

Mingo County

Land Use Master Plan 2013



Photo: Twisted Gun Golf Course in Mingo County

Executive Summary

This Land Use Master Plan (LUMP) conveys information on Mingo County's current demographic and geographic status. This plan will be used to evaluate the potential of post-mine sites for development, and evaluate Mingo County's investment position.

Senate Bill (SB) 603 mandates the development of a LUMP by counties with surface mining operations. The LUMP will be an effective tool towards achieving Mingo County's development goals. The Nick J. Rahall Appalachian Transportation Institute (RTI) will coordinate with the Office of Coalfield Community Development to provide this essential information. Mingo County has already had success with post-mine site development, and this plan will allow the county to improve on that success with other sites.

There are some considerable concerns that Mingo County must analyze before taking action to encourage development. Mingo County has been losing population since the 1980s, possibly even further back. Though its median age and age distribution indicate a population capable of productivity in the labor force, the population is projected to decrease consistently, while the West Virginia population increases.

Employment consists mainly of natural resources and mining, government services, trade, transportation, and utilities, and education and healthcare, four sectors that almost total 70 percent of the workforce. However, natural resources and mining

provide almost half of the county's wages, revealing the strong dependence of the county economy on coal. Likewise, the dependence on coal can be seen in the unemployment rate over time and total wages over time which has closely followed coal's position in the state and the nation. Of particular note is the amount of income, as opposed to wages, derived from government transfers. Thirty-six percent of Mingo County income is from government transfers, ranking it tenth in the state. Alas, Mingo County is not alone in this situation, as West Virginia finds many of its counties deriving almost a third of their incomes from government transfers.

Mingo County's educational system has also followed coal's fortunes. While total enrollment has dropped with the population, the dropout rate has peaked and fallen with the revival of coal and the effects of the recession, respectively. Mingo County has decent educational attainment, but almost a third of the current population does not have a high school education. Still, achievements can be seen in the fall of the dropout rate and the relative stoppering of the fall in 2nd month enrollment.

Utility prices are varied throughout the county, and this plan provides municipal and private rates for electricity, sewer, and water. Broadband, an increasingly important utility in the age of globalization, is highlighted to show the necessity for improvement and access, and showcase the developable properties of this utility.

Transportation is an important issue in any development strategy. Though lacking an interstate, Mingo County is the site of a section of the King Coal Highway, part of a new building of Interstate 73/74. This development is predicted to bring people and money to the area. Mingo County also has the Air Transportation Park and rail connections through both Norfolk Southern and CSX.

Mingo County has had great success from its post-mine site development already. Examples of development include the aforementioned King Coal Highway, the Air Transportation Park, and the Mingo County Fish Hatchery. With success proven, converting other sites to industrial, commercial, or public use will be less difficult. Mingo County also has a tradition of historic preservation, a fact that should be noted when developing. Historic preservation can be a basis for tourism, cultural identity, and community cohesion.

This plan also reviews energy and environmental issues in Mingo County. While coal dominates the county, other issues can and should be addressed to diversify Mingo County's prospects. Mingo County has a middling inventory of wetlands, forests, and wildlife management. Mingo County is also not on the list of air pollution non-attainment areas, which is positive. Mingo County has a system of gas pipes, a small oil field, and Marcellus Shale wells. Production of alternative energy appears to be on the low end of the scale for Mingo County, but should not be dismissed without more investigation.

This information is as critical as the site information for several reasons. One is that development is not a process that can occur in a vacuum. Without understanding the resources available in the county, and the demand for more investment, money will end up wasted. Another is that investment requires active partners who will need information on each of the county's essential demographic topics to determine their level of risk. Without this, investors will not be persuaded to enter the county. Finally, this information can help policy makers target their land use strategies to any of these topics, as long as they understand the situation.

Site analysis is integral to this report. Researchers identified all the post mine sites given certain criteria for Mingo County. The researchers created a distance analysis using a scoring system based on distance to certain essential utilities and features, summed the scores, and plotted each score for each mine site.

Mingo County possesses a unique relationship with the mining companies in the county. Due to the difficulty of acquiring suitable land for development, the public-private partnership in Mingo contains a proviso in which planning for post-mine sites begins almost immediately after a mining company begins work on a site. Therefore, the sites are guaranteed specific utilities at the time of their development. Specifically, this affects their distance scores, as these distance scores in essence become as close as possible. This is true of 2 of the sites currently labeled as post-mine sites: S501807 and S502099. It also adds a

relationship to the total score, an effect that is explained in the suitability analysis methodology.

A workforce analysis was also conducted to determine available labor within certain radii for each site, and a retail analysis was conducted to determine which areas had the most retail activity.

The top five mine sites were then identified, and are displayed individually. Map A contains the sites available in a view of the county.

The tables below are comprehensive comparisons between the top 5 post-mine sites for potential development. In Tables A and B, distances, relationships, and total scores are compared between sites, providing an idea of the more suitable site under a considered criterion. For example, if we want to look for a site which is located closest to a railroad, the answer is site

ranking #2, permit ID S502099. Table C explains how each criterion contributes to the final total score and importance of the weights. Because of the assumption that one criterion may be more important than others (different weights), the site with higher absolute and relative scores is still able to receive a smaller total score than others. Site ranking #2 is a good display of this situation. S502099 has much smaller absolute and relative scores compared to site S501806 and S503894. Still, S502099 receives the higher total score because the distances from this site to major criteria and higher weights are much shorter than the other two, and it is one of the sites with an existing financial relationship between the county and the coal companies. Its weights are higher on the things that really matter for development. Following these tables are the five major sites with general information, the results of the distance analysis, a short description, and an aerial view of the site.

Table A: Distances comparison between top five sites for potential development

Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	4.51	1.25	6.99	1.30	0.90	8
Proposed Highway	0.59	5.81	2.62	0.50	10.34	9
Intermodal Terminal Facilities	25.85	28.35	23.49	23.76	27.11	6
Interstate	69.82	57.07	67.46	61.32	57.09	8
National Waterway Network Ports	77.79	88.12	75.43	69.29	88.20	5
Sewer Treatment Facilities	3.35	1.28	5.47	2.10	0.84	7
Solid Waste Treatment Facilities	11.14	15.31	8.78	8.72	15.33	8
Tri-state Airport	72.59	95.13	70.23	64.09	95.20	3
Yeager Airport	80.59	86.16	78.23	78.50	84.92	3
Broadband	0.50	0.50	0.50	0.20	0.27	9
Gas Pipes	3.09	3.73	0.81	0.06	2.42	6
National Waterway Network	3.98	6.21	2.08	0.74	7.64	4
Power Lines	0.50	0.50	0.50	4.90	0.49	10
Oil Pipes	2.03	1.00	0.86	0.09	0.06	6
Railroad	1.56	0.38	2.06	0.67	0.44	5
Sewer Lines	1.00	1.00	1.00	3.54	0.36	8
Water Lines	0.25	0.25	0.25	0.69	0.36	10

Table B: Total score comparison between top five sites for potential development

Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	60	80	42	80	80	8
Proposed Highway	90	47.25	90	90	22.5	9
Intermodal Terminal Facilities	15	15	22.5	22.5	15	6
Interstate	2	8	2	6	6	8
National Waterway Network Ports	11.25	3.75	11.25	18.75	3.75	5
Sewer Treatment Facilities	49	70	26.25	70	70	7
Solid Waste Treatment Facilities	56	30	56	56	30	8
Tri-state Airport	6.75	0.75	6.75	11.25	0.75	3
Yeager Airport	6.75	2.25	6.75	6.75	2.25	3
Broadband	90	90	90	90	90	9
Gas Pipes	1.5	1.5	42	60	4.5	6
National Waterway Network	28	20	40	40	12	4
Power Lines	100	100	100	2.5	100	10
Oil Pipes	1.5	3	9	60	60	6
Railroad	26.25	50	17.5	50	50	5
Sewer Lines	80	80	80	20	80	8
Water Lines	100	100	100	37.5	70	10
Relationship	100	100	0	0	0	
Total Score	824	801.5	742	721.25	696.75	

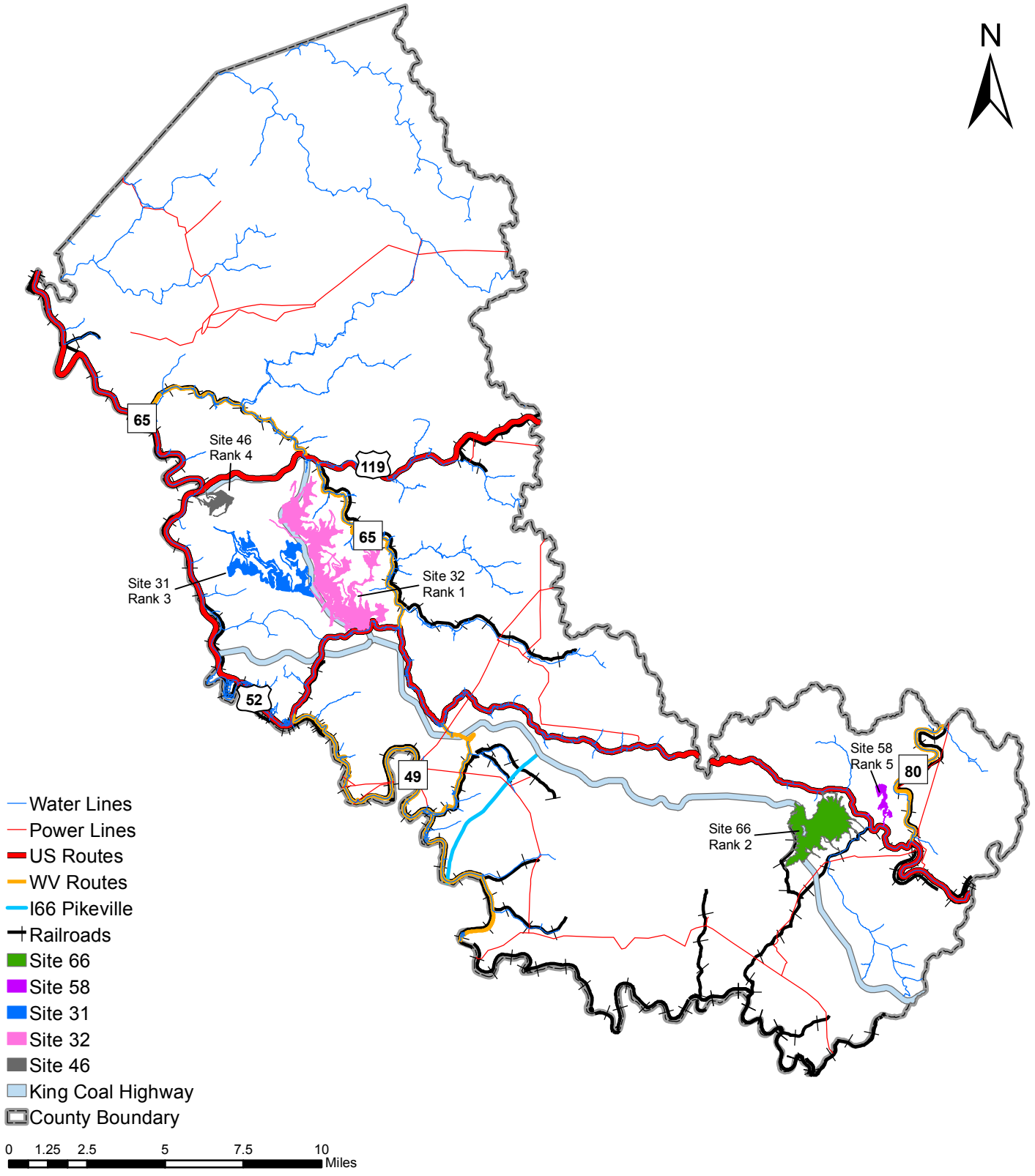
Table C: Absolute/ relative score comparison between top five sites for potential development

Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	10	10	7	10	10	8
Proposed Highway	10	7	10	10	5	9
Intermodal Terminal Facilities	5	5	5	5	5	6
Interstate	1	1	1	1	1	8
National Waterway Network Ports	3	3	3	5	3	5
Sewer Treatment Facilities	7	10	5	10	10	7
Solid Waste Treatment Facilities	7	5	7	7	5	8
Tri-state Airport	3	1	3	5	1	3
Yeager Airport	3	3	3	3	3	3
Broadband	10	10	10	10	10	9
Gas Pipes	1	1	7	10	3	6
National Waterway Network	7	5	10	10	3	4
Power Lines	10	10	10	1	10	10
Oil Pipes	1	1	3	10	10	6
Railroad	7	10	7	10	10	5
Sewer Lines	10	10	10	5	10	8
Water Lines	10	10	10	5	7	10
Total Absolute Score	105	102	111	117	106	
Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	7.5	10	7.5	10	10	8
Proposed Highway	10	7.5	10	10	5	9
Intermodal Terminal Facilities	5	5	7.5	7.5	5	6
Interstate	2.5	10	2.5	7.5	7.5	8
National Waterway Network Ports	7.5	2.5	7.5	7.5	2.5	5
Sewer Treatment Facilities	10	10	7.5	10	10	7
Solid Waste Treatment Facilities	10	7.5	10	10	7.5	8
Tri-state Airport	7.5	2.5	7.5	7.5	2.5	3
Yeager Airport	7.5	2.5	7.5	7.5	2.5	3
Broadband	10	10	10	10	10	9
Gas Pipes	2.5	2.5	10	10	2.5	6
National Waterway Network	10	10	10	10	10	4
Power Lines	10	10	10	2.5	10	10
Oil Pipes	2.5	5	5	10	10	6
Railroad	7.5	10	5	10	10	5
Sewer Lines	10	10	10	5	10	8
Water Lines	10	10	10	7.5	10	10
Total Relative Score	130	125	137.5	142.5	125	

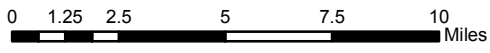
Distance Analysis Results

Top Five Sites for Potential Development

Mingo County



- Water Lines
- Power Lines
- US Routes
- WV Routes
- I66 Pikeville
- Railroads
- Site 66
- Site 58
- Site 31
- Site 32
- Site 46
- King Coal Highway
- County Boundary



Source: Rahall Transportation Institute Analysis 2013

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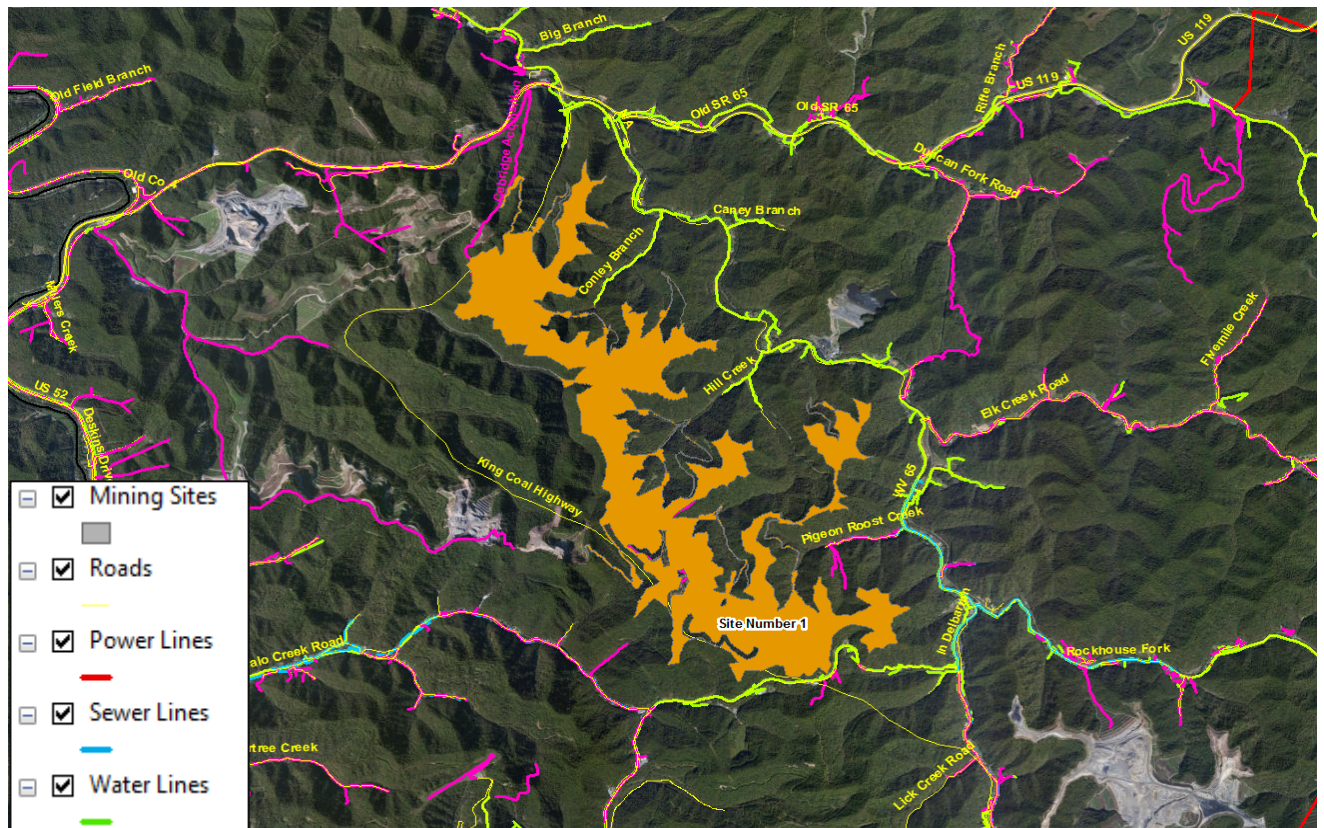
Site's General Info

Permittee	Consol Of Kentucky Inc
Facility Name	Buffalo Mountain Surface Mine
Permit ID	S501807
Issue Date	11/22/2011
Expiration Date	11/22/2016
Current Acres	2282.5
Lat	37° 43' 38.0000"
Long	81° 57' 42.0000"
Nearest Post Office	Delbarton

Site Number	32
Suitability Ranking	1
Total Score	824

Distance Analysis Results

Existing Highway	4.51
Proposed Highway	0.59
Intermodal Terminal Facilities	25.85
Interstate	69.82
National Waterway Network Ports	77.79
Sewer Treatment Facilities	3.35
Solid Waste Treatment Facilities	11.14
Tri-state Airport	72.59
Yeager Airport	80.59
Broadband	0.50
Gas Pipes	3.09
National Waterway Network	3.98
Power Lines	0.50
Oil Pipes	2.03
Railroads	1.56
Sewer Lines	1.00
Water Lines	0.25



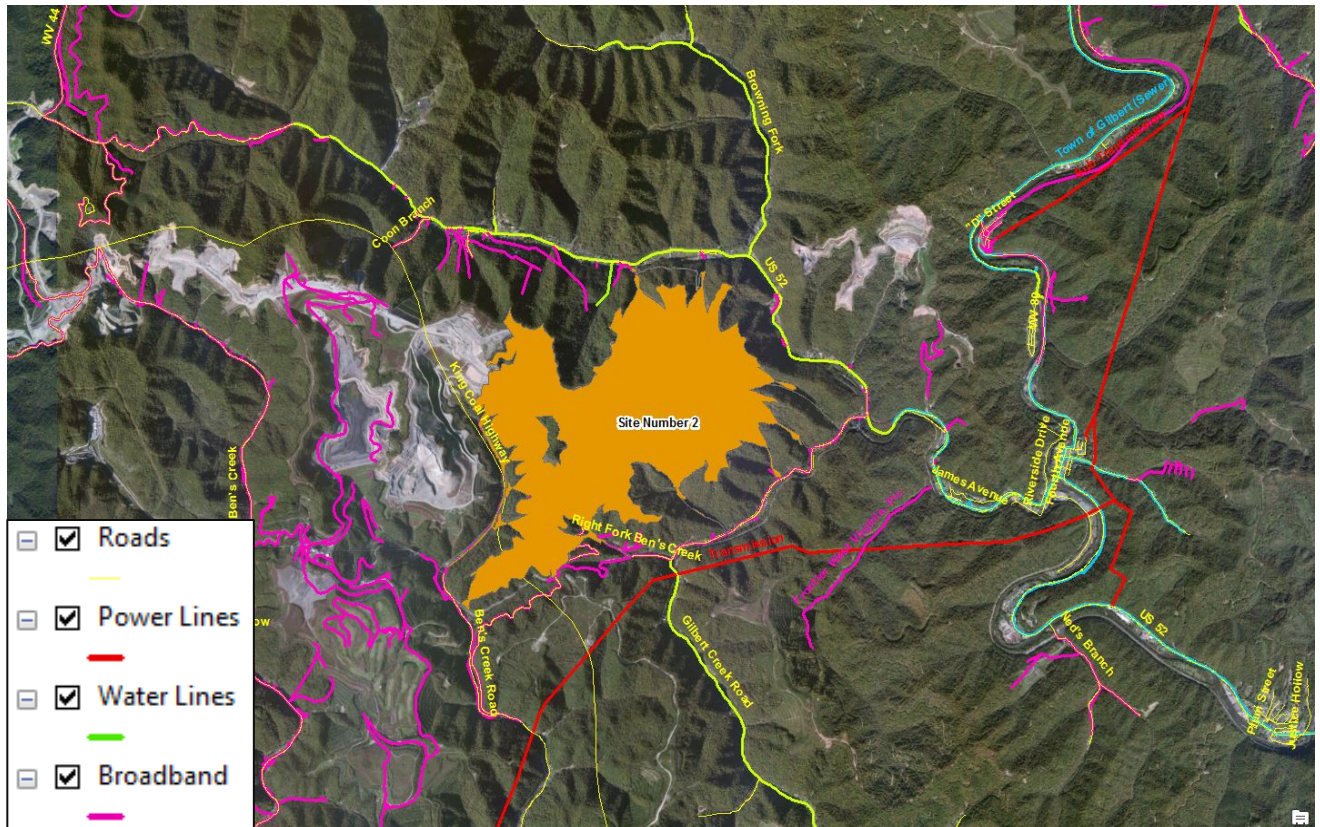
Site's General Info

Permittee	Premium Energy Llc
Facility Name	Surface Mine No. 2
Permit ID	S502099
Issue Date	10/13/2000
Expiration Date	10/13/2015
Current Acres	1384.54
Lat	37° 36' 50.0000"
Long	81° 54' 11.0000"
Nearest Post Office	Gilbert

Site Number	66
Suitability Ranking	2
Total Score	801.5

Distance Analysis Results

Existing Highway	1.25
Proposed Highway	5.81
Intermodal Terminal Facilities	28.35
Interstate	57.07
National Waterway Network Ports	88.12
Sewer Treatment Facilities	1.28
Solid Waste Treatment Facilities	15.31
Tri-state Airport	95.13
Yeager Airport	86.16
Broadband	0.50
Gas Pipes	3.73
National Waterway Network	6.21
Power Lines	0.50
Oil Pipes	1.00
Railroads	0.38
Sewer Lines	1.00
Water Lines	0.25



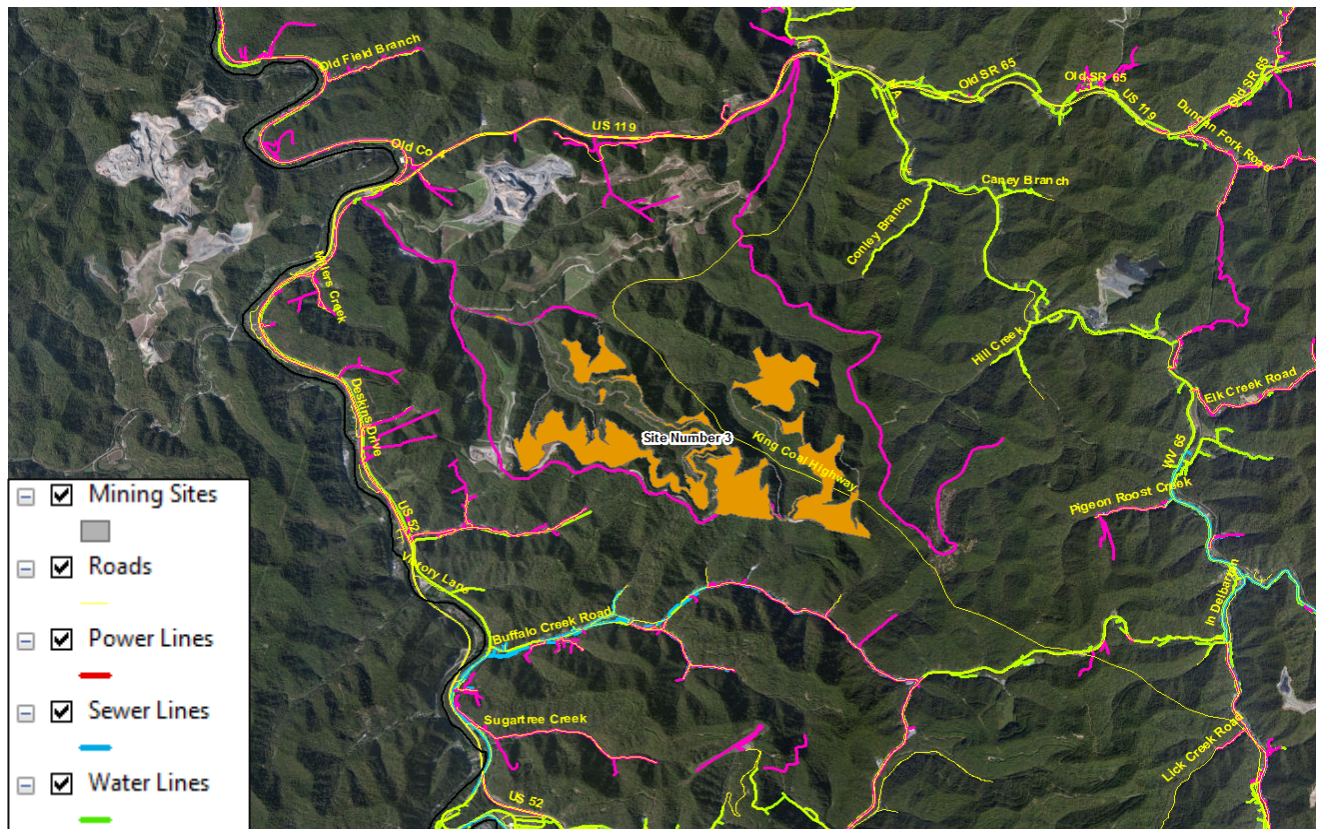
Site's General Info

Permittee	Consol Of Kentucky Inc
Facility Name	Peg Fork Surface Mine
Permit ID	S501806
Issue Date	2/7/2008
Expiration Date	2/7/2018
Current Acres	816.58
Lat	37° 43' 35.0000"
Long	82° 15' 56.0000"
Nearest Post Office	Chattaroy

Site Number	31
Suitability Ranking	3
Total Score	742

Distance Analysis Results

Existing Highway	6.99
Proposed Highway	2.62
Intermodal Terminal Facilities	23.49
Interstate	67.46
National Waterway Network Ports	75.43
Sewer Treatment Facilities	5.47
Solid Waste Treatment Facilities	8.78
Tri-state Airport	70.23
Yeager Airport	78.23
Broadband	0.50
Gas Pipes	0.81
National Waterway Network	2.08
Power Lines	0.50
Oil Pipes	0.86
Railroads	2.06
Sewer Lines	1.00
Water Lines	0.25



Site's General Info

Permittee	Consol Of Kentucky Inc
Facility Name	Mt-11
Permit ID	S503893
Issue Date	4/14/1997
Expiration Date	4/14/2017
Current Acres	177
Lat	37° 45' 21.0000"
Long	82° 18' 00.0000"
Nearest Post Office	unknown

Site Number	46
Suitability Ranking	4
Total Score	721.25

Distance Analysis Results

Existing Highway	1.30
Proposed Highway	0.50
Intermodal Terminal Facilities	23.76
Interstate	61.32
National Waterway Network Ports	69.29
Sewer Treatment Facilities	2.10
Solid Waste Treatment Facilities	8.72
Tri-state Airport	64.09
Yeager Airport	78.50
Broadband	0.20
Gas Pipes	0.06
National Waterway Network	0.74
Power Lines	4.90
Oil Pipes	0.09
Railroads	0.67
Sewer Lines	3.54
Water Lines	0.69



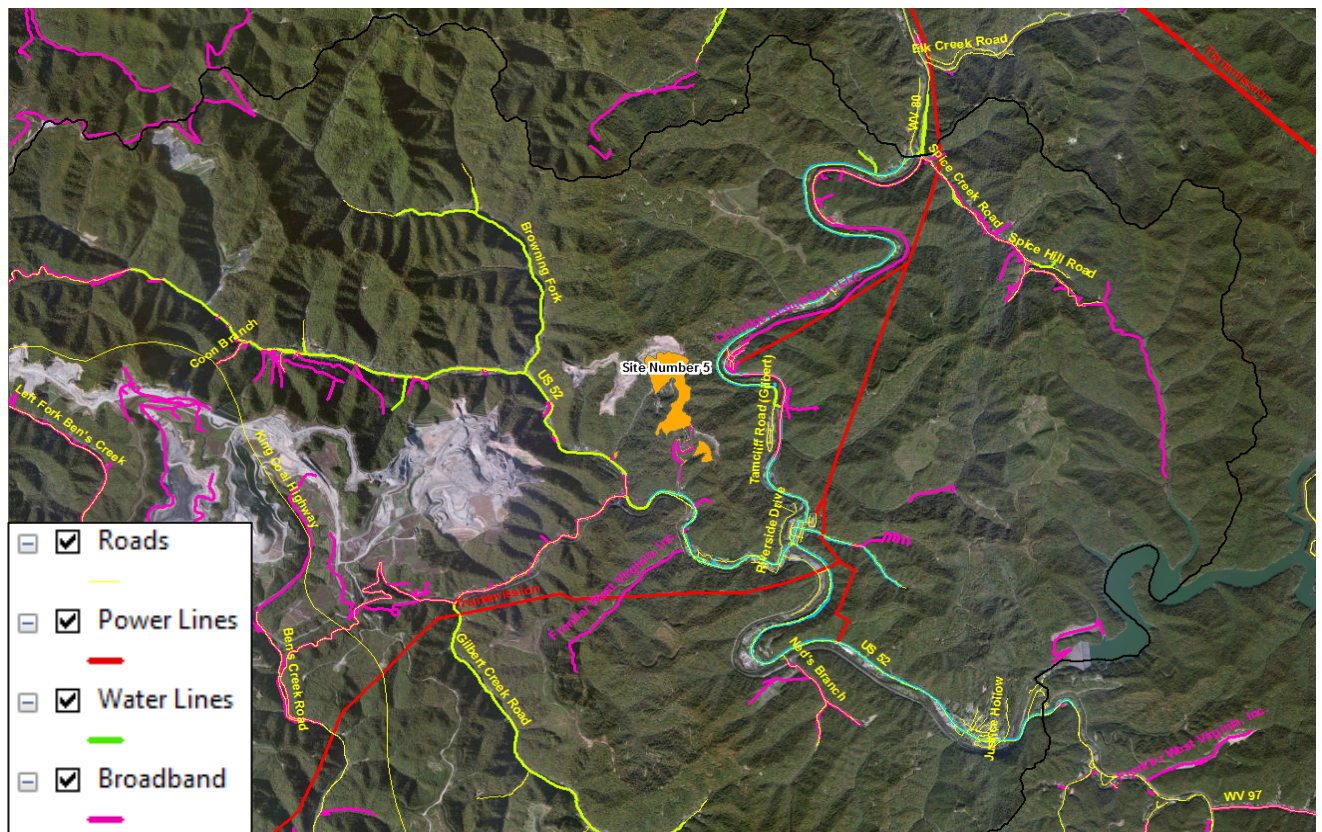
Site's General Info

Permittee	Hampden Coal Company Llc
Facility Name	unknown
Permit ID	S004784
Issue Date	7/27/1984
Expiration Date	7/27/1999
Current Acres	107
Lat	37° 38' 00.0000"
Long	81° 53' 00.0000"
Nearest Post Office	Gilbert

Site Number	58
Suitability Ranking	5
Total Score	696.75

Distance Analysis Results

Existing Highway	0.90
Proposed Highway	10.34
Intermodal Terminal Facilities	27.11
Interstate	57.09
National Waterway Network Ports	88.20
Sewer Treatment Facilities	0.84
Solid Waste Treatment Facilities	15.33
Tri-state Airport	95.20
Yeager Airport	84.92
Broadband	0.27
Gas Pipes	2.42
National Waterway Network	7.64
Power Lines	0.49
Oil Pipes	0.06
Railroads	0.44
Sewer Lines	0.36
Water Lines	0.36



I. Introduction

Senate Bill (SB) 603, passed in the 2001 Legislative Session, mandates the development of a Land Use Master Plan (LUMP) by counties with surface mining operations. The creation of a LUMP would facilitate the development of economic or community assets, secure developable land and infrastructure, and ensure that post-mining land use proposed in any reclamation plan is in compliance with the specified land use in the approved LUMP. In order to promote acceptable principles of smart growth within the desired community it has become evident that a sustainable land use plan is needed to determine development needs within a community. The detailed document addresses the physical development needs of properties within the coalfield counties and provides guidelines, strategies, and a framework for future decisions relating to land use and projected community needs.

The 1977 Surface Mining Control and Reclamation Act established a program for the regulation of surface mining activities and the reclamation of coal-mined lands. The Act requires that coal operators minimize the disturbance and adverse impact on the environment and community in addition to restoring the mined property to its approximate original contour. Special provisions are granted for operators who offer development plans for post-mining land use, in which the coal operators (private sector) make capital investments towards land development that would benefit the community (public sector) affected by the mining operations. This unique opportunity, also known as Public-Private Partnership (P3), has far-reaching consequences on those communities with coal mining operations. The operators utilize the LUMP, created by the county officials with post-mine land use in mind, to gain insight into the land and infrastructure needs of the local community and then materialize the development opportunities described in the LUMP. The LUMP leverages private investment to facilitate public development, which is critical to the sustainability of counties and communities. Community sustainability requires a transition from poorly managed land to land use planning practices that create and maintain efficient infrastructure, ensure close-knit neighborhoods and sense of community, and preserve our natural systems.

RTI, a nationally recognized center of excellence for rural transportation research, was established through the Transportation Equity Act for the 21st Century passed by Congress in 1998 and is funded through a grant from the Research and Innovative Technology Administration (RITA) of the US Department of Transportation. As a University Transportation Center, RTI has cultivated relationships with private industry and public agencies to leverage resources, technology and strategic thinking to improve mobility and to stimulate economic development. RTI has taken the lead in conducting site-specific research, supporting multimodal planning and analysis to improve mobility and global connectivity for rural regions. The Office of Coalfield Community Development (OCCD) was created by the 1999 Legislative Session to

assist communities affected by surface mining activity throughout the State. With the passage of SB 603 in 2001, the responsibilities of the OCCD changed to include working with local economic development agencies to develop land use master plans and include the recommendations of local economic redevelopment authorities in the reclamation plans of surface mine permits. The OCCD established criteria to consider development of these sites, provided for certain land uses as post-mining land uses and stipulated that master plans must comport to environmental reclamation requirements. The office allows existing and future surface mining permits to include master plan criteria and reclamation standards.

Mingo County already has significant experience with post-mine land use. Mingo Central Comprehensive High School, with 732 students currently enrolled, rests on a reclaimed mine site. The Mingo County Air Transportation Park is also on reclaimed mine land, donated by Alpha Natural Resources. This plan will build on the successes that Mingo County has already made.

II. Planning Area

This history comes from Mingo County's website:

“Mingo County is the youngest county in the state, formed by an act of the state legislature in 1895 from parts of Logan County. Its founding was related to a legal protest by a moonshiner who claimed that the Logan County Court that had found him guilty did not have jurisdiction over his case because his still was actually located in Lincoln County. A land survey was taken and discovered that the defendant was correct. The charges were then refilled in Lincoln County court. Although the moonshiner was ultimately found guilty of his crime, the state legislature was made aware of the situation and determined that Logan County was too large for the expeditious administration of justice and decided to create a new county, called Mingo. The county was named in honor of the Mingo Indian tribe that had been the earliest known settlers of the region.”¹

Mingo County's chief product has always been coal, and coal mining is deeply seated in the region. In 2011 coal mining provided about one-third of total employment and approximately half of the makeup of wages. This has been consistently true throughout Mingo County's history.

Mingo County's public-private partnership also contains a unique flavor worthy of mention. The terrain in Mingo County has extreme slopes. This in itself makes private land development

¹ “Mingo County History,” Mingo County, Accessed January 17, 2013, <http://www.polsci.wvu.edu/wv/Mingo/minghistory.html>

extremely difficult and, financially, a near impossible task. The majority of populated areas are small towns located at the foot of a steep mountain or hill and next to a river. The river presents the continuous fear of flooding. Major transportation issues have only recently been addressed with the construction of US 119 and the King Coal Highway. As the P3 concept has developed, Mingo County has taken advantage by planning for potential future use of property even before mining begins. While this may seem too hasty, it allows the county to assure the community of development, and also confirms to potential developers that they will have a site they need when they need it. This unique relationship between the mining companies that currently own the site and the county assures that essential utilities will be in place when site development occurs, an aspect of planning that is taken into account in the suitability analysis. Two sites have already been approved for post-mine development; S501807 and S502099.

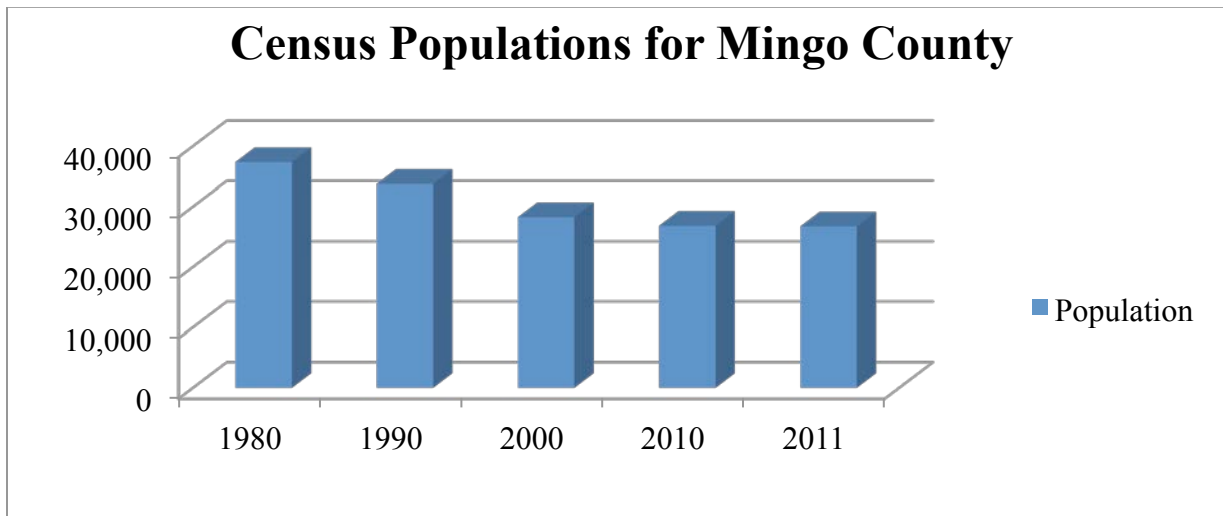
III. Existing Conditions

This information will provide a background understanding of the demographic trends in the county. This base information is meant to provide overall detail on Mingo County's status as it stands. Part IV will deal with possible future site development information, to be considered with the demographic data to target strategies for investment.

Population

The population of Mingo County in 2011 was 26,734 according to the 2011 American Community Survey (ACS) 5-year estimates, ranking it 24th in county population among the 55 counties in West Virginia.² The decennial censuses show that Mingo County has been steadily decreasing in population since 1980, resulting in the 2011 population of the county becoming one-third smaller than the 1980 population. However, the decrease appears to be relieving in severity, indicating that Mingo County may be recovering from the trend of outward migration experienced in the last several decades.

Figure 1

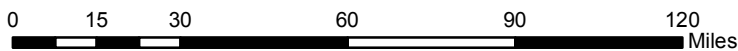
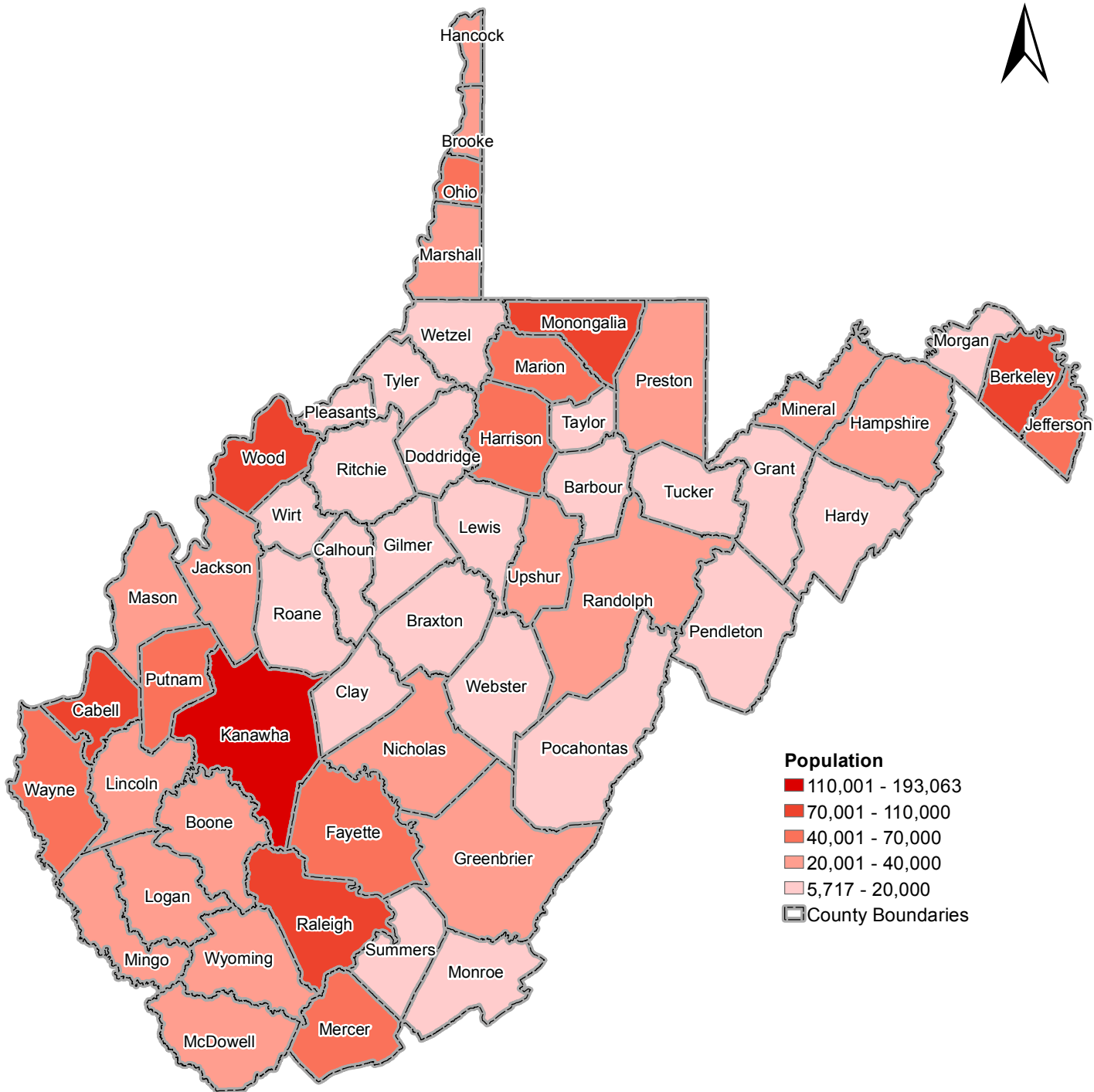


Source: United States Census Bureau

Map 1 illustrates the Mingo County population compared to West Virginia overall. Mingo is at the lower end of the spectrum but is not as rural as many counties in central and eastern West Virginia.

² “2011 American Community Survey 5-Year Estimates,” United States Census Bureau, Accessed February 13, 2013, factfinder2.census.gov.

