mines of the Pittsburgh coal in northern West Virginia and south western Pennsylvania. The hydrogeology of flooded and unflooded underground coal mines in the Upper Freeport seam in northern West Virginia and western Maryland has been reported in a reconnaissance mapping study by Morris et al. (2008).

METHODOLOGY

Underground mining has occurred in 69 of 73 of West Virginia's mineable coals. Coal bed and mining information for these beds including mine polygons, coal cropline, structure contour of the elevation, and scanned images of mine maps (WVGES, 2011) were examined to establish where adequate data existed to determine the position of each mine relative to major drainage where the potential for each mine to be partially or totally filled with groundwater to be determined.

To aid in understanding the potential of this water source for development, available WVGES CBMP data and models were used to determine which seams have mine voids capable of storing large quantities of groundwater. A dynamic, interactive Geographic Information System (GIS) was created to portray the location of mine pools that might provide large volumes of water for various private, public, and industrial uses. This GIS provided tools to estimate mine pool volumes. Figure 1 shows the status of work being conducted by CBMP (B.M. Blake, unpub. data, 2011).

Scope

The scope of the project was limited to the following tasks:

- Evaluation of each coal seam by region to determine which parts of the seam are above, near, and below major drainage.
- Estimate maximum mine pool volume of each seam assuming an average thickness based on WVGES CBMP GIS data and a 50 percent extraction rate—collapsed and uncollapsed mines would have essentially the same volume because additional voids are created in the crushed pillars and fractured overburden of collapsed mines.
- Develop map templates for use in the PDF atlas.
- Prepare maps of each major mine pool for PDF report.

The original scope included collection and evaluation of available water quality data. Unfortunately, much of the available water quality data were from treated mine water, and these analyses were not useful in determining in-situ water quality.

Mining Data

Data available from the ongoing CBMP used in this study include: mine polygons of approximately 9,500 underground mines; coal bed croplines; structure contours of the base of each coal bed; coal bed elevation raster data; and coal isopachs. As the individual data layers are dynamic rather than static and are subject to intermittent updating as new data warrant, all results presented in this report are preliminary and subject to change.

CBMP has digitized footprints of mine maps, and these mine polygons have been compiled to document the extent of underground mine works (Figure 2). Although efforts are made to use the best available data and locate mines as accurately as possible, mine locations should be considered approximate. The actual extent of mining may be unknown because final mine maps at the time of mine closure are not always available and not all underground mining has been documented by mine maps. The quality of mine maps is highly variable in the amount of detail and information presented. Some of the newer mine maps are available in digital form; however, many older mine maps have been photographically reduced from dimensionally unstable paper copies. Photographic reduction also introduced distorted due to lens geometry. Also, coal bed correlations may change with additional information. Active mines were not differentiated from recently closed mines in the CBMP database.

GIS Models

GIS models were used in this study to assist in determining the position of each mine with respect to drainage, the amount of potential groundwater flooding, and direction of groundwater flow.

The Watershed Model, which was used to determine groundwater flow direction, is a standard Esri© ArcMap™ 10.0 geoprocessing model that uses the Spatial Analyst™ Hydrology toolset to convert the CBMP coal bed elevation raster data into predictive hydrologic flow direction and flow accumulation rasters. From these generated datasets the model outputs generalized "stream" features which can be used to predict the direction of groundwater movement through mine voids relative to the coal outcrop. This model was run for all coal beds to aid in determining the extent of potential flooding in underground mines. An example of model output for the Sewell coal seam is shown in Figure 3.

The Mining Above/Below Drainage Model (MABD), which is a geoprocessing model (a series of standard ArcGIS™ tools executed in a certain order), was developed for this study to determine the position of mines with respect to drainage based on perennial stream elevations. Two versions of the MABD Model, the Major Drainage Elevation Model (MDEM) and the Perennial Drainage Elevation Model (PDEM), were generated by assigning USGS 7.5-minute quadrangle elevations to points selected from the National Hydrography Dataset (NHD). The MDEM selected points located within digitized perennial stream polygons; the PDEM selected points located along digitized perennial stream lines. The resolution of these digital elevation models (DEMs) were generated to 10 meters to match the CBMP seam elevation raster data. The coal elevation DEM was subtracted from the MDEM and the PDEM to indicate regions of the coal bed that lie above and below major drainage, these results were individually overlaid with the mine footprint to obtain the two versions of the final GIS layer of potentially flooded mine areas (Figures 4 and 5).

The effectiveness of the MDEM and PDEM models was tested by comparing the model output for 472 mines in the Sewell coal seam located in southern West Virginia with the results of the visual structure contour/cropline examination of the same underground mines (McColloch et al., 2011). The visual structure contour/cropline examination is the most effective method of identifying drainage position and potential extent of flooding in mines. The MDEM proved ineffective in predicting mine position with respect to drainage and potential extent of mine flooding. The PDEM is a fair predictive tool, but it is most effective in identifying potential flooding below drainage. The details of this comparison are presented in Appendix A.

Mine Pool Evaluation Process

- Establish which areas have structure contour and coal cropline coverages so that the position of each underground mine with regard to major drainage (above, near, or below), which allows the potential for each mine to be partially or totally filled with groundwater
- Evaluate position and likelihood of flooding for mines located in areas which have adequate coverages
- Visually examine each mine polygon by seam and assign attributes according to mine pool type, position with respect to drainage, availability of structure contour, availability of cropline, and potential extent of partial flooding

GIS Attribute Tables

To facilitate data analyses and map generation, six fields were added to the CBMP GIS attribute tables of the 69 coal beds that have been mined by underground methods:

- Mine pool type based on extent of potential flooding: 0=undetermined; 1=flooded; 2=not flooded; and 3=partially flooded
  - Undetermined represents underground mines located in areas with no structure contour and cropline coverages
  - Flooded represents underground mines that are located below drainage, and these mines have the potential to be totally filled with groundwater
  - Not flooded represents mines that are probably free draining
  - Partially flooded represents underground mines that have a configuration that would permit the accumulation of groundwater in specific areas that can range from very small to very large and these determinations are qualitative rather than quantitative
- Position with respect to drainage (0=undetermined; A=above; N=near; and B=below
  - Undetermined represents underground mines located in areas with no structure contour and cropline coverages
- Availability of structure contour (1=Yes; 2=No)
- Availability of cropline data (1=Yes; 2=No)
- Potential extent of flooding for partially flooded underground mines based on qualitative rather than quantitative
  - 1=very small potentially flooded area(s)
  - 2=small potentially flooded area(s)
  - 3=intermediate potentially flooded area(s)
  - 4=large potentially flooded area(s)
  - 5=very large potentially flooded area(s)
- Comment field

Mine Pool Volumetric Calculation Method

The CBMP Total Bed Thickness raster layer (totbed) is a 10 meter GRID layer that was the basis for vertical void measure estimates. This layer is produced using an Inverse Distance Weighted algorithm that interpolates grid values between actual coal bed thickness data as described by Wood et al. (1983). CBMP's mine footprint layer was the base used to determine the area covered by each mine void.

ArcMap™'s Spatial Analyst extension Zonal Statistics tool was employed to "sum" each 10 meter cell within a given mine polygon to calculate the total volume of the mine void. These data were output into a .dbf table (zonalstat).

The following mathematical formulas were used:

- Conversion of the Zonal Statistic result from inches/meters to cubic feet: ((SUM / 12) * 32.808399) * 32.808399
- Conversion of cubic feet to acre feet: cubic_ft / 43560
- Conversion of cubic feet to gallons: cubic_ft * 7.48051948
- Storage gallons were calculated as half of the estimated void gallons: (cubic_ft* 7.48051948)*0.5
- The average thickness of the cells intersected by the mine footprint polygon were calculated by taking the sum of the cell values divided by the count of cell selected.

Deliverables

The deliverables included: a final West Virginia Mine Pool Atlas report in electronic format; GIS geodatabases of WVGES's CBMP seam and mining coverages; and GIS map templates. This report includes: general description of major coal beds within each formation; the distribution of potential totally and partially flooded mines in each coal bed by mine footprint area and position with respect to drainage; estimated volume of groundwater contained in each mine pool; a five-map series for each of the 19 major coal beds identified by this study consisting of a structure contour map, an isopach map, a seam overview map, a map showing extent of potential total flooding, and a map showing extent of partial flooding; and overview tables for minor coal beds having potential mine void flooding.

Deliverable Data Layers Description

thickness_measures_location (points) — XY coordinates of coal measure location
thickness_measures_area (polygon) — 3 mile buffer of measure location used to determine "mapped" area of the coal bed as described in USGS Circular 891 (Wood et al., 1983)
structure (line) — coal elevation 40' contours
outcrop (polygon) — original coal resource area as currently mapped
mines (polygon) — underground mine footprints

- Apcard (poly_ID)
- Mine Name
- Company Name
- State Permit #
- WVGES Comment
- Seam Codes
- Stratigraphic Order
- Acres

mine_pool (polygon) — underground mine and zonal statistics tables concatenated
idwTotalBed (raster) — total bed thickness in inches 10 meter GRID
zonalstat (table) — volumetric calculation results

- Apcard (poly ID)
- Count — count of cells intersected by mine
- Area — total square meters of intersected cells
- Sum — total of cell thicknesses in inches
- Void Cubic Foot
- Void Acre Foot
- Void Gallons
- Storage Gallons
- Avgthk — average thickness of cells intersected by the polygon

Structure of the Report

Following evaluation, 19 major seams were identified for inclusion in the map section of the report. These are coal beds in which underground mines occur that have footprints equal to or greater than 500 acres in area and are near or below drainage. An area of 500 acres was chosen as the lower limit for inclusion in this report for two reasons: it would provide adequate potential storage to accommodate a large volume of groundwater; and the mine polygons printed on the map would be large enough to show annotation by attribute. Maps and statistics for each major mine pool presented in this report are limited to the coal and mining information available from the WVGES's CBMP during the period of this study.

The Atlas contains:

- A general description of principal coal beds within the group or formation
- Stratigraphic columns showing the position of the main named coal beds within each formation or group
- Table showing the distribution of potential totally and partially flooded mines in each seam by mine footprint area and position with respect to drainage
- Maps of coal beds that mines in which potential partial and/or total flooding is present in mines exceeding in 500 acres in area.
    - Structure contour of the base of each coal bed
    - Isopach (total coal bed thicknesses)
    - Seam overview
    - Extent of potential total flooding
    - Extent of potential partial flooding
- Overview tables for seams in which potential partial and/or total flooding is present in mines that are less than 500 acres in area

REGIONAL EVALUATION

Data for seams were reported by formation in stratigraphic order from youngest to oldest. A stratigraphic chart of Pennsylvanian coal-bearing strata is shown in Figure 6a. Stratigraphic columns of Pennsylvanian geologic units in Figures 6b–f show the stratigraphic position of named coal beds within each formation or group. The coal bed names shown in these figures are color coded: those in blue denote major seams in which potential totally and partially flooded underground mines exceeding 500 acres in area are present; those in orange correspond to other mineable seams in West Virginia; and those in black represent unmined coal beds.

Study data have been compiled and summarized in Tables 1 through 7. Names of major coal beds containing mines that have significant groundwater potential and exceed 500 acres in area are shown in boldface throughout the text and in Tables 1 through 7. Statistical data about potential totally flooded mines and potentially partially flooded mines are presented in Tables 1 and 2, respectively. Table 3 has information about potential totally and partially flooded mines by position with respect to drainage and by mine area. Tables 4 through 7 provide information about potential extent of partial flooding in above and near drainage mines by mine footprint area. Appendix B presents information about the 99 potential totally flooded underground mines that exceed 500 acres in area. Information about 532 potentially partially flooded underground mines having areas greater than 500 acres is presented in Appendix C. Overviews of 53 coal beds that did not meet the drainage position and area criteria for inclusion in the map atlas are presented in Appendix D.

The percentage of estimated maximum storage in million gallons (MMGal) of potentially totally and partially flooded underground mines of selected seams is shown in Figures 7a–c, respectively.

Elevations of the base of coal beds commonly serve as the basis for defining folds and faults in coal-bearing rock worldwide. Figure 8 shows the location of major structural features in the State.

Coal Bed Analyses by Formation/Group

Dunkard Group

The mainly Upper Pennsylvanian Dunkard Group (Figures 6a, b) contains 14 named coal beds. None of these coals have been mined by underground methods, and therefore, are excluded from further discussion.

Monongahela Group

The Upper Pennsylvanian Monongahela Group (Figures 6a, b) includes nine named coal beds of which four, the Waynesburg, **Sewickley**, Redstone and **Pittsburgh**, have been mined by underground methods. Coal beds that have the potential to contain large volumes of groundwater in mine voids are the **Pittsburgh** and **Sewickley** coals.

Waynesburg: The four underground mines in this seam are located in Monongalia County. All four mines are located above drainage and are potentially partially flooded by groundwater. These mines have limited potential for supplying water resources due to their small size and location above drainage.

Sewickley: This coal bed generally dips to the northwest in the area in which it is mined, and the minimum elevation of this coal is located in the Nineveh Syncline in Wetzel and Marshall counties (Figure 9a). The isopach map indicates the Sewickley bed (Figure 9b) ranges from 0 to 144 inches in thickness, with the thickest coal located in central Marion County. In areas where underground mining has occurred, this bed generally ranges in thickness from 36 to 96 inches.

Seventy-six underground Sewickley mines are located in Marion and Monongalia counties. Fifty-three mines are above drainage, 13 are near drainage, and ten are below drainage (Figure 9c). No below drainage mines greater than 500 acres in area currently occur in this seam (Figure 9d). Six near drainage mines exceeding 500 acres in area have potential partial flooding (Figure 9e). Average bed thicknesses of these mines range from 59.00 to 75.00 inches. Maps and statistical information about potential groundwater flooding of mines in this seam are shown in Figures 9c–e.

The presence of significant groundwater resources in underground Sewickley mines may be affected by underground mining in the stratigraphically lower Pittsburgh coal.

Potentially partially flooded underground mines in the Sewickley provide 100 percent of the estimated 22,809.16 million gallons (MMGal) of potential storage, and these Sewickley mines contain 1.65 percent of total potential storage and 2.23 percent of potential partial storage in underground mines of major coals (Figures 7a, c).

Redstone: This seam has been mined by underground methods in Barbour, Harrison, Lewis, Mason, Monongalia, and Upshur counties. Of the 218 underground mines in this seam, 207 are located above drainage, five mines are located near drainage, and six mines are located below drainage. These mines have limited potential to store significant volumes of groundwater.

Pittsburgh: The elevation of the base of this coal defines a series of south-southwest to north-northeast trending anticlines and synclines in northern West Virginia, and the lowest elevations of the Pittsburgh are found in the Nineveh, Burchfield, and Robinson synclines (Figures 8 and 10a).

The Pittsburgh bed ranges in thickness from 0 to more than 144 inches, and it generally exceeds 48 inches in thickness in many areas (Figure 10b). Although Figure 10b shows total coal bed thicknesses of greater than 144 inches in several small areas of eastern Gilmer County, more recent study indicates this information is erroneous. In areas where underground mining has occurred, the thickness of this bed generally ranges from: 72 to 120 inches in north-central West Virginia; 48 to 84 inches in the northern panhandle of West Virginia; and 36 to 84 inches in the western part of the state.

This coal has been extensively mined by underground methods in Barbour, Braxton, Brooke, Gilmer, Hancock, Harrison, Kanawha, Lewis, Marion, Marshall, Mason, Monongalia, Ohio, Preston, Putnam, Taylor, Upshur, and Wetzel counties. The Pittsburgh has a limited occurrence in Mineral County in the State's eastern panhandle where it has been removed through several generations of underground and surface mines. Mine polygons of 806 mines were examined, and 683 mines are above drainage, 79 are near drainage, and 44 are below drainage (Figure 10c). Twenty-two below drainage mines and one near drainage mine exceed 500 acres in area and are potentially totally flooded (Figure 10d). The average bed thicknesses of these mines range from 56.00 to 98.42 inches. Thirty-one near drainage mines exceed 500 acres in area and have potential partial flooding (Figure 10e). The average coal bed thicknesses of these mines range from 49.00 to 101.63 inches. Maps and statistical information about potential groundwater flooding of mines in the Pittsburgh are presented in Figures 10c–e.

Potentially partially and totally flooded underground mines in the Pittsburgh coal provide an estimated 423,453.52 MMGal of potential storage; and the potentially partially flooded underground Pittsburgh mines contain 51.87 percent of this potential storage. Potential storage in underground Pittsburgh mines accounts for 30.60 percent of total potential storage in underground mines of major seams (Figure 7a).The percentage of potential storage in potentially totally and partially flooded underground Pittsburgh mines represents 56.52 and 21.47 percent, respectively, of the total combined potential storage of mines in major coal beds (Figures 7b, c).

Conemaugh Group

The Upper Pennsylvanian Conemaugh Group (Figures 6a, c) includes 22 named coal beds. Three of these coals, the Elk Lick, **Bakerstown** and Mahoning, have been mined by underground methods. The **Bakerstown** coal is the only Conemaugh Group bed with significant potential to contain large volumes of groundwater in mine.

Elk Lick: This seam has been mined by underground methods in Grant, Lewis, Mineral, and Upshur counties, and 18 mines are present in this seam. All 18 mines are located above drainage. The mines in this seam are generally small in area and occur above local streams, offering limited potential for supplying water resources.

Bakerstown: Elevations of the base of this coal define a series of south-southwest to north-northeast trending anticlines and synclines in the western part of the eastern panhandle and north-central areas of West Virginia (Figure 11a). Most underground Bakerstown mines are located in Preston, Barbour, Tucker, and Grant counties where it has been preserved from erosion in the Ligonier, Belington, Kingwood, and North Potomac synclines (Figures 8 and 11a). The total bed thickness of the Bakerstown generally ranges from 24 to 84 inches, and the thickest part of the coal bed is located in northern Tucker County (Figure 11b).

Sixty-seven mines are located above drainage, and 52 of these mines are potentially partially flooded by groundwater (Figures 11c, e). Most of these mines are small and have limited potential for supplying water resources. No mines are located below drainage (Figure 11d). One near drainage mine located in Tucker County exceeds 500 acres in area and is potentially partially flooded (Figure 11e). The average bed thickness for this mine is 70.00 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 11c–e.

Potential flooding of underground mines in this seam may be affected by underground mining in the stratigraphically lower coals such as: the Upper Freeport in northeastern Tucker, northwestern Grant, and western Preston counties; and the Middle Kittanning in western Preston County.

Potentially partially flooded underground Bakerstown mines provide an estimated 4,600.06 MMGal of total potential storage, and these mines account for 0.33 percent of total potential groundwater storage and 0.45 percent of potential partial storage in underground mines of major seams (Figures 7a–c).

Mahoning: The five underground mines in this seam are located in Mineral County, and all five mines are above drainage. These mines have limited potential to provide water supplies because of their small size and position above drainage.

Allegheny Formation

The Middle Pennsylvanian Allegheny Formation (Figures 6a, d) includes 14 named coal beds; nine which have been mined by underground methods. The seams that have the greatest potential for containing large volumes of groundwater in mine voids are the **Upper Freeport** and **Middle Kittanning** coals in northern West Virginia and the **Number 5 Block** coal in southern West Virginia.

Upper Freeport: This coal bed has been folded into a series of south-southwest to north-northeast trending anticlines and synclines in the western part of the eastern panhandle and in north-central West Virginia (Figures 8 and 12a). Erosional remnants of the Upper Freeport occur along the Chestnut Ridge, Preston, and Blackwater anticlines. Most underground mines in this coal are located in Preston, Barbour, and Tucker counties, preserved in the Ligonier, Kingwood, Mount Carmel, and North Potomac synclines. In southeastern Marion, central Upshur, and northern Barbour counties, bedrock generally dips to the northwest (Figure 12a). Available data indicate the Upper Freeport ranges in thickness from 24 to 144 inches (Figure 12b). The thickest part of the coal bed is located in eastern Preston County.

Analysis of the 285 underground mines in the Upper Freeport (Figure 12c) show that 237 mines are located above drainage, ten are located near drainage, three are located below drainage, and 35 are located in areas with no structure contour and cropline coverages (Figure 12c). One below drainage mine in southwestern Preston County exceeds 500 acres in area (Figure 12d). Average bed thickness of this mine is 49.00 inches. One hundred ninety-two above drainage and 11 near drainage mines are potentially partially flooded (Figure 12e). Intermediate to very large areas of ten above drainage mines that exceed 500 acres in area are potentially flooded. Seven potentially partially flooded near drainage mines exceed 500 acres in area. The average bed thicknesses of these mines range from 51.00 to 97.24 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 12c–e.

Groundwater flooding in a few near and below drainage mines in Preston County may be affected by underground mining in the stratigraphically lower Middle Kittanning and Lower Freeport coal beds. Currently, potential for groundwater flooding has not been determined for underground Upper Freeport mines in Barbour and Upshur counties. A few of these mines are located above underground mining in the stratigraphically lower Middle Kittanning and Lower Freeport coals.

Potentially partially and totally flooded underground mines in the Upper Freeport coal provide an estimated 45,708.19 MMGal of total potential storage. Estimated potential partial storage is 97.42 perent of potential total storage in these mines. Total potential storage in this coal bed represents 3.30 percent of total potential storage in underground mines of major seams (Figure 7a). Estimated storage in potential totally and partially flooded Upper Freeport mines represent 0.33 percent and 4.35 percent storage, respectively, of major seams (Figures 7b, c).

Middle Kittanning: This coal bed has been folded into a series of south-southwest to north-northeast trending anticlines and synclines in north-central West Virginia (Figure 13a). Erosional remnants of the Middle Kittanning occur along the Chestnut Ridge Anticline (Figure 13a). In the areas where bed thickness data are available, this coal bed generally ranges in thickness from 0 to more than 144 inches (Figure 13b). In southwestern Preston County, underground mines in this coal are located in the Ligonier Syncline where the coal bed generally ranges in thickness from 24 to 108 inches (Figures 8 and 13a–b). Elsewhere, bed thickness in mined areas ranges from 24 to 72 inches in Barbour and Taylor counties and from 48 to 72 inches in Marion County.

Of the 43 underground mines in this seam, 22 are in areas where structure contour and/or cropline data are available. Eleven mines are located above drainage, six mines are near drainage and, five mines are below drainage (Figure 13c). The below drainage mines are potentially totally flooded by groundwater (Figure 13d); two of these mines exceed 500 acres in area and have average bed thicknesses of 51.00 and 74.50 inches. Ten above drainage and six near drainage mines are potentially partially flooded (Figure 13e). Three near drainage mines exceed 500 acres in area and have average bed thicknesses that range from 46.00 to 58.98 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 13c–e.

Currently, potential for groundwater flooding cannot be determined for underground Middle Kittanning mines in Barbour and Upshur counties as the CBMP products are not complete. A few mines in this seam are above underground mining in the stratigraphically lower Clarion coal bed in parts of north-central Barbour County and the Lower Kittanning in parts of central Upshur County.

Potentially partially and totally flooded underground mines in the Middle Kittanning provide an estimated 15,669.16 MMGal of total potential storage (Figure 7a). Estimated storage in potentially totally flooded Middle Kittanning mines is 50.72 percent. Potential storage in Middle Kittanning mines accounts for 1.13 percent of total potential storage in underground mines of major seams. This coal represents 2.20 percent and 0.75 percent storage in potential totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

No. 5 Block: This coal bed has been folded into several southwest-northeast trending anticlines and synclines (Figures 8 and 14a). Erosional remnants of the No. 5 Block are preserved along the southwest-northeast trending Warfield Anticline in southwestern West Virginia (Figure 14a). Southeast and northwest of the Warfield Anticline, many underground mines in this coal are located in the Handley Syncline and two unnamed synclines in Wayne and Lincoln counties. The thickness of this bed ranges from 0 to more than 132 inches, and the thickest coal is found in Nicholas County (Figure 14b). Bed thickness in areas of underground mining generally ranges from 24 to more than 132 inches (Figure 14b).

The No. 5 Block has been mined by underground methods in southwestern and central West Virginia. Mine polygons for the 429 underground mines in this seam were examined, and 416 of these mines are located above drainage and 13 near drainage (Figure 14c).

No potential totally flooded underground mines are present in this coal bed (Figure 14d). Three hundred forty-one of the above drainage mines and 12 of the near drainage mines are potentially partially flooded. One potentially partially flooded near drainage mine, which is located in eastern Lincoln County, exceeds 500 acres in area (Figure 14e). Average bed thickness in this mine is 69.00 inches. Additional information about potential groundwater flooding in this seam is presented in Figures 14c–e.

Potential groundwater flooding of above drainage underground mines in this coal in the Handley Syncline may be affected by underground mining of stratigraphically lower coals assigned to the underlying Kanawha Formation. In northern Nicholas, southern Braxton, and western Webster counties, underground mining in the Stockton lower split 2, Coalburg, and Winifrede coals may affect groundwater flooding in a few No. 5 Block mines.

Potentially partially flooded underground mines in the No. 5 Block coal provide an estimated 19,562.68 MMGal of total potential storage, and these mines account for 1.41 percent of total potential groundwater storage and 1.91 percent of potential partial storage in underground mines of major seams (Figures 7a, c).

Kanawha Formation

The Lower to Middle Pennsylvanian Kanawha Formation (Figures 6a, e) includes 42 named coal beds, and 31 have been mined by underground methods. The seven seams having the greatest potential to have mine voids containing large volumes of groundwater are the **Stockton**, **Coalburg**, **Peerless**, **Number 2 Gas**, **Powellton**, **Lower Powellton**, and **Eagle** coals. Nine hundred thirty-four mines have been identified in lower Kanawha Formation coal beds in southern West Virginia (Figure 6e), the Middle War Eagle, Bens Creek, Lower War Eagle, Glenalum Tunnel, Gilbert, and Douglas. For the most part, these mines are small in area, occur above drainage, and contain limited potential water supplies.

Stockton: Several southwest-northeast trending anticlines and synclines are defined by the structure contour of the base of this coal (Figures 8 and 15a). Erosional remnants of the Stockton are preserved along the southwest-northeast trending Warfield Anticline in southwestern West Virginia (Figure 15a). Many underground mines in this bed are located to the southeast of the Warfield Anticline in the Handley Syncline and a few are located on the northwest limb of the Warfield Anticline (Figure 15a). The Stockton ranges from 0 to more than 144 inches in bed thickness, and it obtains its thickest development in south-central Logan County (Figure 15b). Where it has been underground mined, the Stockton generally ranges from 24 to 144 inches thick (Figure 15b).

This coal has been mined by underground methods in southwestern and central West Virginia. Of the 160 mines in this seam, 157 are located above drainage and three are located near drainage (Figure 15c). No mines are located below drainage, and no mines are potentially totally flooded (Figure 15d). One hundred thirty-two of the above drainage mines and three near drainage mines are potentially partially flooded (Figure 15e). One potentially partially flooded near drainage mine, which is located in eastern Kanawha County, exceeds 500 acres in area. At this location, average bed thickness is 64.00 inches. Although potential flooding is generally limited to small areas in many of the smaller mines, intermediate to large areas of several larger mines could be flooded. Additional information about potential groundwater flooding in this seam is presented in Figures 15c–e.

Potential flooding particularly in above and near drainage Stockton mines in the Handley Syncline may be affected by many underground mines in stratigraphically lower coals beds assigned to the Kanawha formation (Figure 6e). In parts of western Boone, southern Braxton, and northern Nicholas counties, underground mining in the Coalburg will likely affect potential flooding in Stockton mines.

Potentially partially flooded underground mines in the Stockton coal provide an estimated 29,161.59 MMGal of total potential storage, and these mines account for 2.11 percent of total potential groundwater storage and 2.85 percent of potential partial storage in underground mines of major seams (Figures 7a, c).

Coalburg: Several southwest-northeast trending anticlines and synclines are defined by the structure contour of the base of this coal (Figures 8 and 16a). Erosional remnants of the Coalburg occur along the southwest-northeast trending Warfield Anticline in southwestern West Virginia (Figure 16a). The bed ranges in thickness from 0 to more than 144 inches, reaching a maximum thickness in northern Mingo County (Figure 16b). Available bed thickness data in areas of underground mining generally range from 24 to more than 144 inches (Figure 16b).

Underground mines in the Coalburg occur across most of southern West Virginia (Figure 16c). Data analysis was completed for the 298 mines for this seam; 287 mines are located above drainage, ten mines are near drainage, and one mine is below drainage (Figure 16c). One near drainage mine and one below drainage mine are potentially totally flooded. Two hundred sixty-five of the above drainage mines and nine of the near drainage mines are potentially partially flooded.

Most potential totally or partially flooded below and near drainage mines that exceed 500 acres in area are located in eastern Wayne and western Lincoln counties (Figure 16d, e). One potentially totally flooded below drainage mine exceeds 500 acres in area. The average bed thickness of this mine is 66.57 inches (Figure 16d). Two potentially partially flooded near drainage mines are greater than 500 acres in area, and the average bed thicknesses of these mines are 58.00 and 62.00 inches. Visual analysis indicates that large areas of these mines are potentially flooded (Figure 16e). Additional information about potential groundwater flooding in this seam is presented in Figures 16c–e.

Potential groundwater flooding of underground Coalburg mines may be affected in some areas by underground mining of stratigraphically lower coals from the Eagle to the Winifrede in the Handley Syncline; the Winifrede and Sewell coals in western Webster County; and the Winifrede and Eagle on the east limb of the Mann Mountain Anticline in western Nicholas County.

Potentially partially and totally flooded underground mines in the Coalburg coal provide an estimated 68,114.13 MMGal of potential storage; 88.44 percent of this estimated storage is in potentially partially flooded mines. This potential storage accounts for 4.92 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 2.18 percent and 5.89 percent storage in potential totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Winifrede: This coal has been widely mined by underground methods in Boone, Fayette, Kanawha, Logan, Mingo, Nicholas, Raleigh, Webster, and Wyoming counties. Mine polygons for the 283 mines in this seam were examined, and 281 mines are located above drainage and two mines are near drainage. The two near drainage mines are less than 500 acreas in area. Two hundred forty-four of the above drainage mines and the two near drainage mines are potentially partially flooded. The two near drainage mines are less than 500 acres in area. Although potential flooding would be limited to small areas in most of these mines, intermediate to large areas of several of the larger mines could be flooded.

Peerless: This coal generally dips to the northwest except in the vicinity of the southwest-northeast trending folds including the Warfield Anticline and the Handley Syncline and the north-northwest trending Mann Mountain Anticline (Figures 8 and 17a). The Peerless crops out on hillsides along the axis of the Warfield Anticline. Many underground mines in this coal are located southeast of the Warfield Anticline, and most of these mines are located above drainage. Ranging in thickness from 0 to more than 132 inches, this coal is thickest in southern Logan County (Figure 17b). Available bed thickness data in areas of underground mining generally range from 24 to 132 inches (Figure 17b).

Underground mining in this seam is present in southern and central West Virginia (Figure 17c) The Peerless often merges with the underlying No. 2 Gas coal which complicates analysis. Mine polygons for 284 mines were examined, and 229 mines are located above drainage, 12 near drainage, five below drainage, and 38 in areas where cropline and structure contour maps have not been completed (Figure 17c). Three mines above drainage, three mines near drainage, and five mines below drainage are potentially totally flooded (Figure 17d). Three potentially totally flooded below drainage mines exceed 500 acres in area. The average bed thicknesses of these mines range from 23.00 to 49.00 inches. Two hundred two above and nine near drainage mines are potentially partially flooded. One potentially partially flooded near drainage mine exceed 500 acres in area, and it has an average bed thickness of 38.00 inches. Visual analysis indicates that intermediate to very large areas of several large above drainage mines may be flooded (Figure 17e). Additional information about potential groundwater flooding in this seam is presented in Figures 17c–e.

Potential groundwater flooding of underground Peerless mines may be affected in some areas by underground mining of stratigraphically lower coals including: the No. 2 Gas, Powellton, Lower Powellton, and Eagle in parts of southern Logan and Mingo counties and the No. 2 Gas, Powellton, Lower Powellton, Eagle, and Little Eagle in parts of easternmost Boone, southernmost Kanawha, western Fayette, and northwestern Raleigh counties.

Potentially partially and totally flooded underground mines in the Peerless coal provide an estimated 53,219.45 MMGal of potential storage; 97.16 percent of this estimated storage is in potentially partially flooded mines. This potential storage accounts for 3.85 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 0.42 percent and 5.05 percent storage in potentially totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

No. 2 Gas: This coal generally dips to the northwest except in the vicinity of the southwest-northeast trending folds including the Warfield Anticline and the Handley Syncline and the north-northwest trending Mann Mountain Anticline (Figures 8 and 18a). The No. 2 Gas crops out on hillsides along the axis of the Warfield Anticline. As noted above, the No. 2 Gas and Peerless beds often merge and are mined concurrently. Many underground mines in this coal are located in the Handley Syncline, and most of these mines are located near or below drainage. Ranging in thickness from 0 to more than 144 inches, this coal is thickest in northern Wyoming, western Raleigh, and southern Boone counties (Figure 18b). Bed thickness in areas of underground mining generally ranges from 24 to 132 inches (Figure 18b).

This seam has been mined extensively across southern West Virginia (Figure 18c), often in conjunction with the superjacent Peerless when the two beds merge. The examination of mine polygons for the 565 underground mines in this seam indicates 506 mines are located above drainage, 39 near drainage, and 15 below drainage (Figure 18c). Six mines above or near drainage and 15 mines below drainage are potentially totally flooded (Figure 18d). In Mingo, Logan, Boone, and Kanawha counties, two near and eight below drainage mines, which exceed 500 acres in area, are potentially totally flooded. The average bed thicknesses of these mines range from 42.08 to 76.00 inches. Visual analysis suggests 460 mines located above or near drainage are potentially partially flooded (Figure 18e). Twenty-three potentially partially flooded near drainage mines exceed 500 acres in area. The average bed thicknesses of these mines range from 19.00 to 77.93 inches. Although potential flooding would be limited to small areas in most of above drainage mines, intermediate to large areas of several large mines could be flooded. Statistical information about potential groundwater flooding in this seam is presented in Figures 18c–e.

Potential groundwater flooding of Number 2 Gas mines may be affected in some areas by underground mining of stratigraphically lower coals including: the Eagle, Powellton, and Lower Powellton in parts of Logan, Mingo, Wyoming, Boone, and McDowell counties; the Lower 2 Gas, Eagle lower split 1, Little Fire Creek in southernmost Logan County; the Eagle, Eagle A, and Bens Creek in northwestern Raleigh County; and the Powellton, Eagle, and Little Eagle in western Fayette and Nicholas counties.

Potentially partially and totally flooded underground mines in the No. 2 Gas coal provide an estimated 163,753.70 MMGal of potential storage; 89.78 percent of estimated storage is in potentially partially flooded mines. This potential storage accounts for 11.84 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 4.64 percent and 14.37 percent storage in potential totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Powellton: This coal generally dips to the northwest except in the vicinity of the southwest-northeast trending folds including the Warfield Anticline and the Handley Syncline and the north-northwest trending Mann Mountain Anticline (Figures 8 and 19a). The Powellton crops out on hillsides along the axis of the Warfield Anticline. Many underground mines in this coal are located in the Handley Syncline, and most of these mines are located below or near drainage. Bed thickness of this coal ranges from 0 to more than 120 inches (Figure 19b). The thickest part of the coal bed is in southeastern Mingo County. In areas of underground mining, this bed thickness generally ranges from 24 to 96 inches.

This seam has been mined widely across southern West Virginia (Figure 19c). Mine polygons for the 321 mines in this seam have been examined, and 305 mines are located above drainage, seven near drainage, six below drainage, and three are not determined. One near drainage mine and the six below drainage mines are potentially totally flooded, and all of these mines exceed 500 acres in area (Figures 19c, d). Average bed thicknesses of these mines range from 46.00 to 69.00 inches. Two hundred sixty-one above and six near drainage mines are potentially partially flooded. Large to very large areas of two potentially partially flooded near drainage mines, which exceed 500 acres in area, may be flooded (Figure 19e). Average bed thicknesses of these two mines are 39.00 and 42.00 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 19c–e.

Potential groundwater flooding of Powellton mines may be affected in some areas by underground mining of stratigraphically lower coals including: the Lower Powellton, Eagle, and Eagle lower split 1 in parts of Mingo, Logan, Boone, and western Kanawha counties; and the Lower Powellton, Eagle, Little Eagle, Bens Creek, and Glenalum Tunnel in northwestern Raleigh, western Fayette, and southern Kanawha counties.

Potentially partially and totally flooded underground mines in the Powellton coal provide an estimated 36,180.12 MMGal of potential storage; and 67.89 percent of estimated storage is in potentially partially flooded mines. This potential storage accounts for 2.61percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 3.22 percent and 2.40 percent storage in potential totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Lower Powellton: This coal generally dips to the northwest except in the vicinity of the southwest-northeast trending folds including the Warfield Anticline and the Handley Syncline and the north-northwest trending Mann Mountain Anticline (Figures 8 and 20a). The Lower Powellton crops out along the flanks of the Warfield Anticline. Ranging in thickness from 0 to more than 132 inches, this bed is thickest in southeastern Logan and northwestern Wyoming counties (Figure 20b). Bed thickness in areas of underground mining generally ranges from 24 to 84 inches (Figure 20b).

This coal has been mined widely across southern West Virginia (Figure 20c). Examination of the 119 mine polygons for this seam shows 112 mines are located above drainage, five near drainage, and two below drainage (Figure 20c). One above drainage and two below drainage mines are potentially totally flooded (Figure 20d). Two potentially totally flooded below drainage mines that are greater than 500 acres in area are located in Mingo County. The average bed thicknesses of these mines are 29.84 and 41.00 inches. Visual analysis suggests 103 mines located above or near drainage are potentially partially flooded (Figure 20e). Although potential flooding would be limited to small areas in most of these mines, large areas of two near drainage mines in Mingo County that exceed 500 acres in area could be flooded. The average bed thicknesses of these two mines are 34.00 and 46.00 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 20c–e.

Potential groundwater flooding of Lower Powellton mines may be affected in some areas by underground mining of stratigraphically lower coals such as: the Eagle in parts of Fayette, Kanawha, Logan, Mingo, Raleigh, and Wyoming counties; the Little Fire Creek in southeastern Logan County; and the Eagle lower split 1, Middle War Eagle, and Bens Creek in northwestern Wyoming County.

Potentially partially and totally flooded underground mines in the Lower Powellton coal provide an estimated 10,062.01 MMGal of potential storage; 87.71 percent of estimated storage is in potentially partially flooded mines. This potential storage accounts for 0.73 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 0.34 percent and 0.86 percent storage in potentially totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Eagle: Dip direction of this coal is generally to the northwest except in the vicinity of the southwest-northeast trending folds (Figures 8 and 21a). The Eagle crops out on hillsides along the flanks of the Warfield Anticline. Many underground mines in this coal are located in synclines northwest and southeast of the Warfield Anticline, and most of these mines are located below or near drainage. This bed ranges from 0 to more than 132 inches in thickness, and it is thickest in southern Boone County (Figure 21b). Bed thickness in areas of underground mining generally ranges from 24 to 96 inches (Figure 21b).

This seam has been mined widely across southern West Virginia (Figure 21c). Mine polygons for the 494 mines in this seam have been examined, and 414 mines are above drainage, 46 near drainage, 16 below drainage, and 18 are undetermined (Figure 21c). Four mines above drainage, five mines near drainage, and 16 mines below drainage are potentially totally flooded (Figure 21d). Eleven below drainage and two near drainage mines exceeding 500 acres in area are potentially totally flooded. The range of average bed thicknesses of these mines range from 33.31 to 62.00 inches. Three hundred sixty-three above and near drainage mines are potentially partially flooded, and visual analysis suggests large areas of 22 of these mines could be flooded (Figure 21e). Fifteen near drainage mines, which are potentially partially flooded, are greater than 500 acres in area and the average bed thicknesses range from 30.00 to 75.00 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 21c–e.

Potential groundwater flooding of Eagle mines may be affected in limited areas by underground mining of stratigraphically lower coal beds such as: the Little Eagle, Glenalum Tunnel, Bens Creek, and Beckley in parts of western Fayette and northwestern Raleigh counties; the Eagle lower split 1 and Bens Creek in northwestern Wyoming County; and the Middle War Eagle and Lower War Eagle in parts of southeastern Mingo and northwestern McDowell counties.

Potentially partially and totally flooded underground mines in the Eagle coal provide an estimated 105,126.15 MMGal of potential storage; and 77.64 percent of estimated storage is in potentially partially flooded mines. This potential storage accounts for 7.60 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 6.52 percent and 7.98 percent storage in potentially totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

New River Formation

The Lower Pennsylvanian New River Formation (Figures 6a, f) includes 20 named coal beds, and 14 have been mined by underground methods. The **Sewell** and **Beckley** seams have the greatest potential for containing totally or partially flooded mine voids. Mines in the other coal beds tend to be small, are generally above drainage, and therefore contain limited potential for storing significant volumes of groundwater.

Sewell: This coal bed generally dips to the northwest except in the vicinity of the southwest-northeast trending Pineville and Mullens anticlines, the north-northwest-south-southeast trending Mann Mountain Anticline, and the south-southwest-north-northeast trending Webster Springs Anticline (Figures 8 and 22a). Bed thickness ranges from 0 to more than 120 inches, and the thickest part of this coal bed is in north-central Raleigh County (Figure 22b). Available bed thickness data in areas of underground mining generally range from 24 to 84 inches (Figure 22b).

This seam has been mined by underground methods in McDowell, Wyoming, Raleigh, Fayette, Nicholas, Greenbrier, and Webster counties. The large mines in the Sewell, especially the ones below drainage, offer high potential for supplying water resources. The down dip areas of some of the large mines located near or above drainage also have potential for supplying water resources. Of the 599 mines in this seam, 415 are located in areas where structure contour and cropline data are available. Three hundred sixty-eight of these mines are above drainage, 31 near drainage, and 16 below drainage (Figure 22c). One near drainage mine and 16 below drainage mines are potentially totally flooded (Figure 22d); and 240 above drainage mines and 28 near drainage mines are potentially partially flooded (Figure 22e). Twelve potentially totally flooded below drainage mines exceed 500 acres in area and average bed thicknesses 37.00 to 57.00 inches. Thirteen potentially partially flooded near drainage mines exceed 500 acres in area, and average bed thicknesses for these mines range from 27.00 to 57.00 inches. Large areas of several above drainage mines exceeding 500 acres in area may be flooded. Statistical information about potential groundwater flooding in this seam is presented in Figures 22c–e.

Potential groundwater flooding of underground Sewell mines may be affected by underground mining of stratigraphically lower coal beds including: the Beckley in parts of Raleigh and Nicholas counties; the Welch, Beckley, Fire Creek, and Pocahontas 3 in parts of central McDowell County; the Beckley and Pocahontas 3 in parts of eastern Wyoming County; and the Fire Creek in parts of eastern Fayette, western Greenbrier, and southeastern Webster counties.

Potentially partially and totally flooded underground mines in the Sewell coal provide an estimated 70,722.33 MMGal of potential storage; and 71.73 percent of estimated storage is in potentially partially flooded mines. This potential storage accounts for 5.11 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 5.54 percent and 4.96 percent storage in potentially totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Beckley: This coal generally dips toward the northwest (Figure 23a). Coal bed thickness ranges from 0 to more than 144 inches, and this coal bed is thickest in western Raleigh County, northern Wyoming County, and central McDowell County (Figure 23b). In areas where underground mining has taken place, bed thickness generally ranges from 24 to 84 inches (Figure 23b).

Underground mines in the Beckley are located in Raleigh, Wyoming, McDowell, Mercer, and Greenbrier counties (Figure 23c). Of the 271 mines in this seam, 112 are located in areas where cropline data are currently available. Ninety-six of these 112 mines are located above drainage, ten near drainage, and six below drainage. The six below drainage mines, which are located in Raleigh County, are potentially totally flooded; and five exceed 500 acres in area (Figure 23d). Average bed thicknesses for these mines range from 49.00 to 70.75 inches. Seventy-seven above drainage mines and ten near drainage mines are potentially partially flooded. Four potentially partially flooded near drainage mines are greater than 500 acres in area; one is located in north-central Raleigh County and three are in southern McDowell County (Figure 23e). Average bed thicknesses for these mines range from 35.00 to 54.00 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 23c–e.

Potential groundwater flooding of underground Beckley mines may be affected by underground mining of stratigraphically lower coal beds including: the Fire Creek and Pocahontas Nos. 7, 6 upper split 1, 6, 4 and 3 in parts of Raleigh County; the Fire Creek and Pocahontas Nos. 6, 4, and 3 in parts of eastern Wyoming County; the Fire Creek, Little Fire Creek and Pocahontas Nos. 6, 4, and 3 in parts of McDowell County; and the Fire Creek and Pocahontas No. 3 in westernmost Mercer County.

Potentially partially and totally flooded Beckley seam underground mines provide an estimated 25,975.14 MMGal of potential storage; 51.88 percent of estimated storage is in potentially partially flooded mines. This potential storage accounts for 1.88 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 3.47 percent and 1.32 percent storage in potentially totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Fire Creek: Underground mines in this seam are located in McDowell, Mercer, Wyoming, Raleigh, Fayette, Greenbrier, Pocahontas, and Webster counties. Of the 459 mines in this seam, 411 are located in areas currently without completed structure contour and cropline maps. Four hundred ten of these mines are above drainage, none near drainage, and one below drainage. The below drainage mine is less than 500 acres in area. These mines are mostly small and have limited potential to store large volumes of groundwater.

Pocahontas Formation

The Lower Pennsylvanian Pocahontas Formation (Figures 6a, f) includes 12 named coal beds of which eight have been mined by underground methods. The seams having the greatest potential for totally and partially flooded mine voids are the **Pocahontas No. 2**, **Pocahontas No. 3**, **Pocahontas No. 4**, and **Pocahontas No. 6**.

Pocahontas No. 6 upper split 1: Underground mining of this seam has taken place in Wyoming, Raleigh, and Mercer counties. Of these 65 mines, 45 mines are located in areas in which CBMP mapping has been completed. Forty-four of these 45 mines are located above drainage, and one mine is located near drainage. Twenty-three above drainage mines and one 115.09-acre near drainage mine are potentially partially filled by groundwater.

Pocahontas No. 6: This coal generally dips to the northwest; however, the southwest-northeast trending Mullens and Pineville anticlines in Wyoming County and the Boggs Knob Anticline and an unnamed syncline locally affect dip direction in easternmost Fayette County (Figures 8 and 24a). Where data are available in parts of Fayette, Raleigh, and Wyoming counties, ranges from 0 to more than 96 inches (Figure 24b). In the areas where underground mining has occurred, this coal bed is generally 24 to 72 inches thick (Figure 24b).

The 262 underground mines in this seam are located in southern West Virginia (Figure 24c). Forty-one mines are located in areas where no structure contour and cropline coverages are currently available. One hundred ninety-nine mines are located above drainage, 16 near drainage, and four below drainage (Figure 24c). The four below drainage mines and two small above drainage mines are potentially totally flooded by groundwater (Figure 24d), and one of these mines exceeds 500 acres in area. The average bed thickness of this mine is 31.00 inches. One hundred twelve above drainage mines and 16 near drainage mines are potentially partially flooded by groundwater (Figure 24e). Eight of the potentially partially flooded near drainage mines are greater than 500 acres in area and average bed thicknesses of these mines range from 27.00 to 37.00 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 24c–e.

Areally extensive underground mines in the stratigraphically lower Pocahontas No. 3 coal may affect groundwater flooding in Pocahontas No. 6 underground mines in southern Raleigh, western Mercer, eastern Wyoming, eastern McDowell, and northern Summers counties.

Potentially partially and totally flooded underground mines in the Pocahontas No. 6 provide an estimated 19,883.69 MMGal of potential storage; and 94.32 percent of estimated storage is in potentially partially flooded mines. This potential storage accounts for 1.44 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 0.31 percent and 1.83 percent storage in potentially totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Pocahontas No. 5: This coal has been mined by underground methods in McDowell, Mercer, and Raleigh counties. Of the 26 mines in this seam, 25 are located in areas in which structure contour and cropline data are currently available. All underground mines in this seam area located above drainage, and 15 of them are potentially partially flooded by groundwater. The down dip areas of four of these mines are partly located in Virginia where potential flooding is more likely to occur.

Pocahontas No. 4: This coal generally dips to the northwest; however, the southwest-northeast trending Pineville, Mullens, and Dry Fork anticlines locally affect dip direction in areas of Raleigh, Wyoming, and McDowell counties (Figure 25a). Erosional remnants of the Pocahontas No. 4 occur along the southwest-northeast trending Dry Fork Anticline in southeastern McDowell County. Available data indicate bed thickness ranges from 0 to more than 144 inches, and the thickest part of the coal bed is in southeastern McDowell County where it has been mined basically to exhaustion. In the areas where underground mining has occurred, this coal bed is generally 24 to 108 inches thick (Figure 25b).

Underground mining in this seam has taken place in McDowell and Wyoming counties (Figure 25c). Of the 58 mines in this seam, 55 are located in areas where structure contour and cropline data have been completed. Thirty-nine mines are located above drainage, nine near drainage, and seven below drainage (Figure 25c). Seven below drainage mines are potentially totally flooded, and six of these are greater than 500 acres in area (Figure 25d). These six mines have average bed thicknesses ranging from 28.50 to 67.47 inches. Thirty-one of the above drainage mines and 9 of the near drainage mines are potentially partially flooded (Figure 25e). Four potentially partially flooded near drainage mines exceed 500 acres in area, and large to very large areas of these mines could be flooded. The average bed thicknesses of these four mines range from 45.28 to 78.27 inches. Statistical information about potential groundwater flooding in this seam is presented in Figures 25c–e.

In parts of central and southeastern McDowell County and eastern Wyoming County, groundwater flooding of underground mines in the Pocahontas No. 4 will likely be affected in areas where underground mines in the Pocahontas No. 3 are present less that 100 feet below.

Potentially partially and totally flooded underground mines in the Pocahontas No. 4 coal provide an estimated 50.432.56 MMGal of potential storage; and 64.42 percent of estimated storage is in potentially partially flooded mines. This potential storage accounts for 3.64 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 4.98 percent and 3.18 percent storage in potentially totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Pocahontas No. 3: This coal generally dips to the northwest; however, the southwest-northeast trending Pineville, Mullens, and Dry Fork anticlines locally affect dip direction in areas of Raleigh, Wyoming, and McDowell counties (Figure 26a). Erosional remnants of the Pocahontas No. 3 occur along the southwest-northeast trending Dry Fork Anticline in southeastern McDowell County. Isopach maps for the Pocahontas No. 3 were not available at the time of this writing. However, data indicate that the Pocahontas No. 3 ranges in thickness from 0 to more than 120 inches.

This seam has been mined extensively by underground methods in Wyoming, McDowell, Raleigh, Mercer, and Summers counties (Figure 26c). Of the 299 mines in this seam, 280 are located in areas in which structure contour maps are currently available; however, cropline data are available for the areas in which these mines are located. Two hundred thirty-two of these mines are located above drainage, 35 near drainage, and 13 below drainage (Figure 26c). In areas where structure contour coverages are available, visual analysis indicates 13 below drainage mines are potentially totally flooded (Figure 26d) and 178 above drainage mines and 33 near drainage mines are potentially partially filled by groundwater (Figure 26e). Twelve potentially totally flooded mines exceed 500 acres in area, and average bed thicknesses of these mines range from 35.00 to 67.00 inches. Twenty-two potentially partially flooded near drainage mines exceed 500 acres in area, and average bed thicknesses of these mines range from 38.08 to 80.58 inches. Statistical information about potential groundwater flooded in this seam is presented in Figures 26c-e.

Potentially partially and totally flooded underground mines in the Pocahontas No. 3 coal provide an estimated 161,086.42 MMGal of potential storage 80.14 percent of estimated storage is in potentially flooded mines. This potential storage accounts for 11.64 percent of total potential storage in underground mines of major seams (Figure 7a). This coal represents 8.87 percent and 12.62 percent storage in potential totally and partially flooded mines, respectively, of major seams (Figures 7b, c).

Pocahontas No. 2: This coal bed dips to the northwest (Figure 27a). Where data are available, this bed is generally 24 to 36 inches thick (Figure 27b), and it is thickest in southern Raleigh County. In areas where underground mining has taken place, bed thickness generally ranges from 24 to more than 36 inches (Figure 23b).

The 15 underground mines in this seam are located in McDowell, Mercer, and Raleigh counties(Figure 27c). Fourteen mines are located above drainage, and one mine is located near drainage (Figure 27c). No potentially totally flooded below drainage mines are present in this coal bed (Figure 27d). Six of these 14 above drainage mines have very small to small areas that are potentially partially filled by groundwater. Large areas of the potentially partially flooded near drainage mine, which exceeds 500 acres in area, is located in southern Raleigh County. The average coal bed thickness of this mine is 31.00 inches (Figure 27e). Statistical information about potential groundwater flooding in this seam is presented in Figures 27c–e.

Potentially partially flooded underground mines in the Pocahontas No. 2 coal provide an estimated 947.09 MMGal of total potential storage, and these mines account for 0.09 percent of total potential groundwater storage and 2.85 percent of potential partial storage in underground mines of major seams (Figures 7a–c).

DISCUSSION

In this study 8,907 of the 9,539 mine polygons examined represented above drainage underground mines. The potential for total or partial flooding in these mines is less certain than it is for near and below drainage mines. These above drainage mines are in coal beds that crop out on hillsides and hilltops. Perched aquifers above local drainage have a more limited areal extent than the unconfined and confined aquifers associated with near and below drainage mines. The degree of certainty about extent of potential flooding of mine voids is greatest in below drainage mines and least in above drainage mines.

Although below and near drainage mines have a greater potential for flooding, storage in above drainage mines should not be overlooked. Statewide public water supply data was analyzed as part of this study to determine which water sources were associated with underground mines. Twenty-seven public water supplies, which are located in Boone, Kanawha, Logan, Mingo, Fayette, Greenbrier, McDowell, Raleigh, and Wyoming counties, were identified as being associated with underground mines in these nine coal beds: Stockton; Winifrede; Fire Clay; No. 2 Gas; Sewell; Beckley; Fire Creek; Pocahontas No. 4; and Pocahontas No. 6. Ten of these public water supplies are springs formed where old works crop out and 17 are wells drilled into old mines. Twenty-two are located above drainage and four are located near drainage, mostly in potential partially flooded mines; and one is located below drainage.

An important finding of this study is the recognition that total estimated potential storage in the Pittsburgh mine pools surpasses that of mine pools in each of the other major coal beds including the No. 2 Gas, Pocahontas No. 3, Eagle, and Sewell. This fact is due to the wide areal extent of this coal bed, its position with respect to major drainage, and its greater average thickness.

This study addressed the potential for large volumes of groundwater storage in underground mines based on mine void volume. Determining the actual extent of groundwater flooding in specific underground mines requires more in depth studies. Recent studies of the extent of mine pool flooding iin the Monongahela Basin, which are based on water-level measurements within specific mines of the Pittsburgh coal bed in northern West Virginia and southwestern Pennsylvania (Ziemkiewisc and Vandivort, 2004, Ziemkiewisc et al., 2004, and Donovan, 2004a, 2004b), have provided insight into the formation of mine pools. Ziemkiewisc et al. (2004) noted that the amount of hydraulic connection between adjacent mines was affected by barrier pillar geometry and thickness and the leakage rate through barrier pillars. Donovan (2004a) reported instances in which groundwater pumping in inactive or closed mines adjacent to an active mine was used to control mine pool elevations to minimize leakage into the active mine. The assumption that all inactive below drainage mines are flooded can be misleading. Donovan (2004b, p. 38) noted that the Valley Camp 1 mine, which is a below drainage mine in the Pittsburgh coal in Brooke County, "... has been closed for over 20 years, the fact that the mine is dry indicates that there is very little inflow to this mine ...."

Multiple seam mining may also affect groundwater flooding in underground mines. In the Monongahela Basin mine flooding study, Donovan (2004a, p. 98) reported that "vertical infiltration to underground mines of the Pittsburgh coal seam is influenced by three principal factors: (a) depth, (b) the presence or absence of overlying Sewickley mining, and (c) status of flooding." Underground mining of multiple coal beds has occurred in many areas of the State. For example, underground mines are present in 14 Kanawha Formation coal beds in the Handley Syncline in southwestern West Virginia, and mines in multiple seams overlap in several areas. Many of the underground mines in this area could be totally or partially flooded, but fracturing of overburden in overlapping mines may affect potential flooding, especially in mines of the upper coal beds. The hydrologic interaction between mines in more than one seam is beyond the scope of this project, and actual determination of mine flooding should be investigated on a case by case basis.

CONCLUSIONS

The total potential storage in the Pittsburgh seam surpasses that of other major seams such as the Number 2 Gas, Pocahontas No. 3, Eagle, and Sewell. The main reasons are the wide lateral extent of this seam and its greater average thickness.

Much of the underground mining in the West Virginia has occurred above drainage. The examination of 9,539 mine polygons of mining in 69 seams determined 8,907 mines are above drainage; 325 are near drainage, 178 are below drainage, and 129 are currently undetermined.

Ninety-nine mines in 14 major seams are potentially totally flooded and are generally located below drainage. These mines are located in these seams in the following counties:

- Pittsburgh seam in Ohio, Marshall, Monongalia, Marion, and Harrison counties
- Upper Freeport seam in Preston County
- Middle Kittanning seam in Preston and Barbour counties
- Coalburg seam in Wayne and Lincoln counties
- Peerless seam in Kanawha, Nicholas, and Mingo counties
- No. 2 Gas seam in Logan, Mingo, Boone, and Kanawha counties
- Powellton seam in Boone, Logan, and Mingo counties
- Lower Powellton seam in Mingo County
- Eagle seam in Nicholas, Fayette, Kanawha, Boone, Logan, and Mingo counties
- Sewell seam in Nicholas, Fayette, Raleigh, and Wyoming counties
- Beckley seam in Fayette, Raleigh, and Wyoming counties
- Pocahontas No. 6 seam in Raleigh County
- Pocahontas No. 4 seam in McDowell County
- Pocahontas No. 3 seam in Wyoming, McDowell, and Raleigh counties

Potential partial flooding was present in 532 mines; 147 mines are located near drainage and 385 are above drainage. Nineteen seams contain potentially partially flooded mines; these seams include the 14 listed above that also have potentially totally flooded mines. Potential partially flooded mines present in the five other seams are located in these counties:

- Sewickley seam in Monongalia and Marion counties
- Bakerstown seam in Preston, Grant, and Tucker counties
- No. 5 Block seam in Braxton, Nicholas, Clay, Kanawha, Boone, Lincoln, Mingo, and Wayne counties
- Stockton seam in Braxton, Nicholas, Kanawha, Boone, Logan, Lincoln, and Mingo counties.
- Pocahontas No. 2 seam in Raleigh County.

Although efforts are made to use best available data and locate mines as accurately as possible, mine locations should be considered approximate. The actual extent of mining may be unknown because final mine maps at the time of mine closures are not always available and not all underground mining has been documented by mine maps. The quality of mines maps is highly variable in the amount of detail and information presented. Some of the newer mine maps are available in digital form; however, many older mine maps have been photographically reduced from dimensionally unstable paper copies. Photographic reduction also introduced distortion due to lens geometry. Also, coal correlations may change with additional information. Active mines are not differentiated from recently closed mines in the CBMP database.

The extent of potential mine flooding is dependent on several factors, including mine orientation, locations of mine entries, proximity to other underground mines, and direction of groundwater flow. Groundwater pumping to enable underground mining can affect water levels in adjacent underground mines. Mine flooding in one seam also may be affected by underground mining in stratigraphically lower coals. In general, once pumping ceases, the mines begin to flood.

The results of this study should be considered a “snapshot” rather than a finished product. New mines continually open in West Virginia and in adjoining states near the State’s borders. In addition, newly obtained mining coverages are being constantly updated in the CBMP GIS as new information becomes available. All of these factors reinforce the need for detailed site-specific studies to determine the actual presence of adequate water resources.

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MINE POOL ATLAS

FIGURES

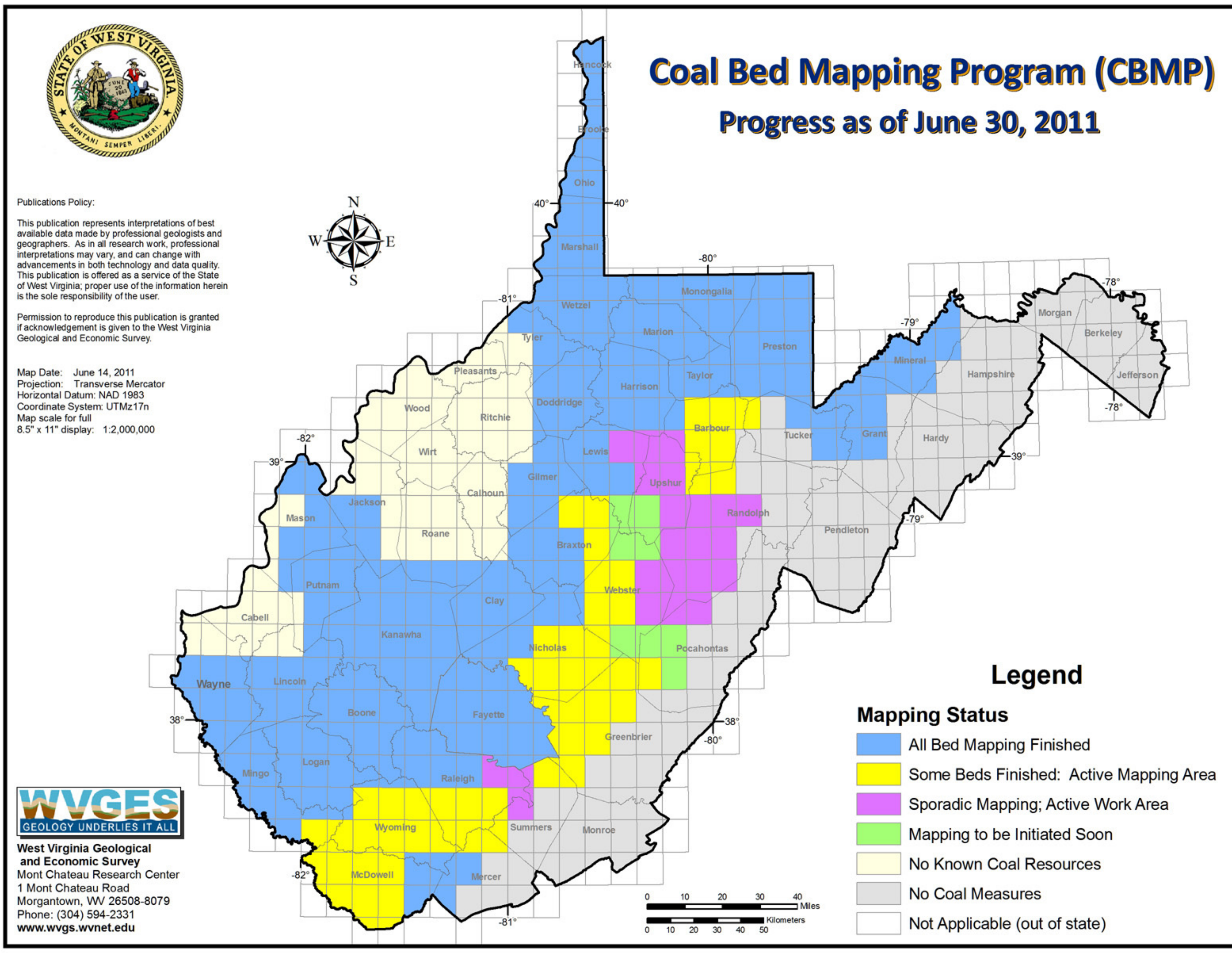


Figure 1. Status of coal bed mapping by the WVGES CBMP as of June 30, 2011 (B.M. Blake, unpub. data, 2011)

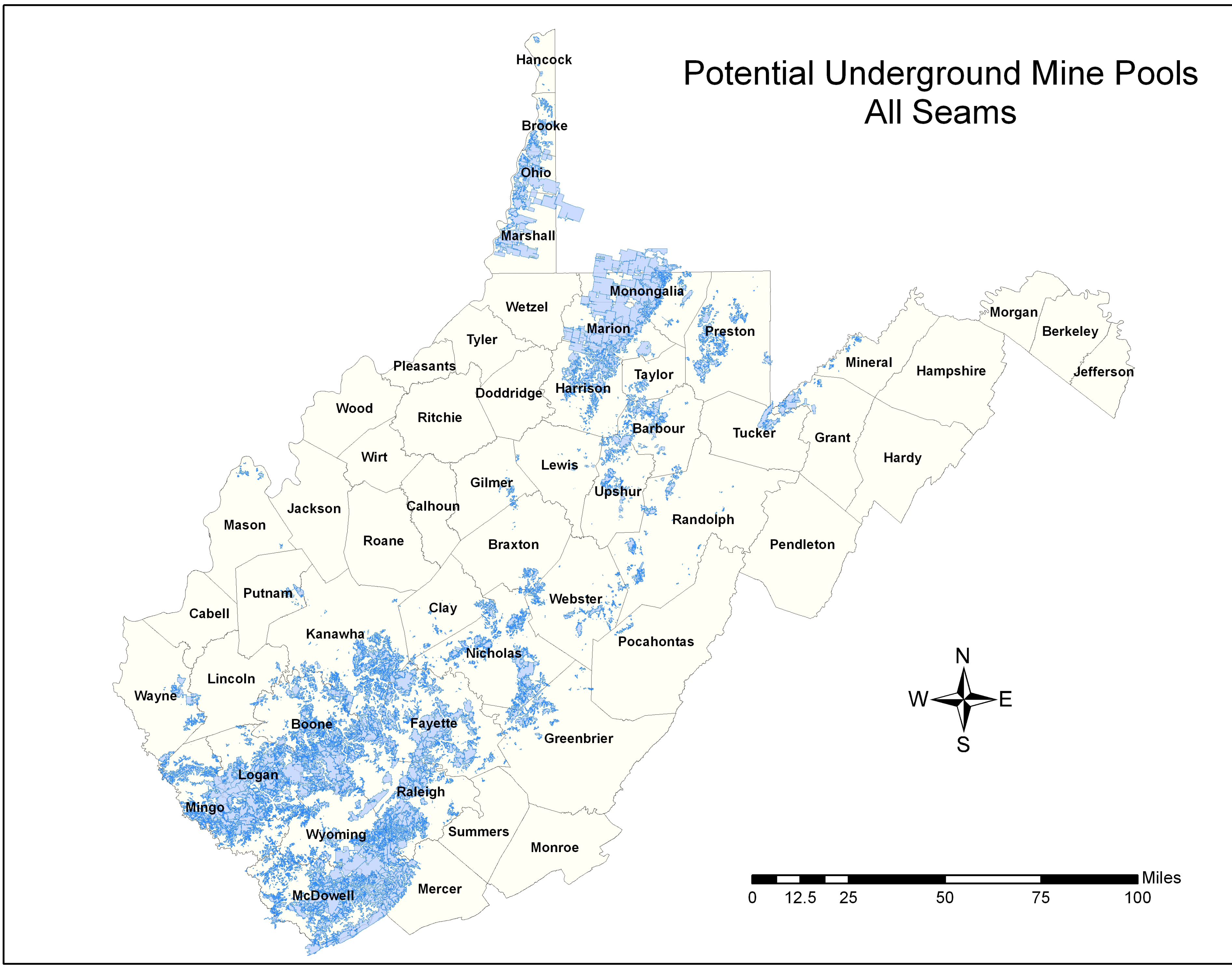


Figure 2. Footprints of all documented underground mines in West Virginia coal seams delineate areas of potential mine pools (WVGES, 2010).

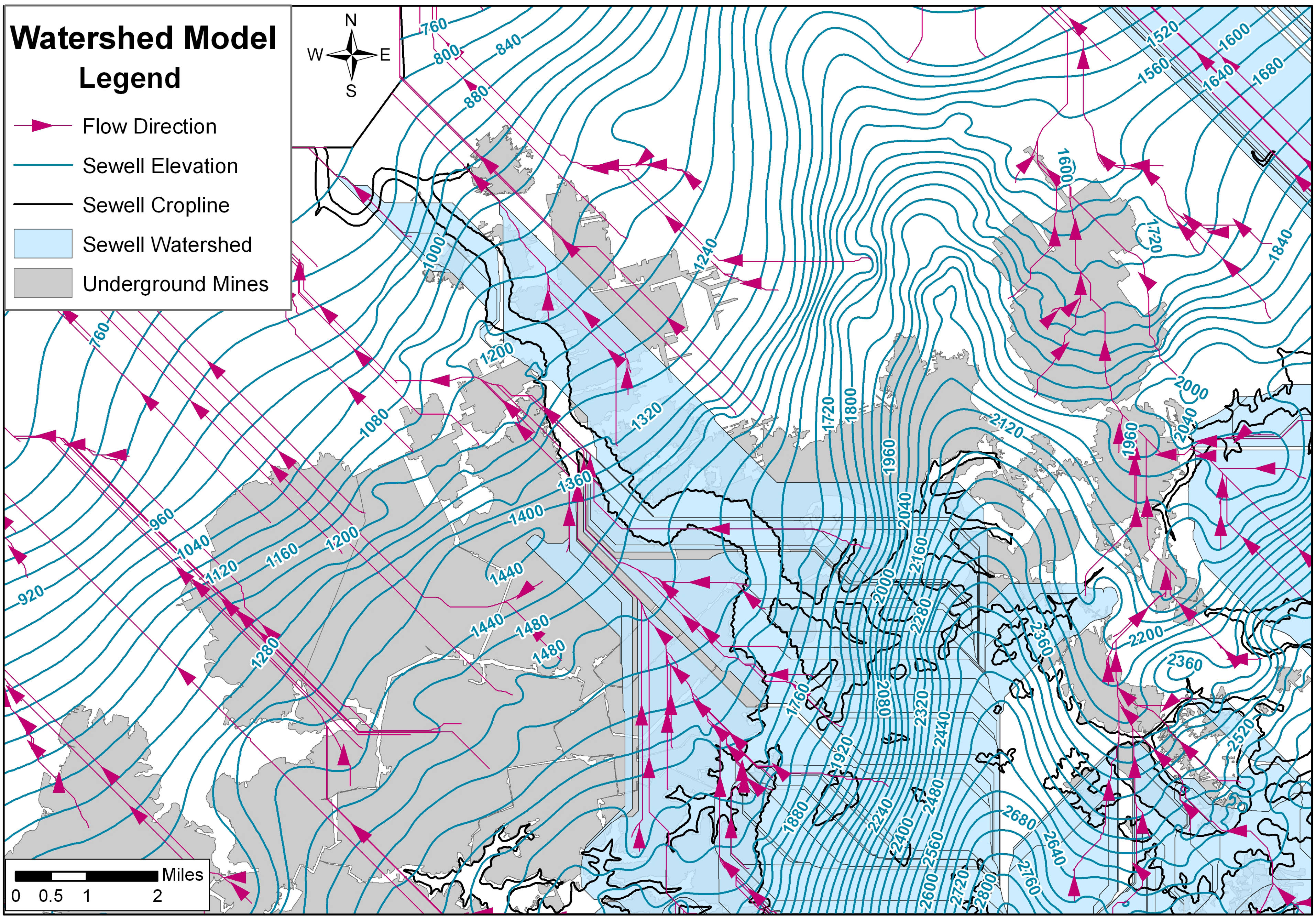


Figure 3. Watershed model output shows predicted direction of groundwater flow through mine voids in the Sewell coal bed on the Fayetteville 7.5-minute topographic quadrangle and surrounding area. The blue watershed area represents water flow from mines contributing to surface water flow. Red arrows show flow direction. This model was run for all coal beds having available input data to aid in determining extent of potential flooding in underground mines.

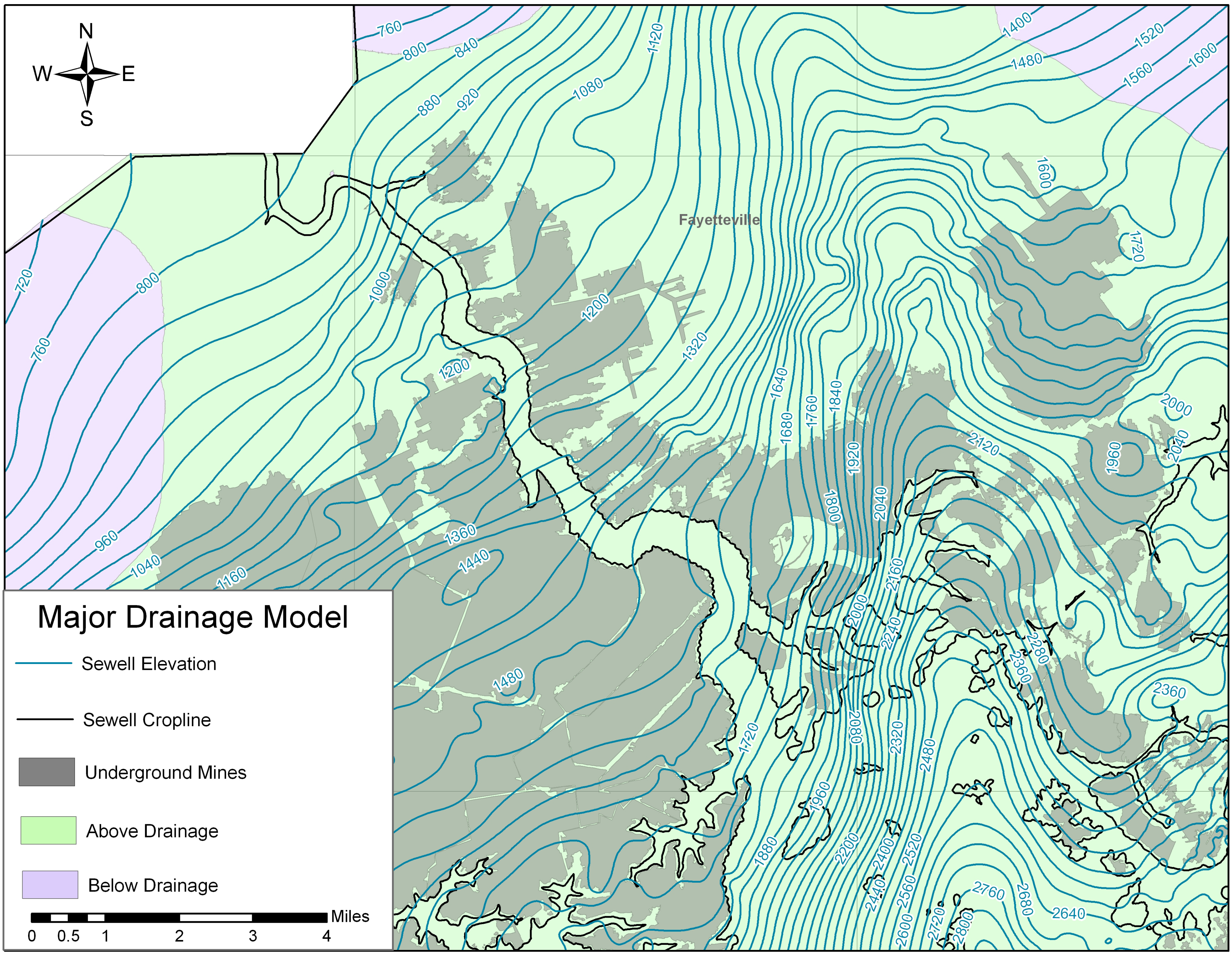


Figure 4. Major Drainage–Mining Above/Below Drainage (MABD) model output shows areas of the Sewell coal bed that lie above and below major drainage on the Fayetteville 7.5-minute topographic quadrangle and surrounding area. This model, which was developed to determine mine position with respect to drainage based on perennial stream elevations, generated a Major Drainage Elevation Model (MDEM) by assigning USGS 7.5-minute quadrangle elevations to points selected from the National Hydrography Dataset (NHD) that are located within digitized perennial stream polygons.

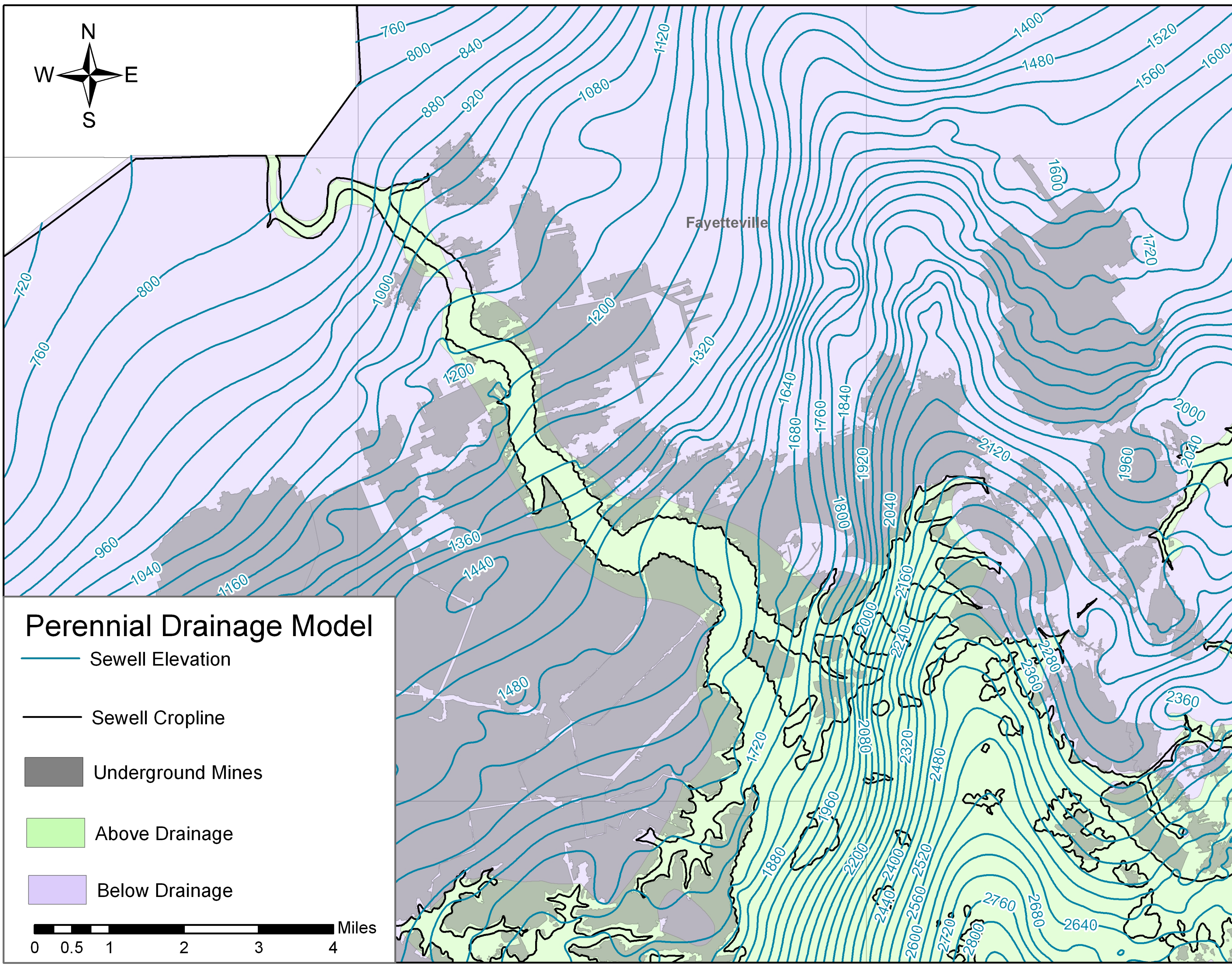


Figure 5. Perennial Drainage –Mining Above/Below Drainage model output shows areas of the Sewell coal bed that lie above and below perennial drainage on the Fayetteville 7.5-minute topographic quadrangle and surrounding area. This model, which was developed to determine mine position with respect to drainage based on perennial stream elevations, generated a Perennial Drainage Elevation Model (PDEM) by assigning USGS 7.5-minute quadrangle elevations to points selected from the National Hydrography Dataset (NHD) that are located along digitized perennial stream lines.