Demographic Population



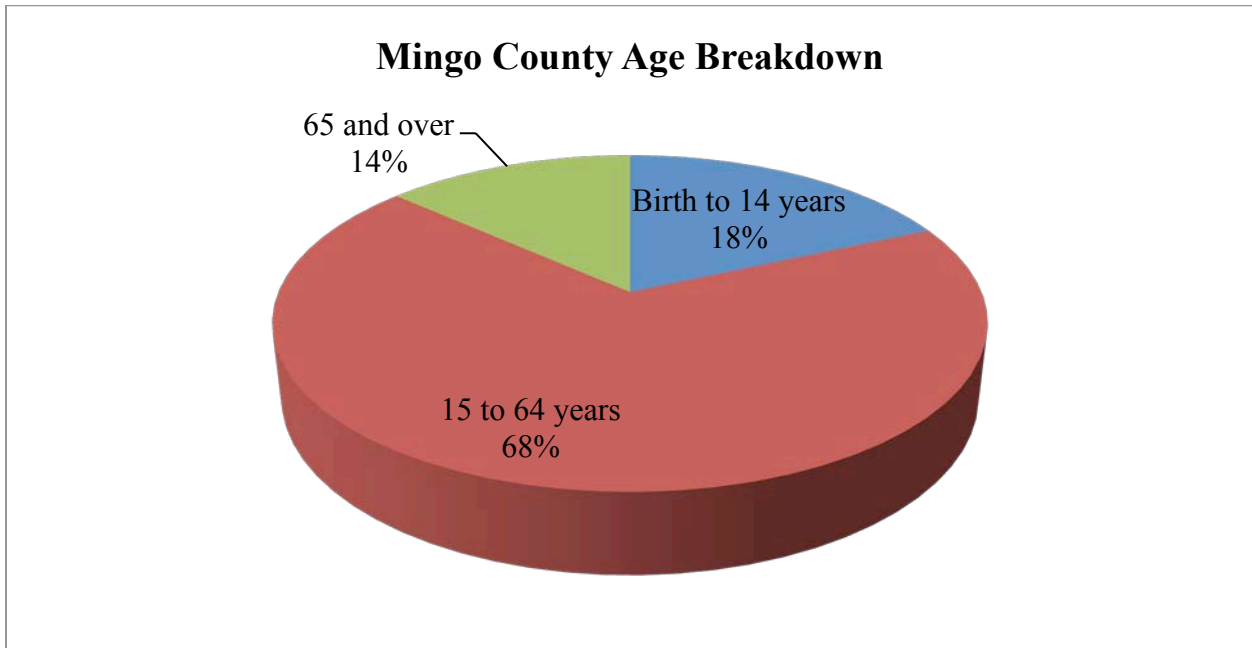
Data Source: United States Census Bureau 2011

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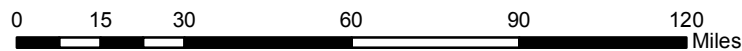
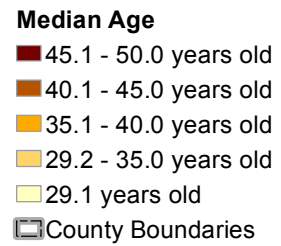
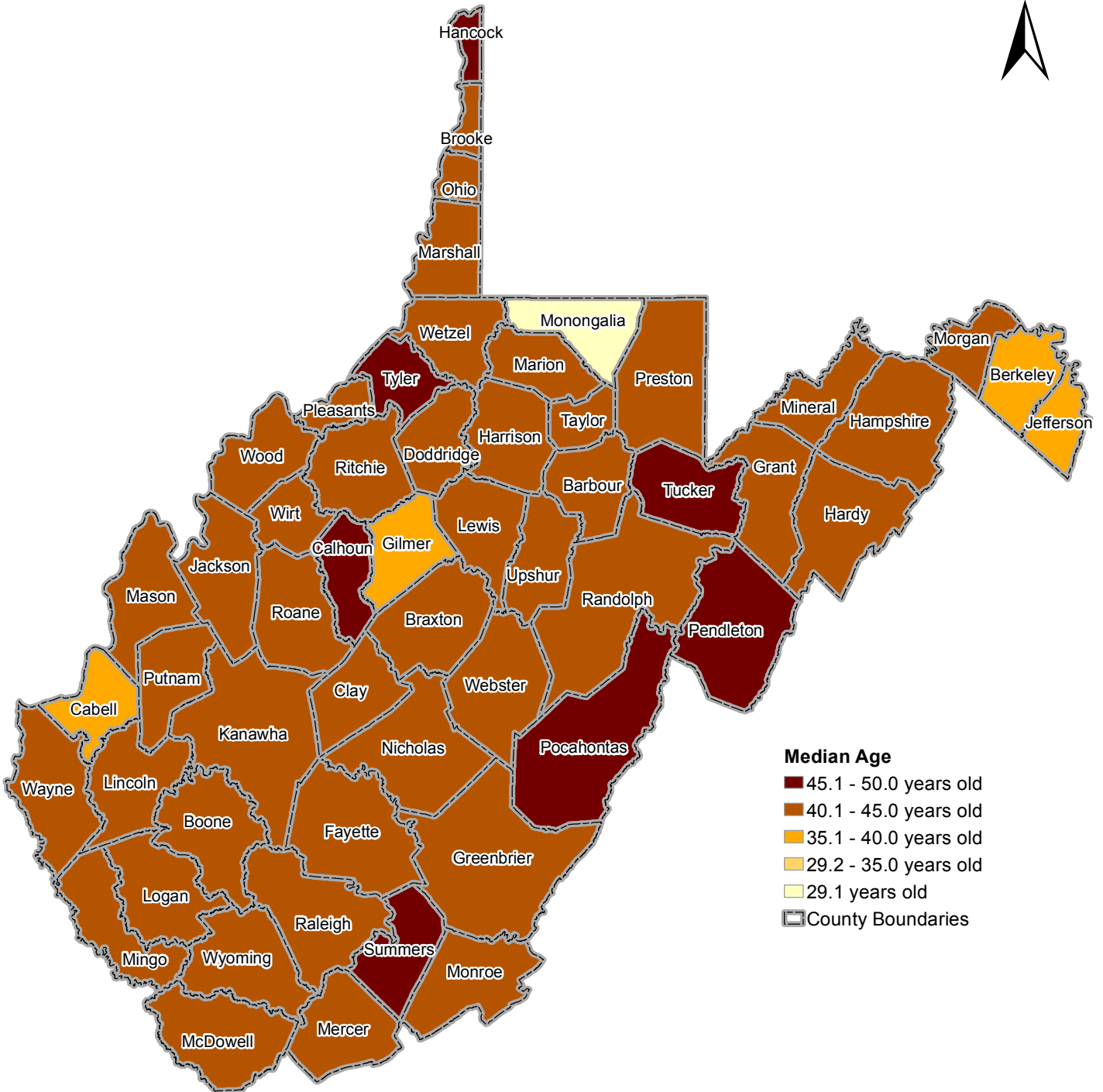
According to the ACS, 20 percent of Mingo County residents are 60 years of age and over, while almost 16 percent are between 5 and 17 years of age and 6.3 percent are below the age of 5. As a result, approximately 5,000 people are of retirement age. The median age in Mingo is 41.2, which is the same as the West Virginian median age (Map 2). The majority of the population is of working age, as denoted in Figure 2.

Figure 2



Source: 2011 American Community Survey 5-Year Estimate Calculation

Demographic Median Age



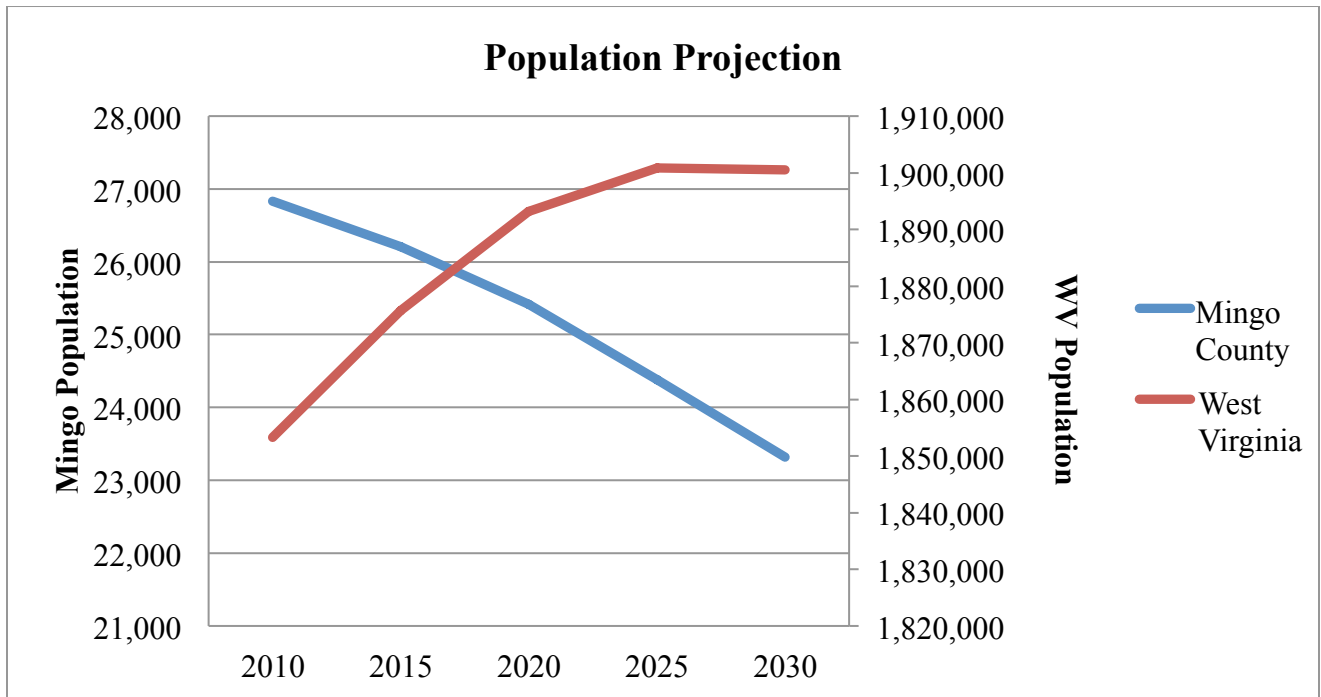
Data Source: United States Census Bureau 2011

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The Bureau of Business and Economic Research at West Virginia University projects a 13.1 percent decrease in the Mingo County population between 2010 and 2030, which is significantly less than the predicted growth of West Virginia as a state.³ The model for the projection is based on past population patterns and statistics, and should not be taken as permanent. A number of measures can be taken to prevent the expected population decrease in Mingo County. This is one intent of the land use master plan.

Figure 3



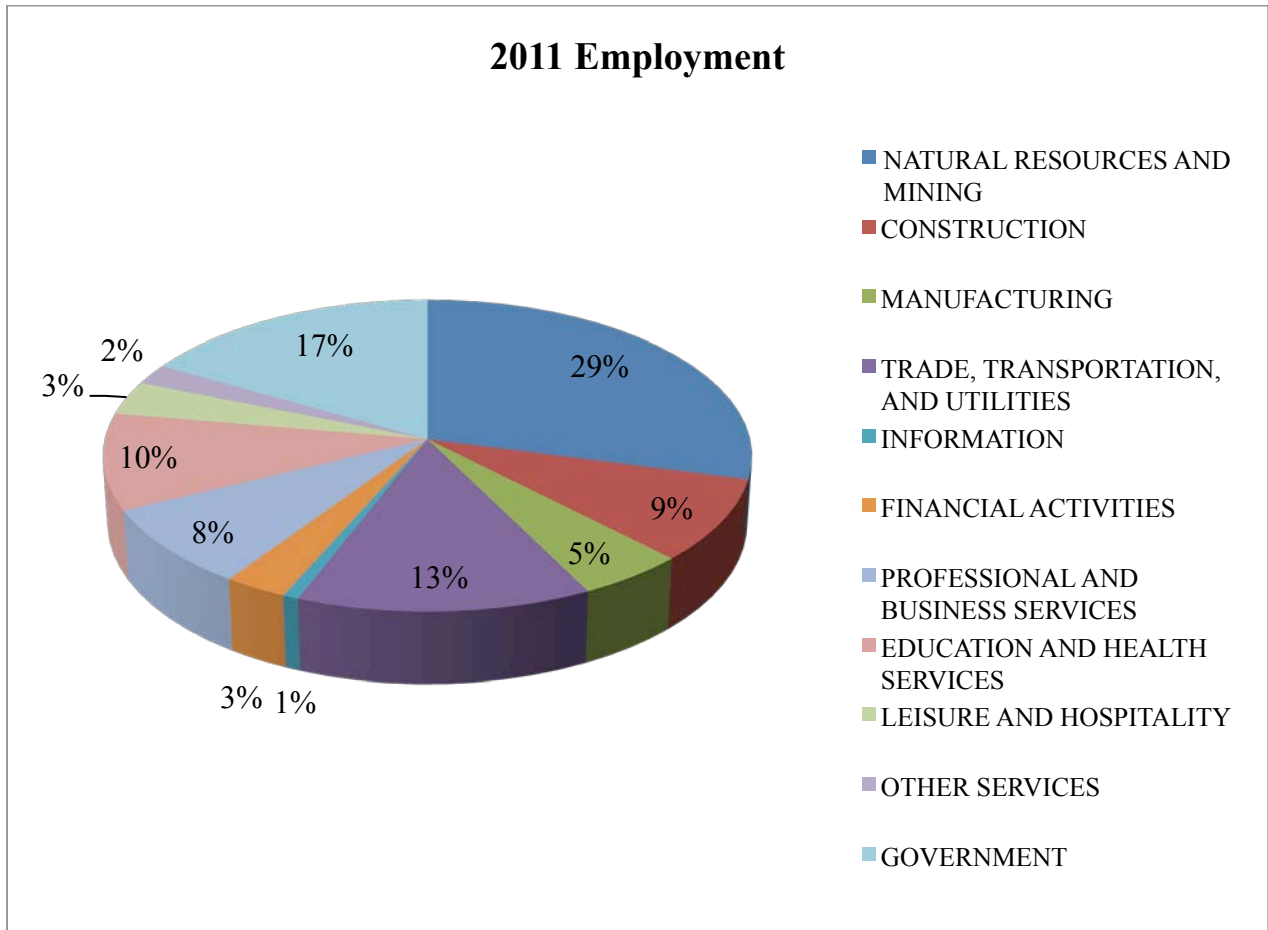
Source: WVU Bureau of Business and Economic Research

Employment

Workforce WV has a complete dataset on employment numbers and wages. The total number of employed in 2011 was 8513. Approximately 29 percent of wage earners in Mingo County worked in natural resources and mining, mainly coal mining and related operations. Mingo County also has a high level of government employees, which is consistent with West Virginia employment patterns as a whole.

³ Christiadi. “Population Projection for West Virginia Counties.” Bureau of Business and Economic Research, College of Business and Economics, West Virginia University, Morgantown, WV (August 2011).

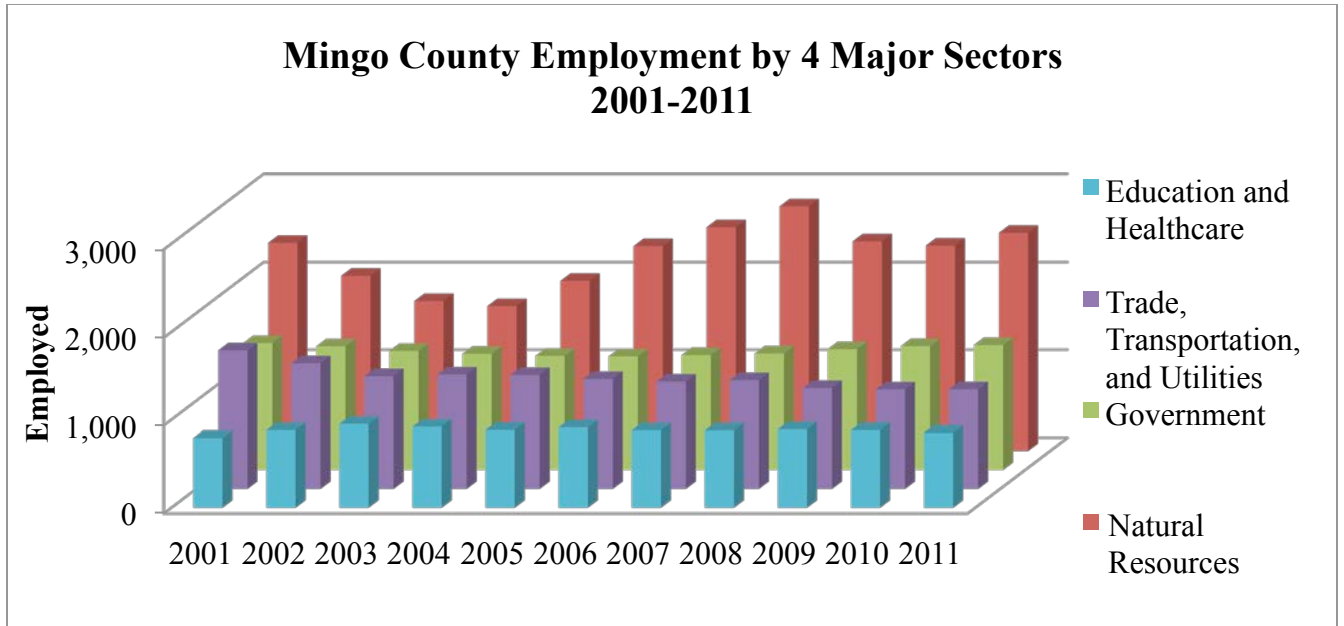
Figure 4



Source: Workforce WV

Four sectors have been the major contributors to employment throughout the past decade: Natural Resources; Trade, Transportation, and Utilities; Government and Education; and Healthcare. The Natural Resources sector has consistently been the highest employer and has also been the most erratic. The other sectors have maintained a fairly consistent employment level in the county.

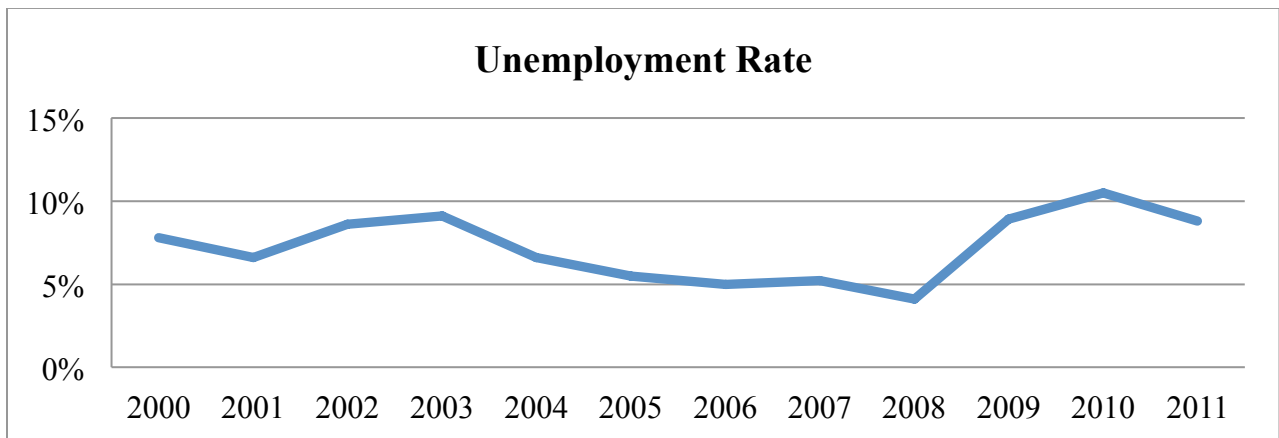
Figure 5



Source: Workforce WV

The civilian labor force in the county, the statistic most interesting to determine potential investors, is at the lowest end of the spectrum. As Map 3 shows, it is consistent with the participation rates of other coalfield counties. It is important to note that this is the exact situation in which a land use master plan is most effective. Unemployment over the past decade has been erratic (Figure 6). Mingo County began seeing a decrease in its unemployment around 2004 as coal mining and economic activity began returning. The unemployment rate increased sharply at the end of the decade, due to the recession and the cost-saving measures of the coal companies. Map 4 provides unemployment rates for Mingo in 2010 compared with the rest of the State.

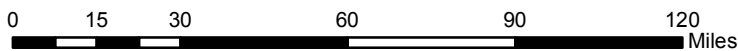
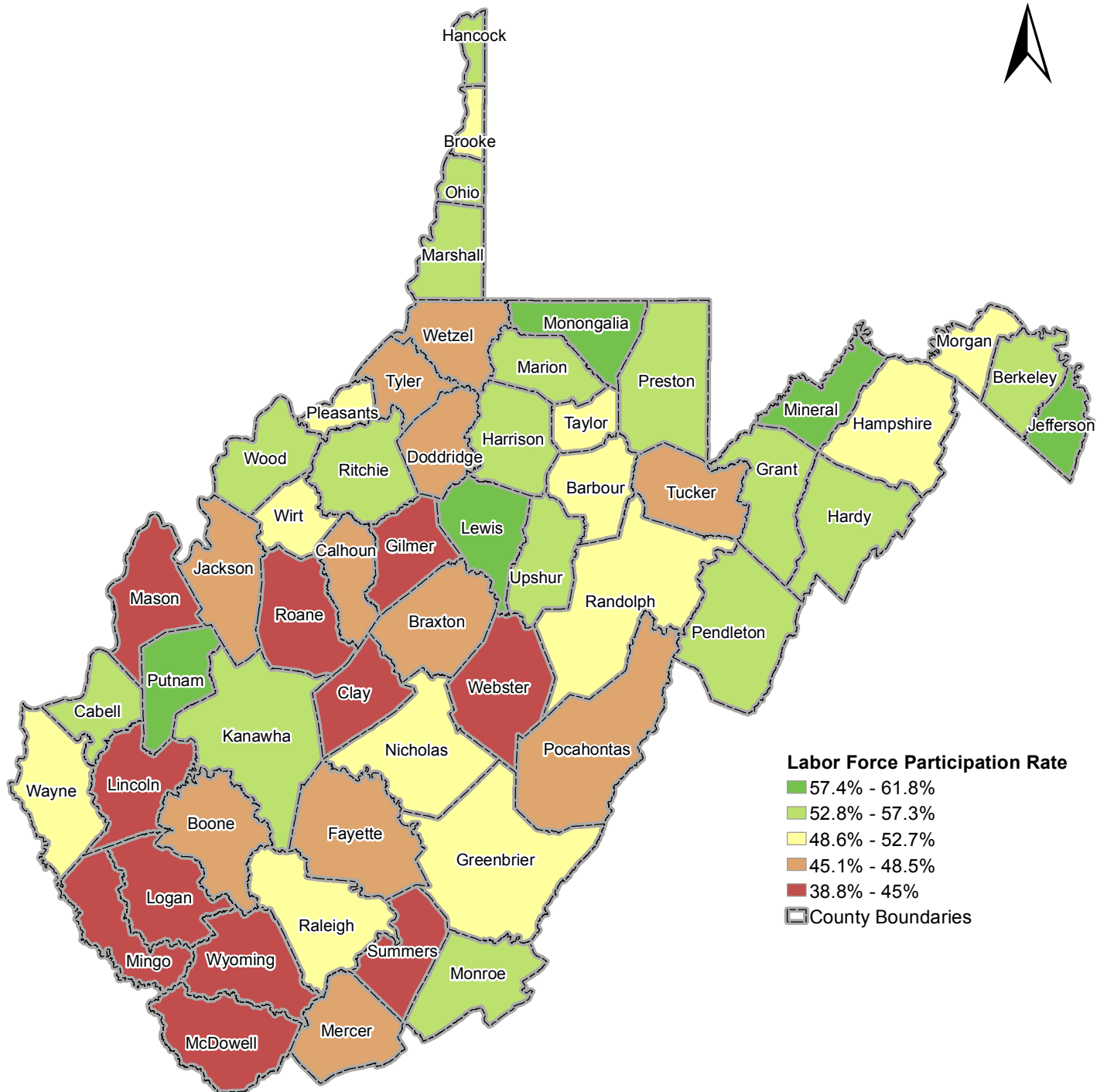
Figure 6



Source: Workforce WV

Demographic

Labor Force Participation Rate

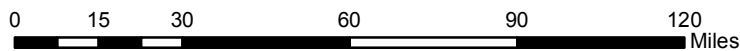
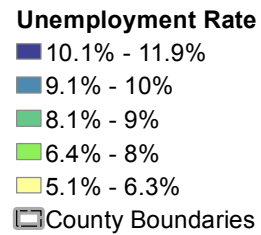
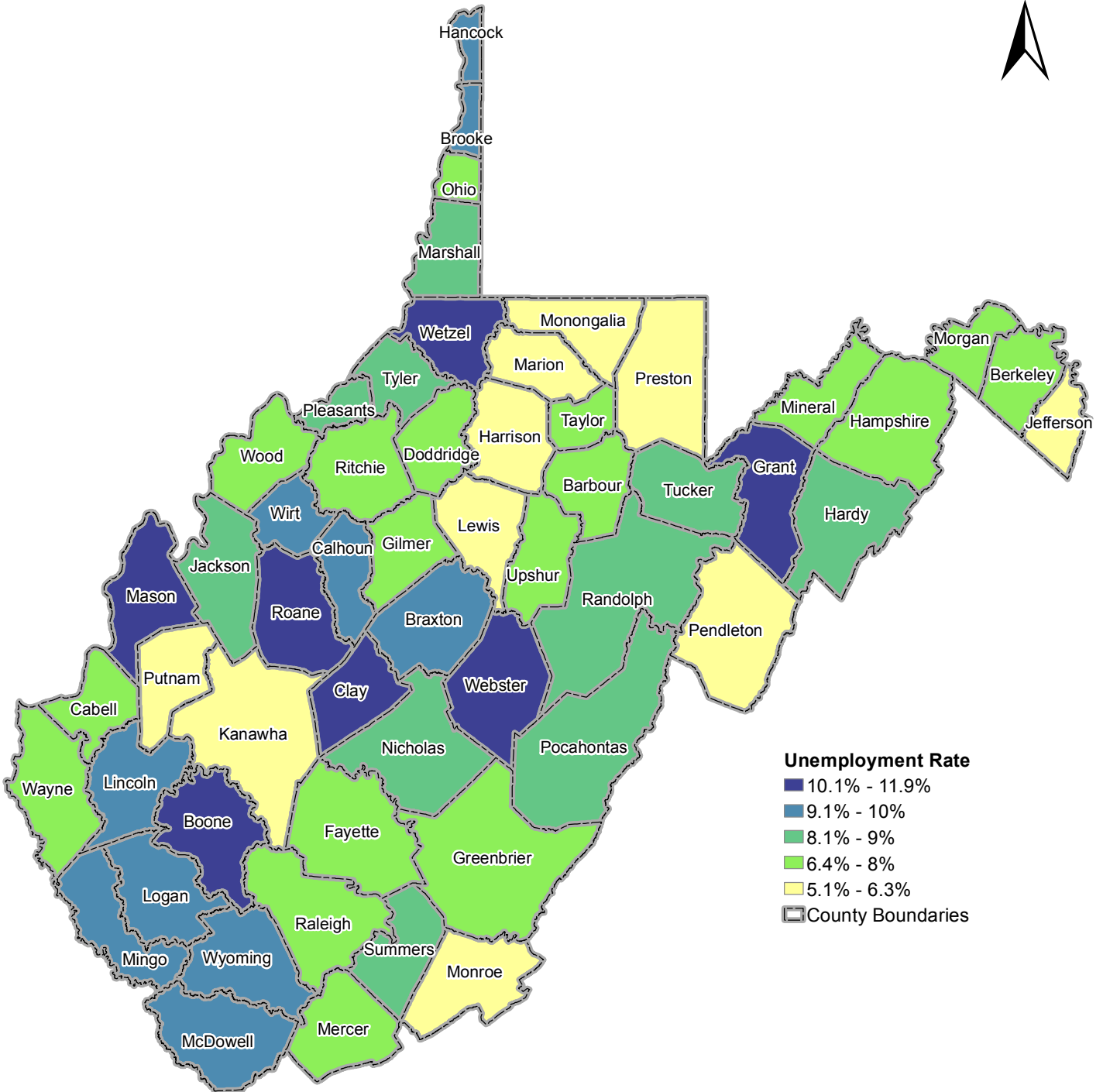


Data Source: Workforce WV 2011

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Demographic Unemployment Rate



Data Source: Workforce WV 2011

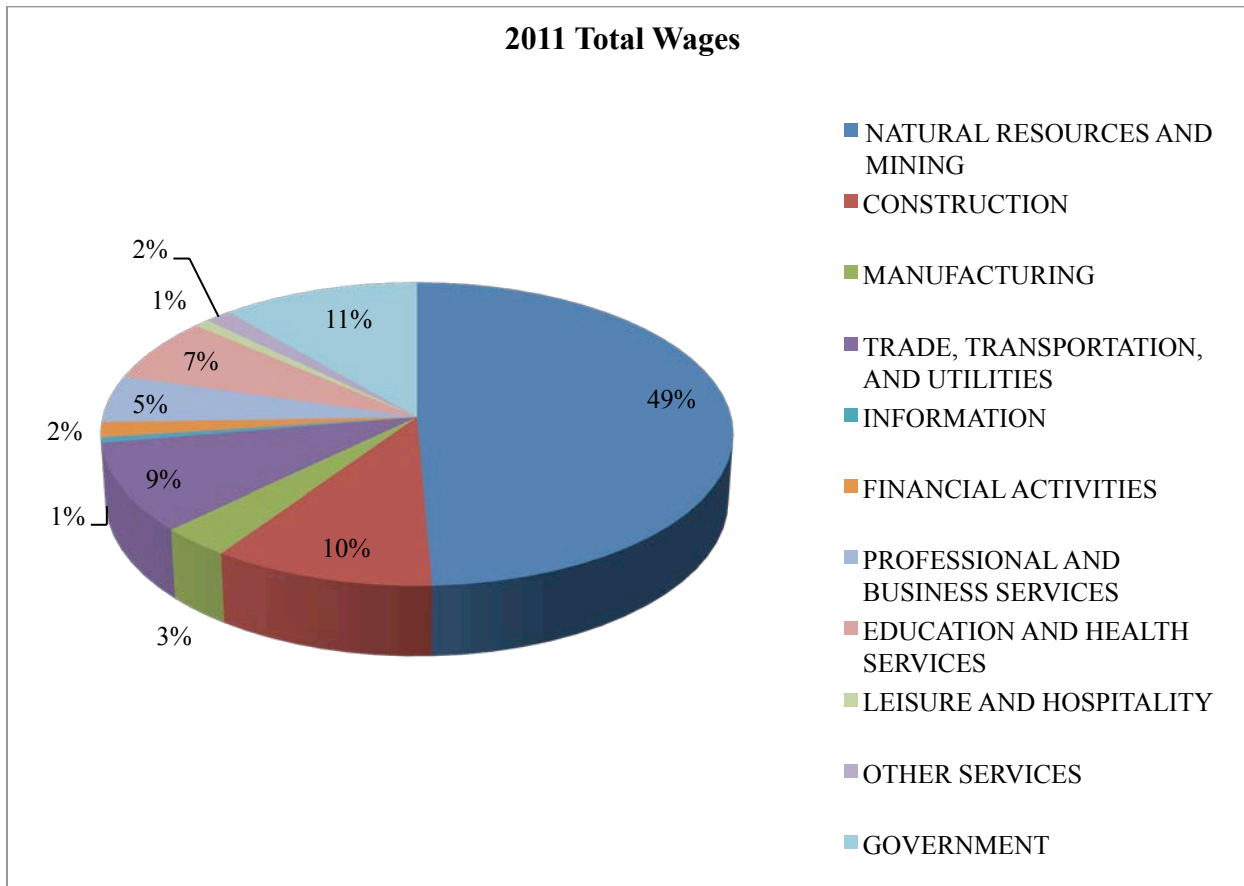
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Wages and Income

Mingo County's wage contributors are varied. However, 49 percent of total wages came from natural resources and mining; 90 percent of wages in this sector were derived from surface and underground coal mining (Figure 7). Pay for these jobs appears to have been exceptional, contributing almost half of earned wages but only a third of total employment for the county.

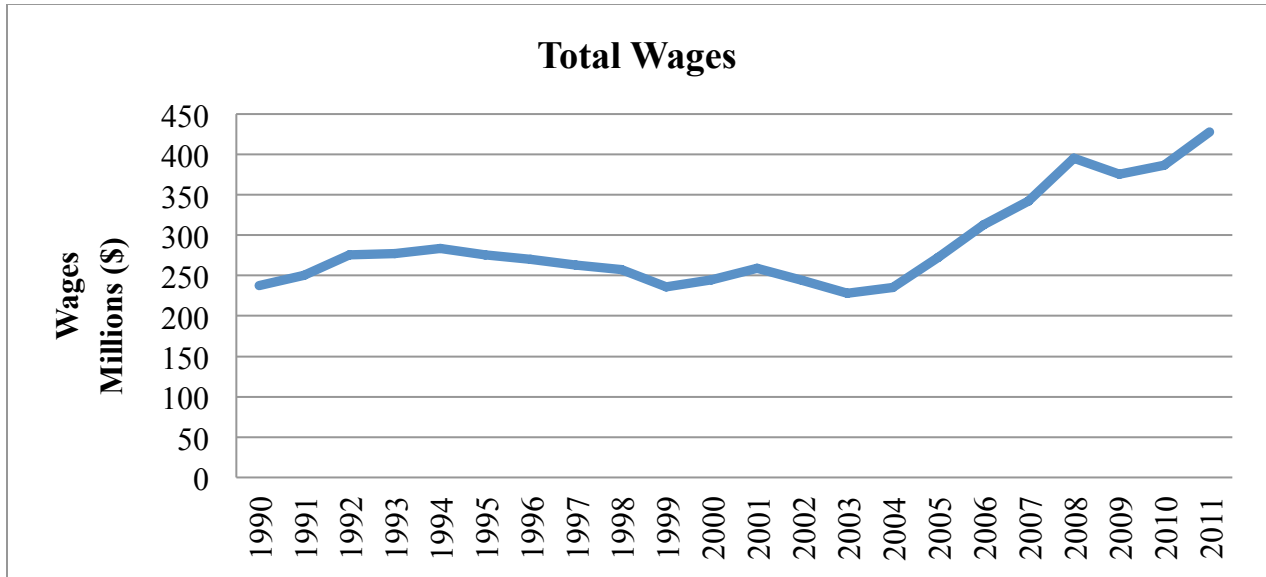
Figure 7



Source: Workforce WV

Historically, wages for Mingo County have shown a tendency to fall. This is regularly attributed to the decline in coal mining and the use of coal as an energy source. Figure 8 shows total wages for Mingo County, which steadily declined until 2004. The year 2005 saw the return of the importance of coal, with the rise of demand in the BRIC nations, the continuing rise in petroleum prices, and more focus on clean coal initiatives and safer mines. A look at the changes in employment from 2004 to 2006 reveals that the return of coal mining to Mingo County played a major role in the return of total wages; the exact reason is difficult to ascertain.

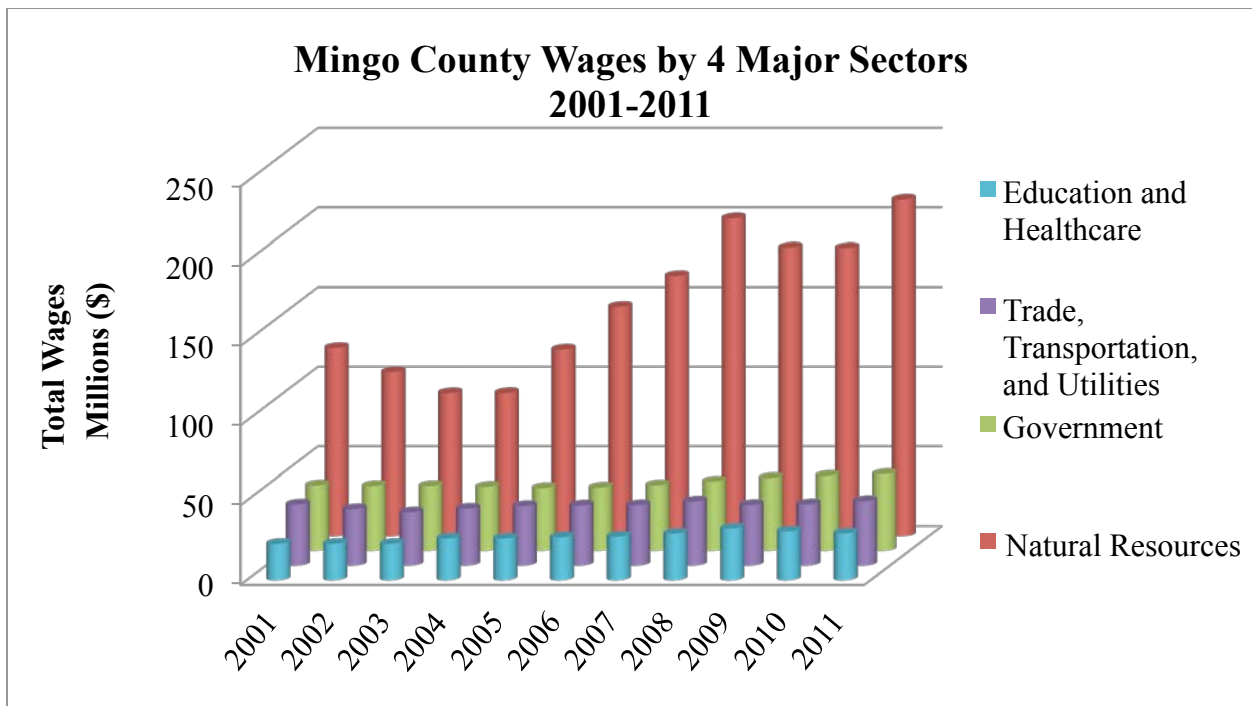
Figure 8



Source: Workforce WV

Figure 9 confirms natural resources wages, made up mostly of mining, as the source of deviations in total wages throughout the past decade. Wages for the other major employment sectors can be seen as mostly constant and dwarfed by mining wages.

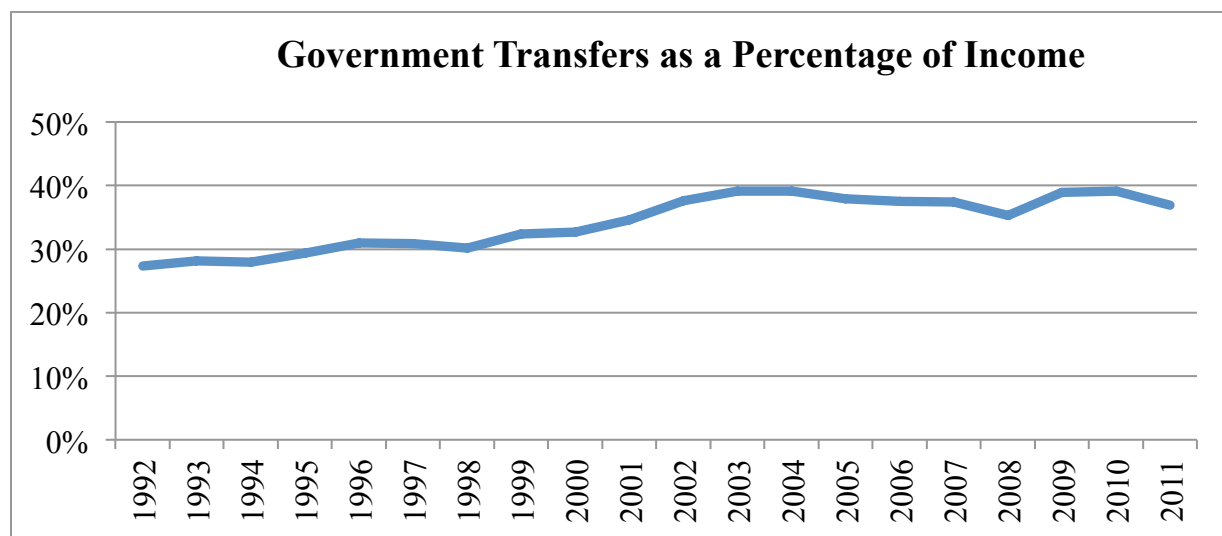
Figure 9



Source: Workforce WV

In most American counties, one would find that the majority of income for people stems from wages. In Mingo County, however, an important distinction must be made between income and wages. Income is the total receipt of earnings resulting from any economic activity, while wages are derived from actual work in an employed setting. Therefore, dividends from stockholdings are considered income, but not wages. The distinction is necessary in the case of Mingo County because in 2011, Mingo County wages were \$428 million for all industries.⁴ Income for the County was larger (around \$800 million). Though there are many components to income other than work earnings, Mingo County is particularly notable because about 36 percent of total Mingo County income is derived from government transfers.⁵ Government transfers accounted for about 95 percent of total transfers to Mingo County, dwarfing transfers from private institutions such as charities. Mingo County has depended heavily on government transfers for the past 30 years, with said transfers contributing a quarter to over a third of county income.

Figure 10



Source: United States Bureau of Economic Analysis

The total personal income of Mingo County is therefore made up of 37 percent government transfers and about 60 percent wages from work. Mingo County is not alone. While being 10th in percentage of income from government transfers, the next 21 counties' government transfers still make up over a third of the income for each county. According to the BEA, per capita income was \$30,862 for Mingo County. Earned income, or income from work, is displayed in

⁴ "Employment and Wages – 2011, Mingo County," Workforce WV, Accessed February 13, 2013, <http://www.workforcewv.org/lmi/EW2011/ew11x059.htm>

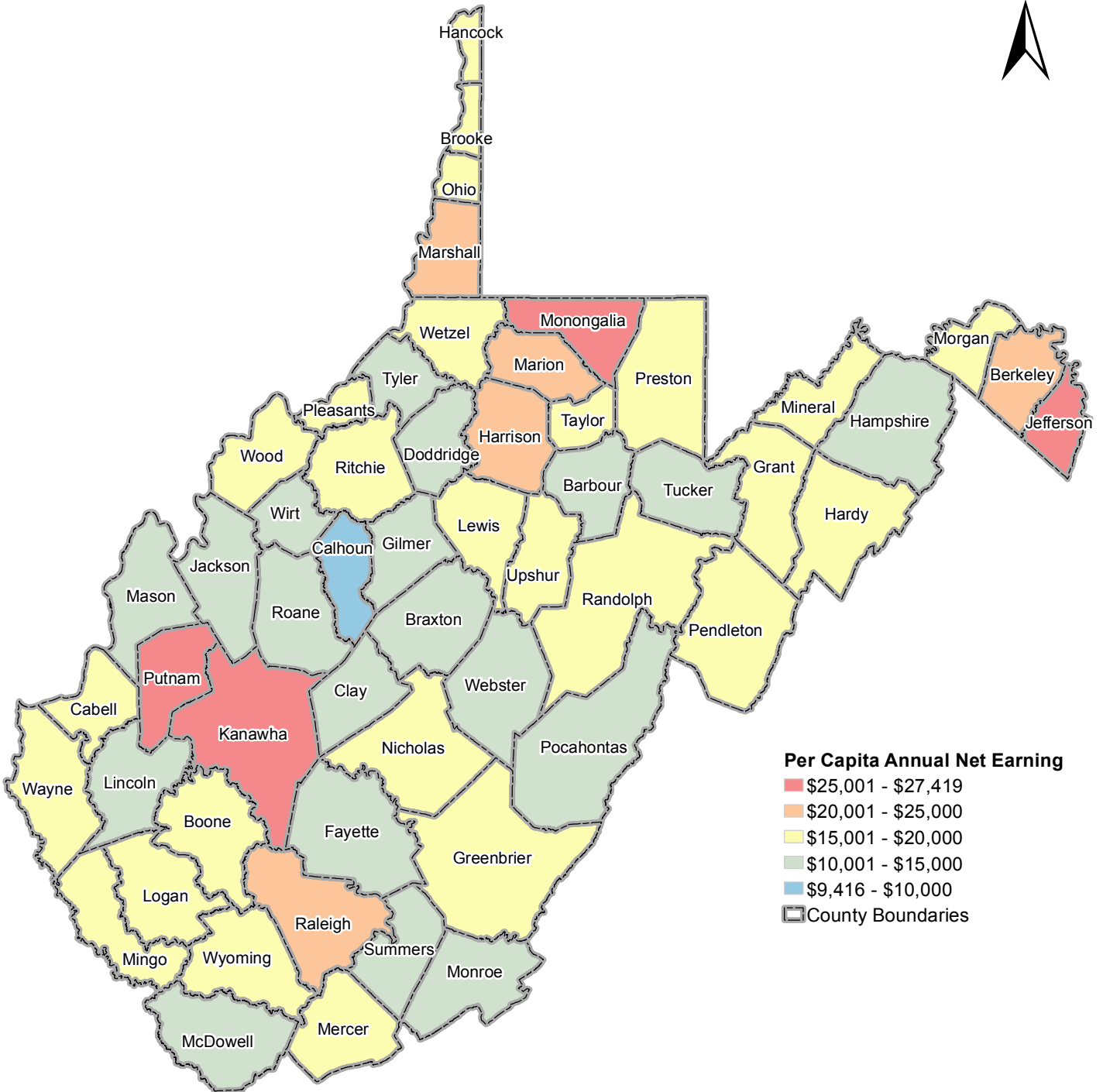
⁵ "Tables CA 04 and CA 35 analysis," Bureau of Economic Analysis, Regional Economic Accounts, Local Area Person Income and Employment, Accessed February 13, 2013, <http://www.bea.gov/regional/index.htm>.

Map 5, and Mingo is now ranked about the median in earned income in West Virginia. Per capita income has steadily grown for Mingo as a result of the mix between wages and transfers.

Another measure of economic health is the number of establishments that do business in the area. For Mingo County, however, coal mining tends to be done by singular companies, so even though they provide the majority of employment and wages, they still only count as one establishment. Map 6 shows the number of establishments in each county in West Virginia. Mingo County is on the lowest end of the spectrum, but a quick dismissal should not be made, as the reason above may be keeping the true interpretation of the data from being revealed.