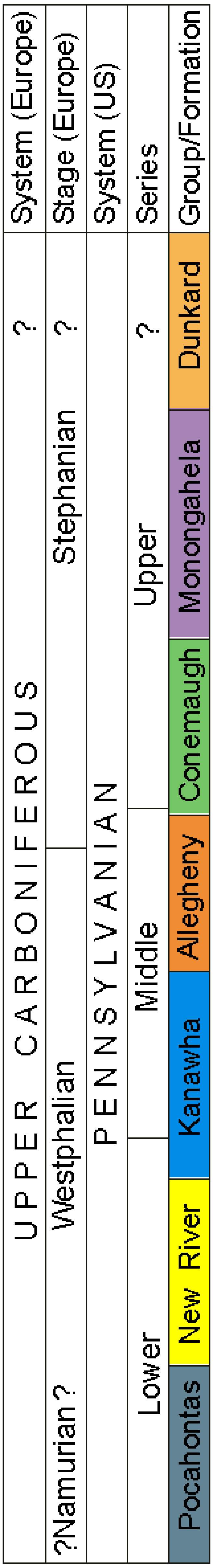


Figure 6a

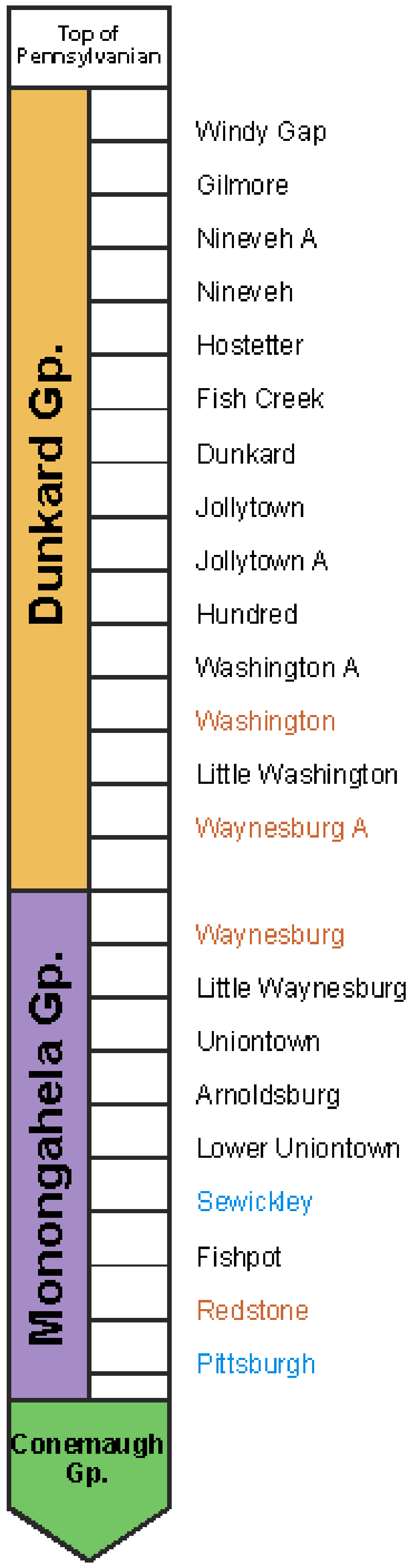


Figure 6b

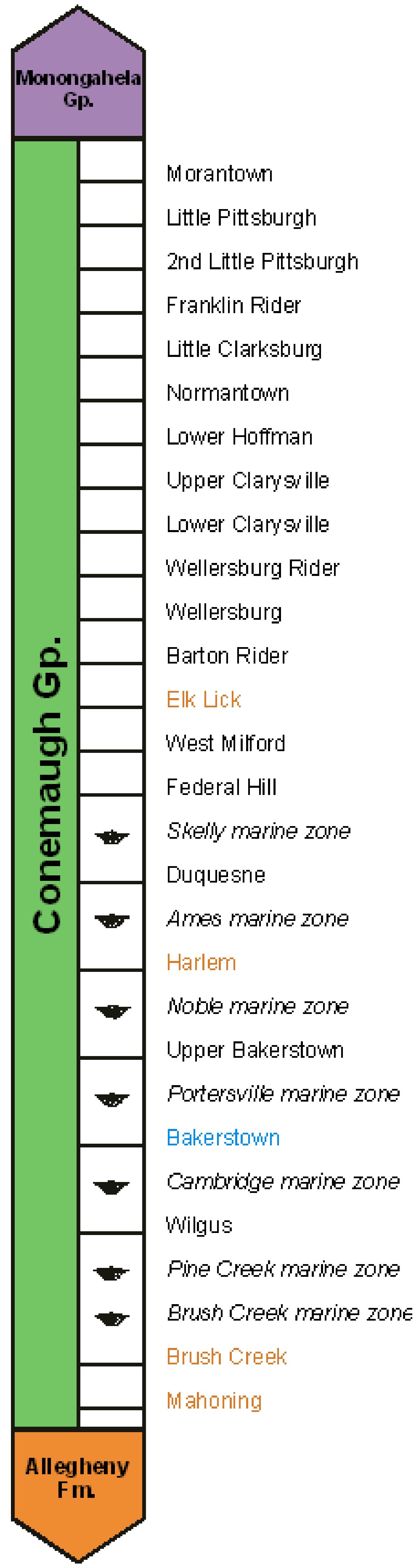


Figure 6c

Figure 6. Stratigraphic chart and columns of the Pennsylvania coal-bearing strata in West Virginia: (a) stratigraphic chart shows age and stratigraphic position of groups/formations; (b) stratigraphic column of the Dunkard and Monongahela Groups; (c) stratigraphic column of the Conemaugh Group; (d) stratigraphic column of the Allegheny Formation; (e) stratigraphic column of the Kanawha Formation; and (f) stratigraphic column of the New River and Pocahontas Formations. The names of the 19 major seams identified in this report, mineable coal beds, and named unmined coal beds are shown in blue, orange, and black, respectively.

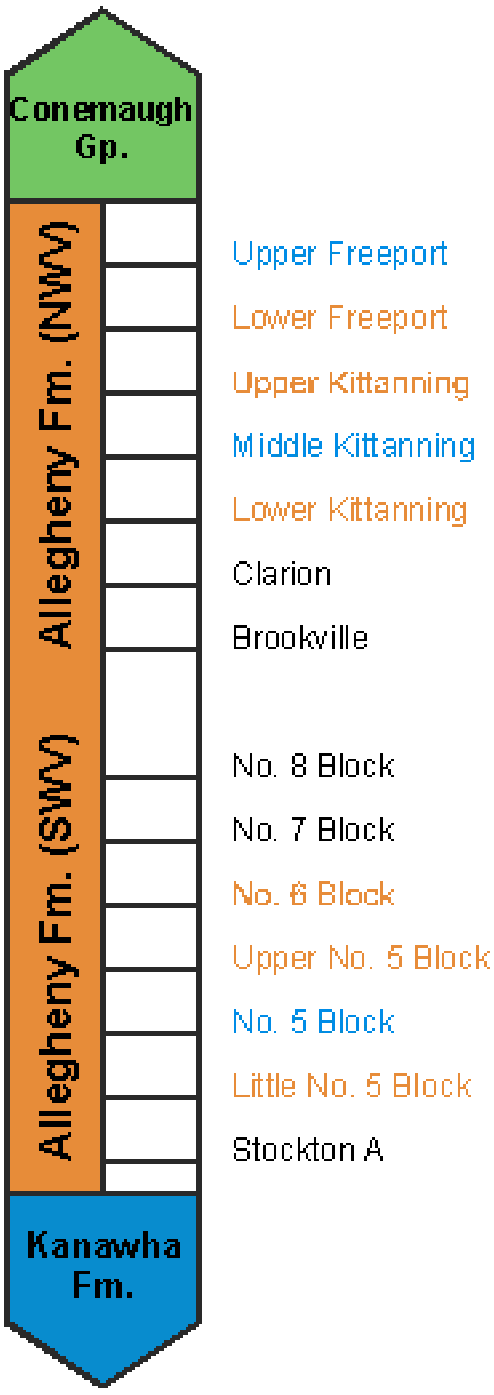


Figure 6d

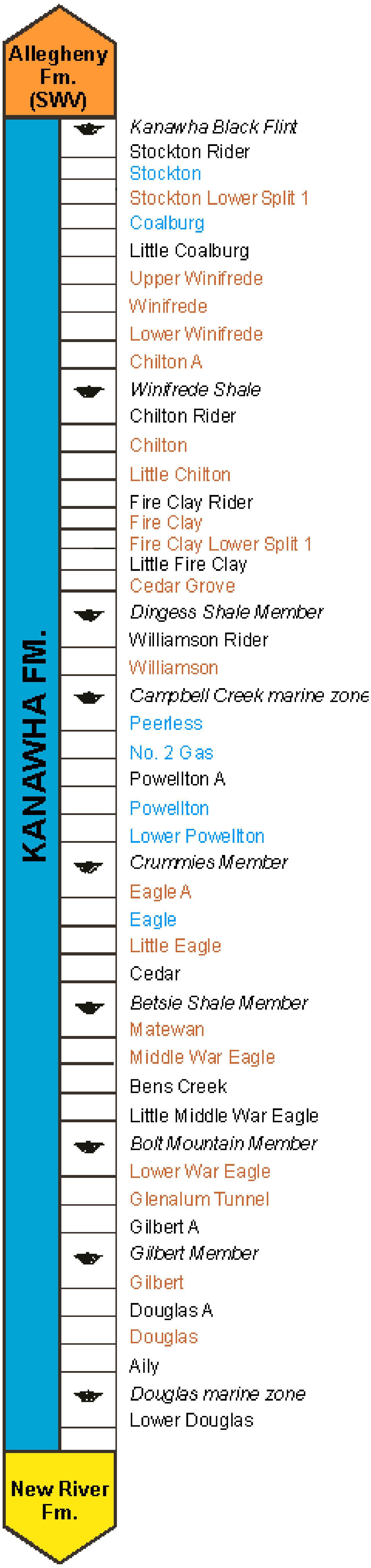


Figure 6e

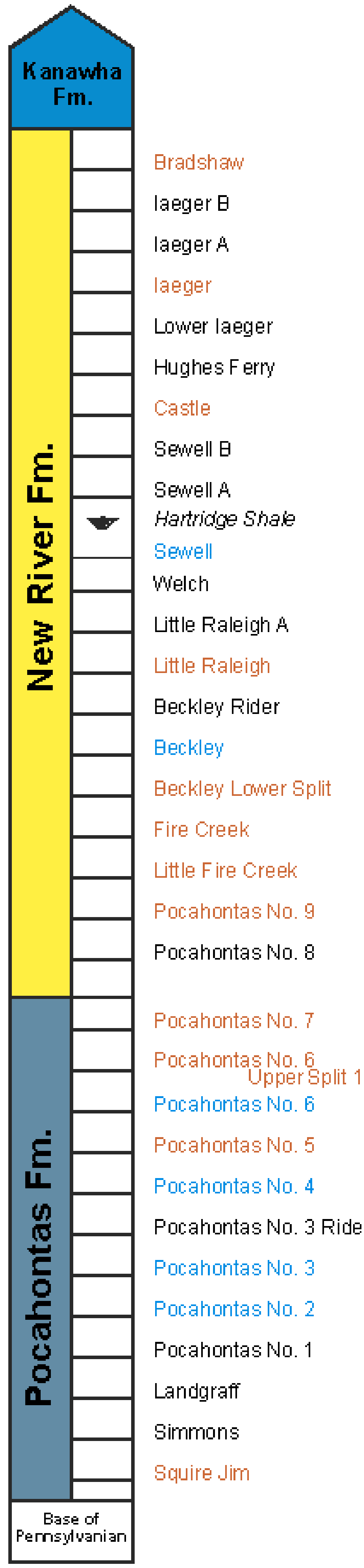
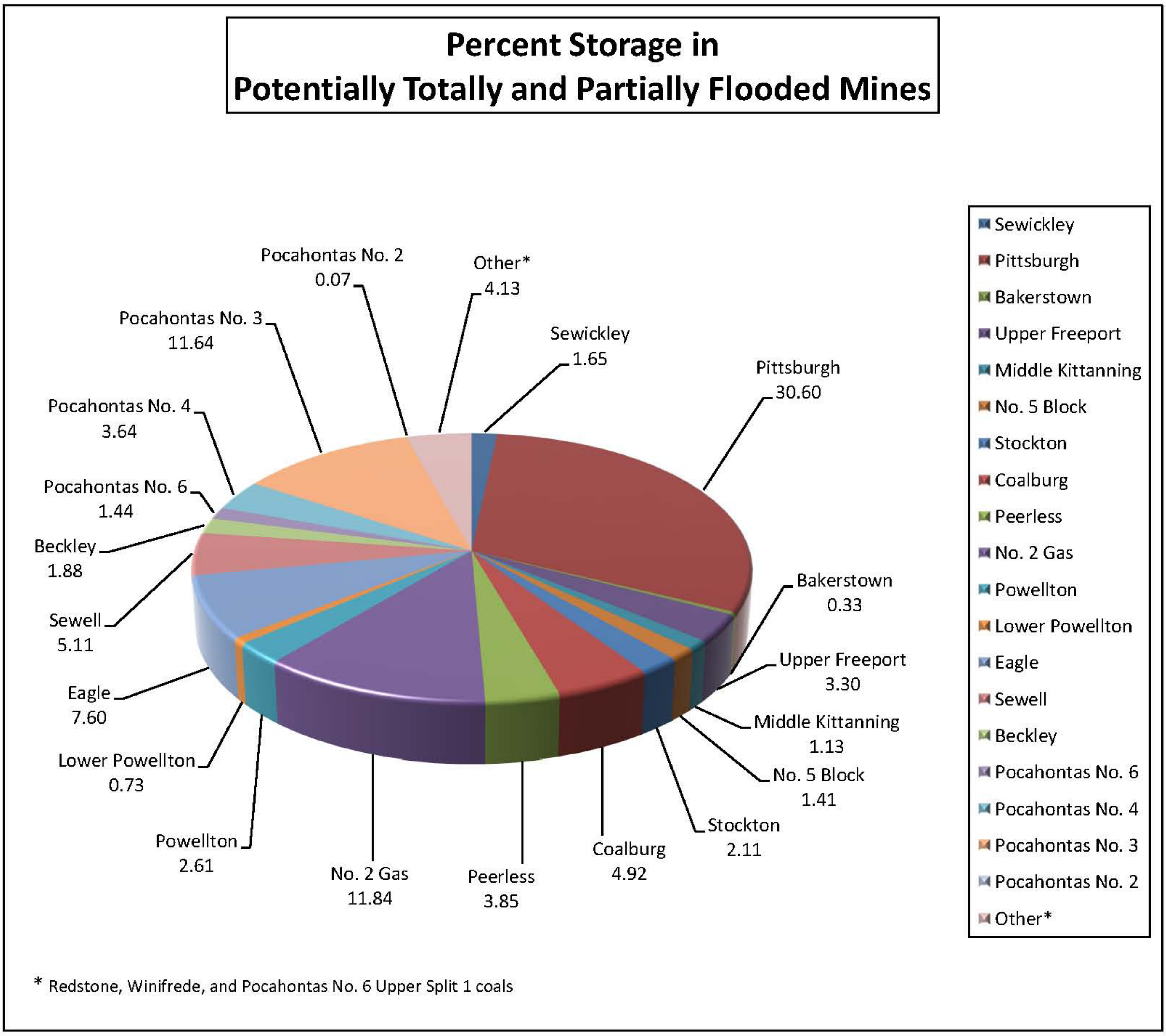


Figure 6f



Percent Storage in
Potentially Totally and Partially Flooded Mines
Pocahontas No. 2
0.07
Other*
4.13
Sewickley
1.65
Pittsburgh
30.60
Pocahontas No. 3
11.64
Pocahontas No. 4
3.64
Pocahontas No. 6
1.44
Beckley
1.88
Sewell
5.11
Eagle
7.60
Lower Powellton
0.73
Powellton
2.61
No. 2 Gas
11.84
Peerless
3.85
Coalburg
4.92
Stockton
2.11
No. 5 Block
1.41
Middle Kittanning
1.13
Upper Freeport
3.30
Bakerstown
0.33
Sewickley
Pittsburgh
Bakerstown
Upper Freeport
Middle Kittanning
No. 5 Block
Stockton
Coalburg
Peerless
No. 2 Gas
Powellton
Lower Powellton
Eagle
Sewell
Beckley
Pocahontas No. 6
Pocahontas No. 4
Pocahontas No. 3
Pocahontas No. 2
Other*
* Redstone, Winifrede, and Pocahontas No. 6 Upper Split 1 coals

Figure 7a

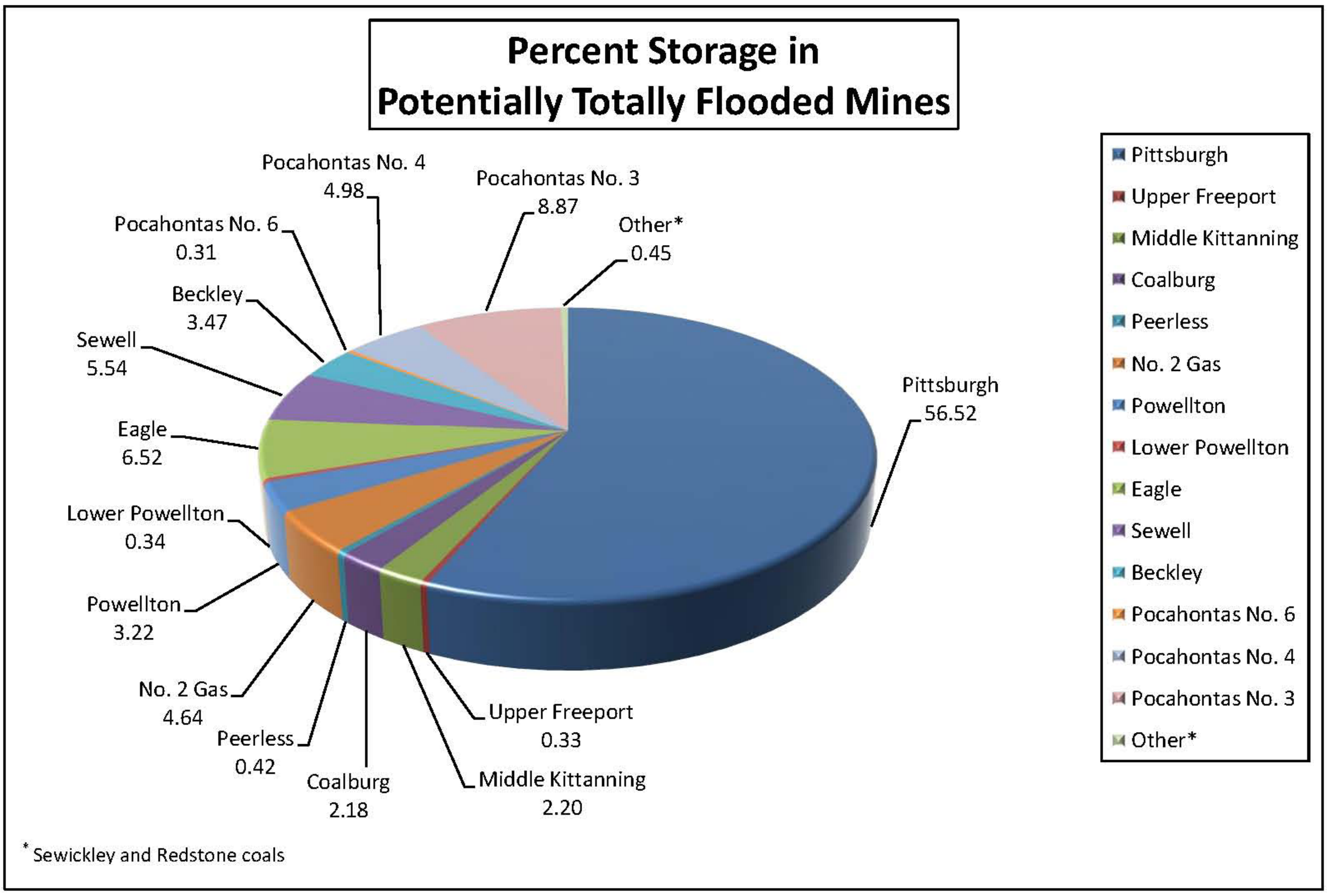

Percent Storage in Potentially Totally Flooded Mines
Pocahontas No. 4 4.98
Pocahontas No. 3 8.87
Pocahontas No. 6 0.31
Other* 0.45
Beckley 3.47
Sewell 5.54
Pittsburgh 56.52
Eagle 6.52
Lower Powellton 0.34
Powellton 3.22
No. 2 Gas 4.64
Peerless 0.42
Upper Freeport 0.33
Coalburg 2.18
Middle Kittanning 2.20
Pittsburgh
Upper Freeport
Middle Kittanning
Coalburg
Peerless
No. 2 Gas
Powellton
Lower Powellton
Eagle
Sewell
Beckley
Pocahontas No. 6
Pocahontas No. 4
Pocahontas No. 3
Other*
* Sewickley and Redstone coals

Figure 7b

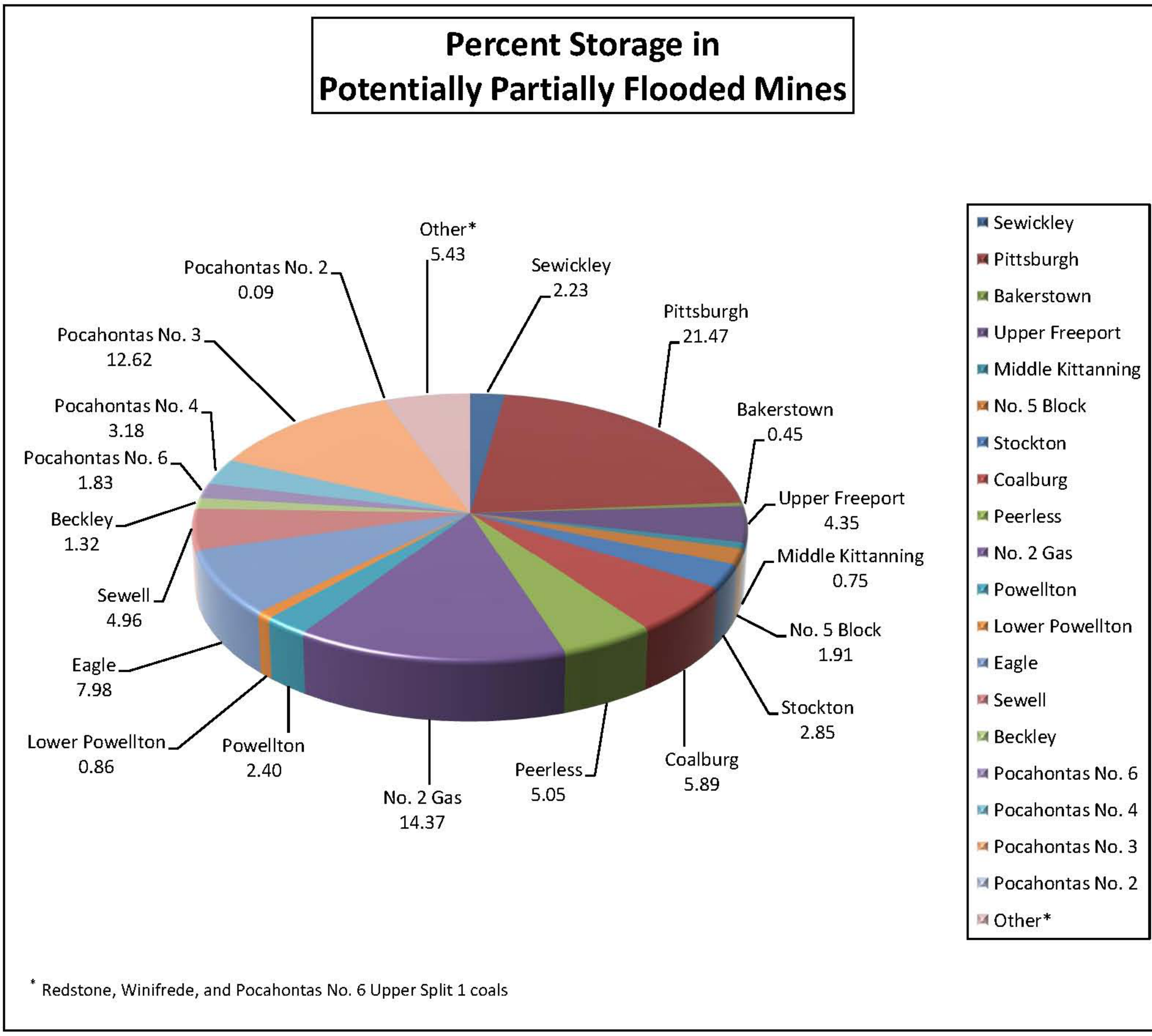

Percent Storage in
Potentially Partially Flooded Mines
Other* 5.43
Sewickley 2.23
Pittsburgh 21.47
Bakerstown 0.45
Upper Freeport 4.35
Middle Kittanning 0.75
No. 5 Block 1.91
Stockton 2.85
Coalburg 5.89
Peerless 5.05
No. 2 Gas 14.37
Powellton 2.40
Lower Powellton 0.86
Eagle 7.98
Sewell 4.96
Beckley 1.32
Pocahontas No. 6 1.83
Pocahontas No. 4 3.18
Pocahontas No. 3 12.62
Pocahontas No. 2 0.09
Sewickley
Pittsburgh
Bakerstown
Upper Freeport
Middle Kittanning
No. 5 Block
Stockton
Coalburg
Peerless
No. 2 Gas
Powellton
Lower Powellton
Eagle
Sewell
Beckley
Pocahontas No. 6
Pocahontas No. 4
Pocahontas No. 3
Pocahontas No. 2
Other*
* Redstone, Winifrede, and Pocahontas No. 6 Upper Split 1 coals

Figure 7c

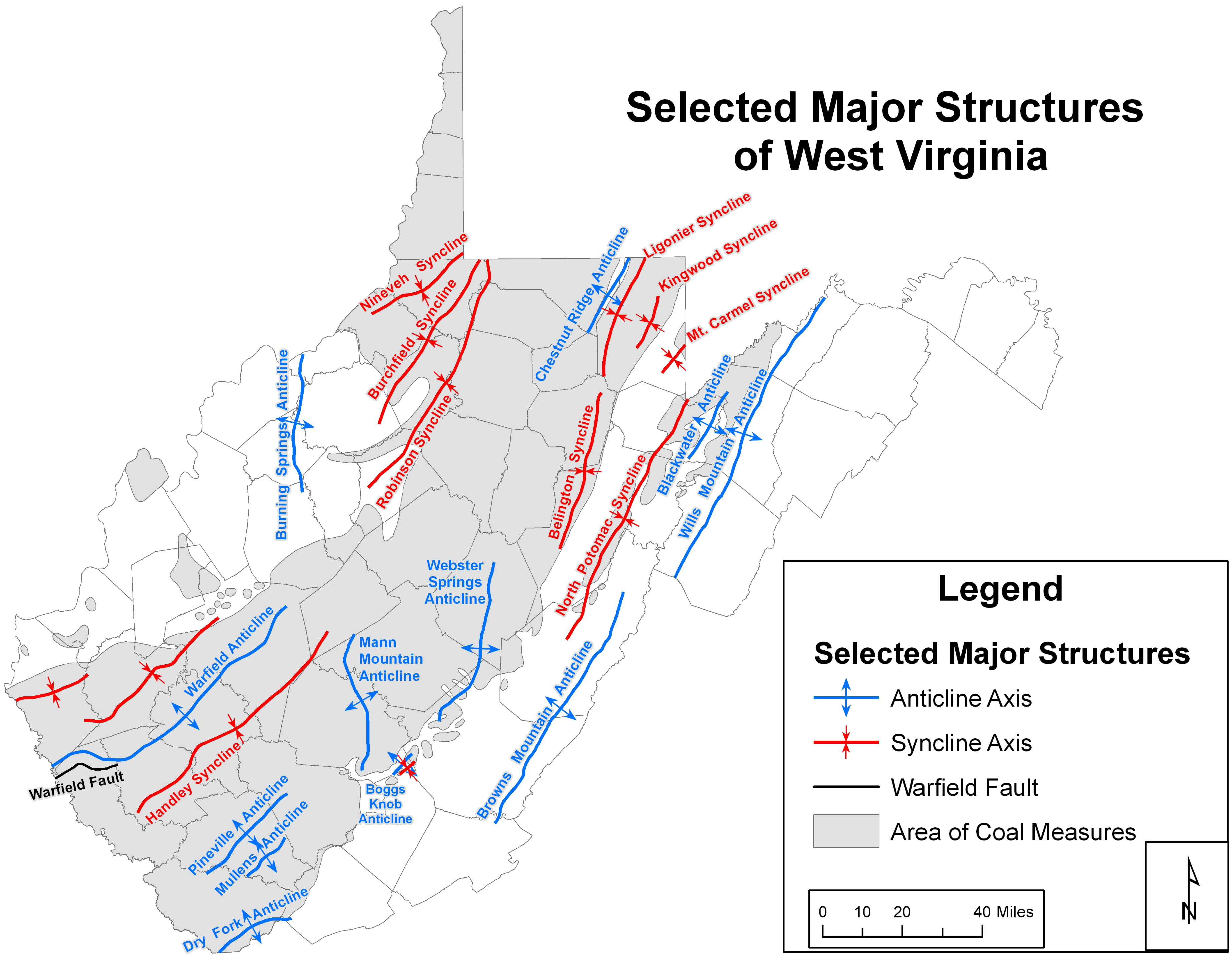

Selected Major Structures
of West Virginia
Legend
Selected Major Structures
Anticline Axis
Syncline Axis
Warfield Fault
Area of Coal Measures
0 10 20 40 Miles
N
Nineveh Syncline
Burchfield Syncline
Robinson Syncline
Burning Springs Anticline
Chestnut Ridge Anticline
Ligonier Syncline
Kingwood Syncline
Mt. Carmel Syncline
Belington Syncline
North Potomac Syncline
Blackwater Anticline
Wills Mountain Anticline
Webster Springs Anticline
Mann Mountain Anticline
Boggs Knob Anticline
Browns Mountain Anticline
Warfield Anticline
Warfield Fault
Handley Syncline
Pineville Anticline
Mullens Anticline
Dry Fork Anticline

Figure 8

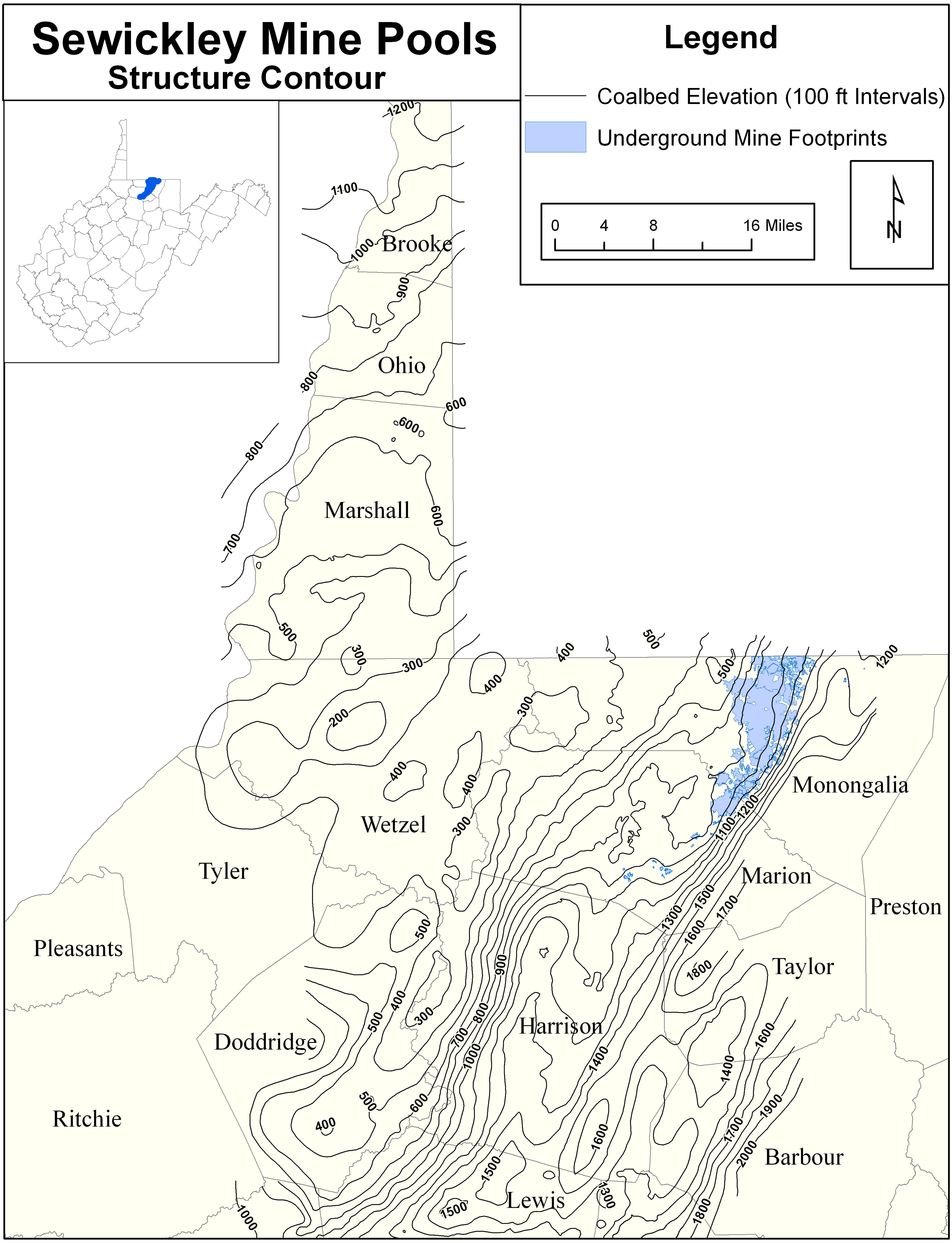

Sewickley Mine Pools
Structure Contour
Legend
Coalbed Elevation (100 ft Intervals)
Underground Mine Footprints
0 4 8 16 Miles
N
Brooke
Ohio
Marshall
Wetzel
Tyler
Pleasants
Ritchie
Doddridge
Harrison
Lewis
Marion
Monongalia
Preston
Taylor
Barbour

Figure 9a

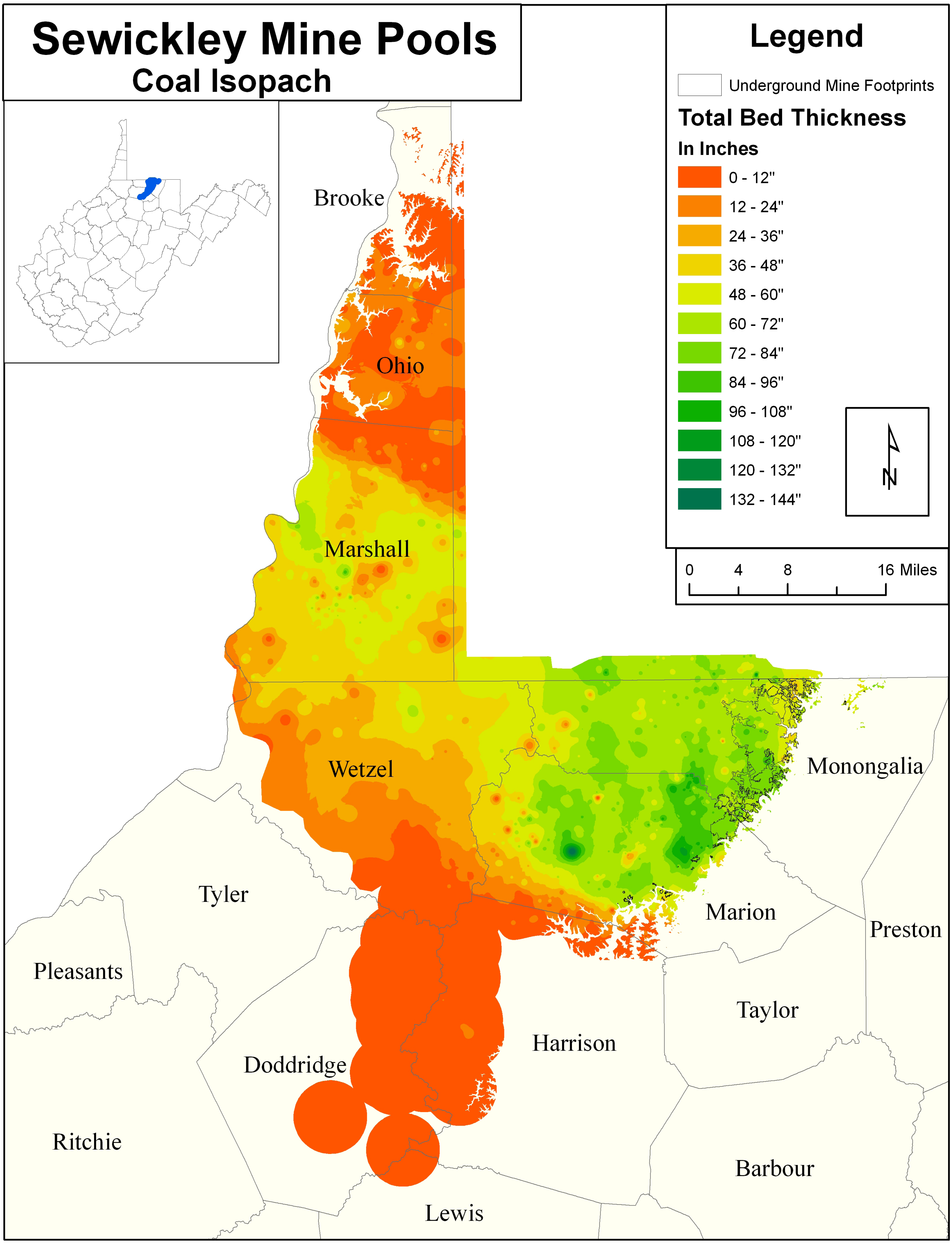
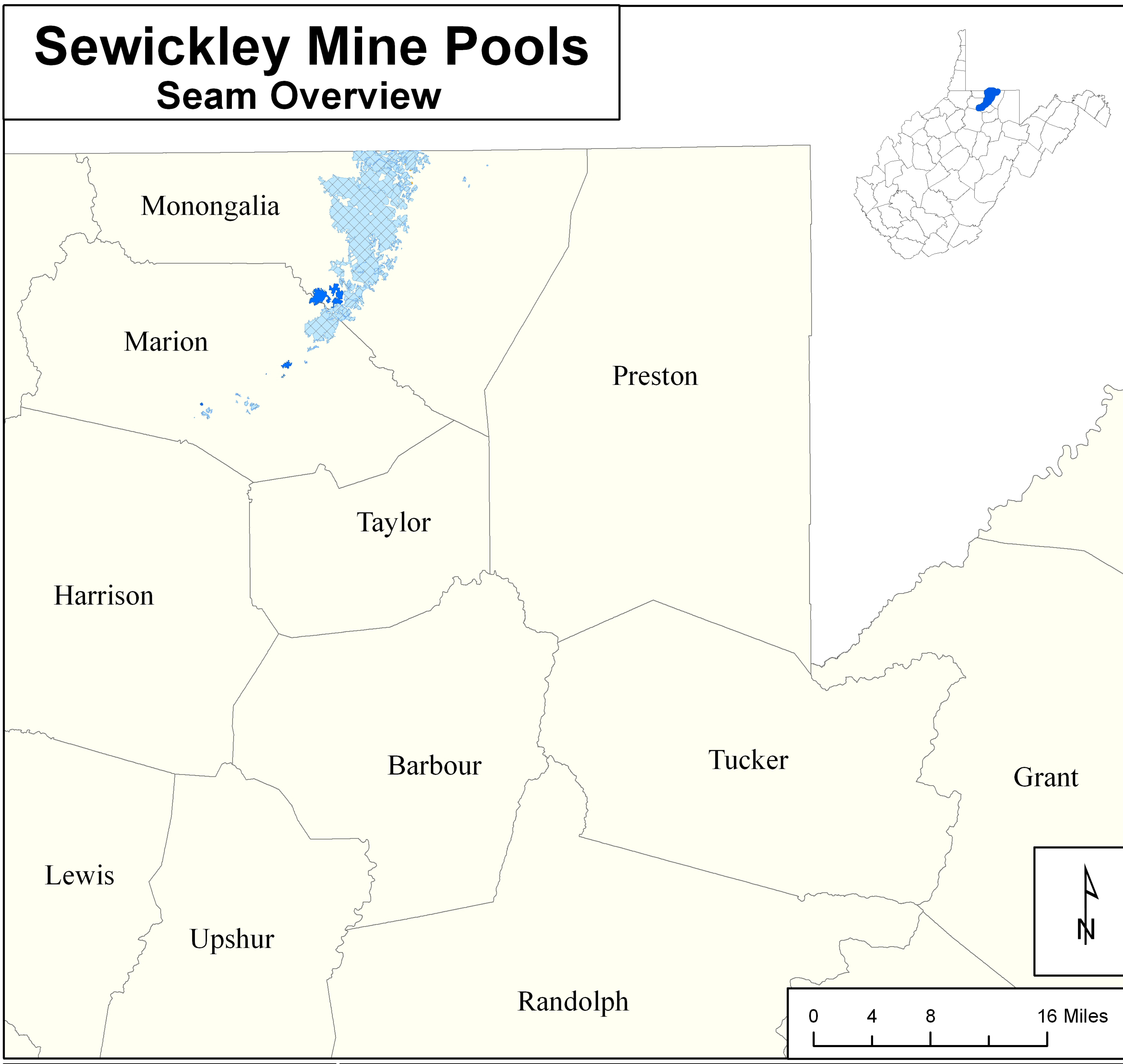

Sewickley Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
N
0
4
8
16 Miles
Brooke
Ohio
Marshall
Wetzel
Monongalia
Tyler
Marion
Preston
Pleasants
Taylor
Harrison
Doddridge
Ritchie
Barbour
Lewis

Figure 9b

Sewickley Mine Pools
Seam Overview



Legend

Position

Above drainage

Near drainage

Below drainage

Potential Extent of Flooding

Undetermined

Flooded areas unlikely

Partially flooded

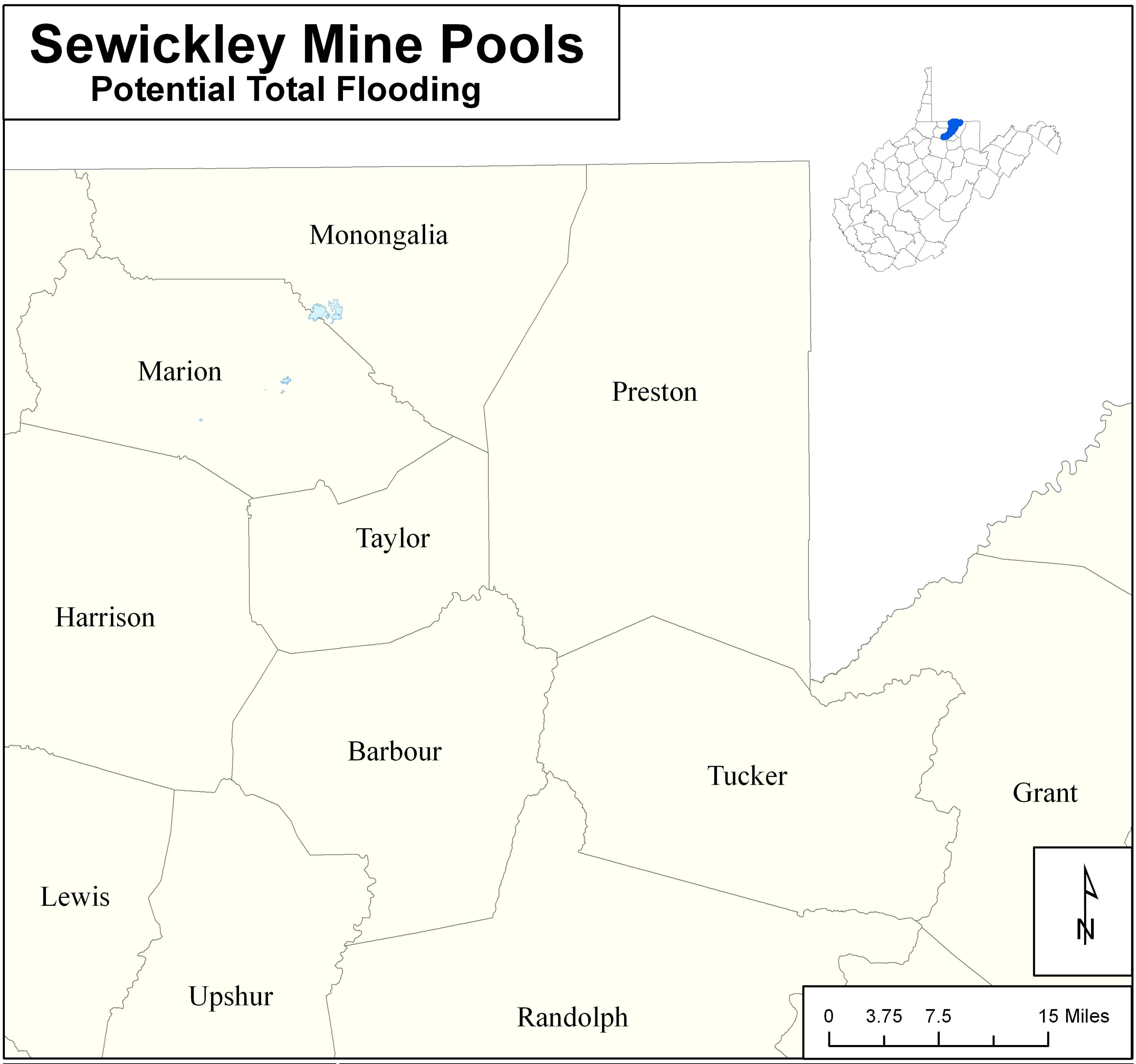
Totally flooded

Sewickley Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	5	61	10
Mean coal bed thickness (feet)	0.00	5.08	5.03	5.73
Min. footprint area (acres)	0.00	0.15	0.03	0.01
Max. footprint area (acres)	0.00	5.47	12,846.57	494.35
Mean footprint area (acres)	0.00	2.31	405.83	109.84
Median footprint area (acres)	0.00	0.87	18.05	9.40
Total footprint area (acres)	0.00	11.56	24,755.47	1,098.45
Estimated void volume (acre feet)	0.00	28.69	69,988.21	3,223.36
Max. potential storage (million gallons)	0.00	9.35	22,809.16	1,050.49

Figure 9c

Sewickley Mine Pools
Potential Total Flooding



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

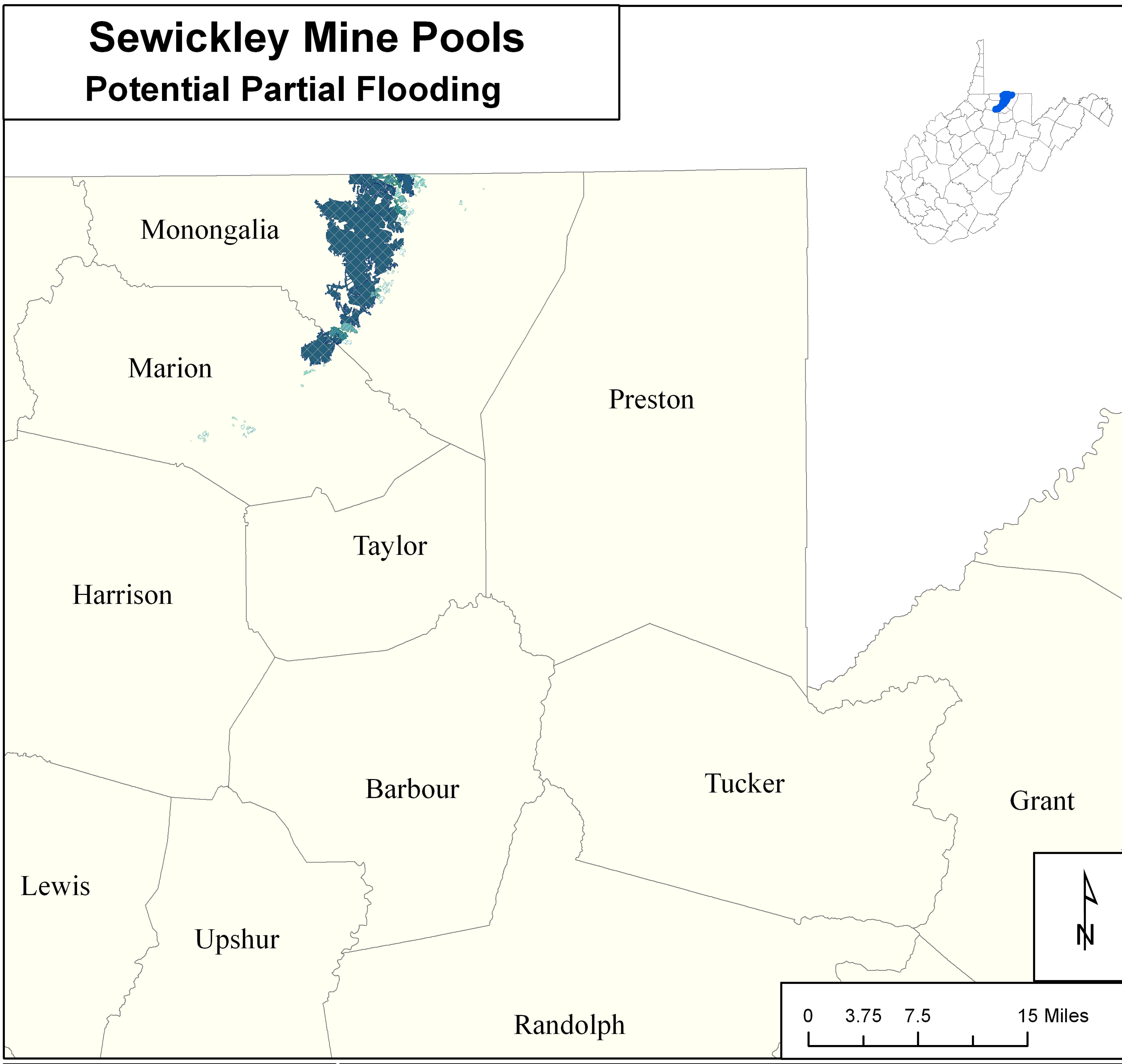
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Sewickley Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	10
Mean coal bed thickness (feet)	0.00	0.00	5.73
Min. foot print area (acres)	0.00	0.00	0.01
Max. foot print area (acres)	0.00	0.00	494.35
Mean foot print area (acres)	0.00	0.00	109.84
Median foot print area (acres)	0.00	0.00	9.40
Total foot print area (acres)	0.00	0.00	1,098.45
Estimated void volume (acre feet)	0.00	0.00	3,223.36
Max. potential storage (million gallons)	0.00	0.00	1,050.49

Figure 9d

Sewickley Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Sewickley Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	48	13
Mean coal bed thickness (feet)	4.91	5.46
Min. footprint area (acres)	0.18	0.03
Max. footprint area (acres)	668.82	12,846.57
Mean footprint area (acres)	62.94	1,671.86
Median foot print area (acres)	16.58	417.34
Total footprint area (acres)	3,021.28	21,734.19
Estimated void volume (acre feet)	7,547.54	62,440.66
Max. potential storage (million gallons)	2,459.74	20,349.41

Figure 9e

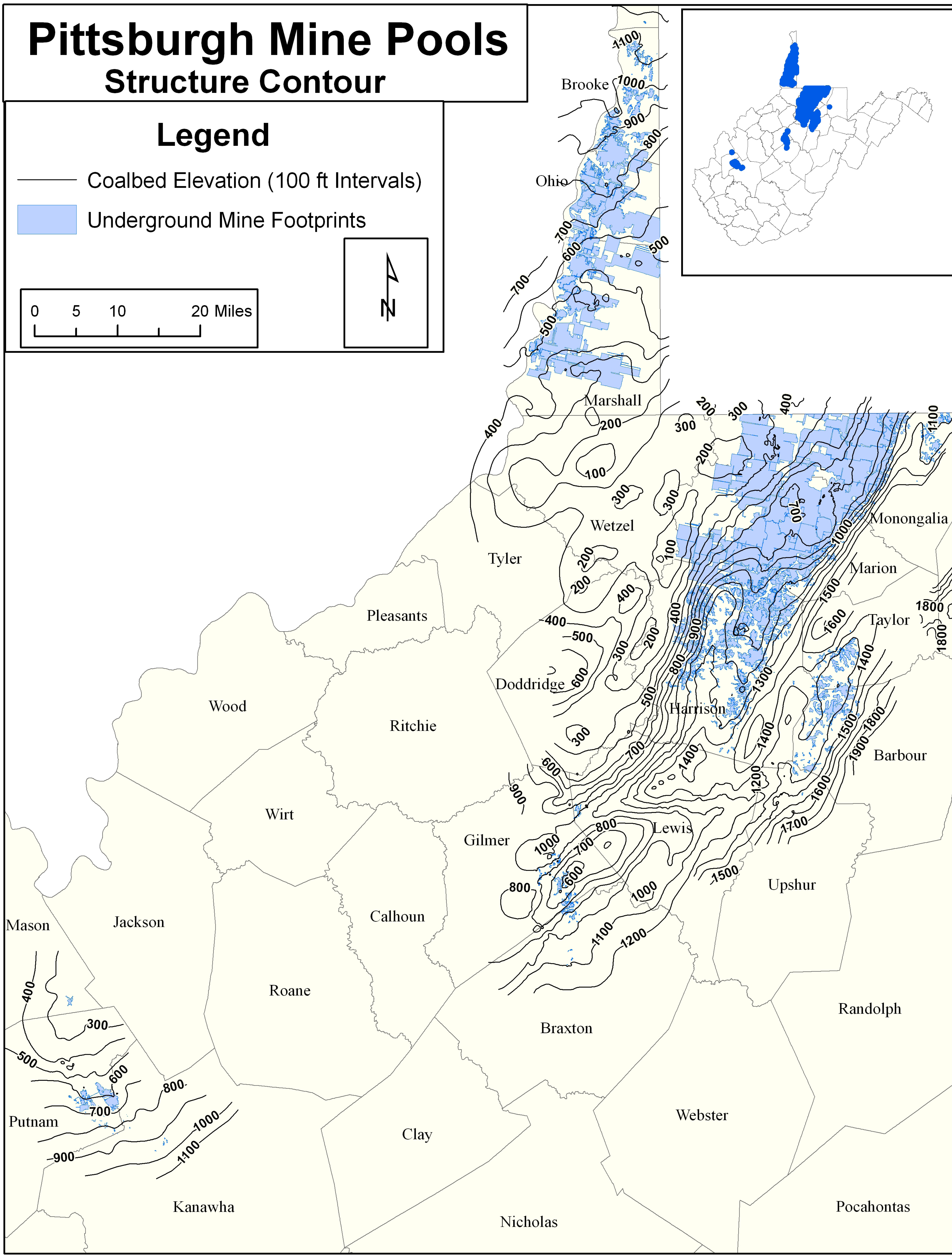

Pittsburgh Mine Pools
Structure Contour
Legend
Coalbed Elevation (100 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Brooke
Ohio
Marshall
Wetzel
Tyler
Monongalia
Marion
Taylor
Pleasants
Doddridge
Harrison
Wood
Ritchie
Barbour
Wirt
Gilmer
Lewis
Upshur
Mason
Jackson
Calhoun
Roane
Braxton
Randolph
Putnam
Clay
Webster
Kanawha
Nicholas
Pocahontas

Figure 10a

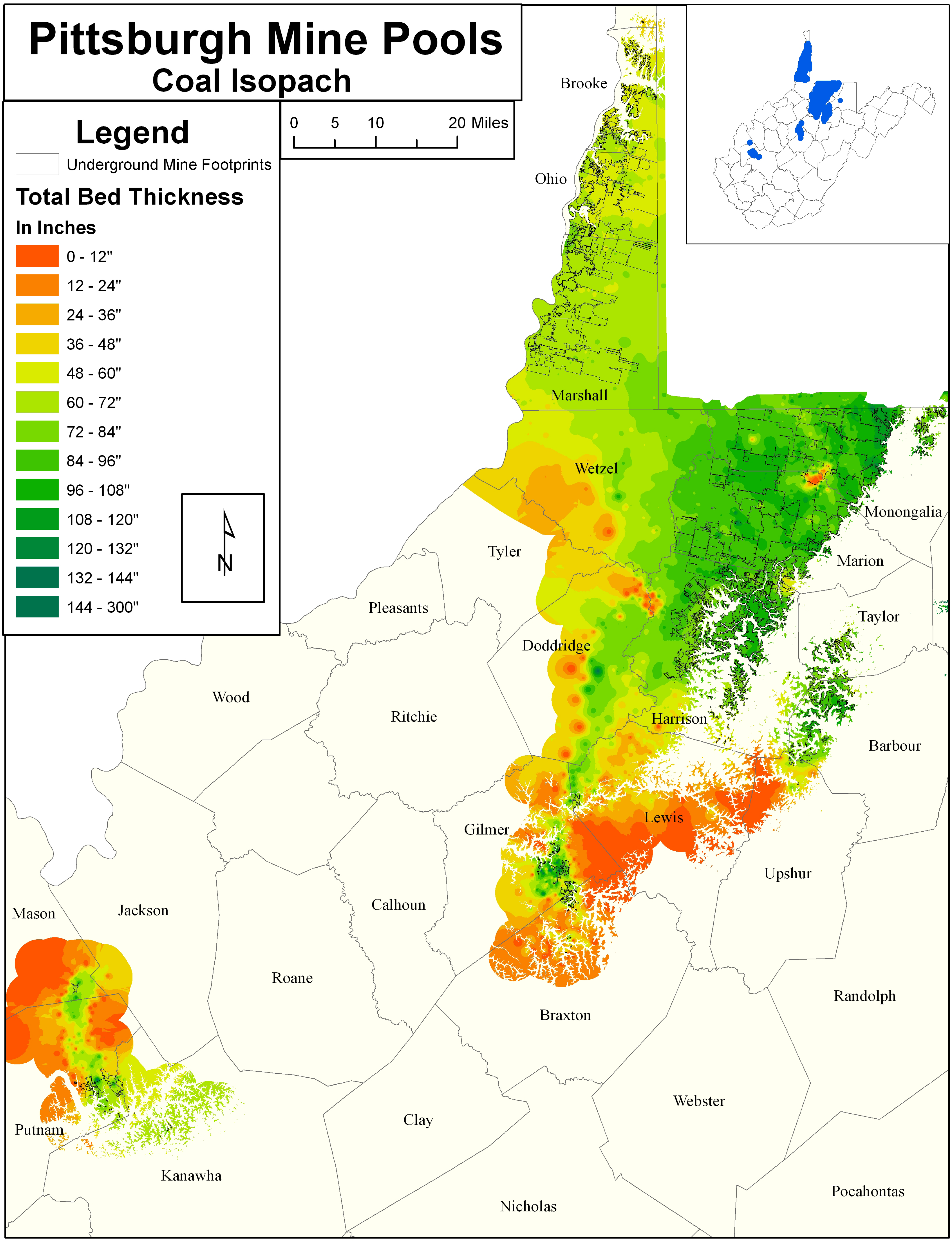
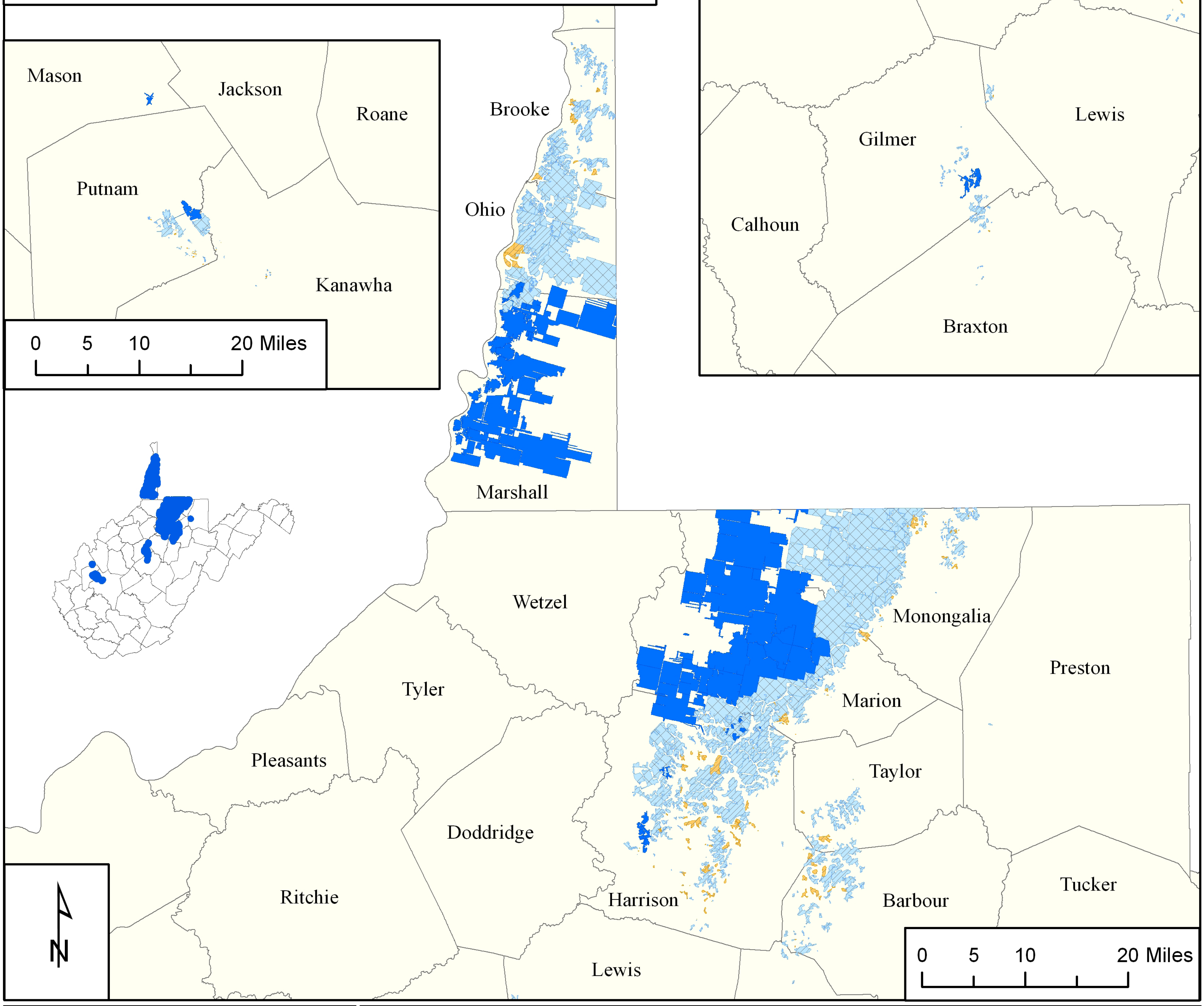

Pittsburgh Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 300"
0 5 10 20 Miles
N
Brooke
Ohio
Marshall
Wetzel
Monongalia
Marion
Tyler
Taylor
Pleasants
Doddridge
Wood
Ritchie
Harrison
Barbour
Lewis
Gilmer
Upshur
Mason
Jackson
Calhoun
Roane
Randolph
Braxton
Webster
Putnam
Clay
Kanawha
Pocahontas
Nicholas

Figure 10b

Pittsburgh Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

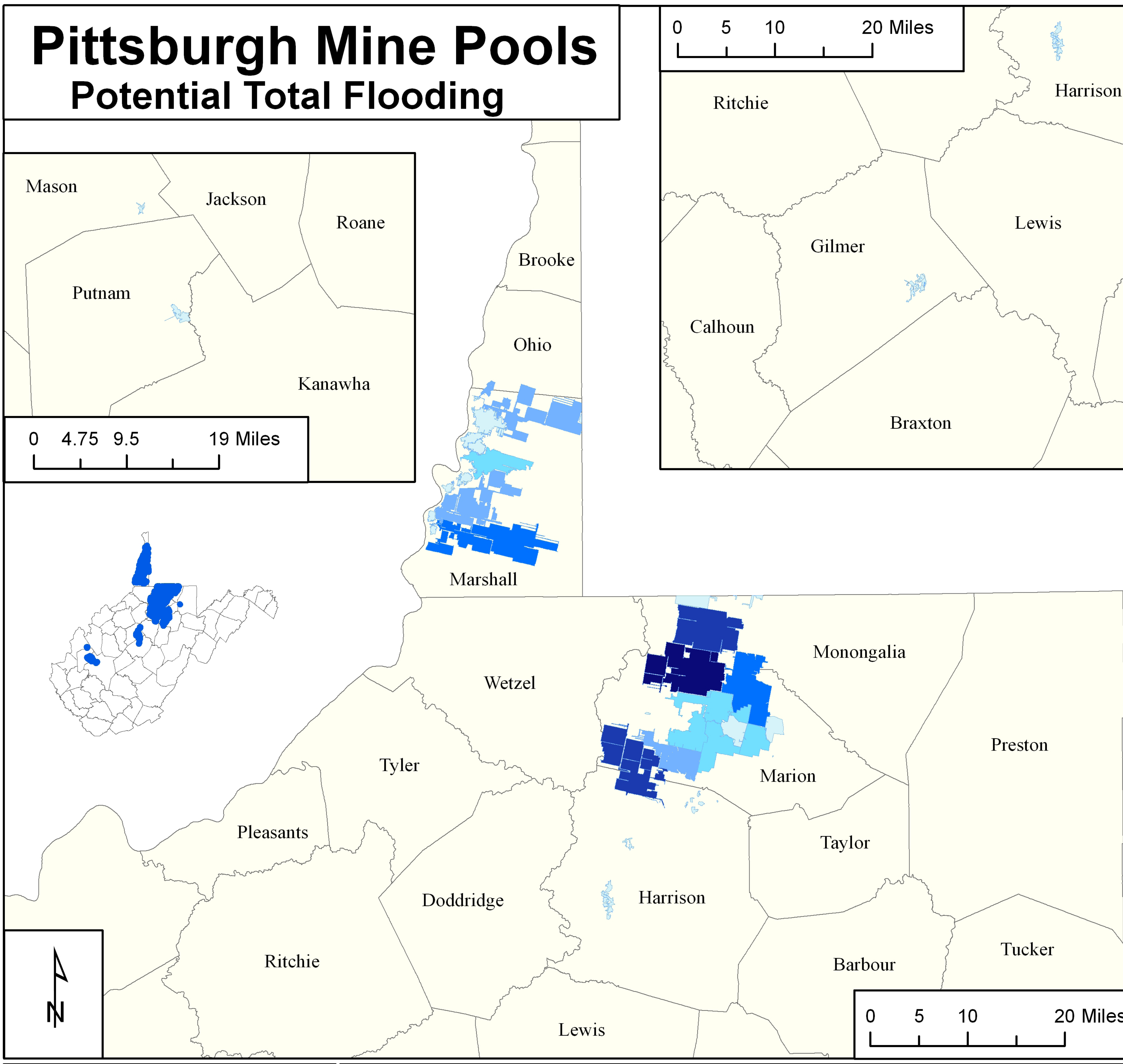
Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Pittsburgh Mine Pool Statistics

	Undetermined	Flooded areas unlikely	Potentially Partially flooded	Potentially Totally flooded
No. of Mines	0	196	564	46
Mean coal bed thickness (feet)	0.00	5.61	6.06	6.38
Min. footprint area (acres)	0.00	0.01	0.01	0.92
Max. footprint area (acres)	0.00	652.31	14,923.99	20,204.27
Mean footprint area (acres)	0.00	42.05	350.55	3,933.91
Median footprint area (acres)	0.00	6.97	22.44	641.06
Total footprint area (acres)	0.00	8,242.18	197,712.71	180,959.81
Estimated void volume (acre feet)	0.00	28,227.65	673,947.07	625,388.68
Max. potential storage (million gallons)	0.00	9,199.39	219,639.35	203,814.17

Figure 10c



Legend

Position

- Above drainage
- Near drainage
- Below drainage

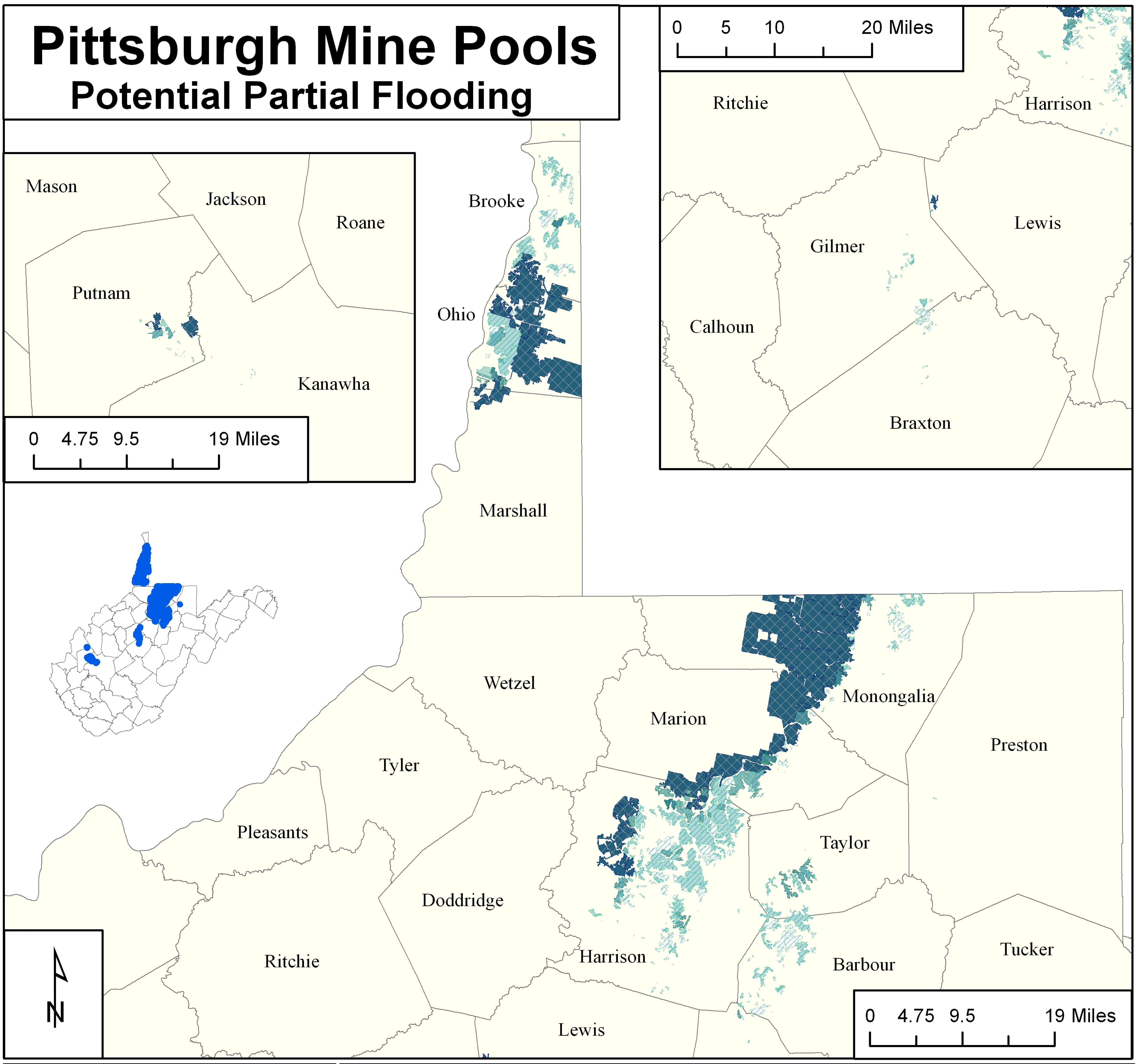
Storage in Million Gallons

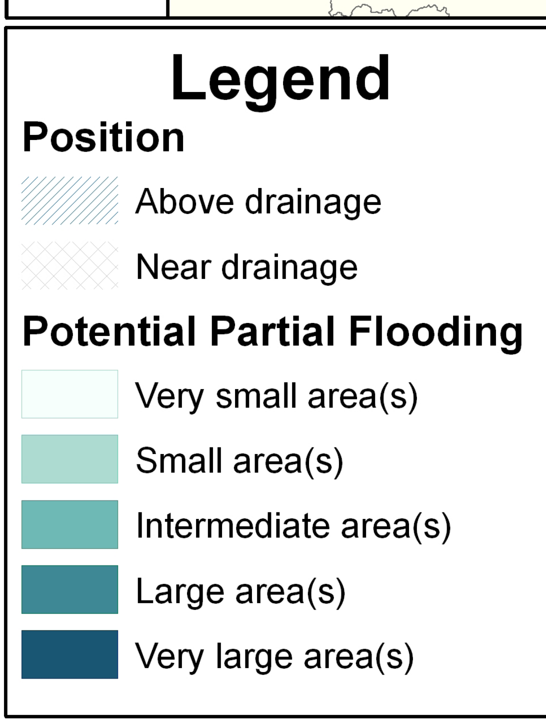
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Pittsburgh Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	2	44
Mean coal bed thickness (feet)	0.00	7.22	6.34
Min. foot print area (acres)	0.00	166.86	0.92
Max. foot print area (acres)	0.00	1,126.20	20,204.27
Mean foot print area (acres)	0.00	646.53	4,083.34
Median foot print area (acres)	0.00	646.53	641.06
Total foot print area (acres)	0.00	1,293.06	179,666.75
Estimated void volume (acre feet)	0.00	4,341.23	621,047.45
Max. potential storage (million gallons)	0.00	1,414.81	202,399.36

Figure 10d





Pittsburgh Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	487	77
Mean coal bed thickness (feet)	5.95	6.76
Min. footprint area (acres)	0.01	0.16
Max. footprint area (acres)	3,935.43	14,923.99
Mean footprint area (acres)	140.54	1,678.85
Median foot print area (acres)	16.14	197.87
Total footprint area (acres)	68,441.16	129,271.55
Estimated void volume (acre feet)	212,639.06	461,308.01
Max. potential storage (million gallons)	69,299.07	150,340.28

Figure 10e

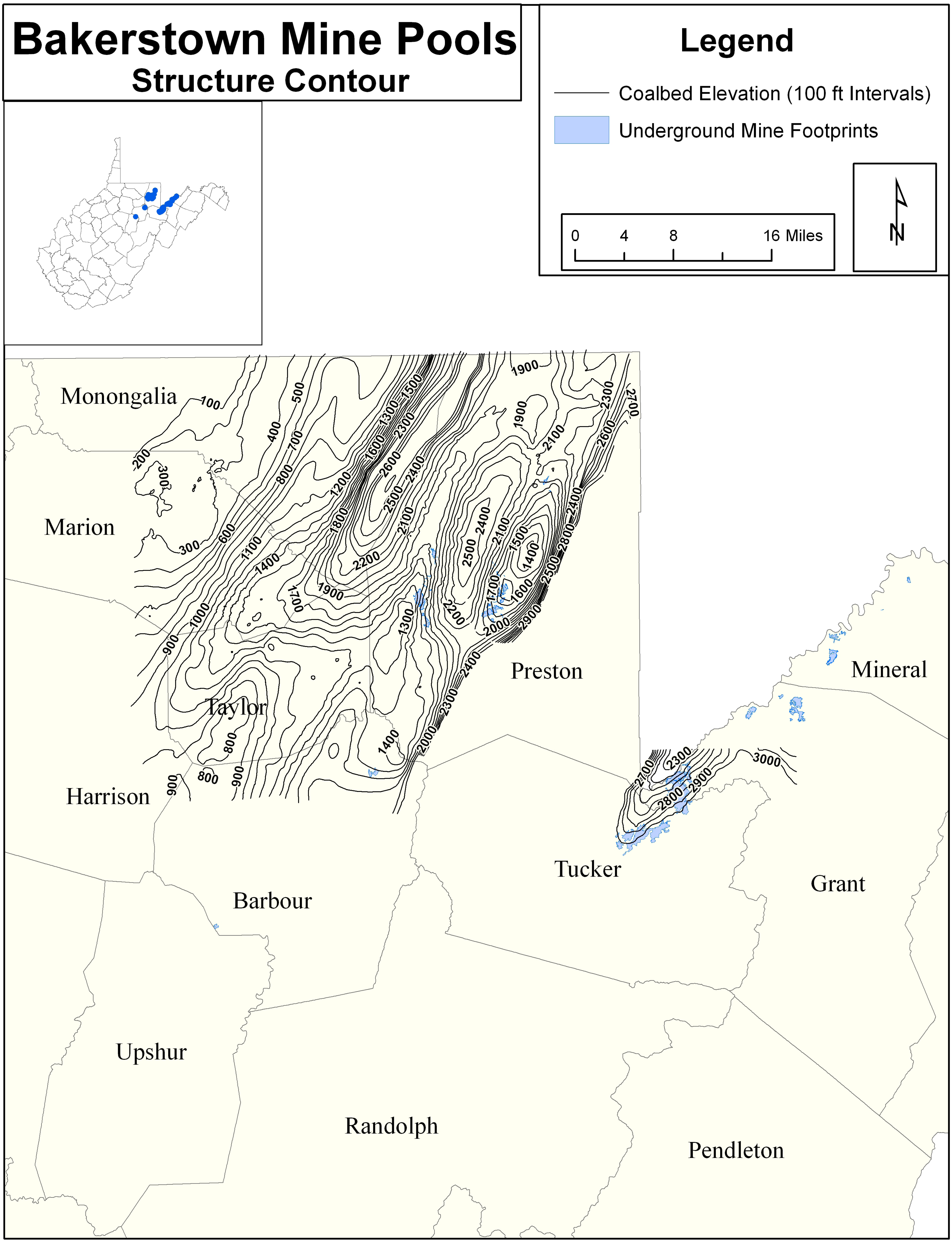

Bakerstown Mine Pools
Structure Contour
Legend
Coalbed Elevation (100 ft Intervals)
Underground Mine Footprints
0 4 8 16 Miles
N
Monongalia
Marion
Taylor
Harrison
Preston
Mineral
Tucker
Grant
Barbour
Upshur
Randolph
Pendleton