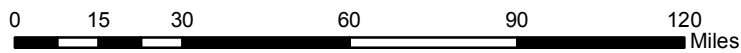
Demographic

Per Capita Annual Net Earning



Per Capita Annual Net Earning

- \$25,001 - \$27,419
- \$20,001 - \$25,000
- \$15,001 - \$20,000
- \$10,001 - \$15,000
- \$9,416 - \$10,000
- County Boundaries



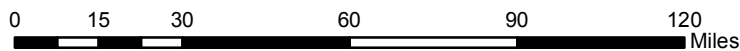
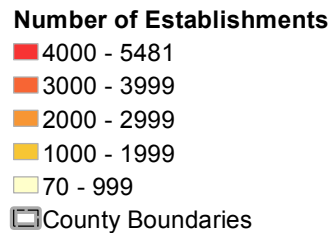
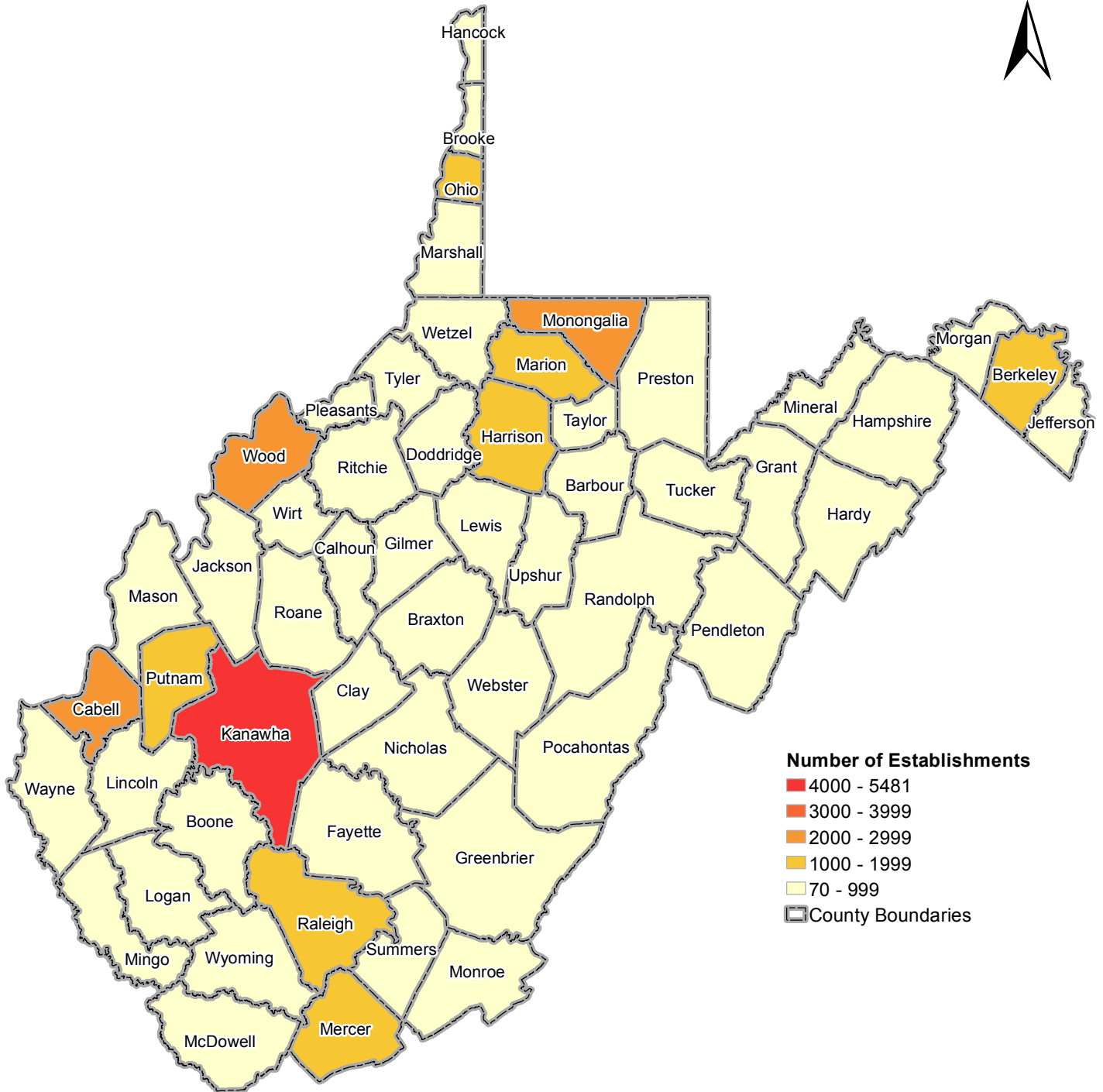
Data Source: United States Bureau of Economic Analysis 2010

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www.njrati.org

Demographic

Number of Establishments



Data Source: United States Census Bureau 2010

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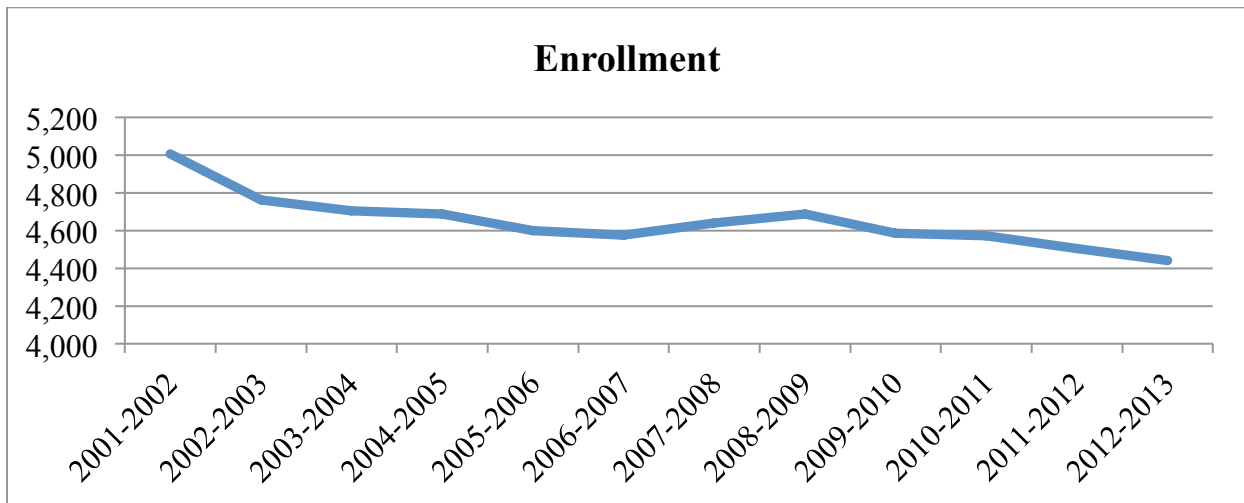


Education

Mingo County has two high schools, four middle schools, and five elementary schools as of the 2011-2012 school year.⁶ It also has two K-8 schools and one PK-6 school.

Mingo County 2nd month school enrollment has steadily dropped, most likely due to the drop in population. From 2006 to 2008 a spike in school enrollment followed the spike in wages and employment, but here again the effects of the coal companies' cost cutting measures and the recession of 2008 can be seen. Like many parts of education, Mingo County 2nd month enrollment is at the low end of the spectrum but greater than most counties in central and eastern West Virginia (Map 7).

Figure 11

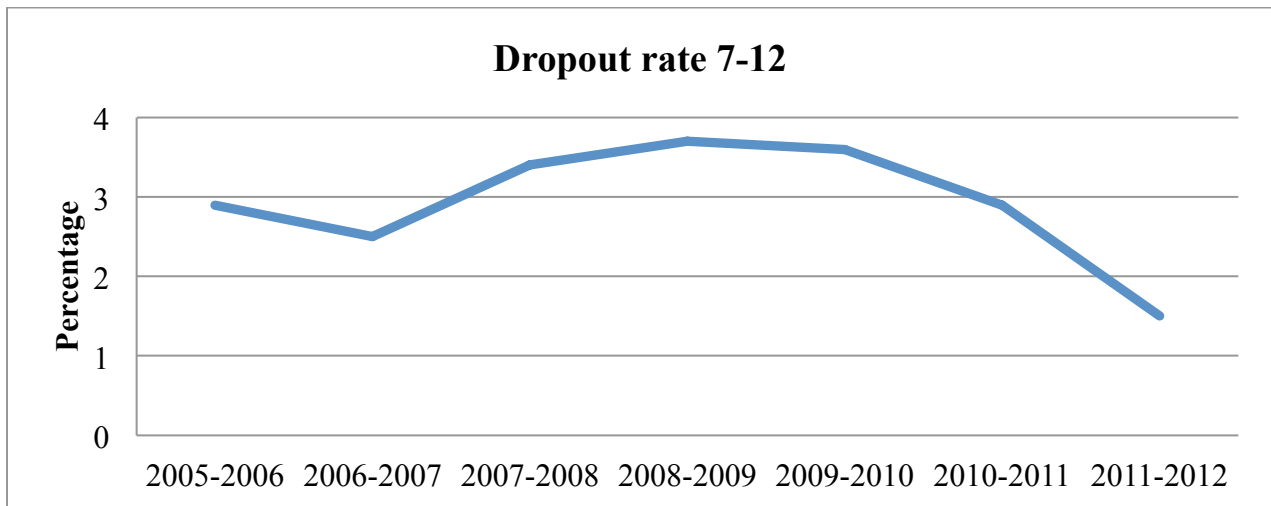


Source: WVEIS

The West Virginia Education Information System (WVEIS) also has dropout rates for the school years from 2005 to 2012. Dropout rates for grades 7-12, which showcase the most likely time for school dropouts, do not follow the total enrollment statistic, as total enrollment is computed with the grades below 7th grade as well. The dropout rate spiked in the 2007-2008 school year, possibly due to the return of low-skilled coal mining jobs, and then decreased to its lowest point in the available WVEIS measurement in 2011-2012. This is likely due to recession and the cost-cutting factors in the coal industry as mentioned consistently throughout this report (Figure 12).

⁶ "School Profiles," West Virginia Education Information System, West Virginia Department of Education, Accessed February 13, 2013, http://wveis.k12.wv.us/nclb/profiles/c_profile.cfm?cn=054.

Figure 12

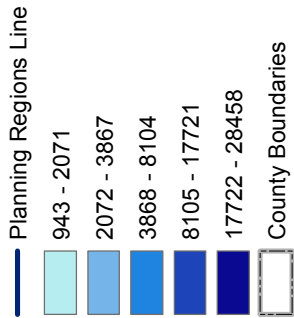
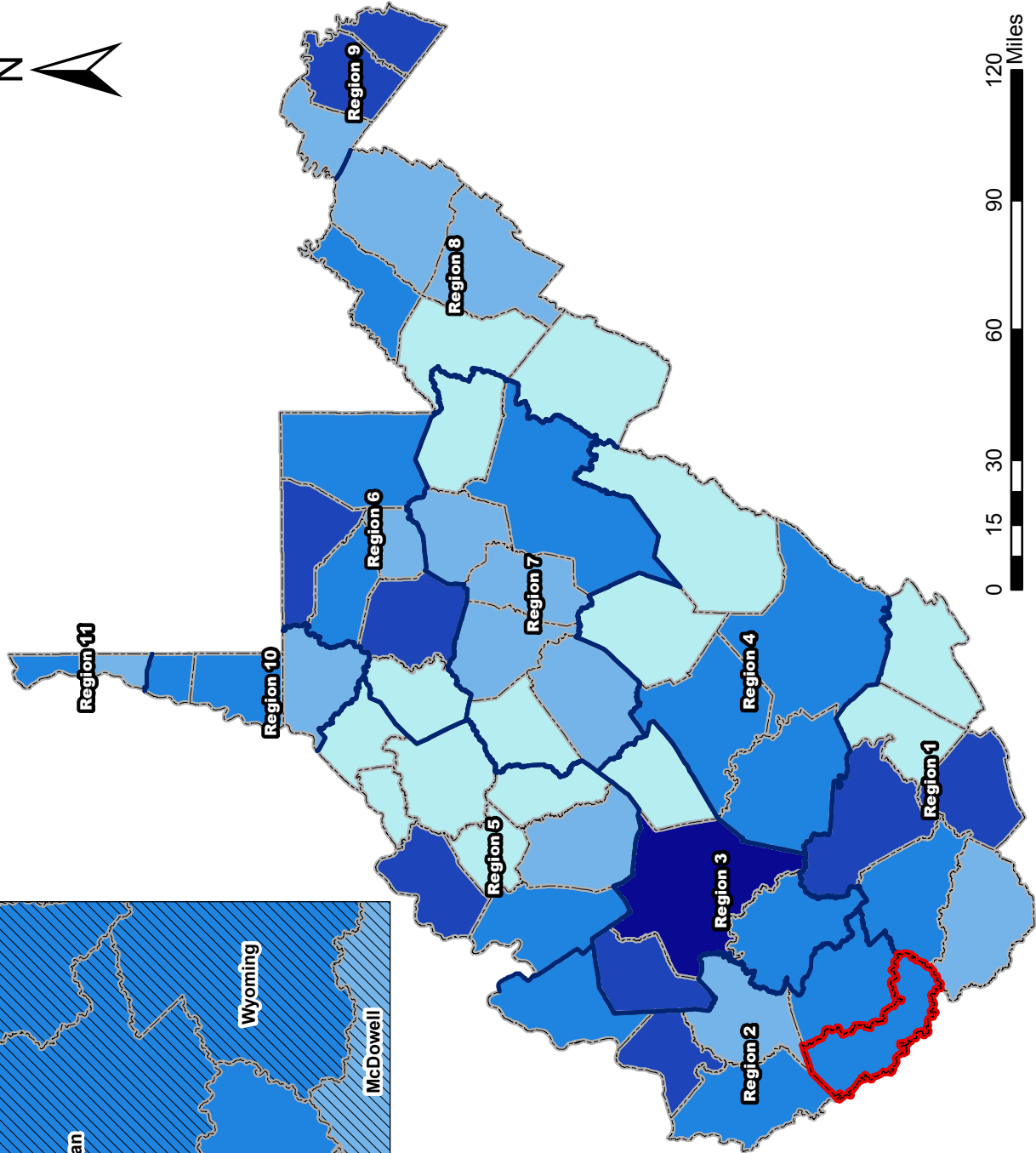
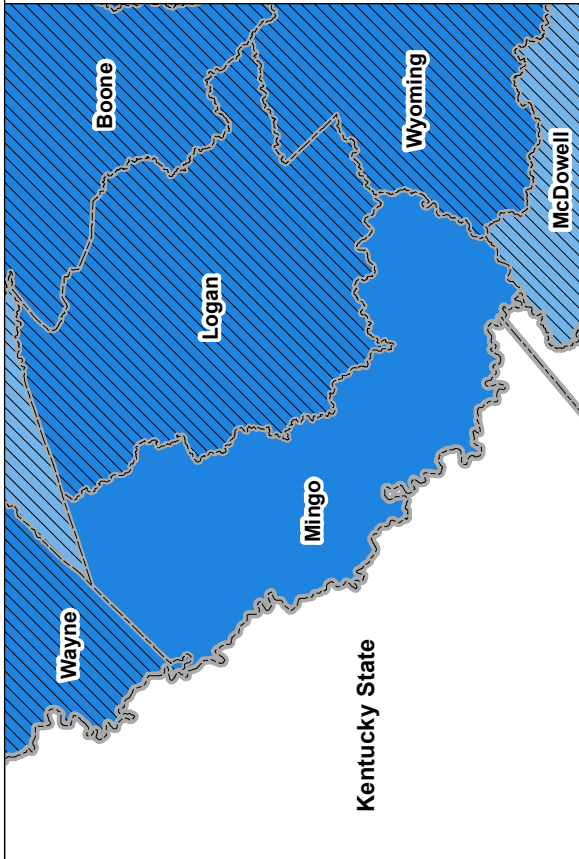


Source: WVEIS

Mingo County has a below average dropout rate for grades 7-12. This is an achievement that not many counties in West Virginia share. Map 8 shows each county's dropout rate. Maps 9 and 10 show the total graduates and the graduation rate by county. Mingo County has a small number of graduates compared to counties like Berkeley and Kanawha but more than most of the counties in the north-central area of West Virginia. The graduation rate is slightly lower than most of the State's, however. Mingo County has several schools with large attendance; their locations are noted in Map 11. Not coincidentally, these schools are located on major routes, mostly US routes. The largest school by attendance in the County is Mingo County Comprehensive. The significance of this school's placement is the location of the King Coal Highway. As the King Coal Highway in this part of the county has already been completed, development has already begun by placing a large school on the route. This showcases the advantages of development, and proves that development is already occurring.

NCLB - Second Month Enrollment

Mingo County



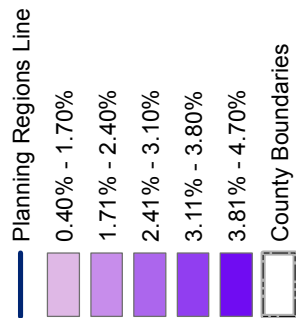
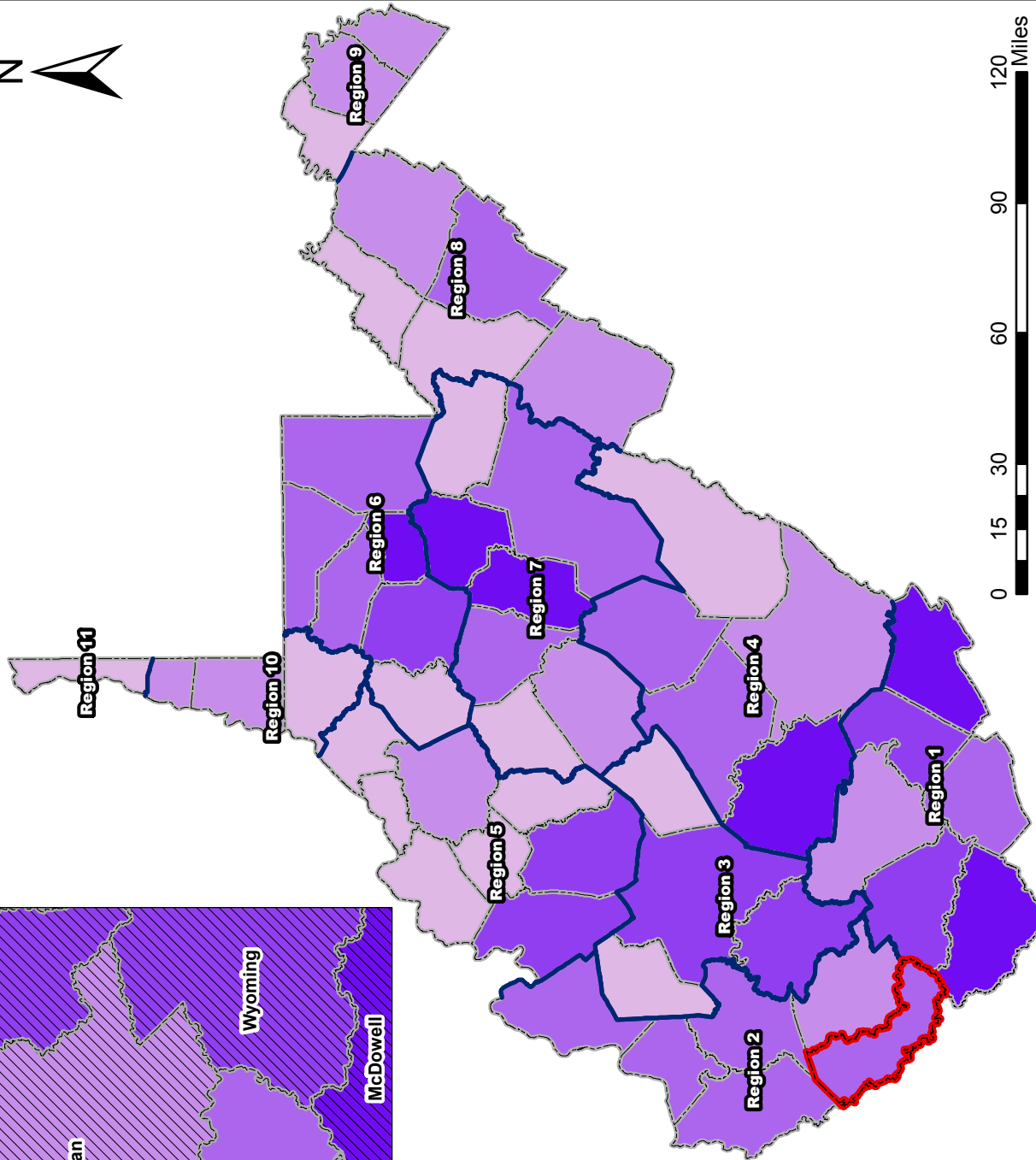
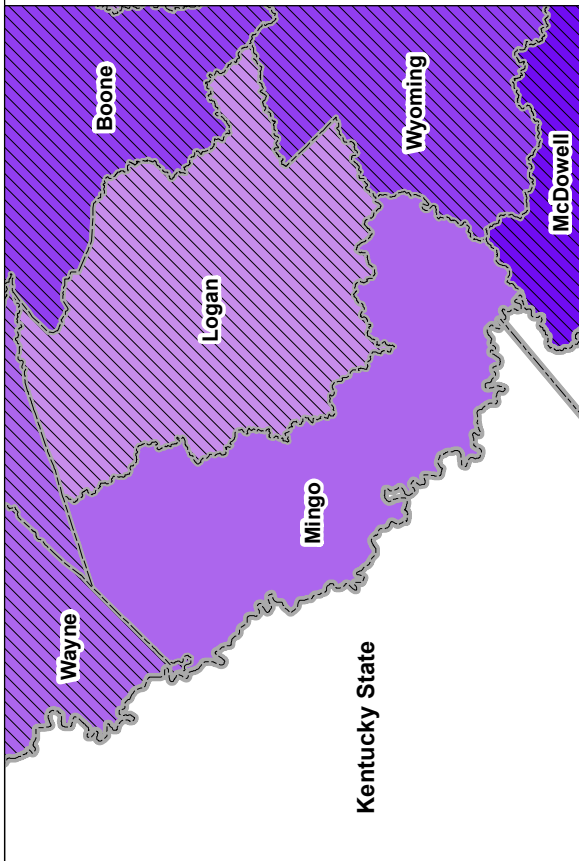
Data Source: West Virginia Department of Education 2012

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NCLB - Dropout Rate

Mingo County



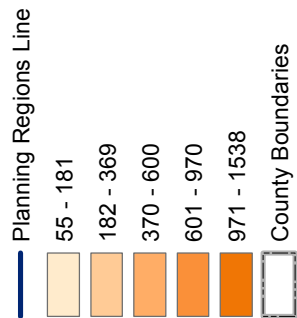
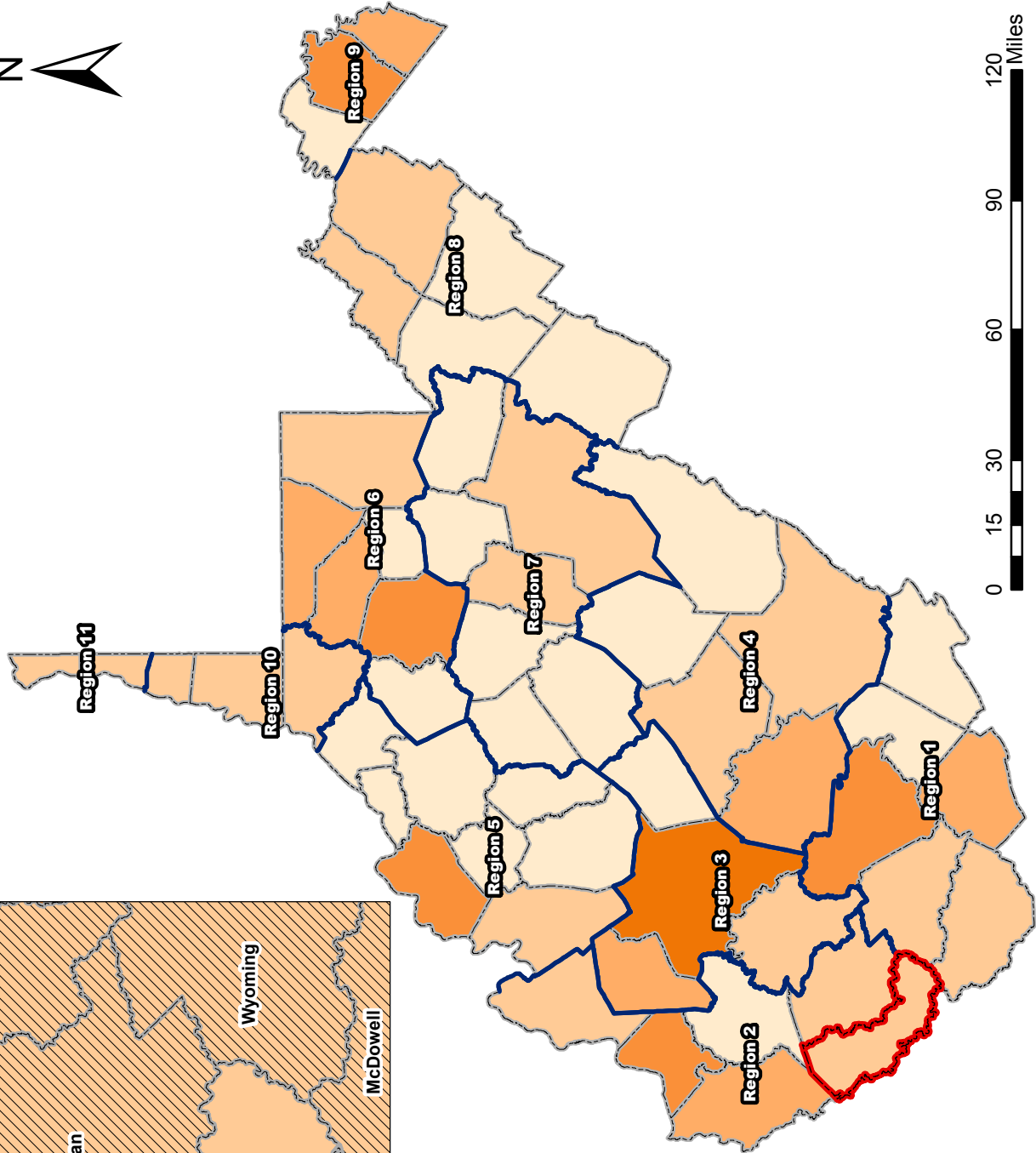
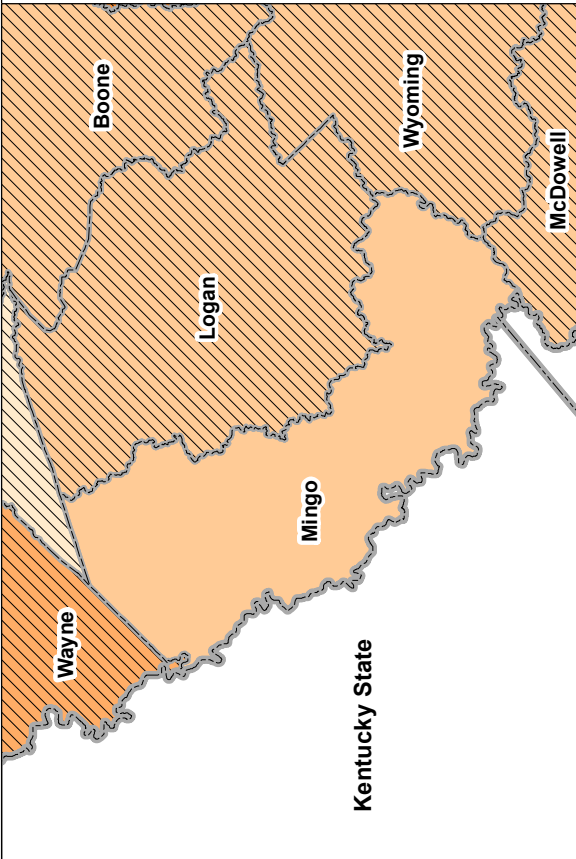
Data Source: West Virginia Department of Education 2012

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NCLB - Total Graduates

Mingo County

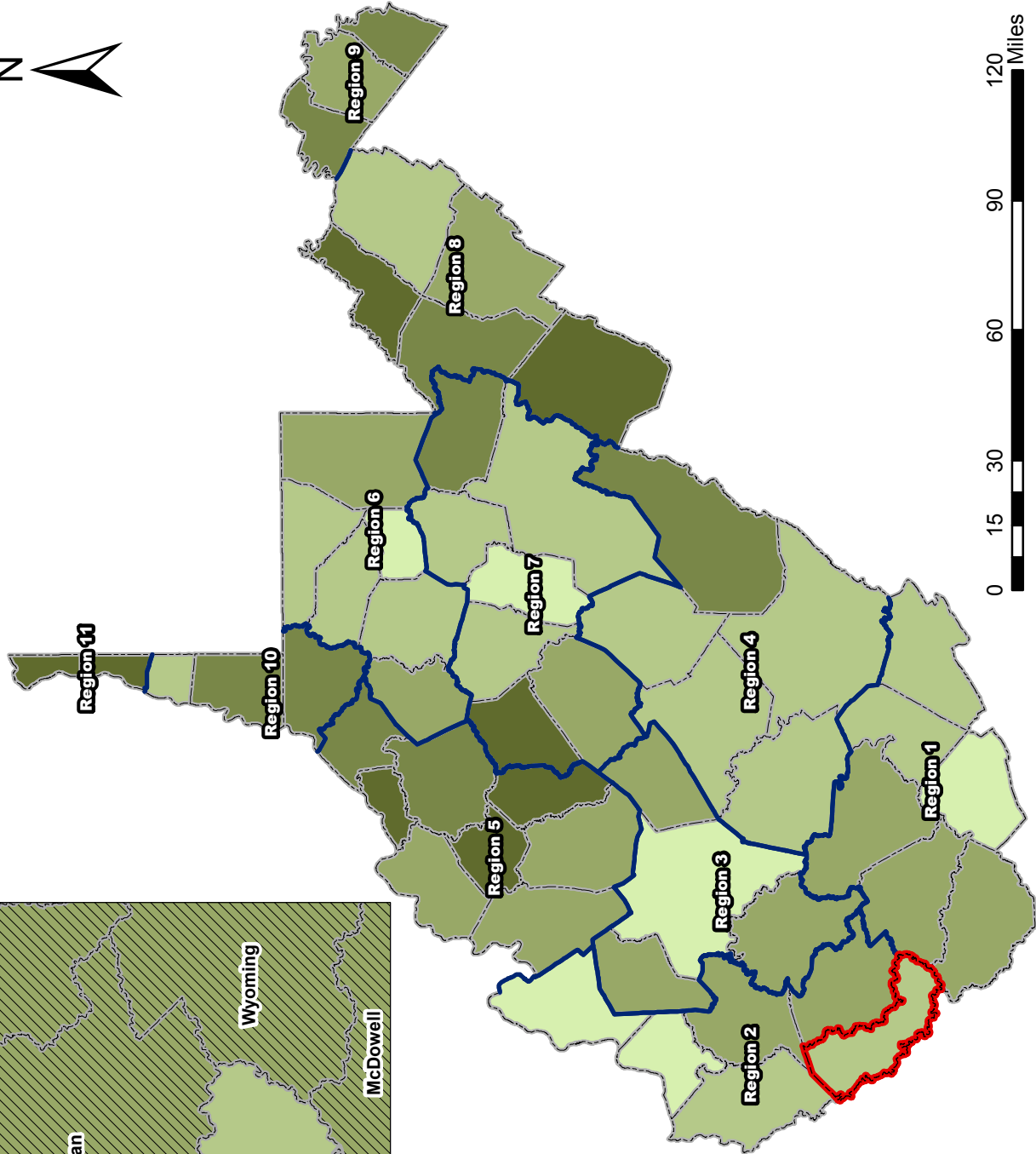
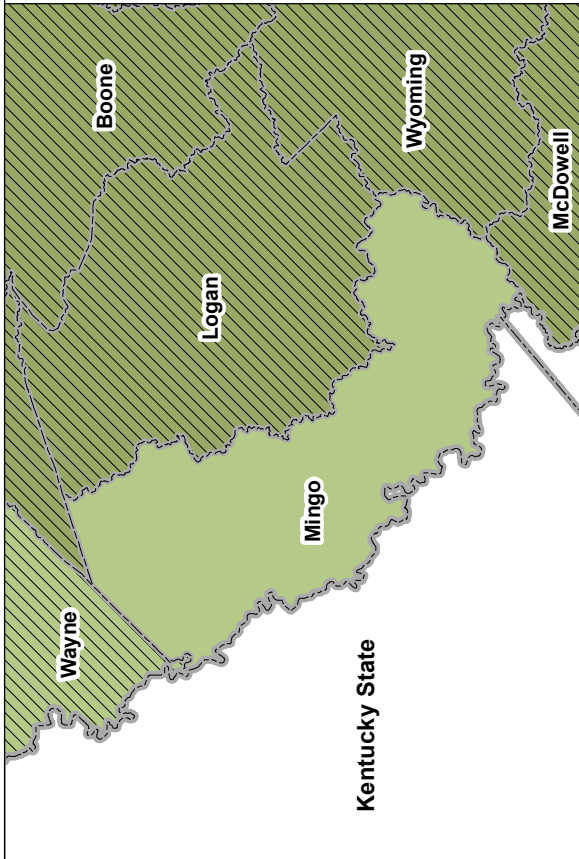


Data Source: West Virginia Department of Education 2012

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NCLB - Graduation Rate

Mingo County



- Planning Regions Line
- 67.40% - 71.80%
- 71.81% - 76.00%
- 76.01% - 80.30%
- 80.31% - 84.30%
- 84.31% - 90.30%
- County Boundaries

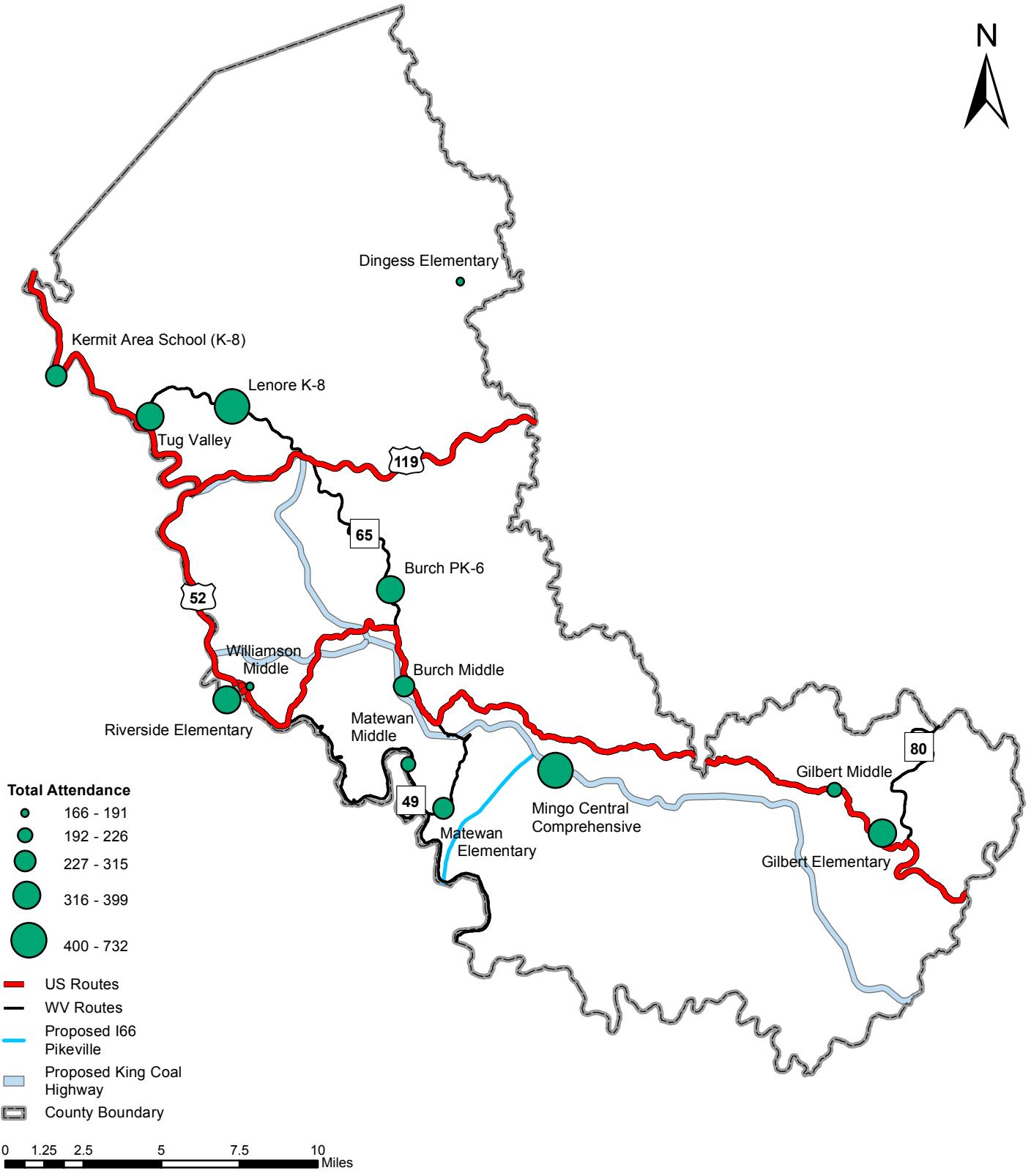
Data Source: West Virginia Department of Education 2012

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Total Attendance by School - 2012

Mingo County



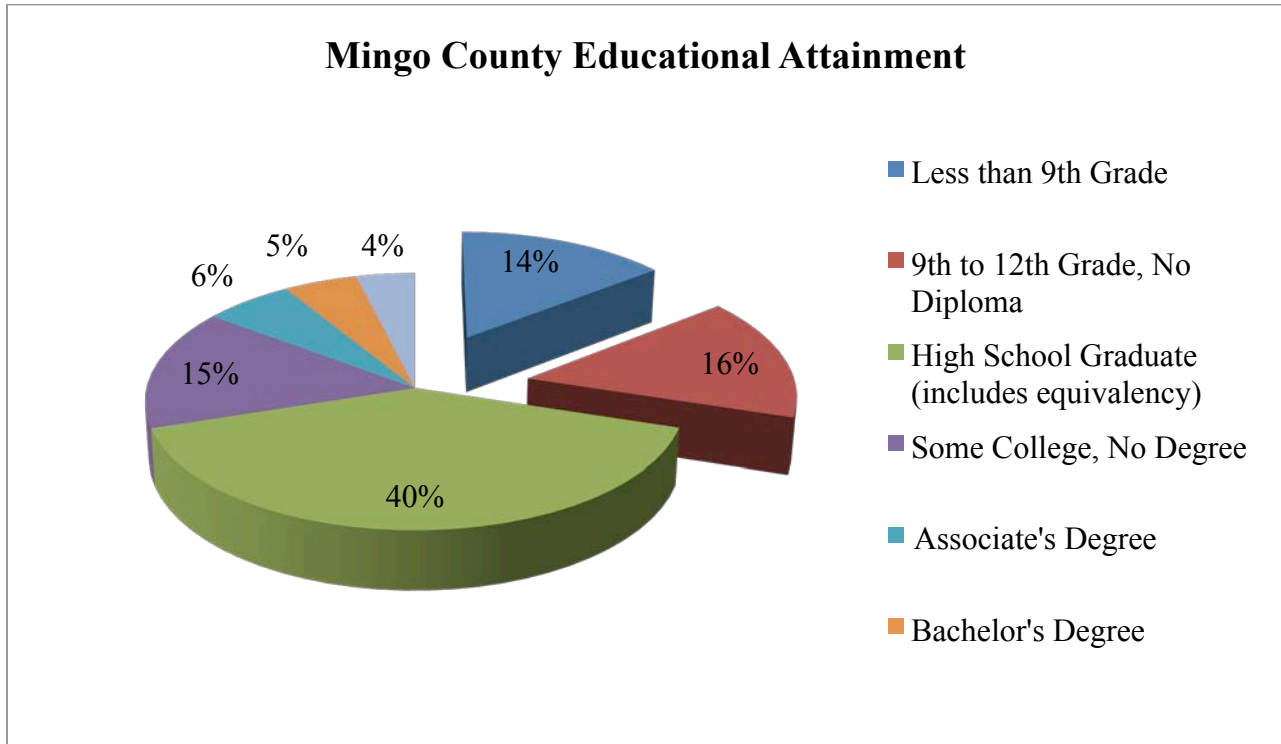
Data Source: West Virginia Department of Education 2012

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The ACS also maintains data on the educational attainment of the population that is 25 years and over. The majority of the residents over 25 in Mingo County have a high school diploma or equivalent, though a close minority has less. However, the ACS estimates that 70 percent of Mingo County residents have a high school degree or higher.

Figure 13



Source: 2011 American Community Survey 5-Year Estimates

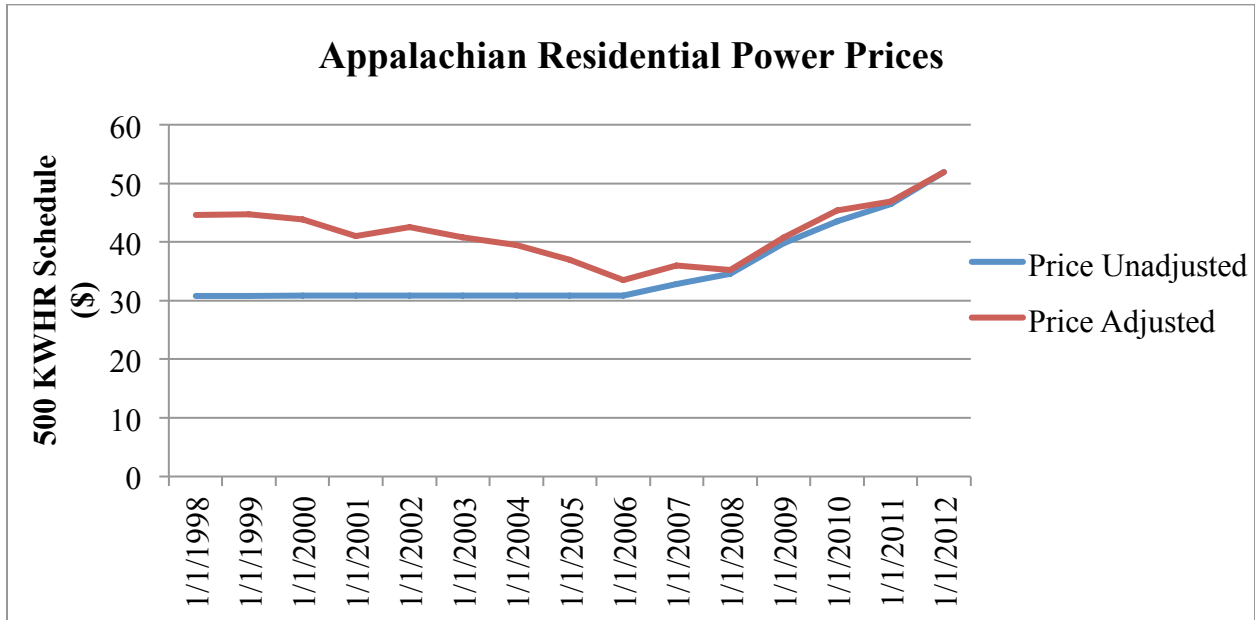
Utilities and Infrastructure

Mingo County has 19 utility companies according to the West Virginia Public Service Commission (PSC). Economic development depends on infrastructure, and Mingo County has several providers of water, sewer, and telecommunications. One company, Appalachian Power Company (American Electric Power), provides residential, industrial, and large-capacity service to Mingo County.

The West Virginia Public Service Commission maintains tariff rates for all companies involved in providing utilities. Of particular importance are electricity tariffs; the monitoring of these tariffs is an ongoing project. To that end, the PSC observes the growth rate of tariffs and possesses a 20 year comparison based on the average residential utility rate of the State. This provides a significant overview of how electric prices behave in West Virginia as a whole. As Figure 14 shows, if the tariffs are adjusted by the Consumer Price Index (CPI), it would appear

that rates are constantly increasing. Viewing rates in such a manner would be a misunderstanding, and would be incorrect in reference to a state with the highs and lows of West Virginia's past. The Bureau of Labor Statistics has a CPI for electricity prices dating to 1998. The adjusted and unadjusted prices are provided in Figure 14.

Figure 14

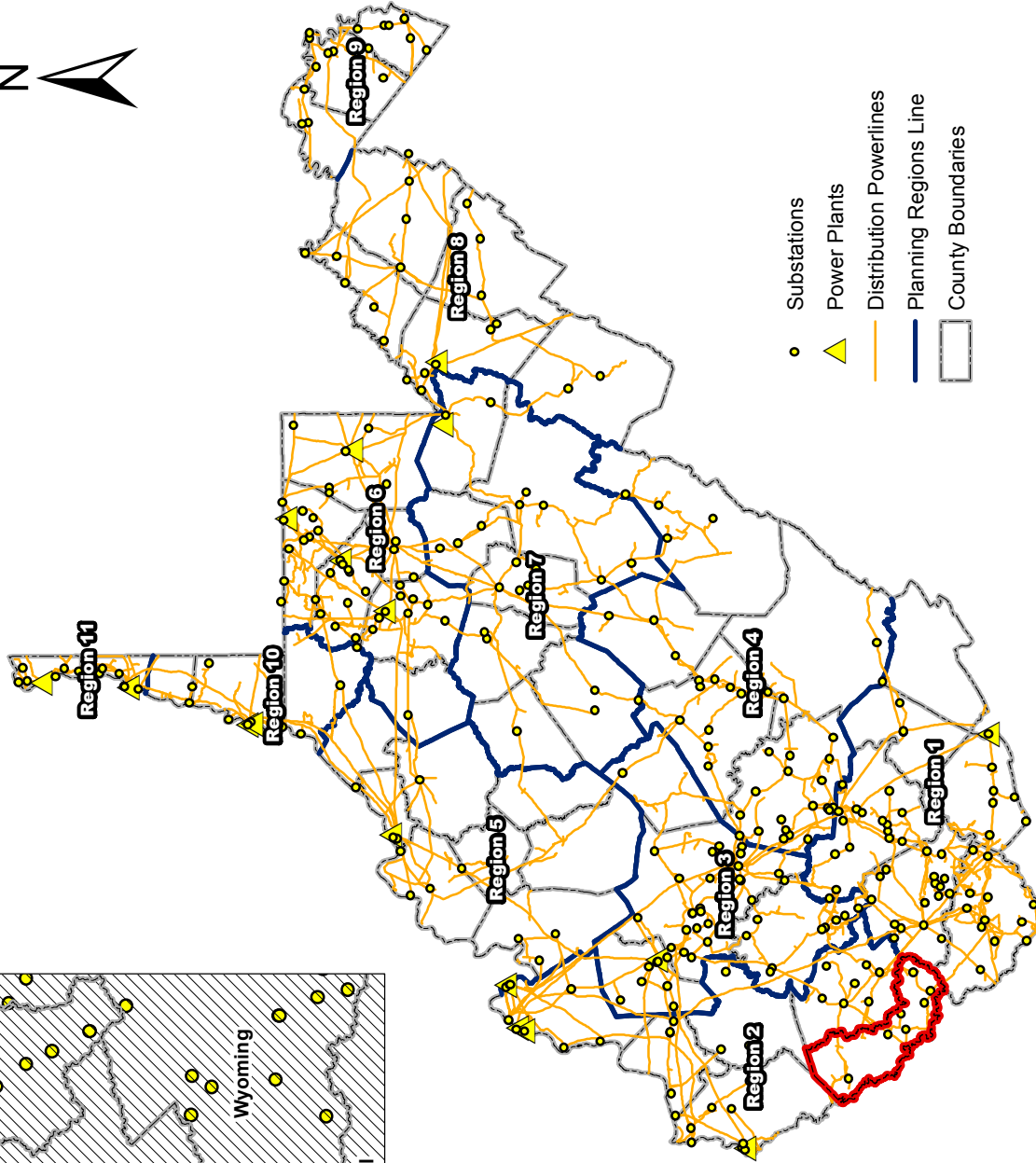
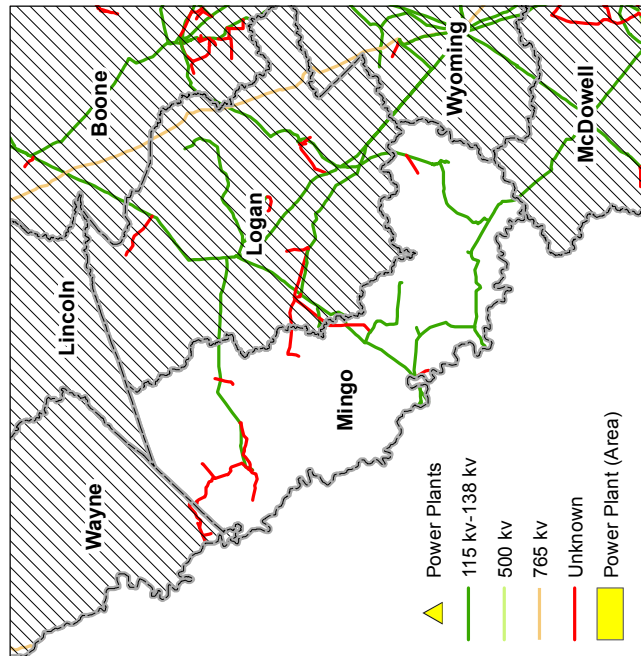
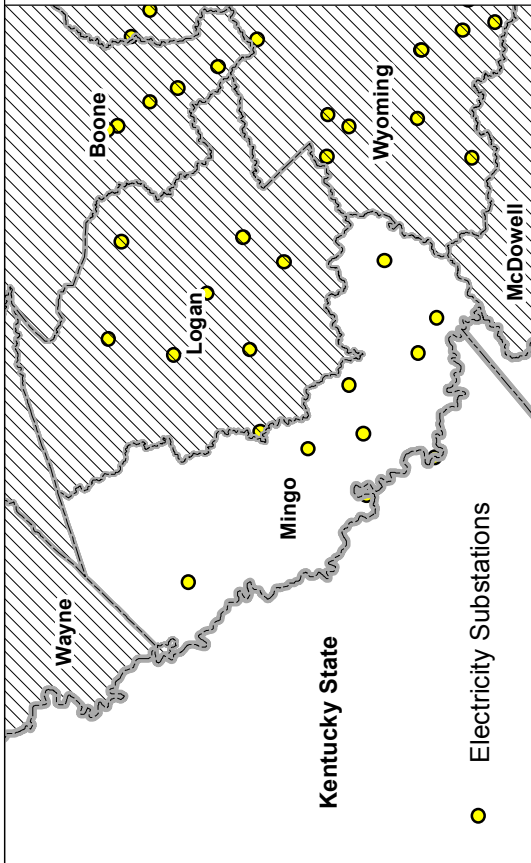


Source: WV Public Service Commission and United States Bureau of Labor Statistics

The graph shows that electricity rates steadily decreased in real terms and through 2006 and remained fairly constant with adjustment. Both adjusted and unadjusted prices have increased since 2006. Many possible factors contributed to this rise, including the increased costs of energy and the increased demand. This is reflected in Mingo as well, as the return of the coal companies saw similar increases in wages and employment around this time. Map 12 also shows the distribution of power lines, plants, and substations within West Virginia and Mingo County.