Figure 11a

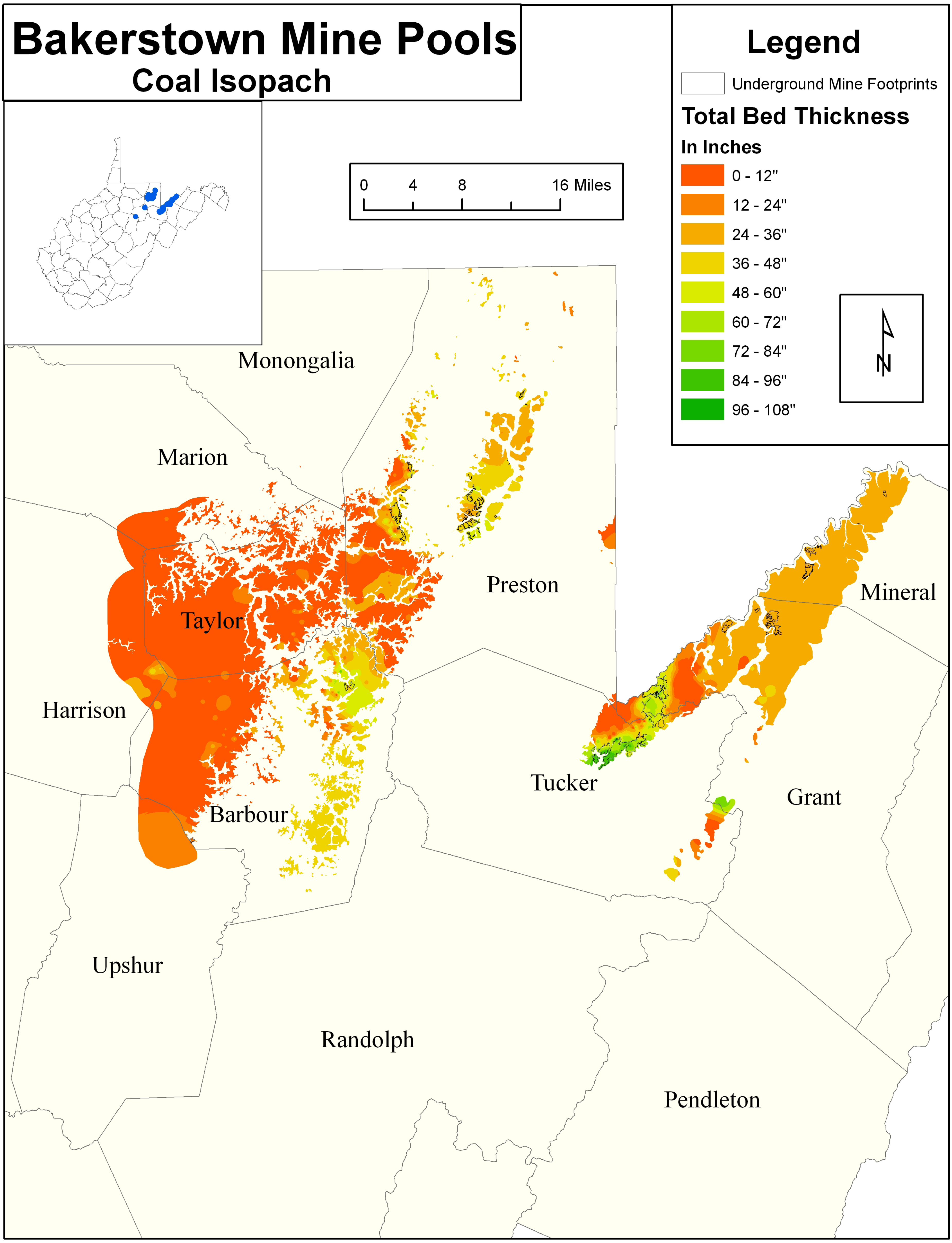
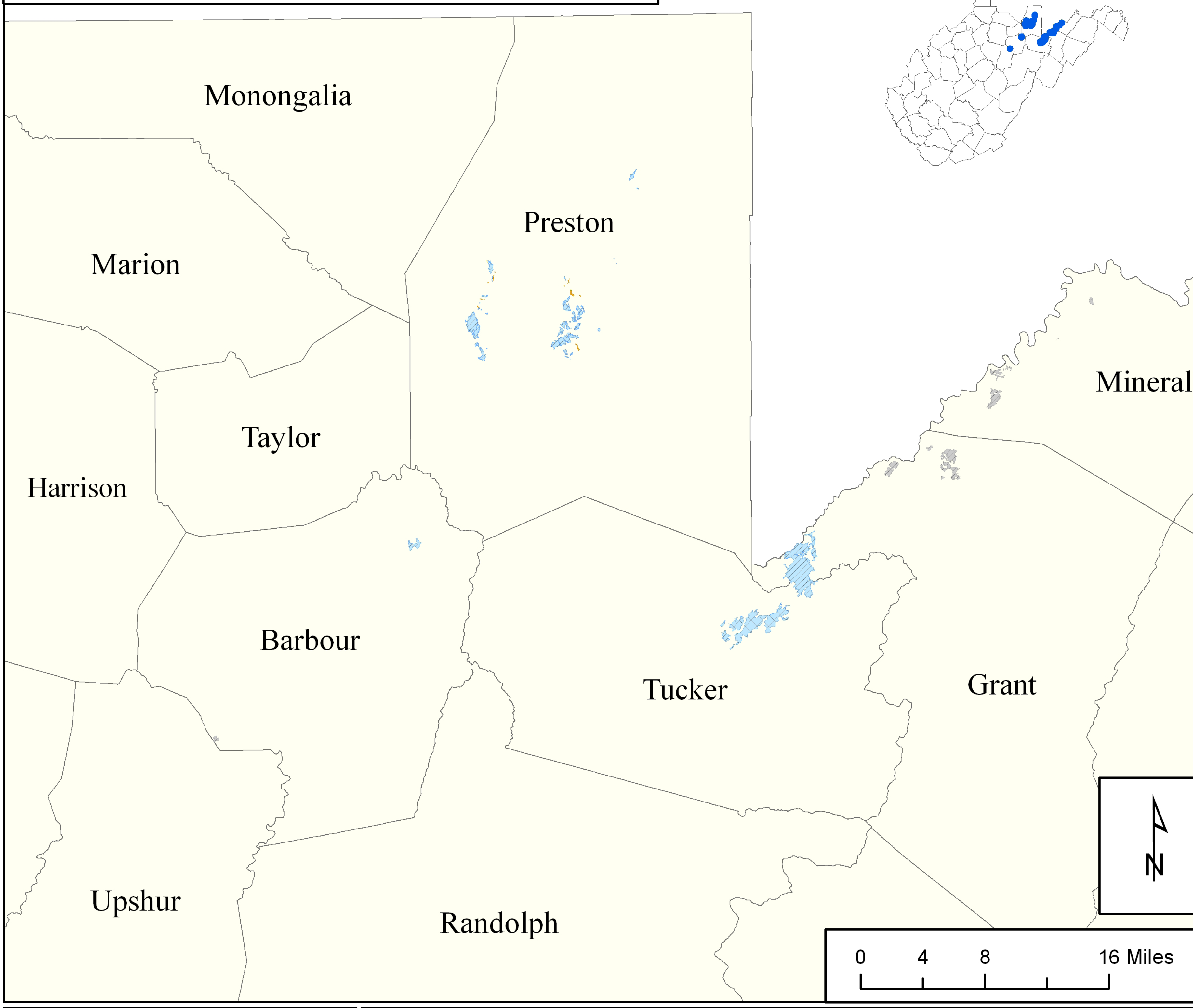

Bakerstown Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
0
4
8
16 Miles
N
Monongalia
Marion
Preston
Taylor
Harrison
Barbour
Tucker
Mineral
Grant
Upshur
Randolph
Pendleton

Figure 11b

Bakerstown Mine Pools

Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

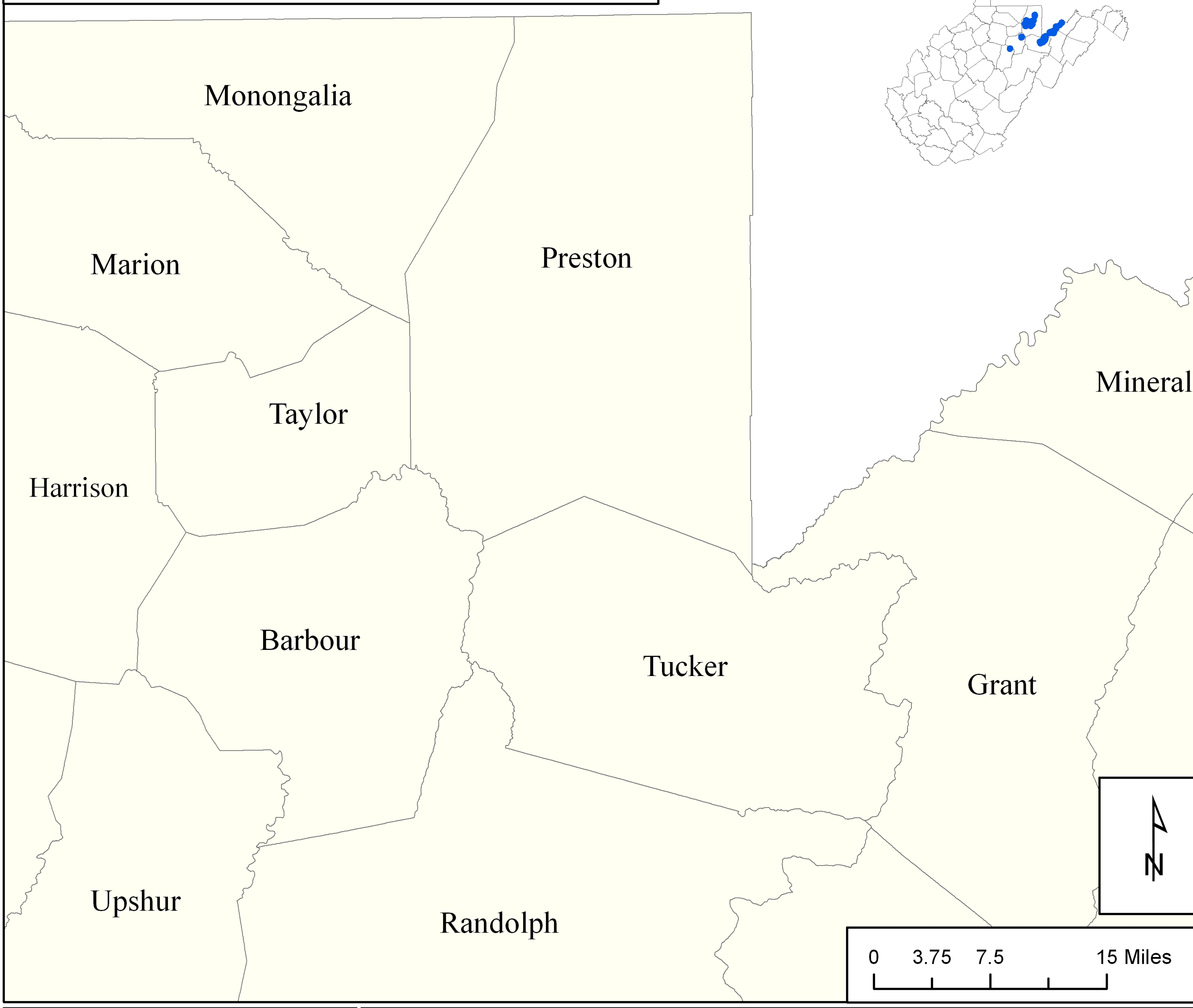
- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Bakerstown Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	15	15	54	0
Mean coal bed thickness (feet)	2.82	2.56	3.24	0.00
Min. footprint area (acres)	0.53	0.14	0.17	0.00
Max. footprint area (acres)	314.63	14.35	1,952.97	0.00
Mean footprint area (acres)	98.07	2.68	122.52	0.00
Median footprint area (acres)	39.89	1.36	24.26	0.00
Total footprint area (acres)	1,470.99	40.18	6,616.09	0.00
Estimated void volume (acre feet)	2,290.51	49.56	14,114.95	0.00
Max. potential storage (million gallons)	746.48	16.15	4,600.06	0.00

Figure 11c

Bakerstown Mine Pools
Potential Total Flooding



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

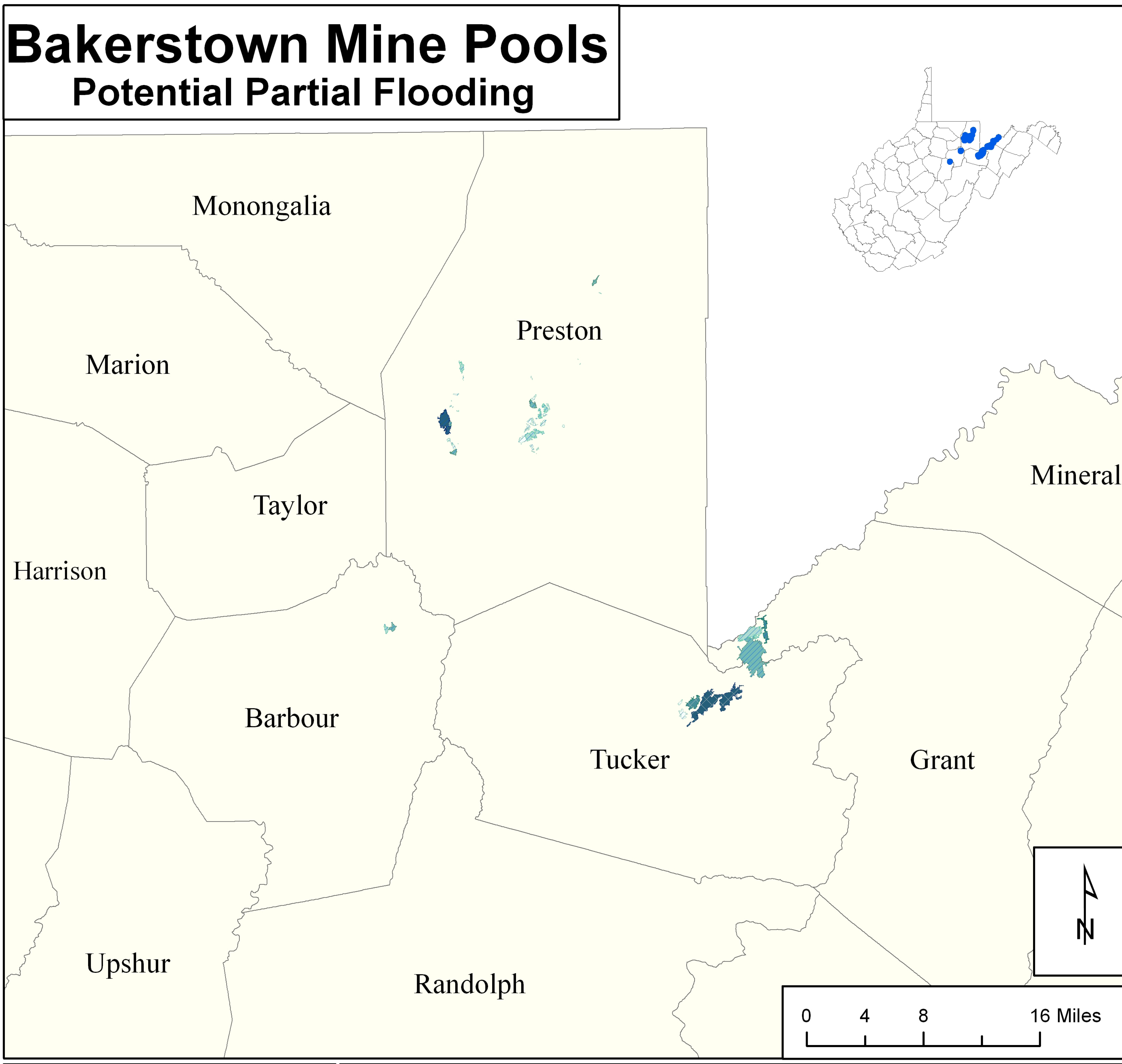
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Bakerstown Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	0
Mean coal bed thickness (feet)	0.00	0.00	0.00
Min. foot print area (acres)	0.00	0.00	0.00
Max. foot print area (acres)	0.00	0.00	0.00
Mean foot print area (acres)	0.00	0.00	0.00
Median foot print area (acres)	0.00	0.00	0.00
Total foot print area (acres)	0.00	0.00	0.00
Estimated void volume (acre feet)	0.00	0.00	0.00
Max. potential storage (million gallons)	0.00	0.00	0.00

Figure 11d

Bakerstown Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Bakerstown Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	52	2
Mean coal bed thickness (feet)	3.14	5.82
Min. footprint area (acres)	0.17	296.31
Max. footprint area (acres)	1,952.97	1,639.48
Mean footprint area (acres)	90.01	967.90
Median foot print area (acres)	21.73	967.90
Total footprint area (acres)	4,680.30	1,935.79
Estimated void volume (acre feet)	8,461.79	5,653.16
Max. potential storage (million gallons)	2,757.70	1,842.37

Figure 11e

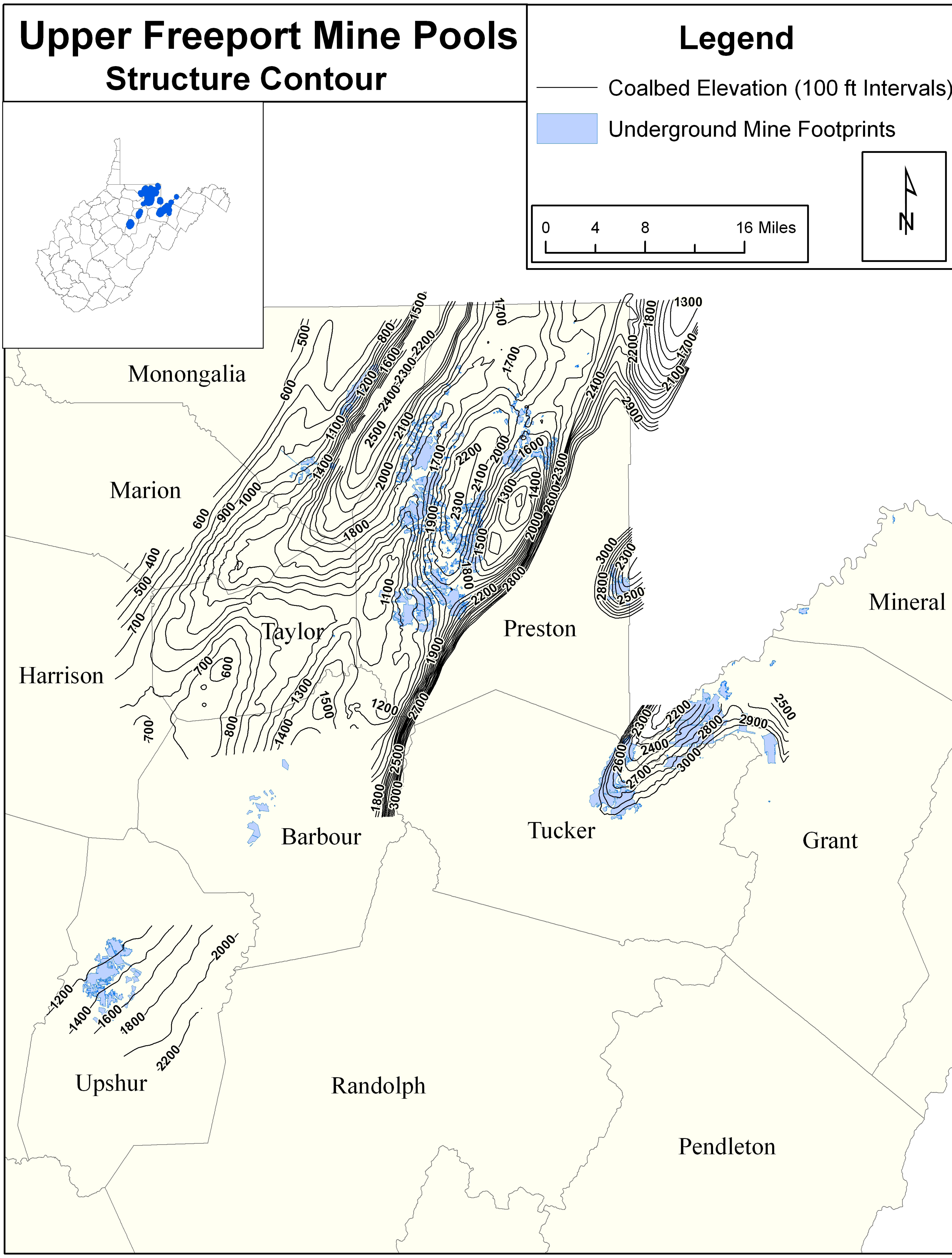

Upper Freeport Mine Pools
Structure Contour
Legend
Coalbed Elevation (100 ft Intervals)
Underground Mine Footprints
0 4 8 16 Miles
N
Monongalia
Marion
Harrison
Taylor
Preston
Mineral
Barbour
Tucker
Grant
Upshur
Randolph
Pendleton

Figure 12a

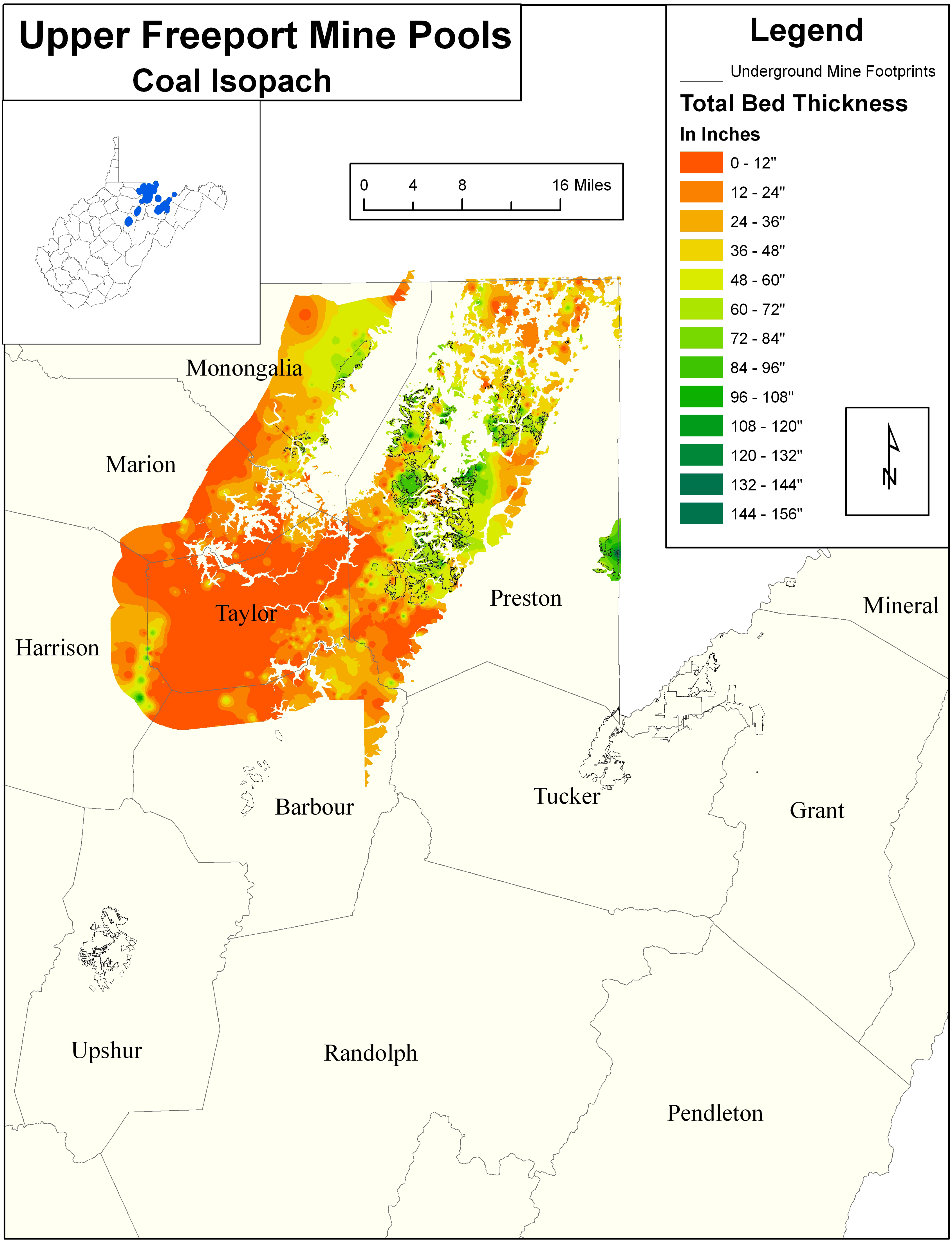
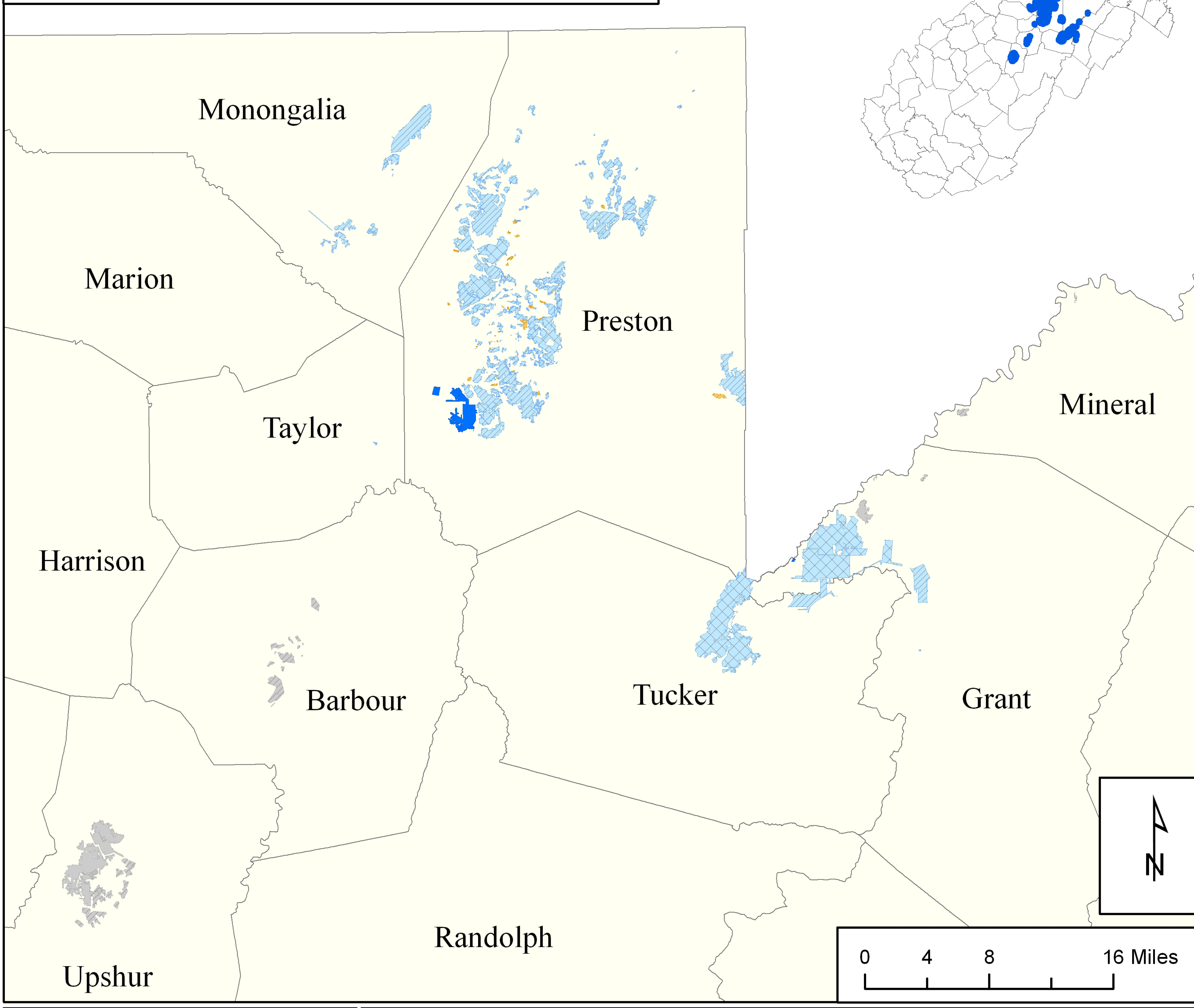

Upper Freeport Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 156"
0 4 8 16 Miles
N
Monongalia
Marion
Taylor
Harrison
Preston
Mineral
Barbour
Tucker
Grant
Upshur
Randolph
Pendleton

Figure 12b

Upper Freeport Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

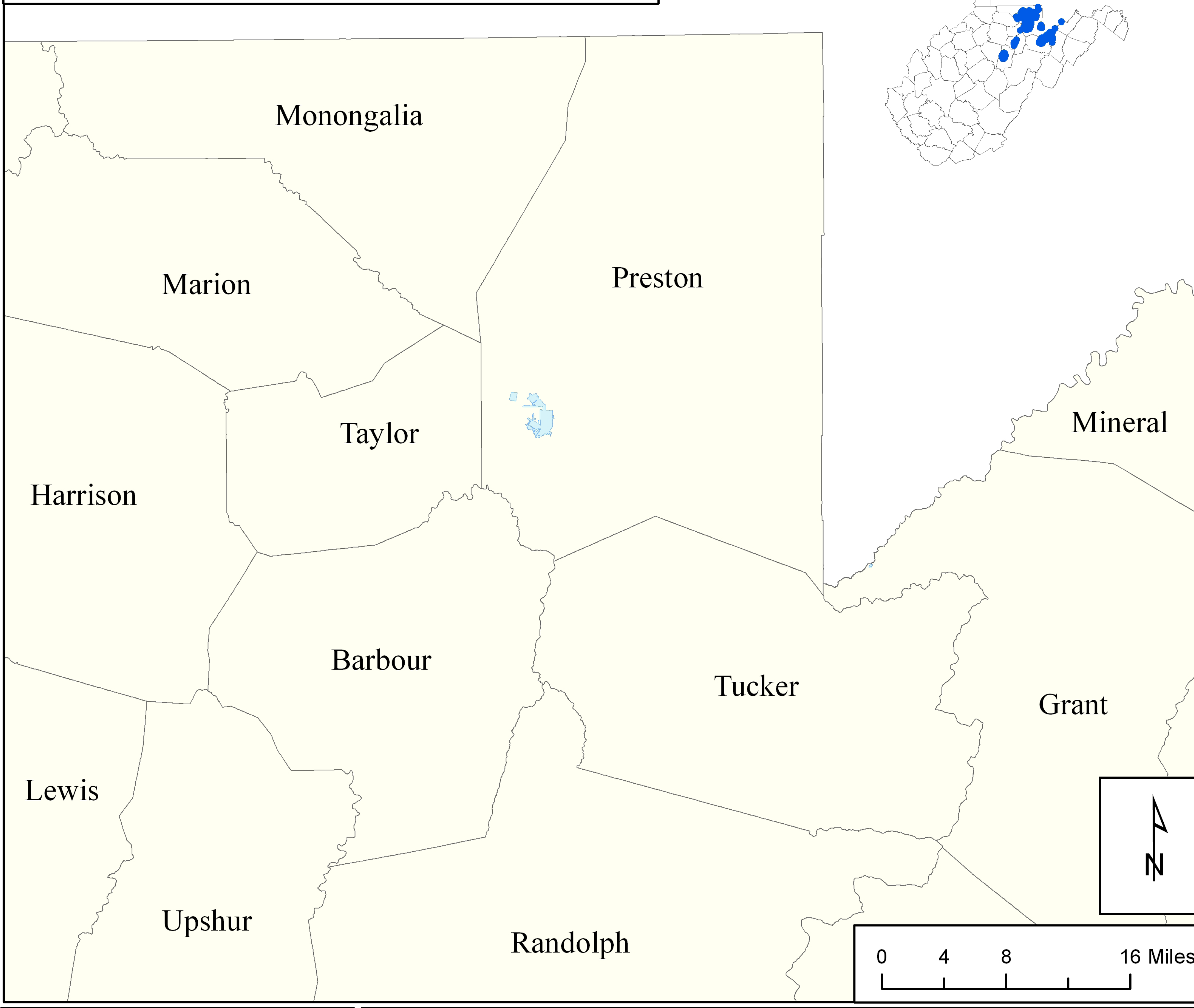
- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Upper Freeport Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	35	45	202	3
Mean coal bed thickness (feet)	2.07	4.72	4.75	5.27
Min. footprint area (acres)	0.01	0.01	0.04	17.38
Max. footprint area (acres)	2,421.33	105.38	7,005.07	1,592.89
Mean footprint area (acres)	243.10	9.44	222.10	582.25
Median footprint area (acres)	91.39	2.27	26.50	136.47
Total footprint area (acres)	8,508.48	424.77	44,864.77	1,746.75
Estimated void volume (acre feet)	14,506.28	1,019.81	136,630.31	3,621.87
Max. potential storage (million gallons)	4,727.60	332.36	44,527.82	1,180.37

Figure 12c

Upper Freeport Mine Pools
Potential Total Flooding



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage

Storage in Million Gallons

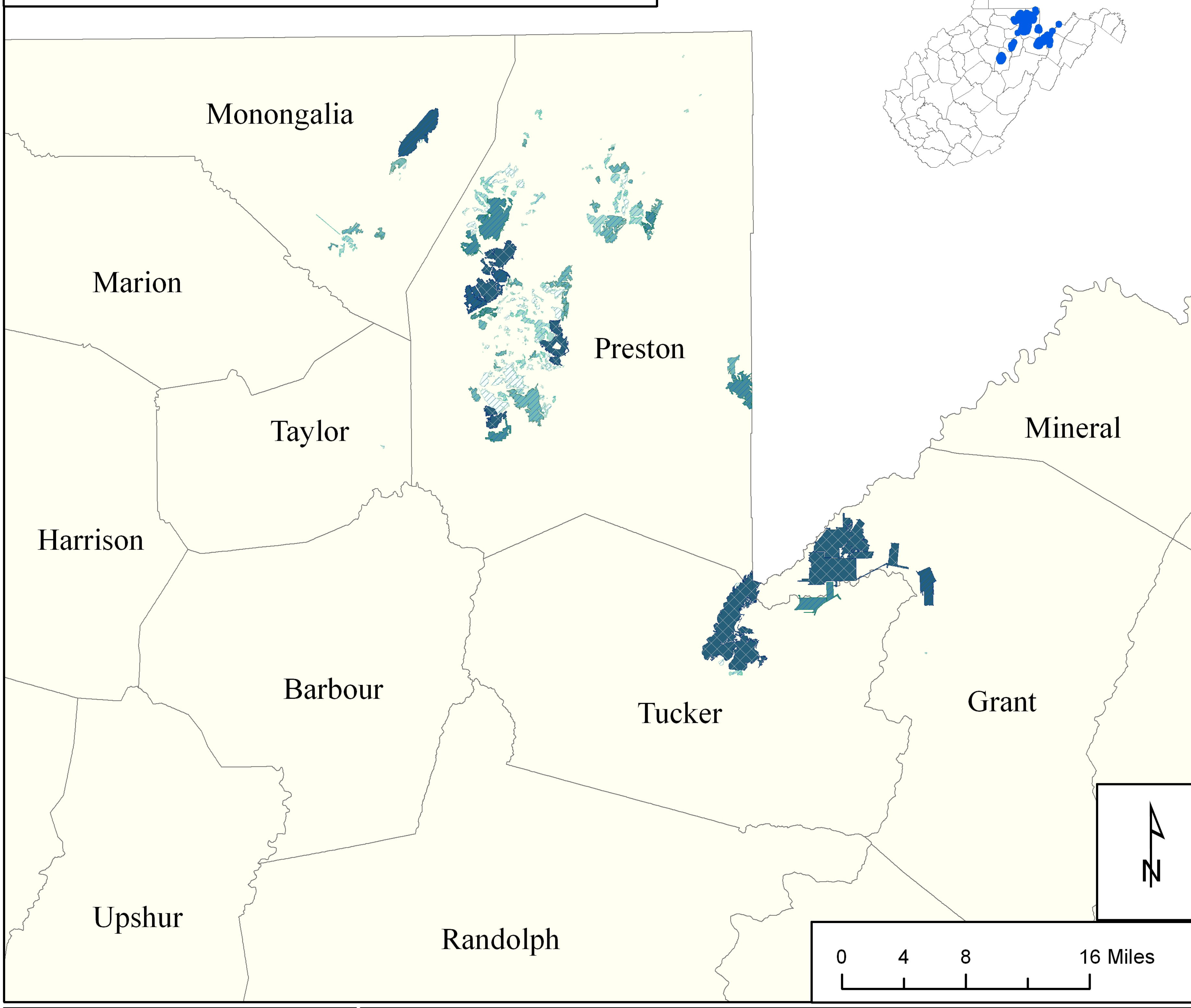
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Upper Freeport Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	3
Mean coal bed thickness (feet)	0.00	0.00	5.27
Min. foot print area (acres)	0.00	0.00	17.38
Max. foot print area (acres)	0.00	0.00	1,592.89
Mean foot print area (acres)	0.00	0.00	582.25
Median foot print area (acres)	0.00	0.00	136.47
Total foot print area (acres)	0.00	0.00	1,746.75
Estimated void volume (acre feet)	0.00	0.00	3,621.87
Max. potential storage (million gallons)	0.00	0.00	1,180.37

Figure 12d

Upper Freeport Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Upper Freeport Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	192	10
Mean coal bed thickness (feet)	4.68	5.99
Min. footprint area (acres)	0.04	101.92
Max. footprint area (acres)	2,252.09	7,005.07
Mean footprint area (acres)	130.35	1,983.84
Median foot print area (acres)	23.17	1,155.12
Total footprint area (acres)	25,026.41	19,838.36
Estimated void volume (acre feet)	67,755.36	68,874.95
Max. potential storage (million gallons)	22,081.47	22,446.35

Figure 12e

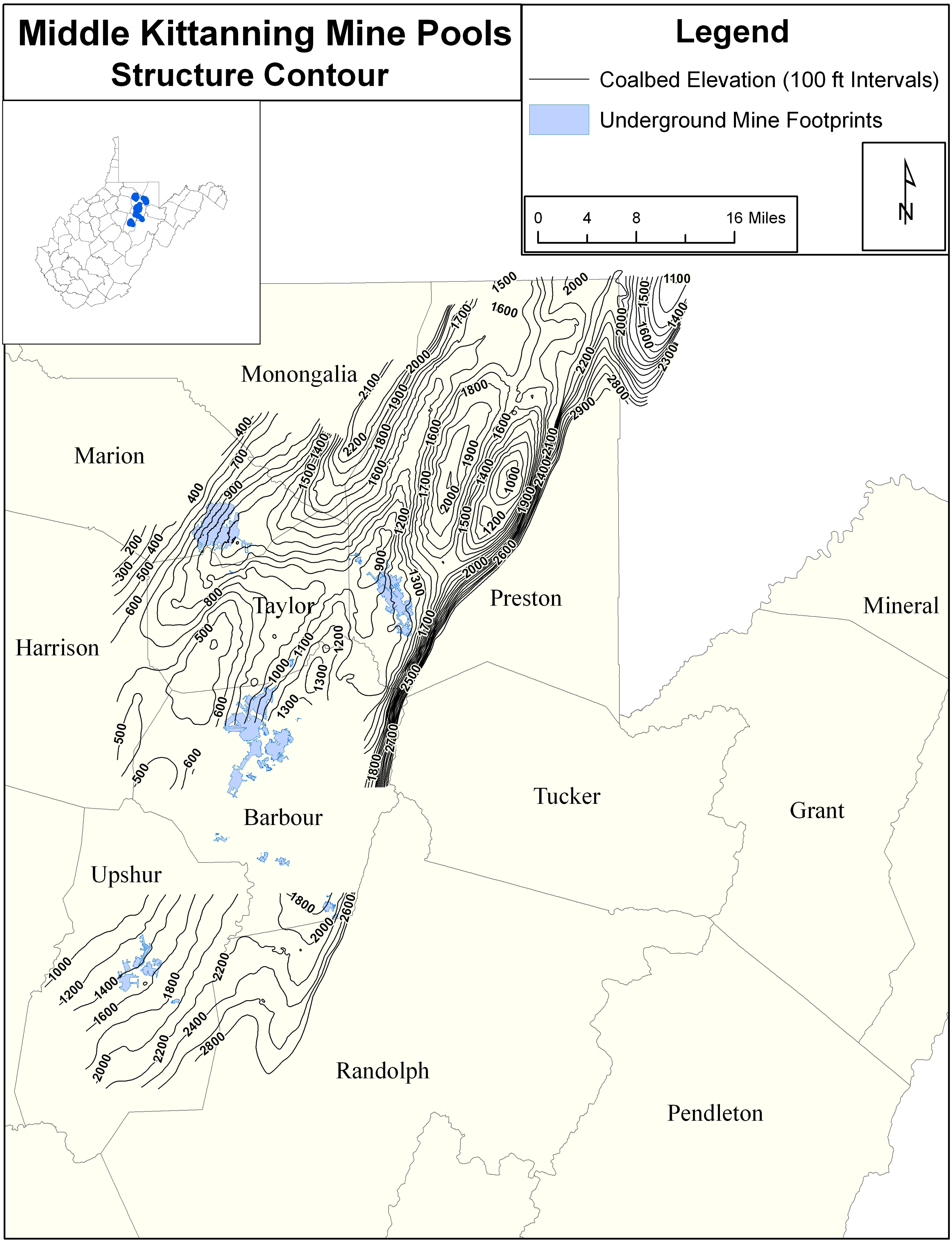
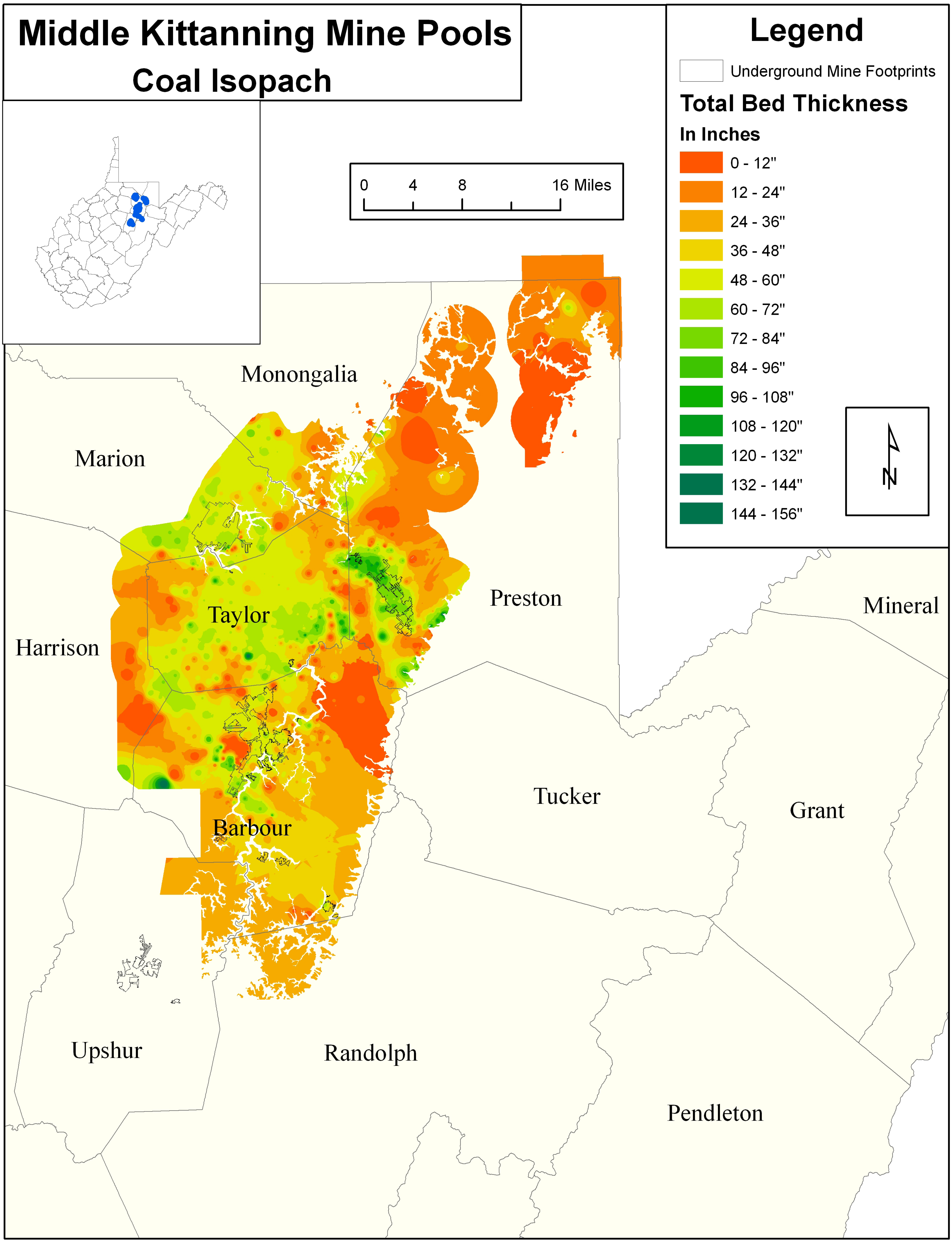

Middle Kittanning Mine Pools
Structure Contour
Legend
Coalbed Elevation (100 ft Intervals)
Underground Mine Footprints
0 4 8 16 Miles
N
Monongalia
Marion
Harrison
Taylor
Preston
Mineral
Tucker
Grant
Barbour
Upshur
Randolph
Pendleton

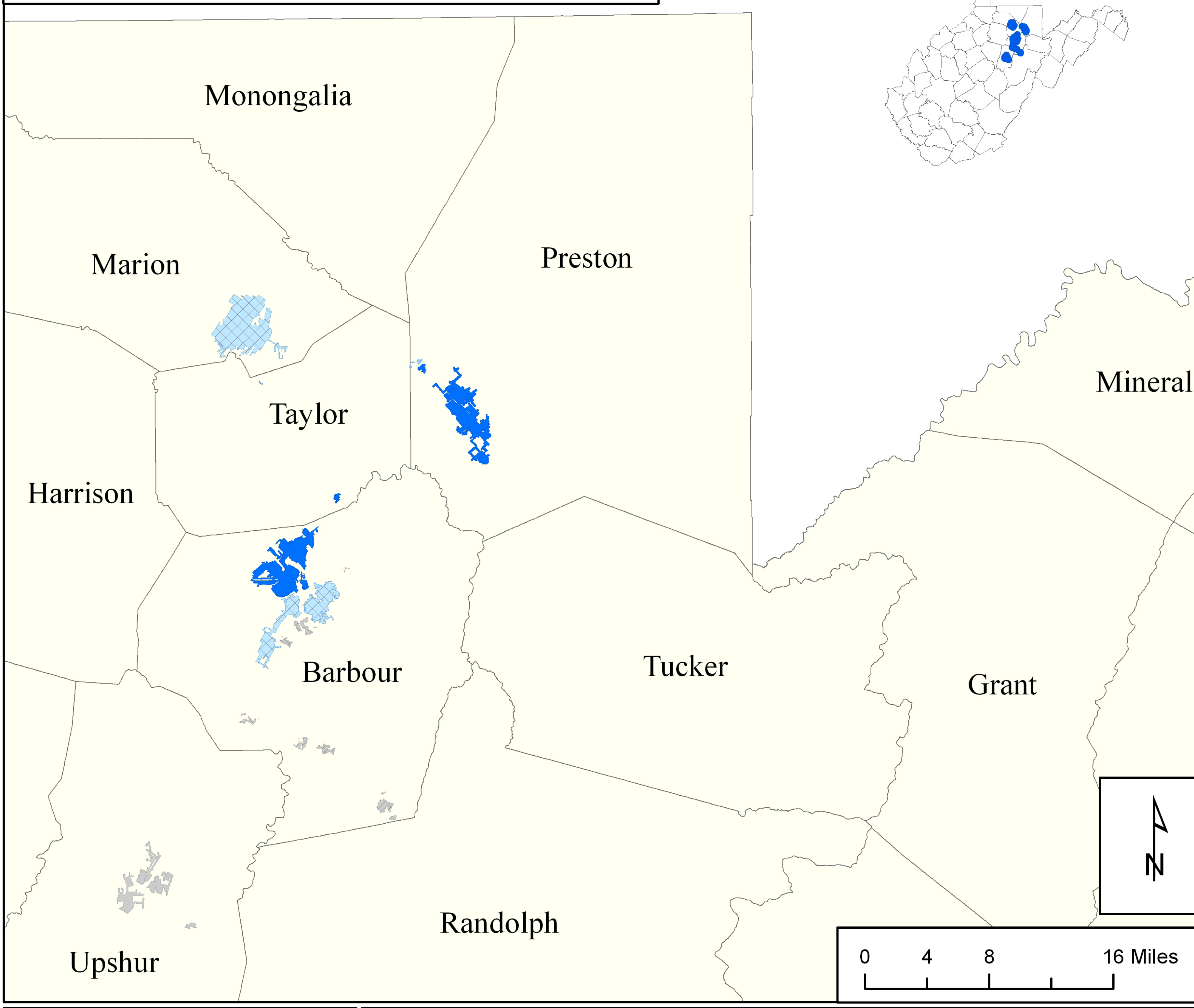
Figure 13a



Middle Kittanning Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 156"
N
0
4
8
16 Miles
Monongalia
Marion
Preston
Mineral
Taylor
Harrison
Tucker
Grant
Barbour
Upshur
Randolph
Pendleton

Figure 13b

Middle Kittanning Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

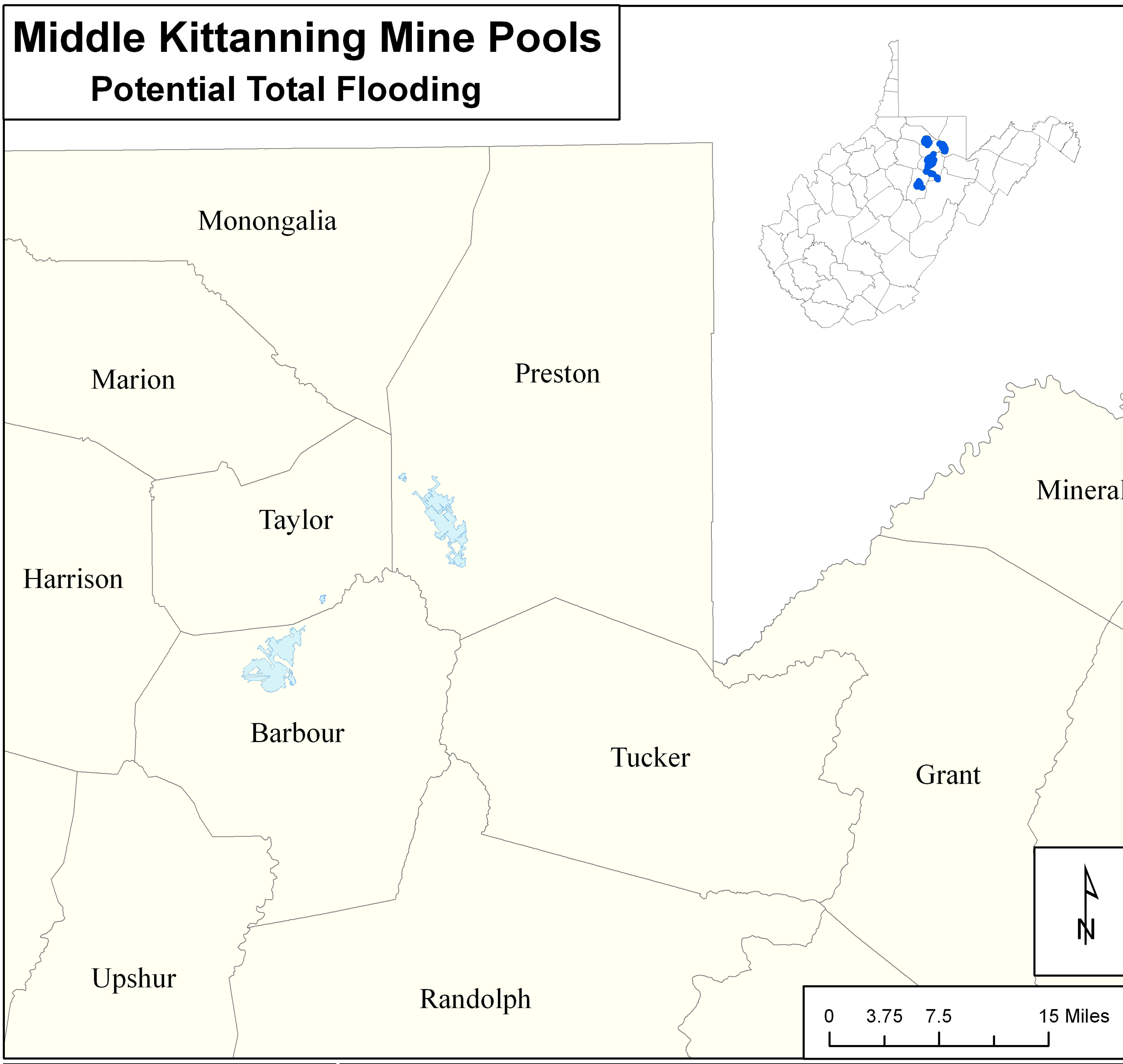
- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Middle Kittanning Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	21	1	16	5
Mean coal bed thickness (feet)	4.16	4.75	5.05	5.39
Min. footprint area (acres)	0.31	0.83	0.06	81.75
Max. footprint area (acres)	1,039.10	0.83	6,191.64	4,755.03
Mean footprint area (acres)	180.83	0.83	643.78	1,879.00
Median footprint area (acres)	88.02	0.83	2.99	172.19
Total footprint area (acres)	3,797.35	0.83	10,300.50	9,395.02
Estimated void volume (acre feet)	8,137.69	1.94	23,692.48	24,387.17
Max. potential storage (million gallons)	2,652.07	0.63	7,721.38	7,947.78

Figure 13c

Middle Kittanning Mine Pools
Potential Total Flooding



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

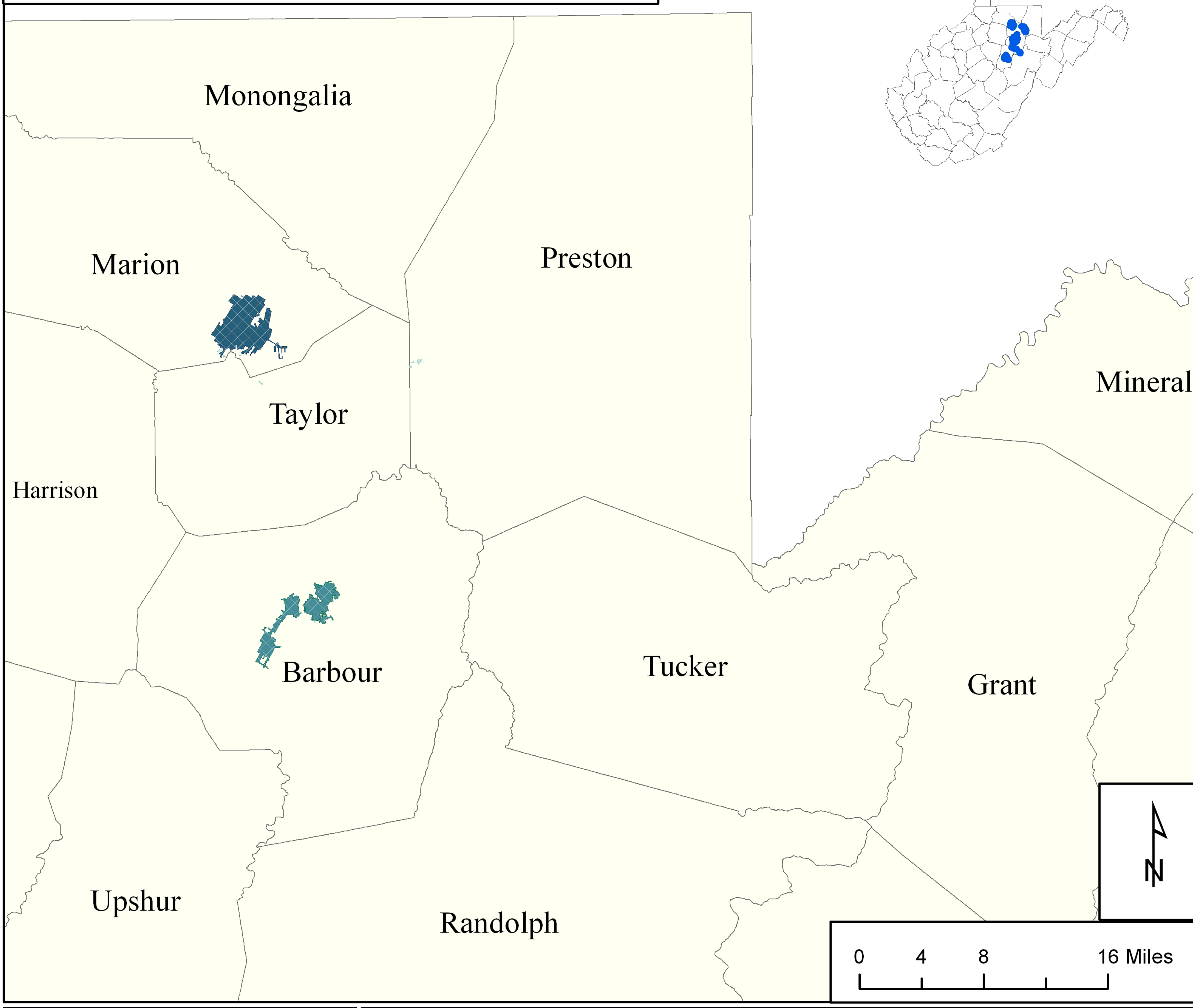
Middle Kittanning Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	5
Mean coal bed thickness (feet)	0.00	0.00	5.39
Min. foot print area (acres)	0.00	0.00	81.75
Max. foot print area (acres)	0.00	0.00	4,755.03
Mean foot print area (acres)	0.00	0.00	1,879.00
Median foot print area (acres)	0.00	0.00	172.19
Total foot print area (acres)	0.00	0.00	9,395.02
Estimated void volume (acre feet)	0.00	0.00	24,387.17
Max. potential storage (million gallons)	0.00	0.00	7,947.78

Figure 13d

Middle Kittanning Mine Pools

Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Middle Kittanning Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	10	6
Mean coal bed thickness (feet)	4.71	5.63
Min. footprint area (acres)	0.06	6.18
Max. footprint area (acres)	23.48	6,191.64
Mean footprint area (acres)	3.32	1,711.22
Median foot print area (acres)	0.62	1,012.53
Total footprint area (acres)	33.16	10,267.34
Estimated void volume (acre feet)	79.67	23,612.80
Max. potential storage (million gallons)	25.97	7,695.41

Figure 13e

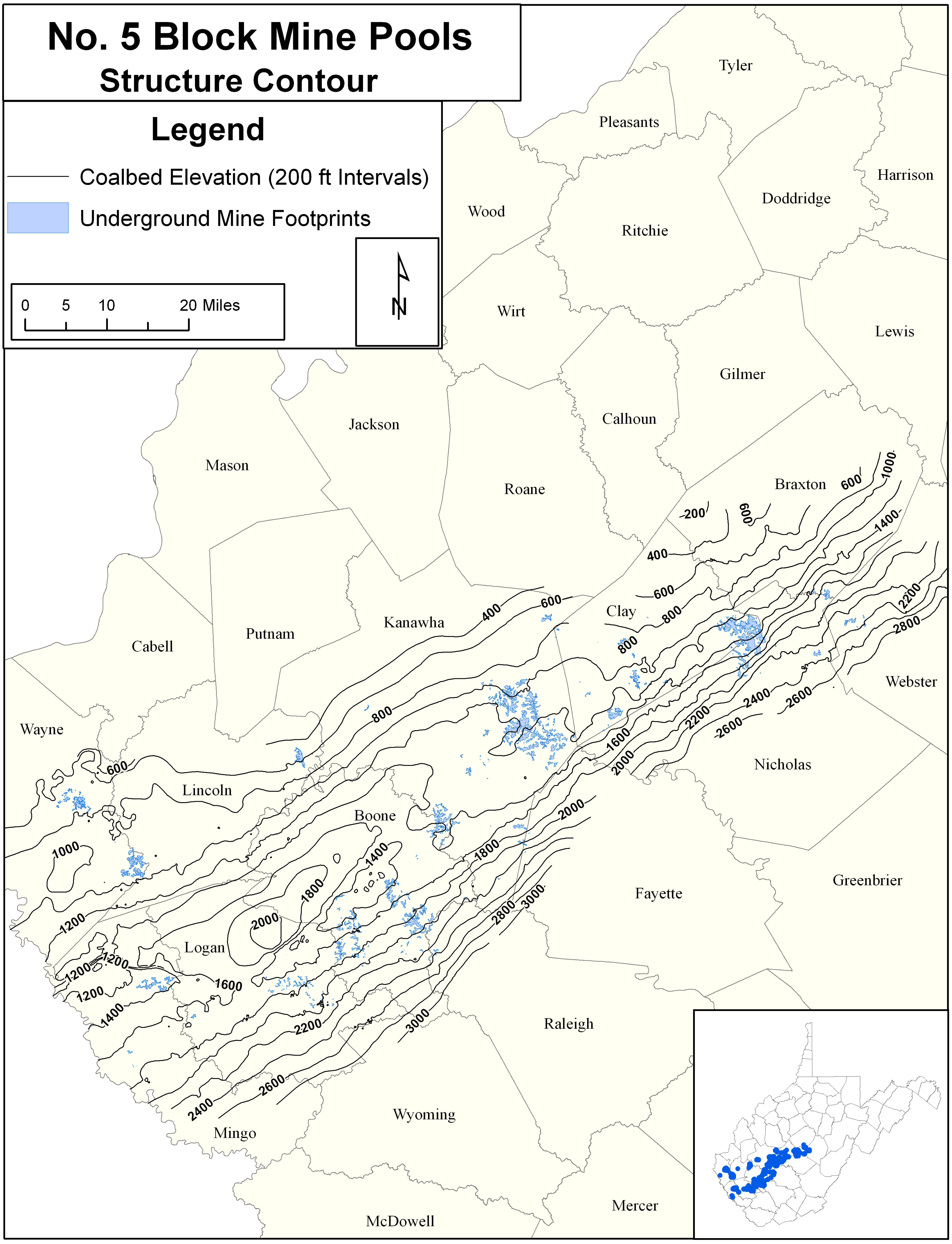
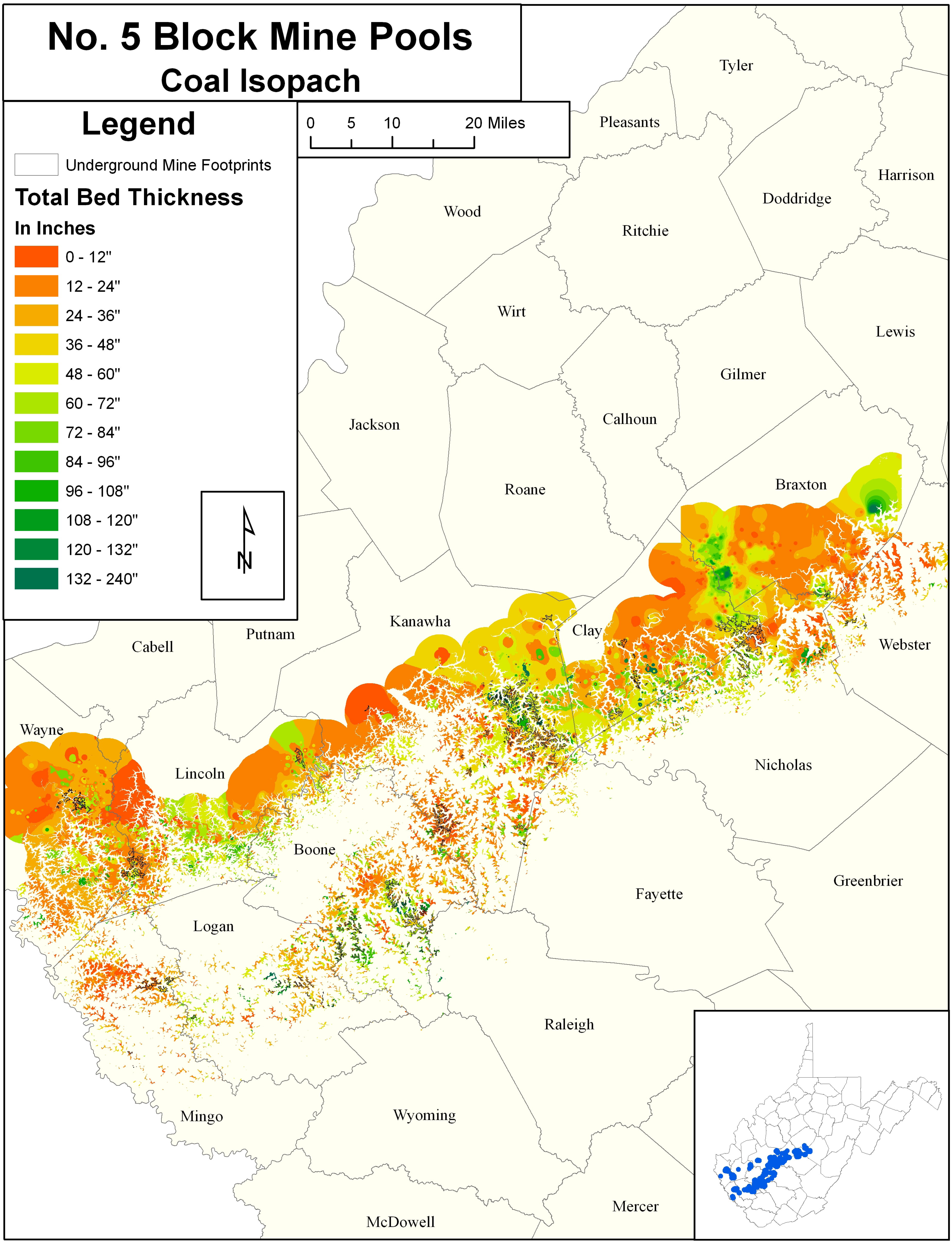
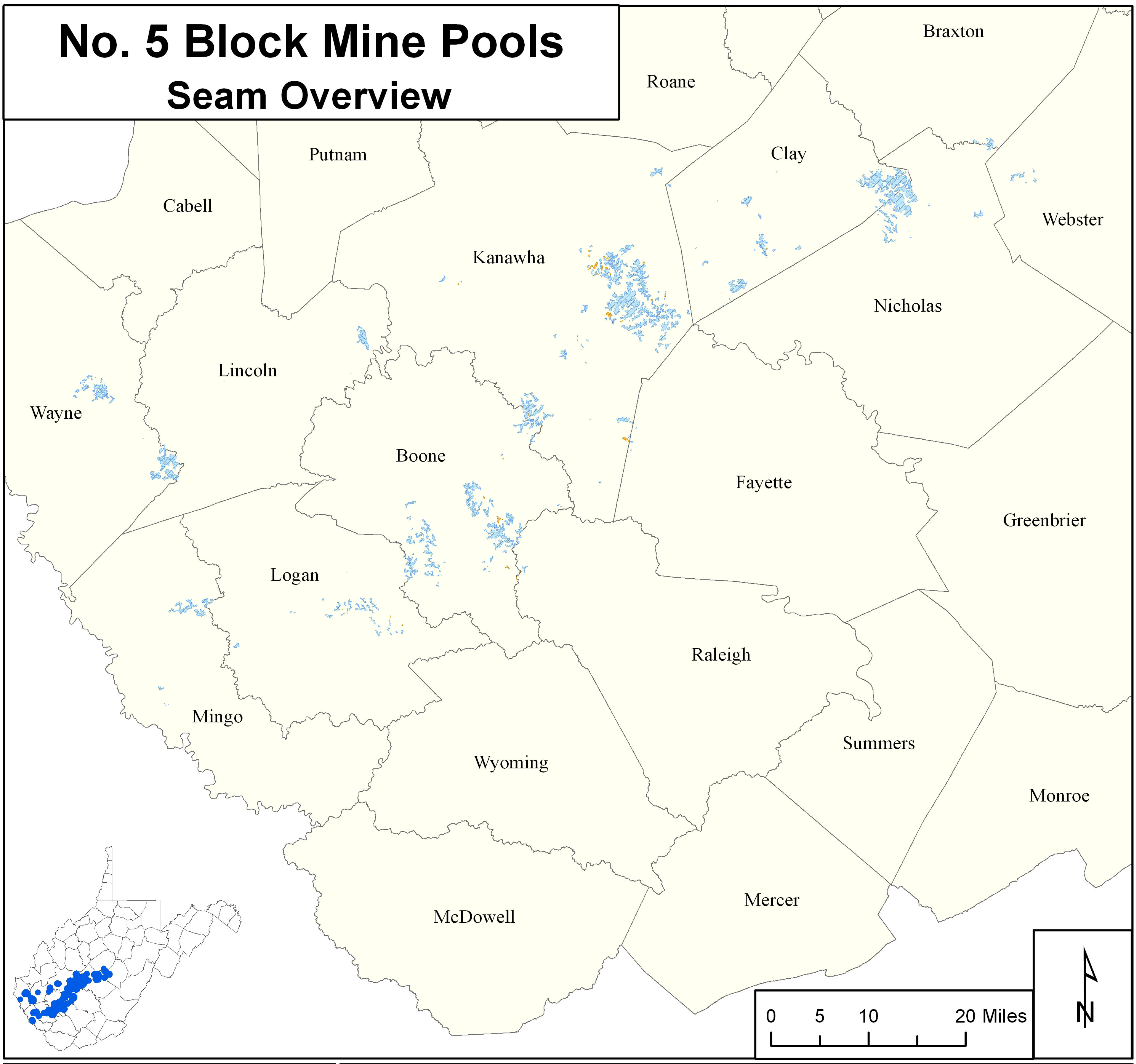

No. 5 Block Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Mason
Braxton
Roane
Clay
Kanawha
Putnam
Cabell
Webster
Wayne
Nicholas
Lincoln
Boone
Greenbrier
Fayette
Logan
Raleigh
Wyoming
Mingo
Mercer
McDowell

Figure 14a



No. 5 Block Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 240"
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Braxton
Roane
Kanawha
Clay
Webster
Cabell
Putnam
Wayne
Lincoln
Nicholas
Boone
Greenbrier
Fayette
Logan
Raleigh
Mingo
Wyoming
Mercer
McDowell

Figure 14b



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

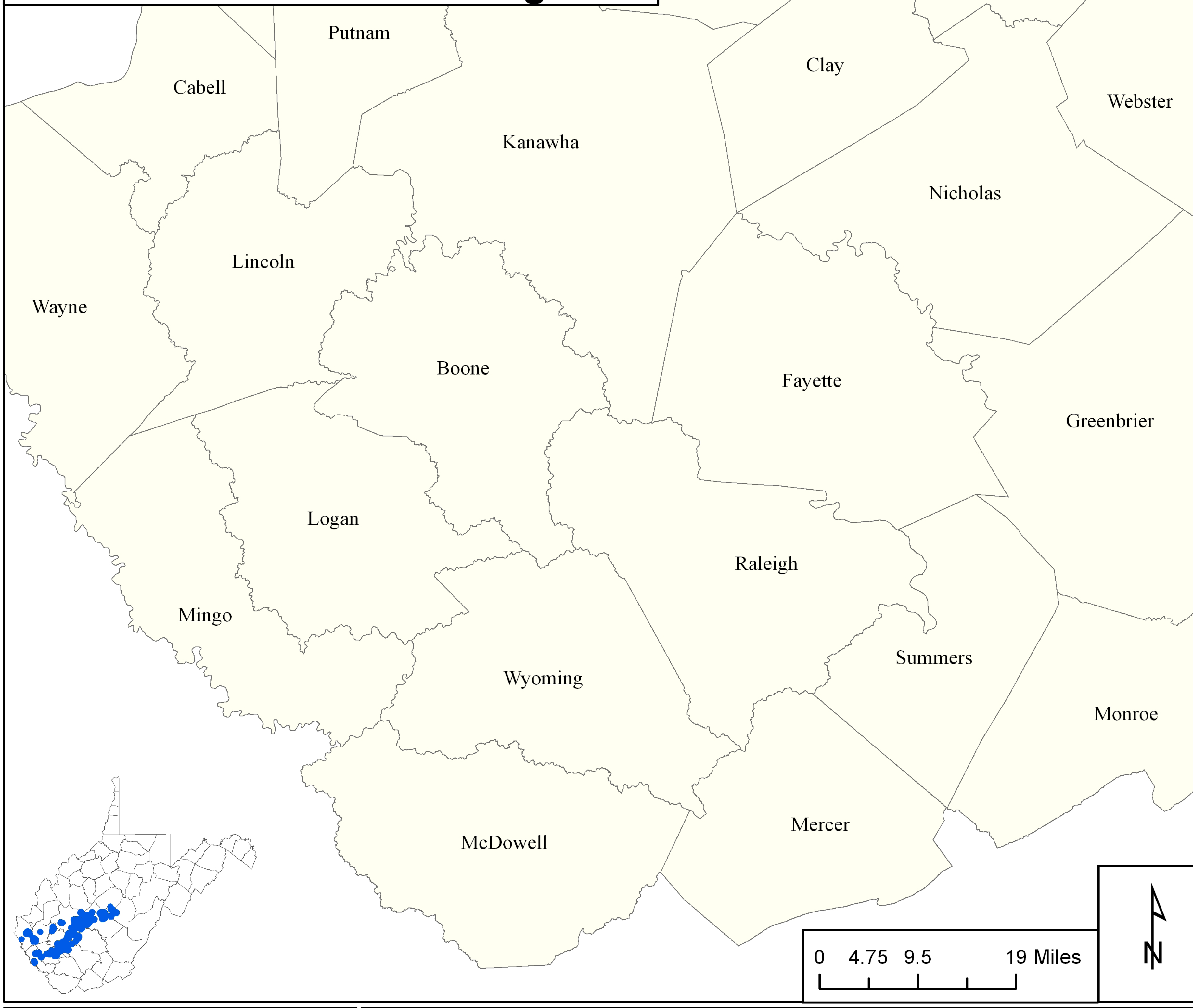
No. 5 Block Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	76	353.00	0
Mean coal bed thickness (feet)	0.00	4.07	3.93	0.00
Min. footprint area (acres)	0.00	0.00	0.02	0.00
Max. footprint area (acres)	0.00	95.87	2,420.30	0.00
Mean footprint area (acres)	0.00	7.99	90.45	0.00
Median footprint area (acres)	0.00	2.20	17.42	0.00
Total footprint area (acres)	0.00	607.04	31,928.68	0.00
Estimated void volume (acre feet)	0.00	1,147.61	60,026.64	0.00
Max. potential storage (million gallons)	0.00	374.01	19,562.68	0.00

Figure 14c

No. 5 Block Mine Pools

Potential Total Flooding



Position **Legend**

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

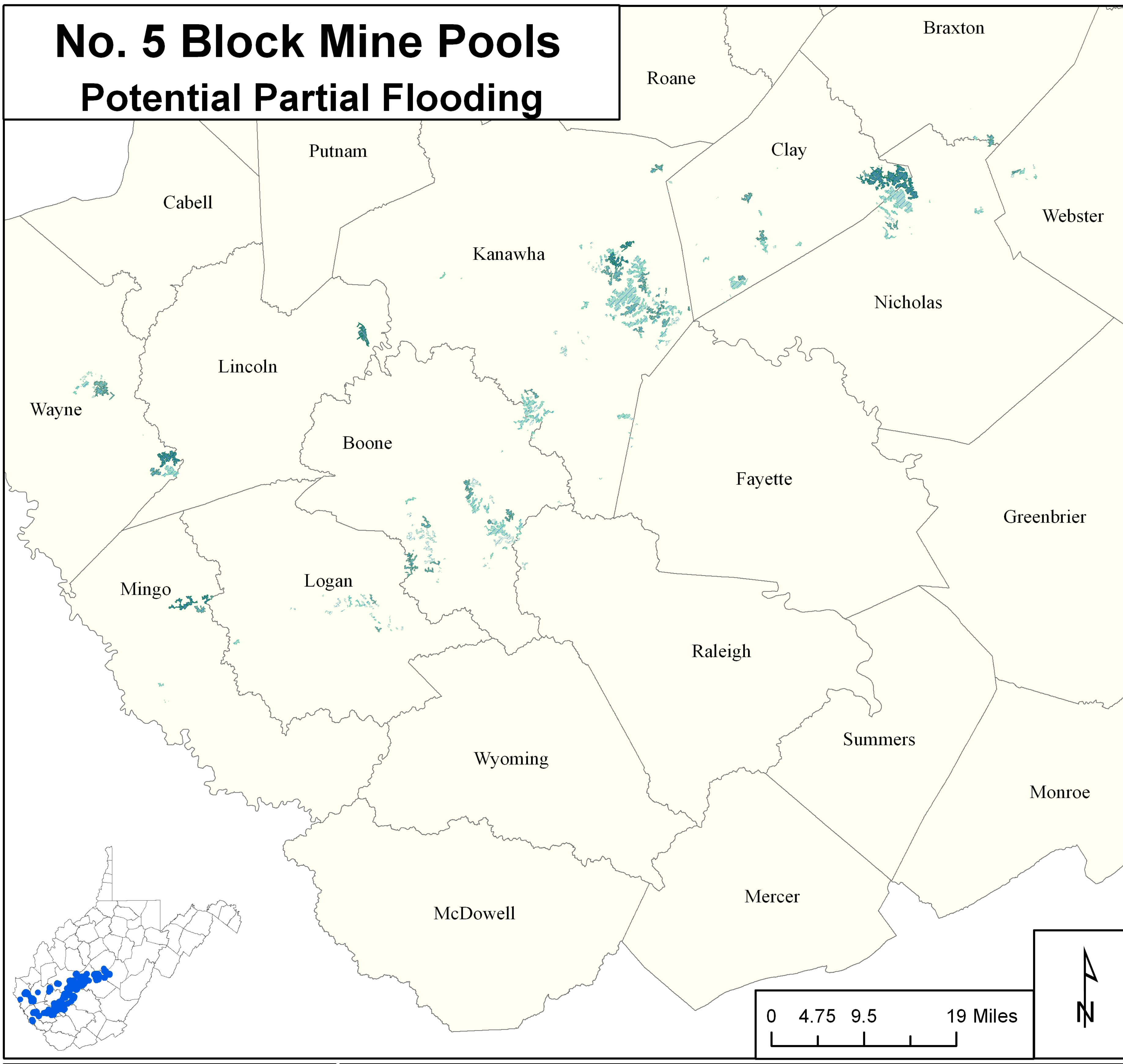
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

No. 5 Block Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	0
Mean coal bed thickness (feet)	0.00	0.00	0.00
Min. foot print area (acres)	0.00	0.00	0.00
Max. foot print area (acres)	0.00	0.00	0.00
Mean foot print area (acres)	0.00	0.00	0.00
Median foot print area (acres)	0.00	0.00	0.00
Total foot print area (acres)	0.00	0.00	0.00
Estimated void volume (acre feet)	0.00	0.00	0.00
Max. potential storage (million gallons)	0.00	0.00	0.00

Figure 14d

No. 5 Block Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

No. 5 Block Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	341	12
Mean coal bed thickness (feet)	3.96	3.07
Min. footprint area (acres)	0.02	0.06
Max. footprint area (acres)	2,420.30	657.28
Mean footprint area (acres)	90.55	87.55
Median foot print area (acres)	17.90	7.76
Total footprint area (acres)	30,878.12	1,050.56
Estimated void volume (acre feet)	57,733.84	2,292.79
Max. potential storage (million gallons)	18,815.46	747.22

Figure 14e

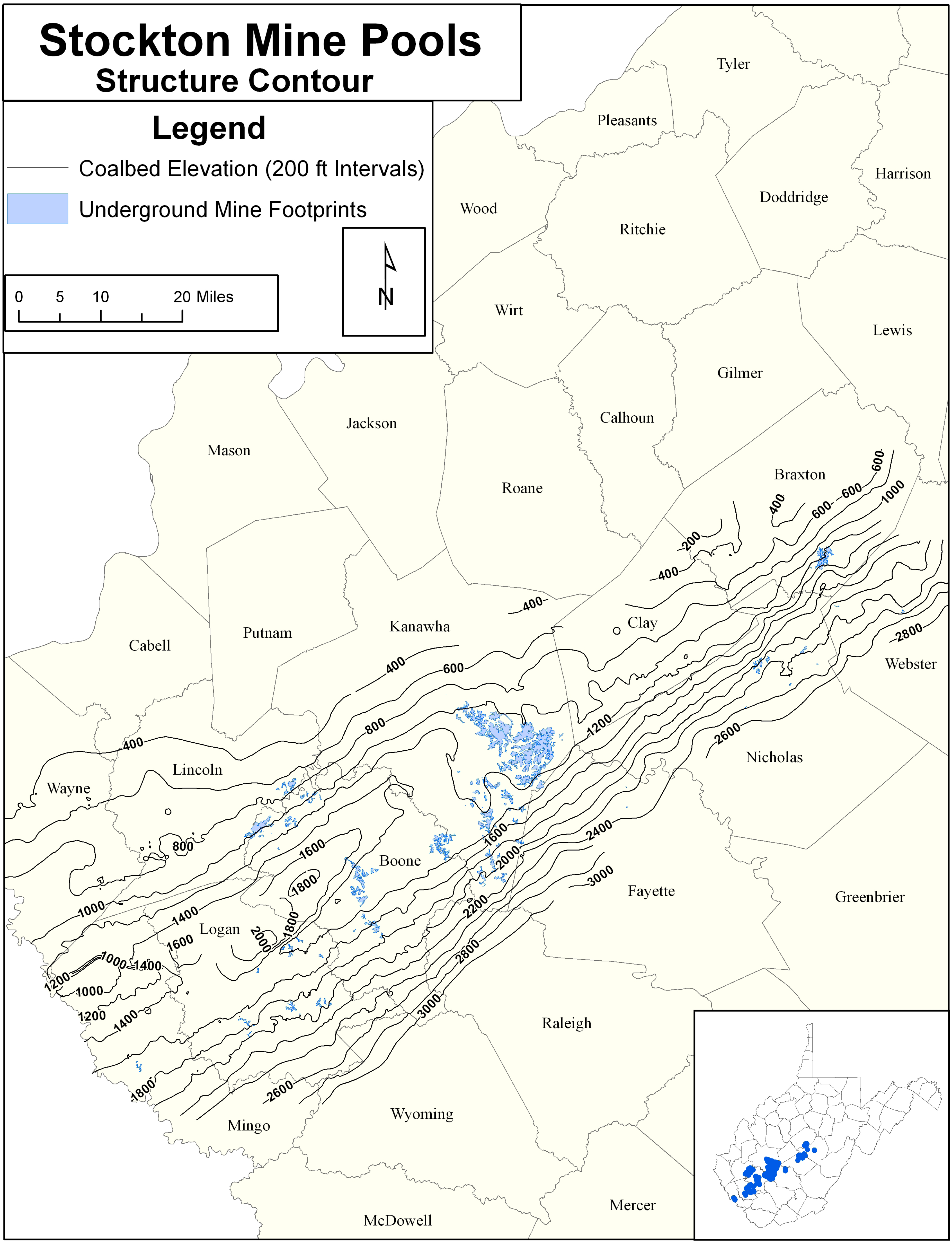
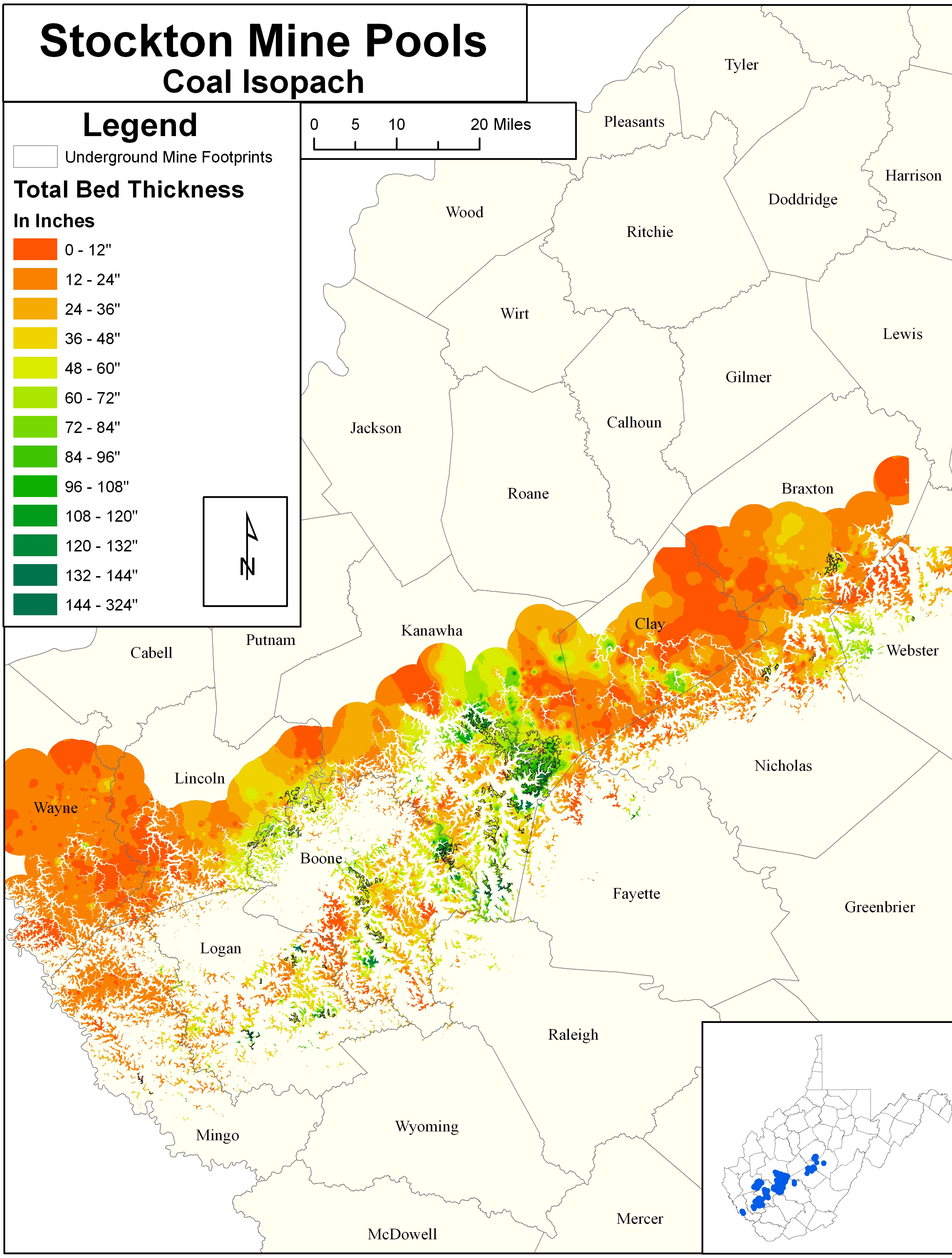

Stockton Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Jackson
Calhoun
Mason
Braxton
Roane
Clay
Kanawha
Putnam
Cabell
Webster
Lincoln
Wayne
Nicholas
Boone
Logan
Fayette
Greenbrier
Raleigh
Mingo
Wyoming
McDowell
Mercer

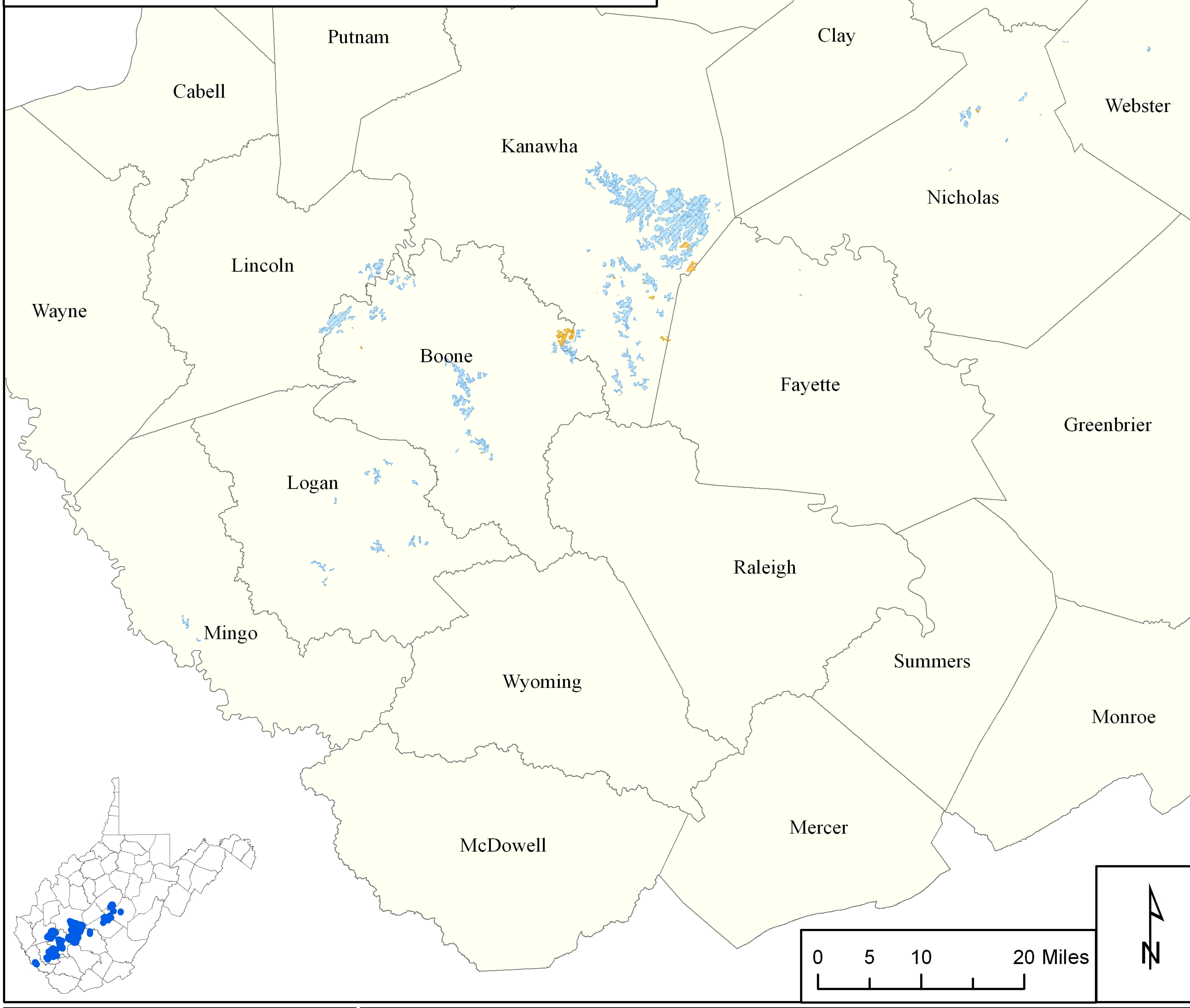
Figure 15a



Stockton Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 324"
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Roane
Braxton
Clay
Kanawha
Webster
Putnam
Cabell
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Raleigh
Wyoming
Mingo
Mercer
McDowell

Figure 15b

Stockton Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

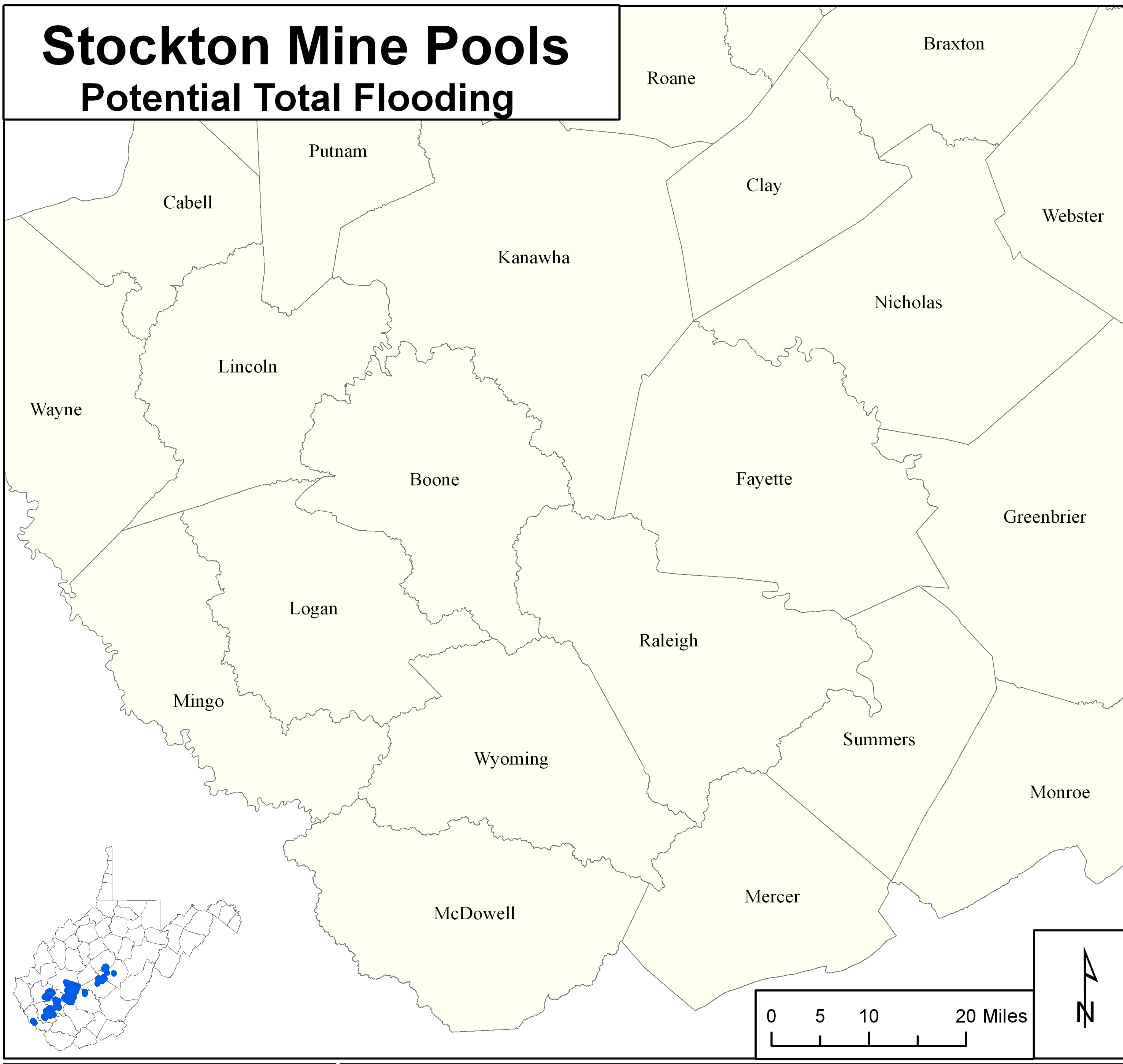
Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Stockton Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	25	135	0
Mean coal bed thickness (feet)	0.00	4.57	4.42	0.00
Min. footprint area (acres)	0.00	0.03	0.00	0.00
Max. footprint area (acres)	0.00	637.40	4,100.05	0.00
Mean footprint area (acres)	0.00	57.39	239.83	0.00
Median footprint area (acres)	0.00	3.34	73.10	0.00
Total footprint area (acres)	0.00	1,434.65	32,376.49	0.00
Estimated void volume (acre feet)	0.00	5,134.91	89,480.16	0.00
Max. potential storage (million gallons)	0.00	1,673.47	29,161.59	0.00

Figure 15c



Legend

Position
- Above drainage
- Near drainage
- Below drainage

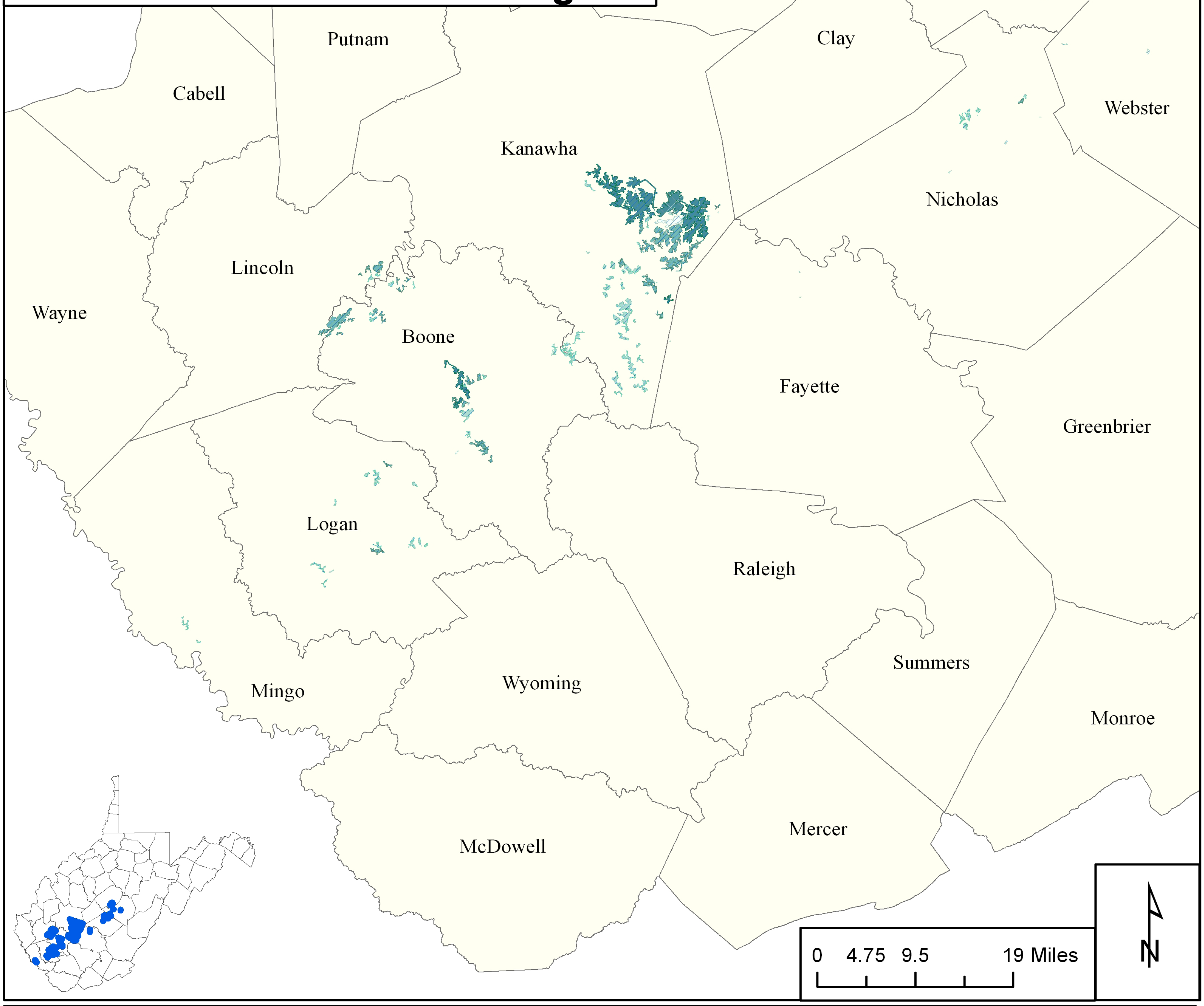
Storage in Million Gallons
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Stockton Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	0
Mean coal bed thickness (feet)	0.00	0.00	0.00
Min. foot print area (acres)	0.00	0.00	0.00
Max. foot print area (acres)	0.00	0.00	0.00
Mean foot print area (acres)	0.00	0.00	0.00
Median foot print area (acres)	0.00	0.00	0.00
Total foot print area (acres)	0.00	0.00	0.00
Estimated void volume (acre feet)	0.00	0.00	0.00
Max. potential storage (million gallons)	0.00	0.00	0.00

Figure 15d

Stockton Mine Pools
Potential Partial Flooding



Legend

Position

Above drainage

Near drainage

Potential Partial Flooding

Very small area(s)

Small area(s)

Intermediate area(s)

Large area(s)

Very large area(s)

Stockton Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	132	3
Mean coal bed thickness (feet)	4.43	4.18
Min. footprint area (acres)	0.00	26.74
Max. footprint area (acres)	4,100.05	2,090.45
Mean footprint area (acres)	228.50	738.30
Median foot print area (acres)	70.72	97.71
Total footprint area (acres)	30,161.58	2,214.90
Estimated void volume (acre feet)	83,689.34	5,790.83
Max. potential storage (million gallons)	27,274.36	1,887.23

Figure 15e

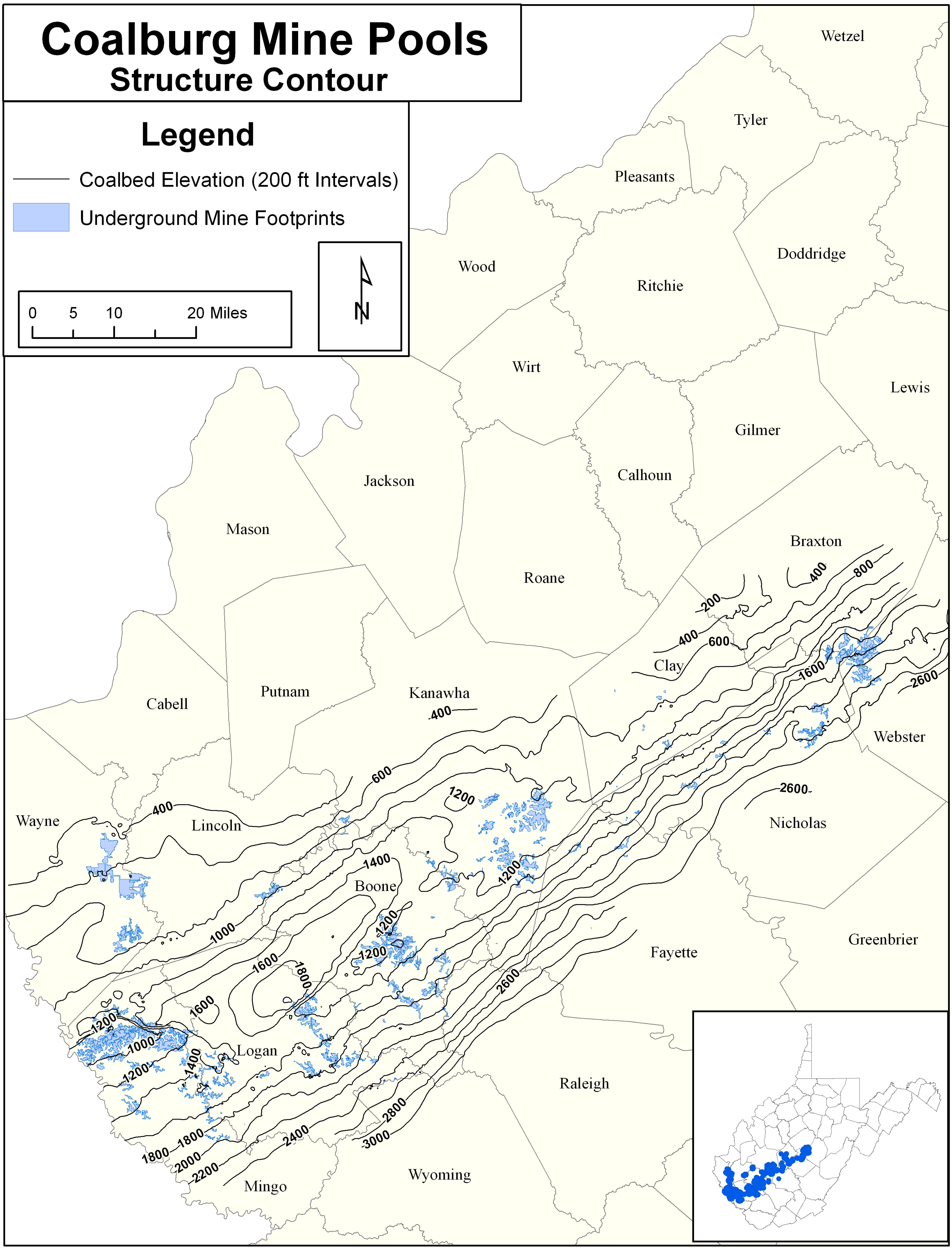

Coalburg Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Wetzel
Tyler
Pleasants
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Jackson
Calhoun
Mason
Braxton
Roane
Clay
Kanawha
Cabell
Putnam
Webster
Wayne
Lincoln
Nicholas
Boone
Greenbrier
Fayette
Logan
Raleigh
Wyoming
Mingo

Figure 16a

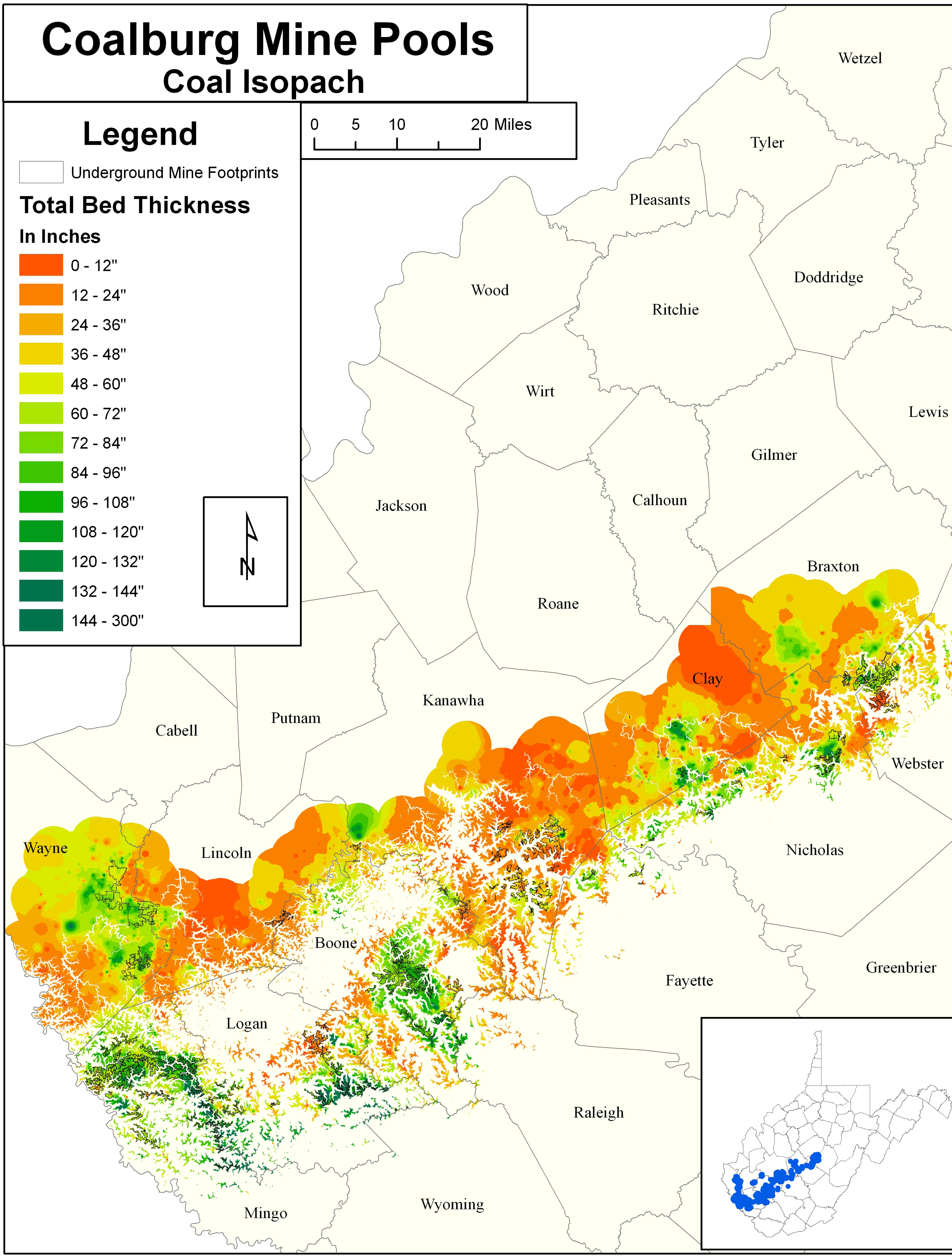
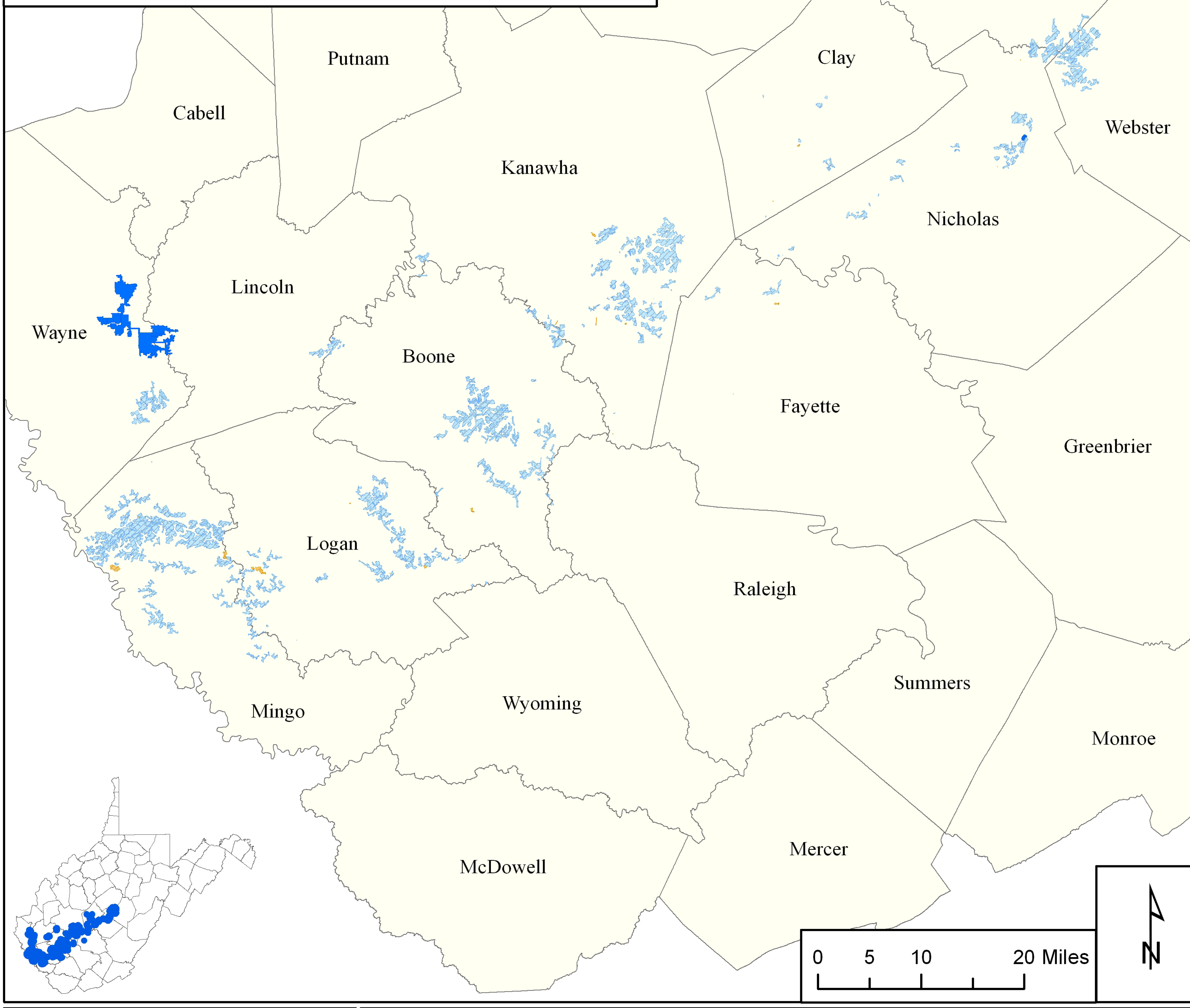

Coalburg Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 300"
N
0
5
10
20 Miles
Wetzel
Tyler
Pleasants
Wood
Ritchie
Doddridge
Wirt
Lewis
Gilmer
Jackson
Calhoun
Braxton
Roane
Clay
Kanawha
Cabell
Putnam
Webster
Wayne
Lincoln
Nicholas
Boone
Greenbrier
Fayette
Logan
Raleigh
Mingo
Wyoming

Figure 16b

Coalburg Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

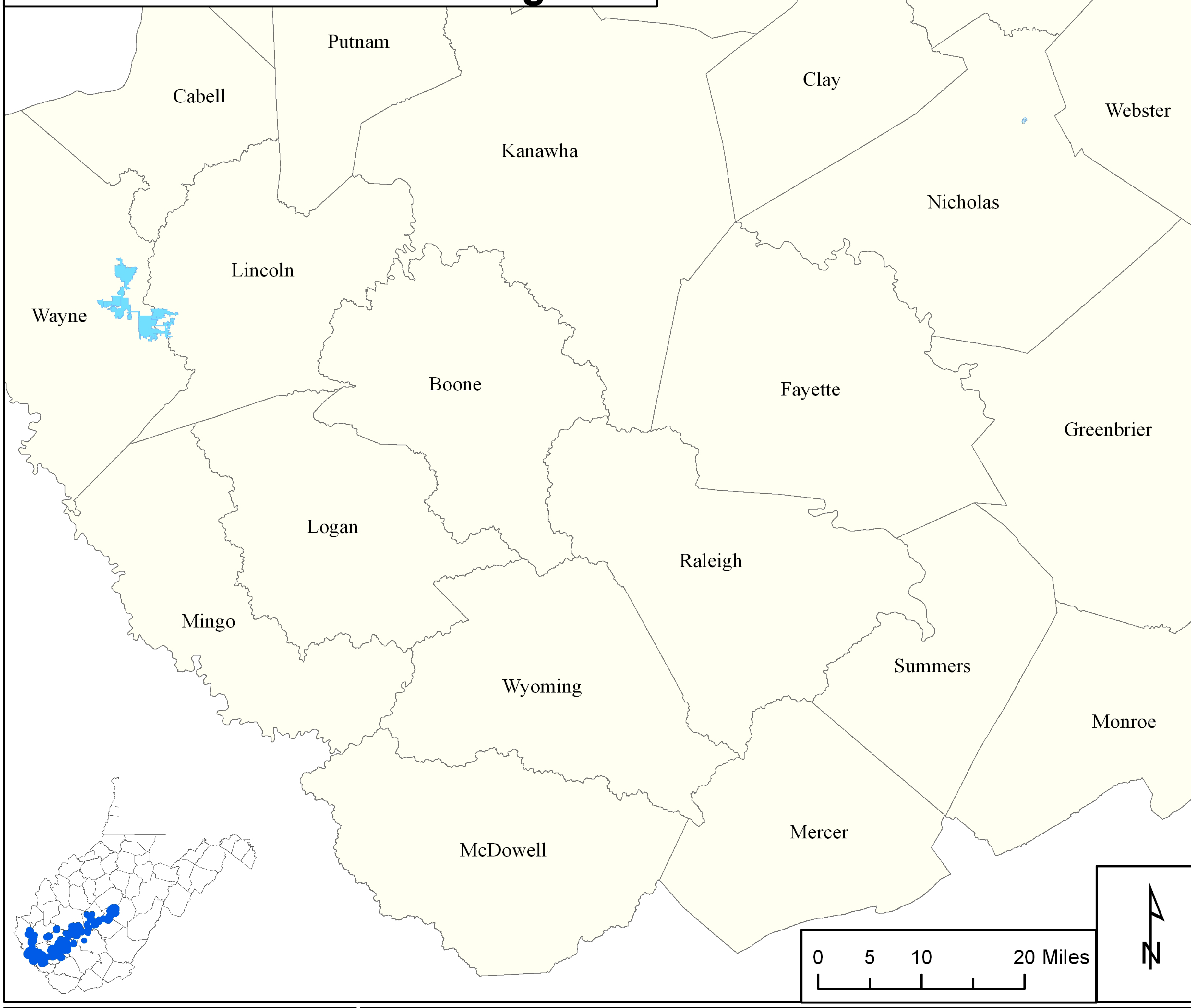
- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Coalburg Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	22	274	2
Mean coal bed thickness (feet)	0.00	4.81	5.30	5.80
Min. footprint area (acres)	0.00	0.26	0.12	0.80
Max. footprint area (acres)	0.00	215.26	4,074.99	8,603.08
Mean footprint area (acres)	0.00	33.65	241.05	4,351.50
Median footprint area (acres)	0.00	11.02	105.74	4,351.50
Total footprint area (acres)	0.00	740.22	66,047.04	8,703.00
Estimated void volume (acre feet)	0.00	2,137.42	184,839.99	24,163.17
Max. potential storage (million gallons)	0.00	696.59	60,239.35	7,874.78

Figure 16c

Coalburg Mine Pools
Potential Total Flooding



Legend

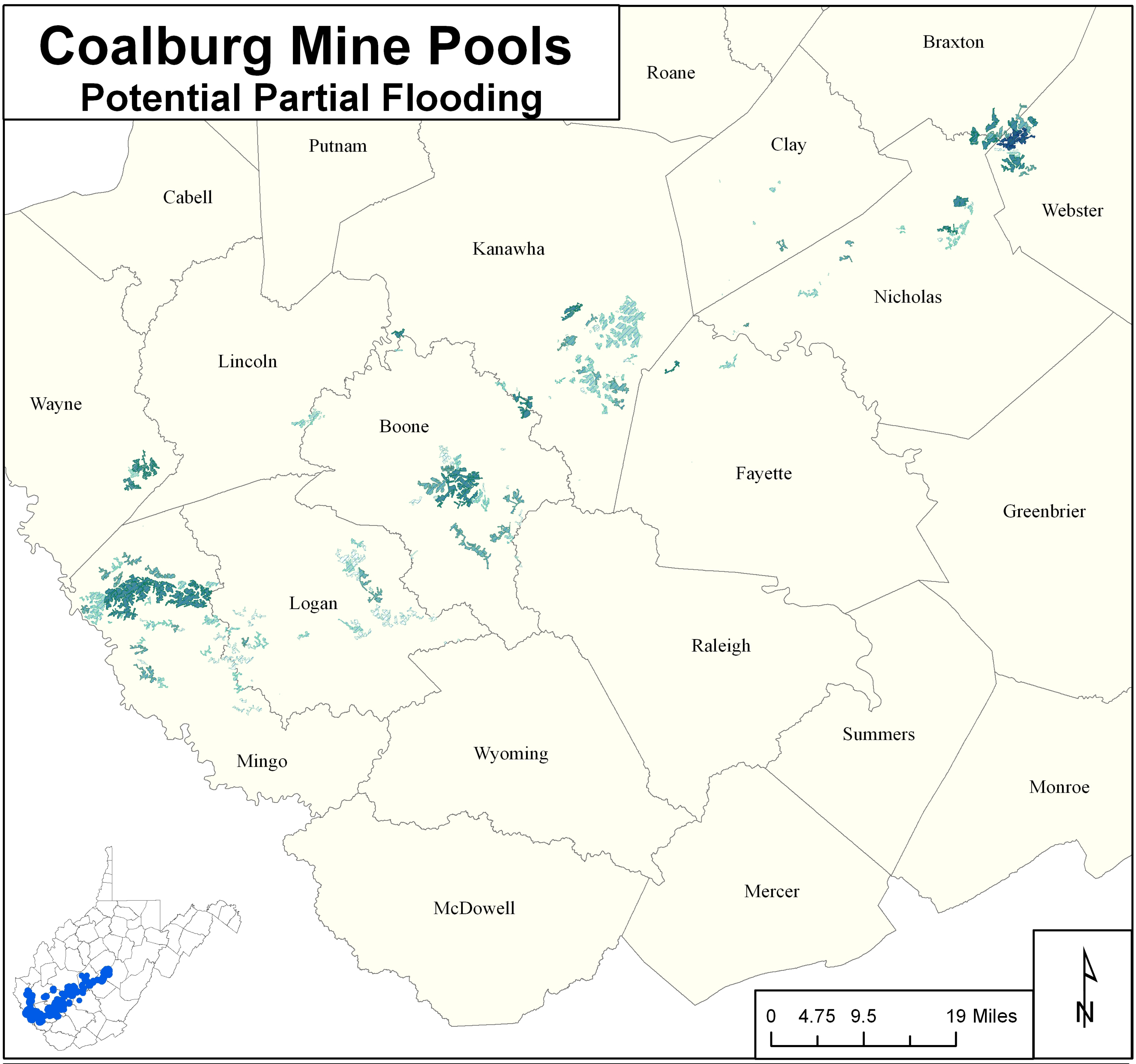
Position
- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Coalburg Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	1	1
Mean coal bed thickness (feet)	0.00	6.04	5.55
Min. foot print area (acres)	0.00	99.93	8,603.08
Max. foot print area (acres)	0.00	99.93	8,603.08
Mean foot print area (acres)	0.00	99.93	8,603.08
Median foot print area (acres)	0.00	99.93	8,603.08
Total foot print area (acres)	0.00	99.93	8,603.08
Estimated void volume (acre feet)	0.00	302.36	23,860.81
Max. potential storage (million gallons)	0.00	98.54	7,776.24

Figure 16d



Legend

Position

- Above drainage
- Near drainage

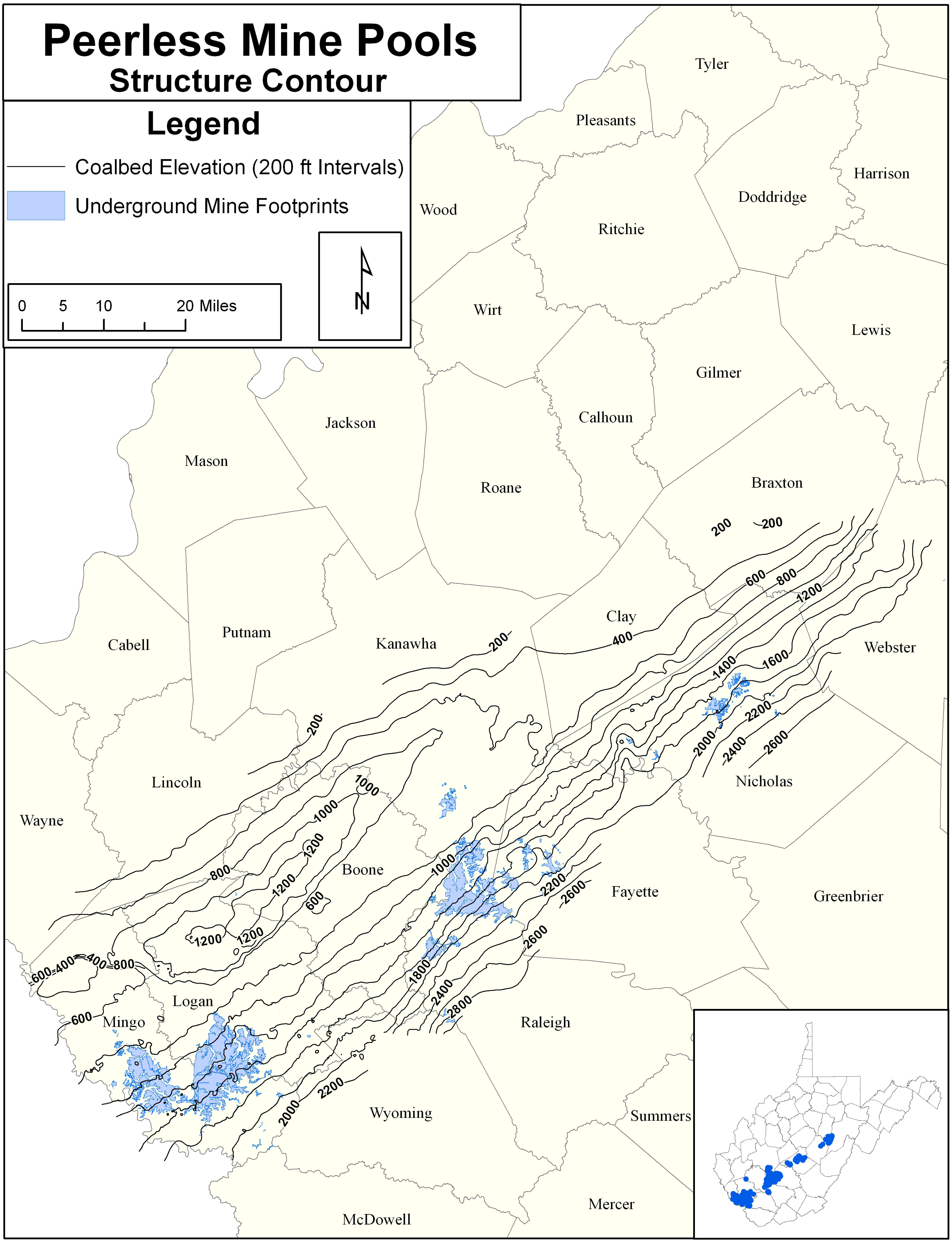
Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Coalburg Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	265	9
Mean coal bed thickness (feet)	5.35	3.98
Min. footprint area (acres)	0.12	1.82
Max. footprint area (acres)	4,074.99	602.41
Mean footprint area (acres)	240.16	267.13
Median foot print area (acres)	105.50	245.97
Total footprint area (acres)	63,642.83	2,404.21
Estimated void volume (acre feet)	178,449.01	6,390.98
Max. potential storage (million gallons)	58,156.53	2,082.82

Figure 16e



Peerless Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Mason
Roane
Braxton
Clay
Putnam
Cabell
Kanawha
Webster
Lincoln
Nicholas
Wayne
Boone
Fayette
Greenbrier
Logan
Mingo
Raleigh
Wyoming
Summers
Mercer
McDowell
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800

Figure 17a

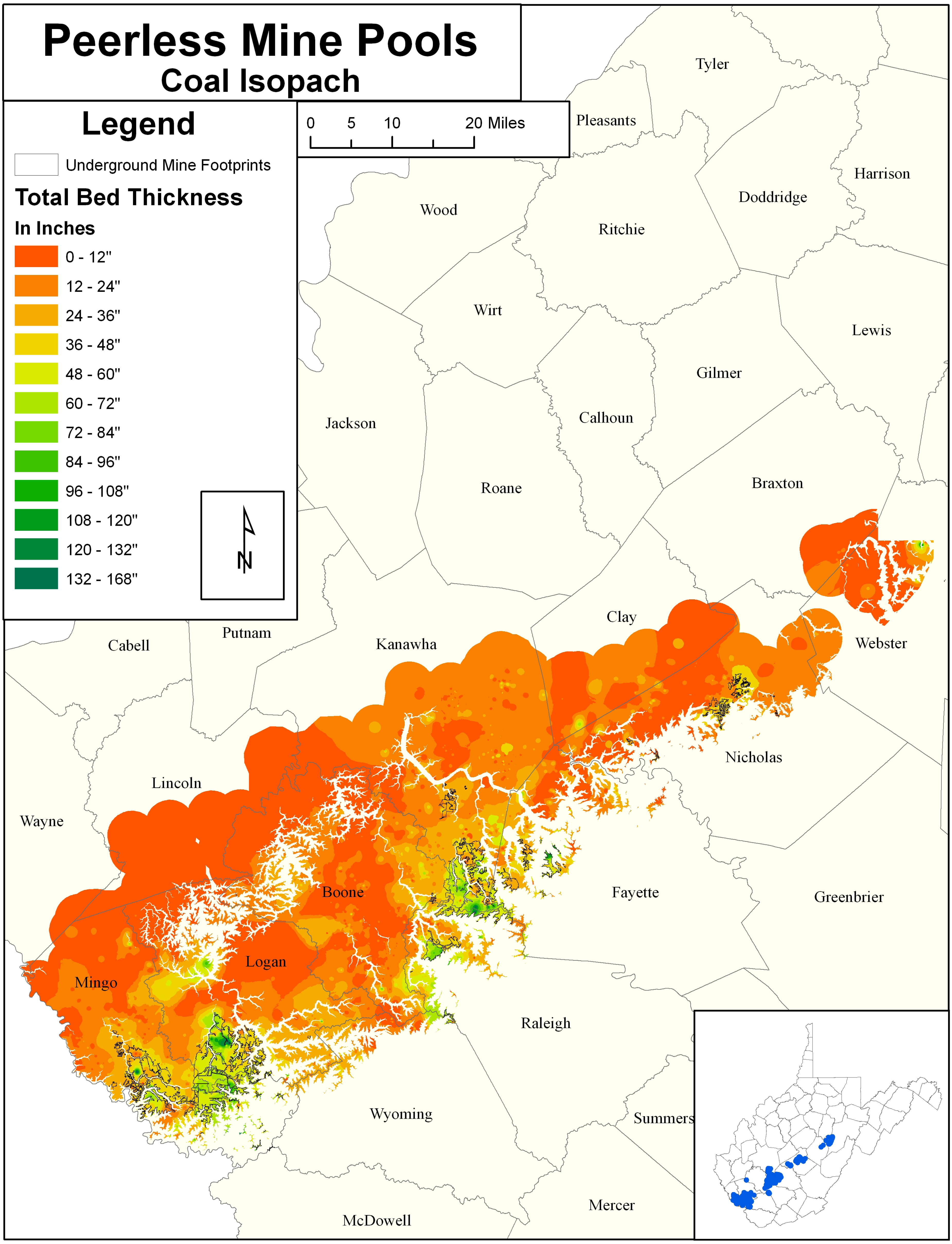
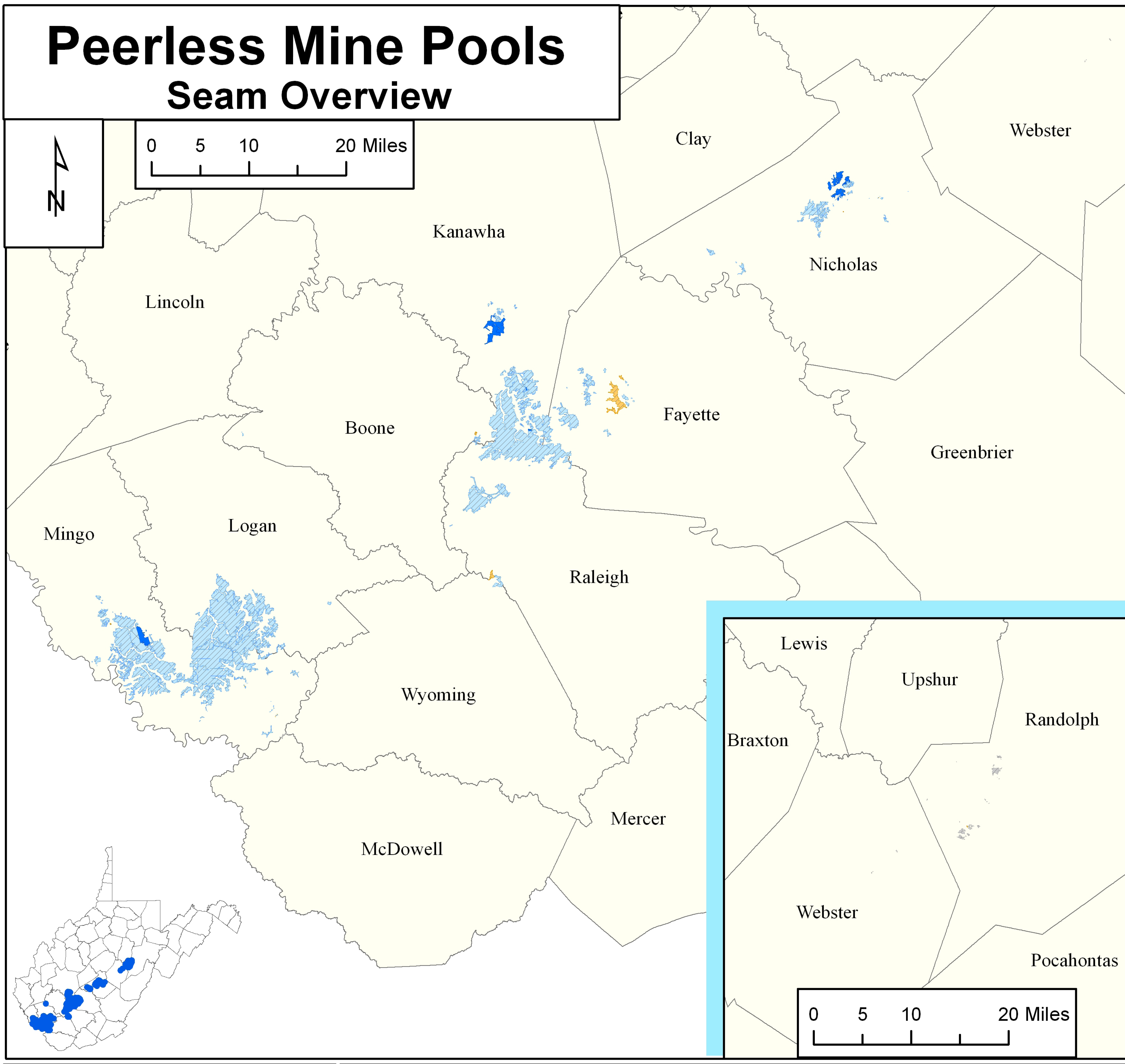

Peerless Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 168"
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Roane
Braxton
Clay
Webster
Cabell
Putnam
Kanawha
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Mingo
Raleigh
Wyoming
Summers
Mercer
McDowell

Figure 17b



Legend

Position

- Above drainage
- Near drainage
- Below drainage

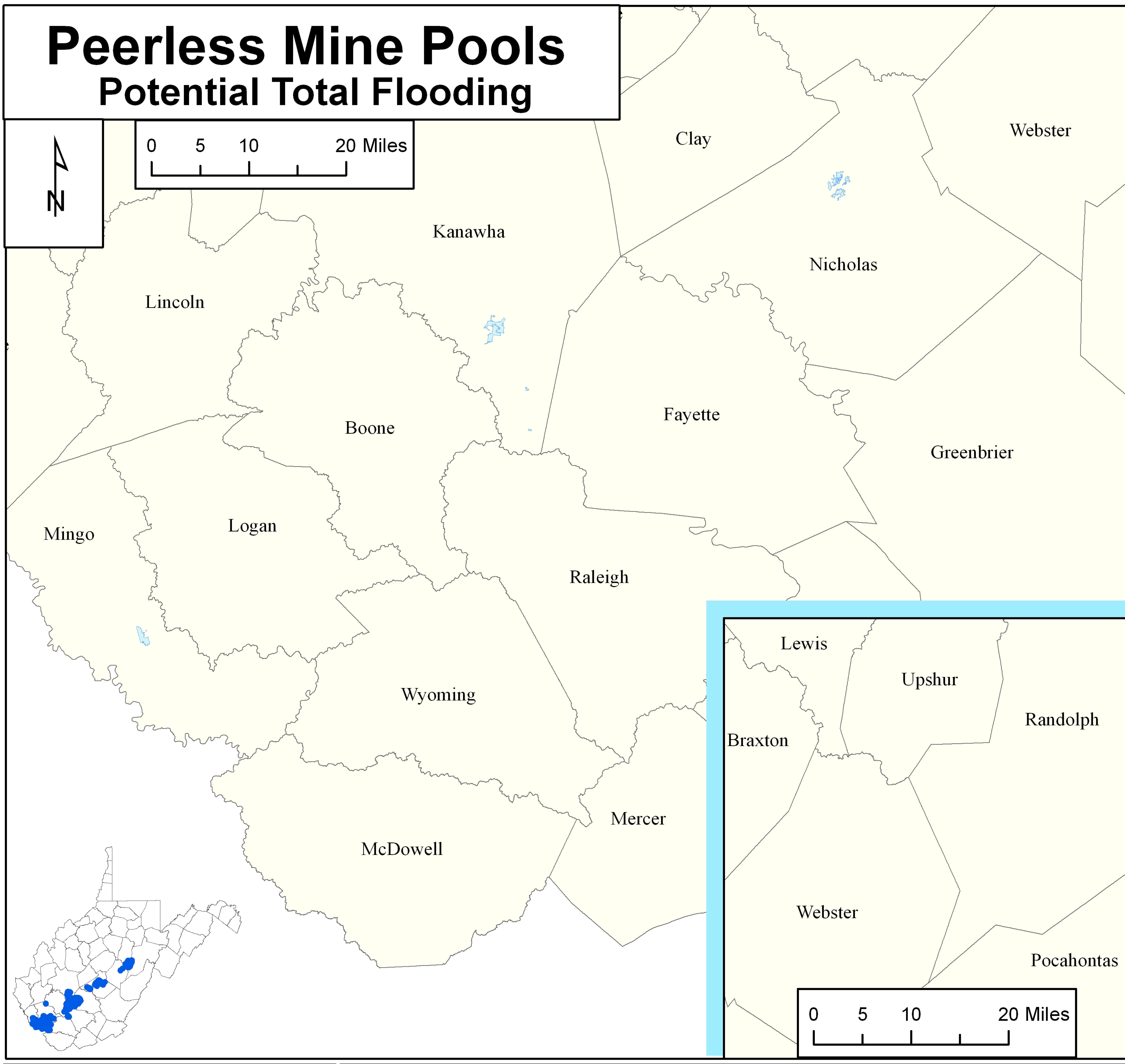
Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Peerless Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	38	24	211	11
Mean coal bed thickness (feet)	2.47	3.52	3.23	3.12
Min. footprint area (acres)	0.12	0.02	0.08	2.58
Max. footprint area (acres)	233.14	1,220.93	8,026.77	1,484.80
Mean footprint area (acres)	16.81	60.38	379.86	310.25
Median footprint area (acres)	3.06	0.56	24.63	33.94
Total footprint area (acres)	638.93	1,449.23	80,151.24	3,412.75
Estimated void volume (acre feet)	651.47	3,469.62	158,654.82	4,645.15
Max. potential storage (million gallons)	212.32	1,130.75	51,705.60	1,513.85

Figure 17c



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

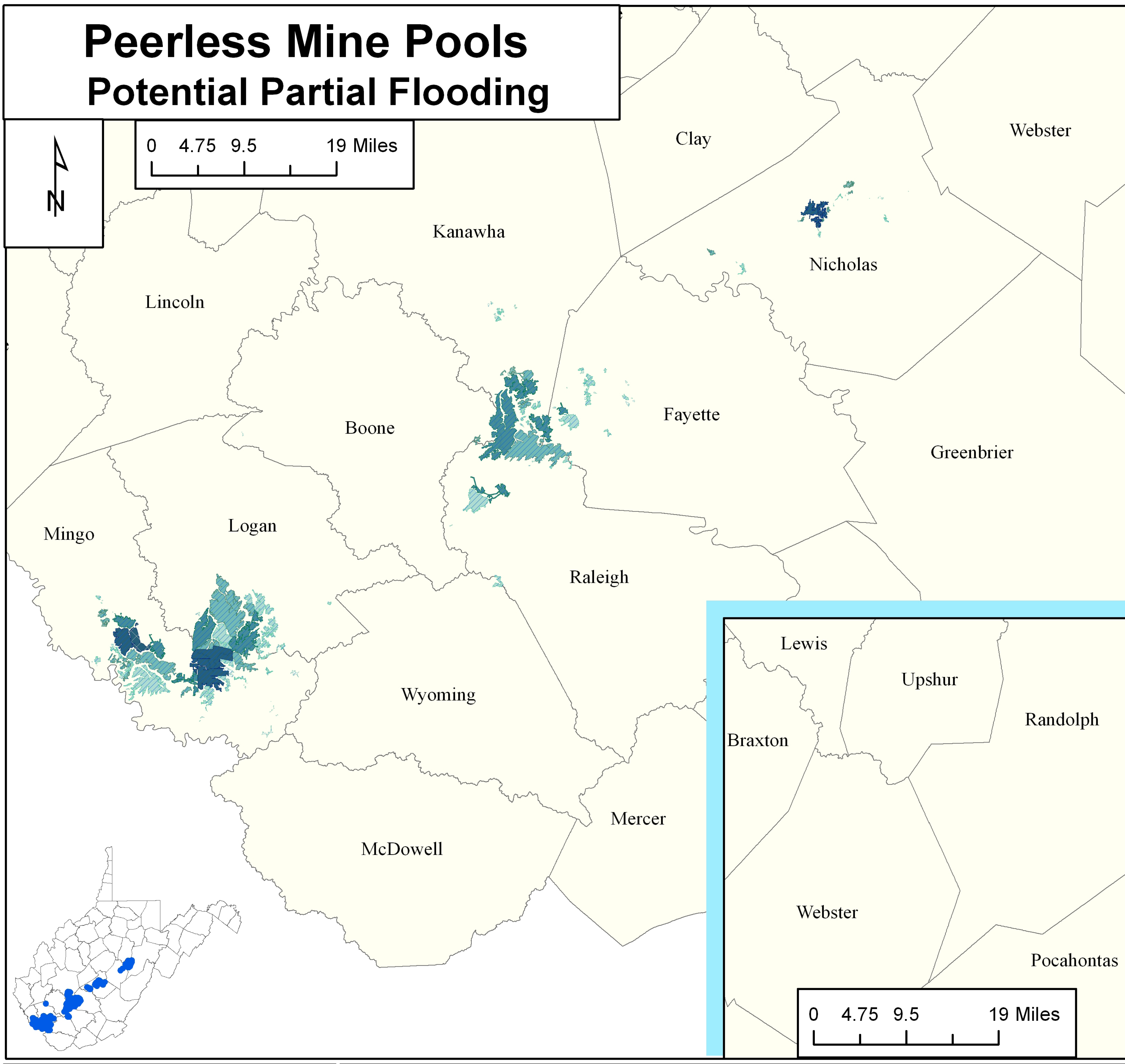
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Peerless Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	3	3	5
Mean coal bed thickness (feet)	3.61	2.62	3.13
Min. foot print area (acres)	4.94	5.32	2.58
Max. foot print area (acres)	33.94	369.14	1,484.80
Mean foot print area (acres)	22.49	130.18	590.95
Median foot print area (acres)	28.60	16.08	591.56
Total foot print area (acres)	67.48	390.54	2,954.73
Estimated void volume (acre feet)	116.82	511.24	4,017.09
Max. potential storage (million gallons)	38.07	166.61	1,309.17

Figure 17d

Peerless Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Peerless Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	202.00	9
Mean coal bed thickness (feet)	3.225657689	3.44
Min. footprint area (acres)	0.081401	0.08
Max. footprint area (acres)	8026.772549	1,497.37
Mean footprint area (acres)	386.8303851	223.50
Median foot print area (acres)	22.8539055	37.78
Total footprint area (acres)	78139.73779	2,011.51
Estimated void volume (acre feet)	155375.6062	3,279.21
Max. potential storage (million gallons)	50636.91006	1,068.69

Figure 17e

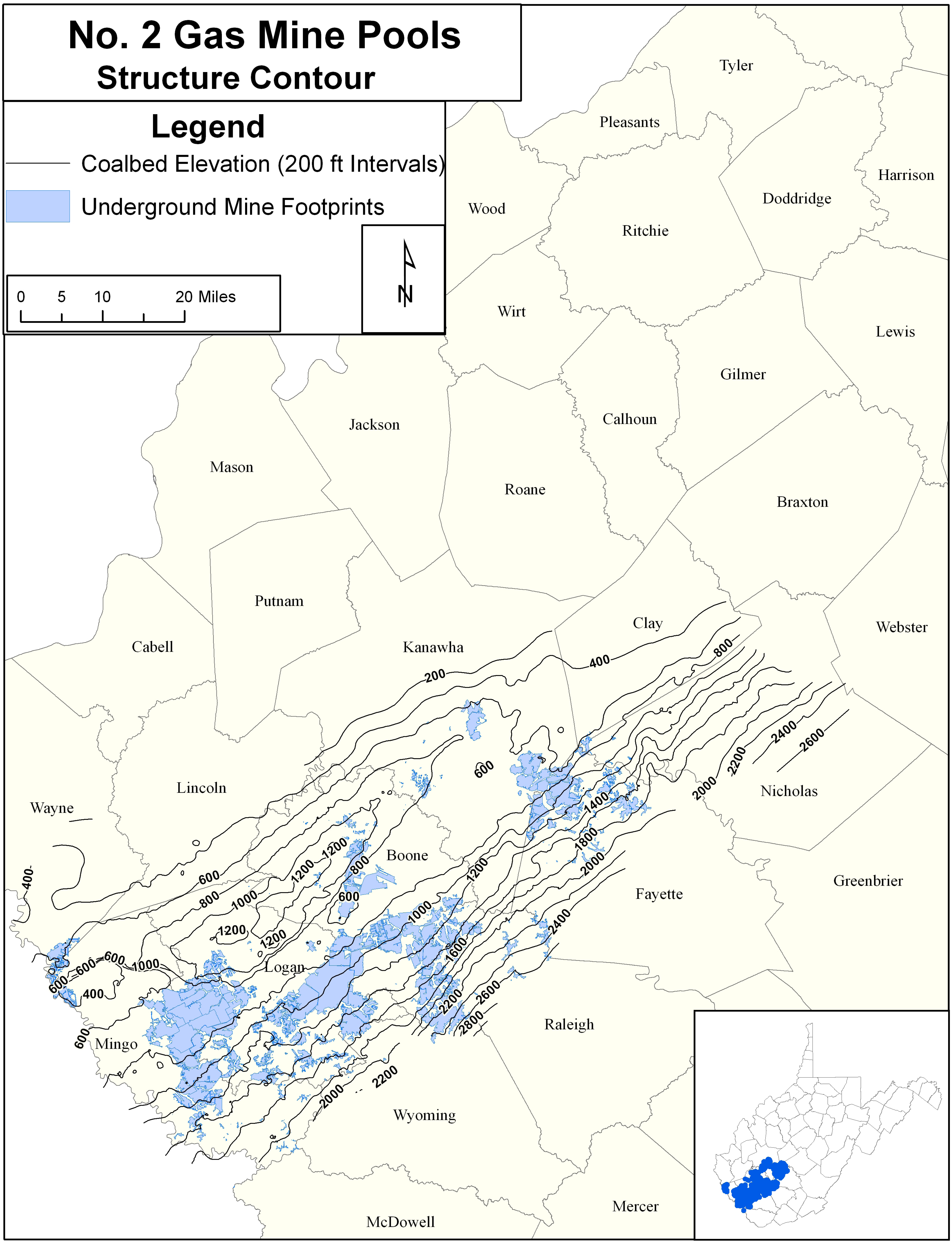

No. 2 Gas Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Mason
Roane
Braxton
Putnam
Clay
Webster
Cabell
Kanawha
Lincoln
Wayne
Nicholas
Boone
Greenbrier
Fayette
Logan
Mingo
Raleigh
Wyoming
Mercer
McDowell

Figure 18a

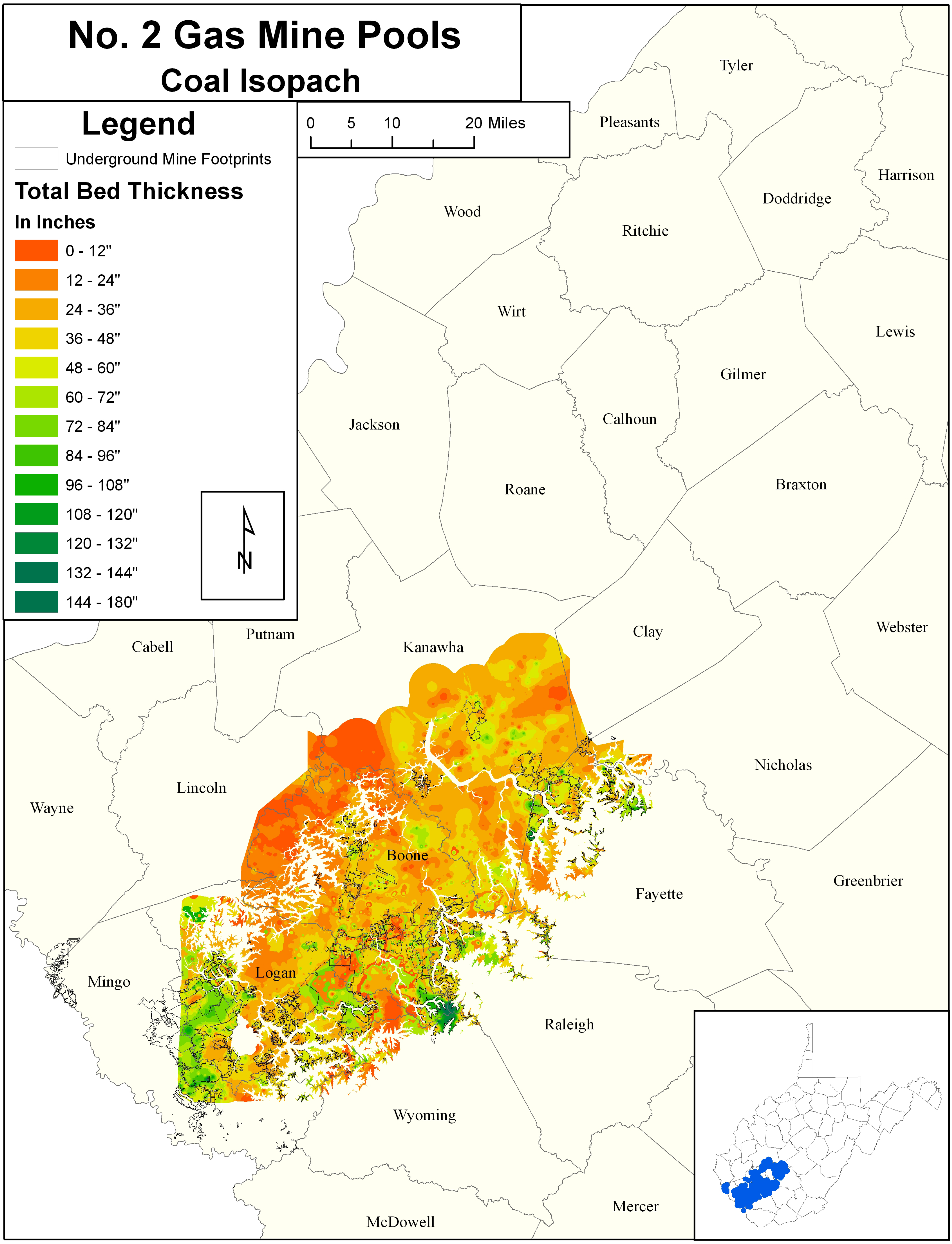
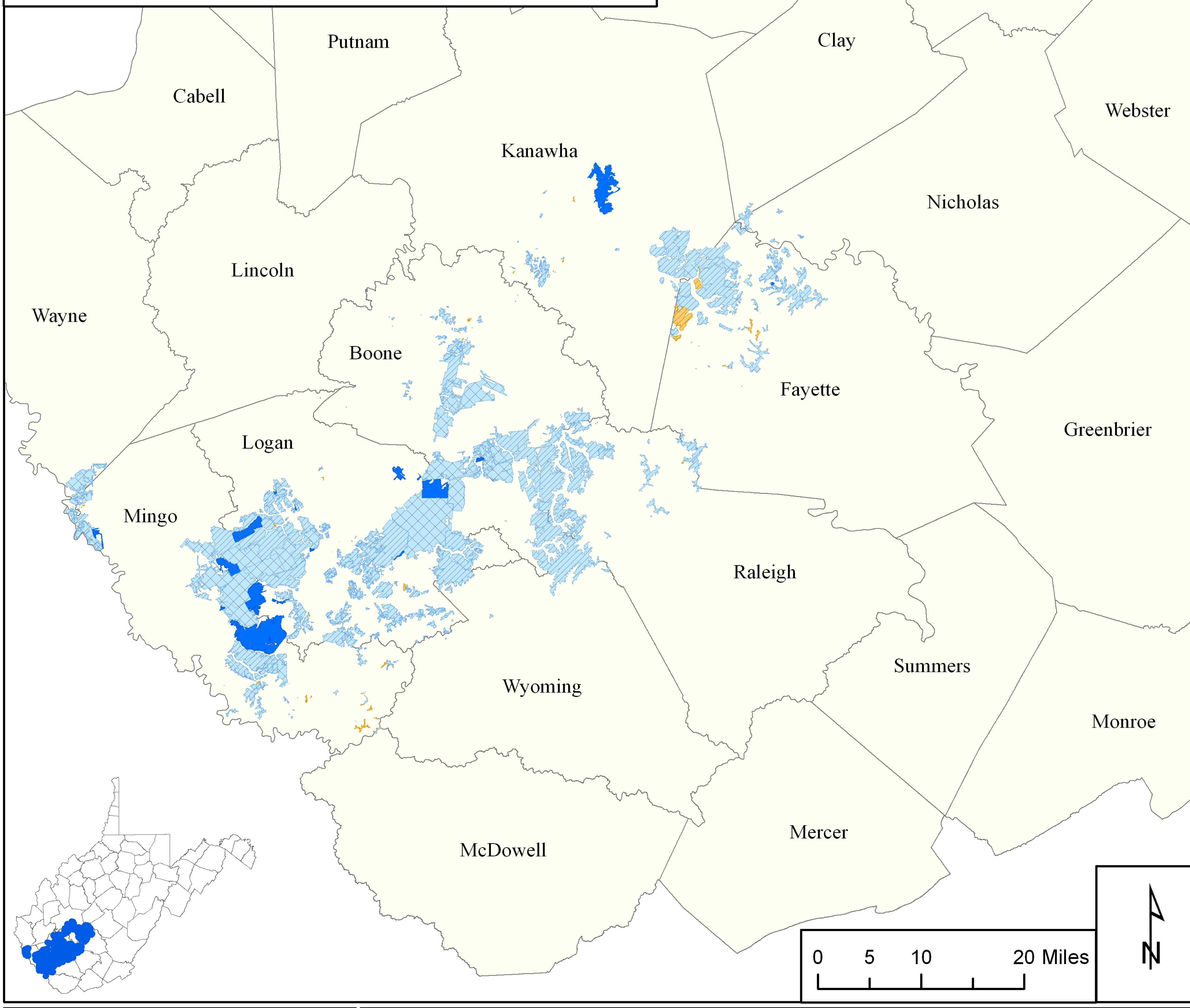

No. 2 Gas Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 180"
N
0 5 10 20 Miles
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Jackson
Calhoun
Roane
Braxton
Clay
Webster
Cabell
Putnam
Kanawha
Lincoln
Wayne
Nicholas
Boone
Greenbrier
Fayette
Logan
Mingo
Raleigh
Wyoming
Mercer
McDowell

Figure 18b

No. 2 Gas Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

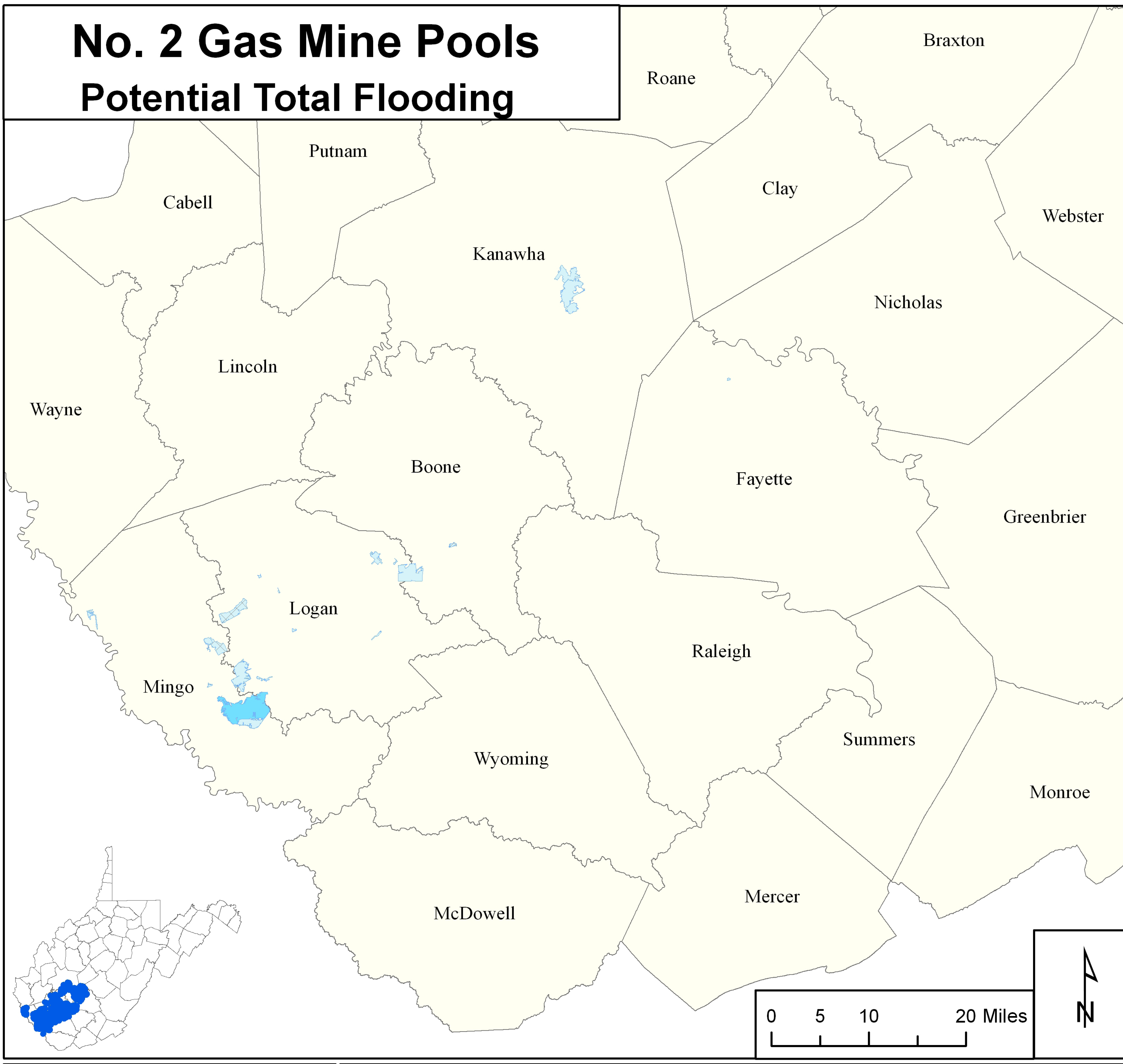
Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

No. 2 Gas Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	5	79	460	21
Mean coal bed thickness (feet)	2.33	3.64	3.55	4.31
Min. footprint area (acres)	0.08	0.01	0.02	22.63
Max. footprint area (acres)	94.36	1,504.81	14,838.87	6,268.92
Mean footprint area (acres)	19.81	35.84	460.33	963.91
Median footprint area (acres)	0.31	1.68	30.48	292.18
Total footprint area (acres)	99.07	2,831.57	211,751.84	20,242.08
Estimated void volume (acre feet)	104.77	7,013.48	451,091.78	51,374.31
Max. potential storage (million gallons)	34.14	2,285.69	147,010.81	16,742.89

Figure 18c



Legend

Position
- Above drainage
- Near drainage
- Below drainage

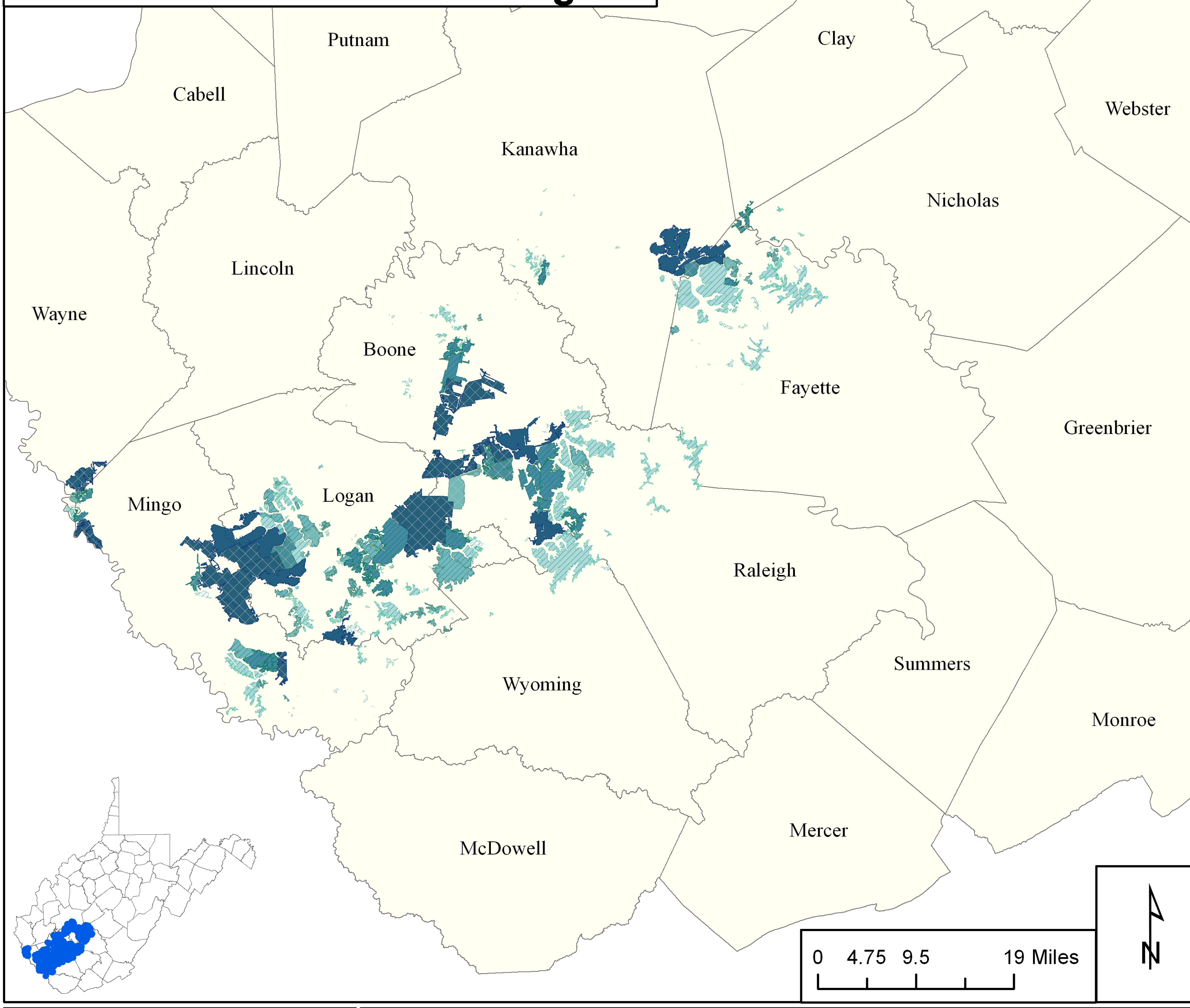
Storage in Million Gallons
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