Utilities - Electricity

Mingo County



Data Source: West Virginia Division of Natural Resources, Statewide Addressing and Mapping 2008

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The two other utilities of particular importance are water and sewer rates. Table 1 displays water and sewer rates for the providers of those services. They are all municipal services with varying rates and categories. Mingo County has 6 municipal sewer and water providers. Maps 13 and 14 show the water and sewer facilities and the served areas for each of these utilities, as well as the solid waste management facilities in West Virginia, including the one located in Mingo.

Table 1: Mingo County Water and Sewer Rates

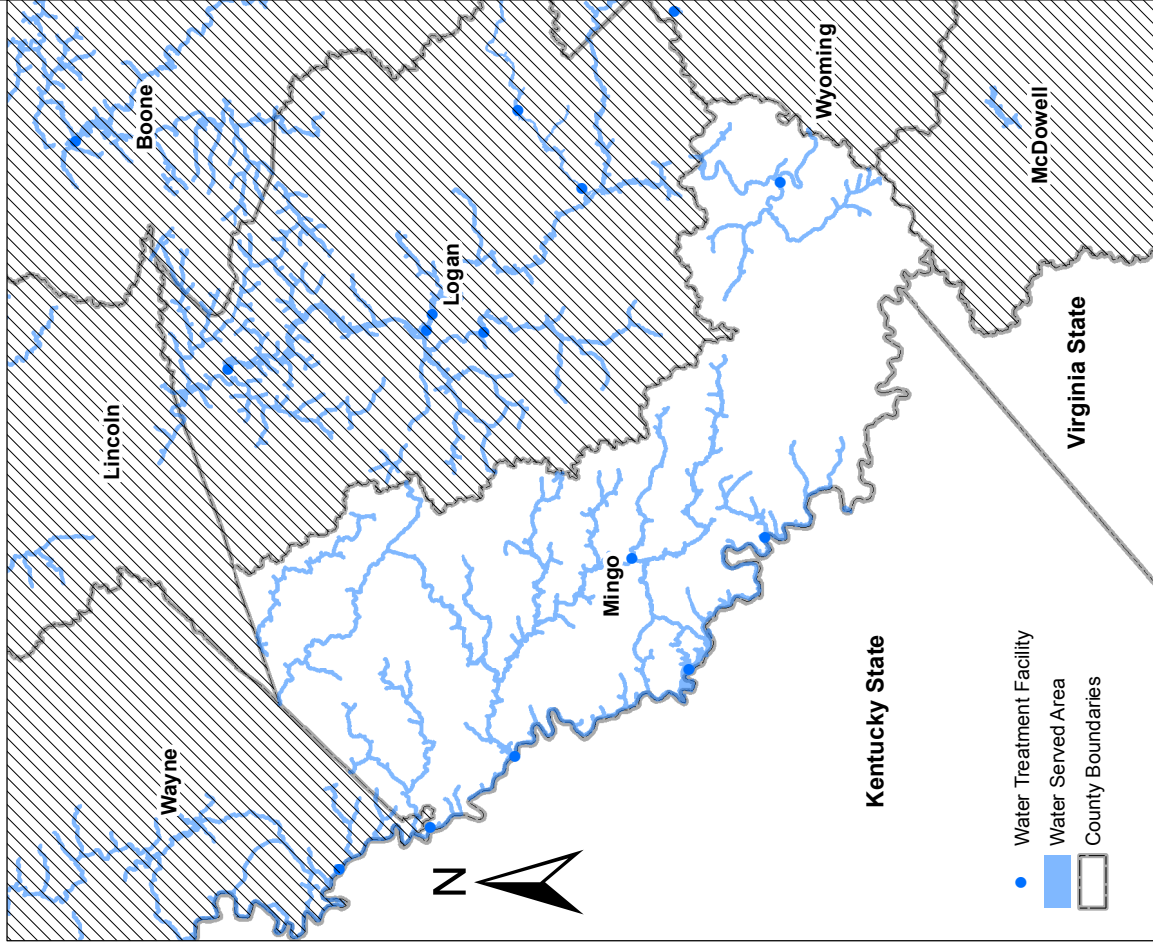
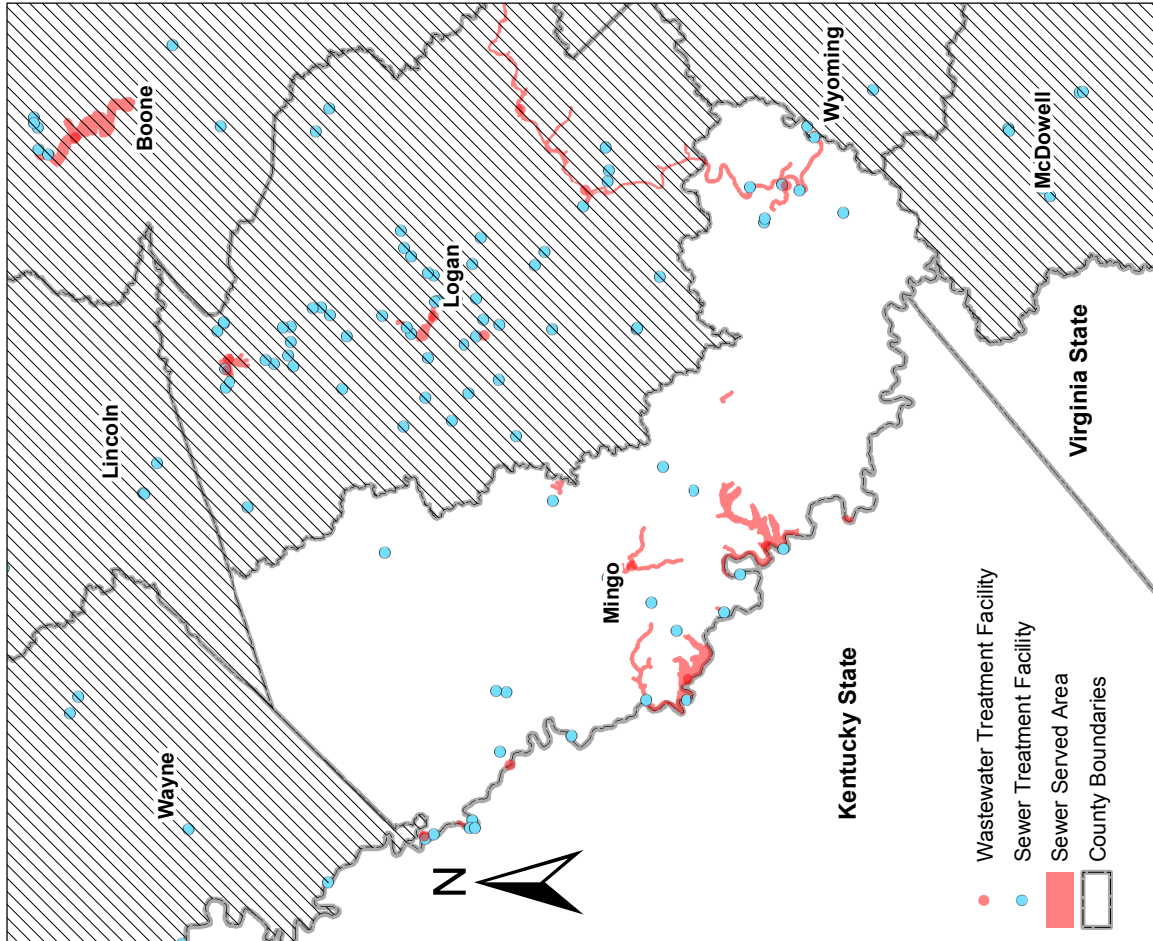
Mingo County Public Service District	
Sewer Rates	
First 3000 gallons used per month	7.63 per 1000 gallons
Next 4000 gallons used per month	6.87 per 1000 gallons
Next 3000 gallons used per month	4.88 per 1000 gallons
All Over 10000 gallons used per month	3.72 per 1000 gallons
Water Rates (Schedule 1)	
All Usage per month	11.20 per 1000 gallons
Water Rates (Schedule 2)	
First 3000 gallons used per month	9.86 per 1000 gallons
Next 3000 gallons used per month	8.12 per 1000 gallons
Next 4000 gallons used per month	7.25 per 1000 gallons
Next 10000 gallons used per month	6.38 per 1000 gallons
Next 20000 gallons used per month	5.51 per 1000 gallons
Next 60000 gallons used per month	4.64 per 1000 gallons
All Over 100000 gallons used per month	4.06 per 1000 gallons
City of Matewan	
Sewer Rates	
First 2000 gallons used per month	12.50 per 1000 gallons
Next 8000 gallons used per month	10.00 per 1000 gallons
All Over 10000 gallons used per month	8.75 per 1000 gallons
Water Rates	
First 2000 gallons used per month	14.00 per 1000 gallons
First 3000 gallons used per month	10.00 per 1000 gallons
Next 5000 gallons used per month	8.00 per 1000 gallons
Next 10000 gallons used per month	6.00 per 1000 gallons
All Over 20000 gallons used per month	5.00 per 1000 gallons
City of Williamson	
Sewer Rates	
First 3000 gallons used per month	7.10 per 1000 gallons
All Over 3000 gallons used per month	7.10 per 1000 gallons
Water Rates (Corporate limits schedule)	
First 4000 gallons used per month	8.00 per 1000 gallons
Next 96000 gallons used per month	6.00 per 1000 gallons
Next 900000 gallons used per month	5.00 per 1000 gallons
All Over 1000000 gallons used per month	4.00 per 1000 gallons
Town of Delbarton	

Sewer Rates	
Residential Usage	38.50 per month
Small Commercial	38.50 per month
Restaruants	56.10 per month
Beauty and Barber Shops	38.50 per month
Funeral Home	56.10 per month
Car Wash	108.90 per month
Medical Half-Way House	108.90 per month
Laundromat	108.90 per month
Clinics	108.90 per month
Schools	460.90 per month
Low-Enrollment Schools	238.70 per month
Small Schools (Headstart)	71.50 per month
Hospitals	108.90 per month
Sewer Rates (pending substantial project completion)	
Residential Usage	46.20 per month
Small Commercial	46.20 per month
Restaruants	67.32 per month
Beauty and Barber Shops	46.20 per month
Funeral Home	67.32 per month
Car Wash	130.68 per month
Medical Half-Way House	130.68 per month
Laundromat	130.68 per month
Clinics	130.68 per month
Schools	553.08 per month
Low-Enrollment Schools	286.44 per month
Small Schools (Headstart)	85.80 per month
Hospitals	130.68 per month
Water Rates	
First 5000 gallons used per month	7.15 per 1000 gallons
Next 5000 gallons used per month	6.75 per 1000 gallons
Next 5000 gallons used per month	6.45 per 1000 gallons
Next 5000 gallons used per month	6.15 per 1000 gallons
All Over 20000 gallons used per month	5.80 per 1000 gallons
Town of Gilbert	
Sewer Rates	
First 2000 gallons per month	10.50 per 1000 gallons
All Over 2000 gallons used per month	8.98 per 1000 gallons
Water Rates	
First 2000 gallons used per month	6.21 per 1000 gallons
Next 2000 gallons used per month	4.97 per 1000 gallons
Next 6000 gallons used per month	2.48 per 1000 gallons
Next 10000 gallons used per month	2.11 per 1000 gallons
All over 20000 gallons used per month	1.86 per 1000 gallons

Water Rates (pending substantial project completion)	
First 2000 gallons used per month	
Next 2000 gallons used per month	
Next 6000 gallons used per month	
All Over 10000 gallons used per month	
Town of Kermit	
Sewer Rates	
First 100000 gallons used per month	15.00 per 1000 gallons
Over 100000 gallons used per month	12.50 per 1000 gallons
Water Rates	
First 3000 gallons used per month	6.16 per 1000 gallons
Next 3000 gallons used per month	5.44 per 1000 gallons
Next 4000 gallons used per month	5.02 per 1000 gallons
Next 10000 gallons used per month	4.62 per 1000 gallons
Next 20000 gallons used per month	4.07 per 1000 gallons
All Over 40000 gallons used per month	3.68 per 1000 gallons

Utilities - Water and Sewer

Mingo County



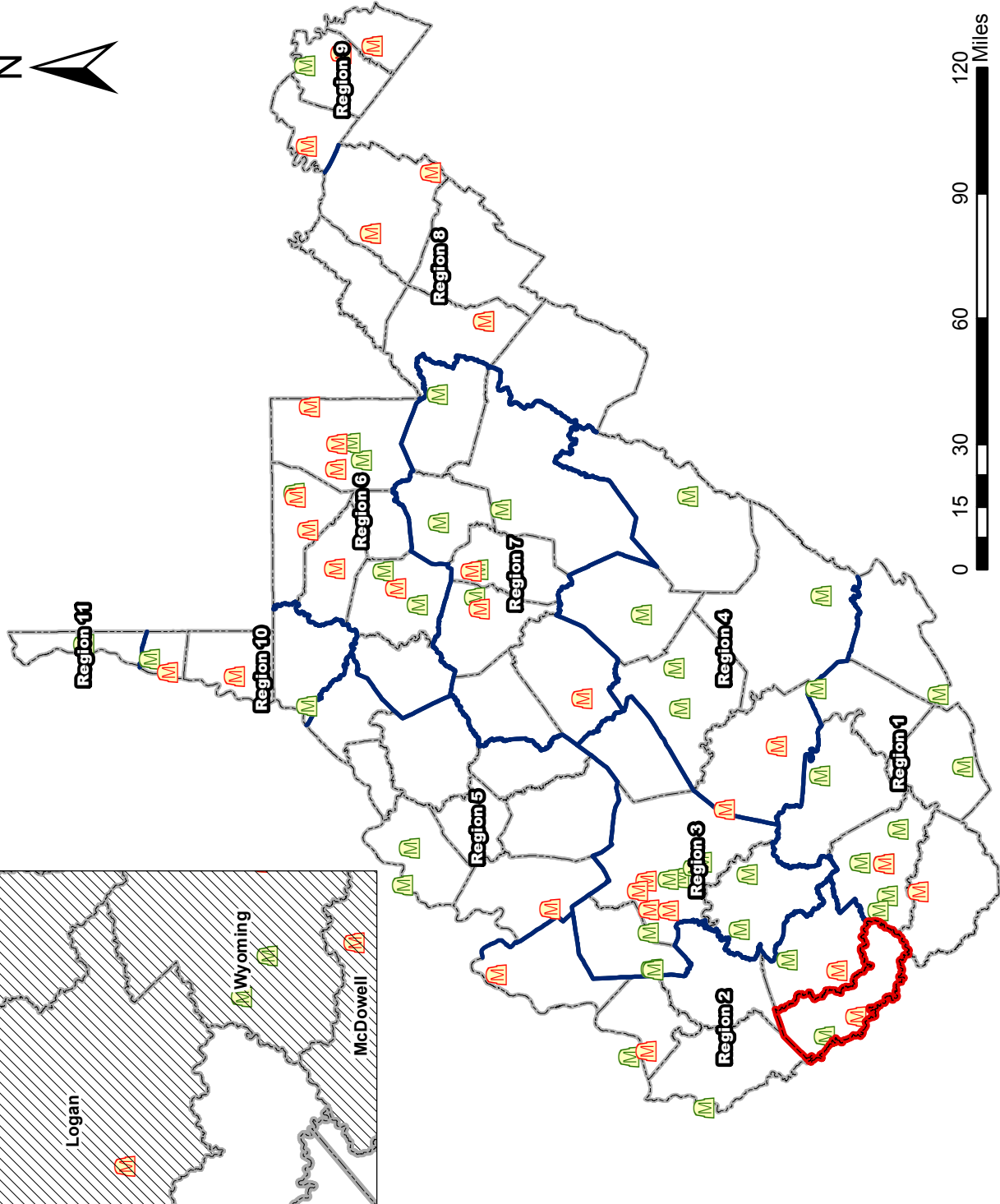
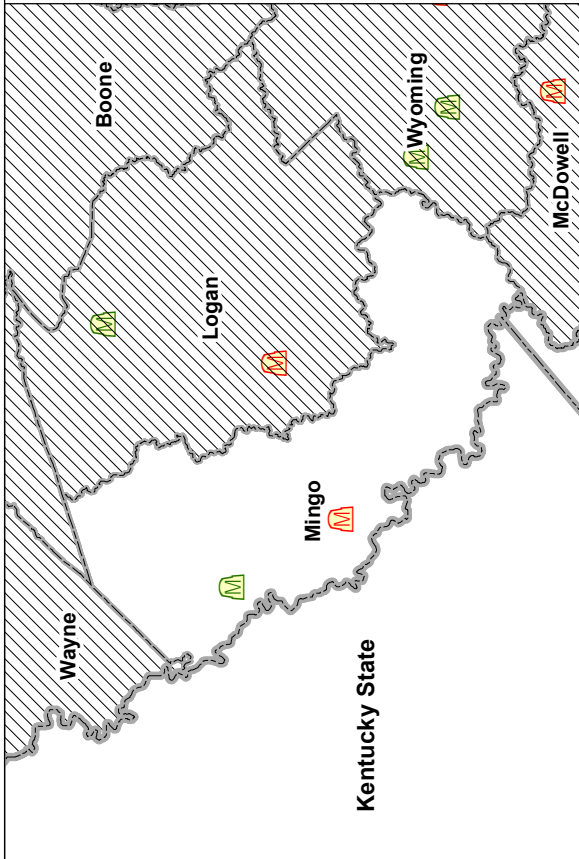
Data Source: West Virginia Infrastructure and Jobs Development Council N.A.

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Utility - Solid Waste Facility

Mingo County



- Closed
- Operating
- Planning Regions Line
- County Boundaries

Data Source: West Virginia Department of Environmental Protection 2002

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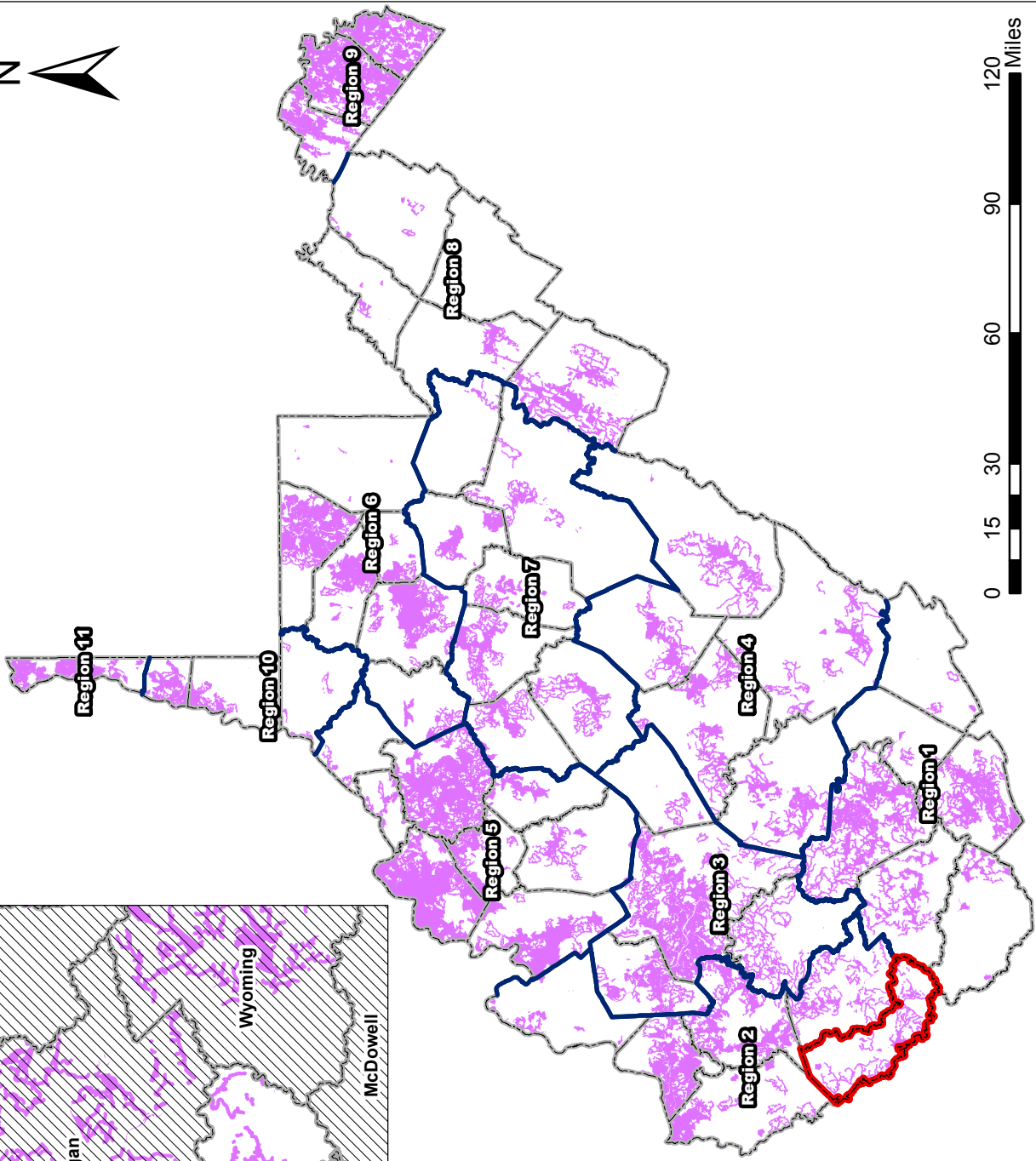
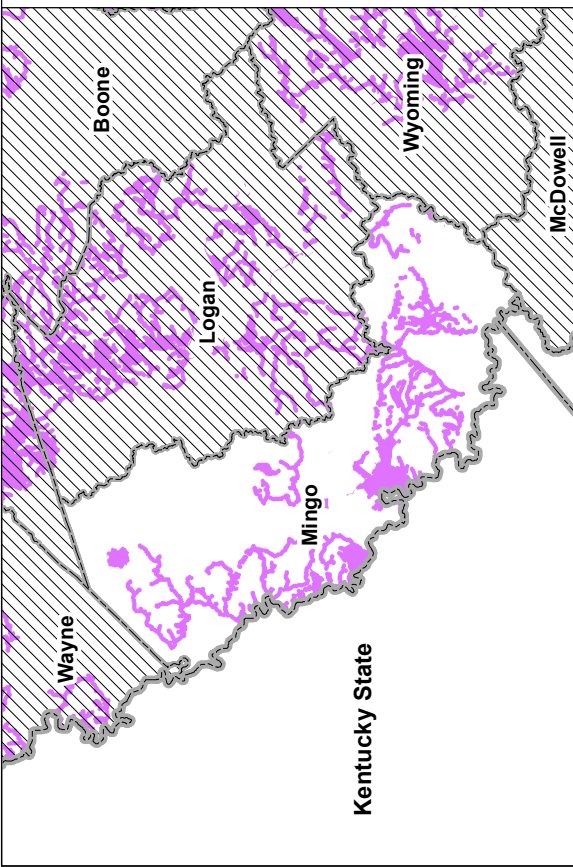
One modern utility, now widely understood as essential in a globalized world, is broadband access. The following 11 maps demonstrate Mingo County's broadband infrastructure in relation to the state's. The largest number of providers in Mingo County is 3, whereas neighboring counties Logan and Wayne have areas with 5 broadband providers. Wyoming and McDowell County maximums are also three. Of particular note is the distinct lack of fixed wireless, the connection of two fixed points wirelessly by radio or other links, and broadband coverage in Mingo County. Plans are currently underway to improve access to these particularly important global utilities.

Map 15 shows physical cable infrastructure running from ISPs to other structures. DSL, BPL, and other copper represent the transferal system of broadband (Map 16). Map 17 shows the entire wire system, represented by physical wires, while Maps 18 and 19 show the maximum uploading and downloading speeds for the system. Map 20 shows the total number of providers, which is denser in the more economically developed areas of the state. Map 21 has fixed wireless coverage, or the connection between two fixed points wirelessly by radio or other links, and the next two maps shown the maximum uploading and downloading speeds in a given area (22 and 23). Map 24 shows the location of mobile wireless coverage, including for smartphones and tablets, and Map 25 shows areas where no broadband coverage is reported in any way.

Each of these maps shows the same pattern in Mingo County internet service as exhibited by WV. Internet service, specifically broadband, is non-existent in many rural areas, and instead focuses on population centers. While this may be financially wise, it deprives rural areas of an increasingly integral link to a globalized economy and society. All areas now need broadband service, and a complete inventory of these services is needed to plan for future investment in any given area.

Broadband - Internet Cable and FTTP Coverage

Mingo County



- Planning Regions Line
- Cable and FTTP
- County Boundaries



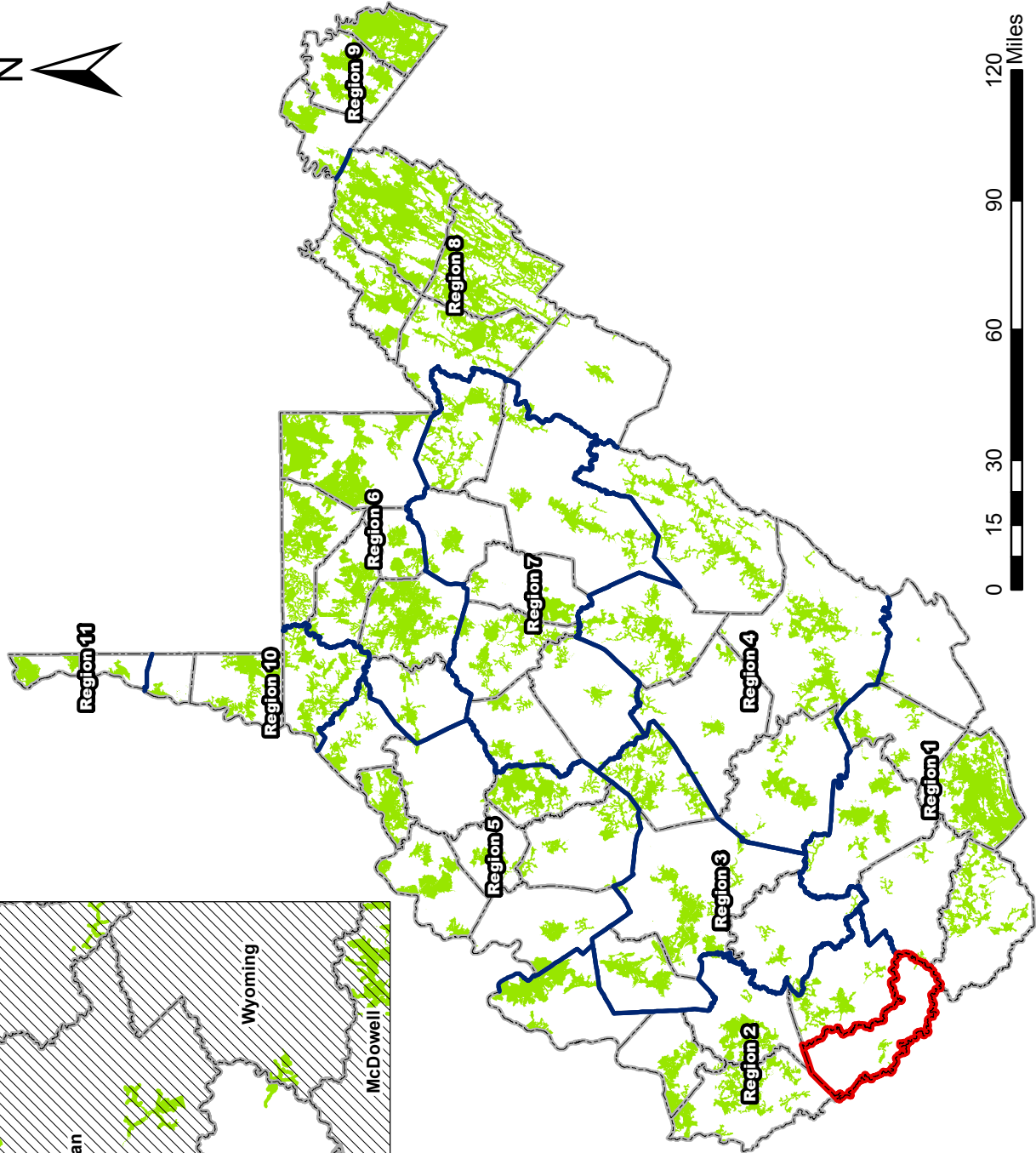
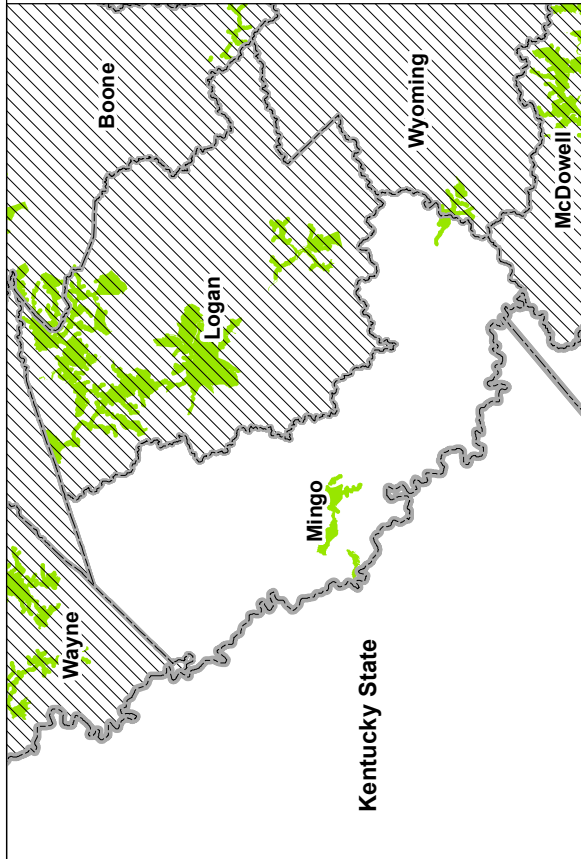
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Data Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet DSL, BPL, Other Copper

Mingo County



-  Planning Regions Line
-  DSL, BPL, Other Copper
-  County Boundaries



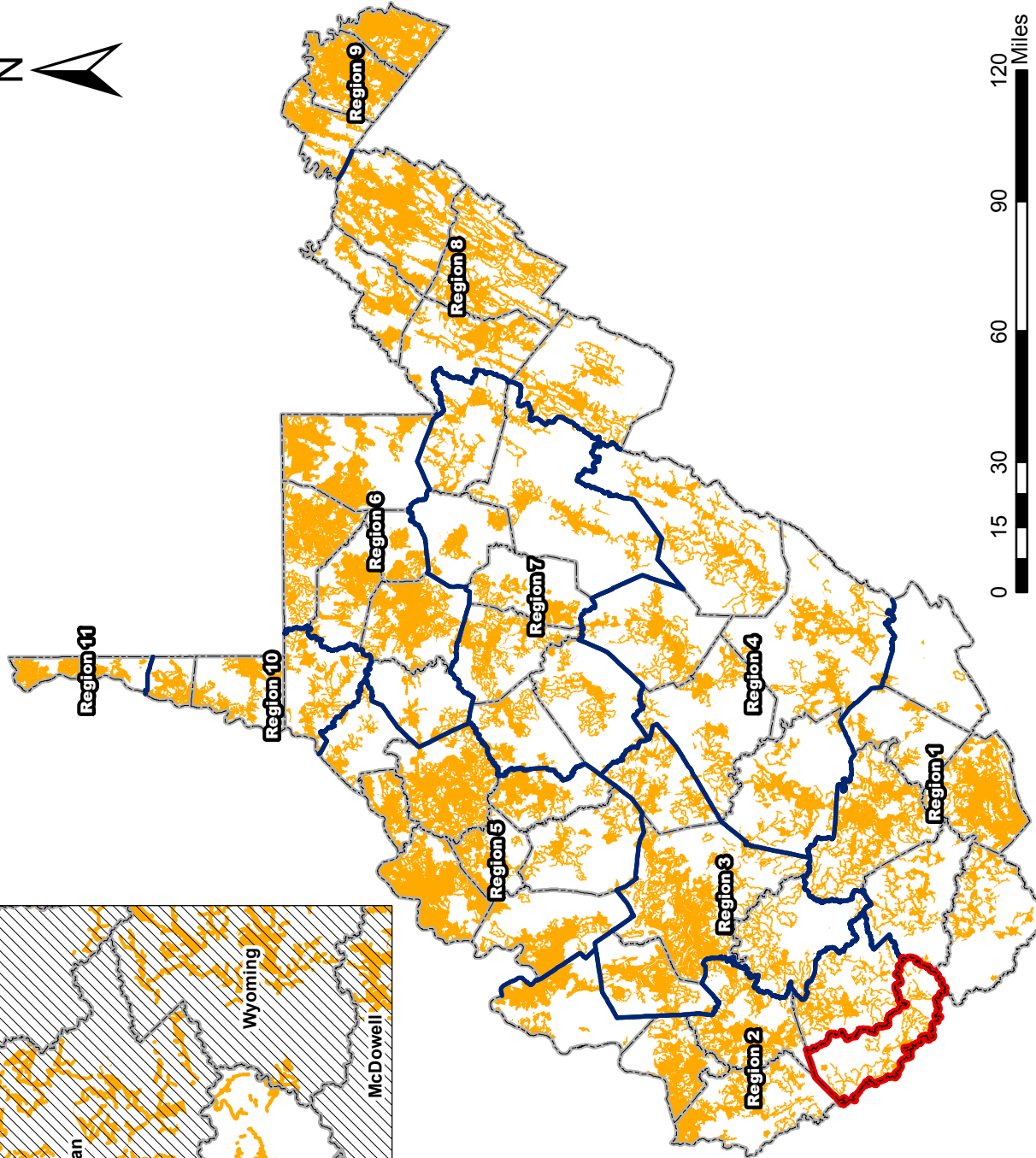
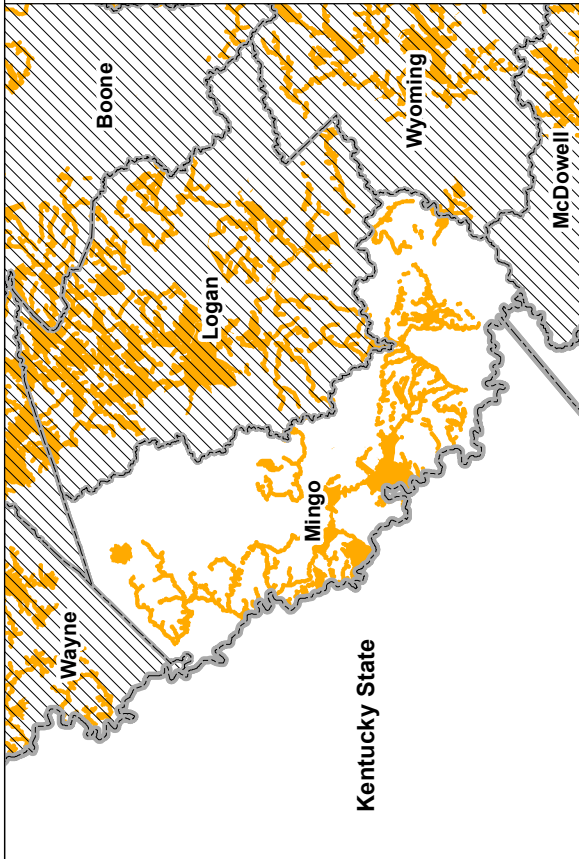
Data Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet Wireline Coverage

Mingo County



- Planning Regions Line
- Wireline Coverage
- County Boundaries

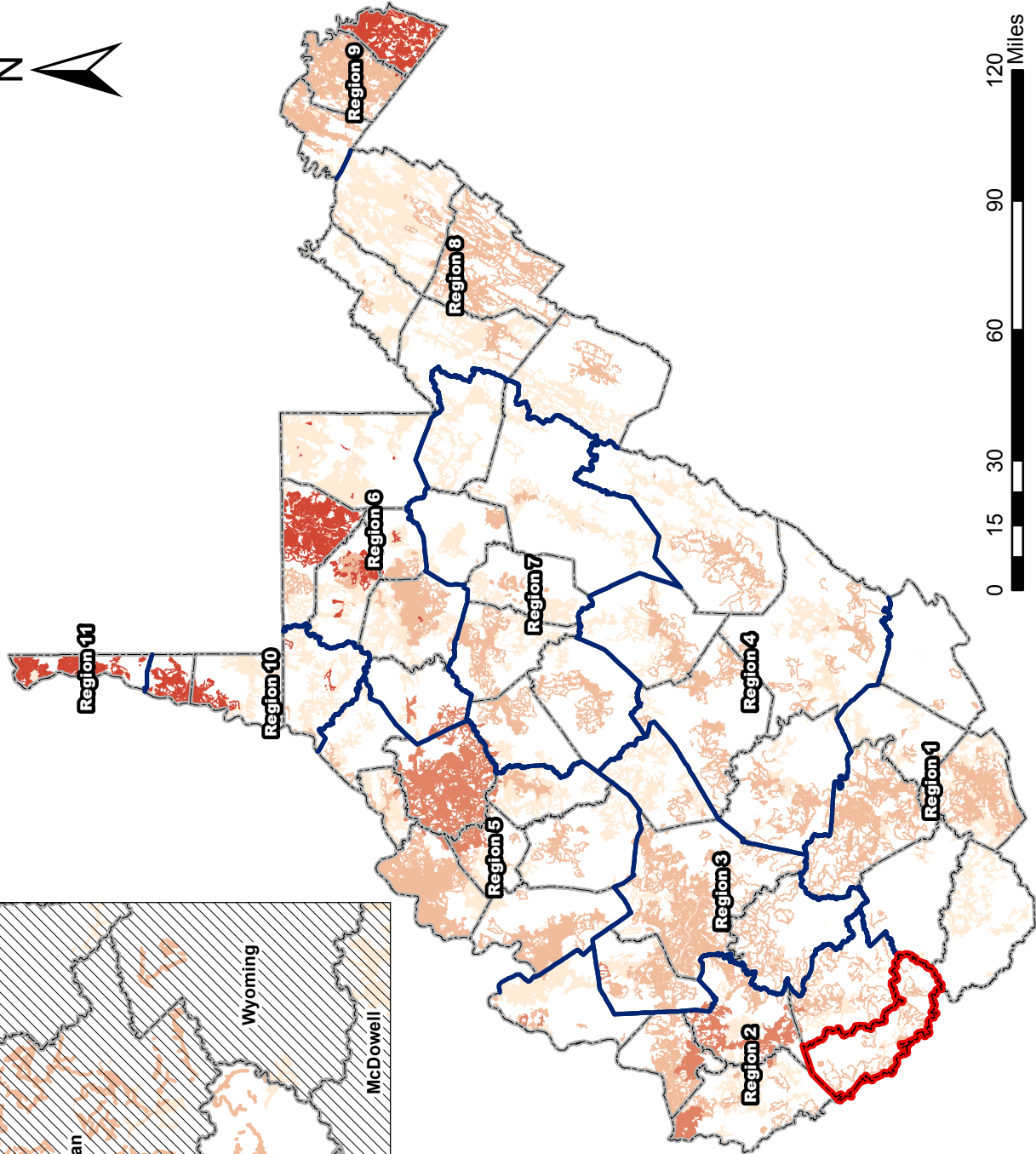
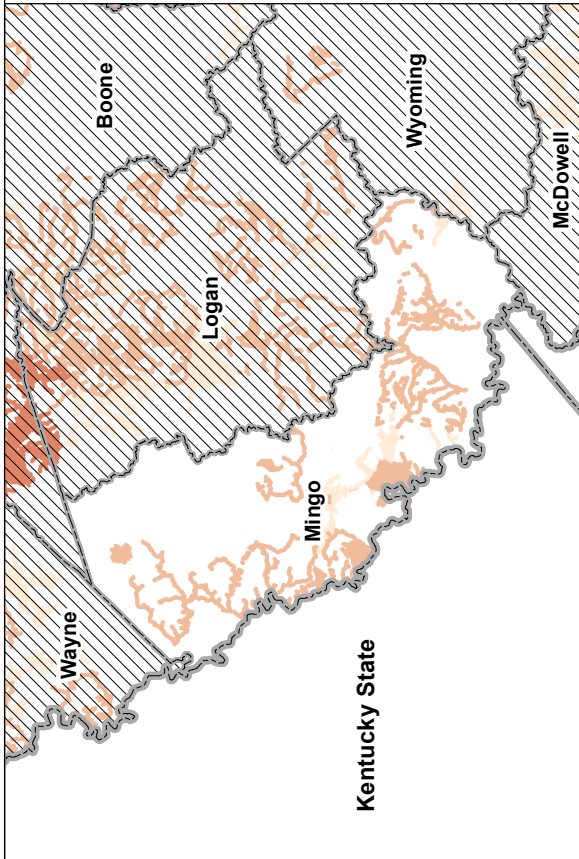


Data Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet MaxUp Speed Wireline

Mingo County



- Planning Regions Line
- 200 - 768 kbps
- 768 kbps - 3 mbps
- 3 - 10 mbps
- 10 - 25 mbps
- Greater than 25 mbps
- County Boundaries



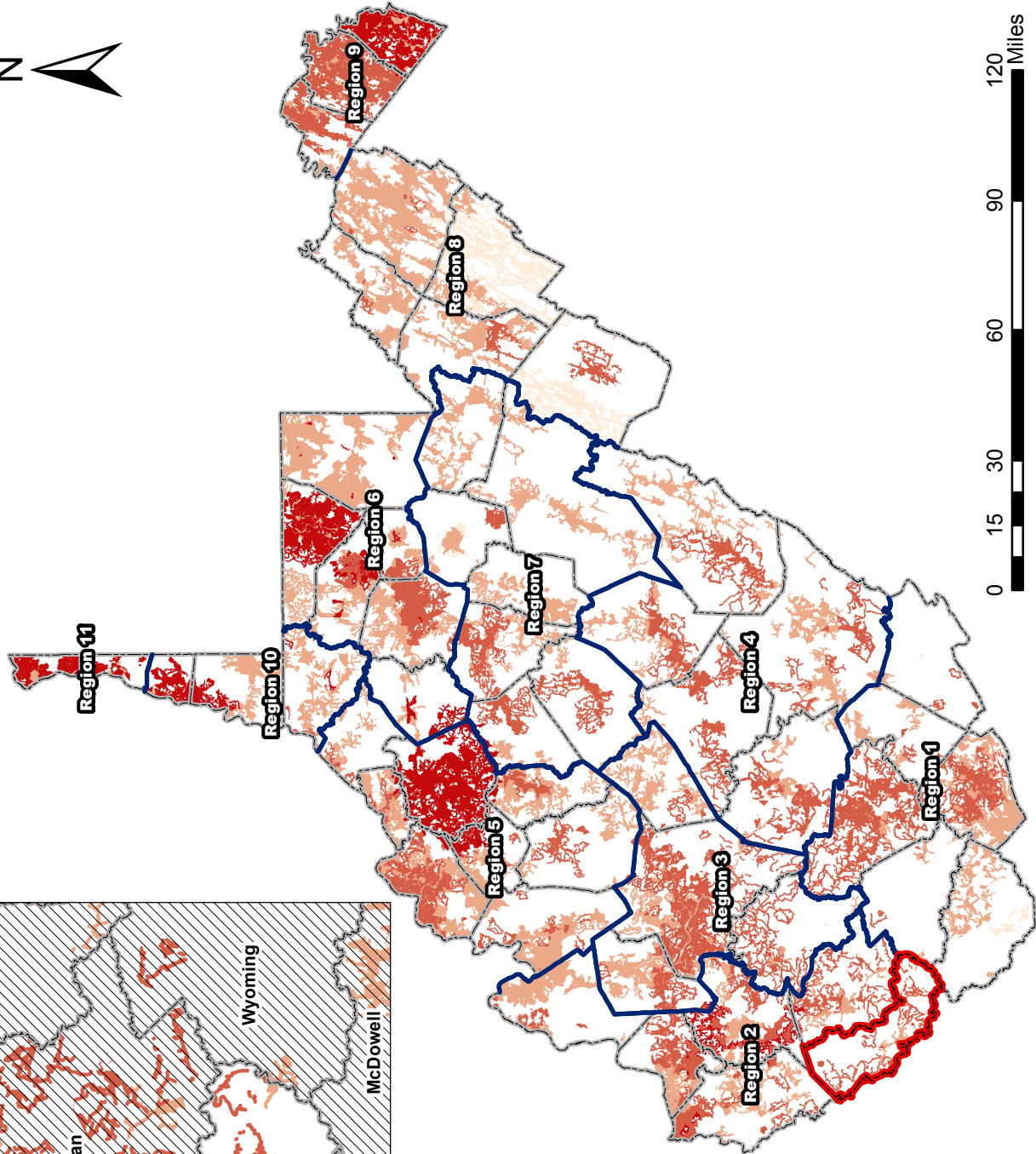
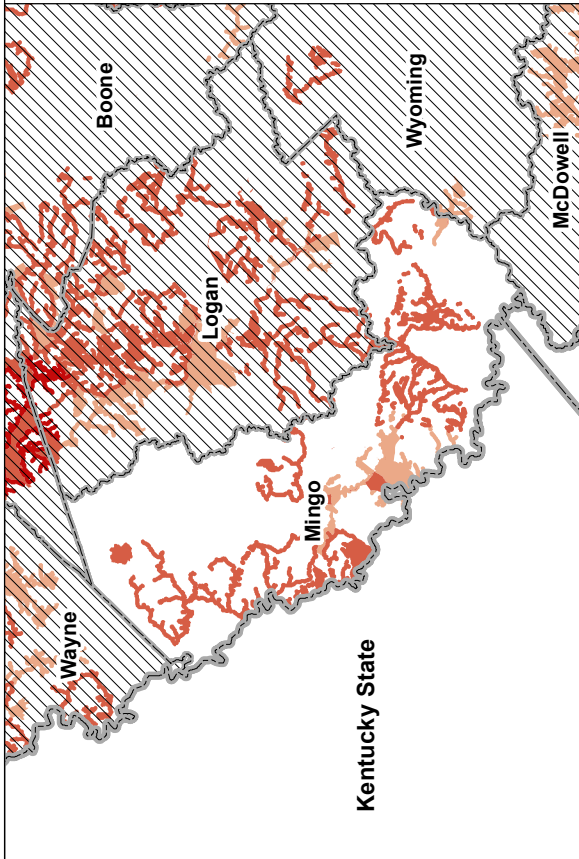
Data Source: West Virginia Broadband Mapping Program 2012.