No. 2 Gas Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	3	3	15
Mean coal bed thickness (feet)	3.78	4.47	4.39
Min. foot print area (acres)	22.63	143.21	42.03
Max. foot print area (acres)	42.94	1,592.96	6,268.92
Mean foot print area (acres)	34.40	898.37	1,162.92
Median foot print area (acres)	37.64	958.94	508.98
Total foot print area (acres)	103.20	2,695.11	17,443.77
Estimated void volume (acre feet)	179.62	5,933.67	45,261.02
Max. potential storage (million gallons)	58.54	1,933.78	14,750.57

Figure 18d

No. 2 Gas Mine Pools
Potential Partial Flooding



Legend

Position
- Above drainage
- Near drainage

Potential Partial Flooding
- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

No. 2 Gas Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	424	36
Mean coal bed thickness (feet)	3.51	3.91
Min. footprint area (acres)	0.02	0.64
Max. footprint area (acres)	8,215.04	14,838.87
Mean footprint area (acres)	329.98	1,995.62
Median foot print area (acres)	22.69	975.63
Total footprint area (acres)	139,909.41	71,842.43
Estimated void volume (acre feet)	281,081.49	170,010.29
Max. potential storage (million gallons)	91,604.46	55,406.35

Figure 18e

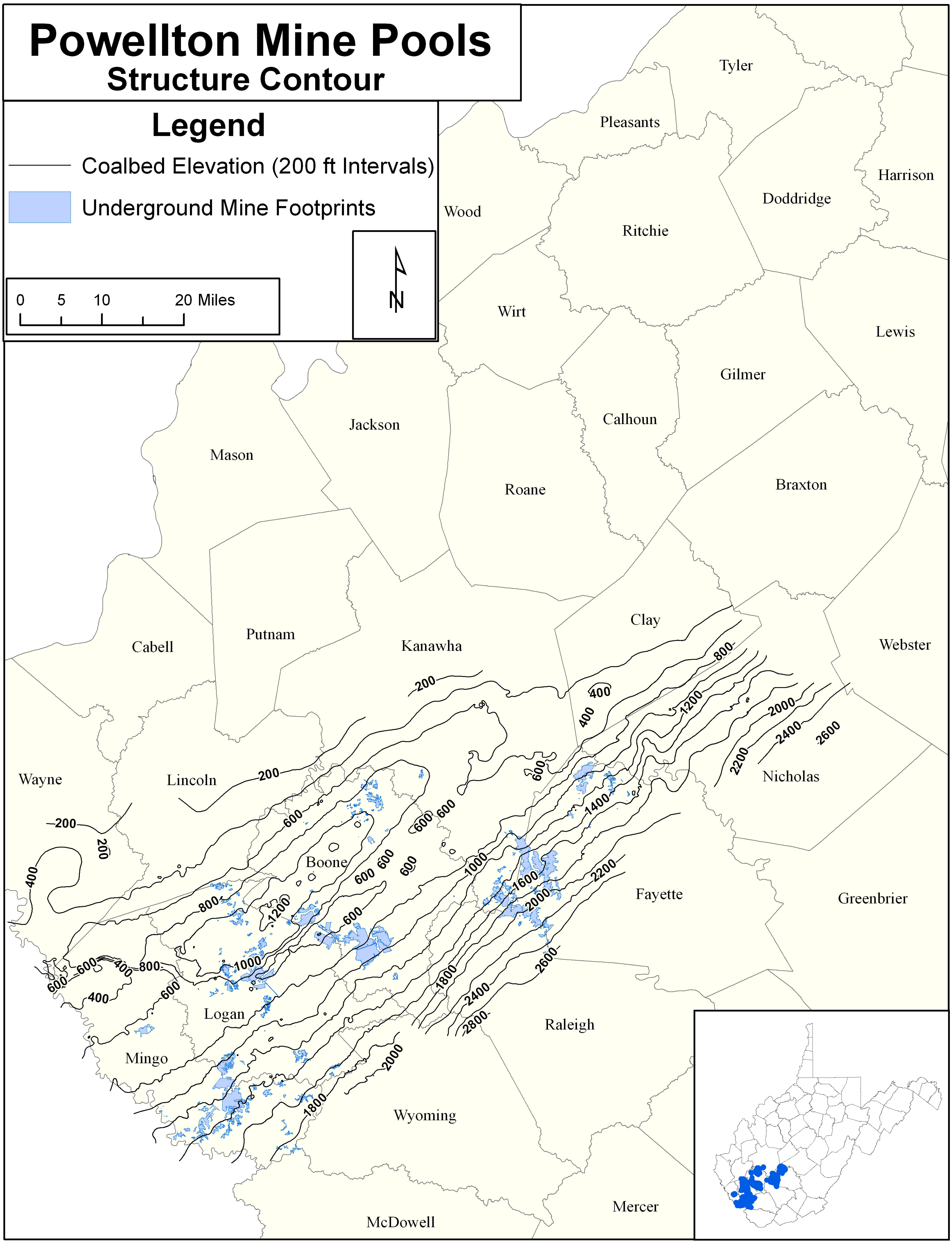

Powellton Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Mason
Roane
Braxton
Clay
Putnam
Cabell
Kanawha
Webster
Wayne
Lincoln
Nicholas
Boone
Fayette
Greenbrier
Logan
Mingo
Raleigh
Wyoming
Mercer
McDowell

Figure 19a

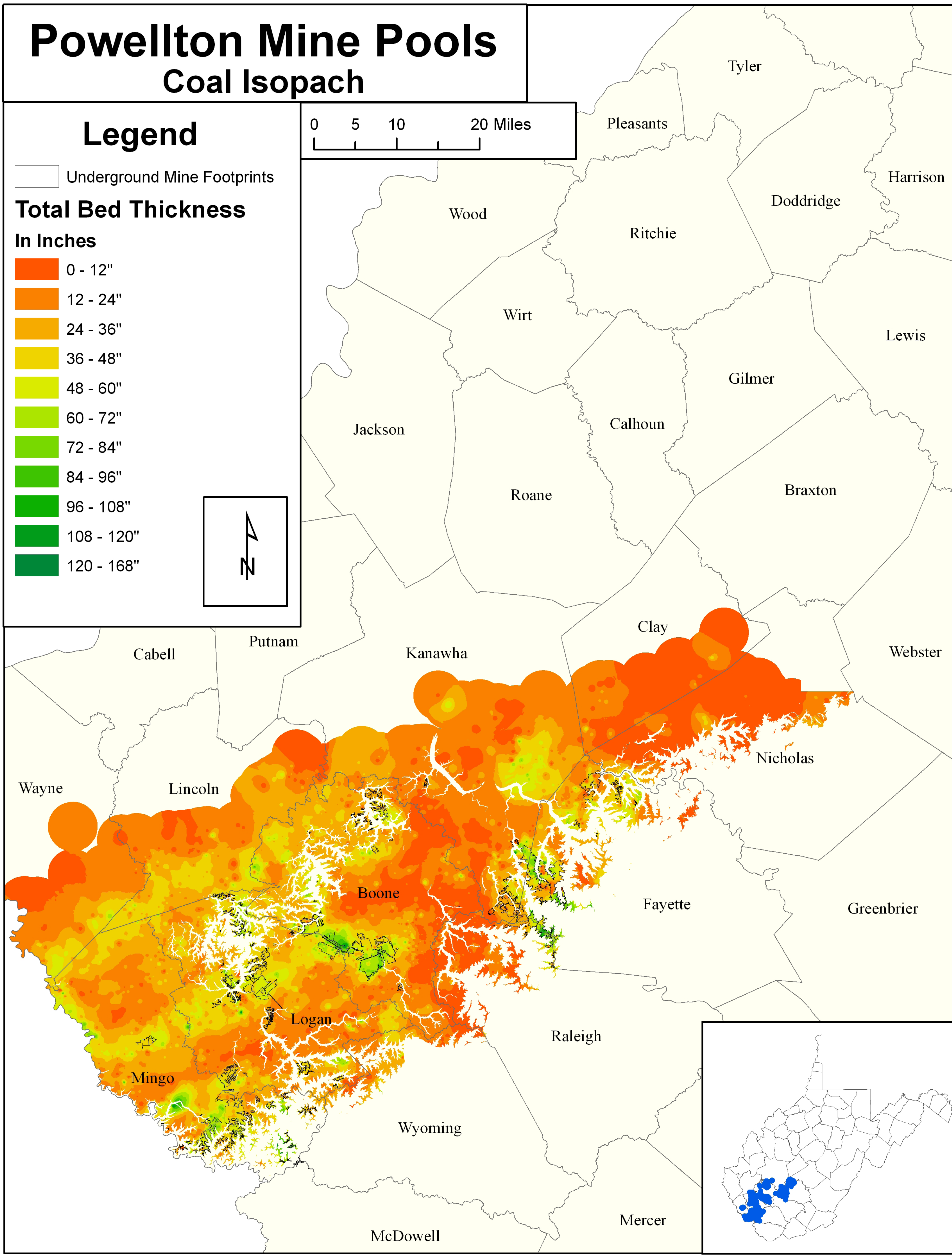
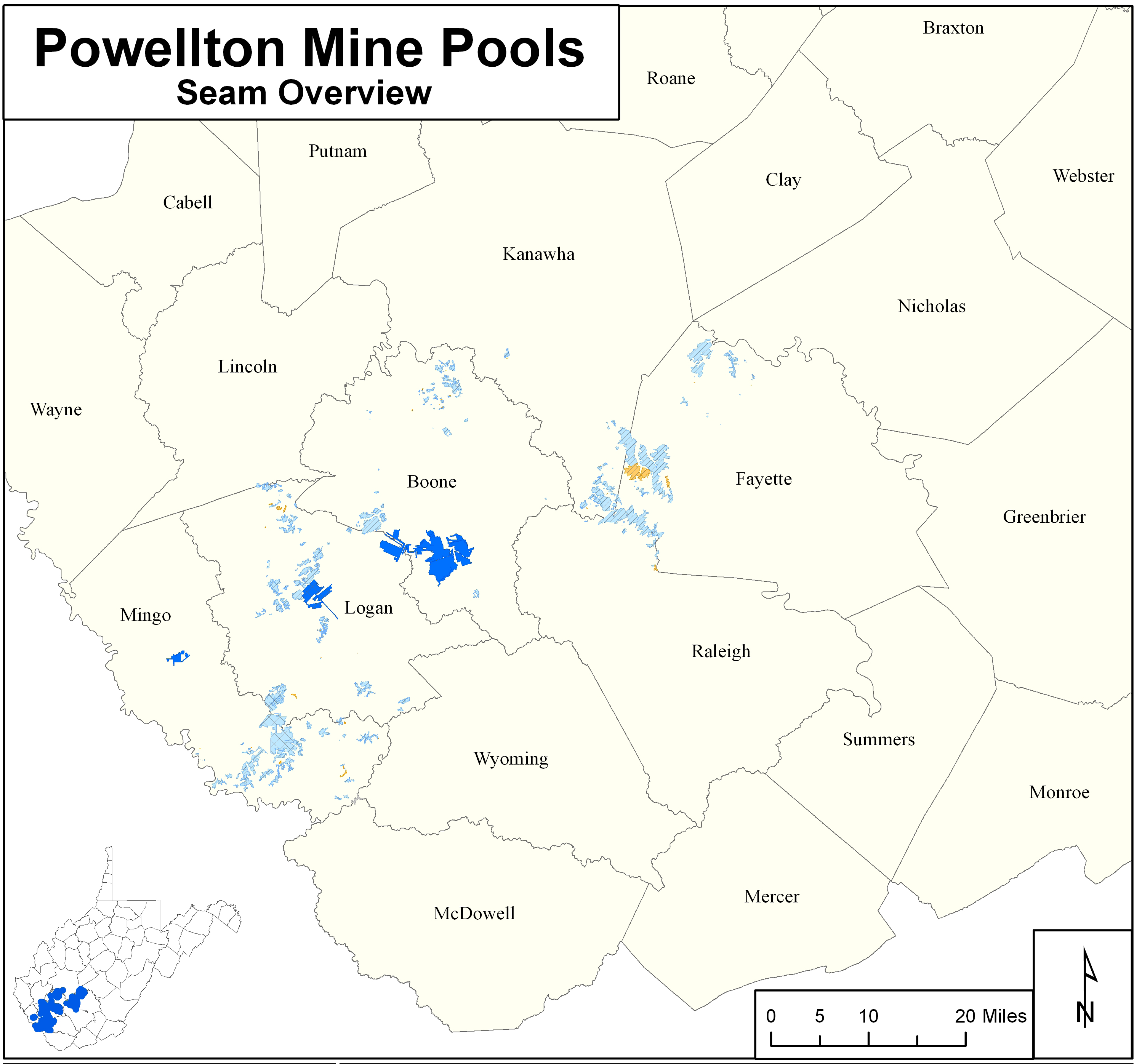

Powellton Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 168"
0 5 10 20 Miles
N
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Jackson
Calhoun
Braxton
Roane
Clay
Webster
Cabell
Putnam
Kanawha
Nicholas
Wayne
Lincoln
Boone
Fayette
Greenbrier
Logan
Raleigh
Mingo
Wyoming
Mercer
McDowell

Figure 19b



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Powellton Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	3	44	267	7
Mean coal bed thickness (feet)	1.59	3.29	3.39	4.65
Min. footprint area (acres)	3.59	0.01	0.01	706.86
Max. footprint area (acres)	161.17	1,126.18	4,755.16	3,633.60
Mean footprint area (acres)	57.62	47.41	152.39	2,096.45
Median footprint area (acres)	8.11	2.21	22.44	2,040.75
Total footprint area (acres)	172.87	2,085.84	40,687.37	14,675.15
Estimated void volume (acre feet)	145.02	3,493.12	75,364.21	35,651.81
Max. potential storage (million gallons)	47.26	1,138.41	24,561.20	11,618.92

Figure 19c

Powellton Mine Pools
Potential Total Flooding

Legend

Position

- Above drainage
- Near drainage
- Below drainage

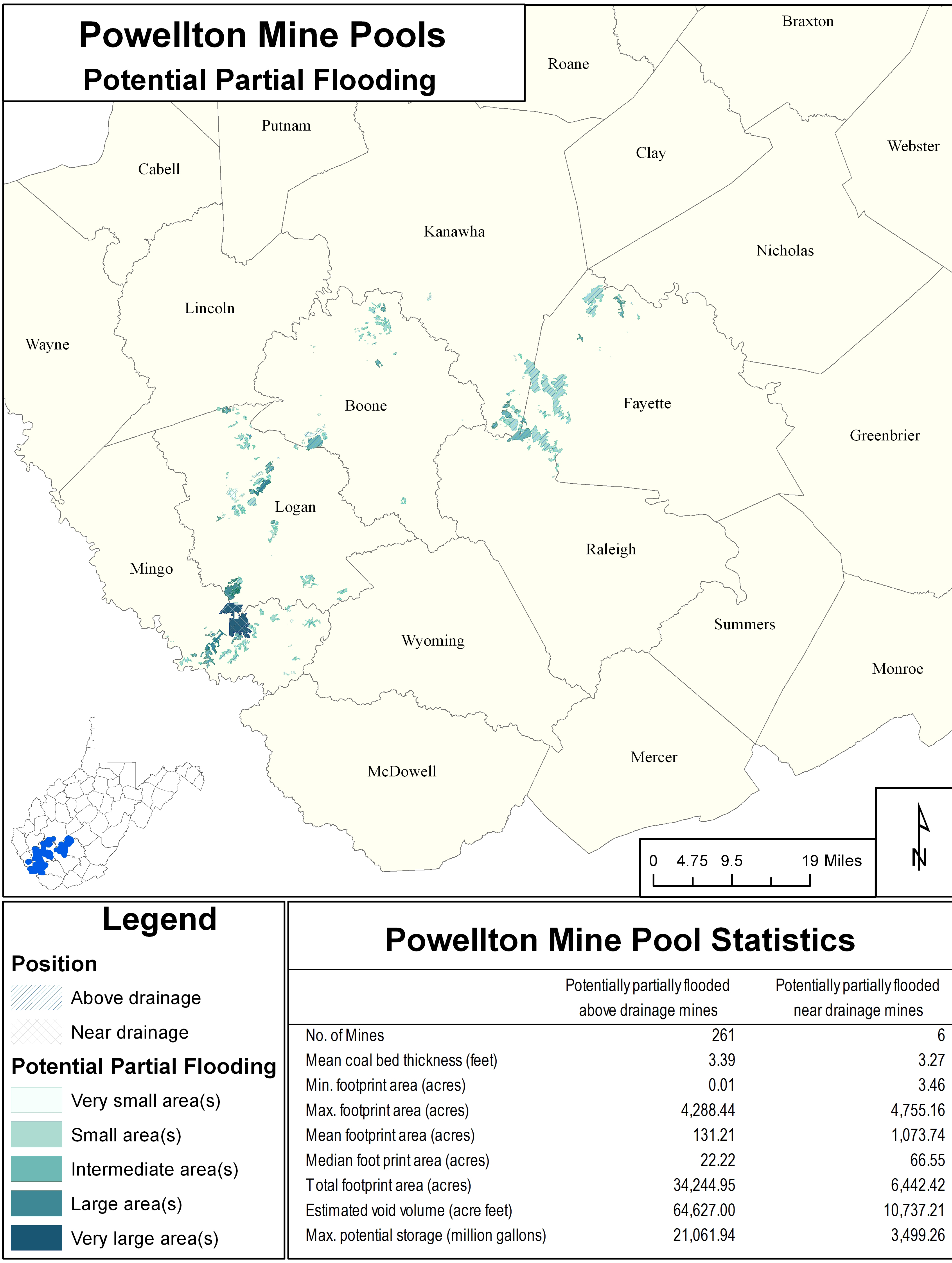
Storage in Million Gallons

- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Powellton Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	1	6
Mean coal bed thickness (feet)	0.00	4.25	4.72
Min. foot print area (acres)	0.00	2,626.71	706.86
Max. foot print area (acres)	0.00	2,626.71	3,633.60
Mean foot print area (acres)	0.00	2,626.71	2,008.07
Median foot print area (acres)	0.00	2,626.71	1,930.53
Total foot print area (acres)	0.00	2,626.71	12,048.44
Estimated void volume (acre feet)	0.00	5,645.37	30,006.44
Max. potential storage (million gallons)	0.00	1,839.83	9,779.10

Figure 19d



Powellton Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	261	6
Mean coal bed thickness (feet)	3.39	3.27
Min. footprint area (acres)	0.01	3.46
Max. footprint area (acres)	4,288.44	4,755.16
Mean footprint area (acres)	131.21	1,073.74
Median foot print area (acres)	22.22	66.55
Total footprint area (acres)	34,244.95	6,442.42
Estimated void volume (acre feet)	64,627.00	10,737.21
Max. potential storage (million gallons)	21,061.94	3,499.26

Figure 19e

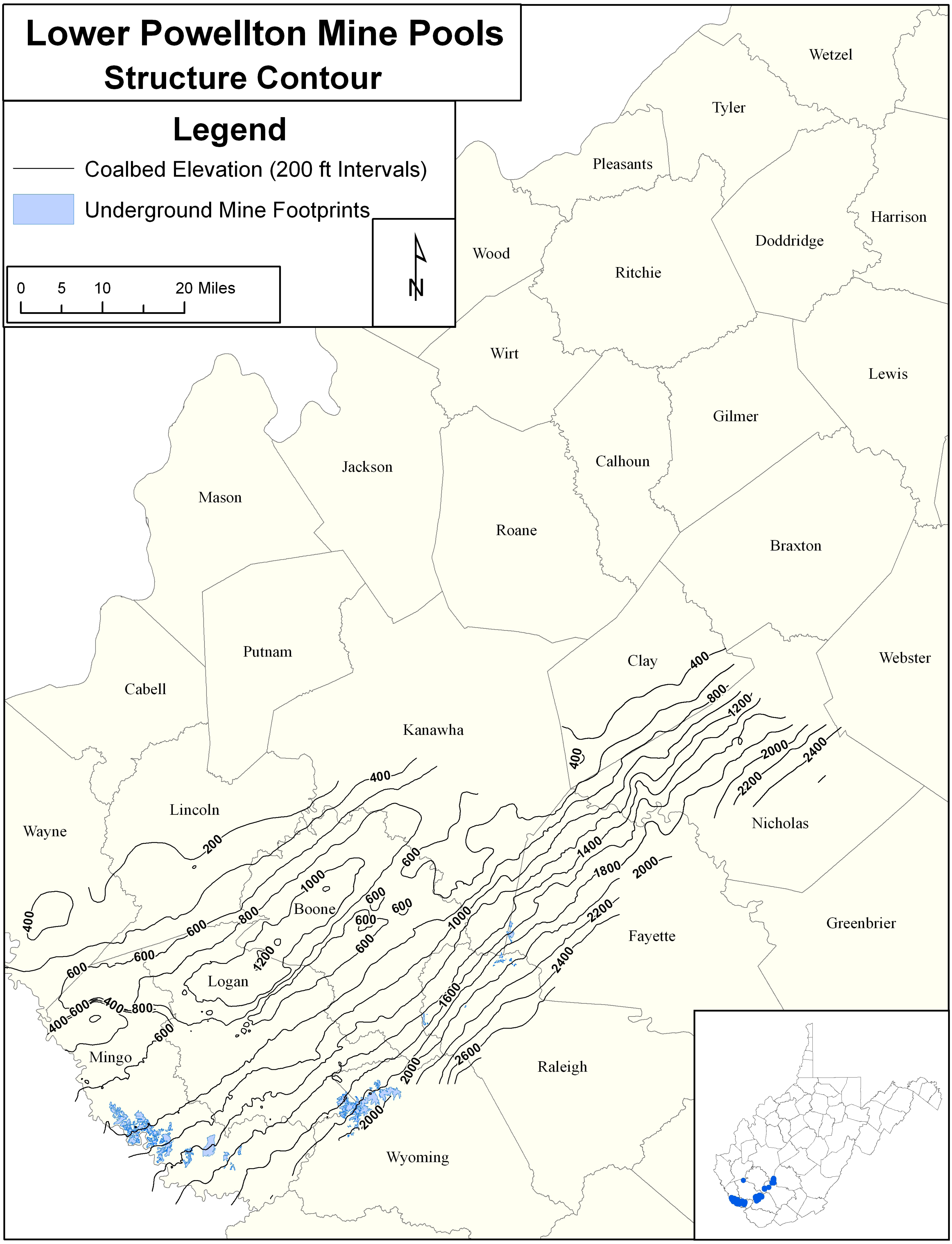
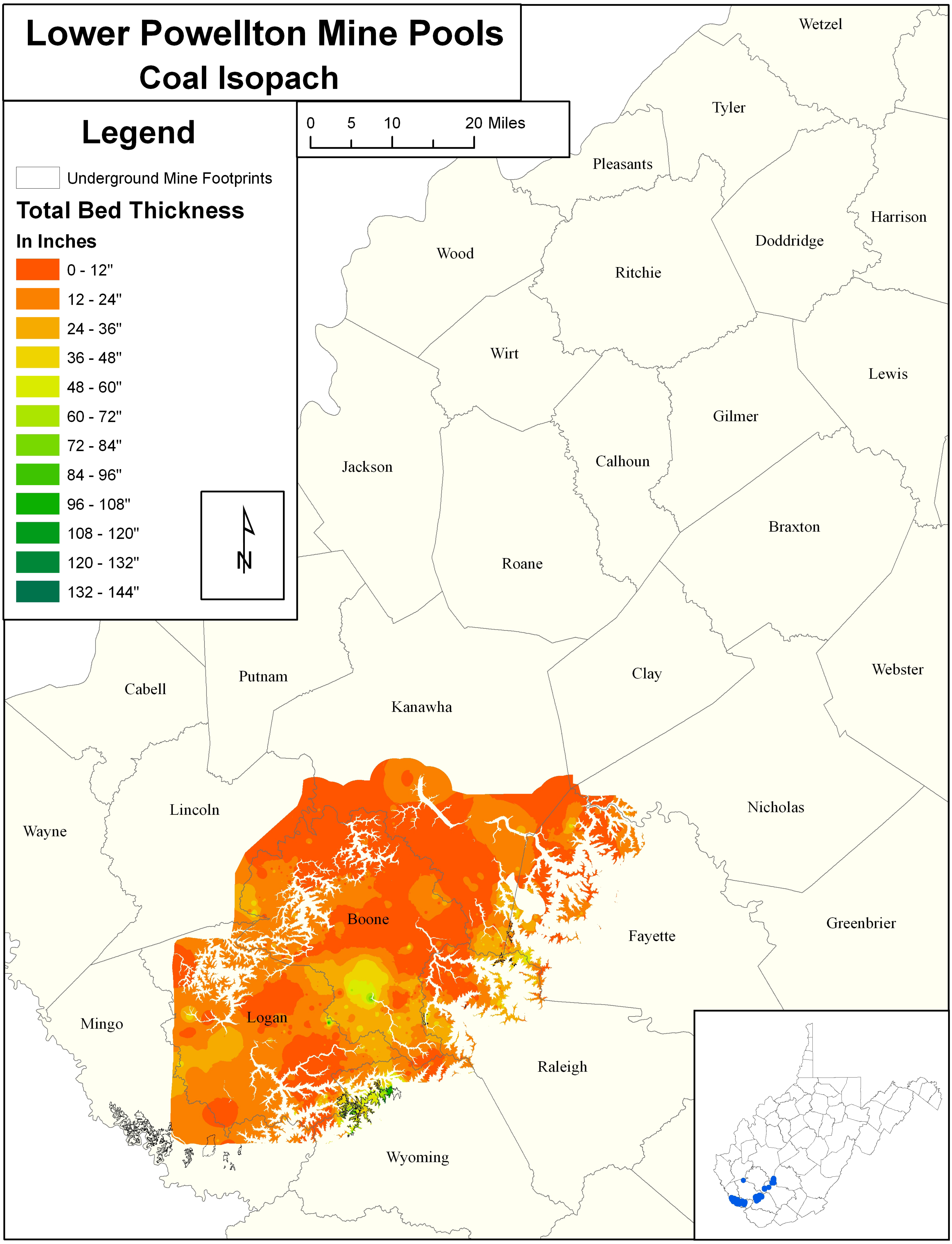
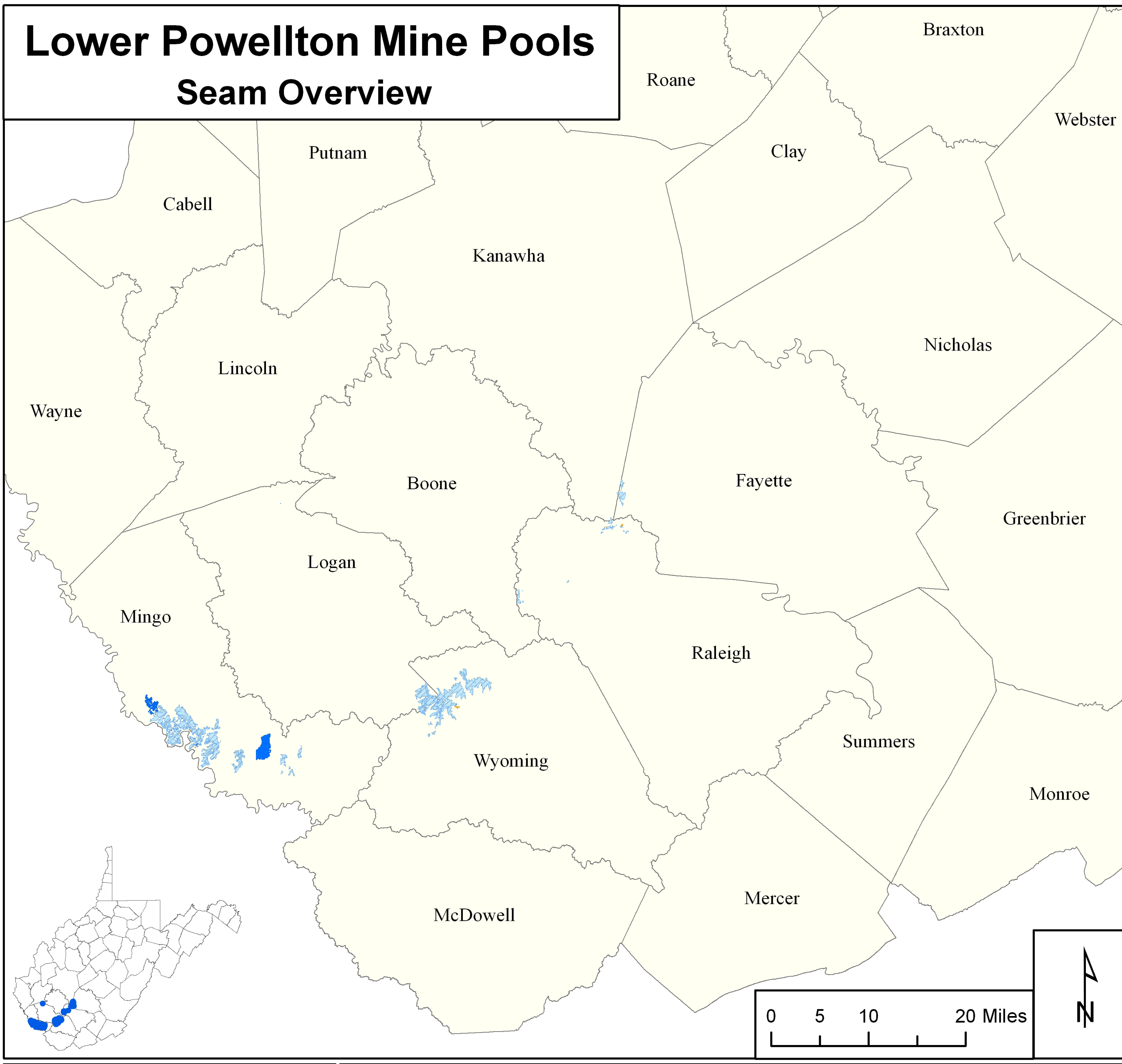

Lower Powellton Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Wetzel
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Jackson
Calhoun
Mason
Roane
Braxton
Putnam
Clay
Webster
Cabell
Kanawha
Lincoln
Wayne
Nicholas
Boone
Greenbrier
Fayette
Logan
Mingo
Raleigh
Wyoming

Figure 20a



Lower Powellton Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
N
0 5 10 20 Miles
Wetzel
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Braxton
Roane
Putnam
Clay
Webster
Cabell
Kanawha
Lincoln
Nicholas
Wayne
Boone
Fayette
Greenbrier
Logan
Mingo
Raleigh
Wyoming

Figure 20b



Legend

Position

- Above drainage
- Near drainage
- Below drainage

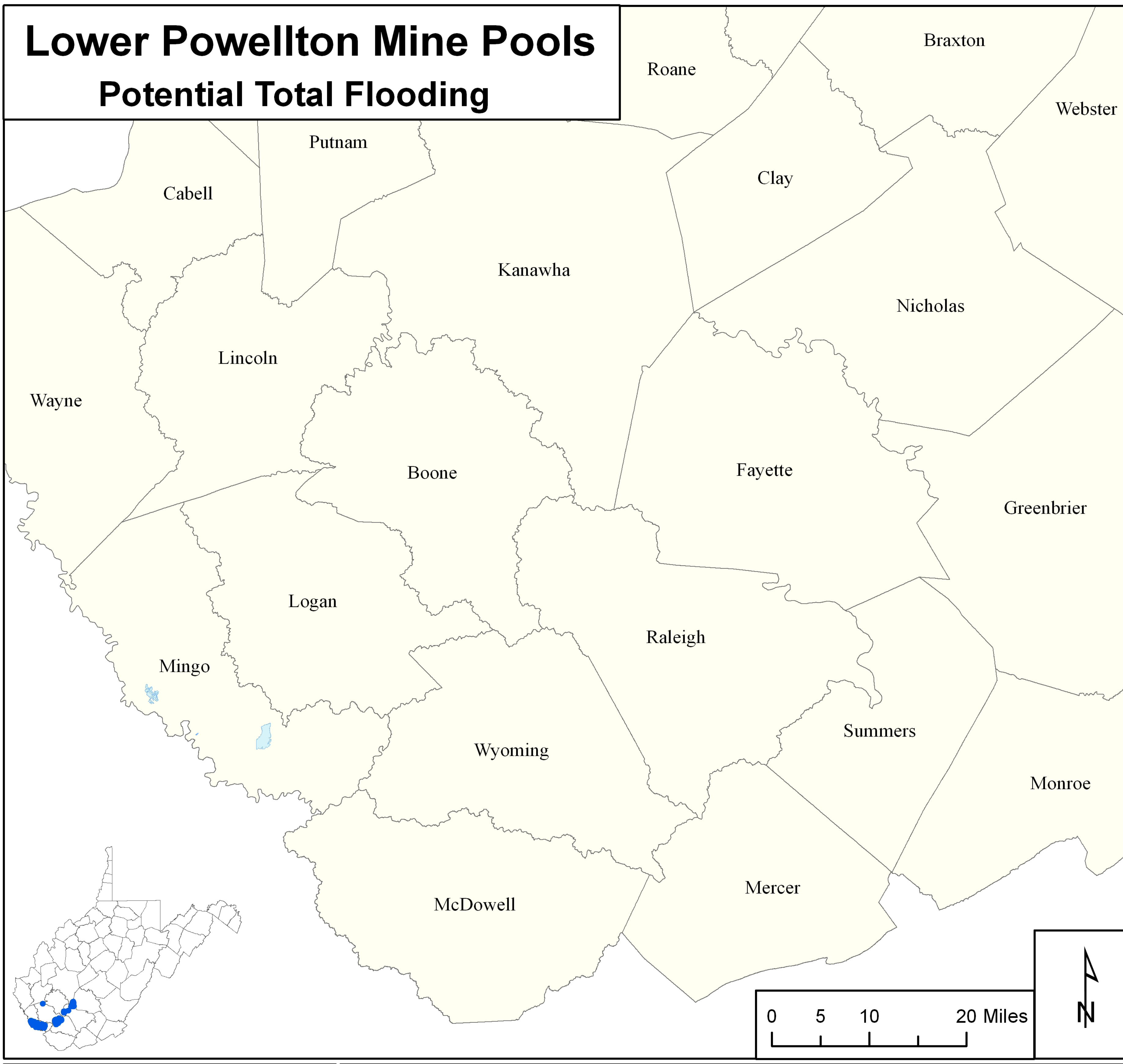
Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Lower Powellton Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	13.00	103.00	3.00
Mean coal bed thickness (feet)	0.00	3.11	3.13	2.71
Min. footprint area (acres)	0.00	0.07	0.04	26.80
Max. footprint area (acres)	0.00	28.90	2,256.73	1,695.89
Mean footprint area (acres)	0.00	4.25	146.07	788.70
Median footprint area (acres)	0.00	0.79	26.44	662.74
Total footprint area (acres)	0.00	55.30	15,045.33	2,366.11
Estimated void volume (acre feet)	0.00	100.49	27,080.13	3,794.42
Max. potential storage (million gallons)	0.00	32.75	8,825.41	1,236.60

Figure 20c



Legend

Position

- Above drainage
- Near drainage
- Below drainage

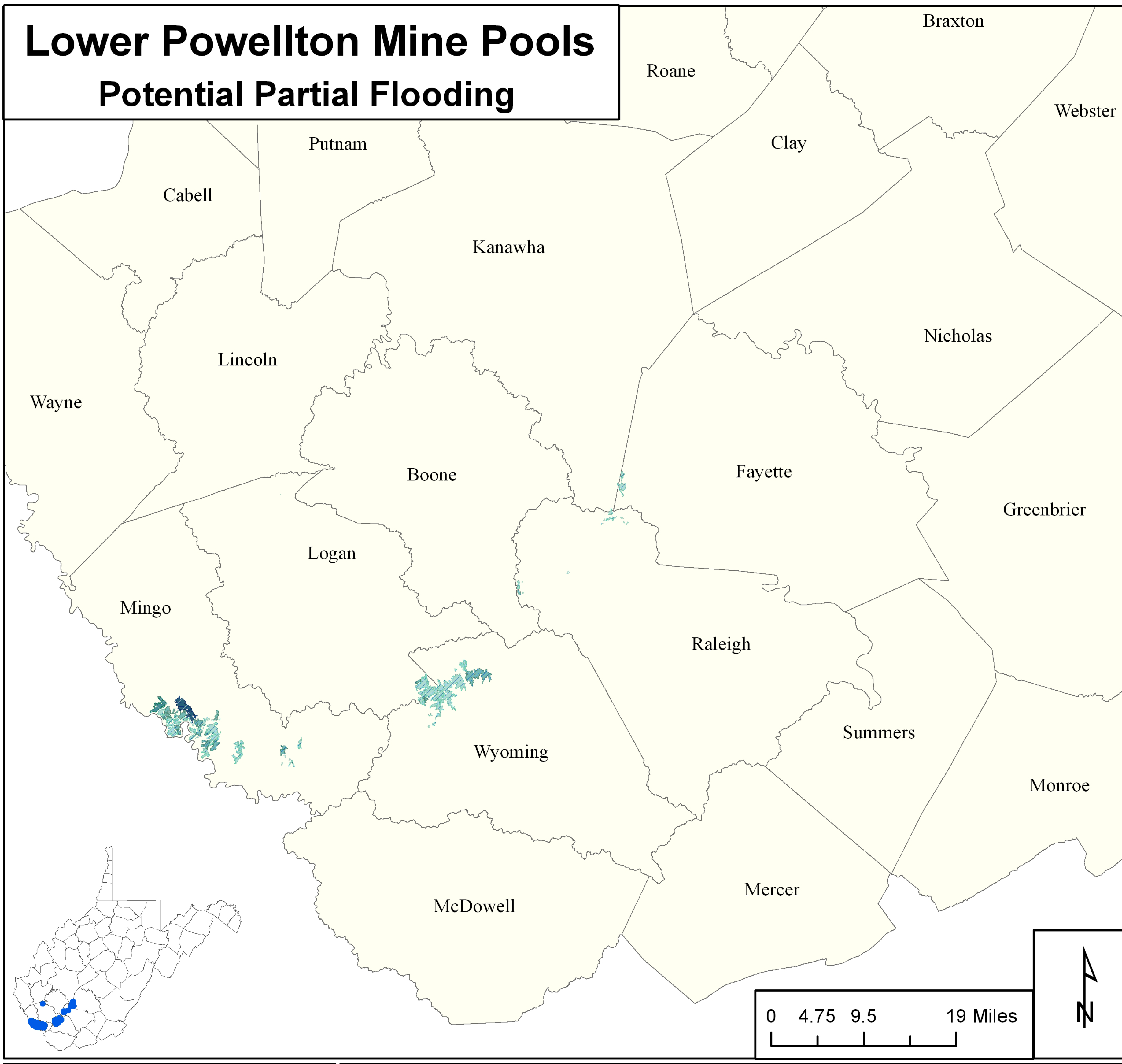
Storage in Million Gallons

- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Lower Powellton Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	1	0	2
Mean coal bed thickness (feet)	2.23	0.00	2.95
Min. foot print area (acres)	7.48	0.00	662.74
Max. foot print area (acres)	7.48	0.00	3,021.37
Mean foot print area (acres)	7.48	0.00	1,179.32
Median foot print area (acres)	7.48	0.00	1,179.32
Total foot print area (acres)	7.48	0.00	2,358.63
Estimated void volume (acre feet)	8.47	0.00	3,785.95
Max. potential storage (million gallons)	2.76	0.00	1,233.84

Figure 20d



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Lower Powellton Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	98	5
Mean coal bed thickness (feet)	3.11	3.38
Min. footprint area (acres)	0.04	144.23
Max. footprint area (acres)	2,256.73	1,126.98
Mean footprint area (acres)	127.65	507.04
Median foot print area (acres)	21.41	380.52
Total footprint area (acres)	12,510.12	2,535.21
Estimated void volume (acre feet)	22,884.69	4,195.44
Max. potential storage (million gallons)	7,458.12	1,367.29

Figure 20e

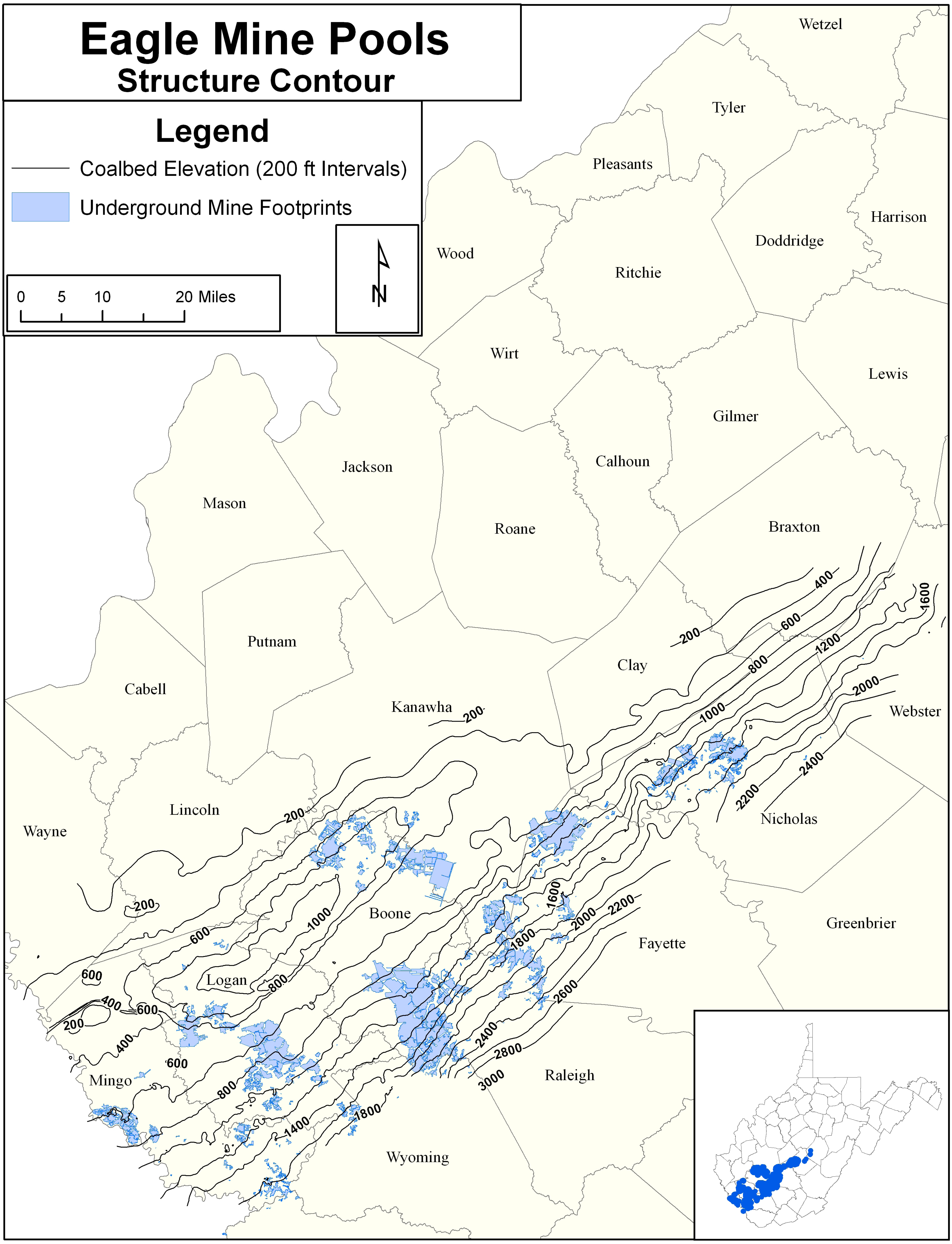

Eagle Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Wetzel
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Jackson
Calhoun
Mason
Roane
Braxton
Putnam
Clay
Cabell
Kanawha
Webster
Lincoln
Wayne
Nicholas
Boone
Greenbrier
Logan
Fayette
Mingo
Raleigh
Wyoming

Figure 21a

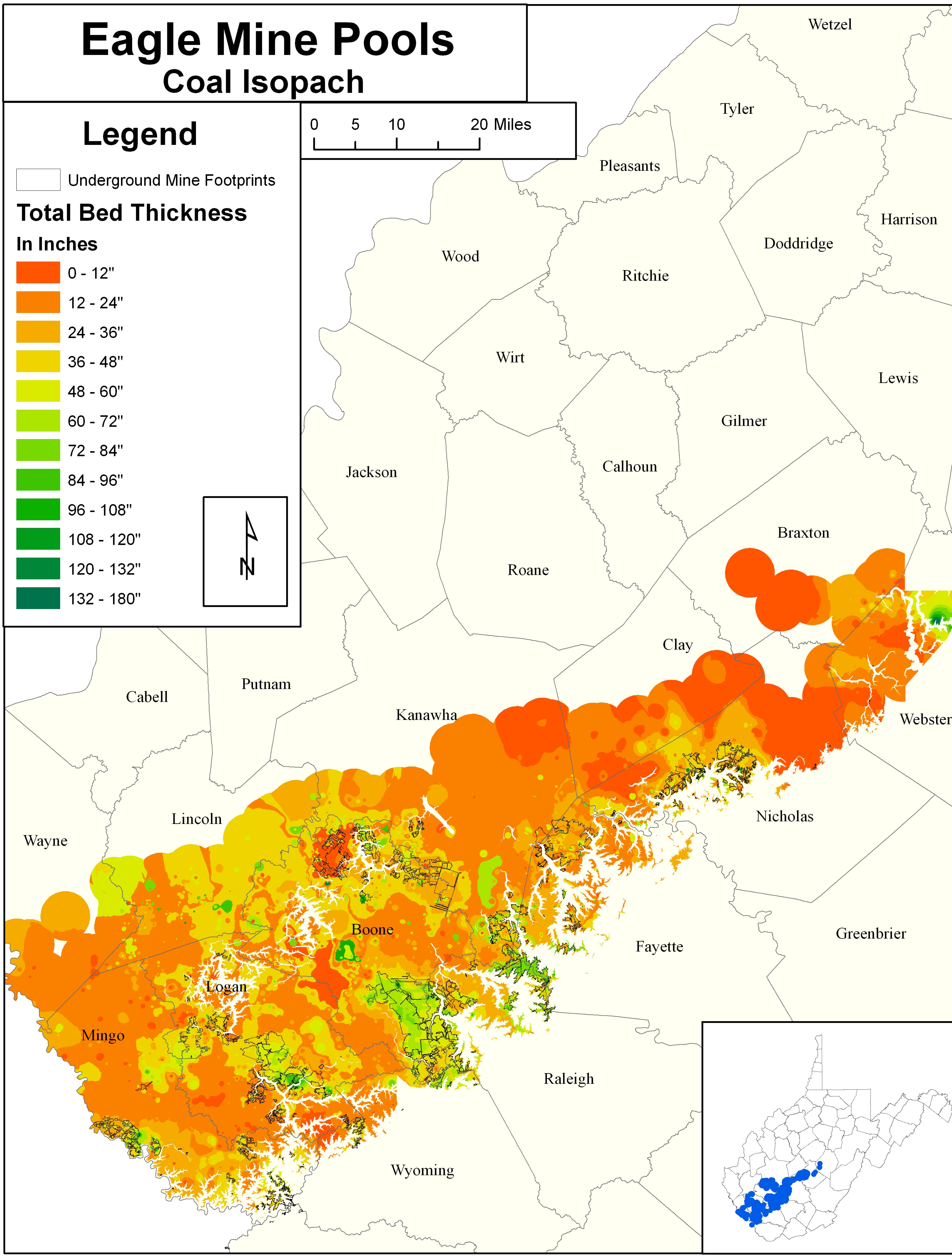
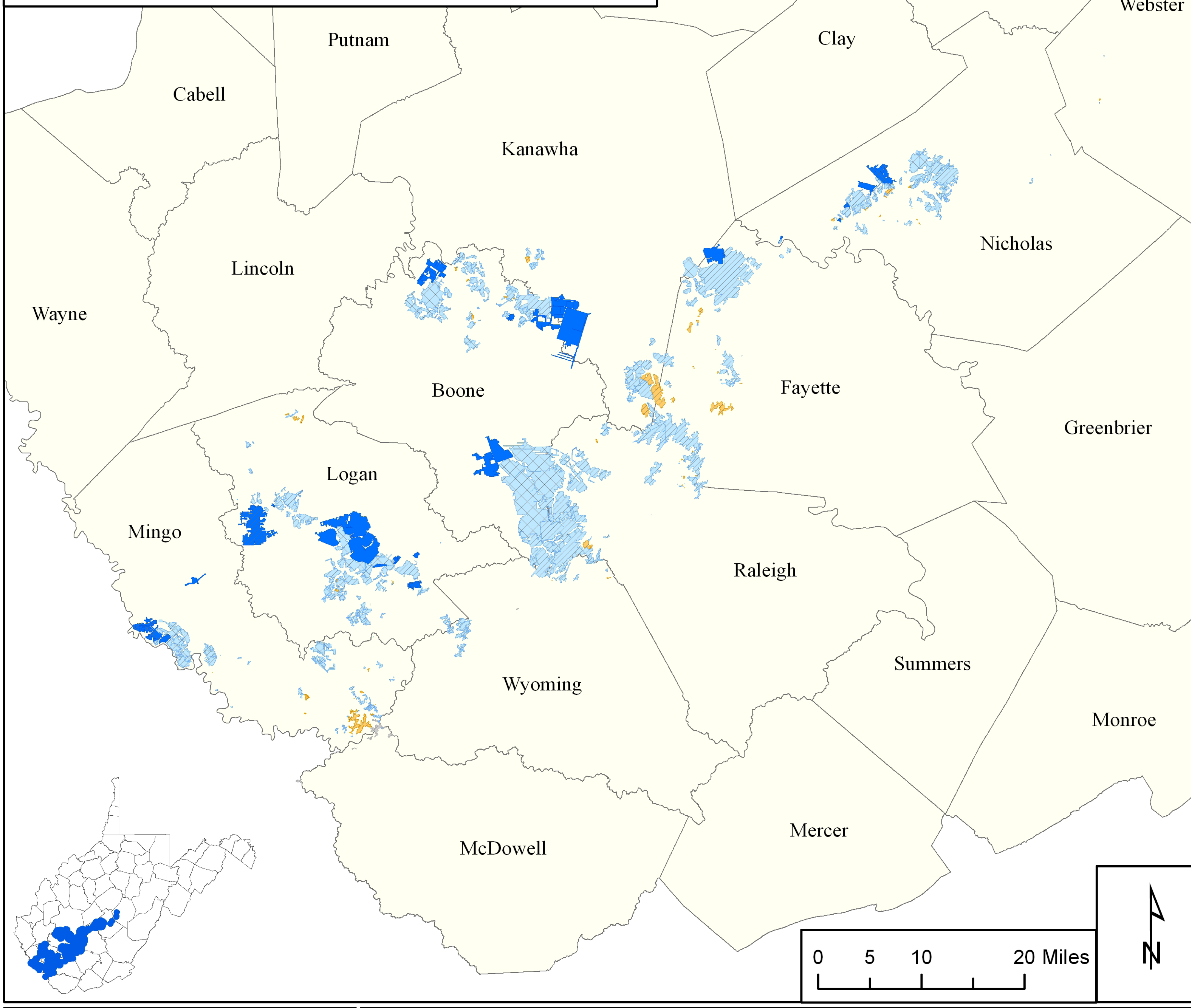

Eagle Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 180"
0 5 10 20 Miles
N
Wetzel
Tyler
Pleasants
Harrison
Doddridge
Wood
Ritchie
Wirt
Lewis
Gilmer
Calhoun
Jackson
Braxton
Roane
Clay
Putnam
Cabell
Kanawha
Webster
Nicholas
Lincoln
Wayne
Boone
Fayette
Greenbrier
Logan
Mingo
Raleigh
Wyoming

Figure 21b

Eagle Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

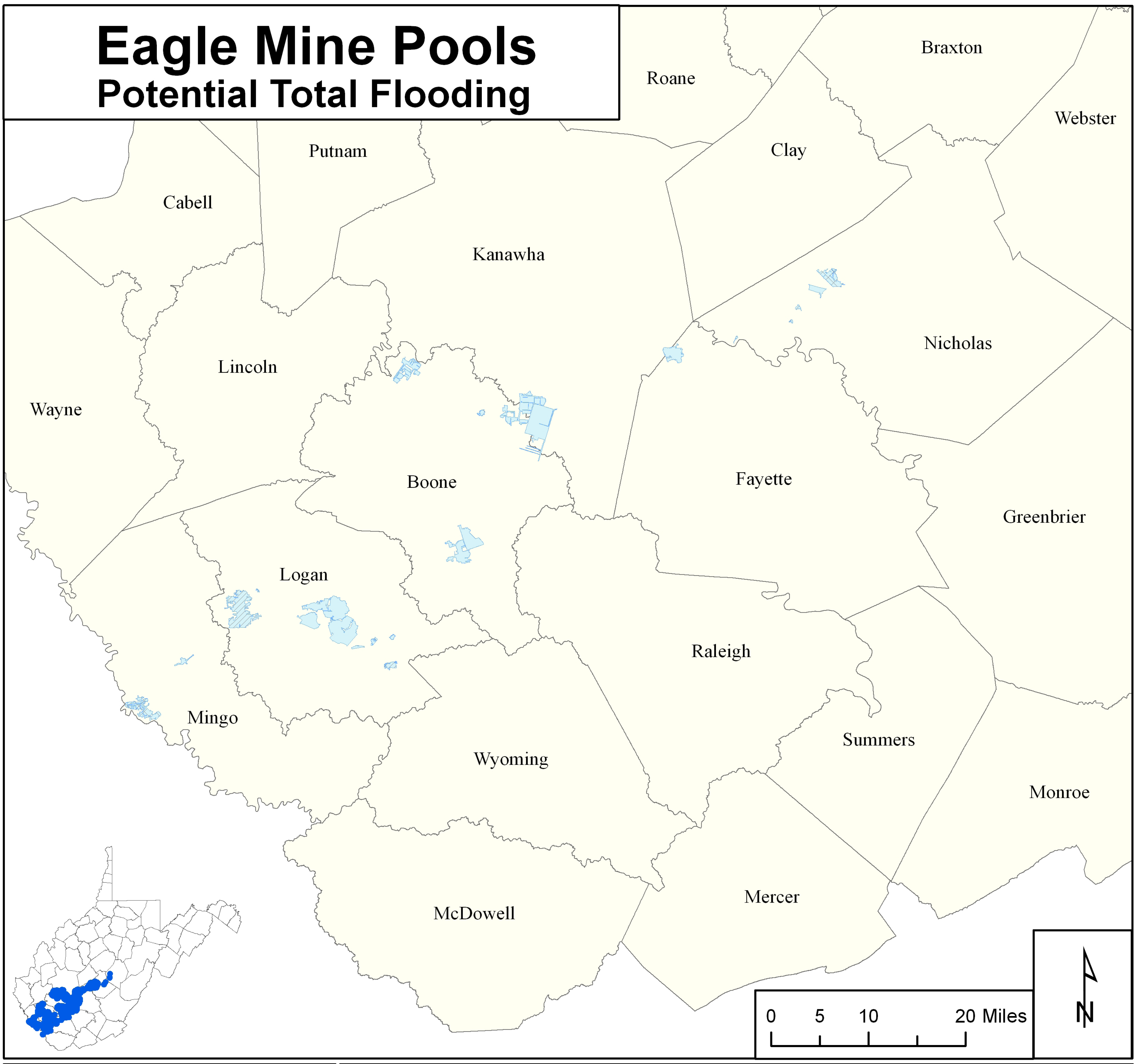
Potential Extent of Flooding

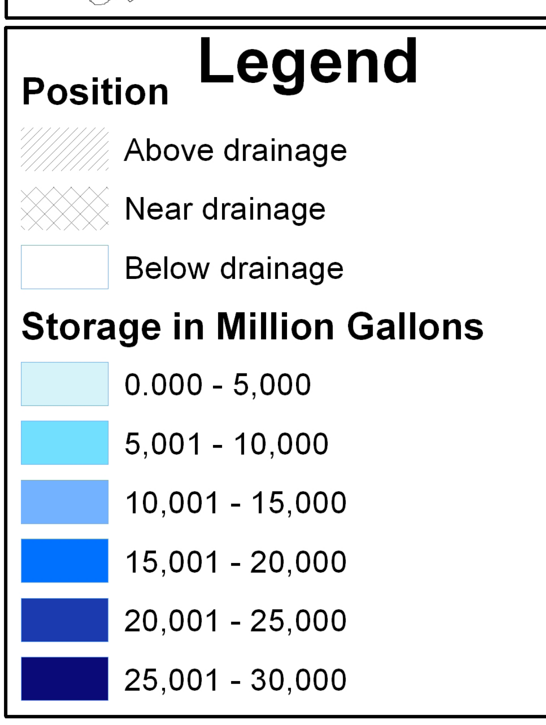
- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Eagle Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	18	88	363	25
Mean coal bed thickness (feet)	3.70	3.63	3.64	3.94
Min. footprint area (acres)	0.14	0.01	0.01	0.99
Max. footprint area (acres)	290.31	1,313.06	10,804.17	4,857.58
Mean footprint area (acres)	27.19	60.60	319.44	1,366.10
Median footprint area (acres)	5.43	5.30	41.67	1,210.73
Total footprint area (acres)	489.50	5,332.65	115,955.57	34,152.40
Estimated void volume (acre feet)	840.94	11,167.81	250,439.00	72,132.80
Max. potential storage (million gallons)	274.06	3,639.59	81,618.07	23,508.08

Figure 21c



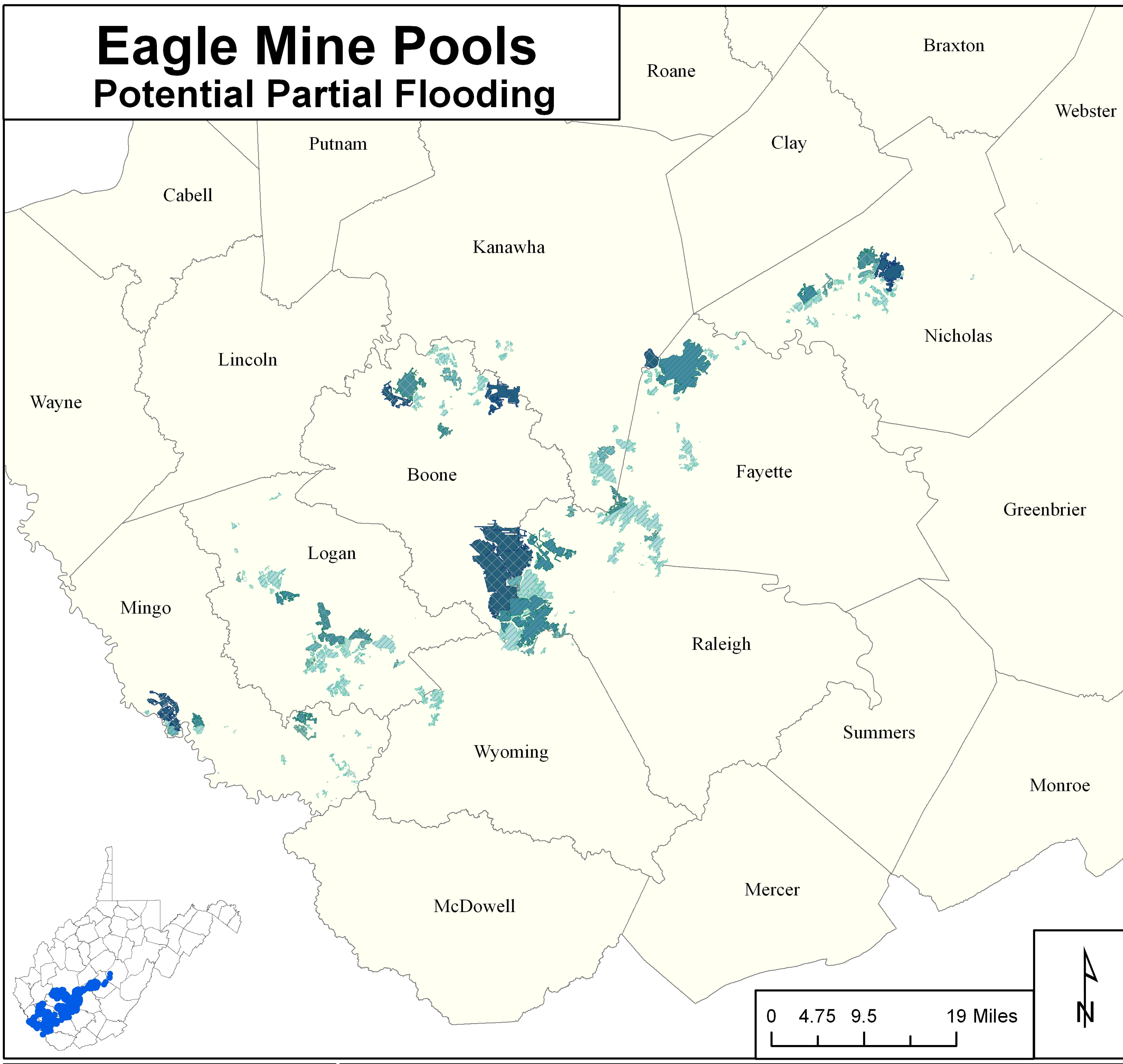


Eagle Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	4	5	16
Mean coal bed thickness (feet)	3.64	3.66	4.10
Min. foot print area (acres)	39.79	108.31	0.99
Max. foot print area (acres)	4,397.68	1,935.34	4,857.58
Mean foot print area (acres)	1,224.99	757.43	1,591.58
Median foot print area (acres)	231.24	179.93	1,496.20
Total foot print area (acres)	4,899.96	3,787.14	25,465.29
Estimated void volume (acre feet)	9,777.27	6,331.76	56,023.77
Max. potential storage (million gallons)	3,186.41	2,063.52	18,258.15

Figure 21d

Eagle Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Eagle Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	322	41
Mean coal bed thickness (feet)	3.62	3.81
Min. footprint area (acres)	0.01	1.20
Max. footprint area (acres)	9,964.83	10,804.17
Mean footprint area (acres)	237.20	965.31
Median foot print area (acres)	29.99	133.91
Total footprint area (acres)	76,377.66	39,577.91
Estimated void volume (acre feet)	157,767.97	92,671.03
Max. potential storage (million gallons)	51,416.58	30,201.49

Figure 21e

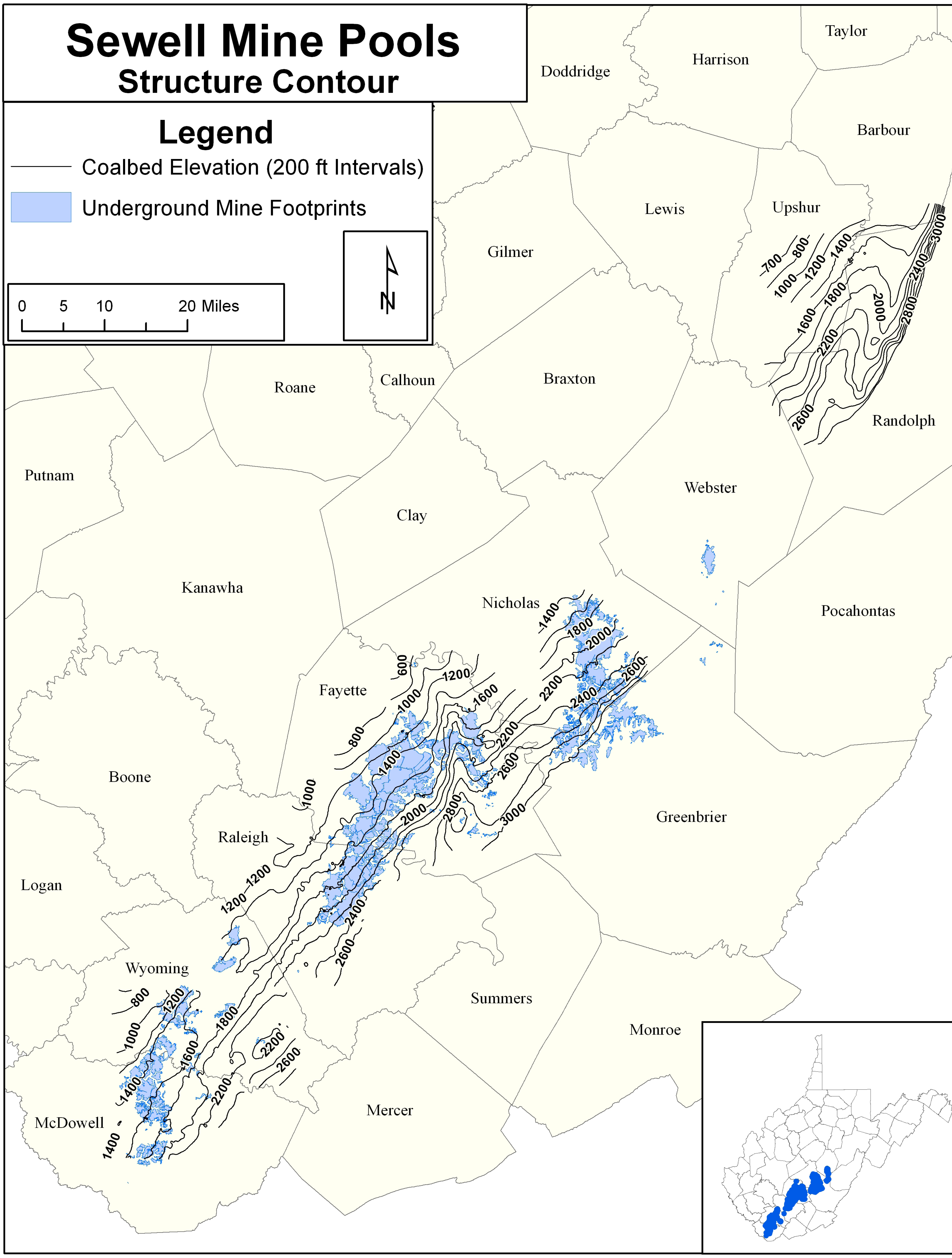
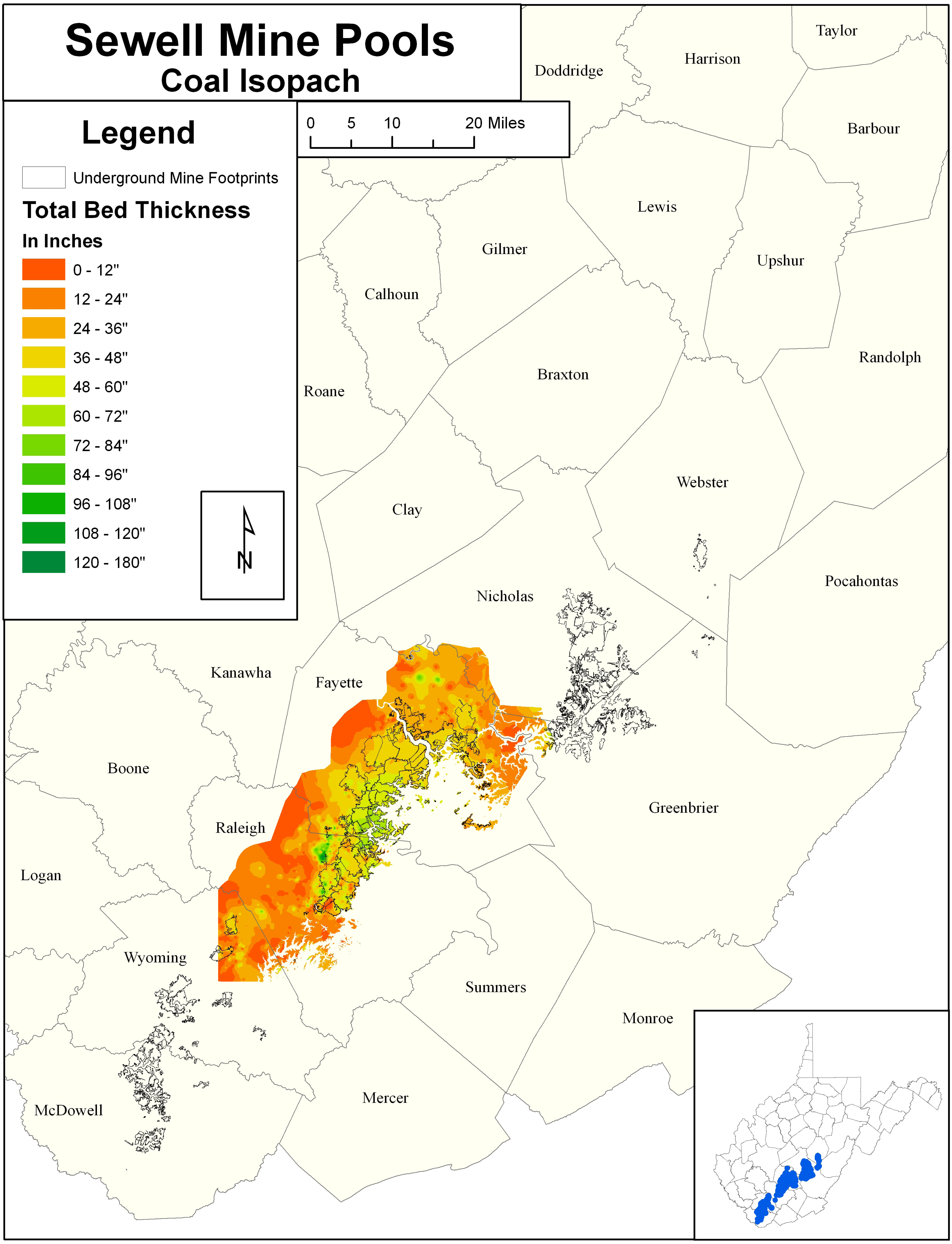

Sewell Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Doddridge
Harrison
Taylor
Barbour
Lewis
Upshur
Gilmer
Roane
Calhoun
Braxton
Randolph
Putnam
Webster
Clay
Kanawha
Nicholas
Pocahontas
Fayette
Boone
Raleigh
Greenbrier
Logan
Wyoming
Summers
Monroe
Mercer
McDowell

Figure 22a


Sewell Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
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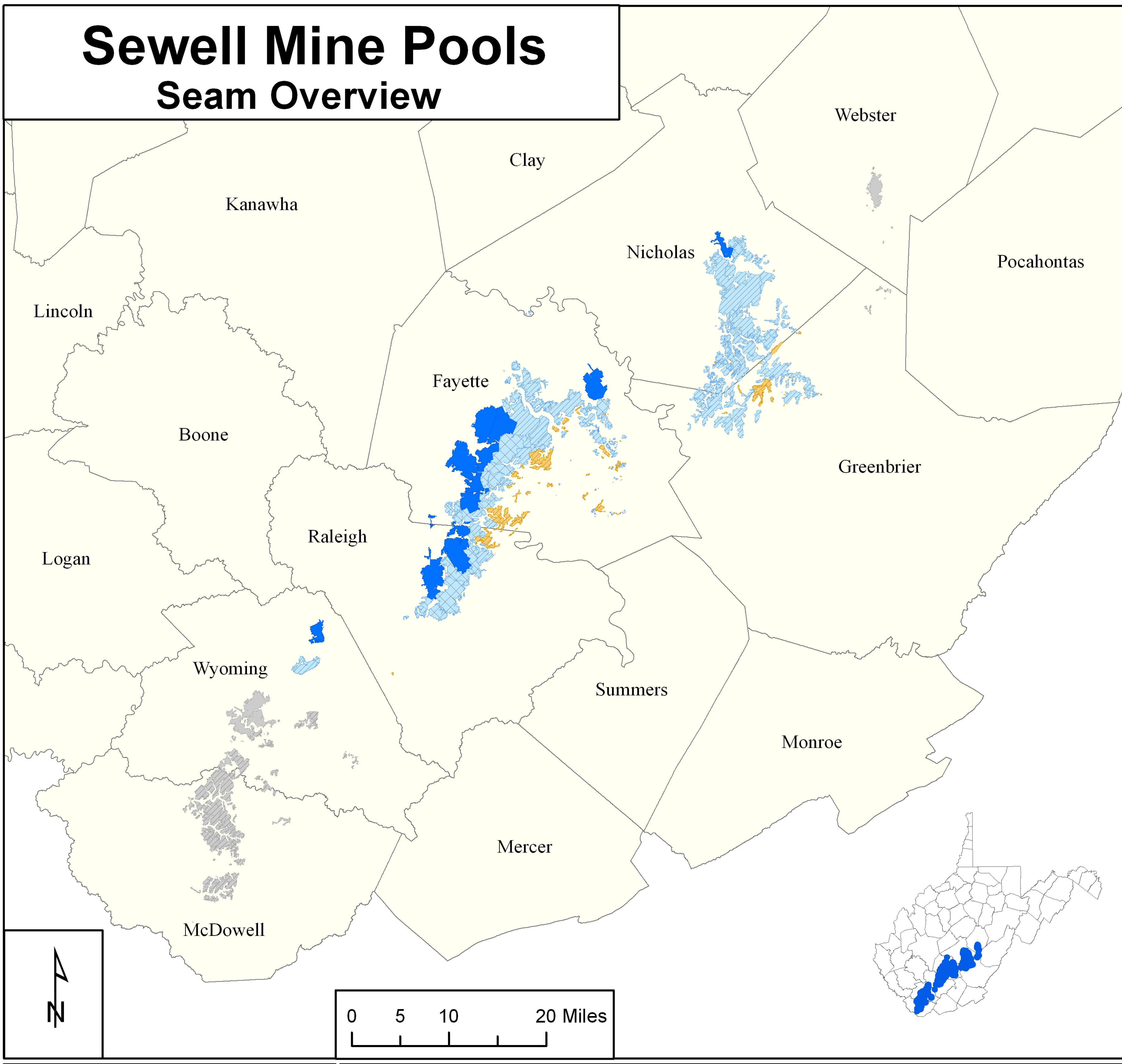
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 180"
N
0 5 10 20 Miles
Doddridge
Harrison
Taylor
Barbour
Lewis
Upshur
Gilmer
Calhoun
Braxton
Randolph
Roane
Webster
Clay
Nicholas
Pocahontas
Kanawha
Fayette
Boone
Greenbrier
Raleigh
Logan
Wyoming
Summers
Monroe
Mercer
McDowell

Figure 22b

Sewell Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

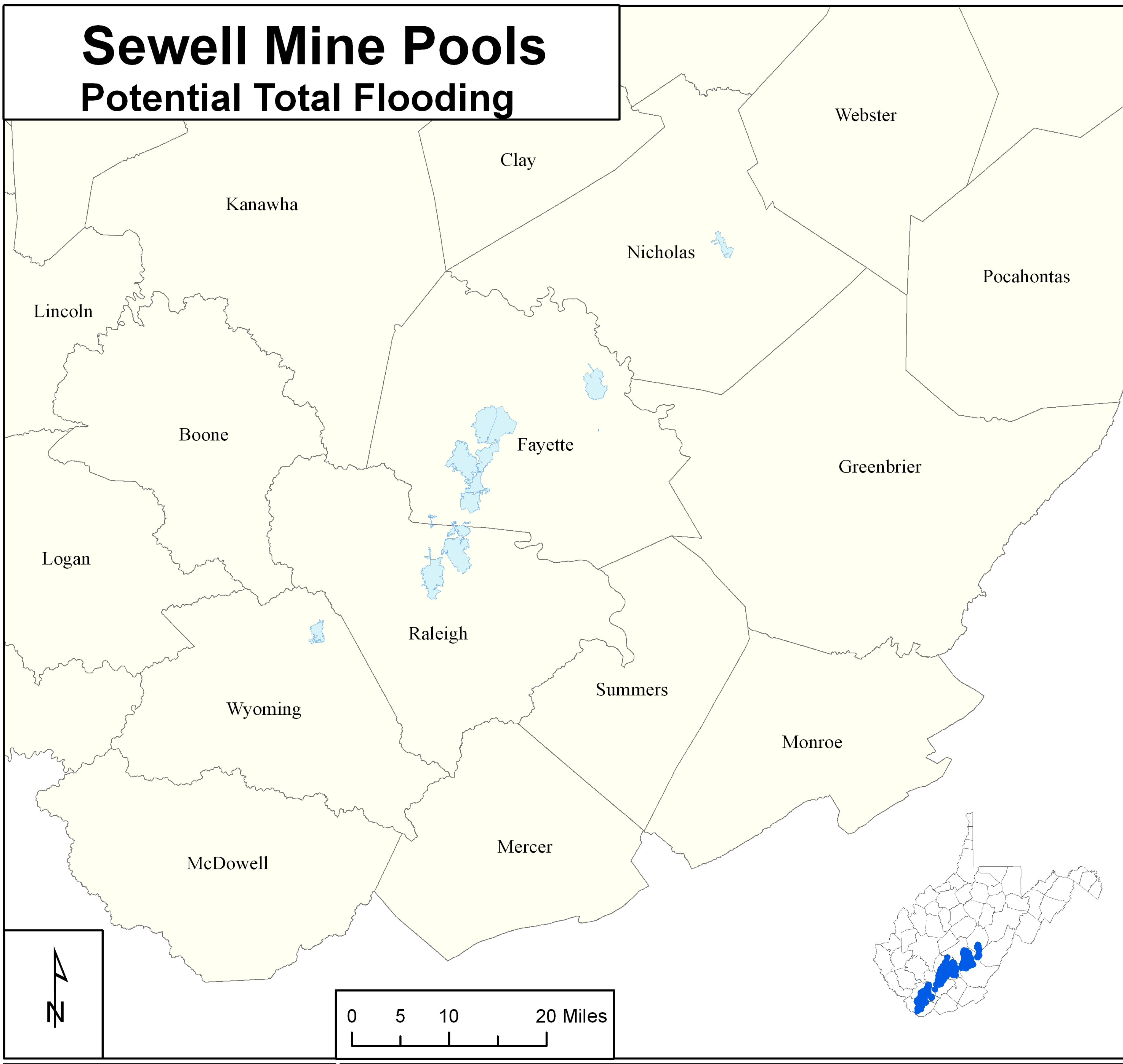
Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Sewell Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	184	130	268	17
Mean coal bed thickness (feet)	3.09	2.61	2.85	3.76
Min. footprint area (acres)	9.49	0.02	0.02	4.58
Max. footprint area (acres)	2,545.93	1,832.97	15,697.79	4,587.45
Mean footprint area (acres)	156.26	68.71	341.56	1,960.08
Median footprint area (acres)	14.88	3.59	15.23	1,380.26
Total footprint area (acres)	28,751.08	8,932.04	91,536.86	33,321.34
Estimated void volume (acre feet)	43,896.53	14,686.32	155,666.76	61,339.45
Max. potential storage (million gallons)	14,305.88	4,786.27	50,731.80	19,990.53

Figure 22c



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

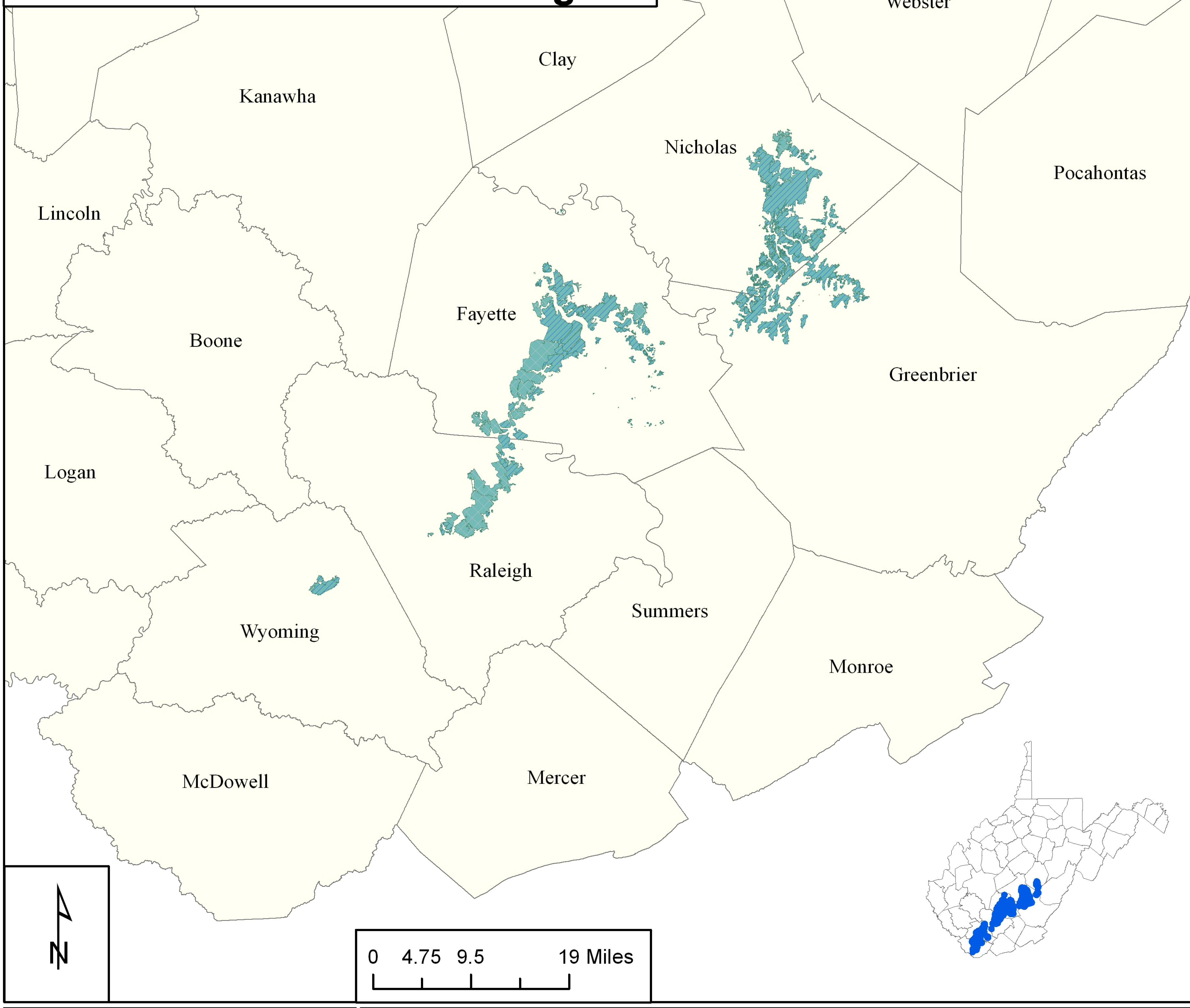
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Sewell Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	1	16
Mean coal bed thickness (feet)	0.00	5.10	3.67
Min. foot print area (acres)	0.00	106.78	4.58
Max. foot print area (acres)	0.00	106.78	4,587.45
Mean foot print area (acres)	0.00	106.78	2,075.91
Median foot print area (acres)	0.00	106.78	1,759.66
Total foot print area (acres)	0.00	106.78	33,214.57
Estimated void volume (acre feet)	0.00	272.77	61,066.67
Max. potential storage (million gallons)	0.00	88.90	19,901.63

Figure 22d

Sewell Mine Pools
Potential Partial Flooding



Legend

Position

Above drainage

Near drainage

Potential Partial Flooding

Very small area(s)

Small area(s)

Intermediate area(s)

Large area(s)

Very large area(s)

Sewell Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	240	28
Mean coal bed thickness (feet)	2.80	3.26
Min. footprint area (acres)	0.02	0.19
Max. footprint area (acres)	15,697.79	4,168.97
Mean footprint area (acres)	277.74	888.59
Median foot print area (acres)	13.13	210.29
Total footprint area (acres)	66,656.43	24,880.43
Estimated void volume (acre feet)	110,543.83	45,122.93
Max. potential storage (million gallons)	36,026.24	14,705.56

Figure 22e

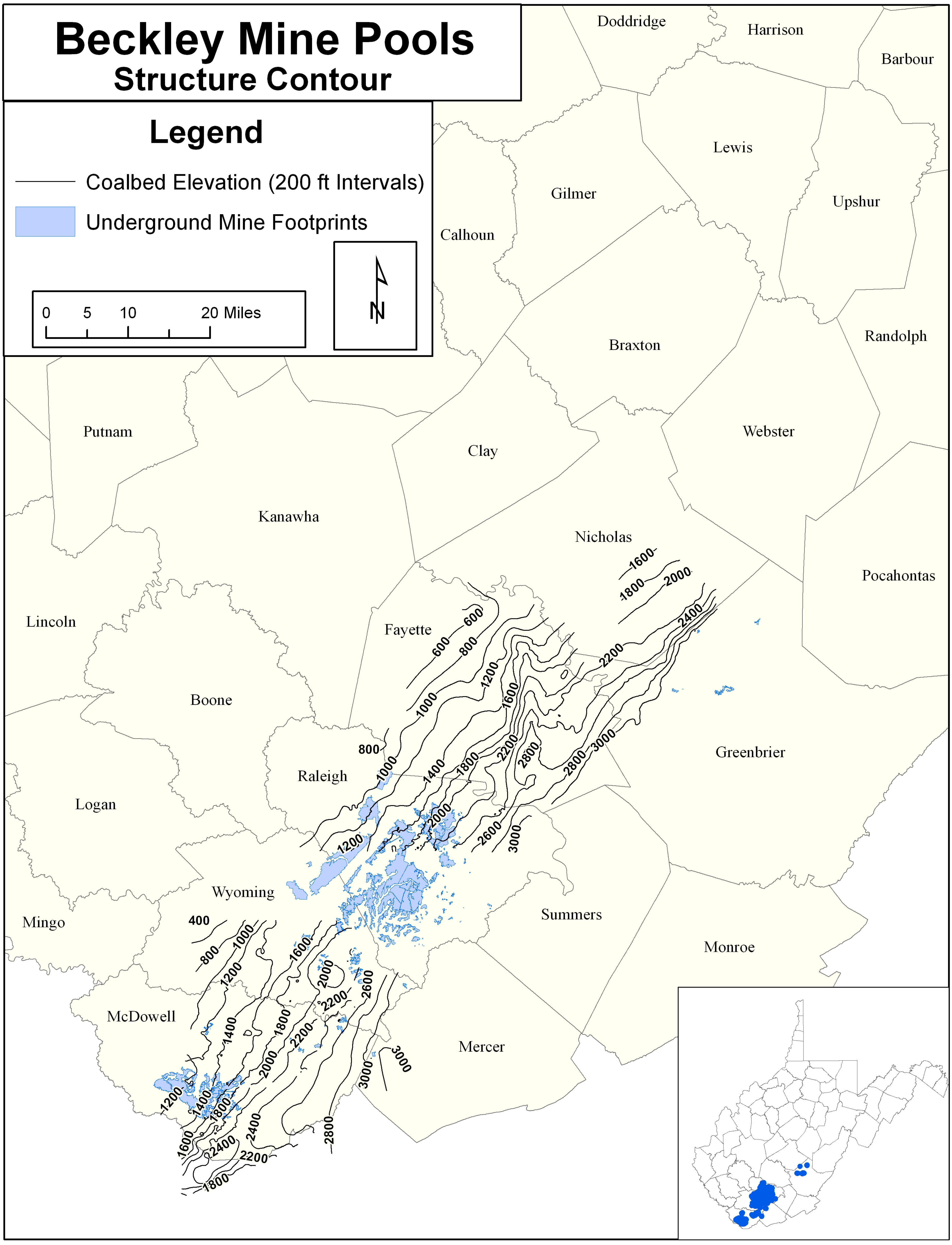
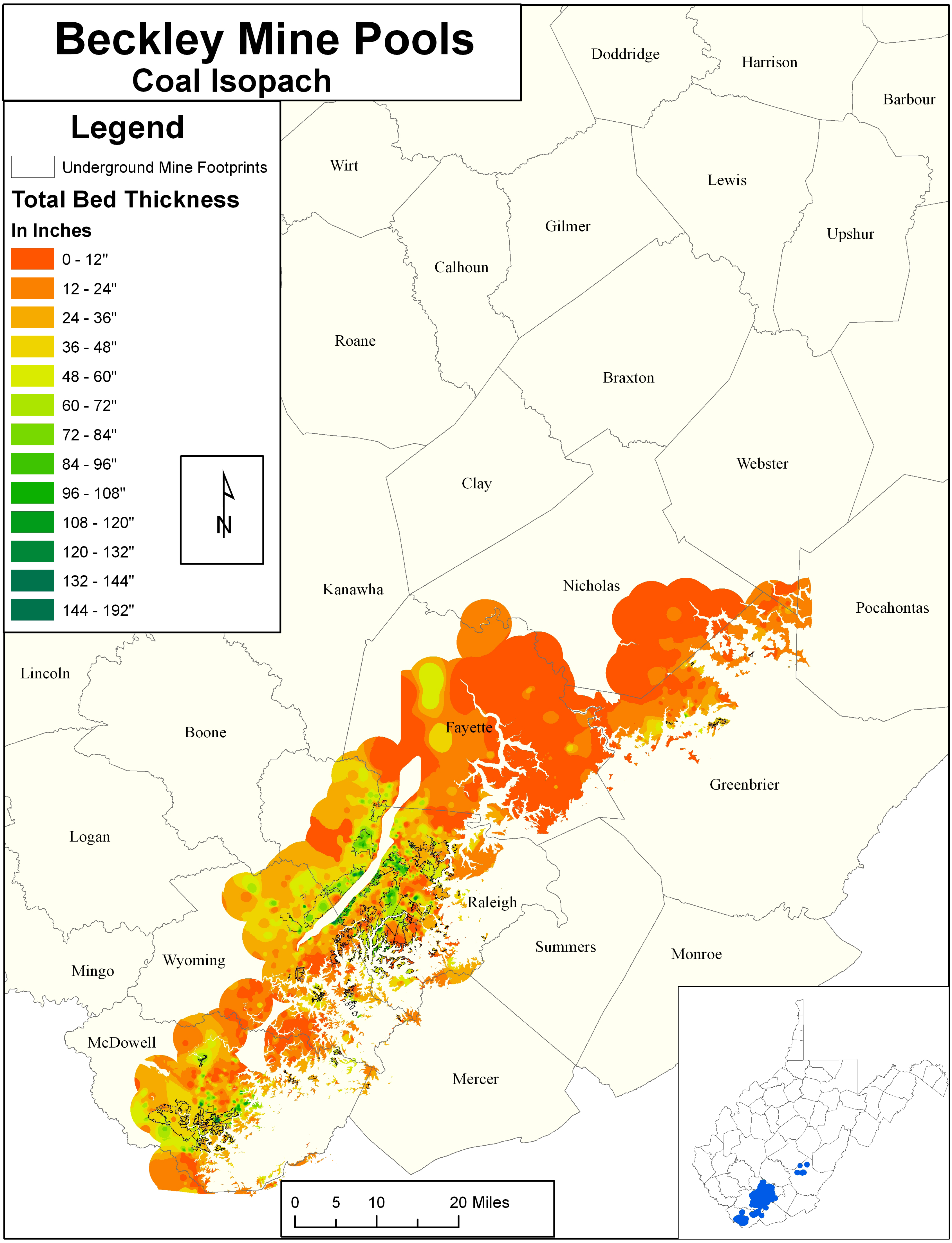

Beckley Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 5 10 20 Miles
N
Doddridge
Harrison
Barbour
Lewis
Gilmer
Upshur
Calhoun
Braxton
Randolph
Putnam
Clay
Webster
Kanawha
Nicholas
Pocahontas
Lincoln
Fayette
Boone
Raleigh
Greenbrier
Logan
Wyoming
Summers
Mingo
Monroe
McDowell
Mercer

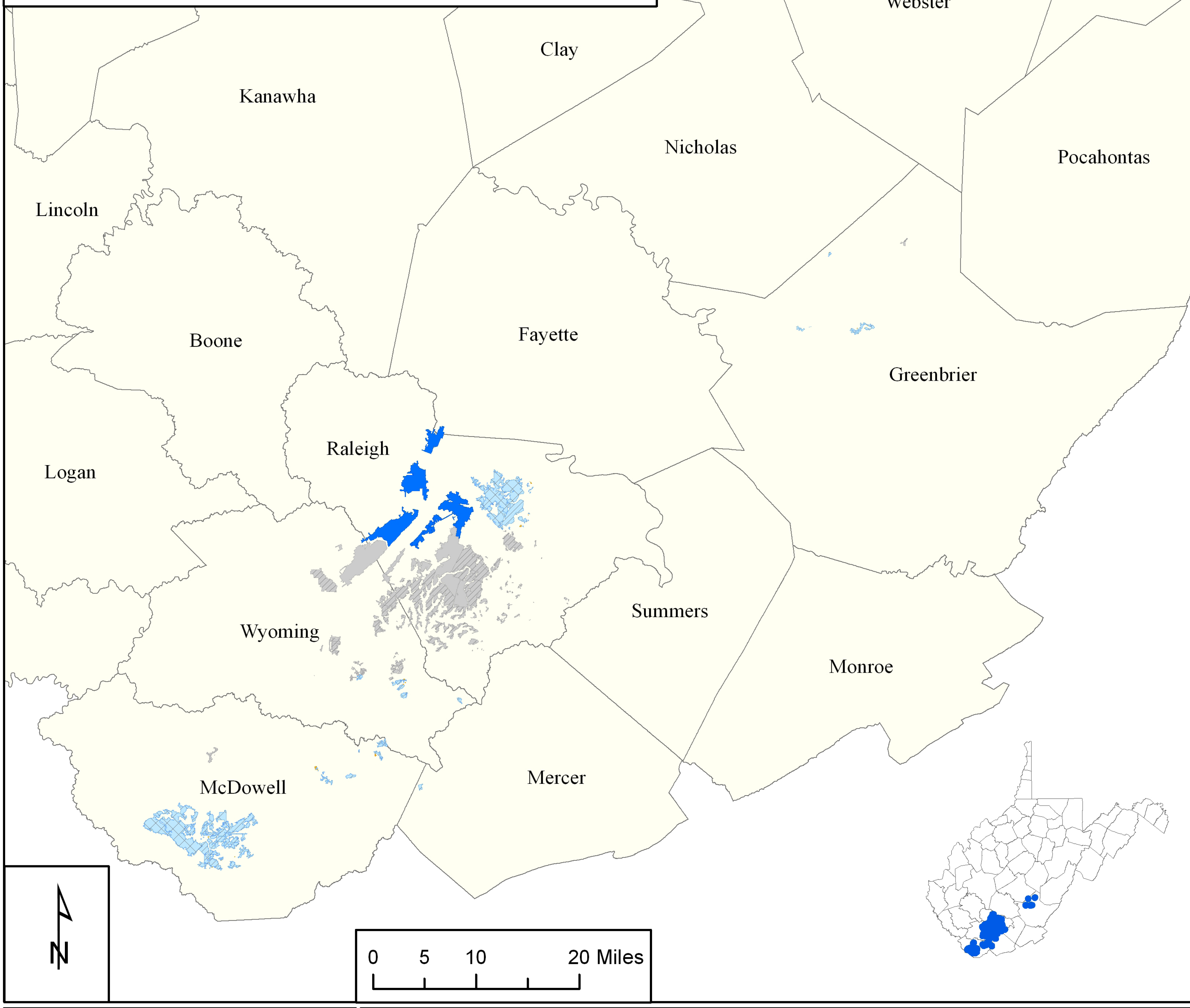
Figure 23a



Beckley Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 192"
N
Doddridge
Harrison
Barbour
Wirt
Lewis
Gilmer
Upshur
Calhoun
Roane
Braxton
Webster
Clay
Kanawha
Nicholas
Pocahontas
Lincoln
Boone
Fayette
Greenbrier
Logan
Raleigh
Summers
Monroe
Mingo
Wyoming
McDowell
Mercer
0 5 10 20 Miles

Figure 23b

Beckley Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

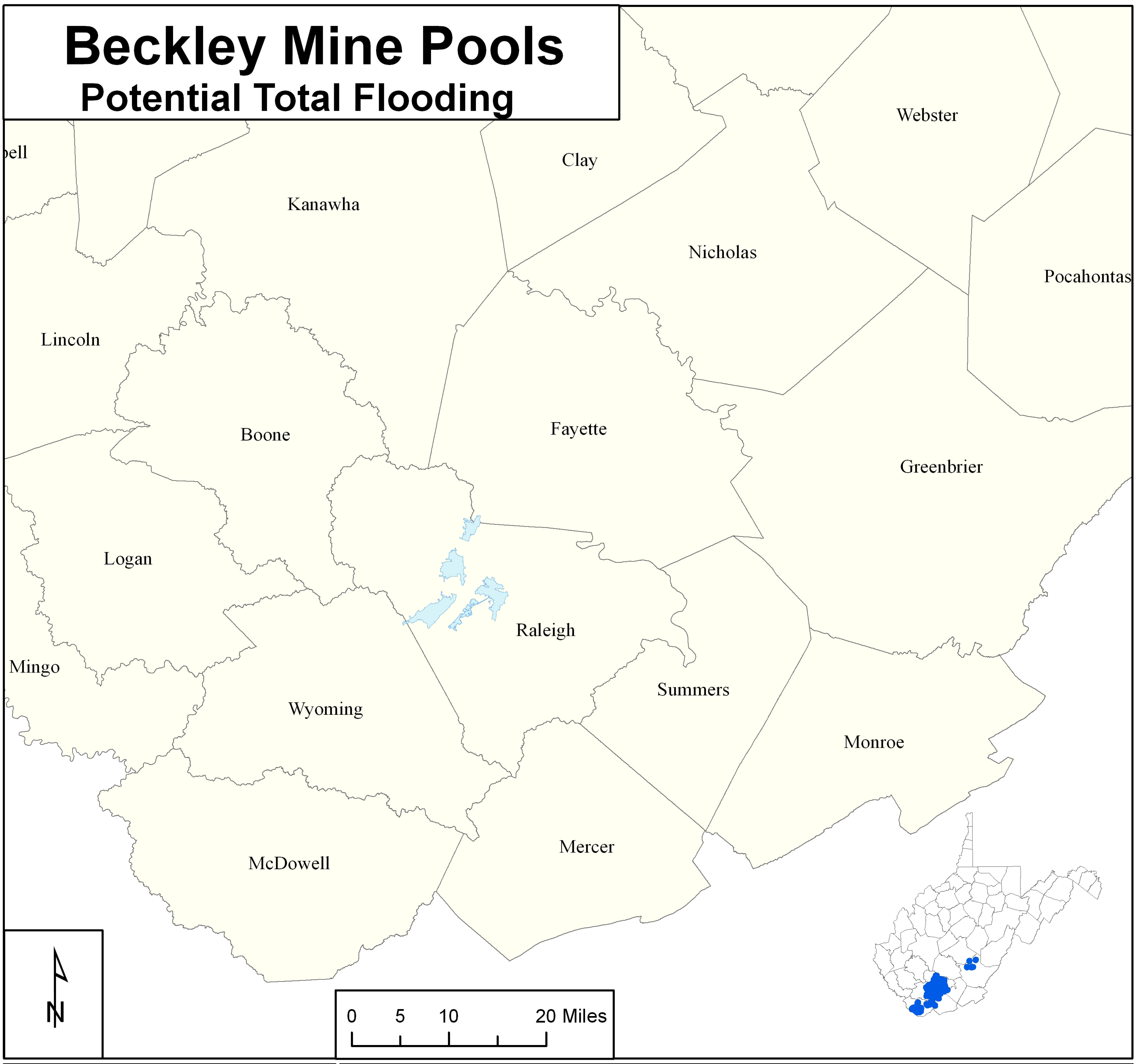
- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Beckley Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	159	19	87	6
Mean coal bed thickness (feet)	2.85	3.43	3.43	5.05
Min. footprint area (acres)	0.08	0.15	0.02	9.73
Max. footprint area (acres)	5,314.48	13.78	6,383.02	4,133.41
Mean footprint area (acres)	238.38	2.94	272.03	2,302.42
Median footprint area (acres)	15.55	1.10	61.32	2,396.15
Total footprint area (acres)	37,901.90	55.87	23,666.68	13,814.54
Estimated void volume (acre feet)	63,074.25	95.73	41,346.11	38,356.68
Max. potential storage (million gallons)	20,555.90	31.20	13,474.70	12,500.44

Figure 23c

Beckley Mine Pools
Potential Total Flooding



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

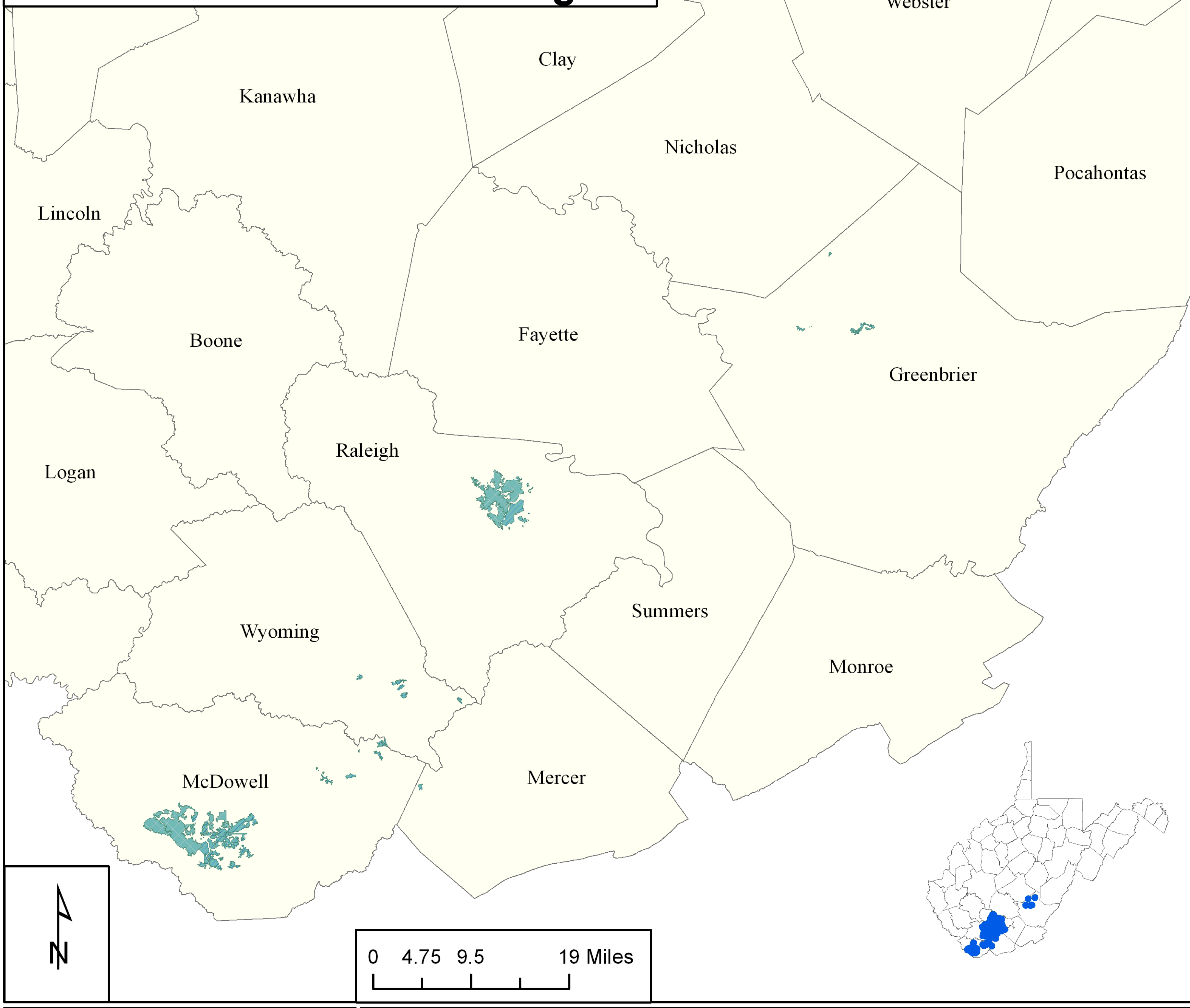
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Beckley Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	6
Mean coal bed thickness (feet)	0.00	0.00	5.05
Min. foot print area (acres)	0.00	0.00	9.73
Max. foot print area (acres)	0.00	0.00	4,133.41
Mean foot print area (acres)	0.00	0.00	2,302.42
Median foot print area (acres)	0.00	0.00	2,396.15
Total foot print area (acres)	0.00	0.00	13,814.54
Estimated void volume (acre feet)	0.00	0.00	38,356.68
Max. potential storage (million gallons)	0.00	0.00	12,500.44

Figure23d

Beckley Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Beckley Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	77	10
Mean coal bed thickness (feet)	3.37	3.89
Min. footprint area (acres)	0.02	1.35
Max. footprint area (acres)	1,633.38	6,383.02
Mean footprint area (acres)	125.71	1,398.70
Median foot print area (acres)	56.70	290.39
Total footprint area (acres)	9,679.69	13,986.99
Estimated void volume (acre feet)	18,240.54	23,105.57
Max. potential storage (million gallons)	5,944.59	7,530.11

Figure 23e

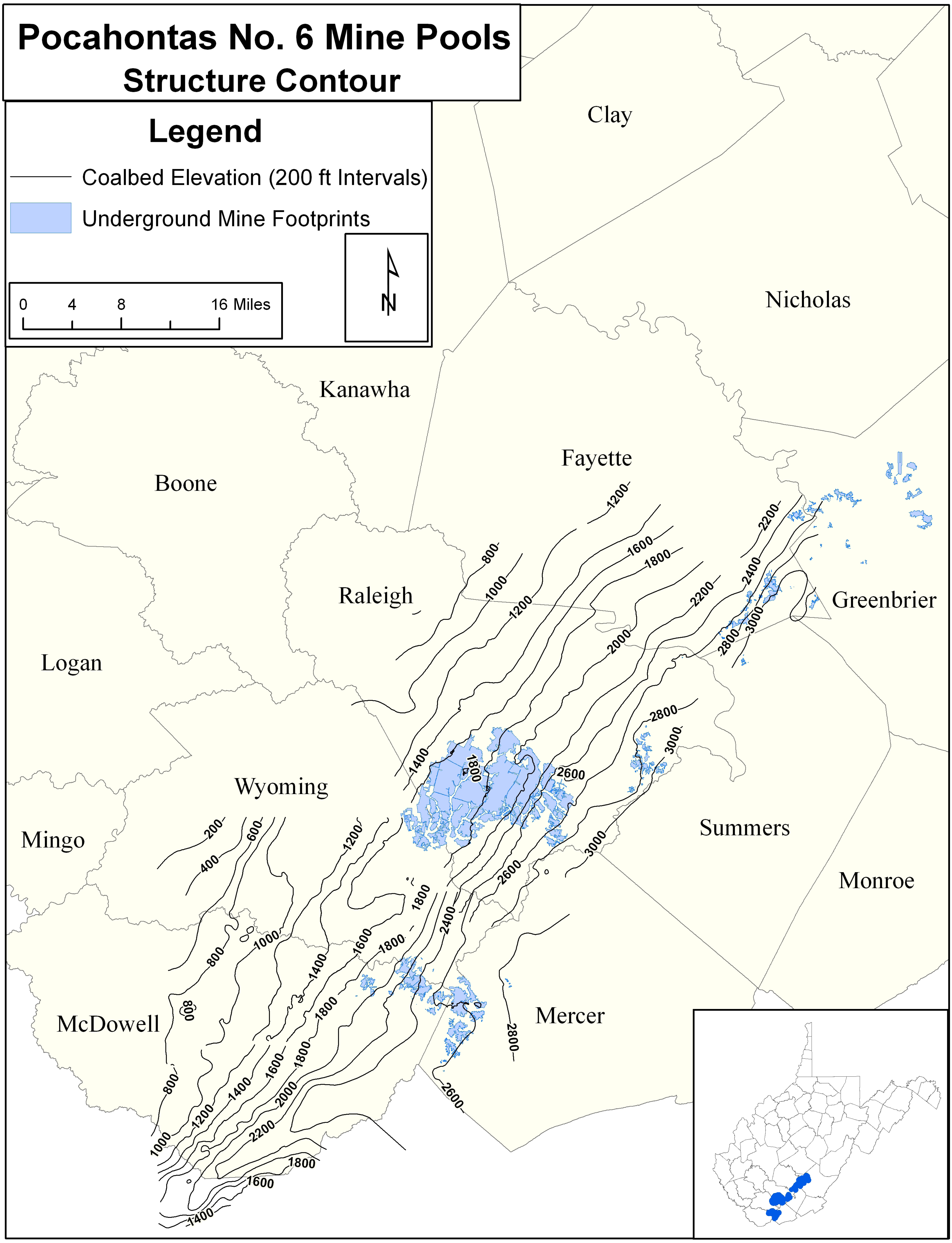

Pocahontas No. 6 Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0
4
8
16 Miles
N
Clay
Nicholas
Kanawha
Fayette
Boone
Raleigh
Greenbrier
Logan
Wyoming
Mingo
Summers
Monroe
McDowell
Mercer

Figure 24a

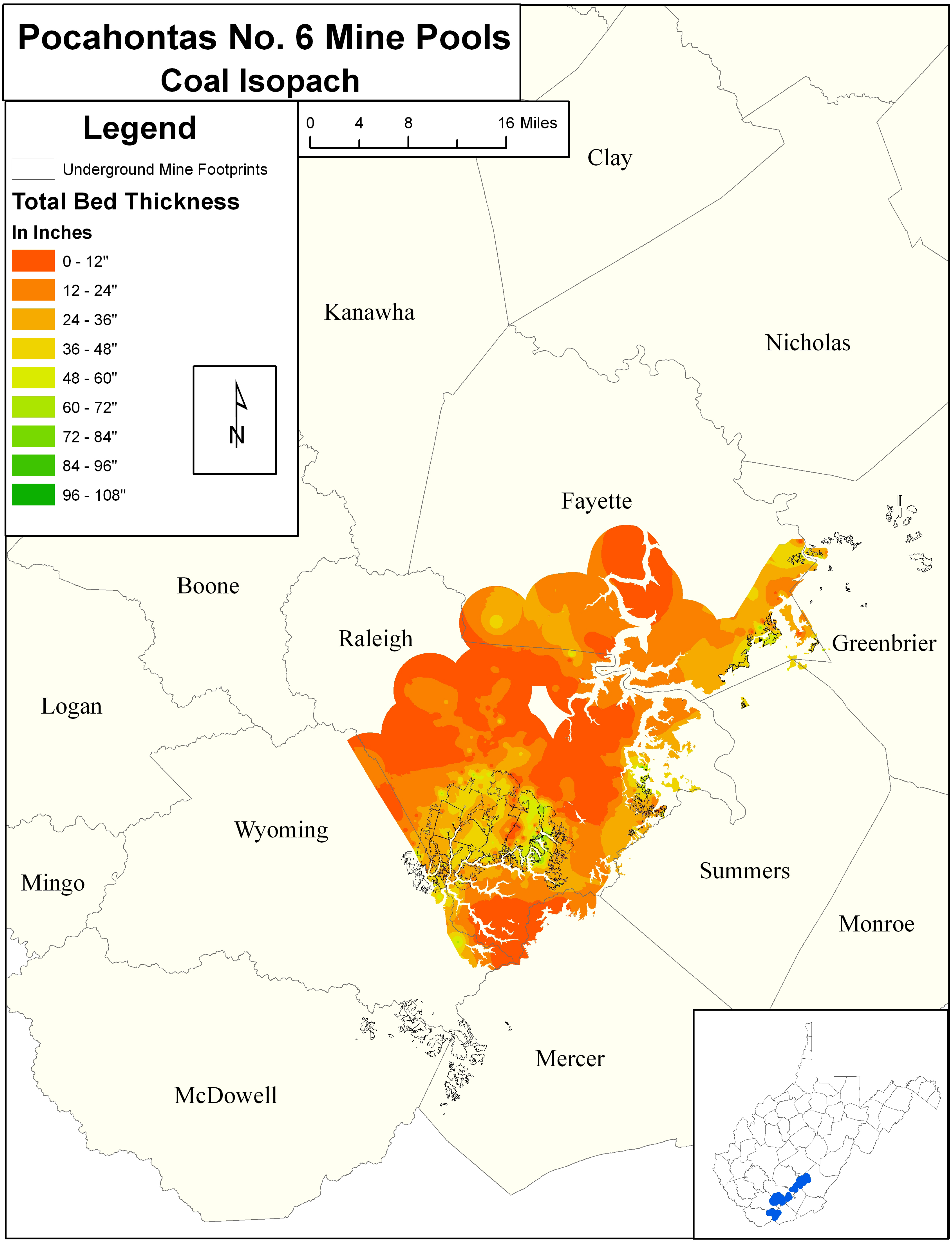
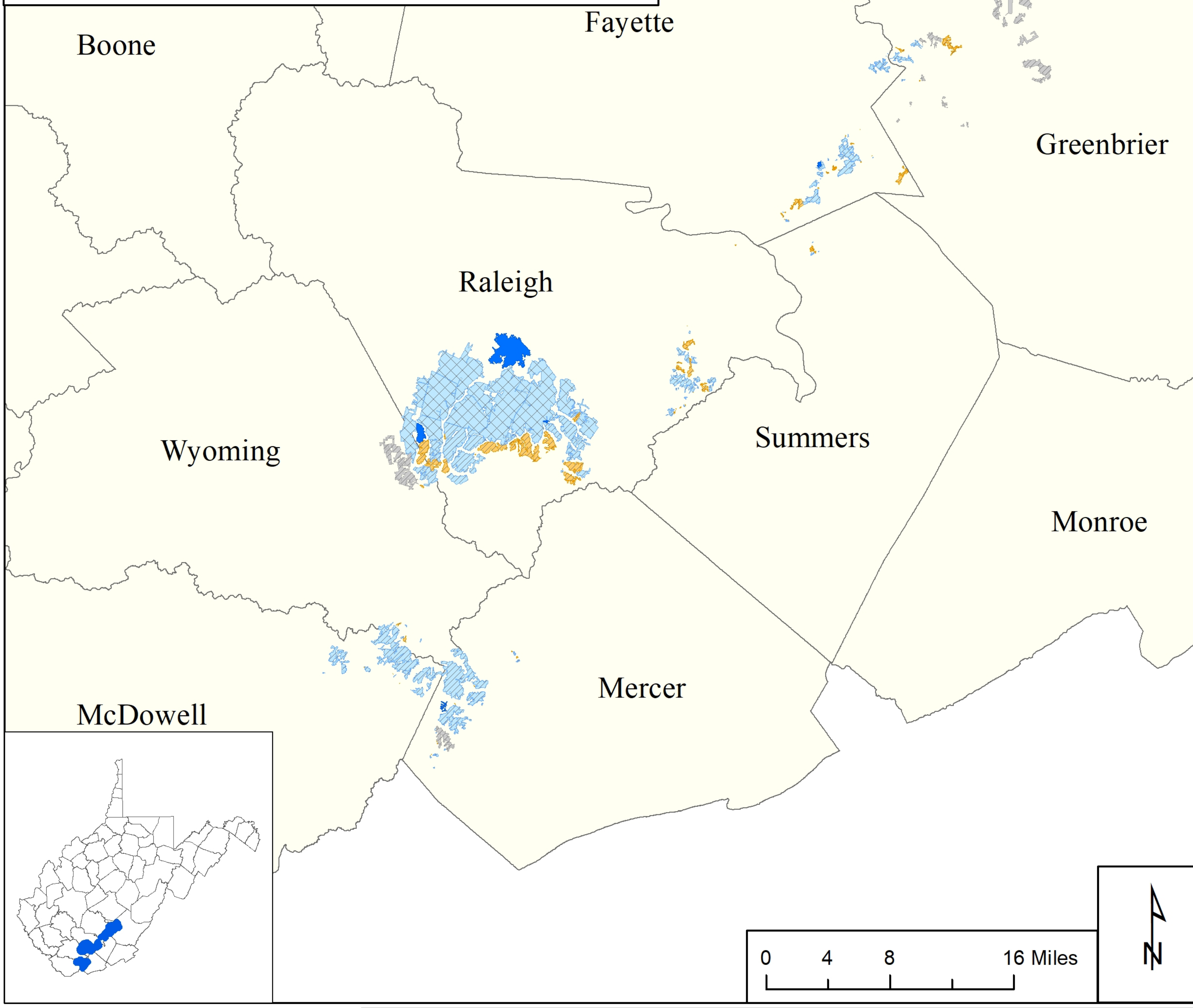

Pocahontas No. 6 Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
N
0 4 8 16 Miles
Clay
Kanawha
Nicholas
Fayette
Boone
Raleigh
Greenbrier
Logan
Wyoming
Mingo
Summers
Monroe
Mercer
McDowell

Figure 24b

Pocahontas No. 6 Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

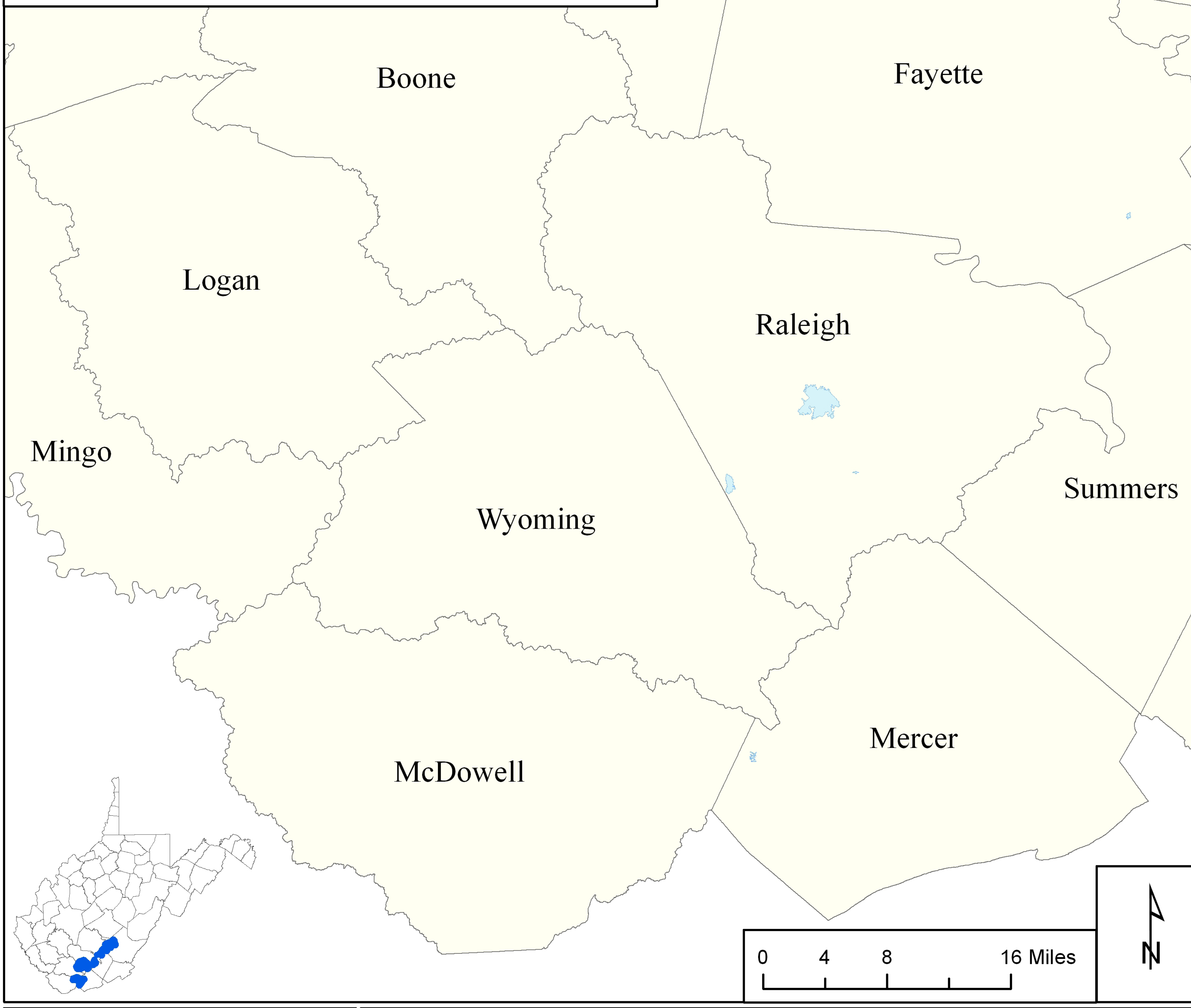
- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Pocahontas No. 6 Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	41	87	128	6
Mean coal bed thickness (feet)	3.32	3.24	2.84	2.99
Min. footprint area (acres)	0.06	0.01	0.03	14.23
Max. footprint area (acres)	518.18	746.95	8,426.85	2,186.21
Mean footprint area (acres)	97.58	46.34	323.26	437.76
Median footprint area (acres)	17.38	1.74	9.88	48.01
Total footprint area (acres)	4,000.80	4,031.70	41,377.25	2,626.56
Estimated void volume (acre feet)	6,716.97	5,240.61	57,546.18	3,465.45
Max. potential storage (million gallons)	2,189.06	1,707.92	18,754.30	1,129.39

Figure 24c

Pocahontas No. 6 Mine Pools
Potential Total Flooding



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

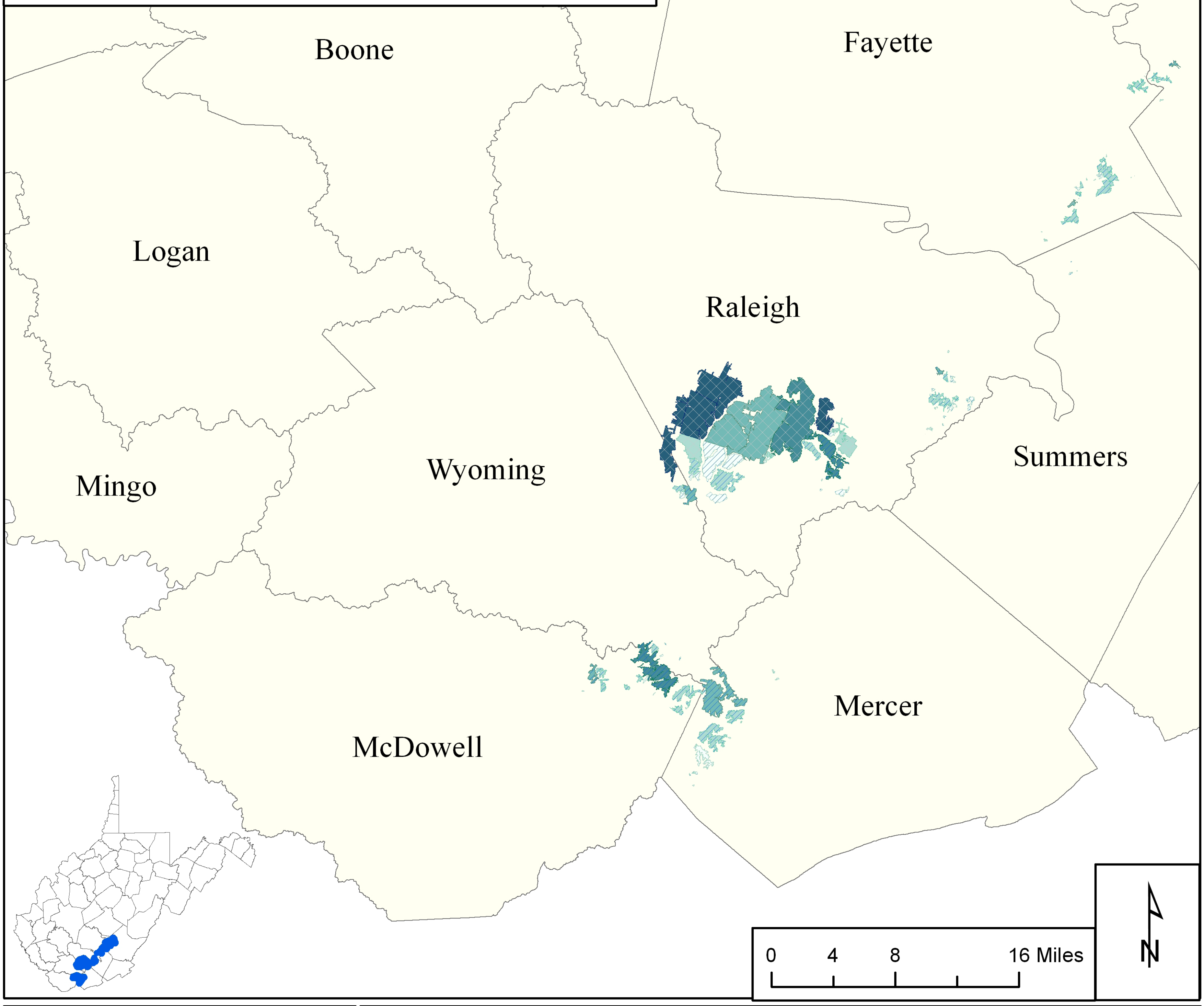
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

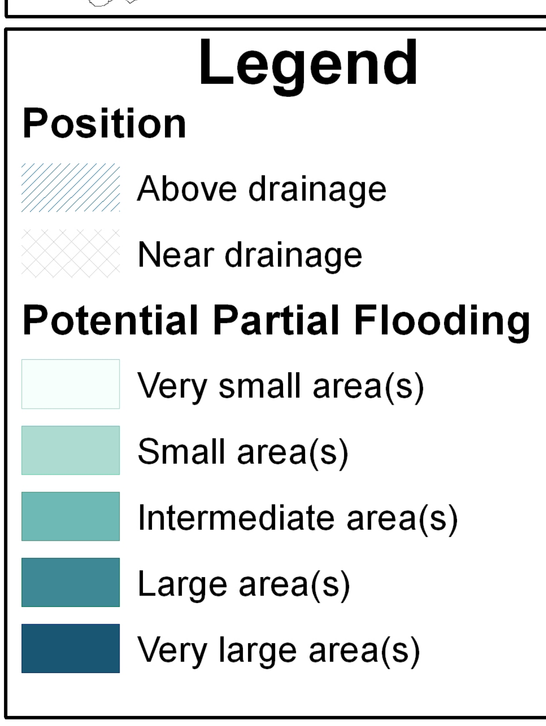
Pocahontas No. 6 Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	2	0	4
Mean coal bed thickness (feet)	2.88	0.00	3.05
Min. foot print area (acres)	14.23	0.00	16.46
Max. foot print area (acres)	53.55	0.00	2,186.21
Mean foot print area (acres)	33.89	0.00	639.70
Median foot print area (acres)	33.89	0.00	178.06
Total foot print area (acres)	67.77	0.00	2,558.79
Estimated void volume (acre feet)	95.95	0.00	3,369.50
Max. potential storage (million gallons)	31.27	0.00	1,098.12

Figure 24d

Pocahontas No. 6 Mine Pools
Potential Partial Flooding

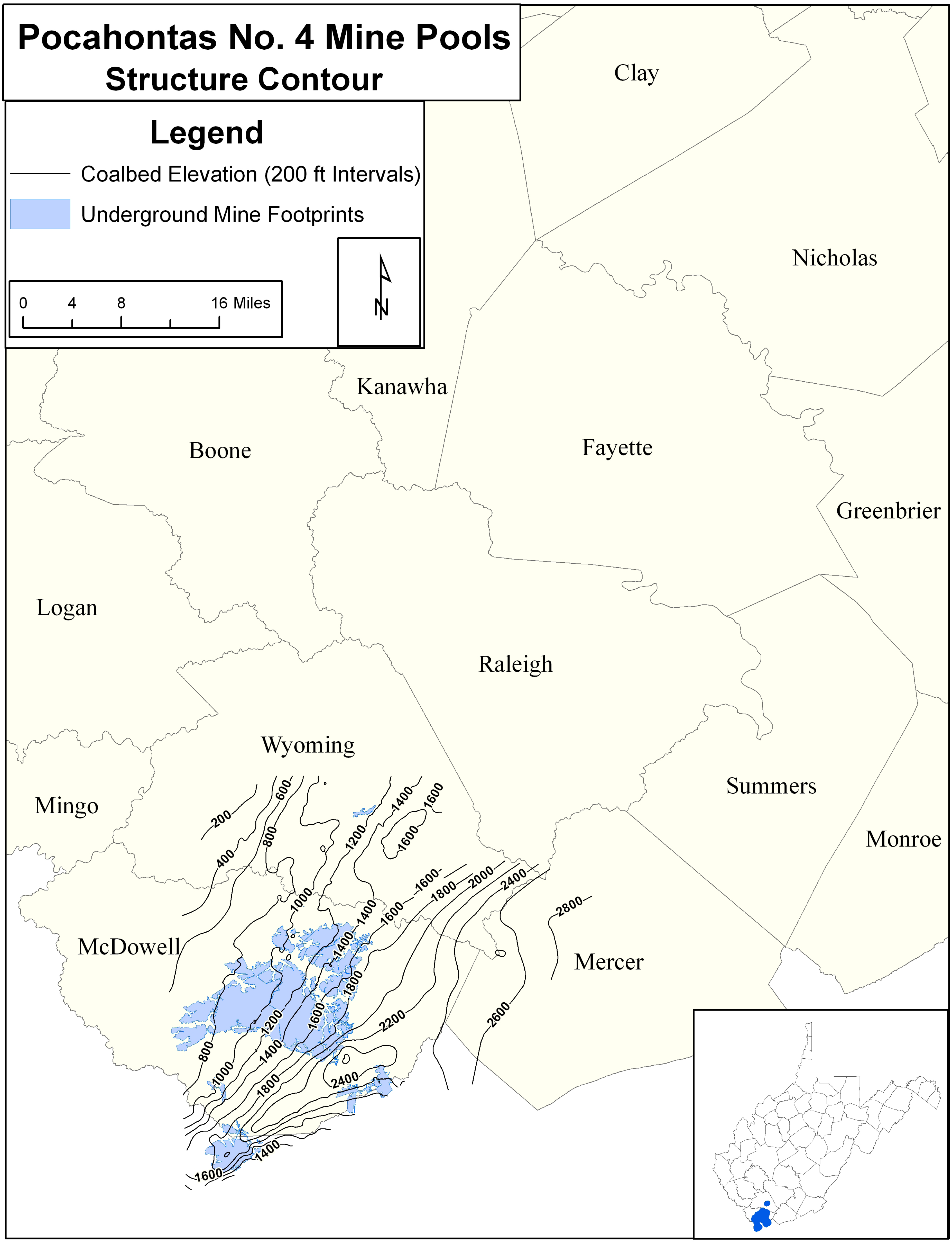




Pocahontas No. 6 Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	112	16
Mean coal bed thickness (feet)	2.84	2.80
Min. footprint area (acres)	0.03	1.72
Max. footprint area (acres)	2,224.17	8,426.85
Mean footprint area (acres)	140.74	1,600.89
Median foot print area (acres)	6.71	504.81
Total footprint area (acres)	15,762.95	25,614.30
Estimated void volume (acre feet)	22,164.77	35,381.41
Max. potential storage (million gallons)	7,223.50	11,530.80

Figure 24e



Pocahontas No. 4 Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0
4
8
16 Miles
N
Clay
Nicholas
Kanawha
Boone
Fayette
Greenbrier
Logan
Raleigh
Wyoming
Mingo
Summers
Monroe
McDowell
Mercer

Figure 25a

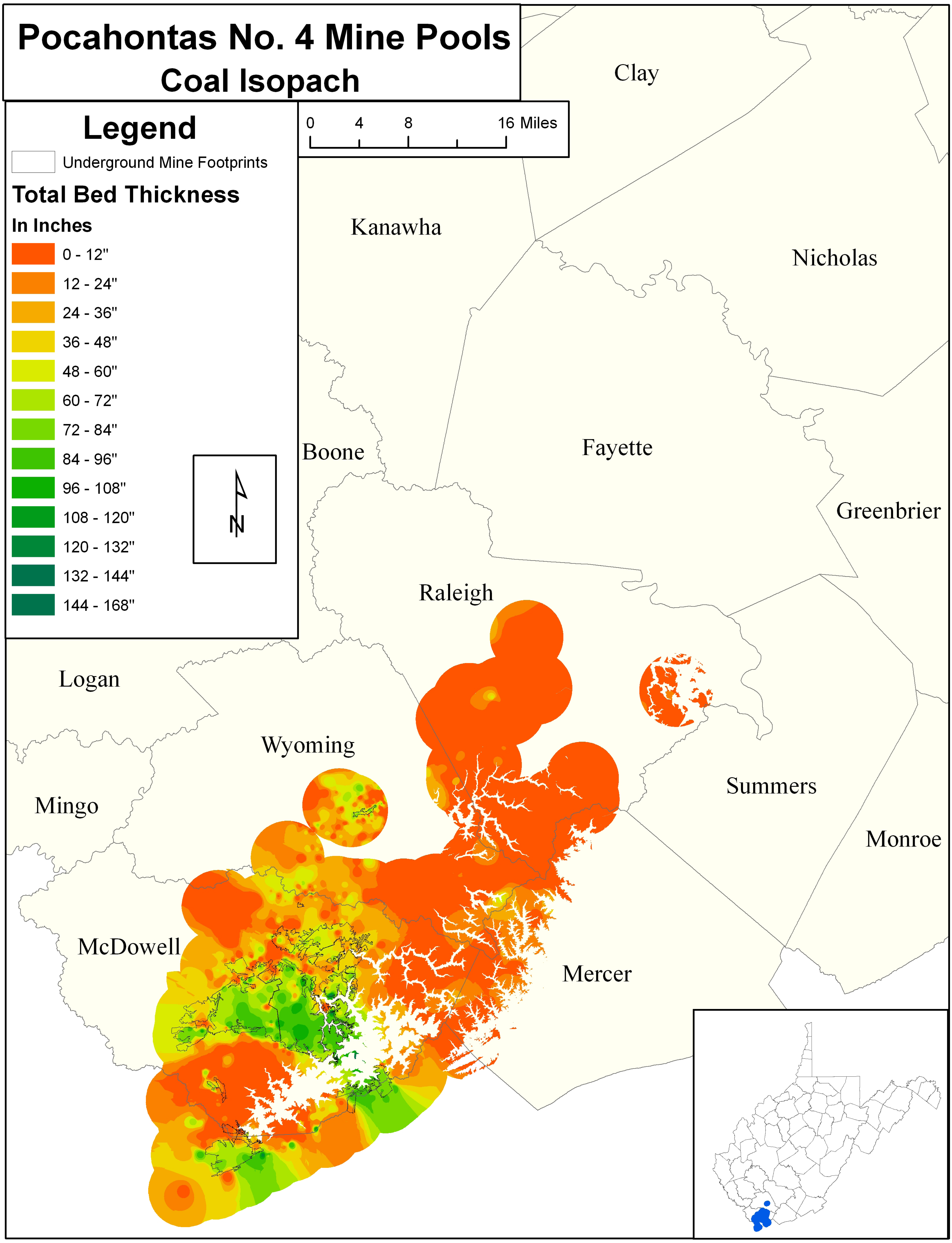
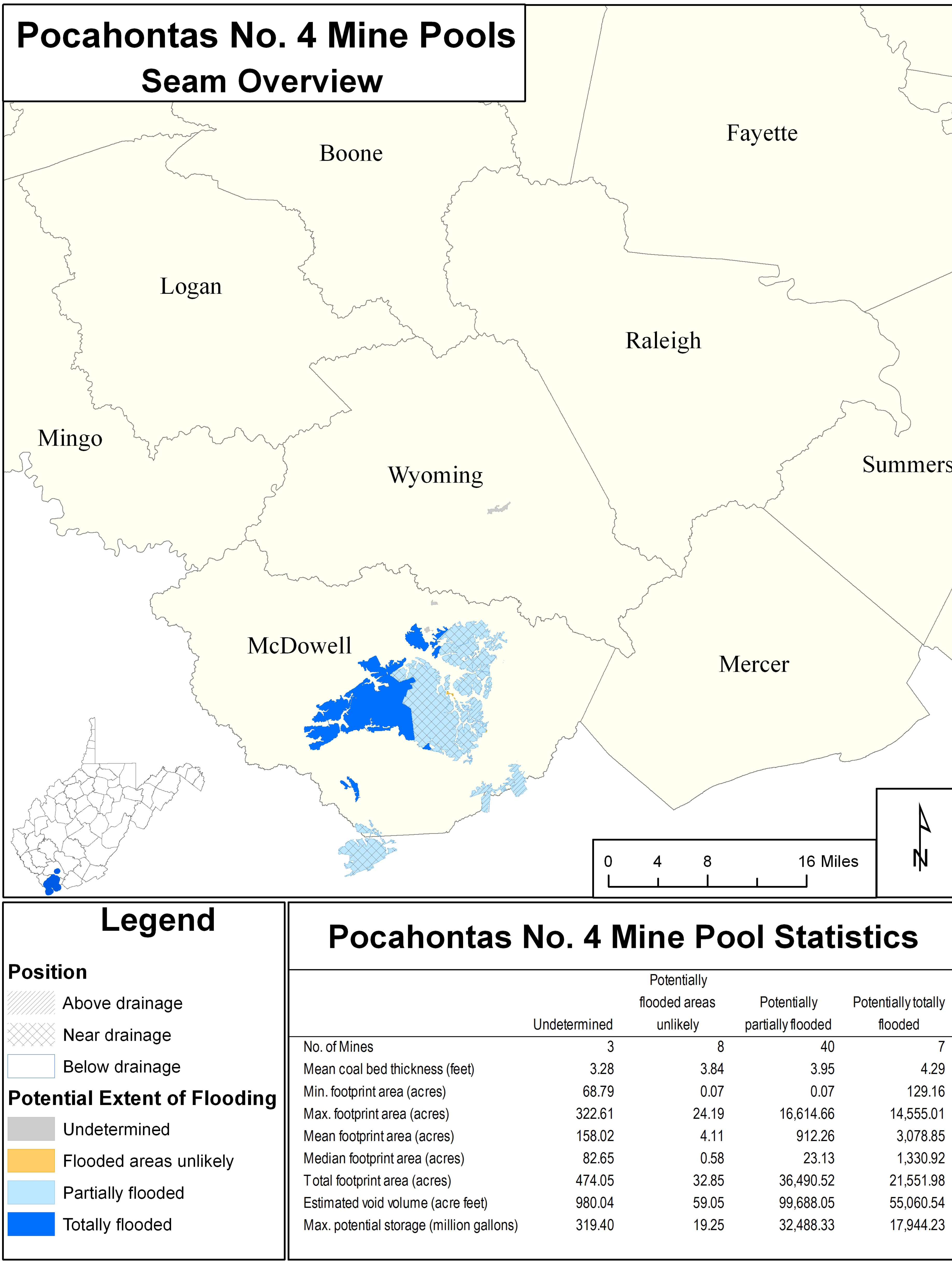

Pocahontas No. 4 Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 168"
N
0
4
8
16 Miles
Clay
Kanawha
Nicholas
Boone
Fayette
Greenbrier
Raleigh
Logan
Wyoming
Mingo
Summers
Monroe
McDowell
Mercer

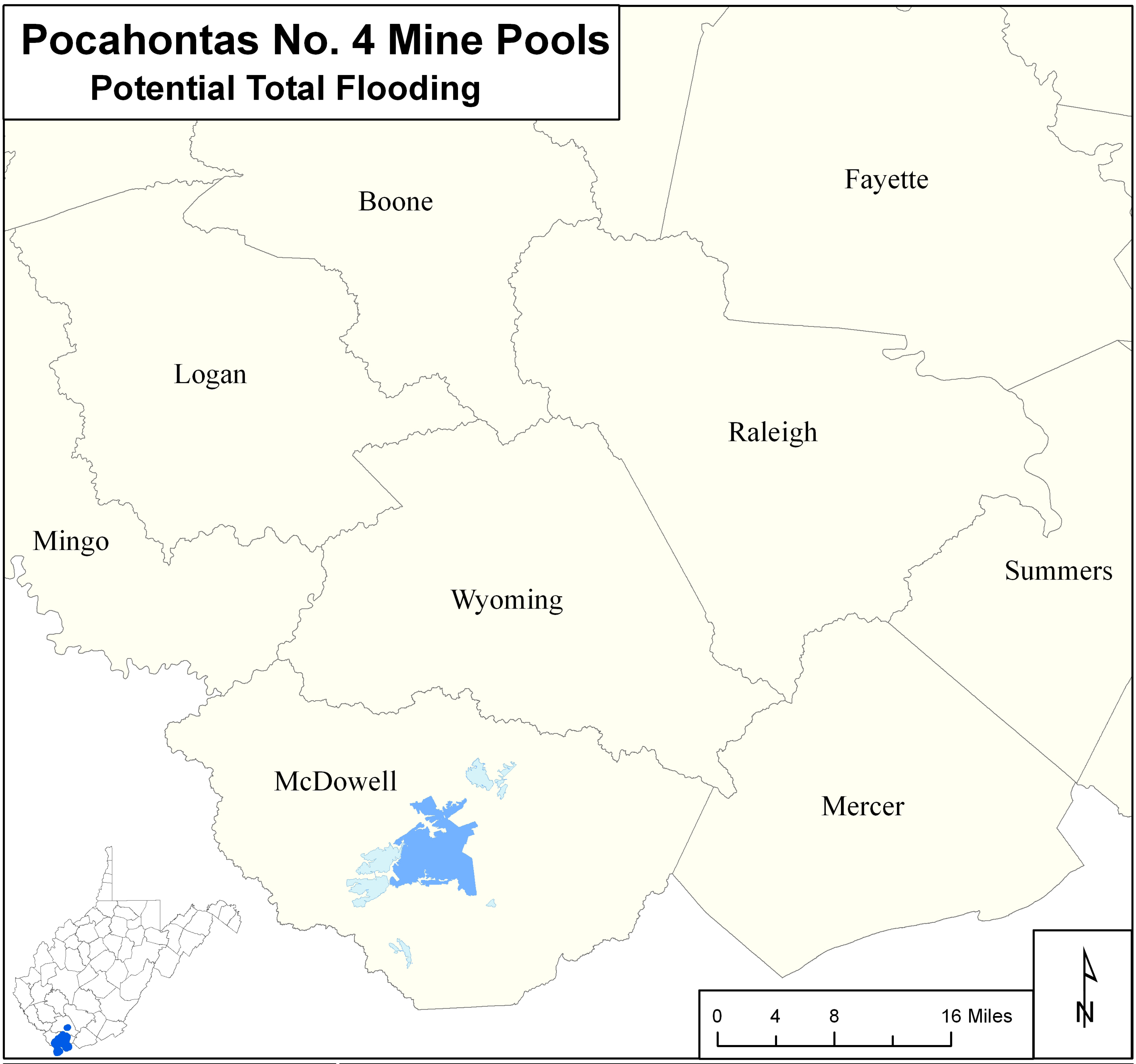
Figure 25b



Pocahontas No. 4 Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	3	8	40	7
Mean coal bed thickness (feet)	3.28	3.84	3.95	4.29
Min. footprint area (acres)	68.79	0.07	0.07	129.16
Max. footprint area (acres)	322.61	24.19	16,614.66	14,555.01
Mean footprint area (acres)	158.02	4.11	912.26	3,078.85
Median footprint area (acres)	82.65	0.58	23.13	1,330.92
Total footprint area (acres)	474.05	32.85	36,490.52	21,551.98
Estimated void volume (acre feet)	980.04	59.05	99,688.05	55,060.54
Max. potential storage (million gallons)	319.40	19.25	32,488.33	17,944.23

Figure 25c



Position **Legend**

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

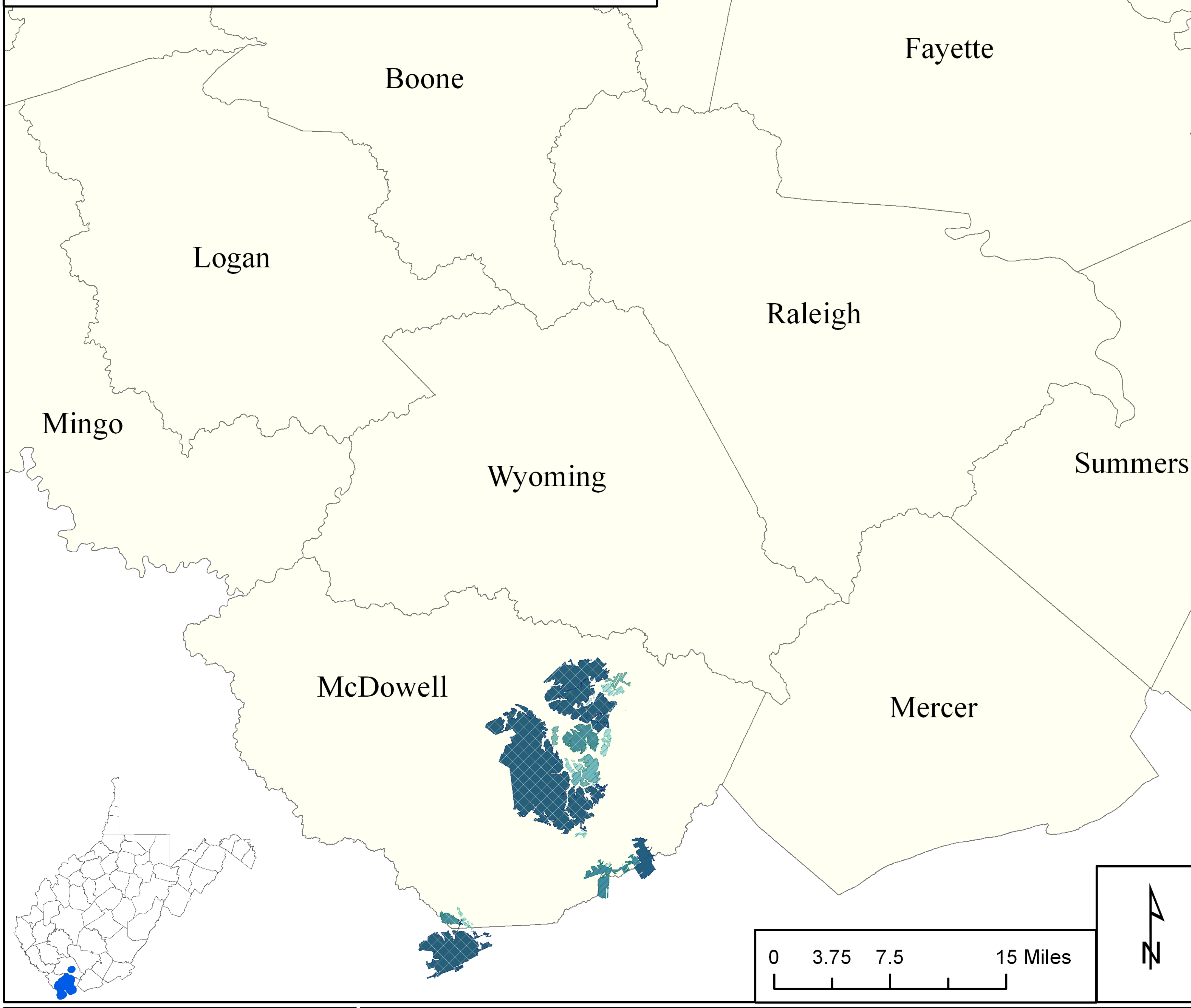
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Pocahontas No. 4 Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	7
Mean coal bed thickness (feet)	0.00	0.00	4.29
Min. foot print area (acres)	0.00	0.00	129.16
Max. foot print area (acres)	0.00	0.00	14,555.01
Mean foot print area (acres)	0.00	0.00	3,078.85
Median foot print area (acres)	0.00	0.00	1,330.92
Total foot print area (acres)	0.00	0.00	21,551.98
Estimated void volume (acre feet)	0.00	0.00	55,060.54
Max. potential storage (million gallons)	0.00	0.00	17,944.23

Figure 25d

Pocahontas No. 4 Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Pocahontas No. 4 Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	31	9
Mean coal bed thickness (feet)	3.95	3.94
Min. footprint area (acres)	0.07	3.25
Max. footprint area (acres)	1,370.04	16,614.66
Mean footprint area (acres)	166.71	3,480.29
Median foot print area (acres)	9.58	387.78
Total footprint area (acres)	5,167.95	31,322.57
Estimated void volume (acre feet)	14,351.90	85,336.15
Max. potential storage (million gallons)	4,677.28	27,811.05

Figure 25e

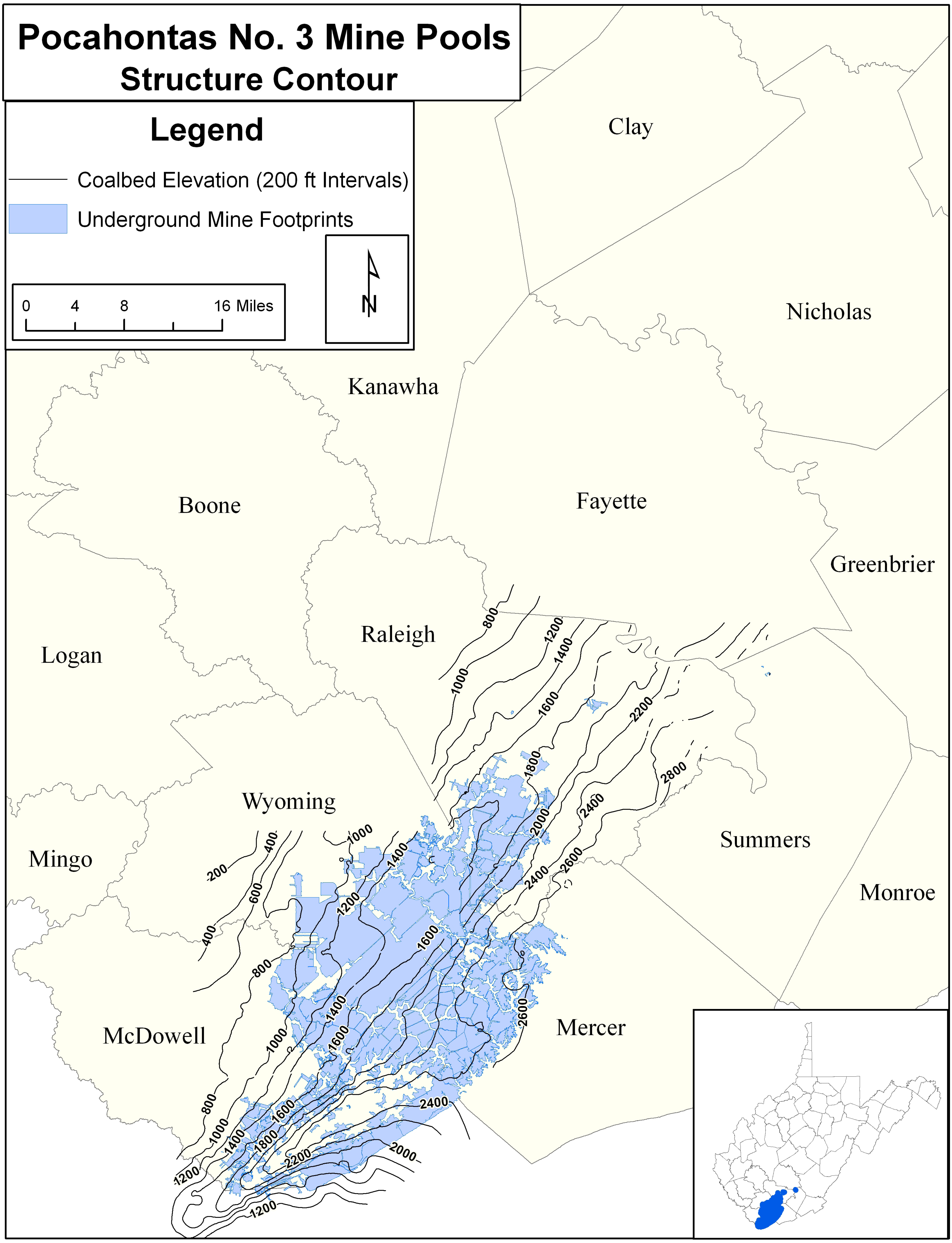

Pocahontas No. 3 Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0 4 8 16 Miles
N
Clay
Nicholas
Kanawha
Boone
Fayette
Greenbrier
Raleigh
Logan
Wyoming
Mingo
Summers
Monroe
McDowell
Mercer

Figure 26a

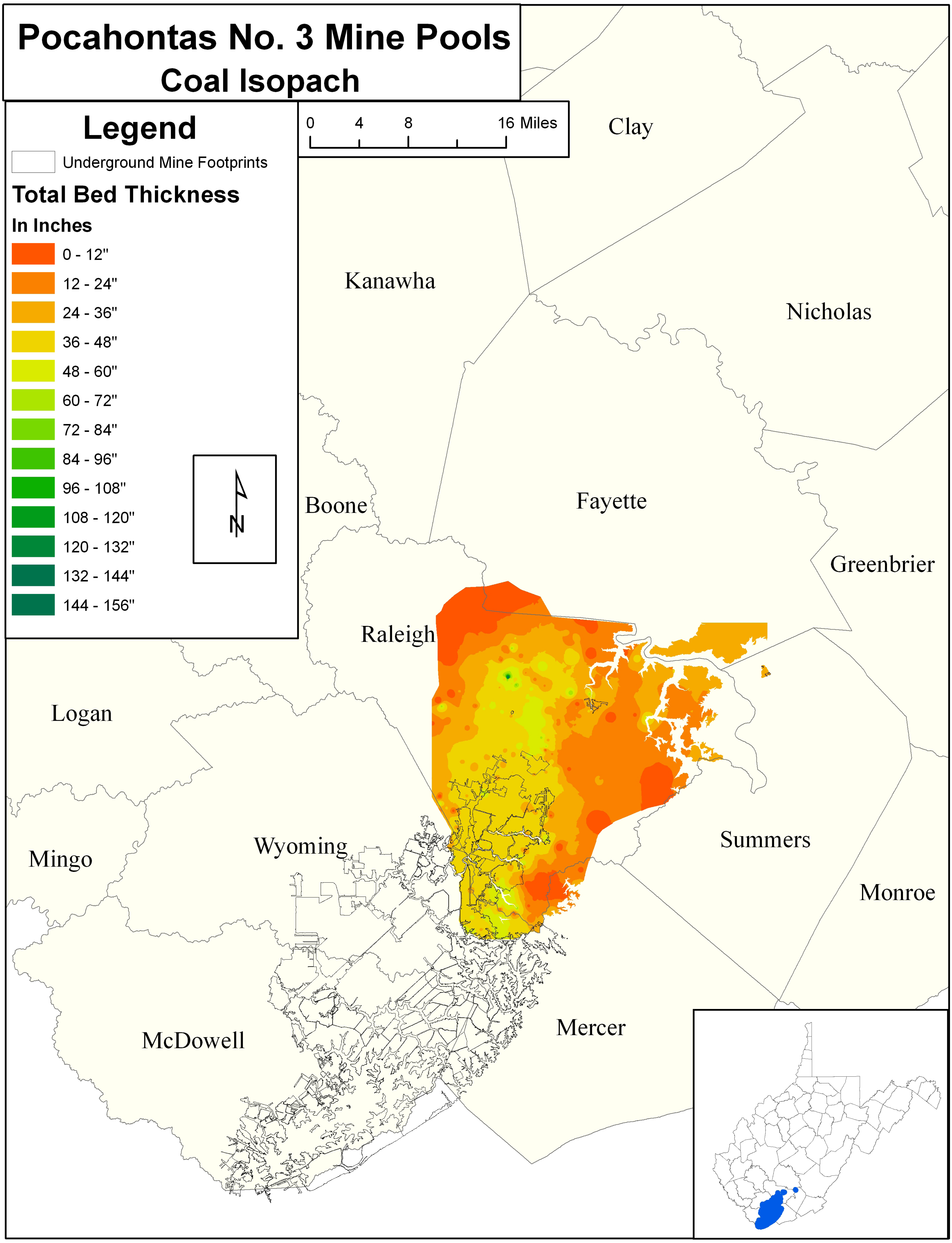
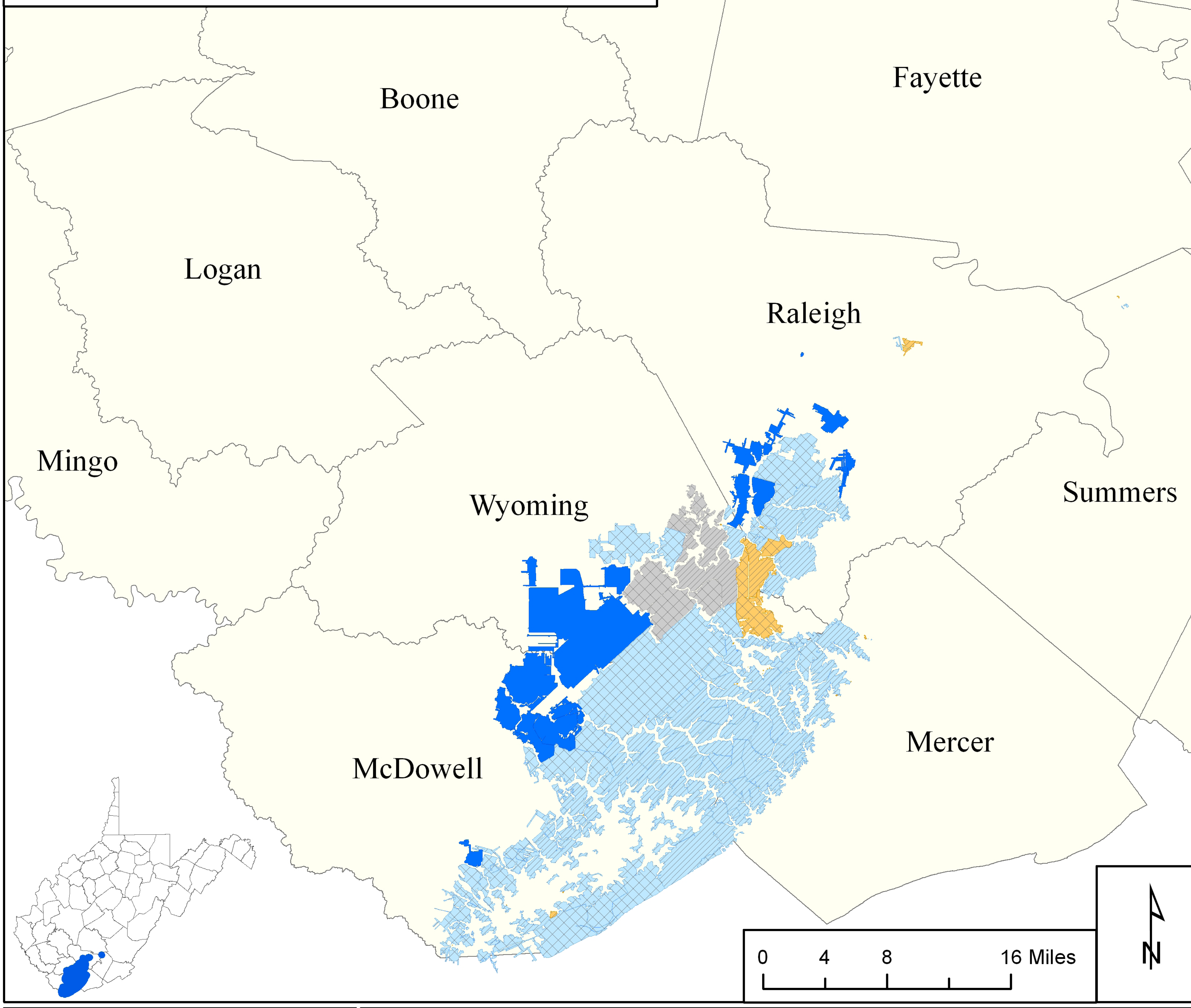