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Broadband - Internet MaxDown Speed Wireline

Mingo County



- Planning Regions Line
- 768 kbps - 3 mbps
- 3 - 10 mbps
- 10 - 25 mbps
- Greater than 25 mbps
- County Boundaries



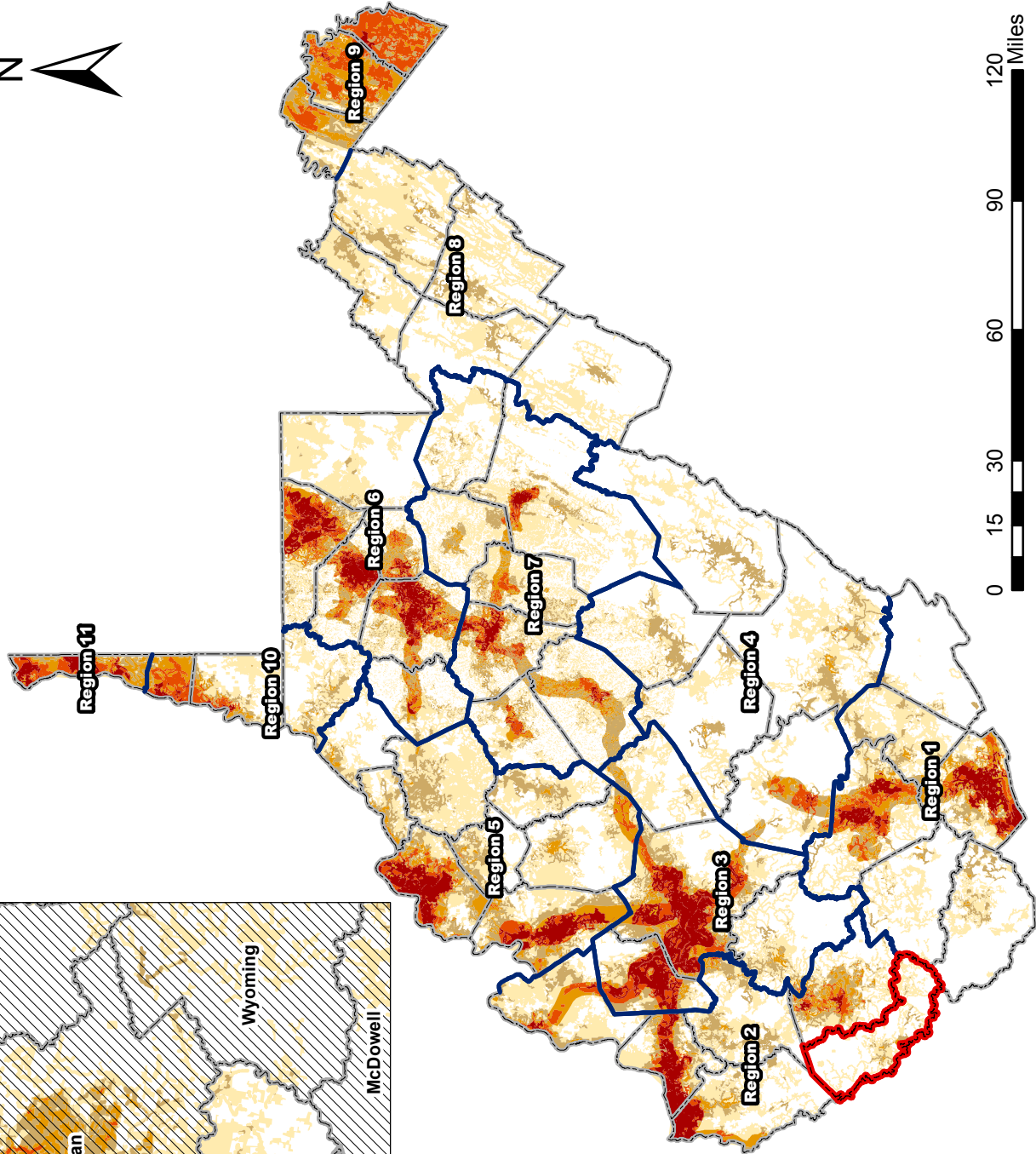
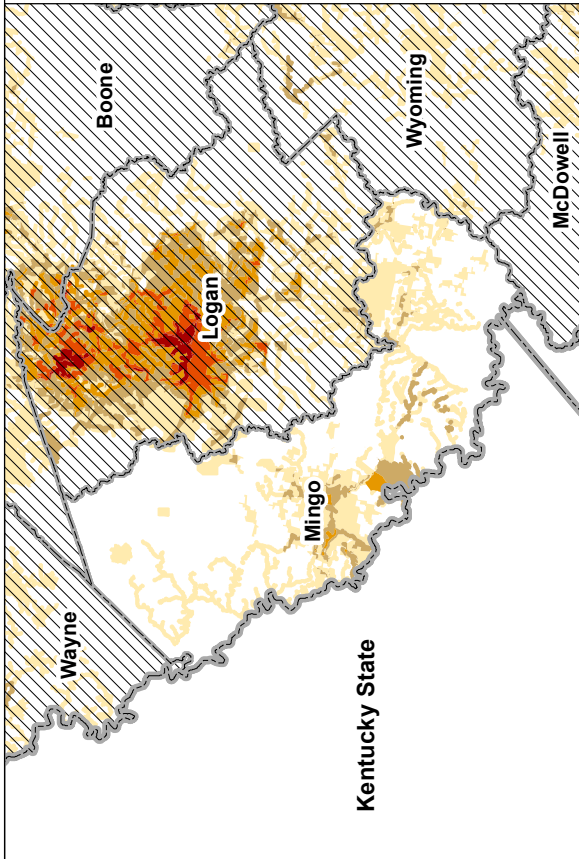
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Data Source: West Virginia Broadband Mapping Program 2012

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Broadband -Internet Total Number of Providers

Mingo County



- Planning Regions Line
- 1 Provider
- 2 Providers
- 3 Providers
- 4 Providers
- 5 Providers
- County Boundaries



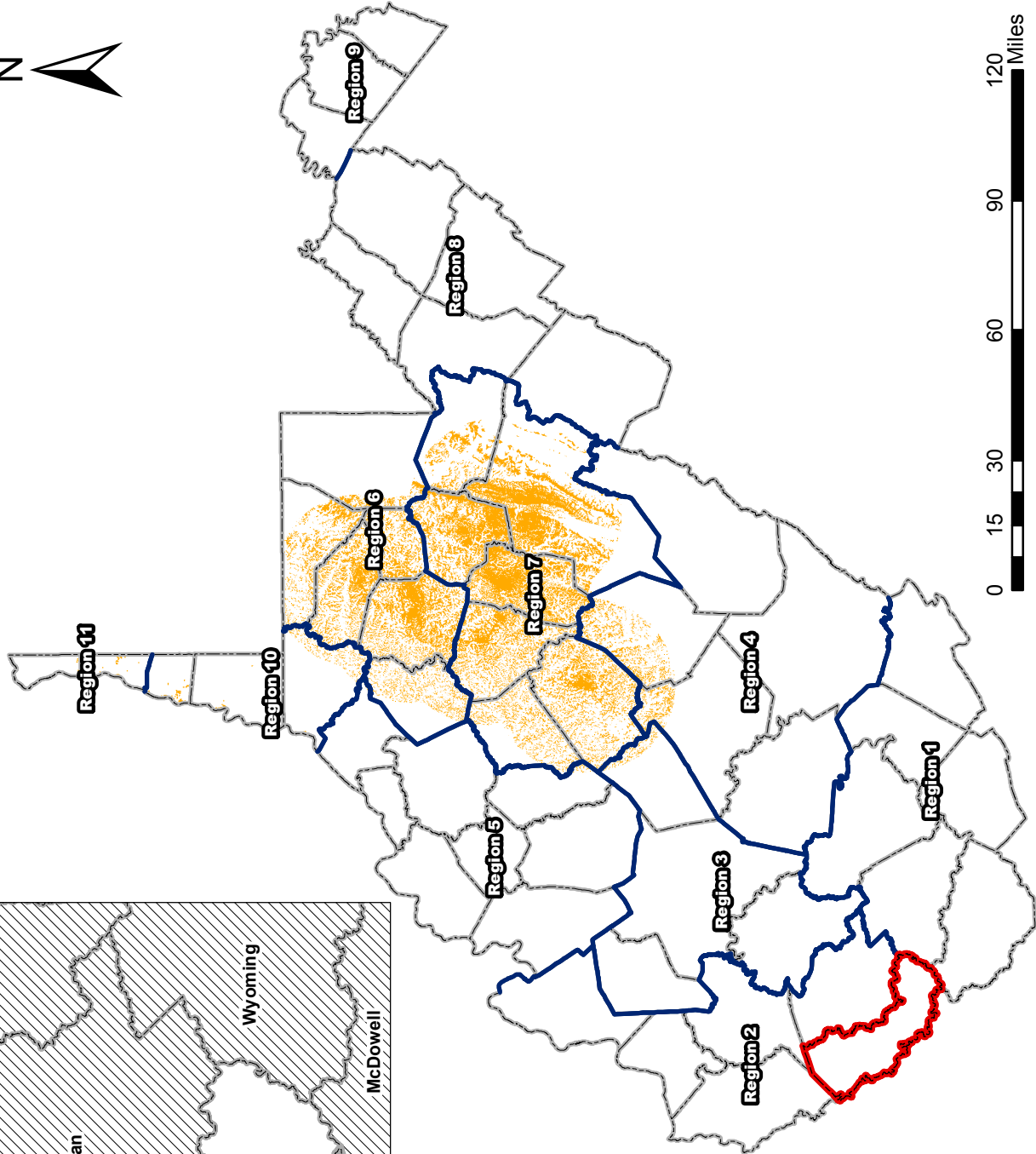
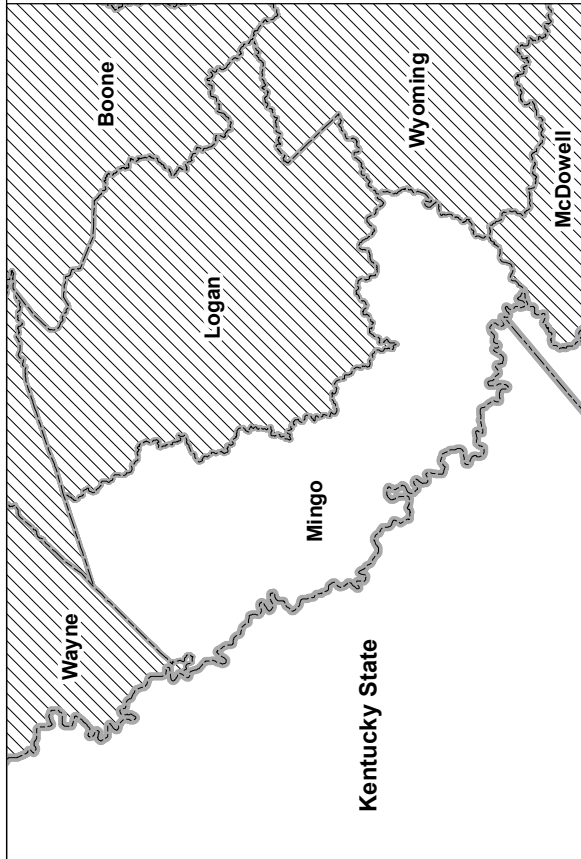
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Data Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet Fixed Wireless Coverage

Mingo County



-  Planning Regions Line
-  Fixed Wireless
-  County Boundaries

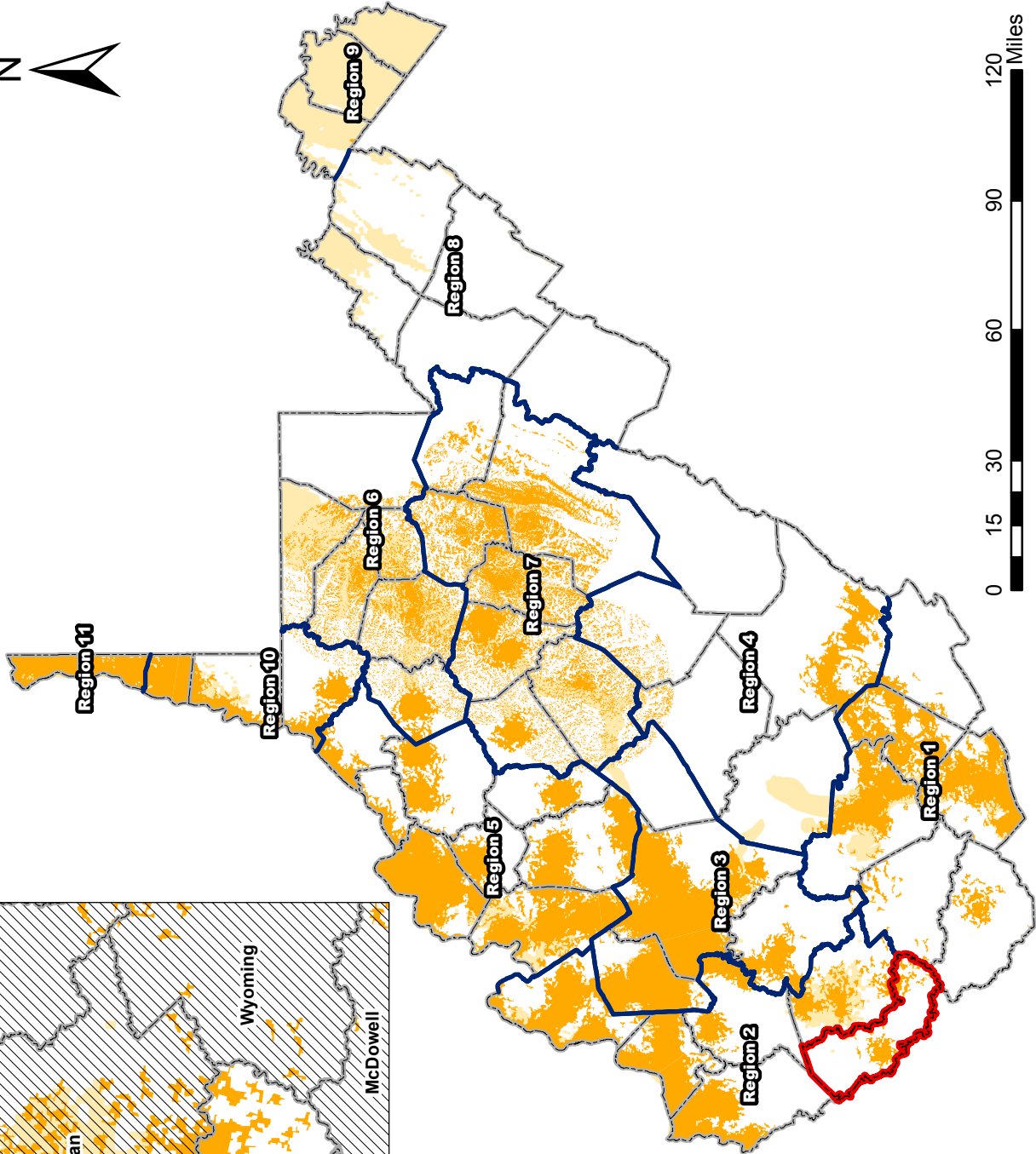
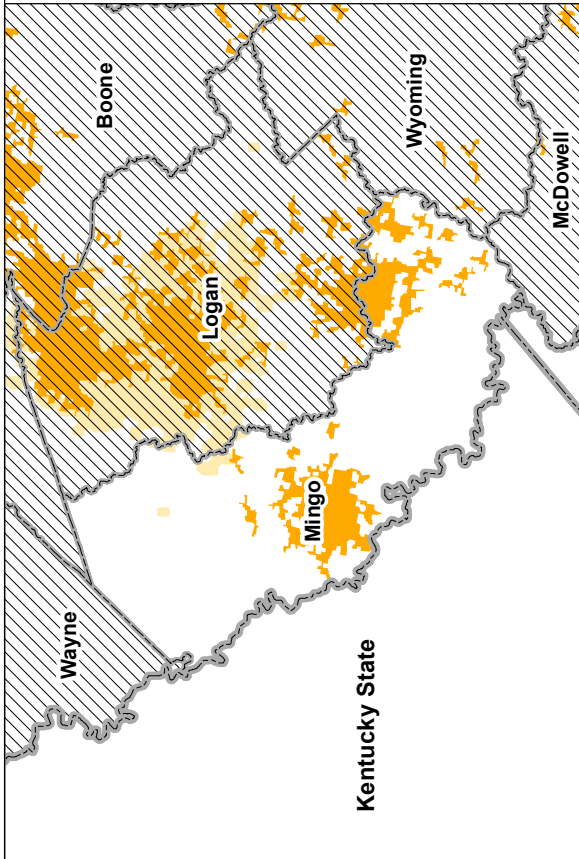






Data Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet MaxDown Speed Wireless

Mingo County



-  Planning Regions Line
-  768 kbps - 3 mbps
-  3 - 10 mbps
-  County Boundaries



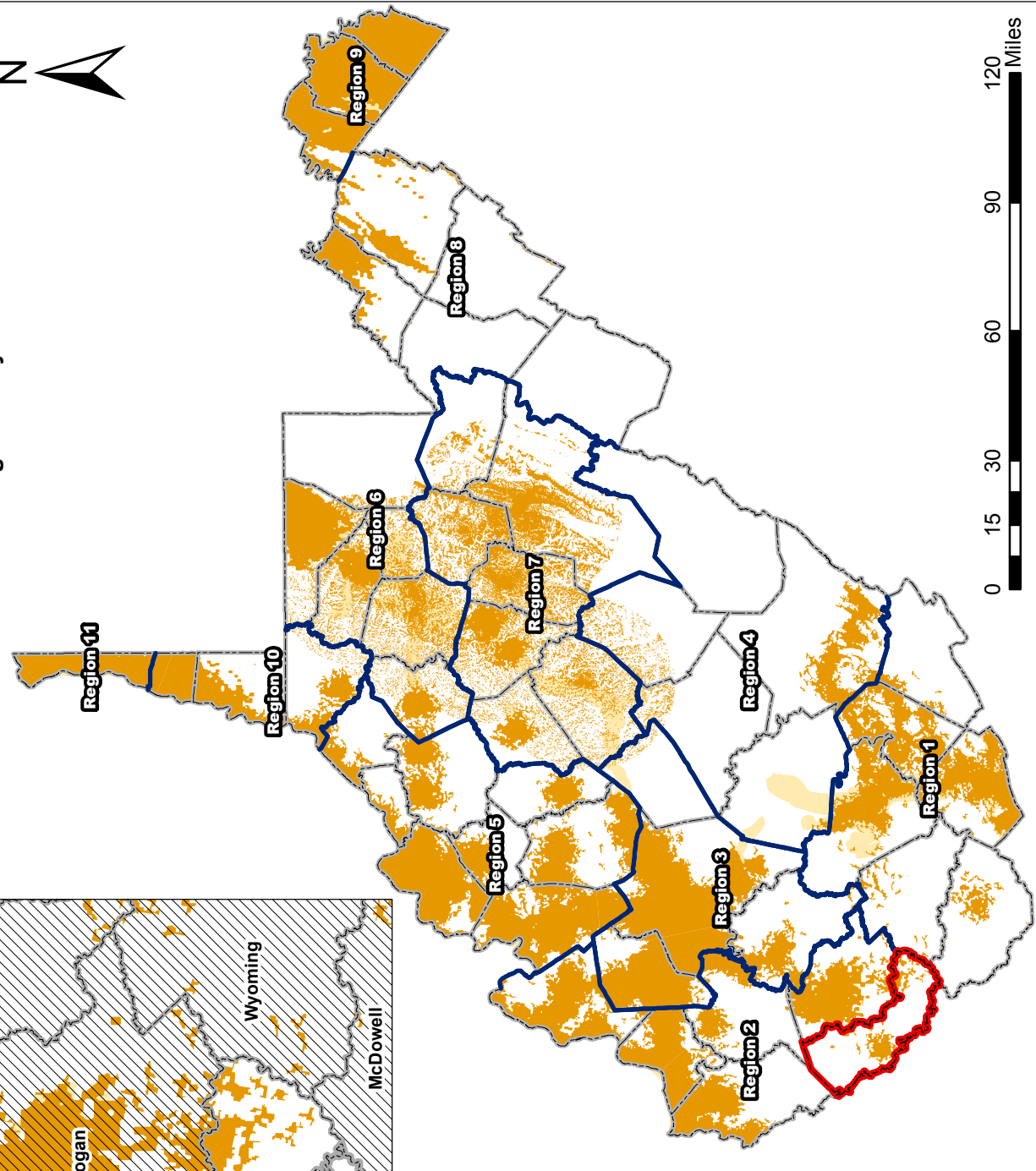
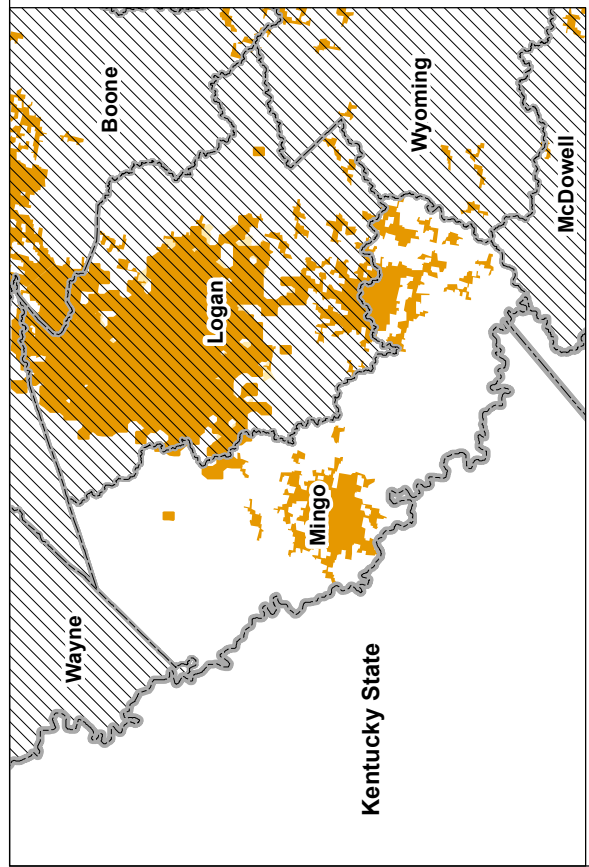
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Data Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet MaxUp Speed Wireless

Mingo County



-  Planning Regions Line
-  200 - 768 kbps
-  768 kbps - 3 mbps
-  County Boundaries



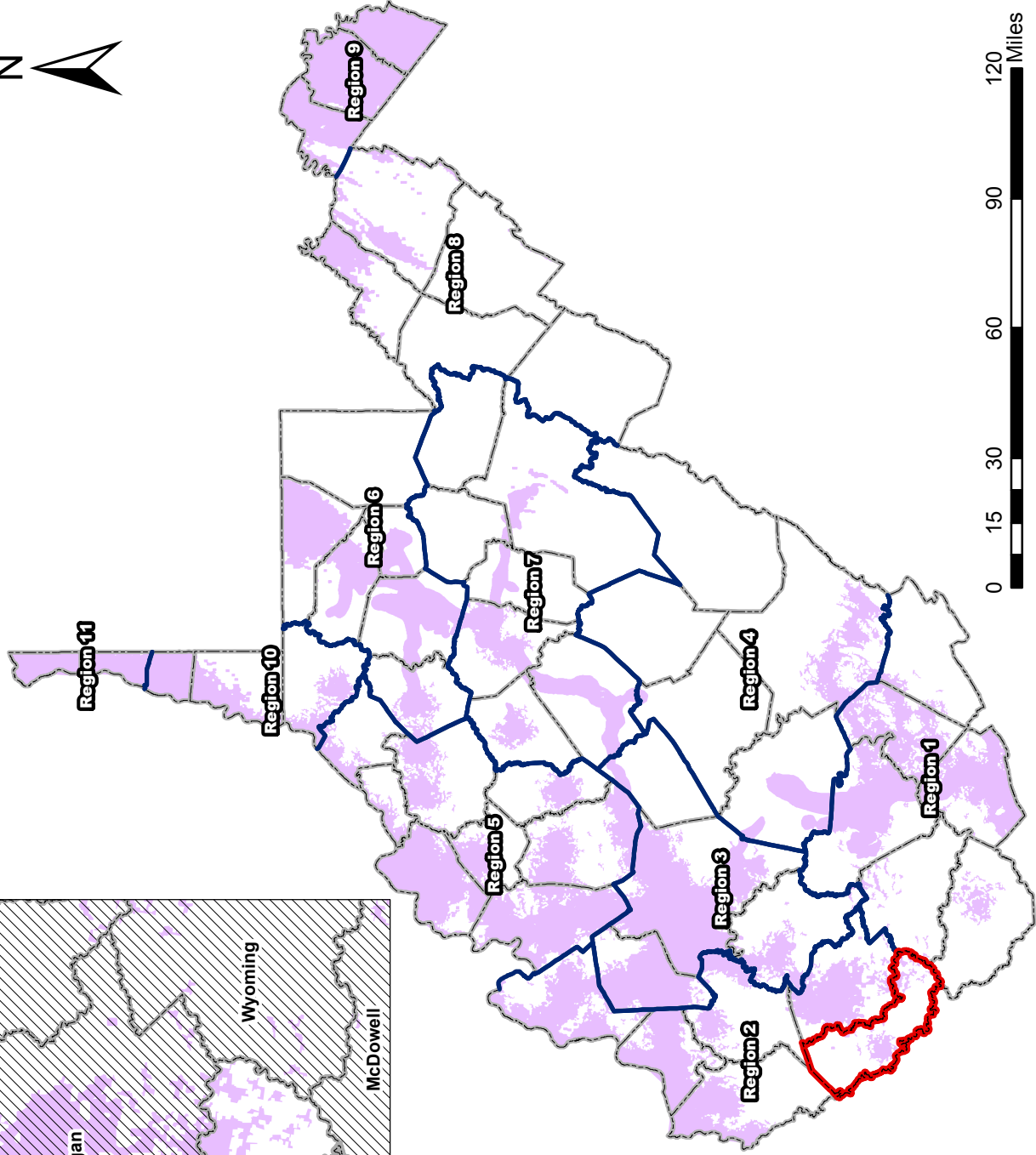
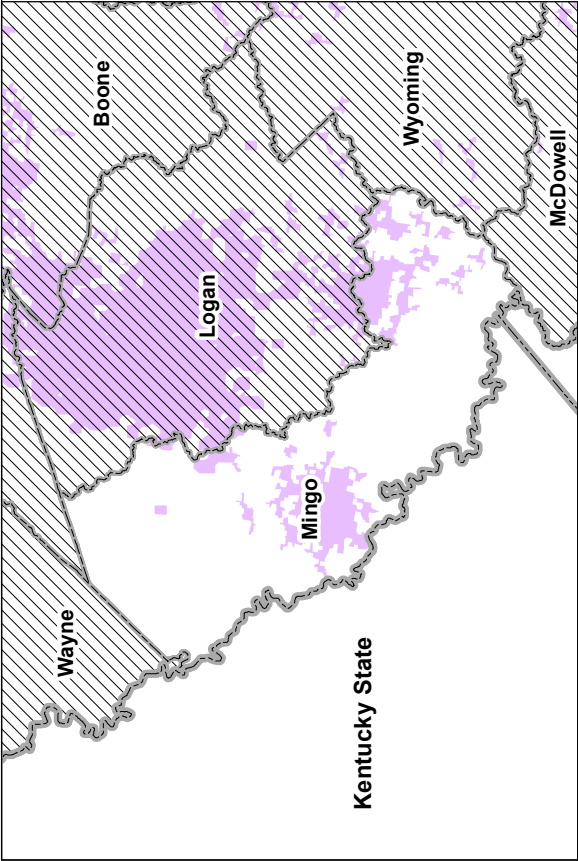
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Data Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet Mobile Wireless Coverage

Mingo County



-  Planning Regions Line
-  Mobile Wireless
-  County Boundaries



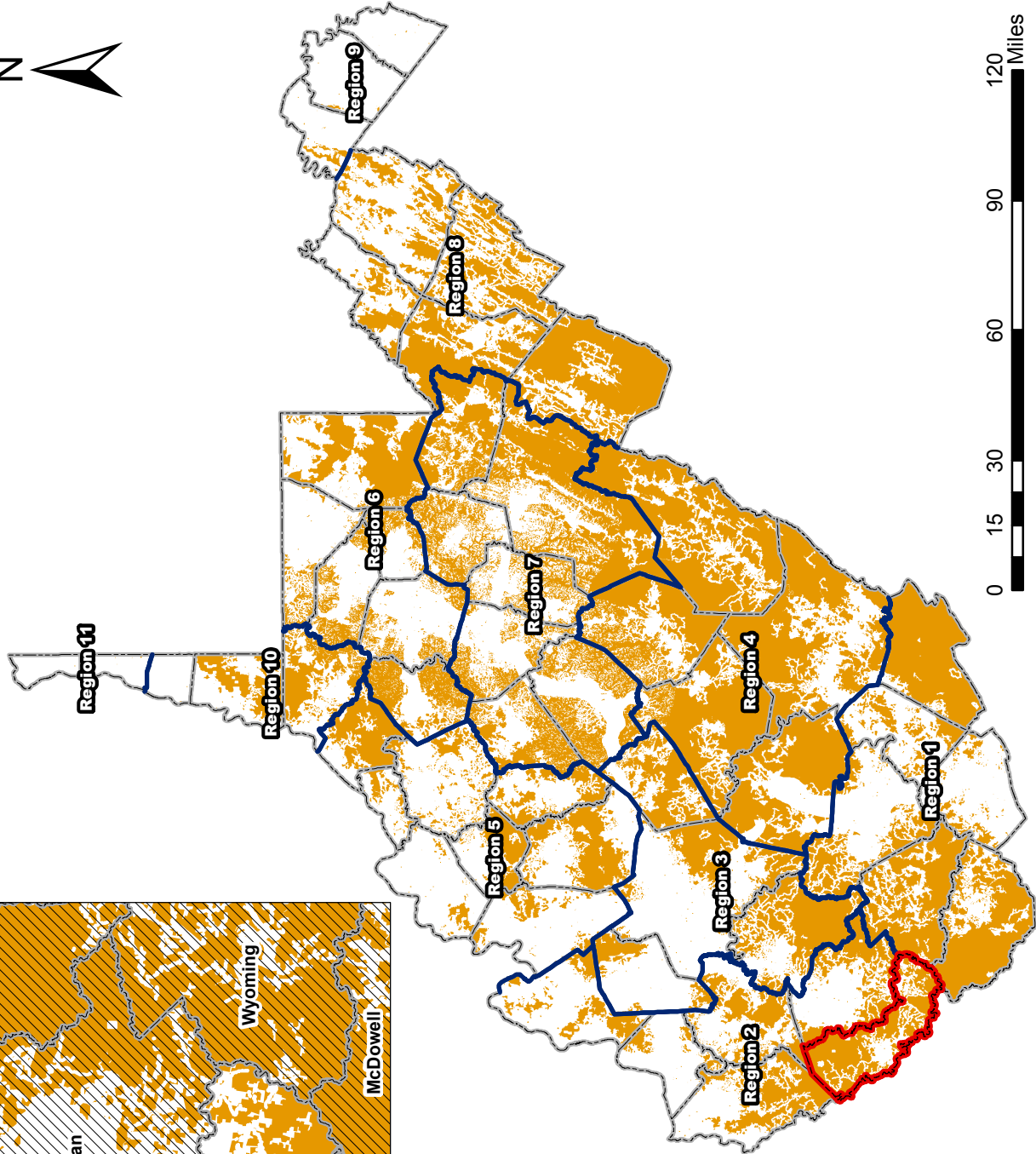
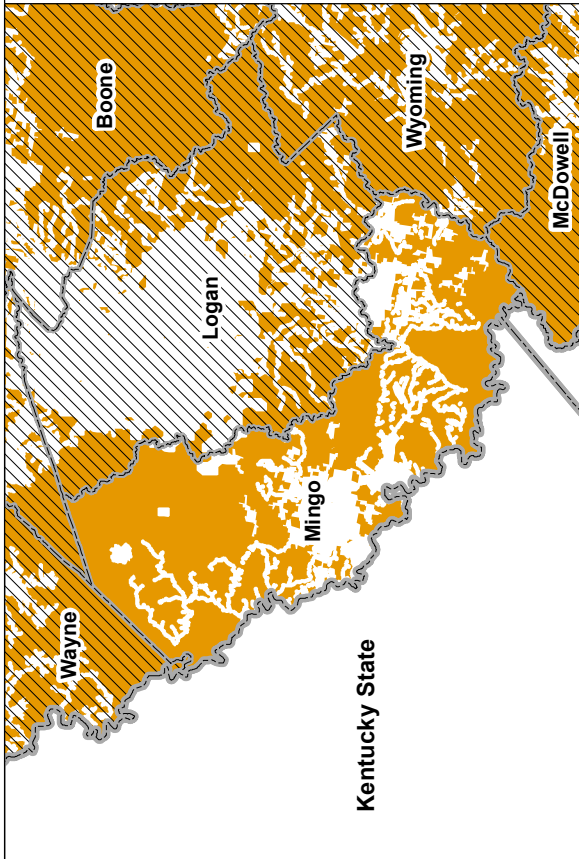
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Data Source: West Virginia Broadband Mapping Program 2012

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Broadband - No Broadband Coverage

Mingo County



-  Planning Regions Line
-  No Coverage Reported
-  County Boundaries

Data Source: West Virginia Broadband Mapping Program 2012

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Transportation

Highways

Mingo County is crisscrossed by U.S. Highways 52 and 119. Three West Virginia Routes, 49, 65, and 80, are also located within Mingo (Map 26). Mingo County is located about 55 miles away from the nearest interstate, Interstate-64.

Currently, construction is underway of a new Interstate 73/74 corridor, known as the King Coal Highway, which would pass through Mingo County as well as other coalfield counties in West Virginia. The highway is projected to bring in money and people, and will revitalize the area by providing more traffic and better connections to more populous and wealthy regions.⁷

Rail

Norfolk Southern and CSX both have tracks in Mingo County. Rail has been very important in West Virginia as it was and still is used to transport the majority of the state's coal. With Mingo County being a major coal county, old and new tracks traverse the entirety of the county.

Air








Mingo County recently celebrated the opening of the Mingo County Air Transportation Park. Part of Mingo County's already successful past with post-mine land use, the 7000-foot runway was built for private and corporate use. Seven million dollars was used to construct the airstrip using a private-public partnership.

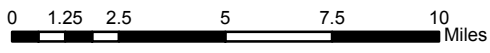
⁷ Chi, Junwook, Matthews, Justin, Weddington, Jessica, and Hamilton, Pamela. *Potential Economic Benefits of Public-Private Partnership (P3s) on Reclaimed Mine Sites in the Construction of the I-73/74 NHS Corridor.* Nick J. Rahall II Appalachian Transportation Institute, Huntington, WV (February 2012).

Transportation

Mingo County



-  Airports
-  US Routes
-  WV Routes
-  I66 Pikeville
-  Railroads
-  King Coal Highway
-  County Boundary



Data Sources: Airports; United States Department of Transportation 2012, West Virginia GIS Technical Center; US Routes, West Virginia Routes, I66 Pikeville, King Coal Highway; West Virginia Department of Transportation 2012; Railroads; Rahall Transportation Institute 2012

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Current Post-Mine Economic Development Sites

Mingo County has already been heavily involved in economic redevelopment. Several sites have been identified by the Mingo County Development Authority as economic development sites. These site descriptions are derived from the MCDA website, and provide the status of the economic development projects in the county.⁸

Wood Products Industrial Park

“The Mingo County Wood Products Industrial Park is a \$34 million project located in southern West Virginia on the border of Mingo and Logan Counties, adjacent to US Route 119, the Robert C. Byrd Freeway. The Wood Products Industrial Park is situated on a reclaimed surface mine and represents the very best of environmental re-use. In late 1999, the MCRA began transforming this site into Mingo County’s first industrial park. The transformation wasn’t easy, as it would require the development of public/private partnerships, the implementation of innovative financing techniques, and the remediation of a mine scarred land into a 650 acre development site with access and infrastructure. At present there are three operations underway including Mohawk Flooring, Coal Mac, Inc., and Weatherford Fracturing Technologies. Though the site caters to value-added wood products, future endeavors will not be limited to this industry.”

Air Transportation Park

“The Air Transportation Park, on the ridge tops of Mingo County, is the result of a public/private partnership with Alpha Natural Resources, the Mingo County Airport Authority, and the state and federal aviation agencies. This project will allow us to relocate our county airport to a post-mined site that is being created as a result of coal mining. The new airport will boast a state of the art 7,000-foot runway, lighting, and instrumentation once funding is secured, and an additional 800 acres of developable property are being created adjacent to the airport site which will allow for the recruitment of even more business and industry to Mingo County.”

I 73-74 King Coal Highway

“Riding on top of the southern West Virginia mountains, this stretch of interstate highway unlocks 1,500 total acres of Mingo County land for development. Beneficial projects, like the Twisted-Gun 18 hole golf course and the Mingo County Air Transportation Park (completion in 2010), at either end of the highway make the new development sites (varying from five to 800 acres) very attractive to new or relocating firms. By 2010, development of the highway will be

⁸ “Industrial Sites and Parks,” Mingo County Redevelopment Authority, Accessed February, 19, 2013, <http://www.mcra-wv.org/?q=node/10>.

well underway and expansions scheduled for the three years following promise substantial incremental progress.”

Mingo County Fish Hatchery

“Construction of the MCRA Fish Hatchery was initiated in 1999. To meet the needs of a large-scale aquaculture industry in southern West Virginia, the capacity of the facility was constructed to permit the production of two batches of 320,000 fingerlings per year. This production capacity enables the facility to meet the needs of a multi-million pound per year commercial grow-out industry in southern West Virginia.

Funding to construct the facility was provided by \$150,000 grant from the WV State Legislators and \$150,000 grant from USDA-Rural Development. Mingo Logan Coal Company donated approximately \$150,000 in-kind contributions for various items such as site prep, a new well and pump, a new 8" water line to the storage tank, a power line from the well to the hatchery. Pocahontas Land Corporation donated 2 ½ acres of property with a value of approximately \$50,000 for the project.

The facility has been stocked with 188,000 Arctic Charr eggs since the spring of 2000. West Virginia Aqua (a local aquaculture consortium) is currently leasing and managing the facility. They have hired four full-time employees at the hatchery and expect to hire an additional 4-6 employees. Yukon Gold™ is a proprietary strain of Arctic Charr developed by Icy Waters over the past 12 years at its hatchery in Whitehorse. Yukon Gold Arctic Charr has consistently demonstrated superior performance and quality characteristics than any other domesticated strain of Arctic Charr.

Yukon Gold™ Arctic Charr, a member of the salmon family, has been accepted by the consumer as a high quality product having firm flesh and a more delicate flavor than salmon. Accordingly, Yukon Gold™ Arctic Charr commands a significant premium price in the marketplace. Yukon Gold™'s high survival rates and remarkable stocking densities make it a favorite among freshwater producers.”

DMV

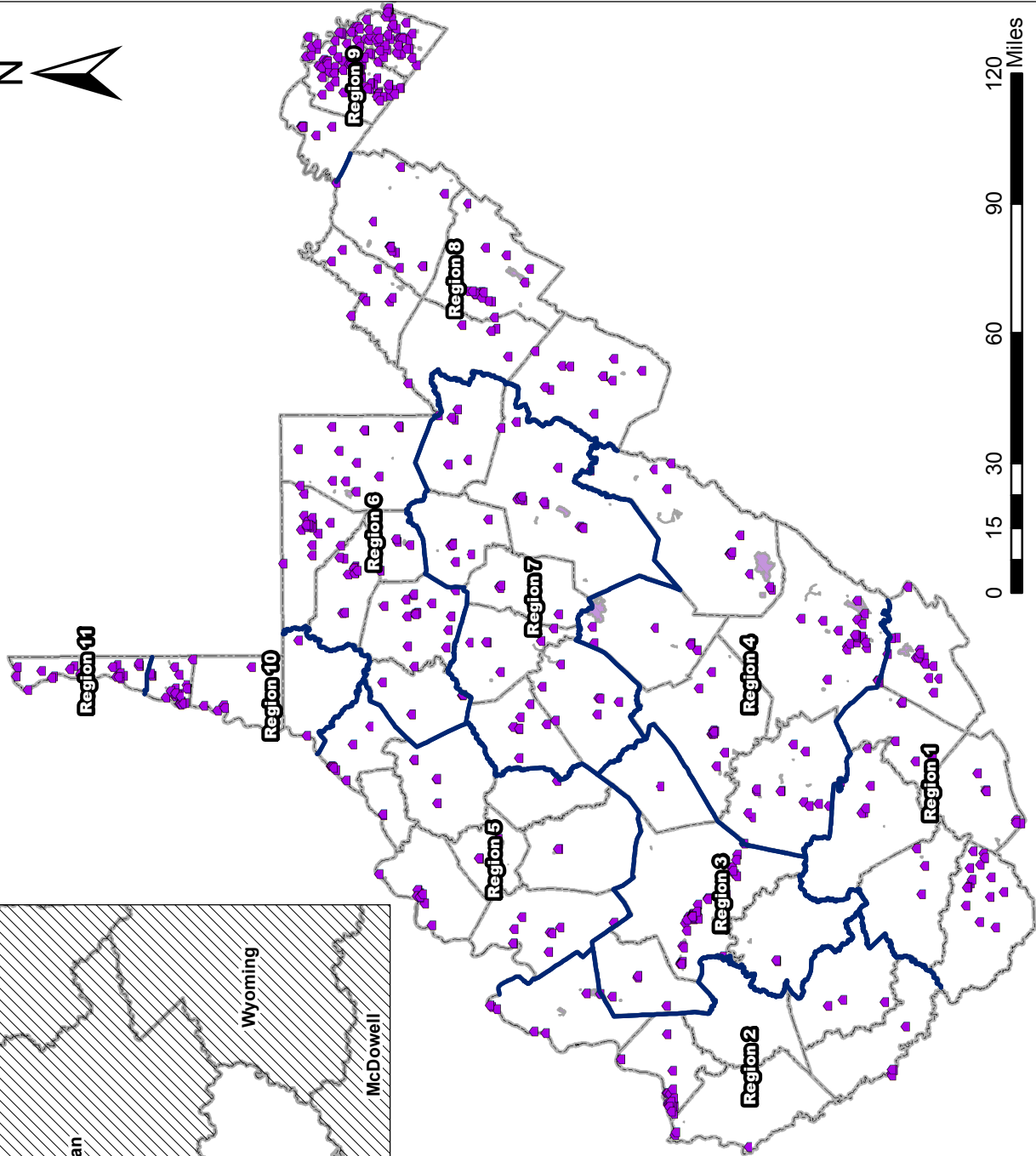
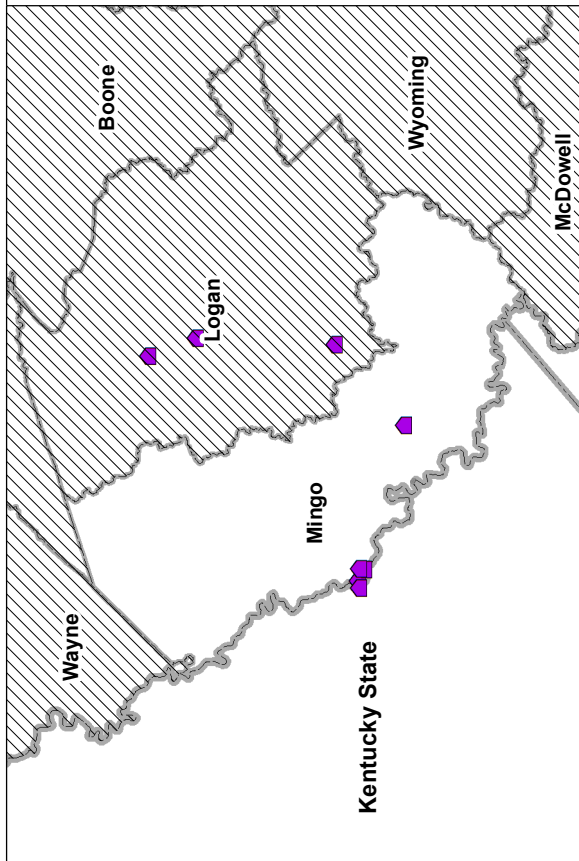
“This project consisted of the design and construction of a ‘Department of Motor Vehicles Office Facility’ to be located on Third Avenue in the downtown area of the City of Williamson. This downtown revitalization project consisted of design and construction of a brick face office facility for the Department of Motor Vehicles that will feature a ‘motorcycle testing area.’ The project included parking lot improvements, site work, installation of walkways, landscaping and other related site improvements. The Department of Motor Vehicles is expected to create approximately 8 new jobs for the area. Both facilities were completed in spring of 2002.”

Historic Preservation

Historic preservation will be essential in a county steeped in coal mining history. Mingo County has several listings in the National Register of Historic Places, including the Coal House, Hatfield Cemetery, the Matewan Historic District, and Mountaineer Hotel, along with four others (Map 27). However, other historic areas have also been designated by other units. Map 28 gives a spatial position to each designated state historic piece of architecture.

National Register of Historic Place

Mingo County



- National Register of Historic Place
- Planning Regions Line
- National Register of Historic Place (Area)
- County Boundaries

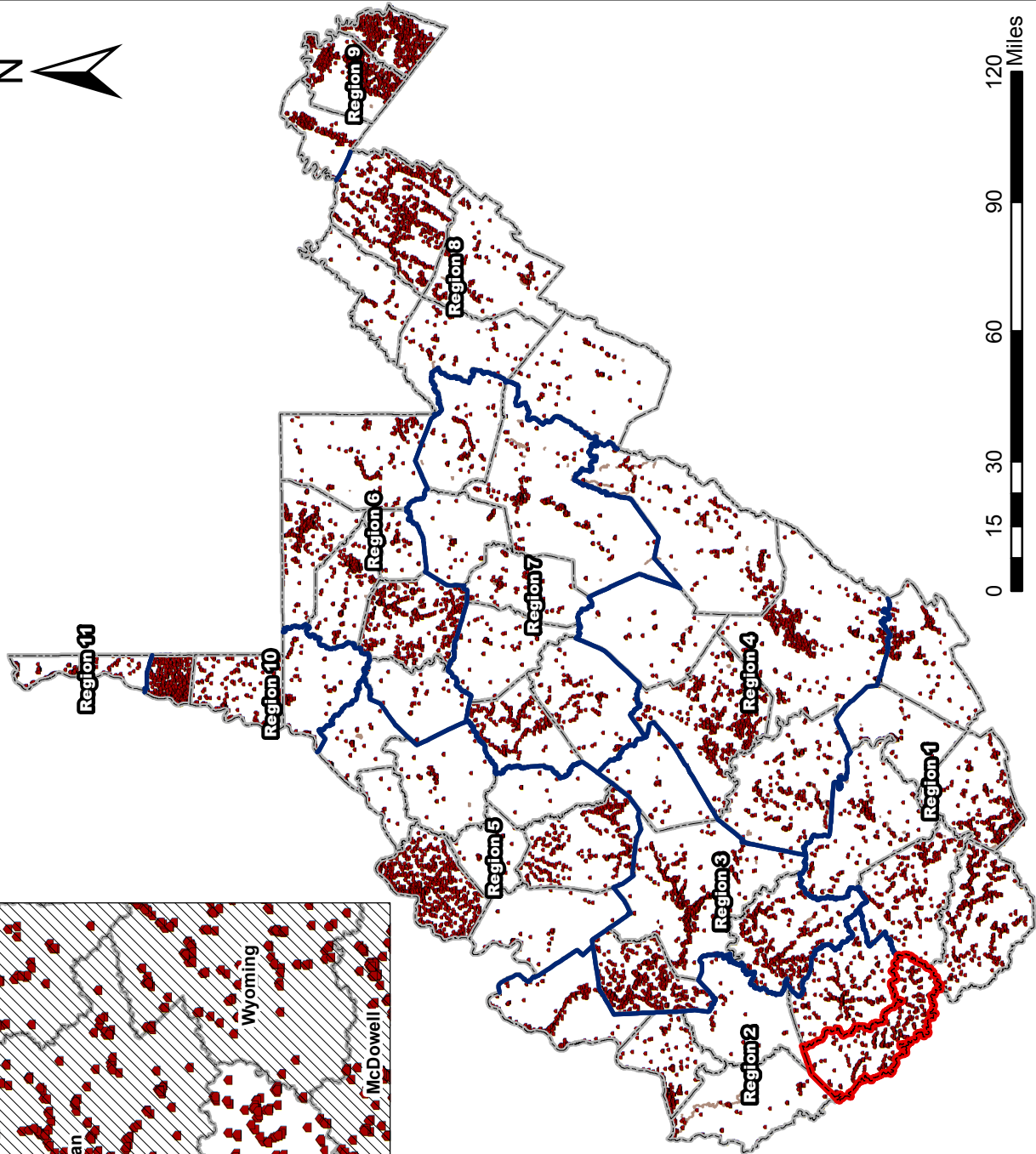
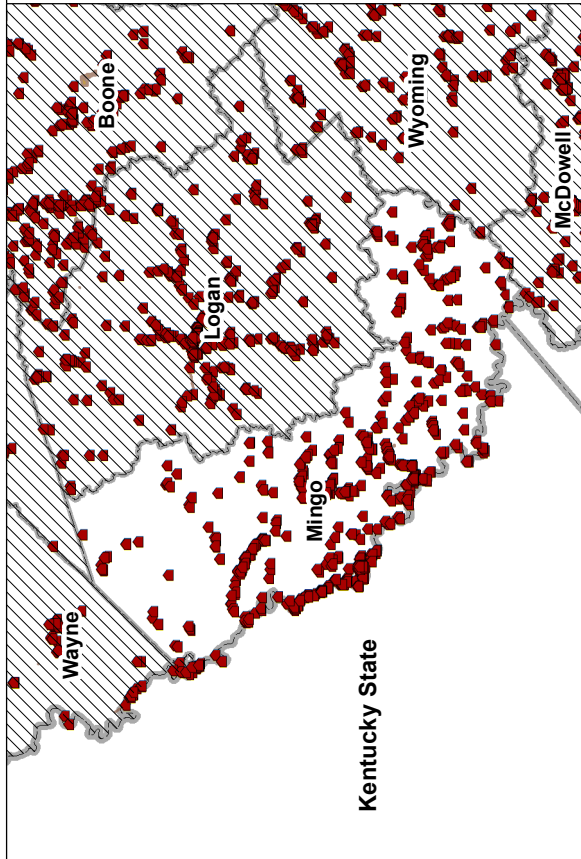


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Data Source: West Virginia State Historic Preservation Office 2012
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State Historic Architecture

Mingo County



- State Historic Architecture
- Planning Regions Line
- State Historic Architecture (Area)
- County Boundaries



Data Source: West Virginia State Historic Preservation Office 2012

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Natural Resources, Environment, and Energy

Particular importance should be given to the spatial positions of natural resource areas, geographic environments, and potential energy sources in a county. This serves to inform potential investors about what possibilities the land provides for production of resources and energy. As mentioned extensively, coal is the major resource for which Mingo County is credited. It is not, however, the only possible source of energy in Mingo, or in the state of West Virginia.

West Virginia has an extensive wetlands inventory, because of its extensive system of lakes, streams, and rivers. Wetlands provide many environmental benefits, including housing fish, replenishing groundwater, and relaying nutrients. Mingo County's system is not as extensive as other counties in West Virginia, but they do exist, and their positions are given in Map 29.

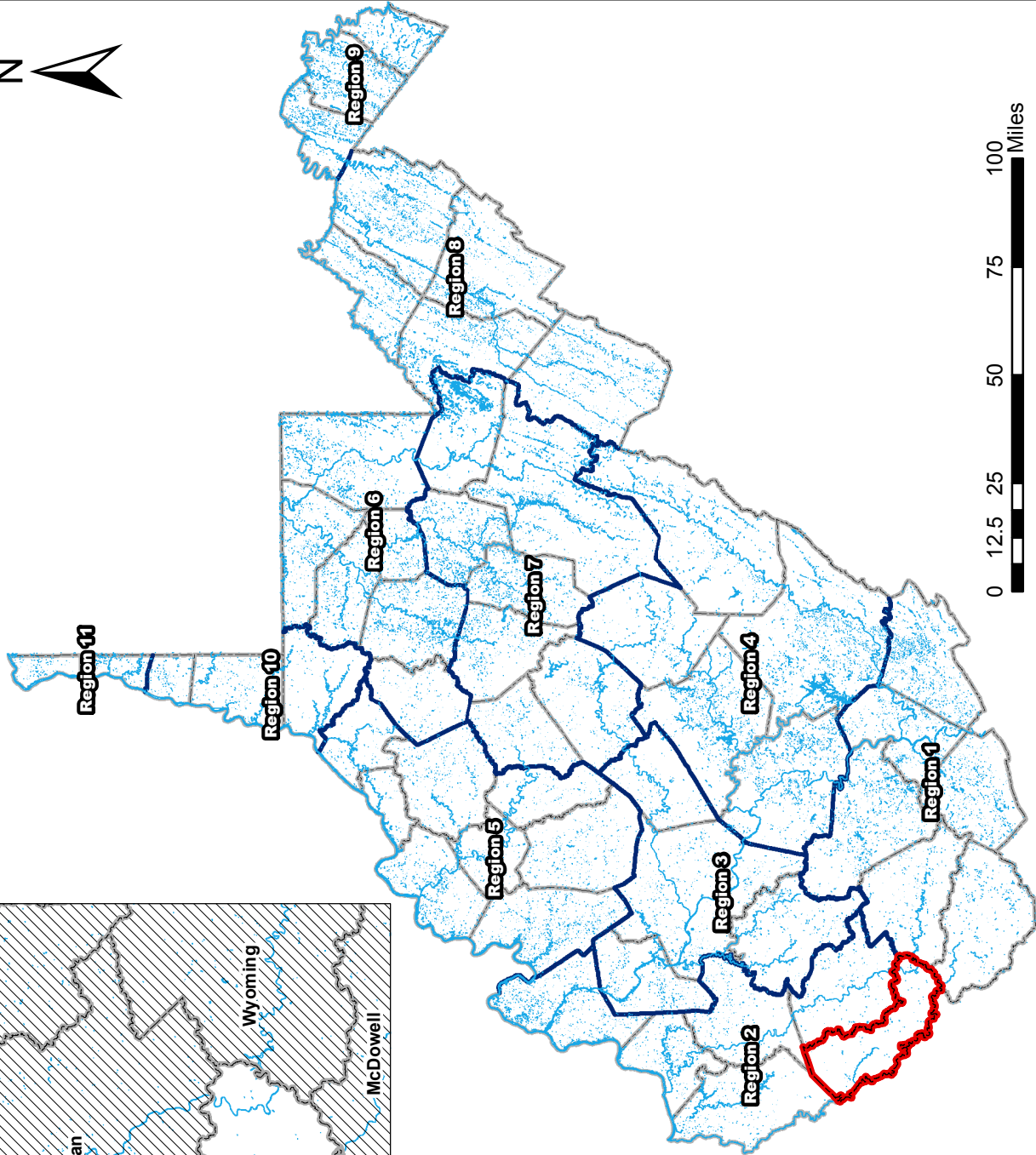
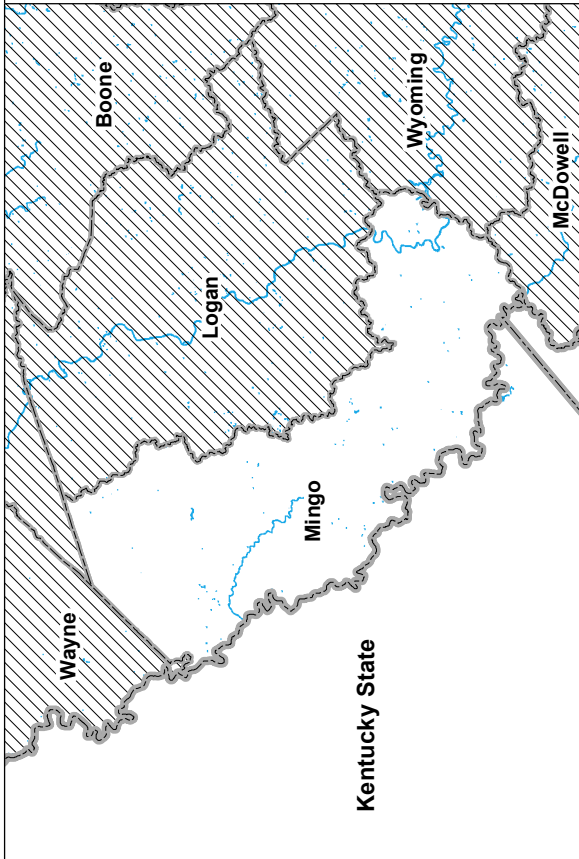
The state also possesses a respectable amount of park and forest land. Most of this land is located in the eastern portion of the state, the area which contains the main part of the Appalachian Mountain range. Mingo has no national or state parks, but does have a system of wildlife management areas that encourage respectful and beneficial interaction with local fauna (Map 30).




Air quality is a necessary environmental health benchmark that can determine the health and vitality of an area's residents. The air pollution non-attainment areas are "areas of the country where air pollution levels persistently exceed the national ambient air quality standards"⁹ There are six full counties in West Virginia that are designated air pollution non-attainment areas, either in annual or 2006 24-hour standards as of the publication of this plan; Mingo County is not among them (Map 31).

⁹ "The Green Book Nonattainment Areas for Criteria Pollutants," Environmental Protection Agency, Accessed March 1, 2013, <http://www.epa.gov/oaqps001/greenbk/>.

Hydrology - National Wetlands Inventory

Mingo County



-  Planning Regions Line
-  National Wetlands Inventory
-  County Boundaries



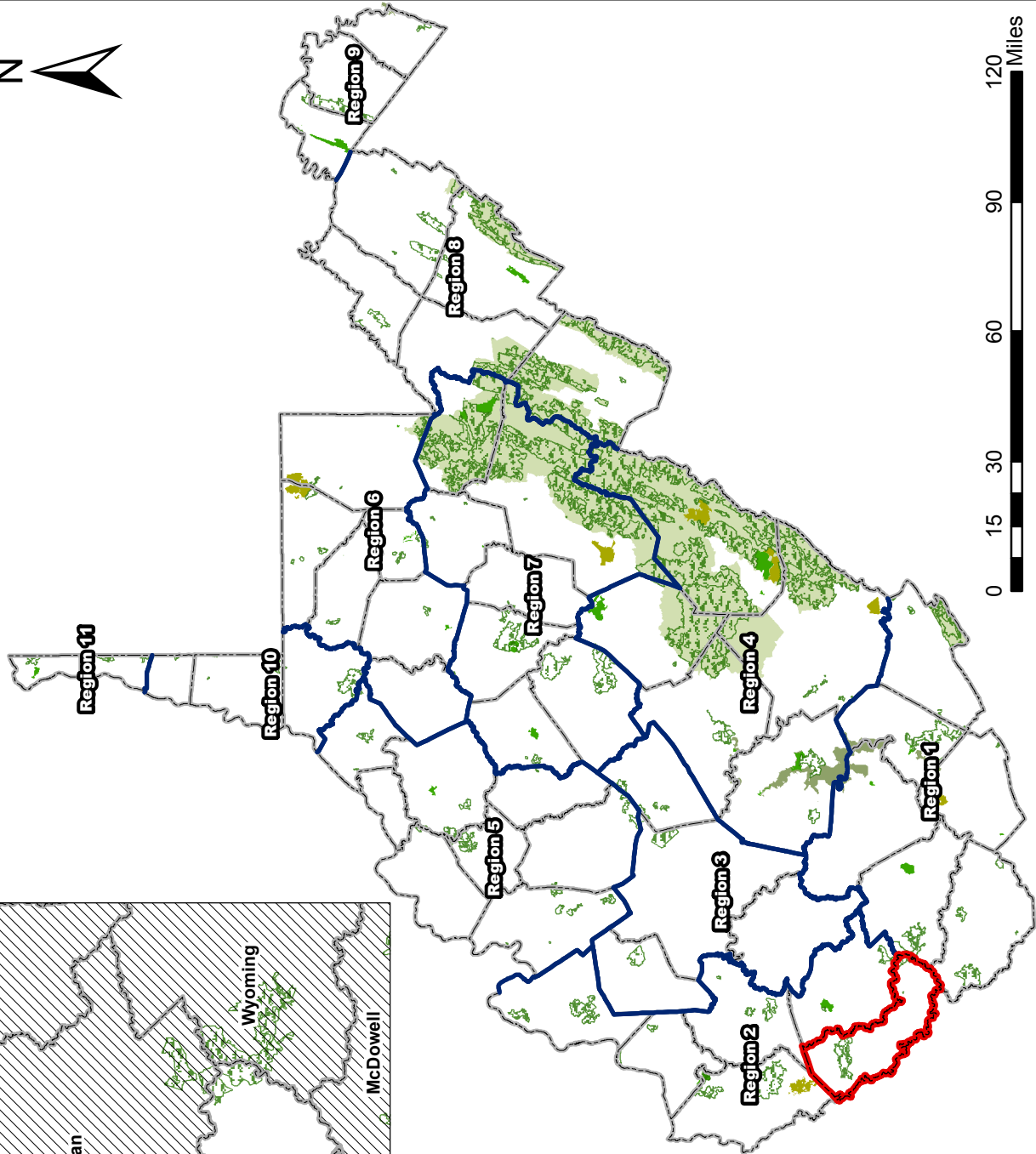
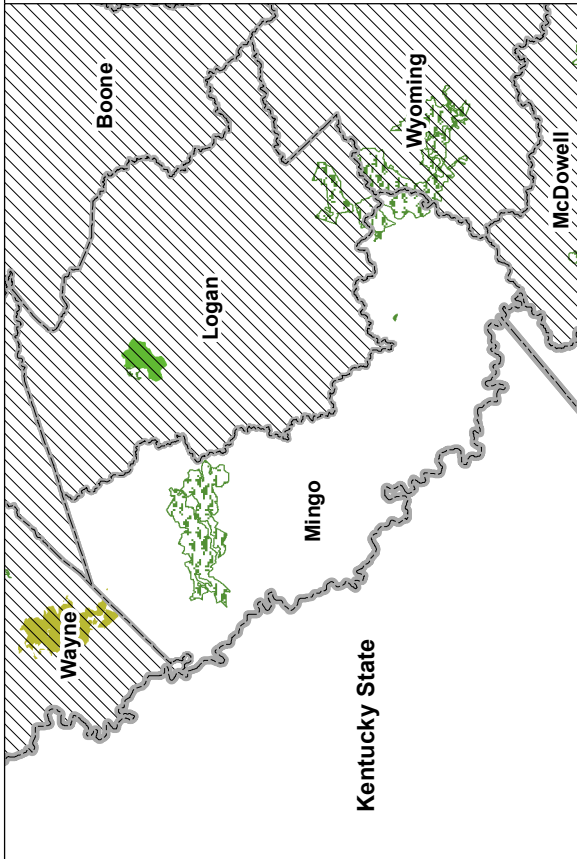
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Data Source: United States Fish and Wildlife Service 1996

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Public Land - Parks and Forests

Mingo County



-  Planning Regions Line
-  Wildlife Management Areas
-  State Forest
-  State Park
-  National Forest
-  National Park
-  County Boundaries



Data Source: Wildlife Management Areas; West Virginia Division of Natural Resources 2002; State Forest; West Virginia Division of Forestry 2004; State Park; West Virginia Division of Natural Resources, Natural Resource Analysis Center 2000

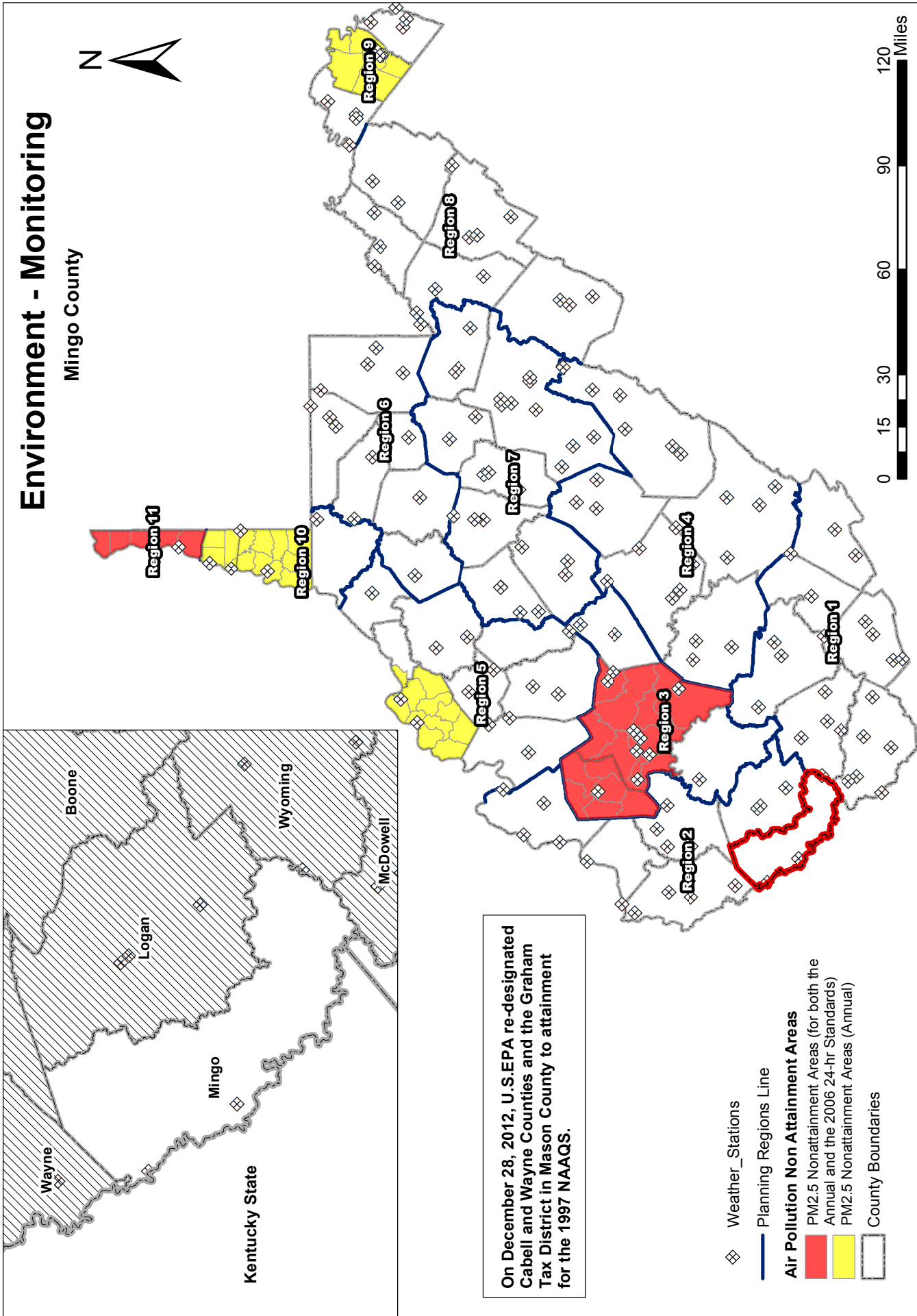
National Forest; United States Forest Service 2005; National Park; United States National Park Service 2003

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Environment - Monitoring

Mingo County



On December 28, 2012, U.S.EPA re-designated Cabell and Wayne Counties and the Graham Tax District in Mason County to attainment for the 1997 NAAQS.

- ◇ Weather_ Stations
- Planning Regions Line
- Air Pollution Non Attainment Areas**
 - PM2.5 Nonattainment Areas (for both the Annual and the 2006 24-hr Standards)
 - PM2.5 Nonattainment Areas (Annual)
- County Boundaries



Data Source: Weather Stations; National Oceanic and Atmospheric Administration 1999; Air Pollution Non Attainment Areas; West Virginia Department of Environmental Protection and United States Environmental Protection Agency

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West Virginia's past and most likely its future are defined by energy. Besides coal, other options for energy have been investigated in the state. Gas and oil are of course the main energy staples in the nation. West Virginia has access to this sort of energy in a number of ways. Mingo County has gas pipes running through mostly the southern part of the county, but also in the eastern and northern parts. Mingo County also has a small oil field in the northern part of the county (Map 32). There are also a number of completed Marcellus Shale wells within the county, most to test the possible production capacity from the Marcellus (Map 33). The Marcellus Shale will continue to be a major player in West Virginia's energy layout for the foreseeable future.

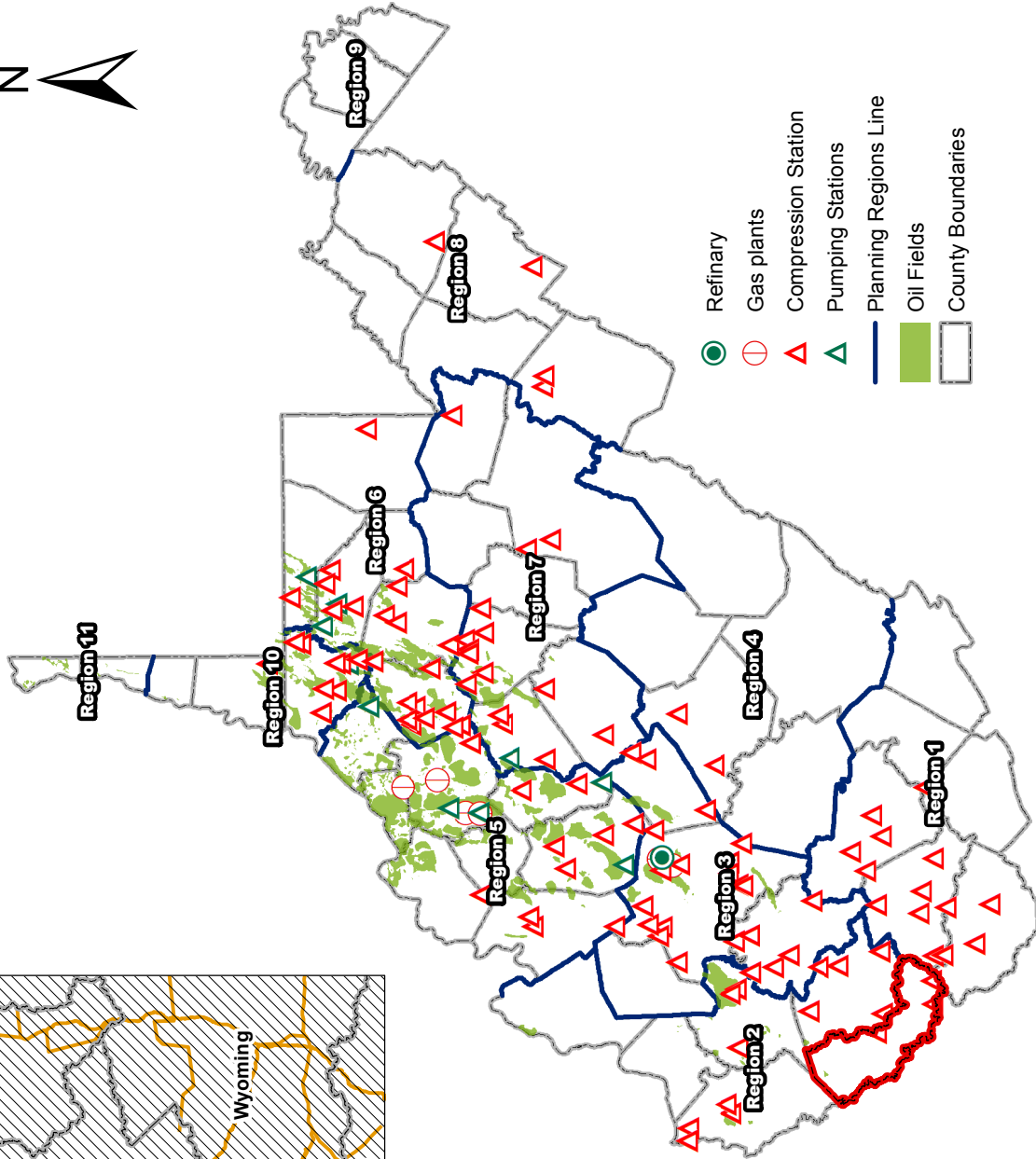
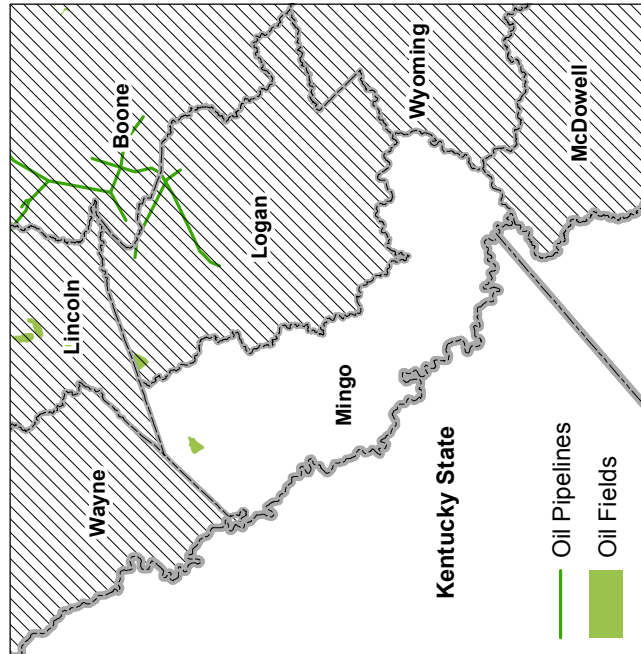
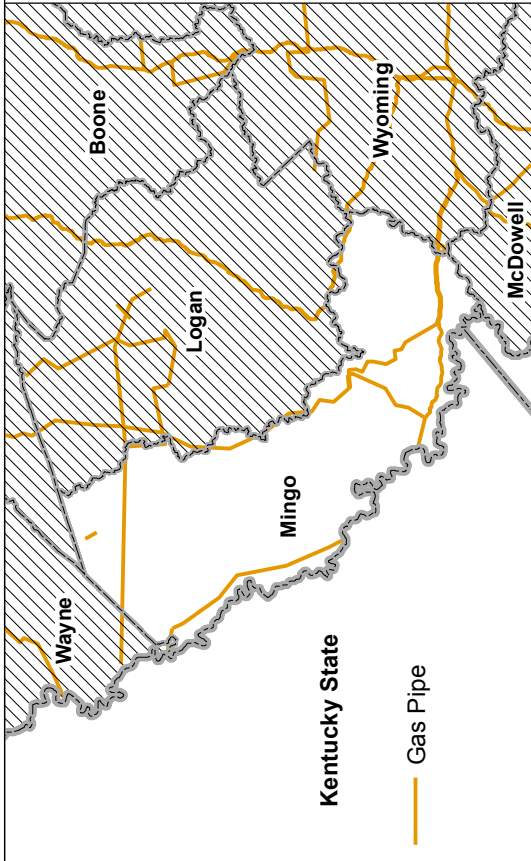
Potential renewable energy sources were also examined. Wood byproducts are a potential energy source classified as biomass energy. Naturally it is most useful in areas with a great deal of wood products. West Virginia is one of the most forested states in the country. Mingo County is on the lower end of the spectrum however, with between 65-75 percent of its land forested (Map 34). That is still a majority of the land, which could prove to be a valuable resource. Though several counties in West Virginia maintain the potential to produce energy by wood byproducts, and for which byproducts are readily available, Mingo County does not appear to be one of them (Maps 35 and 36). Other potential renewable energy sources include geothermal (Map 37), solar (Map 38), and wind (Map 39). Each of these resources was examined in a recent report from the Center of Business and Economic Research at Marshall University.¹⁰ None of these sources was "likely to provide fuel or electricity at a lower cost" than coal and oil. Subsidizing these resources appears to be the only way to encourage faster growth in consumption, and in some cases they still have very limited potential in West Virginia. Geothermal energy, however, appears to have great potential in certain parts of the state, as shown in Map 37, but does not appear to be feasible as a major generator of electricity in Mingo County. A geothermal hotspot with great potential for electricity generation has been found in the Appalachian Mountain chain, but benefits are not expected in the short term and costs may make immediate exploitation infeasible. Still, technology is not predictable, and improvements could occur in each of these resource areas that will make generation feasible. Efforts to monitor research in these areas should be undertaken to make use of any potential developments.¹¹

¹⁰ Kent, Calvin, Risch, Christine, and Pardue, Elizabeth. *Renewable Energy Policy: Opportunities for West Virginia*. Center for Business and Economic Research, Huntington, WV (2012).

¹¹ Ibid.

Energy - Gas and Oil

Mingo County



- Refinery
- Gas plants
- Compression Station
- Pumping Stations
- Planning Regions Line
- Oil Fields
- County Boundaries



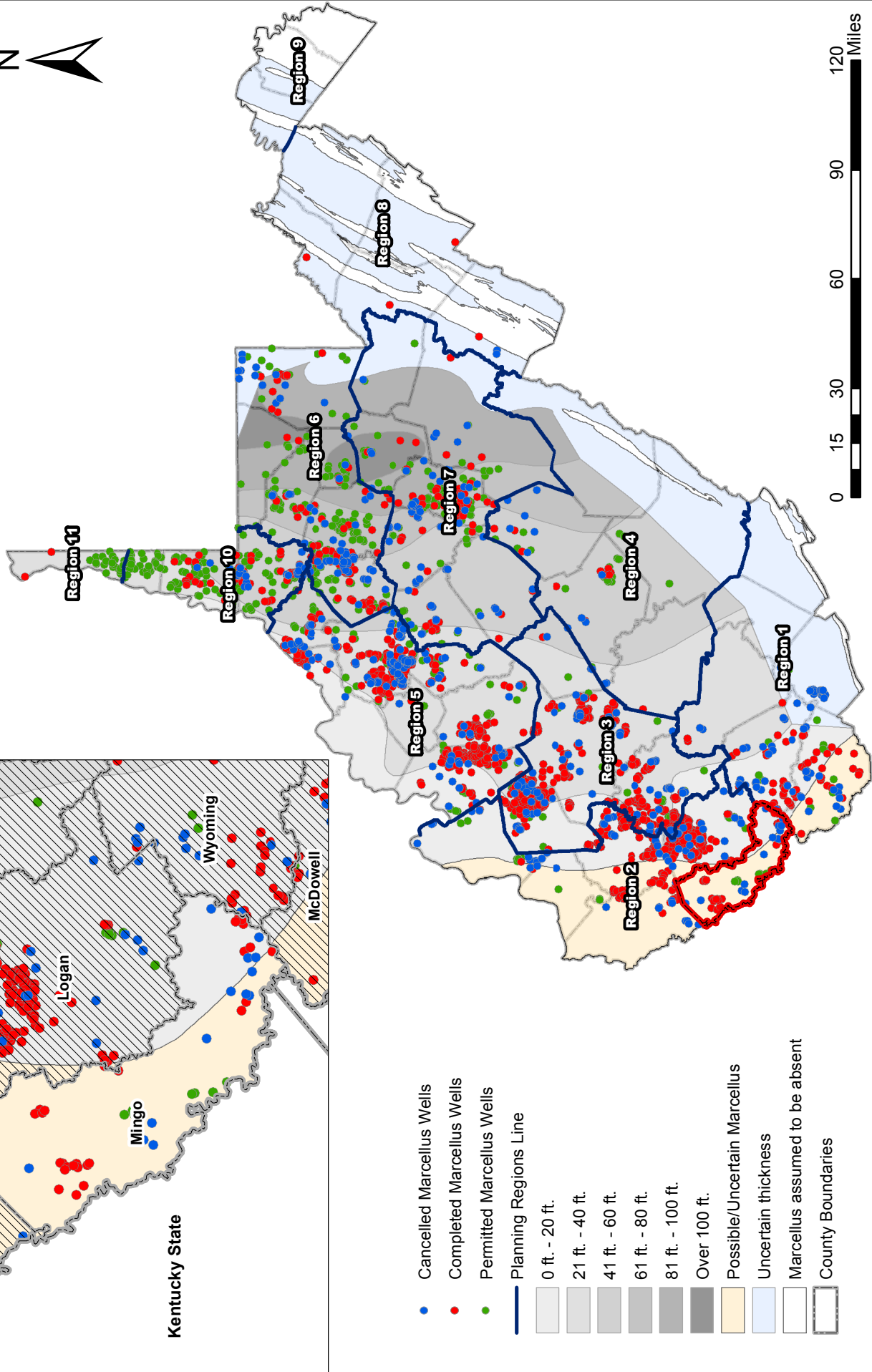
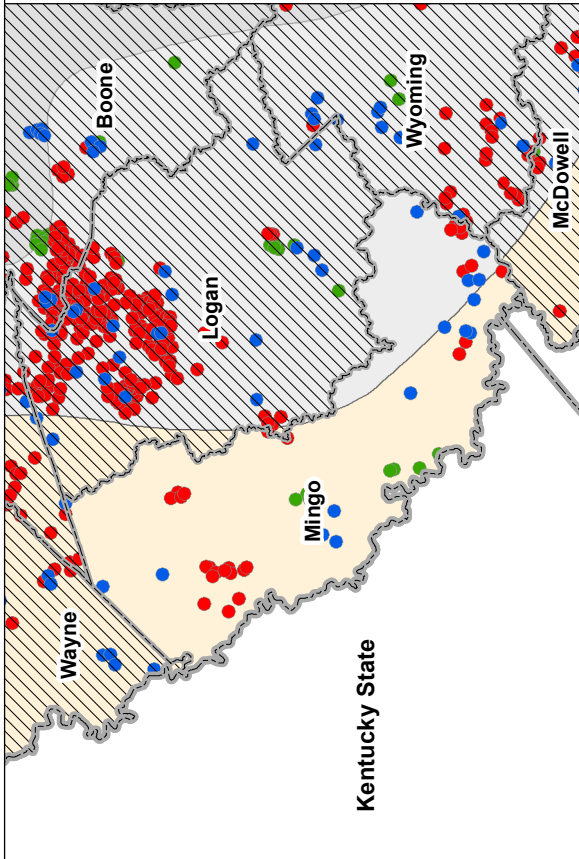
Data Source: West Virginia Geological and Economic Survey, 2007

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Energy - Marcellus Wells

Mingo County



- Cancelled Marcellus Wells
- Completed Marcellus Wells
- Permitted Marcellus Wells
- Planning Regions Line
- 0 ft. - 20 ft.
- 21 ft. - 40 ft.
- 41 ft. - 60 ft.
- 61 ft. - 80 ft.
- 81 ft. - 100 ft.
- Over 100 ft.
- Possible/Uncertain Marcellus
- Uncertain thickness
- Marcellus assumed to be absent
- County Boundaries

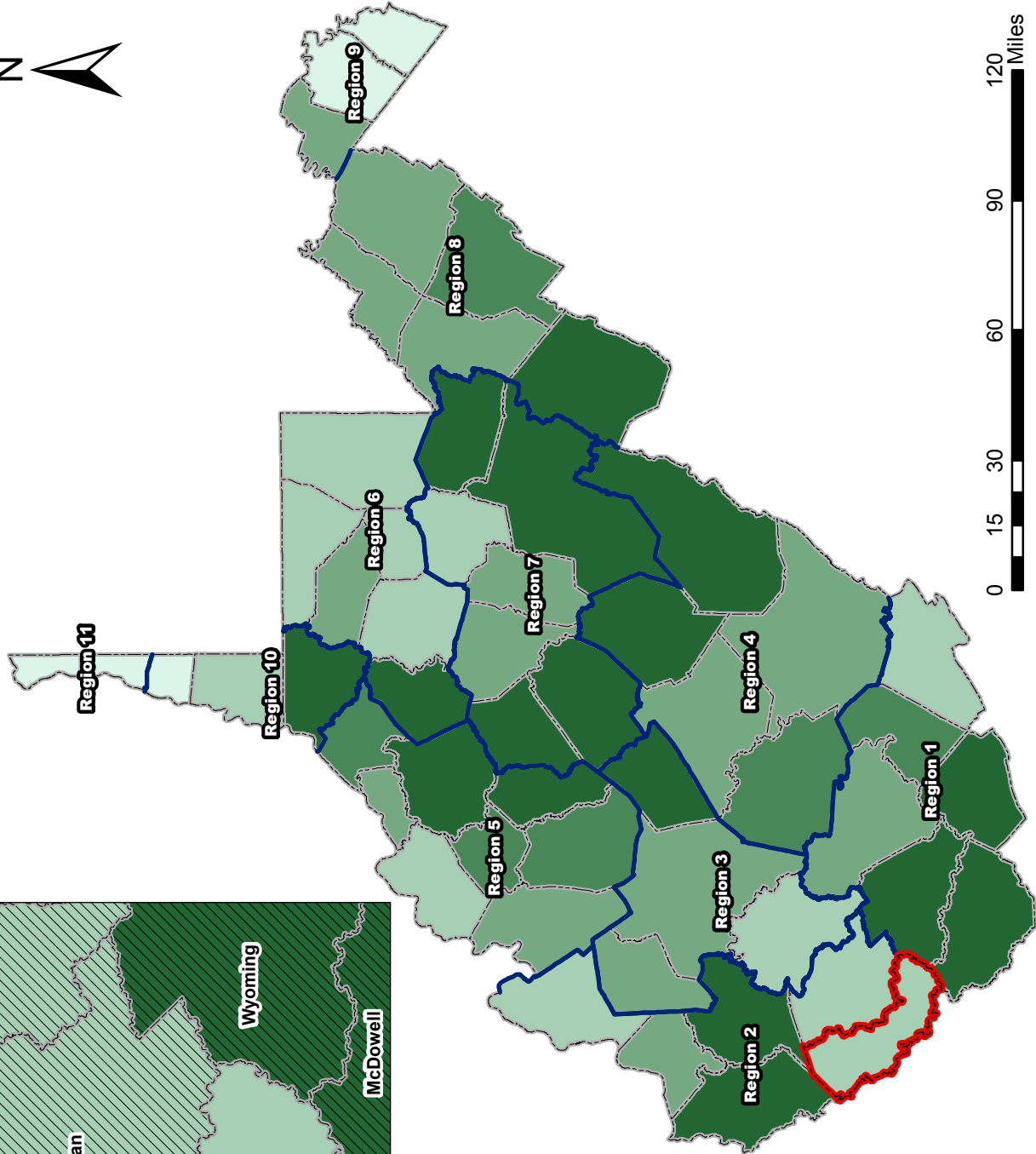
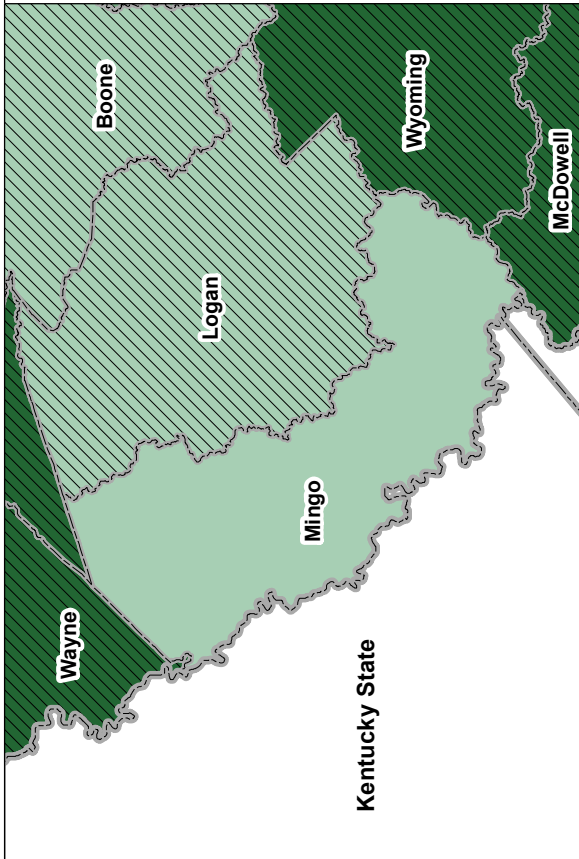


Data Source: West Virginia Geological and Economic Survey 2012

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Energy - Percent Forest Coverage

Mingo County



- Planning Regions Line
- 45.87% - 65%
- 65.01% - 75%
- 75.01% - 82%
- 82.01% - 85%
- 85.01% - 100%
- County Boundaries