Pocahontas No. 3 Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
60 - 72"
72 - 84"
84 - 96"
96 - 108"
108 - 120"
120 - 132"
132 - 144"
144 - 156"
0
4
8
16 Miles
N
Clay
Kanawha
Nicholas
Boone
Fayette
Greenbrier
Raleigh
Logan
Mingo
Wyoming
Summers
Monroe
McDowell
Mercer

Figure 26b

Pocahontas No. 3 Mine Pools
Seam Overview



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

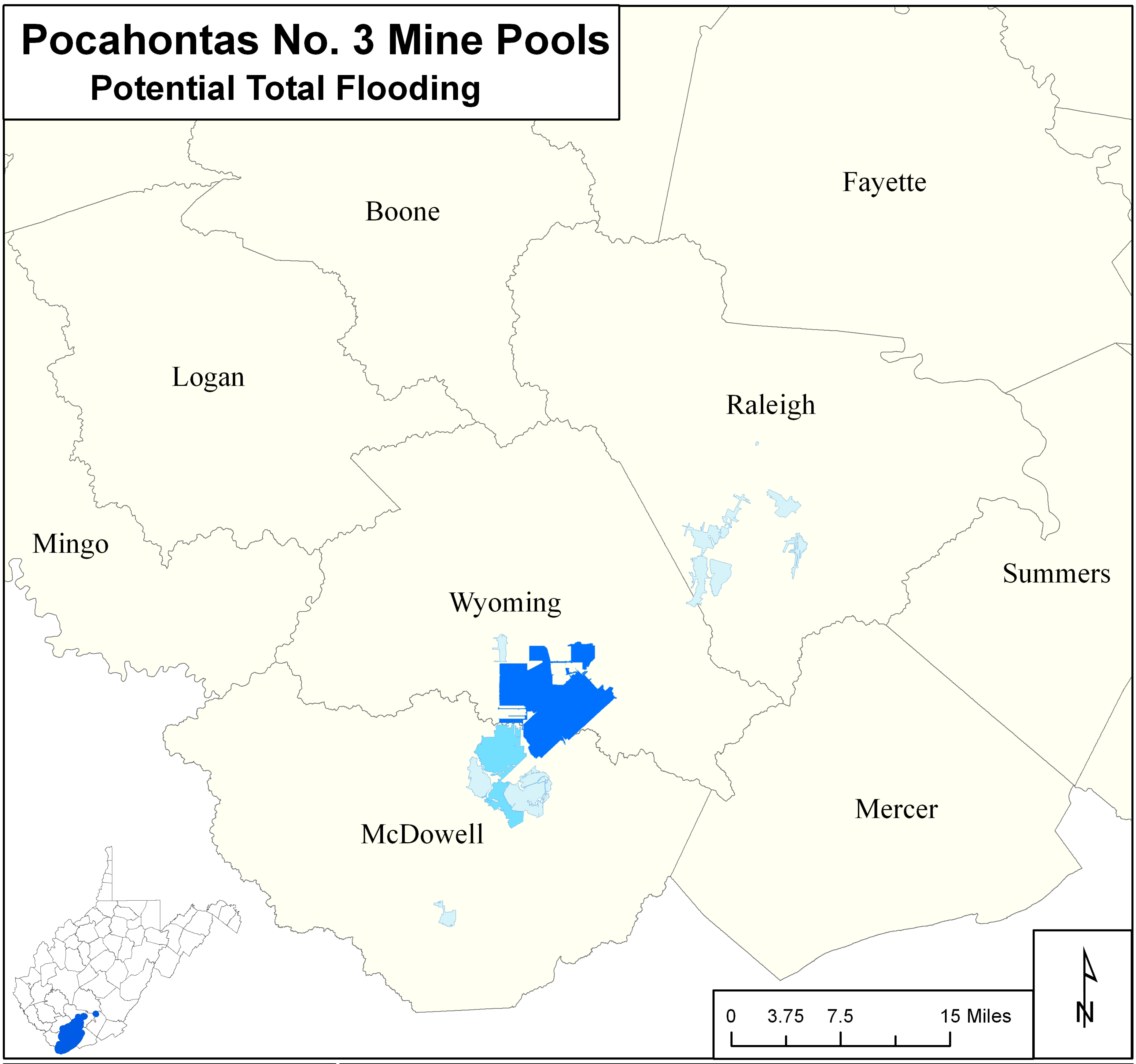
- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Pocahontas No. 3 Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	19	56	211	13
Mean coal bed thickness (feet)	3.63	4.27	4.72	4.10
Min. footprint area (acres)	1.00	0.02	0.03	23.38
Max. footprint area (acres)	7,469.50	4,312.28	24,666.84	21,361.85
Mean footprint area (acres)	990.66	142.19	771.26	3,350.77
Median footprint area (acres)	174.18	0.73	168.10	1,247.45
Total footprint area (acres)	18,822.60	7,962.37	162,736.63	43,560.05
Estimated void volume (acre feet)	37,037.88	13,978.94	396,114.19	98,167.56
Max. potential storage (million gallons)	12,070.64	4,555.74	129,093.61	31,992.81

Figure 26c

Pocahontas No. 3 Mine Pools
Potential Total Flooding



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Storage in Million Gallons

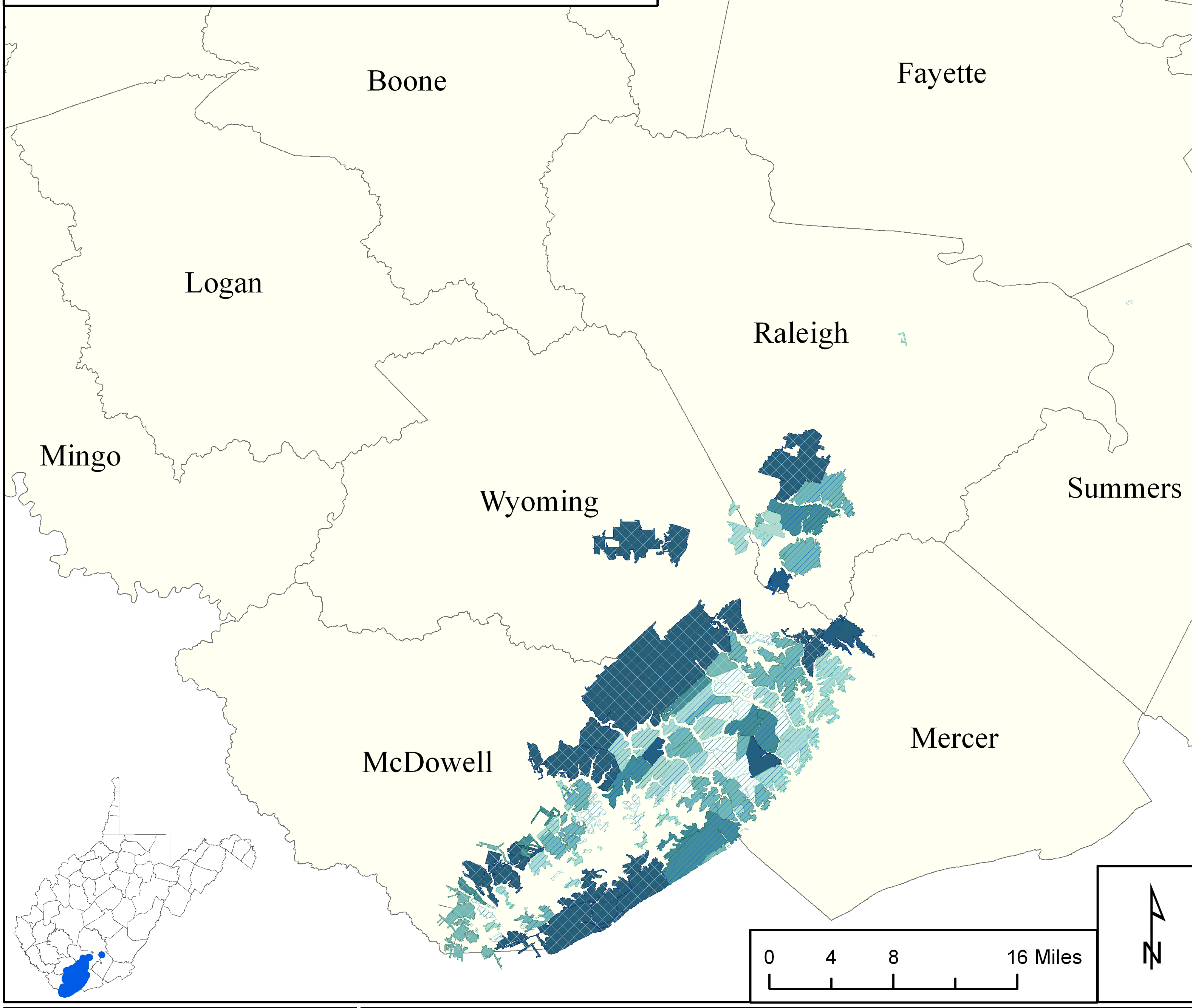
- 0.000 - 5,000
- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000

Pocahontas No. 3 Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	13
Mean coal bed thickness (feet)	0.00	0.00	4.10
Min. foot print area (acres)	0.00	0.00	23.38
Max. foot print area (acres)	0.00	0.00	21,361.85
Mean foot print area (acres)	0.00	0.00	3,350.77
Median foot print area (acres)	0.00	0.00	1,247.45
Total foot print area (acres)	0.00	0.00	43,560.05
Estimated void volume (acre feet)	0.00	0.00	98,167.56
Max. potential storage (million gallons)	0.00	0.00	31,992.81

Figure 26d

Pocahontas No. 3 Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Pocahontas No. 3 Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	178	33
Mean coal bed thickness (feet)	4.79	4.32
Min. footprint area (acres)	0.03	1.17
Max. footprint area (acres)	6,331.74	24,666.84
Mean footprint area (acres)	479.62	2,344.36
Median foot print area (acres)	53.11	1,066.63
Total footprint area (acres)	85,372.69	77,363.93
Estimated void volume (acre feet)	209,876.95	186,237.24
Max. potential storage (million gallons)	68,398.90	60,694.72

Figure 26e

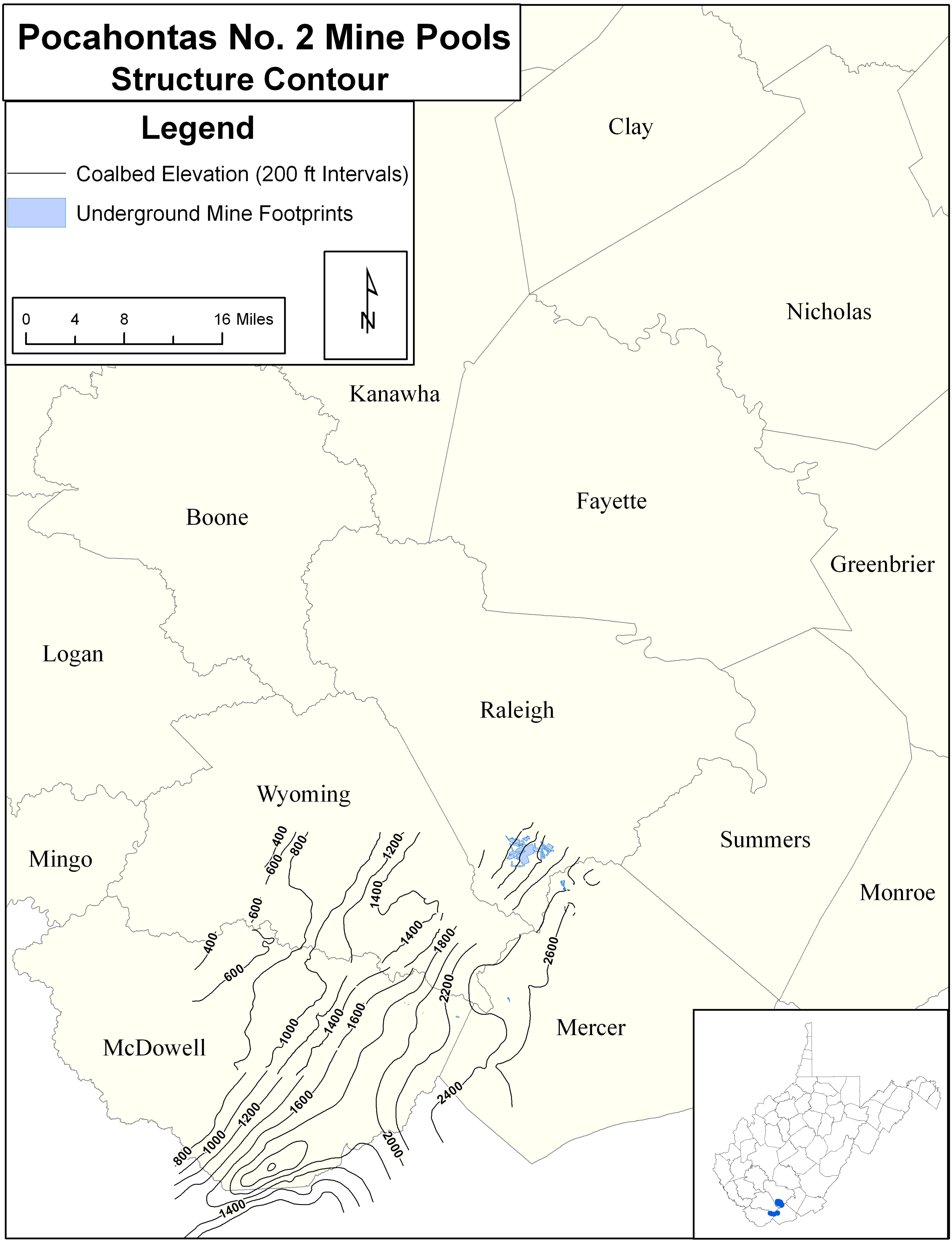

Pocahontas No. 2 Mine Pools
Structure Contour
Legend
Coalbed Elevation (200 ft Intervals)
Underground Mine Footprints
0
4
8
16 Miles
N
Clay
Nicholas
Kanawha
Fayette
Boone
Greenbrier
Logan
Raleigh
Wyoming
Summers
Mingo
Monroe
McDowell
Mercer
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600

Figure 27a

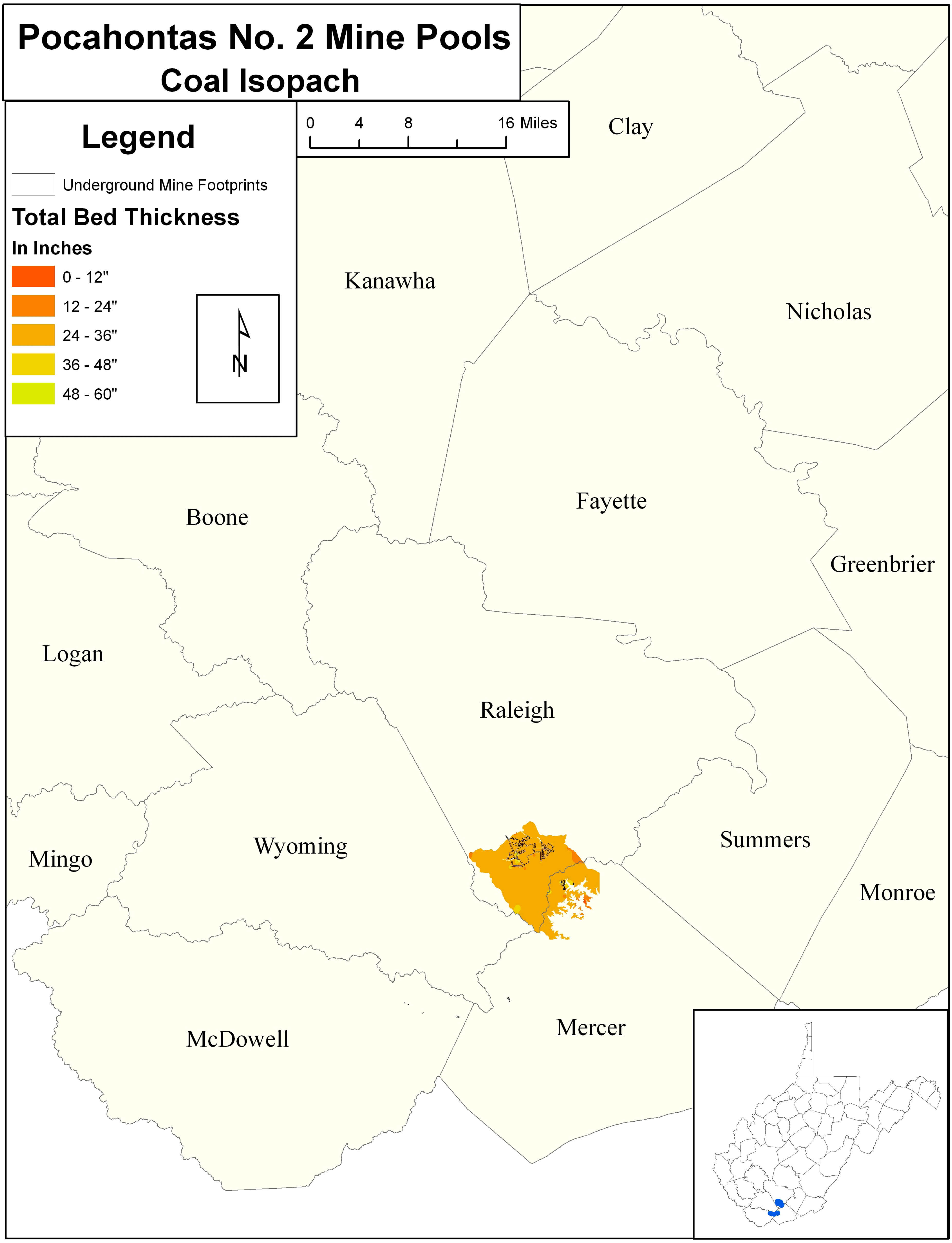
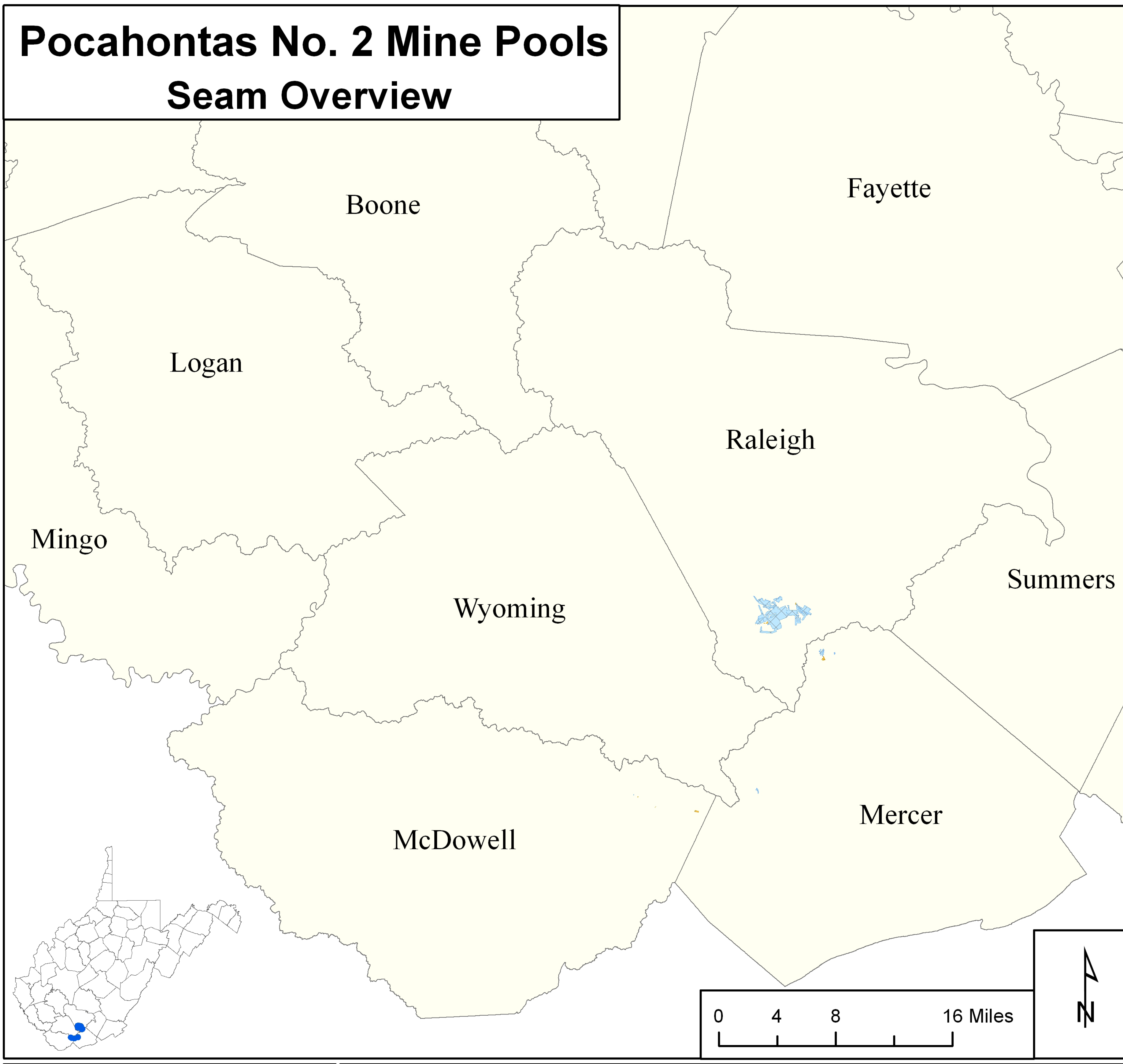

Pocahontas No. 2 Mine Pools
Coal Isopach
Legend
Underground Mine Footprints
Total Bed Thickness
In Inches
0 - 12"
12 - 24"
24 - 36"
36 - 48"
48 - 60"
N
0
4
8
16 Miles
Clay
Kanawha
Nicholas
Boone
Fayette
Greenbrier
Logan
Raleigh
Wyoming
Summers
Mingo
Monroe
McDowell
Mercer

Figure 27b



Legend

Position

- Above drainage
- Near drainage
- Below drainage

Potential Extent of Flooding

- Undetermined
- Flooded areas unlikely
- Partially flooded
- Totally flooded

Pocahontas No. 2 Mine Pool Statistics

	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	8	7	0
Mean coal bed thickness (feet)	0.00	2.58	2.78	0.00
Min. footprint area (acres)	0.00	0.08	0.42	0.00
Max. footprint area (acres)	0.00	13.95	2,064.60	0.00
Mean footprint area (acres)	0.00	4.63	314.27	0.00
Median footprint area (acres)	0.00	1.44	12.49	0.00
Total footprint area (acres)	0.00	37.06	2,199.86	0.00
Estimated void volume (acre feet)	0.00	49.63	2,906.06	0.00
Max. potential storage (million gallons)	0.00	16.17	947.09	0.00

Figure 27c

Pocahontas No. 2 Mine Pools

Potential Total Flooding

Legend

Position

Position

Above drainage

Near drainage

Below drainage

Storage

Storage in Million Gallons

0.000 - 5,000

5,001 - 10,000

10,001 - 15,000

15,001 - 20,000

20,001 - 25,000

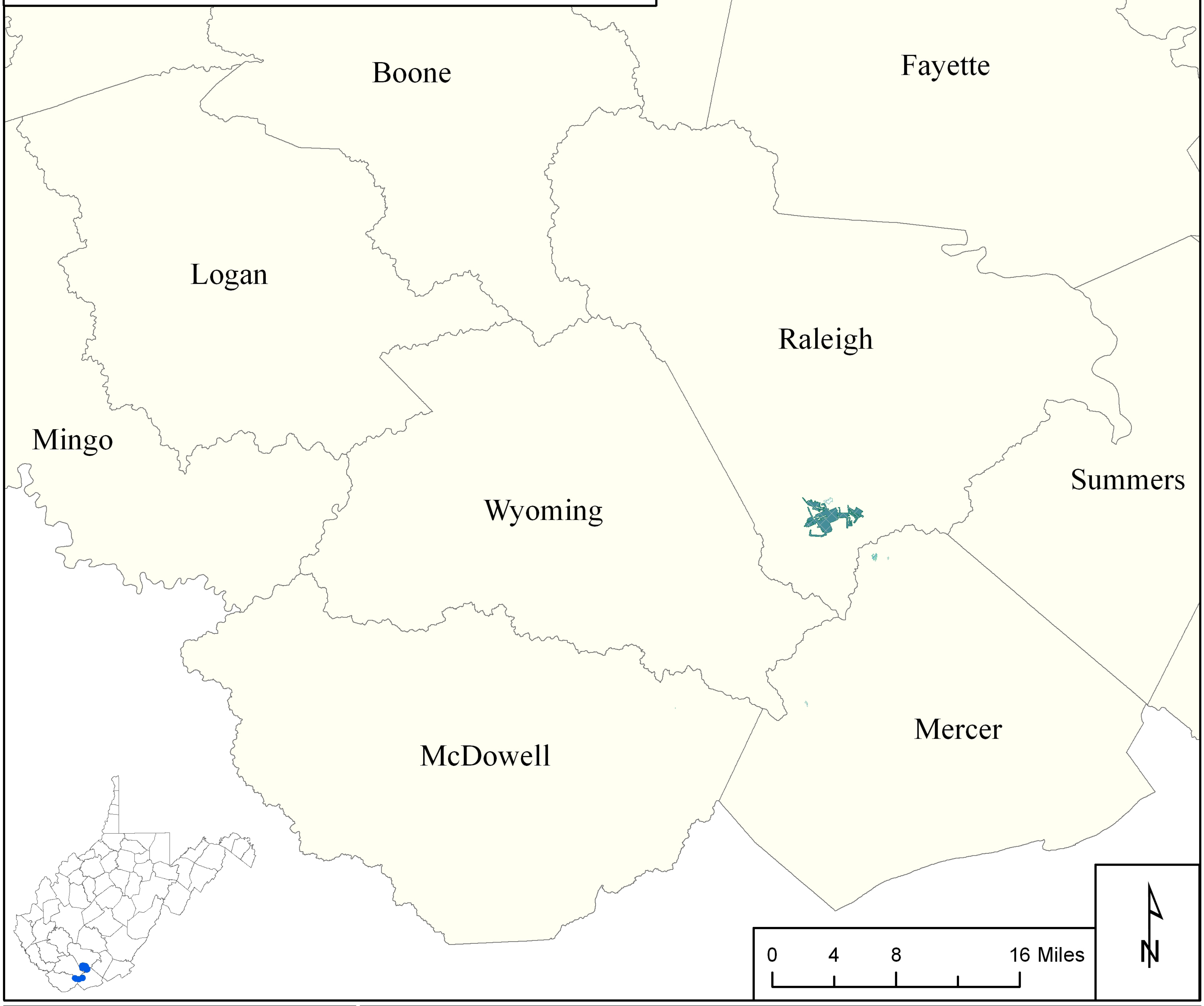
25,001 - 30,000

Pocahontas No. 2 Mine Pool Statistics

	Potentially totally flooded above drainage mines	Potentially totally flooded near drainage mines	Potentially totally flooded below drainage mines
No. of Mines	0	0	0
Mean coal bed thickness (feet)	0.00	0.00	0.00
Min. foot print area (acres)	0.00	0.00	0.00
Max. foot print area (acres)	0.00	0.00	0.00
Mean foot print area (acres)	0.00	0.00	0.00
Median foot print area (acres)	0.00	0.00	0.00
Total foot print area (acres)	0.00	0.00	0.00
Estimated void volume (acre feet)	0.00	0.00	0.00
Max. potential storage (million gallons)	0.00	0.00	0.00

Figure 27d

Pocahontas No. 2 Mine Pools
Potential Partial Flooding



Legend

Position

- Above drainage
- Near drainage

Potential Partial Flooding

- Very small area(s)
- Small area(s)
- Intermediate area(s)
- Large area(s)
- Very large area(s)

Pocahontas No. 2 Mine Pool Statistics

	Potentially partially flooded above drainage mines	Potentially partially flooded near drainage mines
No. of Mines	6	1
Mean coal bed thickness (feet)	2.81	2.58
Min. footprint area (acres)	0.42	2,064.60
Max. footprint area (acres)	70.37	2,064.60
Mean footprint area (acres)	22.54	2,064.60
Median foot print area (acres)	8.48	2,064.60
Total footprint area (acres)	135.26	2,064.60
Estimated void volume (acre feet)	187.16	2,718.90
Max. potential storage (million gallons)	61.00	886.09

Figure 27e

MINE POOL ATLAS

TABLES

Table 1

Group/Formation	Coal Seam	No. of Mines	Mean bed thickness (feet)	Min. footprint area (acres)	Max. footprint area (acres)	Mean footprint area (acres)	Median footprint area (acres)	Total footprint area (acres)	Estimated void volume (acre feet)	Max. potential storage (million gallons)
SUMMARY OF POTENTIALLY TOTALLY FLOODED UNDERGROUND MINES BY COAL SEAM*										
Dunkard Group	Washington	0								
	Waynesburg A	0								
Monongahela Group	Waynesburg	0								
	Uniontown	0								
	Sewickley	**10**	**5.73**	**0.01**	**494.35**	**109.84**	**9.40**	**1,098.45**	**3,223.36**	**1,050.49**
	Redstone	5	3.57	5.13	486.29	212.93	86.26	1,064.63	1,777.56	579.31
	Pittsburgh	**46**	**6.38**	**0.92**	**20,204.27**	**3,933.91**	**641.06**	**180,959.81**	**625,388.68**	**203,814.17**
Conemaugh Group	Elk Lick	0								
	Harlem	0								
	Bakerstown	0								
	Brush Creek	0								
	Mahoning	0								
Allegheny Formation	**Upper Freeport**	**3**	**5.27**	**17.38**	**1,592.89**	**582.25**	**136.47**	**1,746.75**	**3,621.87**	**1,180.37**
	Lower Freeport	0								
	Upper Kittanning	1		402.06	402.06	402.06	402.06	402.06		
	Middle Kittanning	**5**	**5.39**	**81.75**	**4,755.03**	**1,879.00**	**172.19**	**9,395.02**	**24,387.17**	**7,947.78**
	Lower Kittanning	0								
	No. 6 Block	0								
	Upper No. 5 Block	0								
	No. 5 Block	0								
	Little No. 5 Block	0								
Kanawha Formation	Stockton Rider	0								
	Stockton	0								
	Stockton lower split 2	0								
	Coalburg	**2**	**5.80**	**0.80**	**8,603.08**	**4,351.50**	**4,351.50**	**8,703.00**	**24,163.17**	**7,874.78**
	Coalburg lower split 1	0								
	Little Coalburg	0								
	Upper Winifrede	0								
	Winifrede	0								
	Lower Winifrede	0								
	Chilton A	0								
	Chilton	0								
	Little Chilton	1		90.66	90.66	90.66	90.66	90.66		
	Fire Clay	0								
	Fire Clay lower split 1	0								
	Cedar Grove	0								
	Williamson	0								
	Peerless	**11**	**3.12**	**2.58**	**1,484.80**	**310.25**	**33.94**	**3,412.75**	**4,645.15**	**1,513.85**
	No. 2 Gas	**21**	**4.31**	**22.63**	**6,268.92**	**963.91**	**292.18**	**20,242.08**	**51,374.31**	**16,742.89**
	No. 2 Gas lower split 2	0								
	Powellton	**7**	**4.65**	**706.86**	**3,633.60**	**2,096.45**	**2,040.75**	**14,675.15**	**35,651.81**	**11,618.92**
	Lower Powellton	**3**	**2.71**	**26.80**	**1,695.89**	**788.70**	**662.74**	**2,366.11**	**3,794.42**	**1,236.60**
	Eagle A	0								
	Eagle	**25**	**3.94**	**0.99**	**4,857.58**	**1,366.10**	**1,210.73**	**34,152.40**	**72,132.80**	**23,508.08**
	Eagle lower split 1	2		17.27	199.09	108.18	108.18	216.36		
	Little Eagle	2		89.73	193.90	141.82	141.82	283.63		
	Middle War Eagle	0								
	Bens Creek	0								
	Lower War Eagle	0								
	Glenalum Tunnel	0								
	Gilbert	0								
	Douglas	0								
New River Formation	Bradshaw	0								
	Iaeger	0								
	Castle	0								
	Sewell B	0								
	Sewell A	0								
	Sewell	**17**	**3.76**	**4.58**	**4,587.45**	**1,960.08**	**1,380.26**	**33,321.34**	**61,339.45**	**19,990.53**
	Welch	0								
	Little Raleigh	0								
	Beckley	**6**	**5.05**	**9.73**	**4,133.41**	**2,302.42**	**2,396.15**	**13,814.54**	**38,356.68**	**12,500.44**
	Beckley lower split 1	0								
	Fire Creek	1		128.53	128.53	128.53	128.53	128.53		
	Little Fire Creek	0								
	Pocahontas No. 9	0								
Pocahontas Formation	Pocahontas No. 7	0								
	Pocahontas No. 6 upper split 1	0								
	Pocahontas No. 6	**6**	**2.99**	**14.23**	**2,186.21**	**437.76**	**48.01**	**2,626.56**	**3,465.45**	**1,129.39**
	Pocahontas No. 5	0								
	Pocahontas No. 4	**7**	**4.29**	**129.16**	**14,555.01**	**3,078.85**	**1,330.92**	**21,551.98**	**55,060.54**	**17,944.23**
	Pocahontas No. 3	**13**	**4.10**	**23.38**	**21,361.85**	**3,350.77**	**1,247.45**	**43,560.05**	**98,167.56**	**31,992.81**
	Pocahontas No. 2	0								
	Squire Jim	0								
Total	**21 seams/14 with mines>500 acres**	**194**	**71.07**	**1,775.17**	**101,914.86**	**28,595.98**	**16,911.24**	**393,811.87**	**1,106,549.98**	**360,624.64**

*Includes above, near, and below drainage underground mines — seams containing below drainage underground mines > 500 acres in area are highlighted and major seams are in boldface

Table 2

SUMMARY OF POTENTIALLY PARTIALLY FLOODED UNDERGROUND MINES BY COAL SEAM*

Group/Formation	Coal Seam	No. of Mines	Mean bed thickness (feet)	Min. footprint area (acres)	Max. footprint area (acres)	Mean footprint area (acres)	Median footprint area (acres)	Total footprint area (acres)	Estimated void volume (acre feet)	Max. potential storage (million gallons)
Dunkard Group	Washington	0								
	Waynesburg A	0								
Monongahela Group	Waynesburg	4		0.47	30.97	17.74	19.76	70.95		
	Uniontown	0								
	Sewickley	**61**	**5.03**	**0.03**	**12,846.57**	**405.83**	**18.05**	**24,755.47**	**69,988.21**	**22,809.16**
	Redstone	161	4.51	0.01	4,598.10	100.17	17.47	16,127.87	36,338.05	11,842.57
	Pittsburgh	**564**	**6.06**	**0.01**	**14,923.99**	**350.55**	**22.44**	**197,712.71**	**673,947.07**	**219,639.35**
Conemaugh Group	Elk Lick	0								
	Harlem	0								
	Bakerstown	**54**	**3.24**	**0.17**	**1,952.97**	**122.52**	**24.26**	**6,616.09**	**14,114.95**	**4,600.06**
	Brush Creek	0								
	Mahoning	0								
Allegheny Formation	**Upper Freeport**	**202**	**4.75**	**0.04**	**7,005.07**	**222.10**	**26.50**	**44,864.77**	**136,630.31**	**44,527.82**
	Lower Freeport	2		3.07	118.82	60.95	60.95	121.90		
	Upper Kittanning	1		58.09	58.09	58.09	58.09	58.09		
	Middle Kittanning	**16**	**5.05**	**0.06**	**6,191.64**	**643.78**	**2.99**	**10,300.50**	**23,692.48**	**7,721.38**
	Lower Kittanning	6		2.38	813.96	236.82	71.82	1,420.91		
	No. 6 Block	16		10.51	282.57	78.05	60.97	1,248.87		
	Upper No. 5 Block	71		0.60	547.03	83.64	32.08	5,938.39		
	No. 5 Block	**353**	**3.93**	**0.02**	**2,420.30**	**90.45**	**17.42**	**31,928.68**	**60,026.64**	**19,562.68**
	Little No. 5 Block	11		11.48	713.54	136.54	53.18	1,501.90		
Kanawha Formation	Stockton Rider	2		19.90	102.54	61.22	61.22	122.44		
	Stockton	**135**	**4.42**	**0.00**	**4,100.05**	**239.83**	**73.10**	**32,376.49**	**89,480.16**	**29,161.59**
	Stockton lower split 2	39		0.74	3,117.49	200.09	16.38	7,803.33		
	Coalburg	**274**	**5.30**	**0.12**	**4,074.99**	**241.05**	**105.74**	**66,047.04**	**184,839.99**	**60,239.35**
	Coalburg lower split 1	5		11.29	77.29	37.64	23.73	188.20		
	Little Coalburg	2		339.02	695.59	517.31	517.31	1,034.61		
	Upper Winifrede	1		18.52	18.52	18.52	18.52	18.52		
	Winifrede	244	3.77	0.00	6,254.69	236.08	44.21	57,603.54	132,950.40	43,328.53
	Lower Winifrede	9		4.84	175.68	60.10	37.28	540.88		
	Chilton A	18		4.64	938.86	266.38	160.71	4,794.91		
	Chilton	26		2.71	1,017.15	231.26	91.38	6,012.84		
	Little Chilton	31		6.41	3,322.56	425.32	174.69	13,184.95		
	Fire Clay	96		0.01	15,447.96	398.87	62.52	38,291.92		
	Fire Clay lower split 1	10		2.99	1,099.16	325.39	115.04	3,253.94		
	Cedar Grove	107		0.39	3,746.07	296.28	27.36	31,702.21		
	Williamson	74		1.37	2,475.04	188.71	71.37	13,964.21		
	Peerless	**211**	**3.23**	**0.08**	**8,026.77**	**379.86**	**24.63**	**80,151.24**	**158,654.82**	**51,705.60**
	No. 2 Gas	**460**	**3.55**	**0.02**	**14,838.87**	**460.33**	**30.48**	**211,751.84**	**451,091.78**	**147,010.81**
	No. 2 Gas lower split 2	10		1.14	265.84	49.92	17.29	499.19		
	Powellton	**267**	**3.39**	**0.01**	**4,755.16**	**152.39**	**22.44**	**40,687.37**	**75,364.21**	**24,561.20**
	Lower Powellton	**103**	**3.13**	**0.04**	**2,256.73**	**146.07**	**26.44**	**15,045.33**	**27,080.13**	**8,825.41**
	Eagle A	17		0.05	742.24	107.14	11.89	1,821.42		
	Eagle	**363**	**3.64**	**0.01**	**10,804.17**	**319.44**	**41.67**	**115,955.57**	**250,439.00**	**81,618.07**
	Eagle lower split 1	18		3.61	1,040.62	239.13	103.80	4,304.32		
	Little Eagle	44		0.01	2,311.24	68.20	3.18	3,000.88		
	Middle War Eagle	11		1.79	374.32	74.08	12.87	814.89		
	Bens Creek	9		0.10	3,468.35	387.95	2.88	3,491.57		
	Lower War Eagle	1		87.22	87.22	87.22	87.22	87.22		
	Glenalum Tunnel	2		267.54	1,171.14	610.61	782.14	393.14		
	Gilbert	0								
	Douglas	0								
New River Formation	Bradshaw	0								
	Iaeger	0								
	Castle	0								
	Sewell B	3		6.72	223.77	115.14	114.92	345.41		
	Sewell A	3		7.96	195.29	76.13	25.13	228.38		
	Sewell	**268**	**2.85**	**0.02**	**15,697.79**	**341.56**	**15.23**	**91,536.86**	**155,666.76**	**50,731.80**
	Welch	0								
	Little Raleigh	0								
	Beckley	**87**	**3.43**	**0.02**	**6,383.02**	**272.03**	**61.32**	**23,666.68**	**41,346.11**	**13,474.70**
	Beckley lower split 1	0								
	Fire Creek	224		0.01	5,399.51	129.50	12.00	29,008.15		
	Little Fire Creek	25		0.22	399.34	74.72	17.20	1,868.05		
	Pocahontas No. 9	29		0.02	813.81	68.41	33.15	1,983.89		
Pocahontas Formation	Pocahontas No. 7	12		0.15	424.67	60.84	22.11	730.06		
	Pocahontas No. 6 upper split 1	24	3.63	43.79	115.09	24.60	10.50	590.31	1,070.22	348.79
	Pocahontas No. 6	**128**	**2.84**	**0.03**	**8,426.85**	**323.26**	**9.88**	**41,377.25**	**57,546.18**	**18,754.30**
	Pocahontas No. 5	15		0.31	4,673.27	603.13	74.33	9,046.96		
	Pocahontas No. 4	**40**	**3.95**	**0.07**	**16,614.66**	**912.26**	**23.13**	**36,490.52**	**99,688.05**	**32,488.33**
	Pocahontas No. 3	**211**	**4.72**	**0.03**	**24,666.84**	**771.26**	**168.10**	**162,736.63**	**396,114.19**	**129,093.61**
	Pocahontas No. 2	**7**	**2.78**	**0.42**	**2,064.60**	**314.27**	**12.49**	**2,199.86**	**2,906.06**	**947.09**
	Squire Jim	4		0.07	102.34	40.70	30.20	162.81		
Total	**58 seams/19 with mines>500 acres**	**5,191**	**87.19**	**921.34**	**235,510.78**	**13,561.43**	**3,883.14**	**1,499,582.94**	**3,138,975.76**	**1,022,992.20**

*Includes above and near drainage underground mines — seams containing near drainage underground mines > 500 acres in area are highlighted and major seams are in boldface

Table 3

POTENTIALLY TOTALLY AND PARTIALLY FLOODED MINES BY DRAINAGE POSITION AND MINE FOOTPRINT AREA													
Group/Formation	Seam	Mines above drainage				Mines near drainage				Mines below drainage			
		Mine footprint <500 acres		Mine footprint >500 acres		Mine footprint <500 acres		Mine footprint >500 acres		Mine footprint <500 acres		Mine footprint >500 acres	
		Potentially totally flooded	Potentially partially flooded	Potentially totally flooded	Potentially partially flooded	Potentially totally flooded	Potentially partially flooded	Potentially totally flooded	Potentially partially flooded	Potentially totally flooded	Potentially partially flooded	Potentially totally flooded	Potentially partially flooded
Dunkard Group	Washington												
	Waynesburg A												
Monongahela Group	Waynesburg		4										
	Uniontown												
	Sewickley		**47**		**1**		**7**		**6**	**10**			
	Redstone		152		4		5			5			
	Pittsburgh		**451**		**36**	**1**	**46**	**1**	**31**	**22**		**22**	
Conemaugh Group	Elk Lick												
	Harlem												
	Bakerstown		**50**		**2**		**1**		**1**				
	Brush Creek												
	Mahoning												
Allegheny Formation	**Upper Freeport**		**179**		**13**		**3**		**7**	**2**		**1**	
	Lower Freeport		2										
	Upper Kittanning		1							1			
	Middle Kittanning		**10**				**3**		**3**	**3**		**2**	
	Lower Kittanning		5		1								
	No. 6 Block		16										
	Upper No. 5 Block		67		4								
	No. 5 Block		**329**		**12**		**11**		**1**				
	Little No. 5 Block		10		1								
Kanawha Formation	Stockton Rider		2										
	Stockton		**119**		**13**		**2**		**1**				
	Stockton lower split 2		36		3								
	Coalburg		**232**		**33**	**1**	**7**		**2**			**1**	
	Coalburg lower split 1		5										
	Little Coalburg		1		1								
	Upper Winifrede		1										
	Winifrede		213		29		2						
	Lower Winifrede		9										
	Chilton A		15		3								
	Chilton		22		4								
	Little Chilton	1	24		7								
	Fire Clay		82		14								
	Fire Clay lower split 1		8		2								
	Cedar Grove		92		15								
	Williamson		65		9								
	Peerless	**3**	**173**		**29**	**3**	**8**		**1**	**2**		**3**	
	No. 2 Gas	**3**	**365**		**59**	**1**	**13**	**2**	**23**	**7**		**8**	
	No. 2 Gas lower split 2		10										
	Powellton		**245**		**16**		**4**	**1**	**2**			**6**	
	Lower Powellton	**1**	**92**		**6**		**3**		**2**			**2**	
	Eagle A		15		2								
	Eagle	**3**	**290**	**1**	**32**	**3**	**26**	**2**	**15**	**5**		**11**	
	Eagle lower split 1	2	15		3								
	Little Eagle	1	43		1					1			
	Middle War Eagle		11										
	Bens Creek		8		1								
	Lower War Eagle		1										
	Glenalum Tunnel		1		1								
	Gilbert												
	Douglas												
New River Formation	Bradshaw												
	Iaeger												
	Castle												
	Sewell B		3										
	Sewell A		3										
	Sewell		**213**		**27**	**1**	**15**		**13**	**4**		**12**	
	Welch												
	Little Raleigh												
	Beckley		**74**		**3**		**6**		**4**	**1**		**5**	
	Beckley lower split 1												
	Fire Creek		212		12					1			
	Little Fire Creek		25										
	Pocahontas No. 9		28		1								
Pocahontas Formation	Pocahontas No. 7		12										
	Pocahontas No. 6 upper split 1		23				1						
	Pocahontas No. 6	**2**	**104**		**8**		**8**		**8**	**3**		**1**	
	Pocahontas No. 5		11		4								
	Pocahontas No. 4		**28**		**3**		**5**		**4**	**1**		**6**	
	Pocahontas No. 3		**119**		**59**		**11**		**22**	**1**		**12**	
	Pocahontas No. 2		**6**						**1**				
	Squire Jim		4										
Total	**All seams**	**16**	**4,383**	**1**	**474**	**10**	**187**	**6**	**147**	**69**	**0**	**92**	**0**

Table 4

POTENTIAL EXTENT OF PARTIAL FLOODING IN ABOVE DRAINAGE MINES <500 ACRES IN AREA									
Group/Formation	Seam	Mines above drainage				Potential extent of partial flooding			
		Mine footprint <500 acres							
			Potentially partially flooded			Small	Medium	Large	Very large
Dunkard Group	Washington								
	Waynesburg A								
Monongahela Group	Waynesburg		4			4			
	Uniontown								
	Sewickley		47			41	4	2	
	Redstone		152			146	6		
	Pittsburgh		451			432	15	3	1
Conemaugh Group	Elk Lick								
	Harlem								
	Bakerstown		50			43	5	1	1
	Brush Creek								
	Mahoning								
Allegheny Formation	Upper Freeport		179			154	23	1	1
	Lower Freeport		2			1	1		
	Upper Kittanning		1				1		
	Middle Kittanning		10			10			
	Lower Kittanning		5			5			
	No. 6 Block		16			14	2		
	Upper No. 5 Block		67			63	4		
	No. 5 Block		329			285	42	2	
	Little No. 5 Block		10			8	2		
Kanawha Formation	Stockton Rider		2			1	1		
	Stockton		119			87	29	3	
	Stockton lower split 2		36			26	10		
	Coalburg		232			204	22	6	
	Coalburg lower split 1		5			5			
	Little Coalburg		1				1		
	Upper Winifrede		1			1			
	Winifrede		213			197	16		
	Lower Winifrede		9			8	1		
	Chilton A		15			2	12	1	
	Chilton		22			8	14		
	Little Chilton		24			10	13	1	
	Fire Clay		82			51	31		
	Fire Clay lower split 1		8			5	3		
	Cedar Grove		92			71	21		
	Williamson		65			34	27	3	1
	Peerless		173			153	18	2	
	No. 2 Gas		365			324	38	3	
	No. 2 Gas lower split 2		10			9	1		
	Powellton		245			228	17		
	Lower Powellton		92			80	12		
	Eagle A		15			15			
	Eagle		290			279	9	2	
	Eagle Lower Split 1		15			4	11		
	Little Eagle		43			32	11		
	Middle War Eagle		11			4	7		
	Bens Creek		8			8			
	Lower War Eagle		1				1		
	Glenalum Tunnel		1				1		
	Gilbert								
	Douglas								
New River Formation	Bradshaw								
	Iaeger								
	Castle								
	Sewell B		3			1	2		
	Sewell A		3			1	2		
	Sewell		213			205	7	1	
	Welch								
	Little Raleigh								
	Beckley		74			68	5	1	
	Beckley lower split 1								
	Fire Creek		212			166	43	3	
	Little Fire Creek		25			22	3		
	Pocahontas No. 9		28			25	2	1	
Pocahontas Formation	Pocahontas No. 7		12			5	7		
	Pocahontas No. 6 upper split 1		23			23			
	Pocahontas No. 6		104			100	4		
	Pocahontas No. 5		11			9	2		
	Pocahontas No. 4		28			28			
	Pocahontas No. 3		119			118	1		
	Pocahontas No. 2		6			6			
	Squire Jim		4			1	3		
Total	All seams		4,383			3,830	513	36	4

Table 5

POTENTIAL EXTENT OF PARTIAL FLOODING IN ABOVE DRAINAGE MINES >500 ACRES IN AREA									
Group/Formation	Seam	Mines above drainage				Potential extent of partial flooding			
				Mine footprint >500 acres					
					Potentially partially flooded	Small	Medium	Large	Very large
Dunkard Group	Washington								
	Waynesburg A								
Monongahela Group	Waynesburg								
	Uniontown								
	Sewickley				**1**				**1**
	Redstone				4	3		1	
	Pittsburgh				**36**	**29**	**6**		**1**
Conemaugh Group	Elk Lick								
	Harlem								
	Bakerstown				**2**	**1**	**1**		
	Brush Creek								
	Mahoning								
Allegheny Formation	**Upper Freeport**				**13**	**3**	**2**	**5**	**3**
	Lower Freeport								
	Upper Kittanning								
	Middle Kittanning								
	Lower Kittanning				1			1	
	No. 6 Block								
	Upper No. 5 Block				4	3	1		
	No. 5 Block				**12**	**6**	**1**	**5**	
	Little No. 5 Block				1		1		
Kanawha Formation	Stockton Rider								
	Stockton				**13**	**2**	**4**	**7**	
	Stockton lower split 2				3		2	1	
	Coalburg				**33**	**7**	**11**	**13**	**2**
	Coalburg lower split 1								
	Little Coalburg				1		1		
	Upper Winifrede								
	Winifrede				29	6	13	9	1
	Lower Winifrede								
	Chilton A				3			3	
	Chilton				4		4		
	Little Chilton				7	2	2	3	
	Fire Clay				14	4	8	2	
	Fire Clay lower split 1				2		1	1	
	Cedar Grove				15	7	4	3	1
	Williamson				9	1	3	4	1
	Peerless				**29**	**9**	**6**	**11**	**3**
	No. 2 Gas				**59**	**26**	**10**	**15**	**8**
	No. 2 Gas lower split 2								
	Powellton				**16**	**10**	**4**	**2**	
	Lower Powellton				**6**	**5**	**1**		
	Eagle A				2	2			
	Eagle				**32**	**17**	**6**	**6**	**3**
	Eagle Lower Split 1				3	1	2		
	Little Eagle				1	1			
	Middle War Eagle								
	Bens Creek				1		1		
	Lower War Eagle								
	Glenalum Tunnel				1		1		
	Gilbert								
	Douglas								
New River Formation	Bradshaw								
	Iaeger								
	Castle								
	Sewell B								
	Sewell A								
	Sewell				**27**	**12**	**4**	**11**	
	Welch								
	Little Raleigh								
	Beckley				**3**	**2**		**1**	
	Beckley lower split 1								
	Fire Creek				12	6	5	1	
	Little Fire Creek								
	Pocahontas No. 9				1	1			
Pocahontas Formation	Pocahontas No. 7								
	Pocahontas No. 6 upper split 1								
	Pocahontas No. 6				**8**	**5**	**1**	**2**	
	Pocahontas No. 5				4		2	1	1
	Pocahontas No. 4				**3**		**1**	**1**	**1**
	Pocahontas No. 3				**59**	**30**	**18**	**7**	**4**
	Pocahontas No. 2								
	Squire Jim								
Total	**All seams**				**474**	**201**	**127**	**116**	**30**

Table 6

POTENTIAL EXTENT OF PARTIAL FLOODING IN NEAR DRAINAGE MINES <500 ACRES IN AREA									
Group/Formation	Seam	Mines near drainage				Potential extent of partial flooding			
		Mine footprint <500 acres							
			Potentially partially flooded			Small	Medium	Large	Very large
Dunkard Group	Washington								
	Waynesburg A								
Monongahela Group	Waynesburg								
	Uniontown								
	Sewickley		**7**			**5**	**2**		
	Redstone		5			1	2	2	
	Pittsburgh		**46**			**26**	**16**	**2**	**2**
Conemaugh Group	Elk Lick								
	Harlem								
	Bakerstown		**1**					**1**	
	Brush Creek								
	Mahoning								
Allegheny Formation	**Upper Freeport**		**3**			**1**	**1**	**1**	
	Lower Freeport								
	Upper Kittanning								
	Middle Kittanning		**3**			**3**			
	Lower Kittanning								
	No. 6 Block								
	Upper No. 5 Block								
	No. 5 Block		**11**			**10**	**1**		
	Little No. 5 Block								
Kanawha Formation	Stockton Rider								
	Stockton		**2**				**2**		
	Stockton lower split 2								
	Coalburg		**7**			**5**		**2**	
	Coalburg lower split 1								
	Little Coalburg								
	Upper Winifrede								
	Winifrede		2				2		
	Lower Winifrede								
	Chilton A								
	Chilton								
	Little Chilton								
	Fire Clay								
	Fire Clay lower split 1								
	Cedar Grove								
	Williamson								
	Peerless		**8**			**4**	**4**		
	No. 2 Gas		**13**			**8**	**4**	**1**	
	No. 2 Gas lower split 2								
	Powellton		**4**			**3**	**1**		
	Lower Powellton		**3**				**3**		
	Eagle A								
	Eagle		**26**			**22**	**3**	**1**	
	Eagle lower split 1								
	Little Eagle								
	Middle War Eagle								
	Bens Creek								
	Lower War Eagle								
	Glenalum Tunnel								
	Gilbert								
	Douglas								
New River Formation	Bradshaw								
	Iaeger								
	Castle								
	Sewell B								
	Sewell A								
	Sewell		**15**			**14**	**1**		
	Welch								
	Little Raleigh								
	Beckley		**6**			**4**	**1**	**1**	
	Beckley lower split 1								
	Fire Creek								
	Little Fire Creek								
	Pocahontas No. 9								
Pocahontas Formation	Pocahontas No. 7								
	Pocahontas No. 6 upper split 1		1				1		
	Pocahontas No. 6		**8**			**7**	**1**		
	Pocahontas No. 5								
	Pocahontas No. 4		**5**			**2**	**2**	**1**	
	Pocahontas No. 3		**11**			**5**	**5**	**1**	
	Pocahontas No. 2								
	Squire Jim								
Total	**All seams**		**187**			**120**	**52**	**13**	**2**

Table 7

POTENTIAL EXTENT OF PARTIAL FLOODING IN NEAR DRAINAGE MINES >500 ACRES IN AREA										
Group/Formation	Seam	Mines near drainage				Potential extent of partial flooding				
					Mine footprint >500 acres					
					Potentially partially flooded	Small	Medium	Large	Very large
Dunkard Group	Washington								
	Waynesburg A								
Monongahela Group	Waynesburg								
	Uniontown								
	Sewickley				6				6
	Redstone								
	Pittsburgh				31	1	2	2	26
Conemaugh Group	Elk Lick								
	Harlem								
	Bakerstown				1				1
	Brush Creek								
	Mahoning								
Allegheny Formation	**Upper Freeport**				7				7
	Lower Freeport								
	Upper Kittanning								
	Middle Kittanning				3			2	1
	Lower Kittanning								
	No. 6 Block								
	Upper No. 5 Block								
	No. 5 Block				1			1	
	Little No. 5 Block								
Kanawha Formation	Stockton Rider								
	Stockton				1			1	
	Stockton lower split 2								
	Coalburg				2			2	
	Coalburg lower split 1								
	Little Coalburg								
	Upper Winifrede								
	Winifrede								
	Lower Winifrede								
	Chilton A								
	Chilton								
	Little Chilton								
	Fire Clay								
	Fire Clay lower split 1								
	Cedar Grove								
	Williamson								
	Peerless				1				1
	No. 2 Gas				23		3	6	14
	No. 2 Gas lower split 2								
	Powellton				2			1	1
	Lower Powellton				2			1	1
	Eagle A								
	Eagle				15	1	1	8	5
	Eagle lower split 1								
	Little Eagle								
	Middle War Eagle								
	Bens Creek								
	Lower War Eagle								
	Glenalum Tunnel								
	Gilbert								
	Douglas								
New River Formation	Bradshaw								
	Iaeger								
	Castle								
	Sewell B								
	Sewell A								
	Sewell				13		1	12	
	Welch								
	Little Raleigh								
	Beckley				4	1		3	
	Beckley lower split 1								
	Fire Creek								
	Little Fire Creek								
	Pocahontas No. 9								
Pocahontas Formation	Pocahontas No. 7								
	Pocahontas No. 6 upper split 1								
	Pocahontas No. 6				8	2	1	1	4
	Pocahontas No. 5								
	Pocahontas No. 4				4			1	3
	Pocahontas No. 3				22	1	3	3	15
	Pocahontas No. 2				1			1	
	Squire Jim								
Total	**All seams**				**147**	**6**	**11**	**45**	**85**

MINE POOL ATLAS

APPENDIX A

Test Results of Mining Above/Below Drainage GIS Models

The Sewell coal bed was selected to assess the Mining Above/Below Drainage GIS models because it has been extensively mined by underground methods in southern West Virginia as shown in Figure 8. Coal and mining information for the Sewell seam including mine polygons, coal cropline, structure contour of the base of this coal, and scanned images of mine maps (WVGES, 2011) were visually examined to establish which areas have adequate data available to determine the position of each mine relative to major drainage (above, near, or below) and to determine the potential for each mine to be partially or totally filled with groundwater. Of the 884 documented mines in this seam, 472 are located in areas in which cropline, structure contour, and seam elevation raster data are available to provide input to the models.

Visual structure contour/cropline examination of underground mines indicates 431 mines are above drainage, 24 are near drainage, and 17 are below drainage. Nineteen of the near drainage mines and 250 of the above drainage mines are potentially partially flooded. Three of the near drainage mines and all 17 below drainage mines are potentially totally flooded. The potentially totally flooded mines have footprints that range in area from 1.7 to 4,587.4 acres and jointly occupy approximately 33,361 acres.

The effectiveness of the Mining Above/Below Drainage GIS models was tested by comparing the results of the visual structure contour/cropline examination of underground mines to the GIS model output for 472 mines in the Sewell coal seam located in Nicholas, Fayette, Greenbrier, Raleigh, and northeastern Wyoming counties. The results are shown in Table A-1.

The comparison of visual structure contour/cropline examination to Mining Above/Below Drainage GIS models shows the structure contour/cropline examination is the most effective method of identifying areas and potential extents of flooding in mines. The perennial drainage model is a fairly good predictive tool, but it is most effective in identifying potential flooding below drainage. The major drainage model proved ineffective in predicting potential mine flooding.

Mine position relative to drainage/extent of probable groundwater flooding		Method		
		Structure contour/cropline examination	Perennial drainage model	Major drainage model
Mines above drainage	not flooded	181	265	428
	partially flooded	250	118	2
	flooded	0	48	1
Mines near drainage	not flooded	2	0	23
	partially flooded	19	15	1
	flooded	3	9	0
Mines below drainage	not flooded	0	0	12
	partially flooded	0	0	4
	flooded	17	17	1
Total mines		472	472	472

Table A-1. Comparison of structure contour/cropline examination to the major and perennial Mining Above/Below Drainage GIS models for determining mine position with respect to drainage and extent of probable groundwater flooding for underground mines in the Sewell coal seam. Note that Table 1 only includes mines that are potentially partially or totally flooded.

MINE POOL ATLAS

Potential Totally Flooded
Underground Mines > 500 Acres In Area

APPENDIX B

APPENDIX B

POTENTIALLY TOTALLY FLOODED UNDERGROUND MINES >500 ACRES IN AREA

Seam name	Mine ID	Mine name	Company name	State permit number	Average coal bed thickness (inches)	Footprint (acres)	Storage (MMGal)	Drainage position
Pittsburgh	383386C	UNKNOWN	UNKNOWN		56.00	979.21	749.28	below
Pittsburgh	316947A	PANAMA OR BEN FRANKLIN	MOUNDSVILLE COAL		74.00	799.54	807.94	below
Pittsburgh	365156A	PARRS RUN	MINERAL STATE COAL		61.00	1,085.25	910.36	below
Pittsburgh	500416A	FAIRFAX NO 3	FAIRFAX MINING CO	U-1007-96A	77.00	965.21	1,015.34	below
Pittsburgh	905096A	Glendale Mine	Glendale Gas Coal Co.		62.00	1,216.95	1,038.53	below
Pittsburgh	907140A	MINE NO. 42	INDUSTRIAL COLLERIES CORP.		87.00	2,213.91	2,636.72	below
Pittsburgh	500411A	BLACKSVILLE NO 2	CONSOL ENERGY	D-0057-44	84.00	2,414.64	2,751.51	below
Pittsburgh	905094A	Hitchman Mine	Hitchman Coal & Coke Co.		64.04	3,902.76	3,393.35	below
Pittsburgh	364456B	BETHLEHEM MINES NO 8	BETHLEHEM MINES		92.65	3,199.34	4,024.71	below
Pittsburgh	321771A	ALEXANDER	VALLEY CAMP COAL		60.38	7,081.10	5,805.29	below
Pittsburgh	364456A	BETHLEHEM MINES NO 41	BETHLEHEM MINES		96.53	6,042.50	7,919.23	below
Pittsburgh	365598A	JOANNE	EASTERN ASSOCIATED COAL		95.67	6,280.02	8,157.13	below
Pittsburgh	367093A	BETHLEHEM MINES NO 44	BETHLEHEM MINES		84.27	7,166.28	8,199.61	below
Pittsburgh	350404A	CONSOL NO 9	MOUNTAINEER COAL		94.02	7,413.22	9,463.36	below
Pittsburgh	367947A	CONSOL NO 20	CONSOLIDATION COAL		91.75	8,327.84	10,373.64	below
Pittsburgh	323223A	IRELAND	CONSOLIDATION COAL		67.27	13,378.59	12,220.09	below
Pittsburgh	500313A	SHOEMAKER MINE	CONSOL ENERGY	D-0047-91	64.18	14,828.95	12,920.45	below
Pittsburgh	500315A	MCELROY MINE	MCELROY COAL CO	U-0033-83	68.28	19,922.22	18,468.88	below
Pittsburgh	366953A	FEDERAL NO 1	EASTERN ASSOCIATED COAL		92.50	15,041.53	18,890.25	below
Pittsburgh	500415A	FEDERAL NO 2 MINE	EASTERN ASSOCIATED	D-0045-63	91.82	16,327.45	20,354.64	below
Pittsburgh	500646A	ROBINSON RUN NO 95	CONSOL ENERGY	D0047-86S	90.20	17,886.28	21,903.73	below
Pittsburgh	500412A	LOVERIDGE MINE	CONSOL ENERGY	D-0004-03	98.42	20,204.27	26,999.26	below
Pittsburgh	324535A	O DONNELL NO 2	ROCHESTER & PITTSBURGH COAL		78.00	1,126.20	1,199.16	near
Upper Freeport	906659B	WHITETAIL MINE	COASTAL COAL		49.00	1,592.89	1,062.96	below
Middle Kittanning	500408B	SENTINEL MKT	WOLF RUN MINING CO	U-0015-83D	51.00	4,755.03	3,302.97	below
Middle Kittanning	906659A	WHITETAIL KITTANNING MINE	KINGWOOD MINING COMPANY	U-1007-98A	74.50	4,287.69	4,338.41	below
Coalburg	500497A	CAMP CREEK NO 1	ROCKSPRING DEVELOPMENT	U-0025-84	66.57	8,603.08	7,776.24	below
Peerless	381080A	DAY MINING NO 1	DAY MINING		32.61	591.56	261.32	below
Peerless	385343A	APPALACHIAN EAGLE NO 1	APPALACHIAN EAGLE INC	UO-391	23.00	1,484.80	478.62	below
Peerless	906279C	Unknown	Turner Coal Co.		49.00	724.74	491.82	below
No. 2 Gas	326168A	CEDAR GROVE	ZAPATA COAL		42.08	508.98	290.86	below
No. 2 Gas	340059A	DANA SLOPE	AMHERST COAL		56.00	561.12	431.37	below
No. 2 Gas	903492F	Unknown	Massey		45.00	1,291.75	795.39	below
No. 2 Gas	353774B	Mine No. 17	Red Jacket		76.00	1,057.02	1,092.60	below
No. 2 Gas	321933A	HATFIELD CAMPBELL CREEK	HATFIELD CAMPBELL CREEK COAL		40.00	2,229.65	1,238.13	below
No. 2 Gas	363196B	WP NO 5	W P COAL		74.00	2,172.91	2,190.15	below
No. 2 Gas	323252A	HAMPTON NO 4	WESTMORELAND COAL		68.00	2,387.19	2,221.32	below
No. 2 Gas	353774A	NATIONAL COAL MINING NO 25	NATIONAL COAL MINING	1070	68.77	6,268.92	5,854.29	below
No. 2 Gas	363123R	Mine No. 23	Island Creek Coal Co.		57.00	958.94	750.42	near
No. 2 Gas	363123H	Mine No. 8	Island Creek Coal Co.		49.00	1,592.96	1,076.31	near
Powellton	376511A	CRYSTAL RIVERS NO 1	CRYSTAL RIVERS COAL		46.00	706.86	445.46	below
Powellton	500442A	LONG BRANCH NO 18 POW	LONG BRANCH ENERGY	U-14382	53.00	717.06	519.64	below
Powellton	500441A	RIVERS EDGE NO 1	RIVERS EDGE MINING	U-5027-00	54.00	1,820.31	1,340.30	below
Powellton	500489A	MOUNTAINEER II MINE	MINGO LOGAN COAL CO	U-5031-97-A	63.00	2,040.75	1,765.69	below
Powellton	500481A	DAKOTA NO 2	DAY LLC	U-5032-96A-B	55.00	3,633.60	2,762.40	below
Powellton	500443A	LONG BRANCH NO 25	LONG BRANCH ENERGY	U-1500-82	69.00	3,129.87	2,945.62	below
Powellton	500153A	ARACOMA ALMA NO 1	ARACOMA COAL	U-5006-99	51.00	2,626.71	1,839.83	near
Lower Powellton	379413A	JADE ENERGY NO 2	JADE ENERGY		29.84	662.74	268.54	below
Lower Powellton	500651B	UNKNOWN	UNKNOWN		41.00	1,695.89	965.31	below
Eagle	307334A	ISLAND CREEK NO 28	ISLAND CREEK COAL		48.00	4,397.68	2,910.36	above
Eagle	953597A	Jerry Fork Eagle Mine	Alex Energy Inc	U-3007-98	33.31	569.03	257.20	below
Eagle	362958C	MELVILLE	HUTCHINSON COAL		46.00	1,210.73	760.19	below
Eagle	364989A	KANAWHA MINES NO 8	CANNELTON INDUSTRIES	5043	43.00	1,536.90	898.83	below
Eagle	906195B	Dehue Mine	Elkay Mining Company		52.00	1,455.50	1,046.87	below
Eagle	500478A	FORK CREEK NO 1	COAL RIVER MINING INC	U-5022-98B	50.00	1,830.32	1,260.08	below
Eagle	385291A	EAGLE ENERGY NO 1	EAGLE ENERGY	U-34-83-C	60.00	1,821.13	1,505.25	below
Eagle	500428A	BRODY NO 1	BRODY MINING	U-5013-04	61.00	1,847.60	1,541.70	below
Eagle	362958A	MCBETH	HUTCHINSON COAL		52.00	2,591.63	1,841.17	below
Eagle	500469A	EAGLE MINE	NEWTOWN ENERGY	U-0179-83-AA	48.00	3,271.62	2,140.03	below
Eagle	330156A	DEHUE	YOUNGSTOWN MINES CORP		62.00	3,871.40	3,301.63	below
Eagle	500459A	SPEED MINING INC	AMERICAN EAGLE MINE	U-0391	50.00	4,857.58	3,353.33	below
Eagle	385278A	HUTCHINSON BRANCH NO 1	TERRY EAGLE COAL	U-3002-90	37.00	1,390.30	708.44	near
Eagle	907613A	Mine No.1	Sycamore Fuels, Inc.	D-39-81	39.00	1,935.34	1,050.08	near
Sewell	368132A	PRICE HILL	PRICE HILL COLLIERY		37.00	1,048.02	540.36	below
Sewell	500383A	SEWELL	MOUNTAIN EDGE MINING, INC.	EM-88	38.00	1,380.26	728.68	below
Sewell	374050A	SEWELL NO 1-A	SEWELL COAL		56.00	1,227.75	934.69	below
Sewell	365845A	SCARBRO	UNKNOWN		51.00	1,380.22	966.02	below
Sewell	368088A	WHIPPLE MINE WORKINGS	NEW RIVER		46.00	2,193.67	1,380.03	below
Sewell	324430A	SUN	NEW RIVER COAL		57.00	2,139.05	1,679.99	below
Sewell	953225A	MEADOW RIVER NO 1	MEADOW RIVER COAL	D-11249	39.00	3,232.26	1,722.63	below
Sewell	336829A	SUMMERLEE	UNKNOWN		37.00	3,794.41	1,928.35	below
Sewell	336829B	LOCHGELLY	UNKNOWN		41.00	3,692.27	2,103.67	below
Sewell	355382A	ECCLES NO 6	WESTMORELAND COAL		44.00	4,056.84	2,477.32	below
Sewell	336829AC	CRANBERRY	NEW RIVER CO		43.00	4,271.55	2,494.79	below
Sewell	334858A	OAKWOOD	NEW RIVER CO		45.00	4,587.45	2,817.88	below
Beckley	376885A	HANSFORD SMOKELESS NO 4	HANSFORD SMOKELESS COLLIERIES		49.00	1,589.31	1,076.81	below
Beckley	907761A	BAYBECK MINE NO. 1	TEDDY COAL CO., INC.	U-19-84F-B	67.00	1,238.17	1,135.94	below
Beckley	953405A	BECKLEY	PICKANDS MATHER & CO		69.00	3,202.99	3,043.20	below
Beckley	953436A	ECCLES N0 5	WESTMORELAND COAL		70.75	3,640.92	3,497.34	below
Beckley	953169A	MAPLE MEADOW	MAPLE MEADOW MINING	8252	66.67	4,133.41	3,741.66	below
Pocahontas No. 6	322759B	LILLYBROOK COAL	LILLYBROOK COAL		31.00	2,186.21	938.83	below
Pocahontas No. 4	904611J	Unknown Mine J	Unknown		28.50	523.63	202.51	below
Pocahontas No. 4	314264A	SHANNON BRANCH COLLIERY	ALLIED CHEMICAL		48.00	596.93	390.46	below
Pocahontas No. 4	906309A	POCA NO. 4	SEMET-SOLVAY DIVISION ALLIED CHEMICAL AND DYE CORP		32.00	1,330.92	594.48	below
Pocahontas No. 4	323003A	OLGA MINES AND DD HOLES	OLGA COAL		46.00	2,247.93	1,421.45	below
Pocahontas No. 4	323003C	OLGA MINES AND DD HOLES	OLGA COAL		63.00	2,168.41	1,869.89	below
Pocahontas No. 4	328855A	CARTER MINES - DRILL HOLES	CARTER COAL		67.47	14,555.01	13,333.19	below

POTENTIALLY TOTALLY FLOODED UNDERGROUND MINES >500 ACRES IN AREA

Seam name	Mine ID	Mine name	Company name	State permit number	Average coal bed thickness (inches)	Footprint (acres)	Storage (MMGal)	Drainage position
Pocahontas No. 3	365493A	NATIONAL POCAHONTAS	NATIONAL MINES CORP		40.00	636.46	345.80	below
Pocahontas No. 3	500461A	JOSEPHINE NO 3	POCAHONTAS COAL CO	U-3036-92F	35.00	930.13	448.18	below
Pocahontas No. 3	362955A	KEYSTONE NO 4	EASTERN ASSOCIATED COAL		40.00	824.50	454.66	below
Pocahontas No. 3	500528A	CUCUMBER MINE	BROOKS RUN MINING CO LLC	U-4001-01	52.00	731.50	521.71	below
Pocahontas No. 3	385847A	KEYSTONE NO 5	AFFINITY MINING	7071	41.00	1,247.45	710.99	below
Pocahontas No. 3	365820A	MAITLAND NO 3 SEAM	CONSOLIDATION COAL	5047	66.00	802.82	721.89	below
Pocahontas No. 3	362950A	SLAB FORK NO 10	SLAB FORK COAL		40.00	1,520.85	838.01	below
Pocahontas No. 3	904126A	Unknown	Kingston Pocahontas Coal Co.		57.00	1,771.93	1,390.45	below
Pocahontas No. 3	323266A	HELEN NO 9	EASTERN GAS & FUEL		41.00	3,154.06	1,763.80	below
Pocahontas No. 3	353606A	POCAHONTAS NO 3	CANNELTON INDUSTRIES		67.00	3,286.68	3,010.49	below
Pocahontas No. 3	355397A	SHANNON BRANCH	VERA MINING	10588	59.64	7,268.44	5,883.52	below
Pocahontas No. 3	500536A	PINNACLE MINE	PINNACLE MINING CO LLC	U-0204-83A	54.79	21,361.85	15,888.68	below