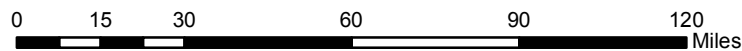
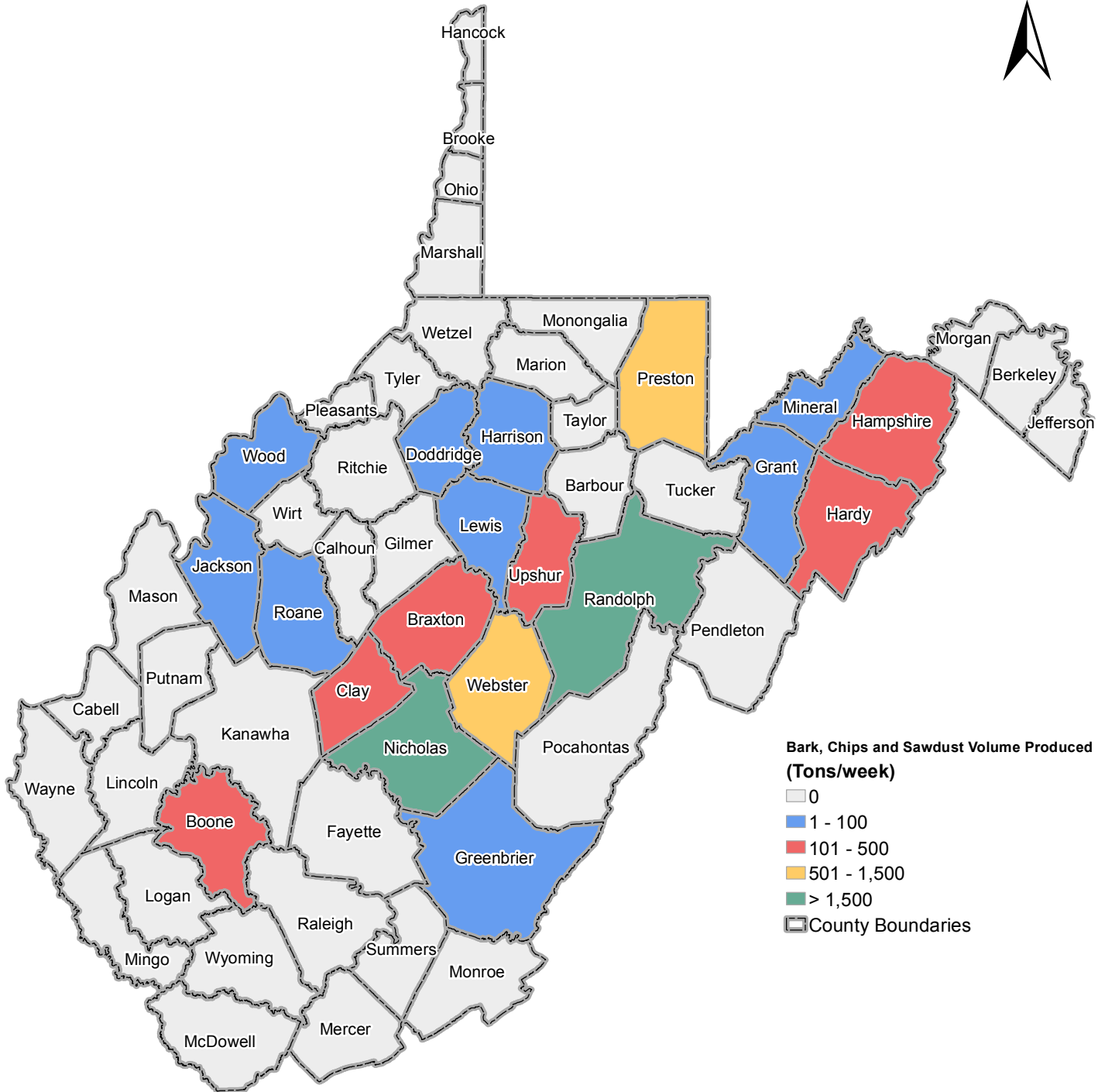


Data Source: Rahaall Transportation Institute 2013

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Renewable Energy - Wood By Products

Bark, Chip and Sawdust Volume Produced - Mingo County



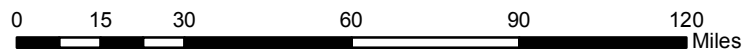
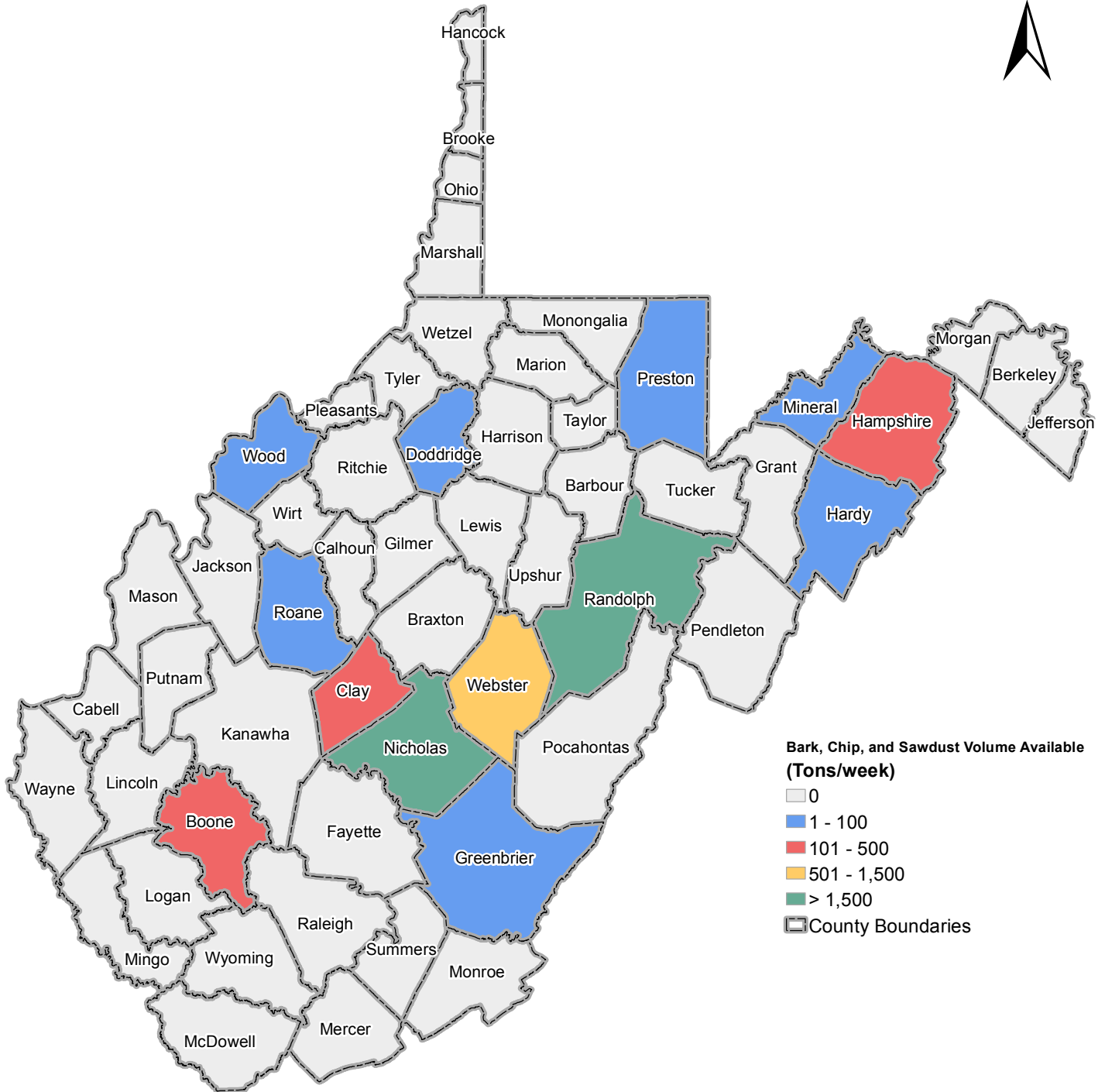
Data Source: Appalachian Hardwood Center 2011

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Renewable Energy - Wood By Products

Bark, Chip, and Sawdust Volume Available - Mingo County



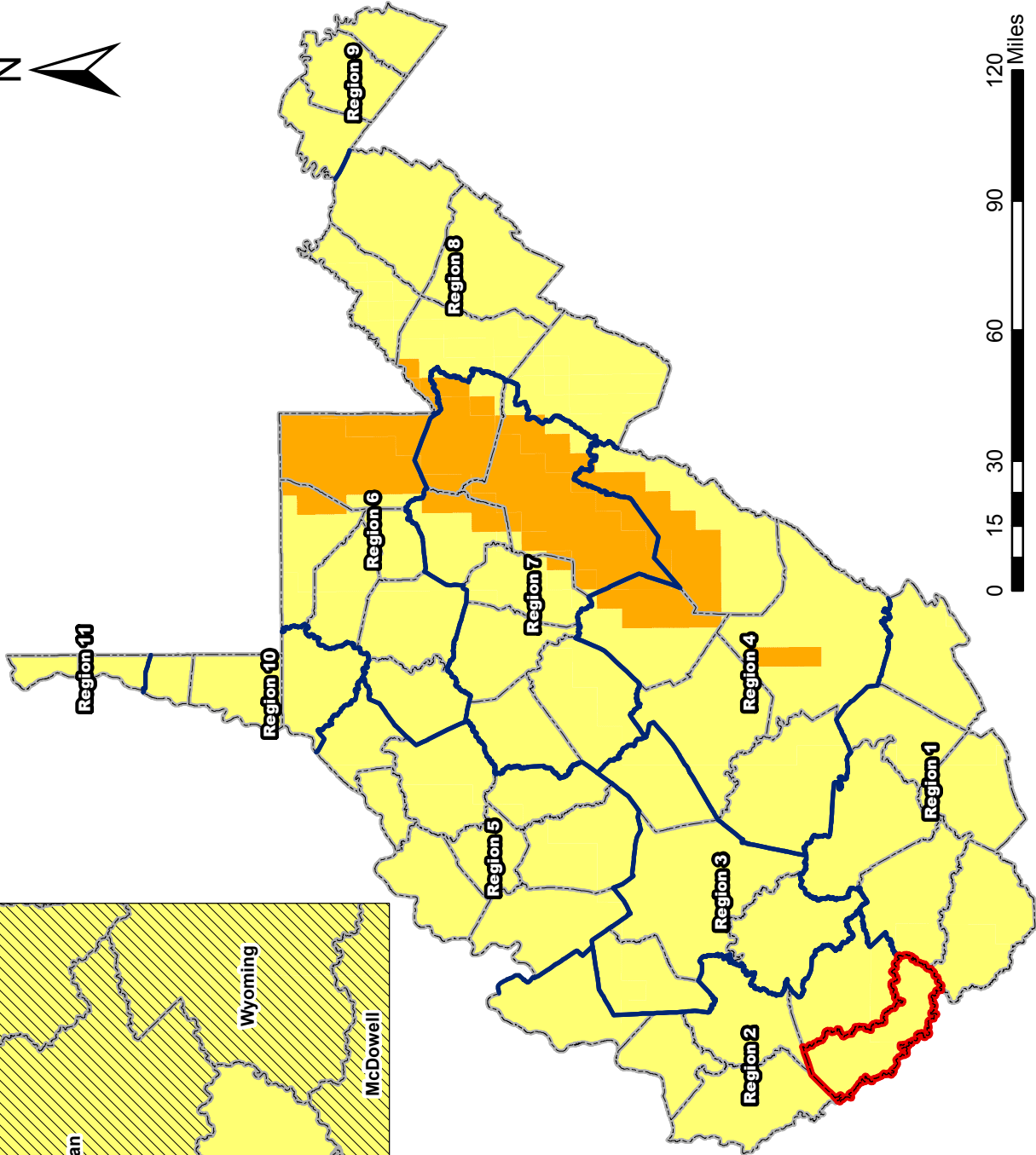
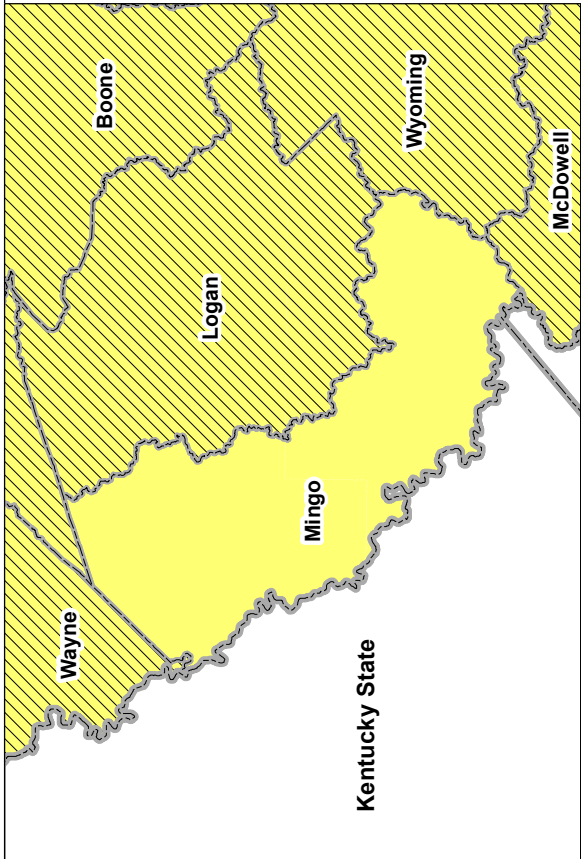
Data Source: Appalachian Hardwood Center 2011




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Energy - Geothermal

Mingo County



-  Planning Regions Line
-  County Boundaries
-  Least Favorable
-  More Favorable

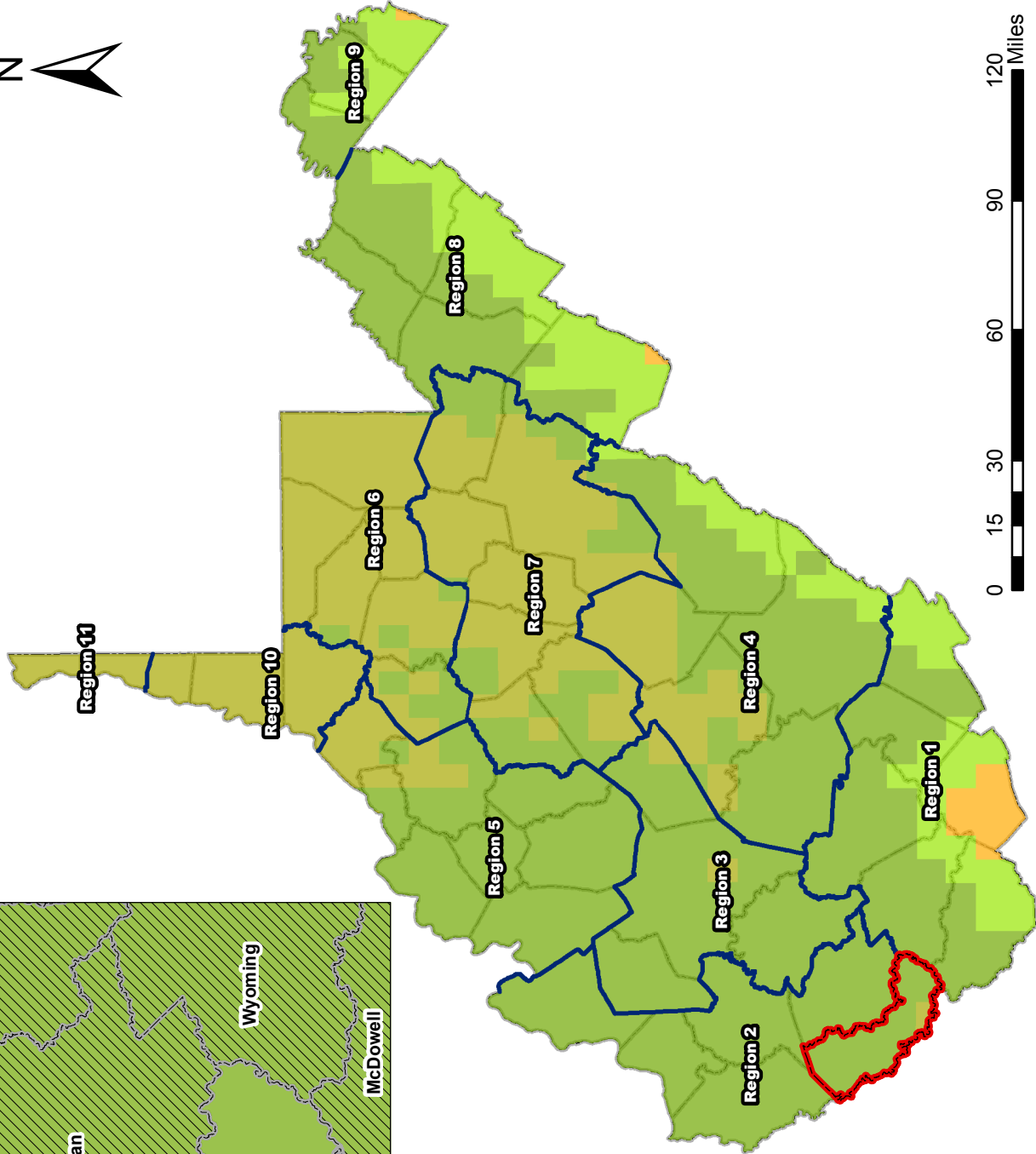
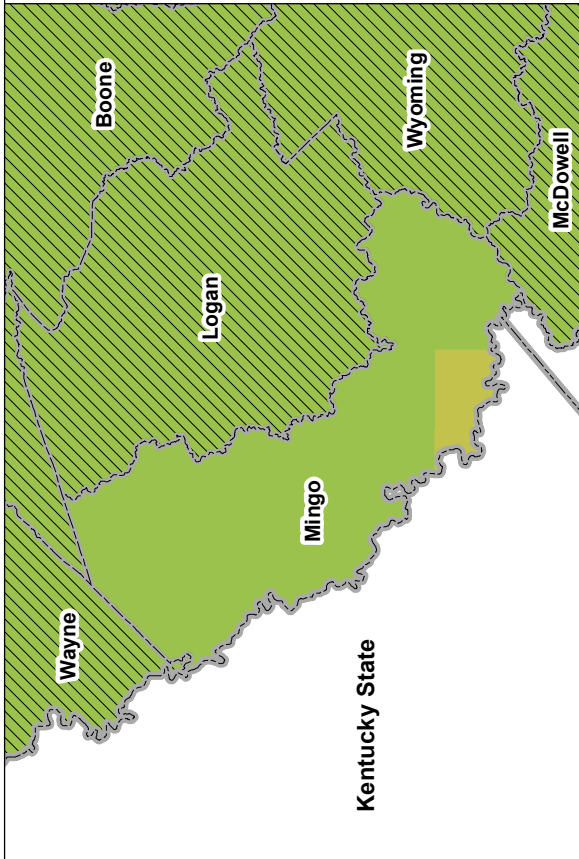
Data Source: National Renewable Energy Laboratory 2009

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Solar - Renewable Energy

Mingo County



- Planning Regions Line
- (kWh/m²/day)
- 4.2 - 4.4
- 4.0 - 4.1
- 3.7 - 3.9
- 3.4 - 3.6
- County Boundaries



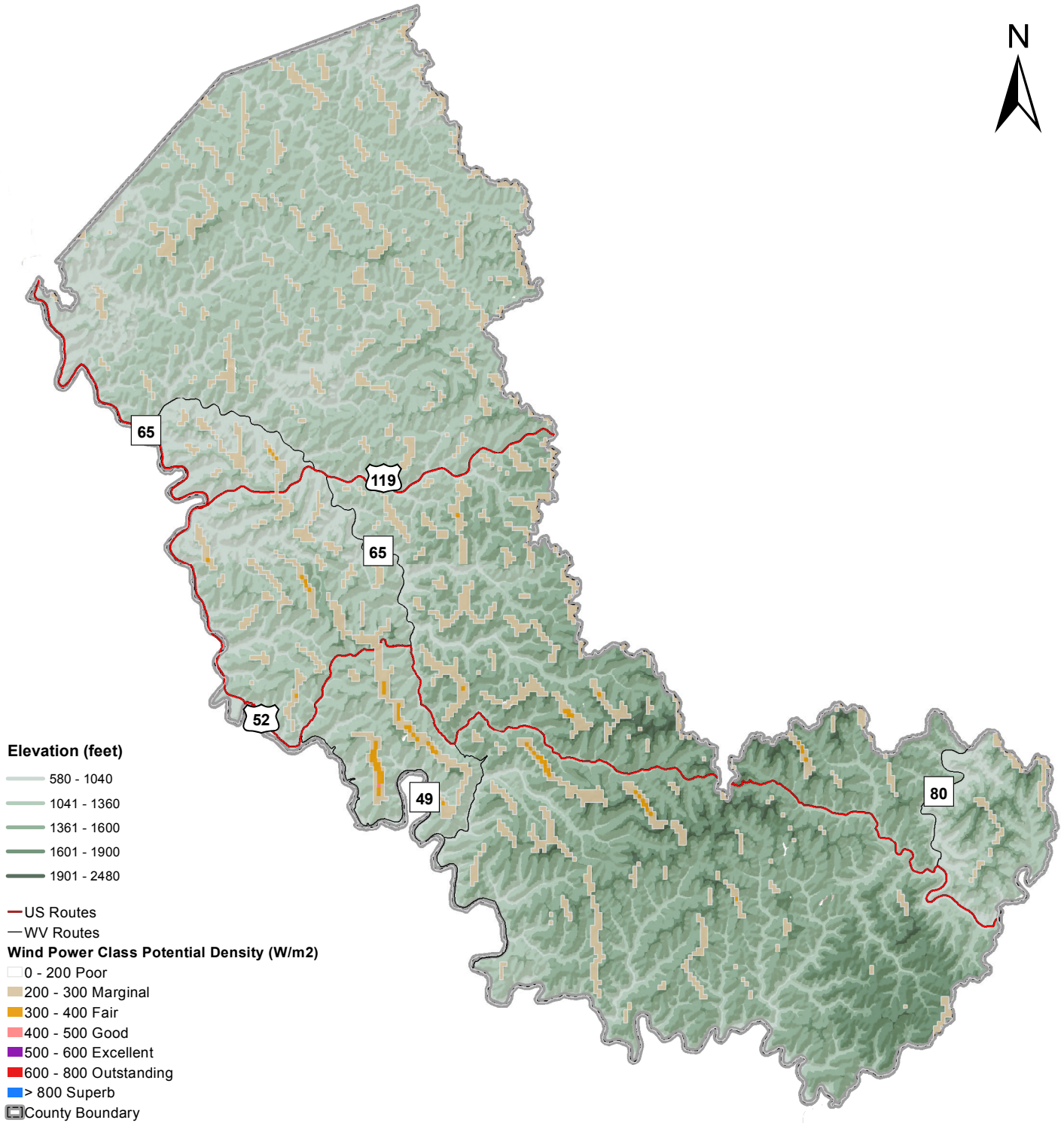
RTI
RAHALL APALACHIAN
TRANSPORTATION INSTITUTE
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Data Source: National Renewable Energy Laboratory 2012

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Renewable Energy-Wind

Mingo County



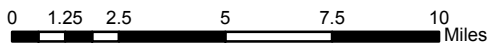
Elevation (feet)

- 580 - 1040
- 1041 - 1360
- 1361 - 1600
- 1601 - 1900
- 1901 - 2480

- US Routes
- WV Routes

Wind Power Class Potential Density (W/m²)

- 0 - 200 Poor
- 200 - 300 Marginal
- 300 - 400 Fair
- 400 - 500 Good
- 500 - 600 Excellent
- 600 - 800 Outstanding
- > 800 Superb
- County Boundary



Data Source: National Renewable Energy Laboratory 2006, United States Geological Survey n.d., ESRI, 2013

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IV. Land Use Smart Planning

The research team constructed a smart planning criterion that would apply to each mine site in Mingo. Tax Districts were utilized and labeled based on a particular land use practice that has previously been incorporated into the site. This criterion allows researchers and policymakers to determine suitability after weighing all the factors mentioned in the plan. A range of potential utilizations is provided to give optimal control to policymakers and investors.

The table below (Table 2) provides the categories and their areas. The Smart Planning Map (Map 40) showcases the geographies separated by utilization.

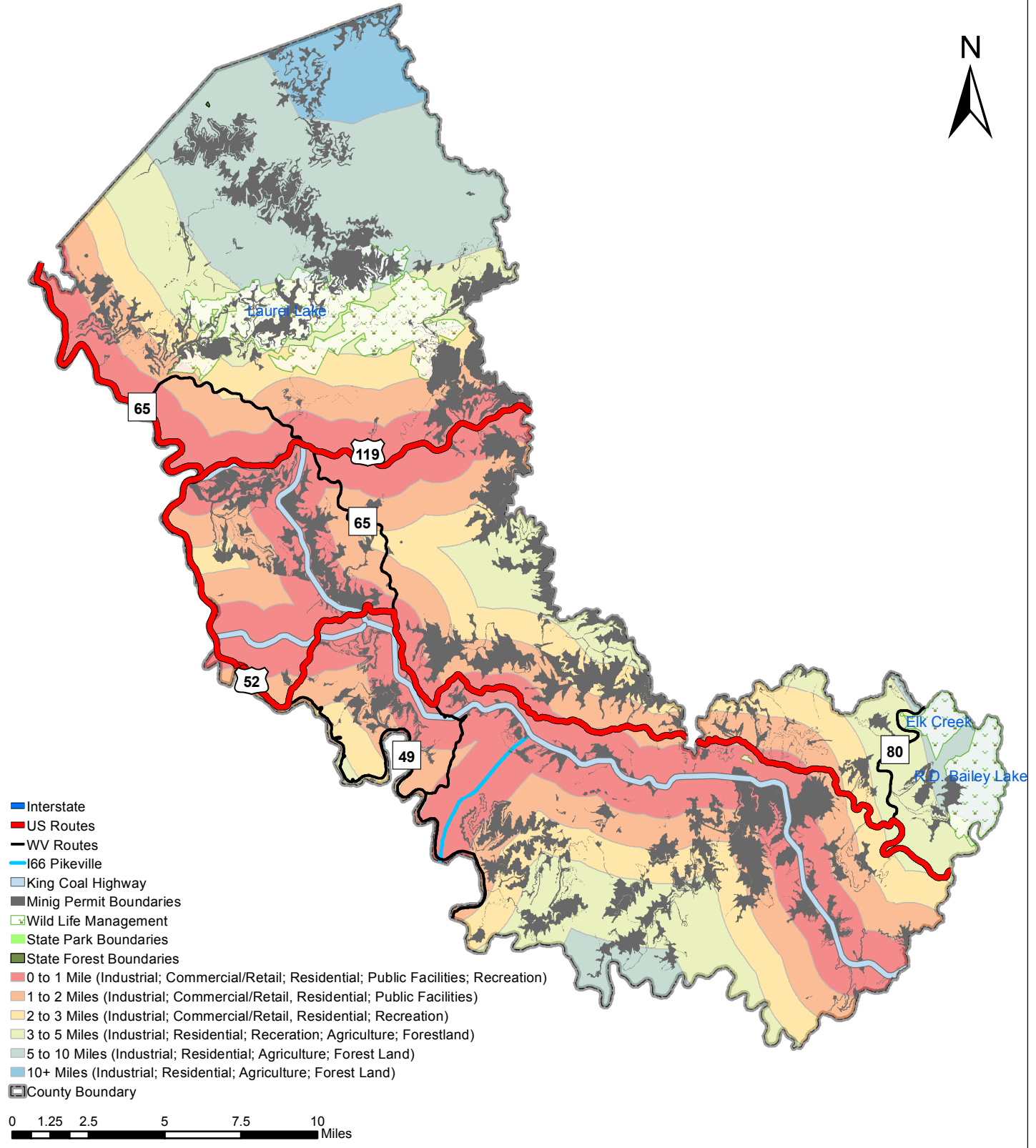
Table 2: Smart Planning Utilizations

Name	Smart Planning Criteria
Utilization Area 0-1 mile	Industrial, Commercial/Retail, Residential, Public Facility, Recreational
Utilization Area 1-2 miles	Industrial, Commercial/Retail, Residential, Public Facilities
Utilization Area 2-3 miles	Industrial, Commercial/Retail, Residential, Recreation
Utilization Area 3-5 miles	Industrial, Residential, Recreation, Agriculture, Forestland
Utilization Area 5-10 miles	Industrial, Residential, Agriculture, Forest Land
Utilization Area 10 miles +	Industrial, Residential, Agriculture, Forest Land

Land development or redevelopment options are determined through a review of the redevelopment authority's anticipated needs. The required infrastructure component standards are determined on a site by site basis by either the county government or the designated redevelopment authority as designated by West Virginia Code Chapter 05B Article 2A.

Landuse Criteria

Mingo County



Data Source: Rahall Transportation Institute 2013

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V. Site Evaluation

Once the smart planning buffers have been created, the sites available for analysis are confirmed. This evaluation provides the county with an inventory of post mine sites that are suitable for development. The evaluation consists of existing infrastructure availability, which gives the most accurate assessment of a site’s physical capabilities for investment purposes. This will encourage strategic development and evaluation.

Initial Data Collection:

The consulting team collected all available data on surface mine sites located in Mingo County to produce an inventory of sites for analysis. The source for site information was primarily the West Virginia Department of Environmental Protection (WV DEP) website, which allows permit searches by geographic location and mining type. The information provided by this source was used to develop a preliminary property database of all surface mines as well as general mapping.

According to the initial data collection there are an estimated 170 mine sites in the county. Some of them are active sites where mining is currently conducted and others are sites in various phases of bond. The potential mining sites for development are the ones not completely released or active. If the site was completely released, the mining surface has already returned to original condition. Therefore they are no longer covered under this land-use plan. There are 69 potential mining sites for development in Mingo County which are included in the following table.

Table 3: Mingo County Potential Surfaces Mine Sites for Development

Site No.	Permit_ID	Permittee	Facility Name	Acres	Expiration Date	Nearest Post Office
1	S501306	Aracoma Coal Company Inc	West Fork Surface Mine #1	342.04	11/16/2017	Dingess
2	S501107	Argus Energy WV Llc	Jims Branch Surface Mine	229	3/3/2014	Breden
3	S500997	Argus Energy WV Llc	Jude Br Surface No. 2	161.61	7/25/2002	
4	S501694	Argus Energy WV Llc	Jude Branch Surface Mine	345.3	11/17/2000	Breden
5	S501900	Argus Energy WV Llc	Tri-County No. 2 Surface	405.51	4/30/2016	Breden

Site No.	Permit_ID	Permittee	Facility Name	Acres	Expiration Date	Nearest Post Office
6	S502698	Argus Energy WV Llc	Copley Trace No. 2 Surface Min	754	6/30/2014	
7	S500707	Central Appalachia Mining, Llc	Grapevine East Surface Mine	342.3	8/19/2013	Edgarton
8	S502508	Central Appalachia Mining, Llc	Grapevine Fork Surface Mine	264.32	4/19/2017	Newtown
9	S400600	Central Appalachia Mining, Llc	Thacker Remining #1	253.6	5/25/2011	Edgarton
10	S500403	Central Appalachia Mining, Llc	Remining No. 2 Surface Mine	167.27	11/21/2013	Edgarton
11	S501404	Central Appalachia Mining, Llc	Remining No. 3 Surface Mine	1175.28	4/3/2016	Edgarton
12	S501901	Central Appalachia Mining, Llc	Grapevine South Surface Mine	398.16	4/1/2014	Edgarton
13	S001078	Chafin Branch Coal Co Llc		360	8/7/2017	Gilbert
14	S009085	Chafin Branch Coal Co Llc		147	9/16/2005	Gilbert
15	S508286	Chafin Branch Coal Co Llc		177	8/25/2006	Gilbert
16	S509087	Chafin Branch Coal Co Llc		284	1/14/1998	Gilbert
17	S502108	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.	Tom Branch Surface Mine	604.6	12/4/2014	Ragland

Site No.	Permit_ID	Permittee	Facility Name	Acres	Expiration Date	Nearest Post Office
18	S007280	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.		500	5/26/2007	Holden
19	S009780	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.		390	1/5/1998	Ragland
20	S500188	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.		236.6	8/12/1998	Ragland
21	S503390	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.		174.52	2/25/2001	Varney
22	S500395	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.	Proposed Holden 22 Surface Min	499.63	7/31/2016	
23	S501494	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.	Scarlet	654	11/16/2015	Holden
24	S501994	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.	Little Muncy Surface Mine	639.2	9/27/2015	Ragland
25	S501998	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.	Phoenix Surface Mine No. 2	562.35	1/25/2011	
26	S502399	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.	Loggy Branch Surface Mine	268.11	2/14/2018	Ragland
27	S506692	Coal-Mac, Inc. Dba Phoenix Coal-Mac Mining, Inc.	Surface Mine #5	545.11	11/9/2004	
28	S401395	Cobra Natural Resources Llc	Low Gap Br Sur. Mine No. 2	740.95	7/5/2015	Baisden
29	S503392	Cobra Natural Resources Llc	Sharkey Branch Surface Mine No	141.5	4/3/2015	Gilbert

Site No.	Permit_ID	Permittee	Facility Name	Acres	Expiration Date	Nearest Post Office
30	S504988	Cobra Natural Resources Llc		143.25	12/2/2013	Wharncliffe
31	S501806	Consol Of Kentucky Inc	Peg Fork Surface Mine	816.58	2/7/2018	Chattaroy
32	S501807	Consol Of Kentucky Inc	Buffalo Mountain Surface Mine	2308	11/22/2016	
33	S502101	Consol Of Kentucky Inc	Marrowbone Trace Surface Mine	246.64	10/22/2013	Breeden
34	S007382	Consol Of Kentucky Inc		48	8/12/1992	Breeden
35	S017978	Consol Of Kentucky Inc		188	6/7/1992	Breeden
36	Z000281	Consol Of Kentucky Inc		300	6/7/1992	Breeden
37	S007384	Consol Of Kentucky Inc		283.73	10/5/2014	Breeden
38	S009585	Consol Of Kentucky Inc		144.4	9/25/2015	Breeden
39	S500402	Consol Of Kentucky Inc	West Virginia Surface Mine No.	797.59	2/7/2015	Myrtle
40	S500692	Consol Of Kentucky Inc	Big Sang Kill #1	505	10/16/2017	
41	S500700	Consol Of Kentucky Inc	West Big Sang Kill Surface	335.6	12/21/2010	Breeden
42	S500802	Consol Of Kentucky Inc	Taywood West Surface Mine	354.54	8/9/2015	Breeden

Site No.	Permit_ID	Permittee	Facility Name	Acres	Expiration Date	Nearest Post Office
43	S500905	Consol Of Kentucky Inc	Mt-500 Surface Mine	1079.83	7/13/2016	Borderland
44	S502598	Consol Of Kentucky Inc	Big Sang Kill No. 2 Surface Mi	658.18	11/5/2014	
45	S503288	Consol Of Kentucky Inc		950	9/14/2013	Lenore
46	S503893	Consol Of Kentucky Inc	Mt-11	177	4/14/2017	
47	S503993	Consol Of Kentucky Inc	Mt-13	219	4/14/2012	Nolan
48	S504093	Consol Of Kentucky Inc	Mt-34	201	4/14/2022	Nolan
49	S506291	Consol Of Kentucky Inc	Snake Permit	196.56	10/16/2017	Naugatuck
50	S400401	Dfm Coal, Llc	Patton No. 11	327.72	9/6/2016	
51	S501006	Frasure Creek Mining, Llc	White Oak Surface Mine #6	205	12/5/2017	Baisden
52	S501808	Frasure Creek Mining, Llc	Spring Fork Surface Mine No. 2	87	5/19/2016	Isaban
53	S502201	Frasure Creek Mining, Llc	Spring Fork Surface Mine No. 1	473.1	10/29/2013	Baisden
54	S400301	Glen Alum Operations Llc	Patton No. 10	31	6/26/2016	Wharncliffe
55	S500410	Hampden Coal Company Llc	Canebrake Contour Surface Mine	485.8	5/9/2017	Gilbert
56	S500808	Hampden Coal Company Llc	Pete Branch Surface Mine	172.4	8/19/2013	

Site No.	Permit_ID	Permittee	Facility Name	Acres	Expiration Date	Nearest Post Office
57	S501310	Hampden Coal Company Llc	Pete Branch Ia Surface Mine	105.6	7/14/2016	Gilbert
58	S004784	Hampden Coal Company Llc		97	7/27/1999	Gilbert
59	S500801	Icg Eastern, Llc	Jennie Creek No. 3	439.56	4/1/2014	
60	S501799	Icg Eastern, Llc	Jennie Creek No.2 Surface Mine	875.54	8/23/2014	
61	S500999	Icg Eastern, Llc	Jennie Creek No. 1 Surface Min	384	11/5/2016	
62	S501294	Kwv Operations Llc	Hernshaw Cut Through	59	11/23/2014	Meador
63	S501307	Premium Energy Llc	Horsepen Highwall Miner No. 1	16.34	1/20/2014	Hampden
64	S501608	Premium Energy Llc	Coon Knob Surface Mine #1	219.04	8/30/2015	Baisden
65	S400400	Premium Energy Llc	No. 3 Surface Mine	510.1	12/21/2016	
66	S502099	Premium Energy Llc	Surface Mine No. 2	934.4	10/13/2015	Gilbert
67	S008880	Trace Creek Coal Company		678.12	1/6/2013	Myrtle
68	S501501	White Flame Energy Inc	Surface Mine #10	1106.1	5/20/2013	Ragland
69	S502097	White Flame Energy Inc	Surface Mine #9	968.5	11/20/2012	

Distance Analysis

Once the surface mining sites in the county were identified each of the sites were evaluated by estimating the shortest distance from the site to a specified criteria (features which are important to development). There are two types of distance calculation in this analysis: road-path and Euclidean distance. Road-path distance is the distance when travelling on an actual roadway from the site to the feature; Euclidean distance is when the distance is a straight line from the site to the feature, without the necessity of following a roadway. Following are lists of criteria used in the analysis:

- Road-path Distances:
 - Distance to nearest roadway (Interstate, Existing Highway, Proposed Highway...)
 - Distance to major airports (Tri-state, Yeager)
 - Distance to Intermodal Terminal Facility and Huntington Port
 - Distance to nearest Sewer/ Solid Waste Treatment Facility

- Euclidean Distances:
 - Distance to Water Lines, Sewer Lines, Power Lines and Broadband
 - Distance to Gas Pipe and Oil Pipe
 - Distance to Railroad, National Waterway Network

The following tables illustrate the results of these assessments for all of the identified sites. All distances were recorded in miles.

Table 4: Assessment of Distances

Site No.	Permit_ID	Interstate (IS)	Name - IS	Existing Highway (EH)	Name - EH	Paved Road	Paved Road Name	Kingcoal Highway
1	S501306	55.74	I64 / I77	18.29	S10	0.4391	Upper 12 Pole Creek Road	16.22
2	S501107	43.38	I64 / I77	11.91	S10	0.0420	Kiah Creek	31.41
3	S500997	54.67	I64 / I77	23.87	S10	0.3307	Jim's Branch Road	19.99
4	S501694	54.10	I64 / I77	23.01	S44	0.5404	Old N&W Roadbed	19.93
5	S501900	45.69	I64 / I77	14.38	S80	0.8597		23.33
6	S502698	45.60	I64 / I77	16.56	S80	0.3885	Mud Fork	31.72
7	S500707	83.93	I64 / I77	20.17	S80	0.4666	Grapevine Fork Beech Creek	12.35
8	S502508	70.54	I64 / I77	14.29	S80	0.3442	Grapevine Creek	7.18

Site No.	Permit_ID	Interstate (IS)	Name - IS	Existing Highway (EH)	Name - EH	Paved Road	Paved Road Name	Kingcoal Highway
9	S400600	82.41	I64 / I77	17.82	S80	0.6373	Grapevine Creek	10.85
10	S500403	80.41	I64 / I77	14.68	US119	0.4252	Grapevine Creek	8.83
11	S501404	81.40	I64	16.22	US119	0.1096	Thacker Creek Road	9.82
12	S501901	82.73	I64	18.29	US119	0.5113	Thacker Creek Road	11.15
13	S001078	61.48	I64	9.86	US119	0.9209	Grimmett Hollow (Verner)	4.81
14	S009085	59.60	I64	0.87	US119	0.5996	Mud Lick Branch	12.85
15	S508286	59.69	I64	5.34	US119	0.5613	WV 80	5.74
16	S509087	60.71	I64	4.22	US119	0.4737	Gilbert Creek Road	16.45
17	S502108	65.64	I64	11.76	US119	0.5990	Rice Branch	8.58
18	S007280	60.35	I64 / I77	6.38	US119	0.6278	Left Fork Elk Creek	12.59
19	S009780	71.05	I64 / I77	11.21	US119	0.5463	Left Fork Elk Creek	10.92
20	S500188	68.53	I64 / I77	10.24	US119	0.8112	Left Fork Elk Creek	10.30
21	S503390	68.86	I64 / I77	1.97	US119	0.6712	Nighway Branch	5.95
22	S500395	62.83	I64 / I77	10.23	US119	0.7816	Rovers Branch	11.26
23	S501494	58.23	I64 / I77	1.67	US119	0.9928	Rovers Branch	8.62
24	S501994	68.06	I64 / I77	2.28	US52 / S80	0.7236	Rockhouse Fork	5.15
25	S501998	66.93	I64 / I77	1.58	US52	0.9802	Boy Scout Camp Road	5.78
26	S502399	64.43	I64 / I77	12.75	US52	0.0086	Pine Creek Road	10.17
27	S506692	66.50	I64 / I77	1.77	US52	1.0421	WV 44	3.60
28	S401395	67.17	I64 / I77	9.65	US52	0.2749	Left Fork Ben's Creek	3.86
29	S503392	62.18	I64 / I77	0.44	US52	0.4158	Left Fork Ben's Creek	2.81
30	S504988	66.22	I64 / I77	8.16	US52	0.2857	US 52	2.91

Site No.	Permit_ID	Interstate (IS)	Name - IS	Existing Highway (EH)	Name - EH	Paved Road	Paved Road Name	Kingcoal Highway
31	S501806	67.46	I64 / I77	6.99	US52	1.1081	Shaft Branch	2.62
32	S501807	69.82	I64 / I77	4.51	US52	0.4835		0.59
33	S502101	58.50	I64 / I77	14.82	US52	0.9136		14.64
34	S007382	59.78	I64 / I77	16.80	US52	0.5550		15.93
35	S017978	55.57	I64 / I77	25.32	US52	0.3726	Marrowbone Creek Road	19.04
36	Z000281	59.63	I64 / I77	16.59	US52	0.5223	Marrowbone Creek Road	15.78
37	S007384	55.97	I64 / I77	25.91	US52	0.4745	Rt. Fork Marrowbone Creek	19.44
38	S009585	53.34	I64 / I77	16.72	US52	0.5755	Rt. Fork Marrowbone Creek	22.73
39	S500402	63.74	I64 / I77	4.04	US52	0.2254	Rt. Fork Marrowbone Creek	6.75
40	S500692	61.66	I64 / I77	19.68	US52	1.0779	Rt. Fork Marrowbone Creek	17.80
41	S500700	55.65	I64 / I77	25.44	US52	0.5215	Rt. Fork Marrowbone Creek	19.13
42	S500802	54.02	I64 / I77	13.70	US52	0.4547	Kings Drive	20.81
43	S500905	65.82	I64 / I77	4.48	US52	0.5376	King Coal Highway	0.98
44	S502598	61.10	I64 / I77	18.84	US52	0.6716	King Coal Highway	17.25
45	S503288	56.88	I64 / I77	17.30	US52	0.0071	King Coal Highway	11.08
46	S503893	61.32	I64 / I77	1.30	US52	0.3364	King Coal Highway	0.50
47	S503993	66.31	I64 / I77	5.23	US52	1.0451	King Coal Highway	1.47
48	S504093	67.45	I64 / I77	6.96	US52	0.6703	Old N&W Roadbed	2.61
49	S506291	56.31	I64	22.79	US52	0.9960	Rifte Branch	16.10
50	S400401	66.72	I64	8.95	US52	0.1809	Dotson Hollow	3.41
51	S501006	60.40	I64	11.16	US52	0.6560	Baisden Fork	3.72

Site No.	Permit_ID	Interstate (IS)	Name - IS	Existing Highway (EH)	Name - EH	Paved Road	Paved Road Name	Kingcoal Highway
52	S501808	56.10	I64	11.59	US52	0.5266	King Coal Highway	0.23
53	S502201	59.05	I64	10.24	US52	0.3472	Gilbert Creek Road	0.31
54	S400301	69.95	I64	15.11	US52	0.4143	Alum Creek Road	7.39
55	S500410	59.37	I64	2.31	US52	0.6190	Browning Fork	4.82
56	S500808	57.18	I64	1.03	US52	0.5671	Tamcliff Road (Gilbert)	10.43
57	S501310	57.18	I64	1.03	US52	0.5671	Tamcliff Road (Gilbert)	10.43
58	S004784	57.09	I64	0.90	US52	0.3592	Tamcliff Road (Gilbert)	10.34
59	S500801	52.40	I64	11.17	US52	0.2551	Marrowbone Creek Road	19.18
60	S501799	54.43	I64	14.35	US52	0.5491	Marrowbone Creek Road	21.22
61	S500999	54.55	I64	14.55	US52	0.6139	Marrowbone Creek Road	21.34
62	S501294	73.31	I64	18.67	US52	0.1592	Right Fork Beech Creek	9.95
63	S501307	64.20	I64	1.49	US52	0.1549	King Coal Highway	1.05
64	S501608	61.57	I64	1.92	US52	0.0821	King Coal Highway	1.51
65	S400400	61.67	I64	2.11	US52	0.1560	Beech Creek Road	0.39
66	S502099	57.07	I64	1.25	US52	0.3093	Gilbert Creek Road	5.81
67	S008880	59.33	I64	1.05	US52	0.6728	Us 119	7.30
68	S501501	73.60	I64	5.58	US52	0.3333	Lower Curry Branch Road	4.62
69	S502097	71.30	I64	5.64	US52	0.6701	Old Field Branch	7.38