MINE POOL ATLAS

Potential Partially Flooded Underground Mines > 500 Acres In Area

APPENDIX C

APPENDIX C

POTENTIALLY PARTIALLY FLOODED UNDERGROUND MINES >500 ACRES IN AREA									
Seam name	Mine ID	Mine name	Company name	State permit number	Average coal bed thickness (inches)	Footprint (acres)	Storage (MMGal)	Drainage position	Extent of partial flooding
Sewickley	905305A	Mine No. 2	Ron Coal Co. Inc.		48.00	668.82	440.87	above	very large
Sewickley	379530A	FLAGGY MEADOW	MOHIGAN MINING		72.00	806.92	794.27	near	very large
Sewickley	500414A	PRIME NO 1	DANA MINING CO	U-0002-51A	59.00	1,665.94	1,338.60	near	very large
Sewickley	905282A	Mine No. 2	Pursglove Coal Mining Co.		60.00	1,981.32	1,627.82	near	very large
Sewickley	362831A	CHRISTOPHER NO 5	PITTSWICK COALS		74.00	1,675.78	1,702.49	near	very large
Sewickley	365167A	PARKER RUN	CONTINENTAL COAL		75.00	2,227.24	2,270.26	near	very large
Sewickley	365168A	OSAGE	OSAGE COAL		67.90	12,846.57	11,843.68	near	very large
Redstone	902848A	Jesse's Run Mine No. 2	Roblee Coal Company	U-1001-91	62.00	511.70	430.95	above	small
Redstone	904889A	Scott Mine No. 4	Reppert Fairmont Coal Co.		46.00	1,469.39	927.57	above	large
Redstone	382346A	RAUER NO 108	RAUER COAL	U-117-83	63.00	2,034.66	1,741.58	above	small
Redstone	304819A	CENTURY NO 101	BETHLEHEM MINES		51.00	4,598.10	3,205.42	above	small
Pittsburgh	953159N	LABELLE NO 4	UNKNOWN	NDE	30.38	530.62	218.79	above	small
Pittsburgh	953158G	LABELLE NO 4	UNKNOWN	NDE	45.00	507.24	312.21	above	small
Pittsburgh	304324A	CANYON COAL & COKE	CANYON COAL & COKE		40.00	624.73	339.60	above	very small
Pittsburgh	905194A	McClandish Mine	Hutchinson Coal Co.		50.00	575.95	391.29	above	very small
Pittsburgh	304313A	ROSEDALE	ROSEDALE COAL		66.00	507.33	504.69	above	medium
Pittsburgh	383008B	CONSOL NO 31	UNKNOWN		56.00	680.82	524.83	above	medium
Pittsburgh	905175A	Standard Mine	Richland Mining Co.		47.00	827.76	538.24	above	small
Pittsburgh	953158B	GILCHRIST (LABELLE NO 3)	UNKNOWN	NDE	49.00	826.90	560.77	above	very small
Pittsburgh	904942A	Mine No. 105 West	Bethlehem Mines Corp.		72.00	580.84	569.78	above	very small
Pittsburgh	953161D	EDGINGTON	UNKNOWN		59.00	720.56	578.42	above	small
Pittsburgh	903033A	No. 10	West Virginia Coal & Coke		61.00	771.32	645.37	above	very small
Pittsburgh	305166A	CONSOL NO 40 & 76	CONSOLIDATION COAL		88.00	545.37	655.24	above	small
Pittsburgh	905004A	Consolidation Nos. 76 & 40 Mines	Consolidation Coal Co.		93.00	526.87	671.28	above	small
Pittsburgh	905012A	Rosehill Mine	Rosehill Coal Company		72.00	696.54	684.94	above	small
Pittsburgh	953058A	BYRON	HUTCHINSON COAL		85.00	611.06	710.45	above	very small
Pittsburgh	305018A	FRANCIS	UNKNOWN		63.00	847.21	732.25	above	small
Pittsburgh	953146B	UNKNOWN	UNKNOWN		60.00	896.40	734.58	above	small
Pittsburgh	306881A	KINGMONT MINES	VIRGINIA & PITTSBURGH COAL & COKE		68.00	875.25	813.94	above	medium
Pittsburgh	953129A	COMPASS A	CLINCHFIELD COAL		96.00	665.28	868.42	above	small
Pittsburgh	904930A	Delmar No. 1 Mine	Waddell Fuel Co.		94.00	690.54	882.27	above	medium
Pittsburgh	303934A	RICHLAND	RICHLAND COAL		58.00	1,158.64	924.46	above	medium
Pittsburgh	905165A	Locust Grove Mine	West Virginia- Pittsburgh Coal Co		52.00	1,381.49	977.16	above	small
Pittsburgh	905033A	Glen Cambria Mine	Mt. Fuel Co.		91.00	826.24	1,026.45	above	very small
Pittsburgh	305163A	CONSOL NO 37	CONSOLIDATION COAL		98.00	825.00	1,101.69	above	small
Pittsburgh	383006D	CONSOL NO 23 & 54	CONSOLIDATION COAL		89.00	912.48	1,107.06	above	small
Pittsburgh	301417A	WENDEL NO 2	WENDEL COAL		75.00	1,155.95	1,188.83	above	medium
Pittsburgh	306601A	LAURA LEE	TABLAR FUEL		76.00	1,254.07	1,297.80	above	very small
Pittsburgh	905046A	Dawson Mine No. 3	Commercial Coal & Coke Co.		54.00	1,893.55	1,409.26	above	small
Pittsburgh	374229A	GALLOWAY NO 2	SIMPSON CREEK COLLIERIES		69.00	1,643.29	1,548.16	above	small
Pittsburgh	904967C	UNKNOWN	UNKNOWN		68.00	1,682.44	1,563.95	above	small
Pittsburgh	383644B	GALLOWAY NO 3	SIMPSON CREEK COLLIERIES		92.00	1,422.47	1,794.88	above	very small
Pittsburgh	904988A	Consolidation No 78 Mine	Consolidation Coal Co		96.00	1,647.00	2,167.53	above	small
Pittsburgh	376828A	CHIEFTON	UNKNOWN		83.00	2,196.04	2,476.78	above	very large
Pittsburgh	304267A	WHEELING VALLEY	WHEELING VALLEY COAL		59.00	3,935.43	3,162.62	above	small
Pittsburgh	904967A	Mine No. 32	Mountaineer Coal Co.		80.00	2,974.03	3,261.01	above	small
Pittsburgh	904996A	Consolidation No 25 Mine	Consolidation Coal Co		95.08	3,556.26	4,590.53	above	small
Pittsburgh	953161E	CARTER	UNKNOWN		49.00	661.25	444.84	near	small
Pittsburgh	383386D	UNKNOWN	UNKNOWN		60.00	564.50	459.99	near	very large
Pittsburgh	905089A	Benwood Mine	Wheeling Steel & Iron Co.		53.00	764.80	555.37	near	very large
Pittsburgh	904837A	National Mine	Christopher Fuel Corporation		84.00	505.39	582.45	near	very large
Pittsburgh	324032A	CONSOL NO 56	CONSOLIDATION COAL		69.00	781.28	738.83	near	large
Pittsburgh	355650A	RAYMOND CITY COAL & TRANS NO 4 & 5	RAYMOND CITY COAL & TRANS		57.00	1,232.90	961.52	near	very large
Pittsburgh	350295G	MAIDEN	KELLYS CREEK COLLIERY		73.00	986.13	981.77	near	very large
Pittsburgh	350295D	EMILY	MON RAIL & RIVER COAL		91.00	825.21	1,028.65	near	very large
Pittsburgh	353473M	WILLIAMS	UNKNOWN		87.00	943.63	1,120.48	near	very large
Pittsburgh	306727A	MORGAN NO 2	VIRGINIA & PITTSBURGH COAL & COKE		87.00	980.92	1,169.80	near	large
Pittsburgh	383006A	KATHERINE/ROBERT MINES	UNKNOWN		94.00	948.87	1,218.29	near	medium
Pittsburgh	902927B	ROBINSON RUN NO 2	CHRISTOPHER COAL CO		98.00	1,073.60	1,429.89	near	very large
Pittsburgh	500014D	VALLEY CAMP NO 5	VALLEY CAMP COAL		63.00	1,759.72	1,509.11	near	very large
Pittsburgh	905031A	No. 26	Consolidation Coal Co.		91.00	1,217.39	1,517.85	near	very large
Pittsburgh	305152A	CONSOL NO 24 & 73	CONSOLIDATION COAL		73.00	1,540.83	1,547.23	near	very large
Pittsburgh	905076A	Booth and Brady Mines	River Seam Coal Co.		99.00	1,653.70	2,240.20	near	very large
Pittsburgh	306747A	CONSOL NO 38	CONSOLIDATION COAL		89.00	1,948.06	2,364.30	near	very large
Pittsburgh	305150A	CONSOL NO 22 & 34	CONSOLIDATION COAL		87.00	2,083.12	2,486.38	near	medium
Pittsburgh	368831A	VALLEY CAMP NO 1	VALLEY CAMP COAL		58.00	4,047.85	3,241.36	near	very large
Pittsburgh	312861A	COMPASS NO 3	CLINCHFIELD COAL		92.98	2,776.72	3,505.38	near	very large
Pittsburgh	340692A	COMPASS NO 2	CLINCHFIELD COAL		88.41	3,435.14	4,124.00	near	very large
Pittsburgh	324367A	MOUNTAINEER COAL NO 43,63 & 92	MOUNTAINEER COAL		93.90	4,673.41	5,957.81	near	very large
Pittsburgh	353473B	WILLIAMS NO 98	CONSOLIDATION COAL		91.83	4,828.49	6,019.92	near	very large
Pittsburgh	902927A	Humphrey No. 7	Consolidation Coal Co.	U-119-83	101.63	699.88	6,141.86	near	very large
Pittsburgh	902927A	Humphrey No. 7	Consolidation Coal Co.	U-119-83	101.63	3,749.71	6,141.86	near	very large
Pittsburgh	902847A	Windsor Mine	Windsor Coal Company	EM-128	58.20	13,694.07	10,820.30	near	very large
Pittsburgh	953151A	VALLEY CAMP NO 3	VALLEY CAMP COAL	NDE	59.79	14,923.99	12,113.88	near	very large
Pittsburgh	379540A	PURSGLOVE NO 15	CONSOLIDATION COAL		97.01	9,899.77	13,040.06	near	very large
Pittsburgh	353745A	JORDAN NO 93	CONSOLIDATION COAL		89.00	13,266.72	15,979.00	near	very large
Pittsburgh	381843A	ARKWRIGHT NO 1	CONSOLIDATION COAL		94.14	13,529.27	17,293.13	near	very large
Pittsburgh	381841A	OSAGE NO 3	CONSOLIDATION COAL		94.94	14,448.27	18,622.68	near	very large
Bakerstown	383409A	DAVIS COAL & COKE NO 22	DAVIS COAL & COKE		56.00	503.66	389.03	above	small
Bakerstown	323068A	ALPINE	ISLAND CREEK COAL		42.00	1,952.97	1,114.66	above	medium
Bakerstown	905742A	Unknown	Unknown		70.00	1,639.48	1,561.52	near	very large
Upper Freeport	377482A	BIG JOE	PRESTON ENERGY		51.00	546.86	380.75	above	large
Upper Freeport	302171A	BURK	INDUSTRIAL COLLIERIES		59.00	608.13	489.60	above	large
Upper Freeport	953529A	AUSTEN MINE	UNKNOWN		55.00	736.91	556.06	above	very small
Upper Freeport	378610A	T & T NO 3	T & T FUELS		80.00	511.23	561.78	above	small
Upper Freeport	384216A	SQUIRES CREEK NO 1	SQUIRES CREEK COAL		66.00	874.25	793.48	above	very large
Upper Freeport	301884A	LOUIS	HOUCK-REIDLER BROTHERS COAL		65.00	896.71	799.02	above	very small
Upper Freeport	376516A	RUTHBELL COALS NO 1	RUTHBELL COALS		72.00	939.23	924.66	above	medium
Upper Freeport	302674A	TUNNELTON COOP COAL FIELD	TUNNELTON COOPERATIVE COAL		43.00	1,575.33	939.62	above	medium
Upper Freeport	377404A	LAUREL RUN MINING NO 1 PORTAL	LAUREL RUN MINING		84.00	1,147.43	1,316.05	above	very large
Upper Freeport	907174B	BANNER	UNKNOWN		81.00	1,292.36	1,433.23	above	large
Upper Freeport	500420A	METTIKI E MINE	METTIKI COAL LLC	U-0033-83, U-	93.00	1,168.53	1,488.60	above	large
Upper Freeport	905310A	Richard Mine	Bethlehem Mines Corp.		66.00	2,033.42	1,838.55	above	very large
Upper Freeport	302170A	MASONTOWN COAL FIELDS	INDUSTRIAL COLLIERIES		65.00	2,252.09	1,993.09	above	large
Upper Freeport	500249E	BIG JOE MINE	PRESTON ENERGY		51.00	683.26	473.86	near	very large
Upper Freeport	381415A	T & T ENERGY NO 1	T & T ENERGY		52.00	1,360.36	973.00	near	very large
Upper Freeport	331071C	IRONA NO 1	UNKNOWN		57.00	1,390.53	1,082.38	near	very large
Upper Freeport	382650A	FAIRFAX FUEL NO 1	FAIRFAX FUEL		87.00	949.88	1,124.96	near	very large
Upper Freeport	379511A	NORTH BRANCH	ISLAND CREEK COAL		94.75	3,491.47	4,492.16	near	very large
Upper Freeport	383043A	POTOMAC	ISLAND CREEK COAL		97.24	4,280.16	5,652.23	near	very large
Upper Freeport	905742A	Unknown	Unknown		84.30	7,005.07	8,018.54	near	very large

POTENTIALLY PARTIALLY FLOODED UNDERGROUND MINES >500 ACRES IN AREA

Seam name	Mine ID	Mine name	Company name	State permit number	Average coal bed thickness (inches)	Footprint (acres)	Storage (MMGal)	Drainage position	Extent of partial flooding
Middle Kittanning	365813A	BADGER NO 14	BADGER COAL		46.00	2,002.25	1,268.27	near	large
Middle Kittanning	323067F	BADGER NO 13	BADGER COAL		51.00	2,031.85	1,423.84	near	large
Middle Kittanning	953115A	TYGART VALLEY	EASTERN ASSOCIATED COAL	8507	58.98	6,191.64	4,957.99	near	very large
No. 5 Block	379496A	BARBARA LYNN NO 4	GOLD RIVER MINING		4.70	535.30	34.17	above	small
No. 5 Block	500486A	LAUREL CREEK NO 4	LAUREL CREEK COAL CO	U-5006-01	16.95	582.69	134.02	above	large
No. 5 Block	341179A	UNION CARBIDE NO 7	UNION CARBIDE		33.47	611.70	277.99	above	large
No. 5 Block	307819A	WARNER COLLIERIES NO 106	KANAWHA & HOCKING COAL & COKE		45.50	500.75	309.27	above	small
No. 5 Block	341332A	BLUE PENNANT NO 16	GLOGORA COAL		40.00	741.16	404.56	above	small
No. 5 Block	904455J	Hardback No 1 & 3	Unknown		22.00	1,605.45	485.77	above	small
No. 5 Block	376256A	HAMPTON NO 6	WESTMORELAND COAL		71.00	522.92	506.66	above	medium
No. 5 Block	318856A	MORRIS FORK NO 5 & 6	UNION CARBIDE		46.00	912.12	570.27	above	small
No. 5 Block	500427A	ARGUS NO 7	ARGUS MINING CO	U-5038-98	46.00	944.46	594.43	above	large
No. 5 Block	327089B	UNKNOWN	UNKNOWN		54.00	1,303.51	972.93	above	large
No. 5 Block	327089A	RICH RUN NORTH SIDE	ELK RIVER COAL & LUMBER		31.00	2,314.68	980.31	above	large
No. 5 Block	327050A	CAMPBELL CREEK	CAMPBELL CREEK COAL		41.00	2,420.30	1,370.22	above	small
No. 5 Block	500480A	TINY CREEK NO 2	COAL RIVER MINING LLC	U-5037-98B	59.00	657.28	534.11	near	large
Stockton	367242A	WYATT	WYATT COAL		39.00	1,162.04	620.43	above	small
Stockton	364342A	CHESTERFIELD NO 1	OMAR MINING	4857	50.00	953.42	650.75	above	large
Stockton	906676A	CAMPBELLS CREEK NO. 6	CATENARY COAL COMPANY	U-3036-93B	60.00	843.78	691.66	above	large
Stockton	500541A	BROOKS RUN NO 5	BROOKS RUN MINING CO	U-1026-91D	40.00	1,290.54	708.52	above	large
Stockton	354080A	WHITNEY AND MABLE MINES	PRINCESS SUSAN COAL		72.00	750.68	743.12	above	very small
Stockton	975025B	UNKNOWN	UNKNOWN		45.00	1,351.26	842.11	above	medium
Stockton	953181B	NO 6C & OLD MINE NO 2	UNKNOWN		89.00	845.98	1,027.15	above	medium
Stockton	906635A	CAMPBELLS CREEK NO.4	POINT MINING, INC.	U-3036-93A	92.00	1,251.88	1,564.34	above	large
Stockton	953181A	UNKNOWN	UNKNOWN		95.00	1,238.15	1,607.78	above	medium
Stockton	903990B	Boone East Development	Boone East Development Co.		72.00	1,641.19	1,618.98	above	large
Stockton	379525A	VALLEY CAMP NO 12A	VALLEY CAMP COAL		65.00	2,390.46	2,114.78	above	large
Stockton	500215A	SPARTAN NO 130	SPARTAN MINING DBA MAMMOTH	U-3042-91A	107.00	1,494.11	2,177.75	above	medium
Stockton	500216A	STOCKTON	SPARTAN MINING DBA MAMMOTH	U-3042-91A	77.46	4,100.05	4,311.89	above	large
Stockton	379505A	VALLEY CAMP NO 15A	VALLEY CAMP COAL		64.00	2,090.45	1,815.75	near	large
Coalburg	500210C	BROOKS RUN MINING NO 9A	BROOKS RUN MINING	U-2004-93A	14.41	714.86	139.81	above	large
Coalburg	953182B	UNKNOWN	UNKNOWN		21.29	520.53	150.54	above	small
Coalburg	369017A	VALLEY CAMP NO 36	VALLEY CAMP COAL		21.94	694.31	206.91	above	large
Coalburg	323160A	VALLEY CAMP NO 9C & 30	VALLEY CAMP COAL		31.35	616.95	262.38	above	medium
Coalburg	906665A	COALBURG NO.6	HOBET MINING, INC.	U-5088-86A	42.38	518.10	298.34	above	medium
Coalburg	379420A	LAUREL CREEK MINING NO 6	LAUREL CREEK MINING	9378	39.74	561.61	303.07	above	medium
Coalburg	355580A	JUNIOR FREEPORT	HOWARD COLLIERIES		37.00	736.42	374.73	above	medium
Coalburg	500207A	BROOKS RUN NO 10A	BROOKS RUN MINING	U-20014-00A	54.00	582.85	429.40	above	large
Coalburg	382389A	BLACK QUEEN	ELK RUN COAL	10840S	44.00	724.78	440.68	above	medium
Coalburg	365701B	COALBURG NO 1	CENTRAL APPALACHIAN COAL		40.00	818.95	455.52	above	medium
Coalburg	500590A	COALBURG MINE	KANAWHA EAGLE COAL	U-5003-02	32.00	1,049.22	458.33	above	large
Coalburg	338635C	NO 109A	UNKNOWN		51.00	684.24	477.70	above	small
Coalburg	906632A	MINE NO. 4A EAST	BROOKS RUN MINING CO., LLC	U0-516	64.00	548.21	483.60	above	very large
Coalburg	307818A	WARNER COLLIERIES NO 102	WARNER COLLIERIES		44.00	856.62	515.80	above	small
Coalburg	377461A	PAMMLID NO 5B	PAMMLID COAL	D-10768	74.00	532.68	539.82	above	large
Coalburg	382109A	LEXIE NO 8A	LEXIE COAL	D-10820	63.00	629.79	544.12	above	large
Coalburg	500445A	LAUREL CREEK COALBURG	SPARTAN MINING	U-5006-94	90.00	506.44	619.87	above	very small
Coalburg	384643A	RED OAK	COPPERAS COAL	U-5022-91	69.00	707.94	663.10	above	medium
Coalburg	500208B	ONEIDA NO 11	UNKNOWN	46-06043	68.00	754.60	705.94	above	medium
Coalburg	382044A	DIABLO NO 2 MINE	DIABLO COAL	U-5010-91C	94.00	553.50	709.09	above	large
Coalburg	500290V	Birch 2A	Fossil Fuels inc		56.00	1,014.01	780.20	above	large
Coalburg	500168A	BLACK KNIGHT II SOUTH	ELK RUN COAL	U-5009-94	86.00	682.53	806.24	above	medium
Coalburg	500020L	LEFT FORK NO 1	UNKNOWN	UO-239	68.00	868.27	810.10	above	large
Coalburg	906346F	Northern Marrowbone Creek	Marrowbone inc	U-5006-97	86.00	739.19	863.56	above	medium
Coalburg	953182A	VALLEY CAMP COAL	VALLEY CAMP COAL		28.00	2,367.51	917.87	above	small
Coalburg	906330A	MINE NO. 1	RAMA DEVELOPMENT CO., INC.	U-5015-99	139.00	528.30	1,002.20	above	very small
Coalburg	500020K	UNKNOWN	UNKNOWN	UNKNOWN	53.00	1,494.79	1,078.01	above	small
Coalburg	906345B	Mine No. 4A West	Brooks Run Mining Co., LLC	D-10767C	69.00	1,248.56	1,180.05	above	very large
Coalburg	500483A	EUROPA MINE	I.O. COAL CO	U-5024-99A-A	88.00	1,478.09	1,779.51	above	medium
Coalburg	500347A	LAUREL CREEK NO 1	LAUREL CREEK COAL CO INC	U-5072-92A	93.00	2,394.95	3,042.91	above	large
Coalburg	906666A	MINE NO.1	JACOB MINING CO., LLC	U-5785-AA-A	83.45	3,071.09	3,482.16	above	large
Coalburg	906346A	BIG BRANCH (AKA SPRUCE CREEK NO. 1)	EASTERN MINGO COAL CO.	U-5785-A	87.46	3,214.57	3,817.07	above	large
Coalburg	500438A	BIG MOUNTAIN NO 16	PINE RIDGE COAL CO	U-5053-91	85.69	4,074.99	4,742.91	above	large
Coalburg	382103A	KIAH CREEK NO 1	PEN COAL		62.00	542.46	457.51	near	large
Coalburg	384260A	PEN COAL NO 2	PEN COAL	U-5008-91	58.00	602.41	475.10	near	large
Winifrede	379546A	BETHLEHEM MINES NO 117	BETHLEHEM MINES		24.00	685.41	223.21	above	large
Winifrede	903084B	UNKNOWN	UNKNOWN		33.28	510.96	230.91	above	small
Winifrede	905497A	Mine No. 1	Webb Coal Mining Co.		22.00	952.67	288.89	above	medium
Winifrede	367085A	CARBON FUEL NO 31	UNKNOWN		40.00	532.05	291.31	above	medium
Winifrede	903421C	UNKNOWN	UNKNOWN		30.60	769.05	319.25	above	medium
Winifrede	316807A	DETROIT NO 2	DETROIT MINING	UNKNOWN	50.00	505.07	346.60	above	medium
Winifrede	366993A	BUFFALO NO 4	ZAPATA COAL		44.00	606.01	366.64	above	medium
Winifrede	903446A	Van Mine	Youghiogheny & Ohio Coal Co.		54.00	655.95	487.93	above	large
Winifrede	327113A	DETROIT NO 1	DETROIT MINING	UNKNOWN	55.00	673.93	504.59	above	medium
Winifrede	384033A	QUEEN	ELK RUN COAL	10836	64.00	607.65	531.35	above	large
Winifrede	377010A	BIG MOUNTAIN NO 8	UNKNOWN	UNKNOWN	67.00	611.47	557.04	above	medium
Winifrede	318894D	CARBON FUEL NO 5	UNKNOWN		51.00	845.49	591.48	above	small
Winifrede	500594A	UNKNOWN	UNKNOWN	U-5016-95	84.00	533.96	614.45	above	large
Winifrede	368064A	MONTCOAL NO 1	ROWLAND LAND		29.00	1,525.13	615.14	above	small
Winifrede	366349A	CHESAPEAKE & OHIO	CHESAPEAKE & OHIO		53.00	854.85	615.73	above	medium
Winifrede	500594B	JACKS BR	INDEPENDENCE COAL		87.00	559.71	662.85	above	large
Winifrede	377985A	HAR-MAT NO 2	HAR-MAT COAL	UO-665	65.00	812.50	727.08	above	large
Winifrede	316935B	VALLEY CAMP NO 9	VALLEY CAMP COAL		72.00	799.82	792.20	above	medium
Winifrede	307806A	VALLEY CAMP NO 2B	VALLEY CAMP COAL		48.00	1,312.43	871.55	above	large
Winifrede	367250A	WYATT	WYATT COAL		46.00	1,443.97	905.93	above	medium
Winifrede	321957A	ANCHOR NO 1 & 2	ANCHOR COAL		60.00	1,144.58	936.48	above	small
Winifrede	379546B	UNKNOWN	UNKNOWN		92.00	856.92	1,078.20	above	small
Winifrede	903084A	Mine No. 4	Central Appalachian Coal Co.		42.00	2,131.29	1,222.94	above	large
Winifrede	383152A	BISHOP	INDEPENDENCE COAL		60.00	2,102.84	1,727.54	above	very large
Winifrede	318937K	WEST MINE	UNKNOWN	UNKNOWN	48.00	3,234.51	2,135.26	above	large
Winifrede	902863A	MINE NO. 5	C & S MINING CORP.	EM-68	104.00	1,790.06	2,546.52	above	medium
Winifrede	368253A	VAN	BUNCH MINING	UNKNOWN	100.00	2,012.74	2,751.12	above	medium
Winifrede	316849A	ARMCO STEEL NO 8	ARMCO STEEL		50.00	4,324.20	2,984.42	above	small
Winifrede	903479A	Acme No. 1	Truax-Traer Coal Co.		35.00	6,254.69	3,050.33	above	medium
Peerless	307386A	X-CELLO NO 1	X-CELLO		33.77	588.91	270.12	above	small
Peerless	907501A	No. 32 Mine	Red Jacket Coal and Coke Co. Inc		38.28	592.15	307.84	above	small
Peerless	316845A	BEECH CREEK NO 1	AMES COAL		40.84	574.29	318.16	above	small
Peerless	363164C	PRINCESS COAL NO 3	UNKNOWN		31.59	747.51	320.50	above	large
Peerless	339167A	PRITCHARD D H	PRITCHARD D H CONTRACTOR		21.18	1,153.42	331.75	above	large
Peerless	372672A	OBE NO 2	OBE MINING		44.00	558.43	339.77	above	medium
Peerless	321865B	IMPERIAL COLLIERY NO 14	UNKNOWN		41.00	610.97	342.49	above	medium

POTENTIALLY PARTIALLY FLOODED UNDERGROUND MINES >500 ACRES IN AREA

Seam name	Mine ID	Mine name	Company name	State permit number	Average coal bed thickness (inches)	Footprint (acres)	Storage (MMGal)	Drainage position	Extent of partial flooding
Peerless	365780A	POWELLTON NO 11	POWELLTON COAL	5812	43.00	739.81	440.28	above	small
Peerless	340970A	RIVERTON NO 18	RIVERTON COAL		33.00	1,052.78	472.18	above	small
Peerless	365713A	SNAP CREEK NO 6	SNAP CREEK COAL	4143	26.00	1,336.65	482.79	above	small
Peerless	307570A	CRYSTAL BLOCK NO 10	CRYSTAL BLOCK COAL & COKE		25.00	1,444.88	494.68	above	small
Peerless	384661A	CEDAR POINT NO 1	CEDAR POINT MINING	5095-87A	45.00	822.72	511.70	above	large
Peerless	500222A	WHITE QUEEN	MARFORK COAL	U-5003-93A	39.00	1,127.36	609.30	above	large
Peerless	321865A	IMPERIAL COLLIERY NO 8	IMPERIAL COLLIERY		44.00	1,024.90	613.19	above	large
Peerless	906287A	Mine No. 26	Island Creek Coal Co.		45.00	1,112.64	683.21	above	large
Peerless	307583C	HOLLY	WYATT-SEANOR COAL		31.00	1,784.31	755.61	above	large
Peerless	376590A	FREEDOM	PEERLESS EAGLE COAL		32.00	1,867.87	826.35	above	very large
Peerless	385364A	DANIELS BRANCH NO 1	DANIELS BRANCH COAL	U-5060-87	52.00	1,175.35	838.21	above	medium
Peerless	362878A	CARBON FUEL NO 9-8 DRIFT	CARBON FUEL	7077	46.00	1,829.15	1,143.62	above	large
Peerless	907500A	No.32 Mine	Red Jacket Coal and Coke Co. Inc		40.00	2,831.01	1,558.43	above	small
Peerless	906279H	Mine No. 2	Lando Coal Corp		36.00	3,495.08	1,717.78	above	medium
Peerless	906279F	Unknown	Puritan Coal Corp.		57.00	2,206.99	1,721.81	above	very large
Peerless	377727A	PEABODY NO 10A	PEABODY COAL COAL		64.00	2,003.91	1,750.95	above	small
Peerless	363164A	Mine #2	PRINCESS COALS		43.00	3,415.64	1,995.78	above	large
Peerless	363192A	UPPER CEDARGROVE NO 18 & 19	UNKNOWN		47.00	3,289.99	2,121.33	above	large
Peerless	500189A	MOUNTAINEER	MINGO LOGAN COAL	U-5013-91	55.22	7,690.77	5,765.79	above	very large
Peerless	356939A	BETHLEHEM MINES NO 111	BETHLEHEM MINES		53.64	8,026.77	5,845.17	above	large
Peerless	318900I	CARBON FUEL NO 8	UNKNOWN		63.09	6,880.27	5,891.94	above	medium
Peerless	347984A	W P NO 15	W P COAL		60.86	7,473.28	6,174.83	above	medium
Peerless	906279G	Unknown	Lando Coal Corp		38.00	1,497.37	776.09	near	very large
No. 2 Gas	903487A	Mine No. 1	Buffalo Chilton Coal Co.		13.02	1,234.11	218.16	above	large
No. 2 Gas	353602A	FIELDS CREEK NO 1	UNKNOWN		28.59	675.95	262.38	above	large
No. 2 Gas	906284A	Elkay Mine No. 1, Merril Coal No. 2, 3, Taplin, Ut	Elkay Coal, Merril Coal, Utilities Coal		44.00	512.56	306.50	above	large
No. 2 Gas	500492A	ROCKHOUSE NO 2	ROCKHOUSE CREEK DEVELOPMENT	U-5064-89D	33.08	696.70	313.26	above	medium
No. 2 Gas	953095B	LONG BRANCH ENERGY NO 14	LONG BRANCH ENERGY		35.60	691.18	334.10	above	small
No. 2 Gas	380371A	W VA COAL & COKE NO 19L	W VA COAL & COKE		47.00	523.60	338.61	above	small
No. 2 Gas	906656A	LOW GAP POWELLTON NO.1 MINE	MARFORK COAL COMPANY, INC.	U-3003-94	38.00	650.64	339.78	above	small
No. 2 Gas	318916D	Mine No. 15	Island Creek Coal Co.		42.00	601.74	344.73	above	small
No. 2 Gas	331917A	Taplin No. 2 &3	H&B Coal Co.		43.00	677.67	398.12	above	large
No. 2 Gas	382102A	NEWTOWN ENERGY NO 1	NEWTOWN ENERGY		52.00	563.84	402.46	above	large
No. 2 Gas	363123C	Mine No. 3	Island Creek Coal Co.		52.00	589.37	420.07	above	medium
No. 2 Gas	381445E	MEADOR ENERGY NO 1	MEADOR ENERGY		59.00	535.51	431.43	above	large
No. 2 Gas	335953A	MARY FRANCES NO 23	MARY FRANCES COAL		28.00	1,150.00	448.26	above	small
No. 2 Gas	907476A	Thacker Mines	Ames Coal Co.		39.00	848.49	460.47	above	small
No. 2 Gas	363191A	Unknown	Unknown		41.00	827.88	464.31	above	medium
No. 2 Gas	338218A	MALLORY NO 1	MALLORY COAL		26.00	1,315.47	475.25	above	small
No. 2 Gas	904177A	Merrill C. Co. #1	Merrill C. Co.		49.00	749.63	506.45	above	small
No. 2 Gas	906182F	NO 3 MINE	Unknown		57.00	660.14	511.56	above	small
No. 2 Gas	906280B	UNKNOWN	UNKNOWN		35.00	1,075.04	521.12	above	small
No. 2 Gas	363123B	Mine No 2	Island Creek Coal Company		54.00	711.58	530.02	above	small
No. 2 Gas	953228A	ROWLAND NO 11	CLEAR FORK COAL	10217-S	45.00	946.65	586.38	above	small
No. 2 Gas	500110L	UNKNOWN	UNKNOWN		47.00	927.70	602.44	above	small
No. 2 Gas	953246A	LOW GAP POWELLTON NO 2	MARFORK COAL	3004-94	42.00	1,064.19	621.23	above	small
No. 2 Gas	903604C	No. 5	Anchor Coal Co.		37.00	1,304.57	672.37	above	small
No. 2 Gas	377426A	INDIAN CREEK NO 1	CANNELTON INDUSTRIES	9127	37.00	1,333.31	680.97	above	large
No. 2 Gas	318916A	ISLAND CREEK NO 16	ISLAND CREEK COAL		52.00	985.00	700.56	above	medium
No. 2 Gas	363123J	Mine No. 11	Island Creek Coal		68.00	766.57	716.89	above	medium
No. 2 Gas	953051B	FILE MAP	FILE MAP (USGS P-5-41A)		58.00	916.53	728.80	above	small
No. 2 Gas	906182G	NO 1 MINE	UNKNOWN		54.00	977.64	729.56	above	medium
No. 2 Gas	906681A	BIRCH FORK MINE	MARFORK COAL COMPANY, INC.	U-5001-93	51.00	1,100.17	766.13	above	small
No. 2 Gas	376241B	Unknown	Unknown		46.00	1,226.24	768.26	above	medium
No. 2 Gas	953004F	LOUP CREEK	LOUP CREEK CO POCA LAND MAP		49.00	1,222.38	824.47	above	small
No. 2 Gas	906682A	OUTPOST WEST MINE	MARSHFORK COAL COMPANY	U-5001-93A	38.00	1,625.58	854.81	above	medium
No. 2 Gas	906329A	SHUMATE POWELLTON MINE	MARFORK COAL COMPANY, INC.	U-3009-95B	42.00	1,470.08	856.06	above	large
No. 2 Gas	906026G	Unknown	Unknown		38.00	1,704.01	889.95	above	large
No. 2 Gas	363123K	Mine No. 12	Island Creek Coal Co.		70.00	969.18	932.84	above	small
No. 2 Gas	336811H	UNKNOWN	UNKNOWN		44.00	1,607.08	966.87	above	small
No. 2 Gas	321746A	HIAWATHA	RALEIGH WYOMING MINING		55.00	1,338.96	1,007.34	above	small
No. 2 Gas	377587A	PEABODY NO 10B	PEABODY COAL COAL		47.00	1,603.98	1,038.50	above	small
No. 2 Gas	365793A	BETHLEHEM MINES NO 116	BETHLEHEM MINES	5389	43.00	1,831.73	1,080.95	above	large
No. 2 Gas	379947B	POWELLTON NO 1	POWELLTON COAL		42.00	2,019.67	1,156.27	above	very large
No. 2 Gas	336811F	UNKNOWN	UNKNOWN		70.00	1,230.91	1,180.86	above	small
No. 2 Gas	953051F	FILE MAP	FILE MAP (USGS P-5-41A)		67.00	1,367.52	1,249.69	above	small
No. 2 Gas	375549B	DAVIDSON NO 1	UNKNOWN		37.00	2,527.51	1,297.68	above	large
No. 2 Gas	307149A	ISLAND CREEK NO 17	ISLAND CREEK COAL		56.00	1,707.92	1,312.69	above	large
No. 2 Gas	906280A	Mine No. 8 Jr.	Red Jacket Mining		73.00	1,439.22	1,439.58	above	medium
No. 2 Gas	365421D	CANNELTON INDUSTRIES NO 105 (2, 5, 5A)	CANNELTON INDUSTRIES		43.00	2,498.51	1,467.85	above	very large
No. 2 Gas	906182A	MINE NO 2	Unknown		57.00	2,060.86	1,613.32	above	large
No. 2 Gas	363123A	Mine No. 1	ISLAND CREEK COAL		50.00	3,067.00	2,085.94	above	very large
No. 2 Gas	321911H	UNKNOWN	UNKNOWN		25.00	6,743.63	2,378.62	above	small
No. 2 Gas	363196A	W P NO 5	W P COAL		63.00	3,517.02	3,025.03	above	very large
No. 2 Gas	381416A	HARRIS NO 2	EASTERN ASSOCIATED COAL		67.00	3,491.40	3,217.10	above	very large
No. 2 Gas	365421A	LADY DUNN NO 105	CANNELTON INDUSTRIES		36.34	7,449.83	3,675.59	above	very large
No. 2 Gas	308177A	LORADO NO 1 & 2	UNION COAL		57.41	4,973.44	3,877.18	above	medium
No. 2 Gas	363123G	Mine No. 7	Island Creek Coal Co.		51.79	5,687.45	3,999.47	above	very large
No. 2 Gas	500577A	WHITE KNIGHT/LOGAN	ELK RUN COAL	U-5060-91	50.98	5,897.39	4,082.30	above	very large
No. 2 Gas	369107A	PARAGON	AMHERST COAL		51.67	6,077.13	4,263.36	above	large
No. 2 Gas	364906A	ARMCO INC NO 7	ARMCO INC		51.72	6,713.07	4,713.76	above	large
No. 2 Gas	323016A	KOPPERSTON NO 2	EASTERN ASSOCIATED COAL		72.11	8,215.04	8,043.18	above	small
No. 2 Gas	384006A	EAGLE ENERGY NO 1	EAGLE ENERGY		25.65	778.95	271.40	near	large
No. 2 Gas	384291A	BELLS CREEK MINE NO 1	TERRY EAGLE COAL CO	U-6016-88	28.00	732.86	278.97	near	large
No. 2 Gas	500499A	RUBY ENERGY LCG	SPARTAN MINING CO	U-5019-96A	42.00	728.09	418.59	near	large
No. 2 Gas	321911G	UNKNOWN	UNKNOWN		56.00	602.77	464.95	near	medium
No. 2 Gas	500444A	LONG BRANCH NO 23	LONG BRANCH ENERGY	U-14382	47.00	989.95	635.12	near	very large
No. 2 Gas	384239A	VANTAGE NO 1	VANTAGE MINING	EM-75	19.00	2,614.79	701.12	near	very large
No. 2 Gas	366045G	CANNELTON COAL NO 7	CANNELTON COAL		57.00	961.31	749.32	near	large
No. 2 Gas	384595A	KERMIT NO 1	KERMIT COAL	6257	36.00	1,779.98	892.08	near	very large
No. 2 Gas	384143A	OLD BEN NO 20	OLD BEN COAL	10826	48.00	1,383.22	910.69	near	very large
No. 2 Gas	500342B	QUINLAND MINE	UNKNOWN		47.00	1,739.67	1,129.89	near	very large
No. 2 Gas	363191B	MONA, ROSSMORE	UNKNOWN		63.00	1,357.80	1,165.07	near	medium
No. 2 Gas	500184B	EAGLE ENERGY NO 132	EAGLE ENERGY		64.00	1,478.82	1,302.58	near	very large
No. 2 Gas	363123P	Mine No. 21	Island Creek Coal Co.		42.00	3,874.40	2,256.53	near	very large
No. 2 Gas	384637A	LIGHTFOOT NO 1	EASTERN ASSOCIATED COAL	9767	58.00	3,100.99	2,461.35	near	medium
No. 2 Gas	363123M	Mine No. 14	Island Creek Coal Co.		77.00	2,444.71	2,560.31	near	large
No. 2 Gas	500351A	LONG BRANCH NO 18 BELT	LONG BRANCH ENERGY	U-0143-82	56.00	3,343.61	2,586.89	near	large
No. 2 Gas	363123S	Mine No. 24	Island Creek Coal Co		63.00	3,064.76	2,662.14	near	very large
No. 2 Gas	363123O	Mine No. 20	Island Creek Coal Co.		71.00	3,257.26	3,158.91	near	very large
No. 2 Gas	363123T	Mine No. 27	Island Creek Coal Company		48.00	4,824.85	3,178.31	near	very large

POTENTIALLY PARTIALLY FLOODED UNDERGROUND MINES >500 ACRES IN AREA

Seam name	Mine ID	Mine name	Company name	State permit number	Average coal bed thickness (inches)	Footprint (acres)	Storage (MMGal)	Drainage position	Extent of partial flooding
No. 2 Gas	500431A	JUSTICE NO 1	INDEPENDENCE MINING	U-5013-98	44.58	6,761.60	4,092.22	near	very large
No. 2 Gas	363123Q	Mine No. 22	Island Creek Coal Co.		73.63	4,779.42	4,777.09	near	very large
No. 2 Gas	323251A	HAMPTON NO 3	WESTMORELAND COAL CO		77.93	4,771.18	5,048.39	near	very large
No. 2 Gas	355310A	GUYAN NO 1	ISLAND CREEK COAL	986	64.03	14,838.87	12,901.35	near	very large
Powellton	344142B	ALLIED CHEMICAL B	ALLIED CHEMICAL		30.18	634.08	259.81	above	small
Powellton	500466A	LICK BRANCH NO 2	LITTLE EAGLE COAL CO	U-0002-88-A	38.14	509.23	263.67	above	medium
Powellton	330040A	MALLORY NO 4 & 5	MCDONALD LAND		41.73	516.65	292.85	above	small
Powellton	372193F	UNKNOWN	UNKNOWN		45.00	561.36	347.15	above	small
Powellton	318904B	CARBON FUEL NO 9X	UNKNOWN		29.00	1,024.60	413.07	above	small
Powellton	904041A	Mine No. 3	Gay Coal & Coke Co.		51.00	626.33	439.03	above	very small
Powellton	907503A	No. 8 Mine	Crystal Block Coal Co.		48.00	691.57	458.97	above	medium
Powellton	500622E	UNKNOWN	UNKNOWN		46.00	805.18	506.40	above	large
Powellton	318904F	UNKNOWN	UNKNOWN		29.00	1,391.30	563.68	above	medium
Powellton	363189A	MILBURN NO 2	MILBURN BY-PRODUCTS COAL		60.00	850.00	693.48	above	small
Powellton	344142A	ALLIED CHEMICAL C	SEMET-SOLVAY ALLIED CHEMICAL		31.00	1,877.63	803.29	above	small
Powellton	903589A	Unknown	Hinch Coal Mining Co.		64.00	975.49	854.93	above	large
Powellton	903940F	Spruce No. 4	Spruce River Coal Co.		53.00	1,395.34	1,016.34	above	medium
Powellton	323197A	KING POWELLTON NO 1	KING POWELLTON MINING		74.00	1,080.31	1,089.92	above	small
Powellton	975007K	PEABODY COAL	PEABODY COAL		65.00	2,423.97	2,170.61	above	small
Powellton	975007N	PEABODY COAL	PEABODY COAL		45.00	4,288.44	2,665.72	above	small
Powellton	365723A	W P NO 19C	W P COAL		42.00	1,540.09	889.78	near	large
Powellton	500651A	MOUTAINEER ALMA A	MINGO LOGAN COAL CO	U-5038-97	39.00	4,755.16	2,525.91	near	very large
Lower Powellton	377472A	HOLLOW MINING NO 1	HOLLOW MINING		31.93	553.49	240.01	above	small
Lower Powellton	368612A	ROCKY EQUIPMENT NO 1	ROCKY EQUIPMENT RENTAL		32.15	647.14	282.04	above	small
Lower Powellton	307650A	ISLAND CREEK NO 1,2,3 & 4	ISLAND CREEK COAL		25.78	840.00	294.28	above	small
Lower Powellton	376524K	FAVOR COAL	FAVOR COAL	UNKNWON	39.74	566.35	305.40	above	small
Lower Powellton	384032A	CANDICE	MYSTIC ENERGY	10959	79.00	1,354.53	1,452.91	above	medium
Lower Powellton	376524F	FAVOR COAL	FAVOR COAL	10351	49.00	2,256.73	1,505.82	above	small
Lower Powellton	307145B	PATSY NO 12	PATSY DEVELOPMENT		46.00	630.19	399.29	near	large
Lower Powellton	907593A	MINE NO. 1	CRYSTAL FUELS CO.	U-56-83-E-B	34.00	1,126.98	534.25	near	very large
Eagle	906195E	No. 2	Snap Creek Coal		31.41	578.08	246.67	above	small
Eagle	366054A	BELVA MINES	BELVA COAL		34.68	541.46	254.92	above	medium
Eagle	379535A	ROBERT EAGLE NO 2	TERRY EAGLE COAL		34.67	573.03	269.84	above	medium
Eagle	363181A	IMPERIAL COLLIERY	IMPERIAL COLLIERY		40.71	534.66	295.51	above	medium
Eagle	318913F	CARBON FUEL NO 2	CARBON FUEL		50.00	526.09	357.90	above	medium
Eagle	903181A	Cornelia No. 10	Peters Creek Coal Company		36.00	810.05	400.61	above	small
Eagle	904040A	Unknown	Moniter & Yuma Coal & Coke Co.		32.00	938.26	409.95	above	large
Eagle	379340A	TONYS BRANCH NO 56	TONYS BRANCH COAL		53.00	611.29	442.55	above	small
Eagle	381079A	KRIS ENERGY NO 2	KRIS ENERGY		56.00	576.99	445.25	above	large
Eagle	368762A	PEERLESS EAGLE NO 3	PEERLESS EAGLE COAL		36.00	951.10	470.25	above	very large
Eagle	368122A	ARMCO STEEL	ARMCO STEEL		57.00	713.35	552.33	above	medium
Eagle	907659A	NAOMA NO. 1 MINE	WILLIAMS MOUNTAIN COAL CO.	U-66-82B	58.00	706.14	556.49	above	small
Eagle	307644A	MCGAYE NO 2	MCGAYE COAL & COKE		42.00	975.93	565.33	above	small
Eagle	364984A	MADISON NO 2	KANAWHA COAL		42.00	1,097.73	637.00	above	small
Eagle	349937A	RIVERTON EAGLE NO 1	RIVERTON COAL		56.00	863.26	659.57	above	small
Eagle	318913E	NABOB NO 1	CARBON FUEL		44.00	1,118.15	672.14	above	small
Eagle	379395A	ROWLAND NO 9	CONSOLIDATION COAL		70.00	853.83	811.77	above	small
Eagle	953002N	LOUP CREEK	LOUP CREEK POCA LAND MAP		68.00	905.41	838.16	above	small
Eagle	308232A	AMHERST NO 3A	AMHERST COAL		49.00	1,356.63	918.94	above	small
Eagle	379377A	BETHENERGY NO 81	BETHENERGY MINES		54.00	1,256.10	931.25	above	large
Eagle	333755A	LONG BRANCH NO 1	KOPPERS COAL DIVISION OF EASTERN GAS AND FUEL		61.00	1,182.57	986.88	above	small
Eagle	953029A	MOUNTAIN MINERALS NO 1	MOUNTAIN MINERALS	U-255-83-A	67.00	1,113.21	1,023.91	above	small
Eagle	318913B	CARBON FUEL NO 20	CARBON FUEL		60.00	1,251.88	1,026.63	above	small
Eagle	344144A	PEERLESS EAGLE NO 1	PEERLESS EAGLE COAL		40.00	2,192.01	1,213.66	above	very large
Eagle	903685A	Raleigh Eagle Coal Co. Mine	Winding Gulf Coal Co.		53.00	1,704.09	1,231.69	above	small
Eagle	384315B	POCAONTAS LAND CORP	POCAHONTAS LAND CORP		50.00	1,895.04	1,288.86	above	small
Eagle	953119A	EASTERN GAS & FUEL	EASTERN GAS & FUEL		55.00	2,275.18	1,701.65	above	small
Eagle	344334A	KINGSTON & WESTERLY	KINGSTON & WESTERLY		60.00	2,240.89	1,838.10	above	small
Eagle	500218A	BRUSHY EAGLE	MARFORK COAL	U-3006-93B	50.00	3,212.75	2,209.59	above	large
Eagle	975004A	EAGLE ENERGY	EAGLE ENERGY		57.00	3,404.30	2,670.62	above	very large
Eagle	500272B	KOPPERSTON NO 1	EASTERN ASSOCIATED		52.67	9,048.34	6,470.13	above	large
Eagle	355223A	HAREWOOD COLLIERY	ALLIED CHEMICAL		50.72	9,964.83	6,862.41	above	large
Eagle	500495A	ROCKHOUSE NO 8	ROCKHOUSE CREEK DEVELOPMENT	U-5002-04	34.91	598.18	284.47	near	medium
Eagle	368943A	INDIAN CREEK NO 4	CANNELTON INDUSTRIES		47.00	592.02	378.60	near	large
Eagle	377356B	U S STEEL MINING NO 36	U S STEEL MINING		47.00	644.76	416.41	near	large
Eagle	500493A	ROCKHOUSE NO 3	ROCKHOUSE CREEK DEVELOPMENT	U-5030-99	36.00	879.43	434.44	near	large
Eagle	384013A	BALD EAGLE NO 1	TERRY EAGLE COAL		36.00	895.80	439.49	near	large
Eagle	384013B	CHRISTOPHER NO 1	UNKNOWN		39.00	898.54	483.68	near	large
Eagle	358810A	CANNELTON INDUSTRIES NO 8	CANNELTON INDUSTRIES		30.00	1,247.83	524.76	near	very large
Eagle	906286A	Elkay Mining - Dehue, Wade Eagel	Elkay Mining, Standard Island Creek Coal		75.00	548.43	561.69	near	small
Eagle	376313A	AMHERST NO 4H	AMHERST COAL	2811	52.00	993.18	704.02	near	large
Eagle	907637A	CAMP CREEK NO. 1 MINE	HOBET MINING COMPANY	U-5008-94	46.00	1,486.00	946.83	near	very large
Eagle	368071A	NELLIS COAL PROPERTY MAP	NELLIS COAL		52.00	2,841.50	2,009.76	near	large
Eagle	907592A	Rocky Hollow Mine	Rawl Sales & Processing Co.	D-9907	53.00	2,831.79	2,043.00	near	very large
Eagle	362958B	DABNEY	UNKNOWN		59.00	2,686.74	2,176.90	near	large
Eagle	953639A	Upper Big Branch Mine	Performance Coal Co.	U-3042-92	61.22	9,134.51	7,592.04	near	very large
Eagle	500482A	HARRIS NO 1	EASTERN ASSOCIATED COAL CO	U-5004-97-C	65.09	10,804.17	9,547.57	near	very large
Sewell	336829Q	MACDONALD	UNKNOWN		23.77	535.73	172.78	above	small
Sewell	336807D	DUBREE NO 1	UNKNOWN		24.55	610.50	203.49	above	medium
Sewell	340051A	DUBREE NO 4	MARYLAND NEW RIVER COAL		33.25	516.03	232.68	above	small
Sewell	338893F	BABCOCK NO 7, 8 & 9	BABCOCK COAL & COKE		31.04	600.66	253.02	above	large
Sewell	327402A	DUO	DUO COALS		37.00	764.08	391.32	above	small
Sewell	500234B	UNKNOWN	UNKNOWN		33.00	877.65	400.23	above	large
Sewell	905494A	Cunard Mine	Coal Run		45.00	758.14	463.91	above	large
Sewell	500235A	WHITE BUCK NO 2	WHITE BUCK COAL	U-0059-85B	29.00	1,227.23	486.82	above	large
Sewell	336829Z	TAMROY	UNKNOWN		25.00	1,452.46	501.80	above	large
Sewell	366093A	F & J NO 4	F & J COAL		44.00	834.60	503.78	above	small
Sewell	367238B	BRANCH COAL	BRANCH COAL		42.00	940.27	539.19	above	large
Sewell	307443A	SAXSEWELL NO 1	ISLAND CREEK COAL		30.00	1,360.74	557.16	above	large
Sewell	367238A	ELI SMOKELESS	ELI SMOKELESS		41.00	1,015.62	568.93	above	small
Sewell	315826A	BOONE JAMES E LEASE 21	BOONE JAMES E COAL		44.00	965.97	581.67	above	small
Sewell	376337A	BELLEMEAD	UNKNOWN		26.00	1,672.24	599.15	above	medium
Sewell	336829T	KILSYTH	UNKNOWN		49.00	915.55	613.44	above	medium
Sewell	905366A	ROCK LICK	ROCK LICK		40.00	1,470.98	814.15	above	large
Sewell	364408B	NO 7	UNKNOWN		41.00	1,445.17	816.71	above	small
Sewell	336809A	AMES MINING	AMES MINING		31.00	2,236.14	954.64	above	large
Sewell	366518A	LESLIE	UNKNOWN		68.00	1,241.98	1,148.42	above	small
Sewell	903263D	Unknown	Island Creek Coal Co.		33.00	2,610.72	1,204.97	above	small
Sewell	364408A	IMPERIAL QUINWOOD 2	WESTMORELAND COAL		29.00	3,055.10	1,219.18	above	large
Sewell	366379C	FRANCES	UNKNOWN		59.00	1,655.81	1,329.63	above	small
Sewell	365986A	AMES LAND	AMES LAND		39.00	3,304.82	1,779.23	above	medium

POTENTIALLY PARTIALLY FLOODED UNDERGROUND MINES >500 ACRES IN AREA

Seam name	Mine ID	Mine name	Company name	State permit number	Average coal bed thickness (inches)	Footprint (acres)	Storage (MMGal)	Drainage position	Extent of partial flooding
Sewell	500235B	JOHNSTOWN COAL & COKE	JOHNSTOWN COAL & COKE		42.00	3,201.21	1,858.20	above	small
Sewell	339390A	KAYMOOR NO 1	UNKNOWN		38.00	4,240.02	2,228.24	above	small
Sewell	500234A	GRASSY CREEK NO 1	WHITE BUCK COAL	U-0148-82C	45.51	15,697.79	9,699.07	above	large
Sewell	953319A	NEW RIVER	MEADOW RIVER COAL	EM-7	40.00	905.65	499.36	near	large
Sewell	336829J	COLLINS	UNKNOWN		43.00	913.07	537.82	near	medium
Sewell	336829C	STAR COAL	STAR COAL		55.00	793.18	602.07	near	large
Sewell	338893A	CLIFFTOP SMOKELESS NO 1	CLIFFTOP SMOKELESS COAL		38.00	1,262.46	652.11	near	large
Sewell	312174A	CRAB ORCHARD	C & H COAL		27.00	1,761.60	662.73	near	large
Sewell	903051A	Stanaford No. 6 Mine	Eastern Gas & Fuel Associated		35.00	1,505.67	721.05	near	large
Sewell	314365A	DONEGAN NO 10 PROPERTY	ISLAND CREEK COAL		46.00	1,539.35	977.95	near	large
Sewell	336829D	HARVEY	STAR COAL		57.00	1,294.29	1,002.49	near	large
Sewell	373495B	MINDEN NO 4 & 5	UNKNOWN		56.00	1,579.18	1,208.06	near	large
Sewell	336829AH	SKELTON	UNKNOWN		40.00	2,282.02	1,250.16	near	large
Sewell	368723A	SILTIX	NEW RIVER		52.00	2,075.76	1,476.02	near	large
Sewell	335447A	SPRAGUE	NEW RIVER CO		36.00	4,059.02	1,986.38	near	large
Sewell	339390B	MINDEN NO 4	UNKNOWN		45.00	4,168.97	2,595.81	near	large
Beckley	327279A	DEXTER POCAHONTAS NO 1	DEXTER POCAHONTAS COAL		39.44	595.95	319.08	above	small
Beckley	367315C	RALEIGH COAL & COKE NO 3	RALEIGH COAL & COKE		40.00	1,515.59	825.40	above	large
Beckley	906307G	Sayers Poca	Unknown		59.00	1,633.38	1,314.30	above	small
Beckley	906307D	Mine No. 5	Unknown		54.00	621.88	463.64	near	large
Beckley	367315H	RALEIGH COAL & COKE NO 4	RALEIGH COAL & COKE		47.00	970.21	622.35	near	large
Beckley	383395A	SKELTON	NEW RIVER CO		35.00	5,411.83	2,601.75	near	large
Beckley	906310A	No. 4 Mine	Pond Creek Pocahontas Co.		40.21	6,383.02	3,485.53	near	small
Pocahontas No. 6	341215A	UNKNOWN	UNKNOWN		13.08	502.29	89.18	above	small
Pocahontas No. 6	383118A	EAST GULF NO 4	EAST GULF FUEL	D-10904	20.12	998.05	272.62	above	small
Pocahontas No. 6	905383A	Mine No. 71	Peabody Coal Co.		35.00	778.06	372.67	above	small
Pocahontas No. 6	376719A	LOUISVILLE NO 6	WINDING GULF COLLIERIES		38.00	879.40	462.48	above	small
Pocahontas No. 6	365639A	HUNTER	SMITH & STOVER COAL	D-943	40.00	1,300.50	711.69	above	large
Pocahontas No. 6	381094A	CRANE CREEK NO 6	CONSOLIDATION COAL	46-01586	24.00	2,224.17	734.93	above	medium
Pocahontas No. 6	330277A	STOTESBURY NO 10	EASTERN ASSOCIATED COAL	NDE	38.00	1,437.87	758.44	above	very small
Pocahontas No. 6	379277A	DRIFTWOOD NO 14	ALGOMA NO 14	46-01967	39.00	2,076.88	1,109.71	above	large
Pocahontas No. 6	903154A	No. 10 Mine	Sterling Smokeless Coal Co.		27.00	945.03	346.69	near	small
Pocahontas No. 6	372133A	STOTESBURY NO 11	EASTERN GAS & FUEL		33.00	1,036.68	473.91	near	small
Pocahontas No. 6	382515A	STONEY NO 8	STONEY COAL	3024-88	31.00	1,284.76	550.95	near	very large
Pocahontas No. 6	307289A	STERLING SMOKELESS	STERLING SMOKELESS COAL		37.00	1,120.67	569.60	near	very large
Pocahontas No. 6	375044A	KEYSTONE NO 4	EASTERN ASSOCIATED COAL		34.00	3,273.69	1,538.00	near	very large
Pocahontas No. 6	362948A	SLAB FORK NO 8	SLAB FORK COAL		36.00	3,818.22	1,881.04	near	very large
Pocahontas No. 6	307255A	LILLYBROOK NO 3	LILLYBROOK COAL		29.00	5,513.83	2,223.04	near	large
Pocahontas No. 6	366483A	TAMS NO 2	UNKNOWN		33.63	8,426.85	3,847.62	near	medium
Pocahontas No. 4	369015A	GARY NO 14-4	U S STEEL MINING		68.00	1,370.04	1,274.57	above	large
Pocahontas No. 4	377296A	ANCHOR NO 2 DEEP	UNKNOWN		73.00	1,310.26	1,305.50	above	very large
Pocahontas No. 4	314194C	U S STEEL NO 6	U S STEEL		76.00	1,328.22	1,372.23	above	medium
Pocahontas No. 4	381351G	GARY NO 4	GARY COAL SALES		60.00	1,721.11	1,415.37	near	large
Pocahontas No. 4	341408A	AMONATE NO 31-CLOSURE MAP	POCAHONTAS FUEL		59.21	4,622.36	3,715.74	near	very large
Pocahontas No. 4	381351F	GARY NO 4	GARY COAL SALES		45.28	7,430.91	4,568.79	near	very large
Pocahontas No. 4	337808B	U S STEEL NO 2,6	U S STEEL		78.27	16,614.66	17,655.03	near	very large
Pocahontas No. 3	384671A	TOP GUN NO 1	TOP GUN	4025-89	58.00	501.49	395.39	above	small
Pocahontas No. 3	904509K	ROANOKE	EMPIRE		59.00	510.98	410.87	above	small
Pocahontas No. 3	953090A	BRUSHY GAP	ESSENTIAL FUELS	U-3044-91B	33.00	993.50	448.59	above	very large
Pocahontas No. 3	500533A	CHEROKEE MINE	WA MINING INC	U-4023-87E	53.00	635.59	459.45	above	medium
Pocahontas No. 3	904593A	Weyanoke Mine	Cliff Coal Co.		40.00	844.54	467.96	above	small
Pocahontas No. 3	902883A	Mine No. 1	Wesley Leasing, Inc.	U-75-84-D	51.00	674.15	473.88	above	small
Pocahontas No. 3	904710A	Cherokee Mine	Pocahontas Fuel Co.		58.00	610.15	488.44	above	medium
Pocahontas No. 3	904509P	TURKEY GAP			51.00	728.20	511.47	above	small
Pocahontas No. 3	366510E	ZENITH LEASEHOLD	UNITED POCAHONTAS?		50.00	796.33	550.91	above	very small
Pocahontas No. 3	904509L	ARLINGTON	EMPIRE		58.00	711.25	560.87	above	small
Pocahontas No. 3	904440A	Thomas Mine No. 1	The Thomas Coal Co.		45.00	937.44	584.83	above	very small
Pocahontas No. 3	904509O	DELTA			61.00	712.11	591.73	above	very small
Pocahontas No. 3	904509H	ASHLAND	ASHLAND		27.00	1,599.18	605.27	above	large
Pocahontas No. 3	904720A	Hiawatha No. 1 Mine	Enris Coal Co.		47.00	967.87	624.02	above	small
Pocahontas No. 3	953527A	EUREKA LEASEHOLD			85.00	542.83	630.58	above	small
Pocahontas No. 3	904509B	CRANE CREEK	AMERICAN COAL		54.00	847.90	632.87	above	small
Pocahontas No. 3	904509M	GREENBRIER			67.00	707.69	643.93	above	very small
Pocahontas No. 3	366273A	WYOMING NO 3 & 4	WYOMING COAL		44.00	1,111.00	665.49	above	small
Pocahontas No. 3	905633A	Mine No. 4	Jacobs Fork Pocahontas Coal Co.		56.00	879.92	675.30	above	medium
Pocahontas No. 3	906112E	SHAWNEE LEASE			80.00	624.33	682.63	above	small
Pocahontas No. 3	904749A	Mine No. 13	United States Coal and Coke Company		88.00	569.44	688.15	above	very small
Pocahontas No. 3	366327A	LECCONY NO 2	LECCONY SMOKELESS FUEL		32.00	1,604.58	707.96	above	large
Pocahontas No. 3	904509T	LICK BRANCH			80.00	657.98	718.50	above	very small
Pocahontas No. 3	904509F	ROLFE			51.00	1,034.24	723.44	above	medium
Pocahontas No. 3	904509E	EMPIRE	EMPIRE COAL AND LAND		42.00	1,280.02	731.24	above	small
Pocahontas No. 3	334967B	MEAD	NORTH AMERICAN COAL & DOCK		25.00	2,092.29	732.93	above	large
Pocahontas No. 3	366510B	INDIAN RIDGE	UNKNOWN		54.00	1,001.63	741.21	above	very small
Pocahontas No. 3	904641C	WENONAH	UNKNOWN		48.00	1,123.61	741.41	above	small
Pocahontas No. 3	904608A	Buckeye Mine	Consolidation Coal Co.		70.00	784.77	746.10	above	medium
Pocahontas No. 3	904596A	Mine No. 1	McDowell Coal & Coke Co.		56.00	1,029.27	787.77	above	very small
Pocahontas No. 3	904654A	Springton Colliery	Kingston Pocahontas Coal Co.		48.00	1,203.04	789.73	above	small
Pocahontas No. 3	904509R	POWHATAN			60.00	957.00	792.68	above	medium
Pocahontas No. 3	904509AA	LYNCHBURG			75.00	880.64	897.34	above	very large
Pocahontas No. 3	904431A	Angle Mine	Angle Coal & Coke Co.		69.00	972.43	917.79	above	very small
Pocahontas No. 3	384300A	MURPHYS BRANCH NO 2	MURPHYS BRANCH INC	U-4023-92	48.00	1,400.62	926.64	above	medium
Pocahontas No. 3	904509DD	MILL CREEK	MILL CREEK		98.00	698.35	930.18	above	large
Pocahontas No. 3	904509Q	HOUSTON			70.00	1,011.58	973.13	above	medium
Pocahontas No. 3	904604A	Booth-Bowen Mine	Booth-Bowen Coal & Coke Co.		76.00	942.16	978.66	above	very small
Pocahontas No. 3	904425B	Elkhorn Mine	Elkhorn Coal & Coke Co.		94.00	767.74	984.66	above	medium
Pocahontas No. 3	904509Z	UPLAND			66.00	1,099.17	997.37	above	small
Pocahontas No. 3	904704A	Louisville Mine	Louisville Coal & Coke Co.		56.00	1,361.45	1,049.92	above	small
Pocahontas No. 3	359505A	U S STEEL NO 9	U S STEEL		55.00	1,489.23	1,118.27	above	medium
Pocahontas No. 3	904424A	West Mine	Mill Creek Coal & Coke Co.		108.00	807.61	1,185.05	above	medium
Pocahontas No. 3	904509J	CRANE CREEK NO 1 ?	AMERICAN ?		47.00	1,864.51	1,198.56	above	large
Pocahontas No. 3	366510A	CHANDLER AND WYOMING LEASES	UNITED POCAHONTAS COAL ?		51.00	1,740.82	1,216.19	above	very small
Pocahontas No. 3	904571A	Piedmont No. 3	Unknown		48.00	1,837.48	1,219.91	above	medium
Pocahontas No. 3	904712A	Pinnacle Mine	Unknown		48.00	1,852.41	1,223.98	above	small
Pocahontas No. 3	305461A	ARISTA	WEYANOKE COAL & COKE		47.00	1,936.49	1,249.13	above	medium
Pocahontas No. 3	904509BB	PULASKI IRON			75.00	1,227.25	1,265.38	above	small
Pocahontas No. 3	953099A	TOMMY CREEK NO 1	MATE CREEK LOADING	U-3040-87A	32.00	2,907.07	1,292.29	above	medium
Pocahontas No. 3	904600C	Shamokin	Pocahontas Land Corp.		86.00	1,158.66	1,360.23	above	medium
Pocahontas No. 3	904641A	TURKEY GAP	Unknown		42.00	2,439.53	1,409.96	above	very large
Pocahontas No. 3	904727A	Sagamore No. 3 Mine	Unknown		56.00	1,890.53	1,455.09	above	very large
Pocahontas No. 3	904509V	CROZER			62.00	1,845.41	1,558.37	above	small
Pocahontas No. 3	367257A	LILLYBROOK	LILLYBROOK COAL		34.00	3,386.53	1,564.60	above	medium

POTENTIALLY PARTIALLY FLOODED UNDERGROUND MINES >500 ACRES IN AREA									
Seam name	**Mine ID**	**Mine name**	**Company name**	**State permit number**	**Average coal bed thickness (inches)**	**Footprint (acres)**	**Storage (MMGal)**	**Drainage position**	**Extent of partial flooding**
Pocahontas No. 3	372024A	C & B NO 10	C & B COAL		54.00	2,467.37	1,810.56	above	medium
Pocahontas No. 3	904619F	PAGE LEASE	Page Coal and Coke		81.00	2,349.02	2,600.00	above	large
Pocahontas No. 3	904708A	Caswell Mine	Caswell Creek Colliery		96.00	2,016.13	2,640.74	above	medium
Pocahontas No. 3	904569A	Jenkinjones Mine	Jenkinjones Colliery		103.49	6,331.74	8,896.89	above	large
Pocahontas No. 3	904611O	UNKNOWN	UNKNOWN		42.64	527.91	305.46	near	large
Pocahontas No. 3	500532A	XMV NO 35	XMV INC	U-4022-91B	46.00	547.81	343.17	near	large
Pocahontas No. 3	366527A	TOMMY CREEK	AMIGO SMOKELESS COAL		42.00	639.52	367.07	near	small
Pocahontas No. 3	904611G	Unknown Mine G	Unknown		44.00	1,021.87	612.06	near	medium
Pocahontas No. 3	368946A	BISHOP NO 36	CONSOLIDATION COAL		52.00	954.15	685.28	near	very large
Pocahontas No. 3	907647A	POSTAR NO. 1	POSTAR COAL CO.	U-75-84B-B	48.00	1,066.63	698.07	near	very large
Pocahontas No. 3	385844A	HIOPE MINING NO 9	HIOPE MINING		43.00	1,315.50	770.03	near	medium
Pocahontas No. 3	308204A	PINNACLE	ALGOMA COAL & COKE		53.00	1,123.62	819.84	near	medium
Pocahontas No. 3	904611Q	UNKNOWN	UNKNOWN		45.00	1,528.33	942.73	near	very large
Pocahontas No. 3	382509A	KEYSTONE NO 3D	NOSEMAN BRANCH MINING		47.00	1,500.71	969.73	near	very large
Pocahontas No. 3	383162A	ITMANN NO 2	ITMANN COAL	900	44.00	1,827.93	1,092.71	near	very large
Pocahontas No. 3	368955C	UNKNOWN	UNITED POCAHONTAS COAL		58.00	1,512.11	1,199.76	near	large
Pocahontas No. 3	381213A	MODOC	CONSOLIDATION COAL		47.00	1,910.15	1,226.86	near	very large
Pocahontas No. 3	903269A	Newhall No. 6	Brewster Coal Co.		59.00	1,809.21	1,464.52	near	very large
Pocahontas No. 3	368078A	PEERLESS COAL & COKE PROPERTY	PEERLESS COAL & COKE		70.00	2,123.70	2,033.64	near	very large
Pocahontas No. 3	500126F	ITMANN NO 3	ITMANN COAL	901	44.00	4,115.58	2,482.46	near	very large
Pocahontas No. 3	362890A	EAST GULF	WESTMORELAND COAL	7051	38.08	6,927.65	3,582.00	near	very large
Pocahontas No. 3	323205A	U S STEEL NO 14D	UNKNOWN		77.27	4,195.45	4,400.61	near	very large
Pocahontas No. 3	340957A	BISHOP NO 35	UNKNOWN		66.85	5,005.16	4,543.15	near	very large
Pocahontas No. 3	374412A	JENKIN JONES	CONSOLIDATION COAL		80.58	4,491.56	4,914.20	near	very large
Pocahontas No. 3	375585A	GARY NO 10	U S STEEL MINING		70.56	5,935.20	5,685.98	near	very large
Pocahontas No. 3	368955A	KEYSTONE NO 1, NO 2	EASTERN ASSOCIATED COAL		58.99	24,666.84	19,754.60	near	very large
Pocahontas No. 2	500460A	JOSEPHINE NO 2	POCAHONTAS COAL CO	U-3036-92E	31.00	2,064.60	886.09	near	large

MINE POOL ATLAS

Overviews of Minor Seams

APPENDIX D

APPENDIX D

OVERVIEWS OF MINOR SEAMS

DUNKARD GROUP

Washington	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)				
Max. footprint area (acres)				
Mean footprint area (acres)				
Median footprint area (acres)				
Total footprint area (acres)				
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Waynesburg A	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)				
Max. footprint area (acres)				
Mean footprint area (acres)				
Median footprint area (acres)				
Total footprint area (acres)				
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

MONONGAHELA GROUP

Waynesburg	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	4	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)			0.47	
Max. footprint area (acres)			30.97	
Mean footprint area (acres)			17.74	
Median footprint area (acres)			19.76	
Total footprint area (acres)			70.95	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Uniontown	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)				
Max. footprint area (acres)				
Mean footprint area (acres)				
Median footprint area (acres)				
Total footprint area (acres)				
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

CONEMAUGH GROUP

Elk Lick	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	18	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	713.23			
Max. footprint area (acres)	0.41			
Mean footprint area (acres)	105.48			
Median footprint area (acres)	39.62			
Total footprint area (acres)	17.87			
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Harlem	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)				
Max. footprint area (acres)				
Mean footprint area (acres)				
Median footprint area (acres)				
Total footprint area (acres)				
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Brush Creek	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)				
Max. footprint area (acres)				
Mean footprint area (acres)				
Median footprint area (acres)				
Total footprint area (acres)				
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Mahoning	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	5	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	24.43			
Max. footprint area (acres)	530.20			
Mean footprint area (acres)	175.97			
Median footprint area (acres)	114.40			
Total footprint area (acres)	879.84			
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

ALLEGHENY FORMATION

Lower Freeport	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	9	0	2	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	1.69		3.07	
Max. footprint area (acres)	531.10		118.82	
Mean footprint area (acres)	89.00		60.95	
Median footprint area (acres)	21.23		60.95	
Total footprint area (acres)	801.03		121.90	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Upper Kittanning	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	5	1	1	1
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.76	0.43	58.09	402.06
Max. footprint area (acres)	476.64	0.43	58.09	402.06
Mean footprint area (acres)	160.25	0.43	58.09	402.06
Median footprint area (acres)	27.91	0.43	58.09	402.06
Total footprint area (acres)	801.23	0.43	58.09	402.06
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Lower Kittanning	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	55	2	6	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.04	6.03	2.38	
Max. footprint area (acres)	2,503.69	7.24	813.96	
Mean footprint area (acres)	160.37	6.64	236.82	
Median footprint area (acres)	53.05	6.64	71.82	
Total footprint area (acres)	8,820.40	13.27	1,420.91	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

No. 6 Block	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	3	16	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)		28.92	10.51	
Max. footprint area (acres)		38.73	282.57	
Mean footprint area (acres)		34.98	78.05	
Median footprint area (acres)		37.29	60.97	
Total footprint area (acres)		104.94	1,248.87	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

ALLEGHENY FORMATION

Upper No. 5 Block	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	1	31	71	0
Mean coal bed thickness (feet)	0	0	0	0
Min. footprint area (acres)	5.79	0.17	0.60	0.00
Max. footprint area (acres)	5.79	274.06	547.03	0.00
Mean footprint area (acres)	5.79	37.37	83.64	0.00
Median footprint area (acres)	5.79	15.28	32.08	0.00
Total footprint area (acres)	5.79	1,158.54	5,938.39	0.00
Estimated void volume (acre feet)	0.00	0.00	0.00	0.00
Max. potential storage (million gallons)	0.00	0.00	0.00	0.00

Little No. 5 Block	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	1	3	11	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	1.70	0.00	11.48	
Max. footprint area (acres)	1.70	2.09	713.54	
Mean footprint area (acres)	1.70	0.76	136.54	
Median footprint area (acres)	1.70	0.18	53.18	
Total footprint area (acres)	1.70	2.27	1,501.90	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

KANAWHA FORMATION

Stockton Rider	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	2	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)			19.90	
Max. footprint area (acres)			102.54	
Mean footprint area (acres)			61.22	
Median footprint area (acres)			61.22	
Total footprint area (acres)			122.44	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Stockton lower split 2	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	2	14	39	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.09	0.17	0.74	
Max. footprint area (acres)	0.52	6.85	3,117.49	
Mean footprint area (acres)	0.31	2.74	200.09	
Median footprint area (acres)	0.31	2.01	16.38	
Total footprint area (acres)	0.62	38.32	7,803.33	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

KANAWHA FORMATION

Coalburg lower split 1	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	5	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)			11.29	
Max. footprint area (acres)			77.29	
Mean footprint area (acres)			37.64	
Median footprint area (acres)			23.73	
Total footprint area (acres)			188.20	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Little Coalburg	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	1	2	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)		125.61	339.02	
Max. footprint area (acres)		125.61	695.59	
Mean footprint area (acres)		125.61	517.31	
Median footprint area (acres)		125.61	517.31	
Total footprint area (acres)		125.61	1,034.61	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Upper Winifrede	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	1	0	1	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	119.53		18.52	
Max. footprint area (acres)	119.53		18.52	
Mean footprint area (acres)	119.53		18.52	
Median footprint area (acres)	119.53		18.52	
Total footprint area (acres)	119.53		18.52	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Winifrede	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	39	244	0
Mean coal bed thickness (feet)		3.34	3.77	
Min. footprint area (acres)		0.01	0.00	
Max. footprint area (acres)		489.06	6,254.69	
Mean footprint area (acres)		25.47	236.08	
Median footprint area (acres)		2.02	44.21	
Total footprint area (acres)		993.18	57,603.54	
Estimated void volume (acre feet)		2,209.54	132,950.40	
Max. potential storage (million gallons)		720.09	43,328.53	

OVERVIEWS OF MINOR SEAMS

KANAWHA FORMATION

Lower Winifrede	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	40	3	9	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.26	4.46	4.84	
Max. footprint area (acres)	1,192.74	40.58	175.68	
Mean footprint area (acres)	103.21	25.86	60.10	
Median footprint area (acres)	16.90	32.53	37.28	
Total footprint area (acres)	4,128.27	77.57	540.88	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Chilton A	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	2	18	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)		2.01	4.64	
Max. footprint area (acres)		89.74	938.86	
Mean footprint area (acres)		45.88	266.38	
Median footprint area (acres)		45.88	160.71	
Total footprint area (acres)		91.75	4,794.91	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Chilton	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	1	3	26	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.30	3.16	2.71	
Max. footprint area (acres)	0.30	80.31	1,017.15	
Mean footprint area (acres)	0.30	30.64	231.26	
Median footprint area (acres)	0.30	8.44	91.38	
Total footprint area (acres)	0.30	91.91	6,012.84	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Little Chilton	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	31	1
Mean coal bed thickness (feet)				
Min. footprint area (acres)			6.41	90.66
Max. footprint area (acres)			3,322.56	90.66
Mean footprint area (acres)			425.32	90.66
Median footprint area (acres)			174.69	90.66
Total footprint area (acres)			13,184.95	90.66
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

KANAWHA FORMATION

Fire Clay	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	15	96	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)		0.02	0.01	
Max. footprint area (acres)		222.07	15,447.96	
Mean footprint area (acres)		23.07	398.87	
Median footprint area (acres)		1.70	62.52	
Total footprint area (acres)		346.09	38,291.92	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Fire Clay lower split 1	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	10	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)			2.99	
Max. footprint area (acres)			1,099.16	
Mean footprint area (acres)			325.39	
Median footprint area (acres)			115.04	
Total footprint area (acres)			3,253.94	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Cedar Grove	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	6	6	107	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	1.46	0.26	0.39	
Max. footprint area (acres)	149.71	529.62	3,746.07	
Mean footprint area (acres)	29.61	96.23	296.28	
Median footprint area (acres)	4.26	2.84	27.36	
Total footprint area (acres)	177.65	577.37	31,702.21	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Williamson	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	3	74	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)		4.56	1.37	
Max. footprint area (acres)		13.85	2,475.04	
Mean footprint area (acres)		9.03	188.71	
Median footprint area (acres)		8.68	71.37	
Total footprint area (acres)		27.10	13,964.21	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

KANAWHA FORMATION

No. 2 Gas lower split 2	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	24	1	10	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.82	42.94	1.14	
Max. footprint area (acres)	934.72	42.94	265.84	
Mean footprint area (acres)	106.33	42.94	49.92	
Median footprint area (acres)	36.27	42.94	17.29	
Total footprint area (acres)	2,551.87	42.94	499.19	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Eagle A	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	8	17	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)		2.40	0.05	
Max. footprint area (acres)		16.06	742.24	
Mean footprint area (acres)		6.46	107.14	
Median footprint area (acres)		4.24	11.89	
Total footprint area (acres)		51.69	1,821.42	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Eagle lower split 1	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	6	18	2
Mean coal bed thickness (feet)				
Min. footprint area (acres)		0.83	3.61	17.27
Max. footprint area (acres)		12.01	1,040.62	199.09
Mean footprint area (acres)		6.50	239.13	108.18
Median footprint area (acres)		7.14	103.80	108.18
Total footprint area (acres)		38.97	4,304.32	216.36
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Little Eagle	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	16	44	2
Mean coal bed thickness (feet)				
Min. footprint area (acres)		0.03	0.01	89.73
Max. footprint area (acres)		15.15	2,311.24	193.90
Mean footprint area (acres)		3.14	68.20	141.82
Median footprint area (acres)		1.02	3.18	141.82
Total footprint area (acres)		50.18	3,000.88	283.63
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

KANAWHA FORMATION

Middle War Eagle	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	97	1	11	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.06		1.79	
Max. footprint area (acres)	704.53		374.32	
Mean footprint area (acres)	34.86		74.08	
Median footprint area (acres)	2.92		12.87	
Total footprint area (acres)	3,381.18		814.89	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Bens Creek	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	36	0	9	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.05		0.10	
Max. footprint area (acres)	366.26		3,468.35	
Mean footprint area (acres)	31.44		387.95	
Median footprint area (acres)	3.00		2.88	
Total footprint area (acres)	1,131.80		3,491.57	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Lower War Eagle	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	80	0	1	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.13		87.22	
Max. footprint area (acres)	167.18		87.22	
Mean footprint area (acres)	19.83		87.22	
Median footprint area (acres)	5.51		87.22	
Total footprint area (acres)	1,586.32		87.22	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Glenalum Tunnel	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	8	0	2	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.26	267.54	267.54	
Max. footprint area (acres)	228.72	267.54	1,171.14	
Mean footprint area (acres)	53.79	267.54	610.61	
Median footprint area (acres)	24.90	267.54	782.14	
Total footprint area (acres)	430.35	267.54	393.14	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

KANAWHA FORMATION

Gilbert	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	68	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.07		0.00	
Max. footprint area (acres)	566.74		0.00	
Mean footprint area (acres)	62.05		0.00	
Median footprint area (acres)	16.69		0.00	
Total footprint area (acres)	4,219.18		0.00	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Douglas	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	621	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.03		0.00	
Max. footprint area (acres)	761.05		0.00	
Mean footprint area (acres)	18.64		0.00	
Median footprint area (acres)	4.32		0.00	
Total footprint area (acres)	11,575.39		0.00	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

NEW RIVER FORMATION

Bradshaw	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	66	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.12		0.00	
Max. footprint area (acres)	3,172.20		0.00	
Mean footprint area (acres)	90.43		0.00	
Median footprint area (acres)	4.29		0.00	
Total footprint area (acres)	5,968.56		0.00	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Iaeger	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	34	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.02		0.00	
Max. footprint area (acres)	1,563.25		0.00	
Mean footprint area (acres)	120.50		0.00	
Median footprint area (acres)	19.83		0.00	
Total footprint area (acres)	4,096.92		0.00	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

NEW RIVER FORMATION

Castle	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)				
Max. footprint area (acres)				
Mean footprint area (acres)				
Median footprint area (acres)				
Total footprint area (acres)				
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Sewell B	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	1	3	26	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.30	3.16	2.71	
Max. footprint area (acres)	0.30	80.31	1,017.15	
Mean footprint area (acres)	0.30	30.64	231.26	
Median footprint area (acres)	0.30	8.44	91.38	
Total footprint area (acres)	0.30	91.91	6,012.84	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Sewell A	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	21	0	3	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.17		7.96	
Max. footprint area (acres)	123.88		195.29	
Mean footprint area (acres)	16.72		76.13	
Median footprint area (acres)	4.32		25.13	
Total footprint area (acres)	351.10		228.38	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Welch	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	79	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.01		0.00	
Max. footprint area (acres)	4,103.16		0.00	
Mean footprint area (acres)	100.87		0.00	
Median footprint area (acres)	12.01		0.00	
Total footprint area (acres)	7,968.66		0.00	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

NEW RIVER FORMATION

Little Raleigh	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	15	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.16			
Max. footprint area (acres)	62.84			
Mean footprint area (acres)	22.36			
Median footprint area (acres)	17.34			
Total footprint area (acres)	335.44			
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Beckley lower split 1	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	19	0	0	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.29			
Max. footprint area (acres)	663.50			
Mean footprint area (acres)	62.36			
Median footprint area (acres)	8.63			
Total footprint area (acres)	1,184.90			
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Fire Creek	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	48	186	224	1
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.10	0.00	0.01	128.53
Max. footprint area (acres)	1,107.64	550.64	5,399.51	128.53
Mean footprint area (acres)	108.38	8.21	129.50	128.53
Median footprint area (acres)	8.05	0.05	12.00	128.53
Total footprint area (acres)	5,202.34	1,526.78	29,008.15	128.53
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Little Fire Creek	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	2	5	25	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	21.12	0.10	0.22	
Max. footprint area (acres)	326.34	130.30	399.34	
Mean footprint area (acres)	173.73	27.80	74.72	
Median footprint area (acres)	173.73	0.65	17.20	
Total footprint area (acres)	347.47	139.02	1,868.05	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

NEW RIVER FORMATION

Pocahontas No. 9	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	1	12	29	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	3.44	0.02	0.02	
Max. footprint area (acres)	3.44	79.51	813.81	
Mean footprint area (acres)	3.44	10.87	68.41	
Median footprint area (acres)	3.44	1.15	33.15	
Total footprint area (acres)	3.44	130.48	1,983.89	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

POCAHONTAS FORMATION

Pocahontas No. 7	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	61	4	12	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	0.16	0.84	0.15	
Max. footprint area (acres)	1,342.66	17.23	424.67	
Mean footprint area (acres)	94.34	6.79	60.84	
Median footprint area (acres)	11.04	4.55	22.11	
Total footprint area (acres)	5,754.86	27.17	730.06	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

Pocahontas No. 6 upper split 1	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	20	21	24	0
Mean coal bed thickness (feet)	2.77	3.25	3.63	
Min. footprint area (acres)	0.08	0.05	43.79	
Max. footprint area (acres)	488.87	76.94	115.09	
Mean footprint area (acres)	53.16	13.00	24.60	
Median footprint area (acres)	10.24	0.91	10.50	
Total footprint area (acres)	1,063.14	272.95	590.31	
Estimated void volume (acre feet)	1,227.65	427.01	1,070.22	
Max. potential storage (million gallons)	400.09	139.16	348.79	

Pocahontas No. 5	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	1	10	15	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)	4.45	0.01	0.31	
Max. footprint area (acres)	4.45	2.66	4,673.27	
Mean footprint area (acres)	4.45	0.51	603.13	
Median footprint area (acres)	4.45	0.05	74.33	
Total footprint area (acres)	4.45	5.06	9,046.96	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				

OVERVIEWS OF MINOR SEAMS

POCAHONTAS FORMATION

Squire Jim	Undetermined	Potentially flooded areas unlikely	Potentially partially flooded	Potentially totally flooded
No. of Mines	0	1	4	0
Mean coal bed thickness (feet)				
Min. footprint area (acres)		1.95	0.07	
Max. footprint area (acres)		1.95	102.34	
Mean footprint area (acres)		1.95	40.70	
Median footprint area (acres)		1.95	30.20	
Total footprint area (acres)		1.95	162.81	
Estimated void volume (acre feet)				
Max. potential storage (million gallons)				