Table 5 Distances from Sites to Major Airports

Site No.	Permit_ID	Permittee	Tri-state	Yeager
1	S501306	ARACOMA COAL COMPANY INC	66.90	67.18
2	S501107	ARGUS ENERGY WV LLC	52.68	63.27
3	S500997	ARGUS ENERGY WV LLC	59.23	73.98
4	S501694	ARGUS ENERGY WV LLC	58.66	73.92
5	S501900	ARGUS ENERGY WV LLC	60.11	62.59
6	S502698	ARGUS ENERGY WV LLC	53.00	66.26
7	S500707	CENTRAL APPALACHIA MINING, LLC	90.26	96.78
8	S502508	CENTRAL APPALACHIA MINING, LLC	93.44	87.96
9	S400600	CENTRAL APPALACHIA MINING, LLC	88.75	95.27
10	S500403	CENTRAL APPALACHIA MINING, LLC	86.74	93.26
11	S501404	CENTRAL APPALACHIA MINING, LLC	87.73	94.25
12	S501901	CENTRAL APPALACHIA MINING, LLC	89.06	95.58
13	S001078	CHAFIN BRANCH COAL CO LLC	100.62	91.65
14	S009085	CHAFIN BRANCH COAL CO LLC	92.63	82.34
15	S508286	CHAFIN BRANCH COAL CO LLC	97.75	88.77
16	S509087	CHAFIN BRANCH COAL CO LLC	93.36	83.07
17	S502108	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	76.25	74.30
18	S007280	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	78.01	69.01
19	S009780	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	82.90	79.71
20	S500188	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	82.28	77.19
21	S503390	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	85.51	83.11

Site No.	Permit ID	Permittee	Tri-state	Yeager
22	S500395	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	78.92	71.49
23	S501494	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	74.34	66.88
24	S501994	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	86.73	82.31
25	S501998	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	85.77	76.79
26	S502399	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	77.83	73.09
27	S506692	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	87.61	80.76
28	S401395	COBRA NATURAL RESOURCES LLC	92.86	84.97
29	S503392	COBRA NATURAL RESOURCES LLC	89.02	80.05
30	S504988	COBRA NATURAL RESOURCES LLC	91.91	84.02
31	S501806	CONSOL OF KENTUCKY INC	70.23	78.23
32	S501807	CONSOL OF KENTUCKY INC	72.59	80.59
33	S502101	CONSOL OF KENTUCKY INC	61.27	88.54
34	S007382	CONSOL OF KENTUCKY INC	62.55	89.82
35	S017978	CONSOL OF KENTUCKY INC	60.14	73.03
36	Z000281	CONSOL OF KENTUCKY INC	62.40	89.67
37	S007384	CONSOL OF KENTUCKY INC	60.53	73.43
38	S009585	CONSOL OF KENTUCKY INC	57.90	75.06
39	S500402	CONSOL OF KENTUCKY INC	72.48	72.40
40	S500692	CONSOL OF KENTUCKY INC	64.43	91.70
41	S500700	CONSOL OF KENTUCKY INC	60.22	73.12
42	S500802	CONSOL OF KENTUCKY INC	56.79	77.28
43	S500905	CONSOL OF KENTUCKY INC	68.60	76.60

Site No.	Permit_ID	Permittee	Tri-state	Yeager
44	S502598	CONSOL OF KENTUCKY INC	63.87	91.14
45	S503288	CONSOL OF KENTUCKY INC	67.65	70.65
46	S503893	CONSOL OF KENTUCKY INC	64.09	78.50
47	S503993	CONSOL OF KENTUCKY INC	69.09	77.08
48	S504093	CONSOL OF KENTUCKY INC	70.23	78.23
49	S506291	CONSOL OF KENTUCKY INC	64.07	70.09
50	S400401	DFM COAL, LLC	92.41	84.52
51	S501006	FRASURE CREEK MINING, LLC	101.45	92.48
52	S501808	FRASURE CREEK MINING, LLC	100.71	91.74
53	S502201	FRASURE CREEK MINING, LLC	96.79	87.82
54	S400301	GLEN ALUM OPERATIONS LLC	96.38	88.49
55	S500410	HAMPDEN COAL COMPANY LLC	94.14	85.17
56	S500808	HAMPDEN COAL COMPANY LLC	95.29	85.00
57	S501310	HAMPDEN COAL COMPANY LLC	95.29	85.00
58	S004784	HAMPDEN COAL COMPANY LLC	95.20	84.92
59	S500801	ICG EASTERN, LLC	55.17	78.37
60	S501799	ICG EASTERN, LLC	57.20	76.92
61	S500999	ICG EASTERN, LLC	57.33	77.00
62	S501294	KWV OPERATIONS LLC	96.21	90.74
63	S501307	PREMIUM ENERGY LLC	88.16	79.76
64	S501608	PREMIUM ENERGY LLC	90.26	82.38
65	S400400	PREMIUM ENERGY LLC	91.62	82.65

Site No.	Permit_ID	Permittee	Tri-state	Yeager
66	S502099	PREMIUM ENERGY LLC	95.13	86.16
67	S008880	TRACE CREEK COAL COMPANY	73.02	67.98
68	S501501	WHITE FLAME ENERGY INC	76.37	82.90
69	S502097	WHITE FLAME ENERGY INC	79.86	79.96

Table 6: Shortest Distances from Sites to Other Transportation Methods

Site No.	Permit_ID	Railroad (RR)	Owner (RR)	Intermodal Terminal Facility (CSXT)	National Waterway Network (Big Sandy River)	Huntington Port
1	S501306	3.59	XXXX	15.46	10.97	63.15
2	S501107	5.27	CSXT	26.35	13.57	49.71
3	S500997	8.04	NS	22.26	9.94	59.08
4	S501694	8.30	NS	22.20	9.70	58.52
5	S501900	5.91	XXXX	16.68	15.01	53.11
6	S502698	6.00	CSXT	29.34	13.05	50.02
7	S500707	0.33	NS	40.54	1.08	95.45
8	S502508	0.86	NS	30.16	1.71	89.93
9	S400600	0.63	NS	39.03	1.36	93.94
10	S500403	0.11	XXXX	37.02	0.67	91.93
11	S501404	0.50	XXXX	38.01	1.12	92.92
12	S501901	0.40	NS	39.34	0.47	94.25
13	S001078	0.54	NS	33.85	5.45	93.62
14	S009085	0.63	CSXT	24.54	9.20	85.63
15	S508286	0.69	NS	30.97	5.04	90.74
16	S509087	1.66	CSXT	25.27	9.36	86.36
17	S502108	2.21	CSXT	19.56	6.83	76.30
18	S007280	0.51	CSXT	14.27	8.50	71.01
19	S009780	2.19	NS	21.91	7.97	81.68
20	S500188	1.41	NS	19.39	7.68	79.16
21	S503390	1.78	NS	25.32	6.18	85.08
22	S500395	1.15	CSXT	16.75	7.61	73.49
23	S501494	0.72	CSXT	12.14	9.50	68.88
24	S501994	2.02	NS	24.51	6.98	84.28
25	S501998	2.62	CSXT	18.99	8.74	78.76
26	S502399	1.72	CSXT	18.35	7.11	75.09
27	S506692	3.40	NS	22.95	7.89	82.72
28	S401395	1.08	NS	27.17	3.37	86.94
29	S503392	2.76	NS	22.25	7.24	82.02
30	S504988	0.95	NS	26.22	4.17	85.99
31	S501806	2.06	NS	23.49	2.08	75.43
32	S501807	1.56	NS	25.85	3.98	77.79
33	S502101	5.66	NS	33.80	6.91	66.46
34	S007382	5.95	NS	35.08	7.81	67.75
35	S017978	6.48	NS	21.32	8.44	59.99

Site No.	Permit_ID	Railroad (RR)	Owner (RR)	Intermodal Terminal Facility (CSXT)	National Waterway Network (Big Sandy River)	Huntington Port
36	Z000281	5.59	NS	34.94	7.59	67.60
37	S007384	6.70	NS	21.72	8.00	60.38
38	S009585	7.26	NS	25.82	7.76	57.75
39	S500402	1.34	CSXT	17.66	8.95	74.40
40	S500692	4.58	NS	36.96	7.10	69.63
41	S500700	6.60	NS	21.40	8.31	60.07
42	S500802	6.14	NS	28.04	6.20	59.97
43	S500905	2.23	NS	21.86	2.30	73.79
44	S502598	5.11	NS	36.41	7.52	69.07
45	S503288	5.30	NS	18.94	8.08	64.29
46	S503893	0.67	NS	23.76	0.74	69.29
47	S503993	1.91	NS	22.35	1.99	74.28
48	S504093	1.29	NS	23.49	1.36	75.42
49	S506291	6.29	NS	18.37	9.01	63.72
50	S400401	0.81	NS	26.72	3.66	86.49
51	S501006	1.61	NS	34.68	5.34	94.45
52	S501808	0.48	XXXX	33.94	3.18	93.70
53	S502201	1.88	NS	30.02	2.99	89.78
54	S400301	0.31	NS	30.69	2.57	90.46
55	S500410	1.14	CSXT	27.37	8.17	87.14
56	S500808	0.64	CSXT	27.20	7.71	88.29
57	S501310	0.64	CSXT	27.20	7.71	88.29
58	S004784	0.44	CSXT	27.11	7.64	88.20
59	S500801	4.84	NS	29.13	4.91	60.37
60	S501799	6.04	NS	27.68	6.11	59.61
61	S500999	6.34	NS	27.76	6.41	59.70
62	S501294	1.23	NS	32.94	3.37	92.71
63	S501307	3.67	NS	21.96	6.91	81.73
64	S501608	1.75	NS	24.58	6.23	84.34
65	S400400	0.45	NS	24.85	5.61	84.61
66	S502099	0.38	NS	28.35	6.21	88.12
67	S008880	0.73	CSXT	13.25	8.84	69.99
68	S501501	0.73	NS	25.22	3.31	81.57
69	S502097	0.78	NS	22.16	4.19	81.93

Table 7: Shortest Distances from Sites to Sewer Lines (SL) and Water Lines (WL)

Site No.	Permit ID	Sewer Lines	Public Utility - SL	Water Lines	Public Utility - WL
1	S501306	5.92	Mingo County Public Service District	0.30	Mingo County Public Service District
2	S501107	9.54	Town of Chapmanville (Sewer)	2.25	Mingo County Public Service District
3	S500997	10.41	Kermit Municipal Sewer Department	0.86	Mingo County Public Service District
4	S501694	10.25	Kermit Municipal Sewer Department	0.54	Mingo County Public Service District
5	S501900	6.39	Town of Chapmanville (Sewer)	2.57	Mingo County Public Service District
6	S502698	9.60	Town of Chapmanville (Sewer)	1.33	Mingo County Public Service District
7	S500707	3.61	Mingo County Public Service District	0.41	Mingo County Public Service District
8	S502508	4.40	Mingo County Public Service District	1.23	Mingo County Public Service District
9	S400600	2.38	Mingo County Public Service District	0.63	Mingo County Public Service District
10	S500403	1.99	Mingo County Public Service District	0.11	Mingo County Public Service District
11	S501404	2.64	Mingo County Public Service District	0.52	Mingo County Public Service District
12	S501901	2.25	Mingo County Public Service District	0.43	Mingo County Public Service District
13	S001078	0.71	Justice Public Service District	0.71	Town of Gilbert Water Works
14	S009085	0.55	Town of Gilbert (Sewer)	0.56	Town of Gilbert Water Works
15	S508286	1.60	Justice Public Service District	0.47	Town of Gilbert Water Works
16	S509087	1.76	Town of Gilbert (Sewer)	0.95	Mingo County Public Service District
17	S502108	1.23	Mingo County Public Service District	0.62	Mingo County Public Service District
18	S007280	0.90	Mingo County Public Service District	0.74	Mingo County Public Service District
19	S009780	2.35	Mingo County Public Service District	1.11	Mingo County Public Service District
20	S500188	3.35	Mingo County Public Service District	0.78	Mingo County Public Service District
21	S503390	1.61	Mingo County Public Service District	0.72	Mingo County Public Service District

Site No.	Permit ID	Sewer Lines	Public Utility - SL	Water Lines	Public Utility - WL
22	S500395	1.80	Mingo County Public Service District	1.04	Mingo County Public Service District
23	S501494	1.17	Mingo County Public Service District	0.63	Mingo County Public Service District
24	S501994	1.43	Mingo County Public Service District	0.90	Mingo County Public Service District
25	S501998	2.58	Mingo County Public Service District	1.43	Logan County Public Service District
26	S502399	2.21	Mingo County Public Service District	0.95	Mingo County Public Service District
27	S506692	1.63	Mingo County Public Service District	0.71	Mingo County Public Service District
28	S401395	4.50	Justice Public Service District	2.58	Town of Gilbert Water Works
29	S503392	3.65	Mingo County Public Service District	0.39	Town of Gilbert Water Works
30	S504988	4.30	Justice Public Service District	2.33	Town of Gilbert Water Works
31	S501806	1.66	Mingo County Public Service District	0.97	Mingo County Public Service District
32	S501807	1.45	Town of Delbarton (Sewer)	0.98	Mingo County Public Service District
33	S502101	7.26	Kermit Municipal Sewer Department	0.40	Mingo County Public Service District
34	S007382	8.13	Kermit Municipal Sewer Department	0.66	Mingo County Public Service District
35	S017978	8.79	Kermit Municipal Sewer Department	0.71	Mingo County Public Service District
36	Z000281	8.19	Kermit Municipal Sewer Department	0.37	Mingo County Public Service District
37	S007384	8.45	Kermit Municipal Sewer Department	0.94	Mingo County Public Service District
38	S009585	8.35	Kermit Municipal Sewer Department	0.38	Mingo County Public Service District
39	S500402	3.58	Mingo County Public Service District	1.08	Mingo County Public Service District
40	S500692	8.96	Mingo County Public Service District	1.26	Mingo County Public Service District
41	S500700	8.70	Kermit Municipal Sewer Department	0.69	Mingo County Public Service District
42	S500802	6.77	Kermit Municipal Sewer Department	0.37	Mingo County Public Service District
43	S500905	2.78	Mingo County Public Service District	1.75	Mingo County Public Service District

Site No.	Permit ID	Sewer Lines	Public Utility - SL	Water Lines	Public Utility - WL
44	S502598	8.97	Mingo County Public Service District	1.59	Mingo County Public Service District
45	S503288	8.34	Mingo County Public Service District	0.66	Mingo County Public Service District
46	S503893	3.54	Mingo County Public Service District	0.69	Mingo County Public Service District
47	S503993	3.08	Mingo County Public Service District	1.93	Mingo County Public Service District
48	S504093	2.12	Mingo County Public Service District	0.82	Mingo County Public Service District
49	S506291	8.86	Mingo County Public Service District	1.31	Mingo County Public Service District
50	S400401	4.55	Mingo County Public Service District	3.25	Town of Gilbert Water Works
51	S501006	1.74	Justice Public Service District	0.70	Town of Gilbert Water Works
52	S501808	3.69	Justice Public Service District	0.76	Town of Gilbert Water Works
53	S502201	3.13	Justice Public Service District	0.72	Town of Gilbert Water Works
54	S400301	5.02	Mingo County Public Service District	4.62	Town of Gilbert Water Works
55	S500410	1.08	Town of Gilbert (Sewer)	0.62	Town of Gilbert Water Works
56	S500808	0.56	Town of Gilbert (Sewer)	0.56	Town of Gilbert Water Works
57	S501310	0.56	Town of Gilbert (Sewer)	0.56	Town of Gilbert Water Works
58	S004784	0.36	Town of Gilbert (Sewer)	0.36	Town of Gilbert Water Works
59	S500801	5.74	Kermit Municipal Sewer Department	0.25	Mingo County Public Service District
60	S501799	6.92	Kermit Municipal Sewer Department	0.60	Mingo County Public Service District
61	S500999	7.23	Kermit Municipal Sewer Department	0.77	Mingo County Public Service District
62	S501294	3.90	Mingo County Public Service District	3.83	Mingo County Public Service District
63	S501307	1.99	Mingo County Public Service District	0.70	Mingo County Public Service District
64	S501608	4.04	Mingo County Public Service District	0.75	Town of Gilbert Water Works
65	S400400	3.20	Justice Public Service District	0.75	Town of Gilbert Water Works

Site No.	Permit ID	Sewer Lines	Public Utility - SL	Water Lines	Public Utility - WL
66	S502099	0.84	Justice Public Service District	0.31	Town of Gilbert Water Works
67	S008880	2.99	Mingo County Public Service District	0.85	Mingo County Public Service District
68	S501501	0.71	Town of Delbarton (Sewer)	0.39	Mingo County Public Service District
69	S502097	2.44	Town of Delbarton (Sewer)	0.67	Mingo County Public Service District

Table 8: Shortest Distances from Sites to Broadband and Power Lines

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
1	S501306	2.66	Frontier West Virginia, Inc.	1.51	Transmission	115-138
2	S501107	1.93	Armstrong Holdings, Inc.	7.64	Sub-Transmission	Unknown
3	S500997	1.30	Cebridge Acquisition LLC	3.14	Transmission	115-138
4	S501694	1.46	Cebridge Acquisition LLC	3.70	Transmission	115-138
5	S501900	1.00	Frontier West Virginia, Inc.	4.43	Transmission	115-138
6	S502698	1.70	Frontier West Virginia, Inc.	6.75	Sub-Transmission	Unknown
7	S500707	0.06	Cebridge Acquisition LLC	0.12	Transmission	115-138
8	S502508	0.46	Cebridge Acquisition LLC	0.62	Transmission	115-138
9	S400600	0.05	Inter-Mountain Cable Inc	0.00	Transmission	115-138
10	S500403	0.11	Inter-Mountain Cable Inc	0.94	Transmission	115-138
11	S501404	0.51	Inter-Mountain Cable Inc	1.03	Transmission	115-138
12	S501901	0.43	Inter-Mountain Cable Inc	0.29	Transmission	115-138
13	S001078	0.35	Frontier West Virginia, Inc.	1.25	Transmission	115-138
14	S009085	0.63	Cebridge Acquisition LLC	1.11	Sub-Transmission	Unknown
15	S508286	0.29	Frontier West Virginia, Inc.	0.55	Transmission	115-138
16	S509087	0.92	Cebridge Acquisition LLC	1.38	Transmission	115-138
17	S502108	0.62	Frontier West Virginia, Inc.	1.55	Sub-Transmission	Unknown
18	S007280	0.49	Cebridge Acquisition LLC	0.24	Transmission	115-138
19	S009780	1.57	Cebridge Acquisition LLC	1.87	Transmission	115-138
20	S500188	0.72	Cebridge Acquisition LLC	2.40	Transmission	115-138
21	S503390	0.78	Frontier West Virginia, Inc.	0.63	Transmission	115-138

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
22	S500395	0.31	Cebridge Acquisition LLC	0.33	Sub-Transmission	Unknown
23	S501494	1.25	Cebridge Acquisition LLC	0.39	Sub-Transmission	Unknown
24	S501994	0.74	Frontier West Virginia, Inc.	0.89	Transmission	115-138
25	S501998	0.87	Cebridge Acquisition LLC	2.00	Transmission	115-138
26	S502399	0.35	Cebridge Acquisition LLC	0.25	Sub-Transmission	Unknown
27	S506692	0.62	Cebridge Acquisition LLC	1.02	Transmission	115-138
28	S401395	0.01	Cebridge Acquisition LLC	1.64	Transmission	115-138
29	S503392	0.28	Cebridge Acquisition LLC	3.47	Transmission	115-138
30	S504988	0.01	Cebridge Acquisition LLC	2.00	Transmission	115-138
31	S501806	0.56	Cebridge Acquisition LLC	6.80	Sub-Transmission	Unknown
32	S501807	0.27	Cebridge Acquisition LLC	5.78	Sub-Transmission	Unknown
33	S502101	0.39	Cebridge Acquisition LLC	1.12	Sub-Transmission	Unknown
34	S007382	0.16	Cebridge Acquisition LLC	2.01	Sub-Transmission	Unknown
35	S017978	0.16	Cebridge Acquisition LLC	2.56	Sub-Transmission	Unknown
36	Z000281	0.23	Cebridge Acquisition LLC	2.30	Sub-Transmission	Unknown
37	S007384	0.76	Cebridge Acquisition LLC	2.09	Sub-Transmission	Unknown
38	S009585	1.13	Cebridge Acquisition LLC	1.97	Sub-Transmission	Unknown
39	S500402	0.56	Frontier West Virginia, Inc.	1.37	Sub-Transmission	Unknown
40	S500692	1.89	Cebridge Acquisition LLC	0.37	Transmission	115-138
41	S500700	0.40	Cebridge Acquisition LLC	2.41	Sub-Transmission	Unknown
42	S500802	0.32	Cebridge Acquisition LLC	0.49	Sub-Transmission	Unknown
43	S500905	0.51	Cebridge Acquisition LLC	5.85	Sub-Transmission	Unknown

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
44	S502598	1.32	Cebridge Acquisition LLC	1.02	Transmission	115-138
45	S503288	2.81	Cebridge Acquisition LLC	0.23	Transmission	115-138
46	S503893	0.20	Cebridge Acquisition LLC	4.90	Sub-Transmission	Unknown
47	S503993	0.32	Cebridge Acquisition LLC	5.50	Sub-Transmission	Unknown
48	S504093	0.18	Cebridge Acquisition LLC	6.34	Sub-Transmission	Unknown
49	S506291	2.71	Cebridge Acquisition LLC	0.30	Transmission	115-138
50	S400401	0.36	Cebridge Acquisition LLC	1.50	Transmission	115-138
51	S501006	0.66	Frontier West Virginia, Inc.	2.36	Transmission	115-138
52	S501808	1.92	Frontier West Virginia, Inc.	1.90	Transmission	115-138
53	S502201	1.11	Frontier West Virginia, Inc.	1.61	Transmission	115-138
54	S400301	1.18	Frontier West Virginia, Inc.	0.38	Transmission	115-138
55	S500410	1.10	Cebridge Acquisition LLC	1.23	Sub-Transmission	Unknown
56	S500808	0.62	Cebridge Acquisition LLC	0.70	Sub-Transmission	Unknown
57	S501310	0.62	Cebridge Acquisition LLC	0.70	Sub-Transmission	Unknown
58	S004784	0.27	Frontier West Virginia, Inc.	0.49	Sub-Transmission	Unknown
59	S500801	0.24	Cebridge Acquisition LLC	1.32	Sub-Transmission	Unknown
60	S501799	0.53	Cebridge Acquisition LLC	1.56	Sub-Transmission	Unknown
61	S500999	0.61	Cebridge Acquisition LLC	1.73	Sub-Transmission	Unknown
62	S501294	0.64	Cebridge Acquisition LLC	1.50	Transmission	115-138
63	S501307	0.16	Cebridge Acquisition LLC	1.99	Transmission	115-138
64	S501608	0.08	Cebridge Acquisition LLC	3.41	Transmission	115-138
65	S400400	0.40	Cebridge Acquisition LLC	2.07	Transmission	115-138

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
66	S502099	0.29	Cebridge Acquisition LLC	0.84	Transmission	115-138
67	S008880	0.61	Frontier West Virginia, Inc.	0.82	Sub-Transmission	Unknown
68	S501501	0.26	Frontier West Virginia, Inc.	1.14	Transmission	115-138
69	S502097	0.78	Frontier West Virginia, Inc.	0.63	Transmission	115-138

Table 9: Shortest Distances from Sites to Sewer and Solid Waste Treatment Facilities

Site No.	Permit_ID	Sewer Treatment (ST)	Facility Name (ST)	Solid Waste Treatment (SWT)	Facility Name (SWT)
1	S501306	2.91	Dingess Grade School	14.33	Mingo County Transfer
2	S501107	7.83	Harts High School	21.99	Refuse Disposal
3	S500997	6.90	Dingess Grade School	18.10	Mingo County Transfer
4	S501694	6.84	Dingess Grade School	18.04	Mingo County Transfer
5	S501900	2.62	Hugh Dingess Elementary School	19.60	Refuse Disposal
6	S502698	10.82	Harts High School	24.98	Refuse Disposal
7	S500707	7.70	Matewan Water Works -- Water Treatment Plant	28.80	Mingo County Transfer
8	S502508	13.60	Gilbert Terrace Apts.	28.78	Morgan Sanitation
9	S400600	6.20	Matewan Water Works -- Water Treatment Plant	27.30	Mingo County Transfer
10	S500403	4.19	Matewan Water Works -- Water Treatment Plant	25.28	Mingo County Transfer
11	S501404	5.18	Matewan Water Works -- Water Treatment Plant	26.27	Mingo County Transfer
12	S501901	6.51	Matewan Water Works -- Water Treatment Plant	27.60	Mingo County Transfer
13	S001078	1.48	Cline Grade School	19.72	Morgan Sanitation
14	S009085	3.83	Gilbert Town Of	17.84	Morgan Sanitation
15	S508286	2.41	Cline Grade School	17.92	Morgan Sanitation
16	S509087	7.43	Gilbert Town Of	21.44	Morgan Sanitation
17	S502108	5.57	Delbarton Town Of	14.80	Mingo County Transfer
18	S007280	7.16	Omar Jr. High And Elementary School	17.36	Mingo County Transfer
19	S009780	3.91	Ragland Water Treatment Plant	21.46	Mingo County Transfer
20	S500188	3.28	Ragland Water Treatment Plant	20.83	Mingo County Transfer

Site No.	Permit_ID	Sewer Treatment (ST)	Facility Name (ST)	Solid Waste Treatment (SWT)	Facility Name (SWT)
21	S503390	5.09	Varney Grade School	24.05	Mingo County Transfer
22	S500395	8.25	Delbarton Town Of	17.47	Mingo County Transfer
23	S501494	2.02	Mingo County Wood Products Industrial Park	12.89	Mingo County Transfer
24	S501994	6.30	Varney Grade School	25.27	Mingo County Transfer
25	S501998	3.84	Mountain View Apartments	24.03	Refuse Disposal
26	S502399	7.16	Delbarton Town Of	16.38	Mingo County Transfer
27	S506692	7.18	Varney Grade School	24.74	Morgan Sanitation
28	S401395	10.23	Gilbert Terrace Apts.	25.40	Morgan Sanitation
29	S503392	5.24	Gilbert Terrace Apts.	20.41	Morgan Sanitation
30	S504988	9.29	Gilbert Terrace Apts.	24.45	Morgan Sanitation
31	S501806	5.47	Ten Pin Alley Bowling Ctr	8.78	Mingo County Transfer
32	S501807	3.35	Ten Pin Alley Bowling Ctr	11.14	Mingo County Transfer
33	S502101	10.16	Tug Valley High School	10.32	Mingo County Transfer
34	S007382	11.44	Tug Valley High School	11.60	Mingo County Transfer
35	S017978	5.95	Dingess Grade School	17.16	Mingo County Transfer
36	Z000281	11.29	Tug Valley High School	11.45	Mingo County Transfer
37	S007384	6.35	Dingess Grade School	17.55	Mingo County Transfer
38	S009585	10.45	Dingess Grade School	18.40	Mingo County Transfer
39	S500402	6.42	Mingo County Wood Products Industrial Park	11.02	Mingo County Transfer
40	S500692	13.32	Tug Valley High School	13.48	Mingo County Transfer
41	S500700	6.04	Dingess Grade School	17.24	Mingo County Transfer

Site No.	Permit_ID	Sewer Treatment (ST)	Facility Name (ST)	Solid Waste Treatment (SWT)	Facility Name (SWT)
42	S500802	9.93	Town Of Kermit	16.48	Mingo County Transfer
43	S500905	5.82	Lenore Junior And Elementary School	7.15	Mingo County Transfer
44	S502598	12.76	Tug Valley High School	12.92	Mingo County Transfer
45	S503288	3.57	Dingess Grade School	9.18	Mingo County Transfer
46	S503893	2.10	Bethel Temple Assembly Of God	8.72	Mingo County Transfer
47	S503993	6.22	Ten Pin Alley Bowling Ctr	7.63	Mingo County Transfer
48	S504093	6.61	Ten Pin Alley Bowling Ctr	8.77	Mingo County Transfer
49	S506291	3.01	Dingess Grade School	14.21	Mingo County Transfer
50	S400401	9.79	Gilbert Terrace Apts.	24.95	Morgan Sanitation
51	S501006	2.26	Cline Grade School	18.64	Morgan Sanitation
52	S501808	4.60	Cline Grade School	14.34	Morgan Sanitation
53	S502201	8.90	Cline Grade School	17.29	Morgan Sanitation
54	S400301	13.76	Gilbert Terrace Apts.	28.18	Morgan Sanitation
55	S500410	2.44	Gilbert Terrace Apts.	17.60	Morgan Sanitation
56	S500808	1.14	Gilbert Town Of	15.42	Morgan Sanitation
57	S501310	1.14	Gilbert Town Of	15.42	Morgan Sanitation
58	S004784	0.84	Gilbert Town Of	15.33	Morgan Sanitation
59	S500801	8.30	Town Of Kermit	14.86	Mingo County Transfer
60	S501799	10.34	Town Of Kermit	16.89	Mingo County Transfer
61	S500999	10.46	Town Of Kermit	17.01	Mingo County Transfer
62	S501294	16.38	Gilbert Terrace Apts.	31.55	Morgan Sanitation

Site No.	Permit_ID	Sewer Treatment (ST)	Facility Name (ST)	Solid Waste Treatment (SWT)	Facility Name (SWT)
63	S501307	6.81	Mountain View Apartments	22.43	Morgan Sanitation
64	S501608	4.64	Gilbert Terrace Apts.	19.81	Morgan Sanitation
65	S400400	4.74	Gilbert Terrace Apts.	19.91	Morgan Sanitation
66	S502099	1.28	Gilbert High School	15.31	Morgan Sanitation
67	S008880	3.81	Mingo County Wood Products Industrial Park	11.57	Mingo County Transfer
68	S501501	4.08	Ragland Water Treatment Plant	14.92	Mingo County Transfer
69	S502097	1.02	Ragland Water Treatment Plant	18.41	Mingo County Transfer

Table 10: Shortest Distances from Sites to Gas Pipe and Oil Pipe

Site No.	Permit_ID	Gas Pipe (GP)	Company Name (GP)	Oil Pipe (OP)	Company Name (OP)
1	S501306	1.11	Columbia Gas Transmission Corp.	0.40	CL Coatings, LLC
2	S501107	3.86	Columbia Gas Transmission Corp.	2.64	CL
3	S500997	0.34	Columbia Gas Transmission Corp.	1.56	CL
4	S501694	0.76	Columbia Gas Transmission Corp.	1.51	CL
5	S501900	1.93	Columbia Gas Transmission Corp.	1.63	CL
6	S502698	3.26	Columbia Gas Transmission Corp.	2.69	CL
7	S500707	0.24	Columbia Gas Transmission Corp.	0.21	CL
8	S502508	0.79	Columbia Gas Transmission Corp.	0.45	CS
9	S400600	0.60	Columbia Gas Transmission Corp.	0.10	CS
10	S500403	1.01	Columbia Gas Transmission Corp.	0.09	Unknown
11	S501404	1.77	Columbia Gas Transmission Corp.	0.27	CS
12	S501901	0.58	Columbia Gas Transmission Corp.	0.42	CL
13	S001078	1.85	Columbia Gas Transmission Corp.	0.54	CL
14	S009085	0.79	Dominion Transmission Inc.	0.82	CN
15	S508286	2.59	Columbia Gas Transmission Corp.	0.92	CL
16	S509087	1.70	Dominion Transmission Inc.	1.71	CN
17	S502108	1.29	Columbia Gas Transmission Corp.	0.50	CS
18	S007280	0.59	Columbia Gas Transmission Corp.	0.19	CS
19	S009780	1.24	Columbia Gas Transmission Corp.	0.26	CS
20	S500188	0.94	Columbia Gas Transmission Corp.	0.11	CS

Site No.	Permit_ID	Gas Pipe (GP)	Company Name (GP)	Oil Pipe (OP)	Company Name (OP)
21	S503390	0.24	Columbia Gas Transmission Corp.	0.27	CS
22	S500395	0.06	Columbia Gas Transmission Corp.	0.20	CS
23	S501494	0.16	Columbia Gas Transmission Corp.	0.42	CL
24	S501994	0.46	Columbia Gas Transmission Corp.	0.01	CS
25	S501998	1.85	Columbia Gas Transmission Corp.	0.29	CS
26	S502399	0.36	Columbia Gas Transmission Corp.	0.31	CS
27	S506692	0.73	Columbia Gas Transmission Corp.	0.75	CS
28	S401395	0.74	Columbia Gas Transmission Corp.	1.94	CL
29	S503392	2.13	Columbia Gas Transmission Corp.	2.91	CN
30	S504988	1.17	Columbia Gas Transmission Corp.	2.07	CL
31	S501806	0.81	Columbia Gas Transmission Corp.	0.86	CL
32	S501807	3.09	Columbia Gas Transmission Corp.	2.03	Unknown
33	S502101	1.29	Columbia Gas Transmission Corp.	0.90	CL
34	S007382	1.24	Columbia Gas Transmission Corp.	0.62	CL
35	S017978	0.87	Columbia Gas Transmission Corp.	0.02	CL
36	Z000281	1.68	Columbia Gas Transmission Corp.	0.52	CL
37	S007384	0.47	Columbia Gas Transmission Corp.	0.41	CL
38	S009585	0.25	Columbia Gas Transmission Corp.	0.27	CL
39	S500402	1.55	Columbia Gas Transmission Corp.	1.24	CS
40	S500692	3.34	Columbia Gas Transmission Corp.	0.71	CL
41	S500700	0.68	Columbia Gas Transmission Corp.	0.11	CL

Site No.	Permit ID	Gas Pipe (GP)	Company Name (GP)	Oil Pipe (OP)	Company Name (OP)
42	S500802	0.51	Columbia Gas Transmission Corp.	0.02	CL
43	S500905	1.31	Columbia Gas Transmission Corp.	1.35	CL
44	S502598	2.67	Columbia Gas Transmission Corp.	0.02	CL
45	S503288	3.15	Columbia Gas Transmission Corp.	0.61	CL
46	S503893	0.06	Columbia Gas Transmission Corp.	0.09	CL
47	S503993	1.15	Columbia Gas Transmission Corp.	1.12	CL
48	S504093	0.02	Columbia Gas Transmission Corp.	0.04	CL
49	S506291	2.21	Columbia Gas Transmission Corp.	0.24	CL
50	S400401	0.25	Columbia Gas Transmission Corp.	1.10	CL
51	S501006	0.49	Columbia Gas Transmission Corp.	0.58	CL
52	S501808	1.00	Columbia Gas Transmission Corp.	1.01	CL
53	S502201	0.25	Columbia Gas Transmission Corp.	0.34	CL
54	S400301	1.36	Columbia Gas Transmission Corp.	0.20	CL
55	S500410	1.70	Dominion Transmission Inc.	0.67	CL
56	S500808	2.28	Dominion Transmission Inc.	0.20	CL
57	S501310	2.28	Dominion Transmission Inc.	0.20	CL
58	S004784	2.42	Dominion Transmission Inc.	0.06	CL
59	S500801	0.06	Columbia Gas Transmission Corp.	0.90	CL
60	S501799	0.54	Columbia Gas Transmission Corp.	0.71	CL
61	S500999	0.75	Columbia Gas Transmission Corp.	0.73	CL
62	S501294	1.08	Columbia Gas Transmission Corp.	0.49	CL

Site No.	Permit ID	Gas Pipe (GP)	Company Name (GP)	Oil Pipe (OP)	Company Name (OP)
63	S501307	0.60	Columbia Gas Transmission Corp.	2.58	CS
64	S501608	2.18	Columbia Gas Transmission Corp.	3.41	CL
65	S400400	2.81	Columbia Gas Transmission Corp.	3.32	CL
66	S502099	3.73	Dominion Transmission Inc.	1.00	CL
67	S008880	1.44	Columbia Gas Transmission Corp.	1.03	CS
68	S501501	4.10	Columbia Gas Transmission Corp.	0.47	CS
69	S502097	2.26	Columbia Gas Transmission Corp.	0.19	CS

Suitability Model

The suitability model for Mingo County is created with a weighted scoring method. The method scores options against a prioritized requirements list to determine which option best fits the selection criteria. Using a consistent list of criteria, weighted according to the importance or priority of the criteria to the organization, a comparison of similar “products” can be completed. If numerical values are assigned to the criteria priorities (**weighting**) and the ability of the product to meet a specific criterion (**scoring**), a “score” can be derived. By summing the score (**total score**), the product most closely meeting the criteria can be determined.

Criteria are chosen and weighted based on published Land Use Master Plans (LUMPs) for several counties in West Virginia, based on our own research, the existing conditions in Mingo County, and expert advice about important factors to site development.¹² Then scores for each site are given by comparing the closest distance from the site to all factors within given distance thresholds. There are four sets of scores for the Mingo County suitability model: **absolute scores, relative scores, relationship score, and the total score.**

Absolute scores are given by comparing certain distance thresholds with the results of GIS Distance Analysis. Thresholds are determined mainly based on the researcher’s experience, characteristics of the considered criteria and the priority given to the criteria. For example, if the closest distance from a site to an interstate ranges from 5 to 10 miles, the site will be given 7 points for the Interstate Criteria. Absolute scores will directly affect the site selection. Different score categories may result in significant change in the cost of investment, and will thus impact the county’s decisions.

Relative scores, on the other hand, depend solely on the closest distances of sites to relative criteria features. Initially, statistical values will be computed according to distance values from all sites to a certain factor (criteria), including min, quartile 1 – Q1, quartile 2 – Q2, quartile 3 – Q3, and max. Then, distance values will be classified into four groups and given the scores shown in Table 13 (below). This score set is used to clarify the differences between all sites in a certain category and therefore aid the decision maker. For example, No-1 and No-23 have the same absolute score (in the same range of miles) but may fall in different statistical groups. Then the two sites will have different relative scores.

Relationship is a score that indicates an existing relationship to develop a particular site. Mingo County has been actively involved in acquiring mining company partners in order to develop post-mine sites. Because of this, the county and the companies now mining the sites have already approved several of the mine sites. The existence of a public-private partnership is

¹² Joseph, M. (2006). A Decision-Support Model of Land Suitability Analysis for the Ohio Lake Erie Balanced Growth Program. EcoCity Cleveland.

important to this plan and the analysis, as the goal is to encourage such planning and investment ideas. The model for Mingo contains a relationship variable that reveals a plan already in motion for a particular site. Furthermore, the relationship changes the distance calculations.

Specifically, the Mingo agreement confirms that the mining companies, when a mine becomes a post-mine site, will specifically provide for utilities to be set up in the area of the site. Therefore, the distance to utilities, such as water, sewer, power, and broadband lines are all at the closest distance to a site, both in absolute and relative terms, as per the Mingo agreement. This means that the sites with the agreement receive both a relationship score for feasibility of developing the site (as these sites will be developed in the future regardless) and have their distance scores increase due to the proximity of water, power, and sewer lines.

The score is not weighted in either the absolute or relative scores as there is no definitive way to quantify the relationship's potential and cost. However, its existence is enough to add it to the score of the site, as it is already approved for development. Conveniently, the site either has an existing relationship in operation or does not, creating a binary choice that is easily added to the model.

The total score is a combination of weights, absolute scores, relative scores, and the presence of an existing investment or relationship. The following equation is used to calculate the total score of a certain studied site:

$$\text{Total score of site A} = \text{relationship} + \sum (\text{absolute score} \times \text{relative score} \times \text{weight} / 10)_{ci}$$

(ci: criteria i)

Sites with higher total scores reveal a higher chance of the site being developable. Total scores will vary according to a combination of four components: weights, absolute scores, and relative scores. In this paper, total scores are calculated by the linear equation indicating that all components are treated equally.

1. Weighting

Table 11 prioritizes post-mining land-use criteria for surface coal mining site selection in Mingo County. Criteria weights are assigned on a one-to-ten scale. According to Joseph, utilities (power, water, and sewer) and road networks are considered more important factors to development. Therefore, those factors receive higher weights (7-10) in the suitability model. On the other hand, decision-makers are less affected by factors such as airports, national waterways and ports. Those factors may be good supplements but do not critically change the investments.

Table 11: Weighting Sites Selection Criteria

No	Criteria	Weight
1	Interstate	8
2	Existing Highway	8
3	Proposed Highway	9
4	Yeager Airport	3
5	Tri-state Airport	3
6	National Waterway Network Ports	5
7	Sewer Treatment Facilities	7
8	Solid Waste Treatment Facilities	8
9	National Waterway Network	4
10	Intermodal Terminal Facilities	6
11	Sewer Lines	8
12	Railroads	5
13	Water Lines	10
14	Power Lines	10
15	Gas Pipes	6
16	Pipe Lines	6
17	Broadband	9

2. Scoring

2.1 Absolute Scores:

The shorter the distance to a feature from a site, the higher absolute score the site receives. Table 12 describes the thresholds and score categories for each criterion, ranging from 1 to 10. In order to achieve a better comparison between sites, the score scale is evenly distributed between five distance groups (1-3-5-7-10).

As mentioned above, thresholds are mainly defined based on researcher experience, traveling method from a site to the features (road-path vs. Euclidean), and characteristic of criteria (type of feature, priority, and density). For example, distance thresholds for “Solid Waste Treatment Facilities” are much smaller than ones for “Intermodal Terminal Facilities”. This is because treatment facilities are much denser than intermodal terminal facilities. In addition, solid waste facilities are considered more important in site selection (weight: 8 vs. 6).

Table 12: Absolute Scoring System

Absolute Score		10	7	5	3	1
Criteria (Distances in miles)	Existing Highway	0 - 5	5 - 10	10 - 15	15 - 20	> 20
	Proposed Highway	0 - 5	5 - 10	10 - 15	15 - 20	> 20
	Intermodal Terminal Facilities	0 - 10	10 - 20	20 - 30	30 - 40	> 40
	Interstate	0 - 5	5 - 14	14 - 22	22 - 30	> 30
	National Waterway Network Ports	0 - 30	30 - 50	50 - 70	70 - 90	> 90
	Sewer Treatment Facilities	0 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	> 10
	Solid Waste Treatment Facilities	0 - 5	5 - 14	14 - 22	22 - 30	> 30
	Tri-state Airport	0 - 30	30 - 50	50 - 70	70 - 90	> 90
	Yeager Airport	0 - 30	30 - 50	50 - 70	01 - 90	> 90
	Broadband	0 - 0.5	0.5 - 2	2 - 3	3 - 4	> 4
	Gas Pipe (Natural Gas)	0 - 0.5	0.5 - 1.5	1.5 - 2	2 - 2.5	> 2.5
	National Network Waterway	0 - 2.5	2.5 - 5	5 - 7.5	7.5 - 10	> 10
	Power Lines	0 - 0.5	0.5 - 1.5	1.5 - 2	2 - 2.5	> 2.5
	Pipe Lines (Oil)	0 - 0.25	0.25 - 0.5	0.5 - 0.75	0.75 - 1	> 1
	Railroads	0 - 1	1 - 3	3 - 4	4 - 5	> 5
	Sewer Lines	0 - 1	1 - 3	3 - 4	4 - 5	> 5
Water Lines	0 - 0.25	0.25 - 0.5	0.5 - 0.75	0.75 - 1	> 1	

2.2 Relative Scores:

Table 13 shows four statistical groups and their relative scores in the Mingo County land suitability model. The total number of coal mining sites will be equally distributed in each group.

The relative score differs from the absolute score in two ways. First, thresholds for relative scores are derived only from real distances from the sites to the features (criteria). It is not affected by personal opinion and does not consider either traveling method or nature of criteria.

Table 13: Relative Scoring System

Threshold (Distances in miles)		Min - Q1	Q1 - Q2	Q2 - Q3	Q3 - Max	
Relative Score		10	7.5	5	2.5	
No	Criteria	Min	Q1	Q2	Q3	Max
1	Interstate	43.38	57.07	61.32	67.17	83.93
2	Existing Highway	0.44	4.04	10.24	16.56	25.91
3	Proposed Highway	0.23	4.62	9.95	16.10	31.72
4	Yeager Airport	62.59	74.30	80.59	87.82	96.78
5	Tri-state Airport	52.68	64.07	78.92	91.91	101.45
6	National Waterway Network Ports	49.71	67.60	78.76	87.14	95.45
7	Sewer Treatment Facilities	0.84	3.81	6.20	8.30	16.38
8	Solid Waste Treatment Facilities	7.15	14.34	17.55	21.99	31.55
9	National Waterway Network	0.47	3.66	6.91	8.08	15.01
10	Intermodal Terminal Facilities	12.14	21.91	25.32	30.02	40.54
11	Sewer Lines	0.36	1.74	3.20	6.77	10.41
12	Railroads	0.11	0.72	1.72	5.11	8.30
13	Water Lines	0.11	0.56	0.72	1.04	4.62
14	Power Lines	0.00	0.70	1.50	2.30	7.64
15	Gas Pipes	0.02	0.58	1.11	1.93	4.10
16	Pipe Lines	0.01	0.21	0.52	1.03	3.41
17	Broadband	0.01	0.29	0.56	0.92	2.81

2.3 Relationship

The relationship score is a binary choice, between an existing relationship and no relationship. Therefore, it is summed into the total score after the distance analysis. In the final part of the distance analysis, each criterion has the potential to score 100 points. Therefore, the model is scaled to the hundreds. For consistency, the relationship variable also has the potential of 100 points, while the ones without a relationship have zero, again because of the binary nature of the variable and the inability to properly weigh it in the distance selection criteria. The two known sites with 100 points for the relationship score are S501807 and S502099.

3. Mingo County's Suitability Model:

Table 14 shows the total scores of all studied sites in Mingo County. Site No-32 (Permit ID = S501807) has the highest score of 824. The sites with higher total scores suggest better opportunities for development. Results in Table 14 are also plotted in the bar chart (Figure 15) for better visualization. Among 69 potential development sites of Mingo County, it is easy to

notice that five of the sites, which have total scores above 695, should be considered as the most suitable sites for investment. The top five sites for development are highlighted.

Certainly, any change in weight values or the scoring system will result in different output and may change the decision. For better analysis and decision-making, the dynamic suitability model, which allows modification in criteria’s weights, thresholds, and scores, is available for distribution through RTI’s Geospatial Program.

Besides a distance analysis, a suitability model for Mingo is supported by demographic data as well as two additional analyses which are retail location density and workforce analysis (shown on Table 15 and Map 41 below). The best decision will be made with careful consideration of the suitability analysis as well as the demographic and economic information.

Table 14: Total score of all surface coal mining sites in Mingo County

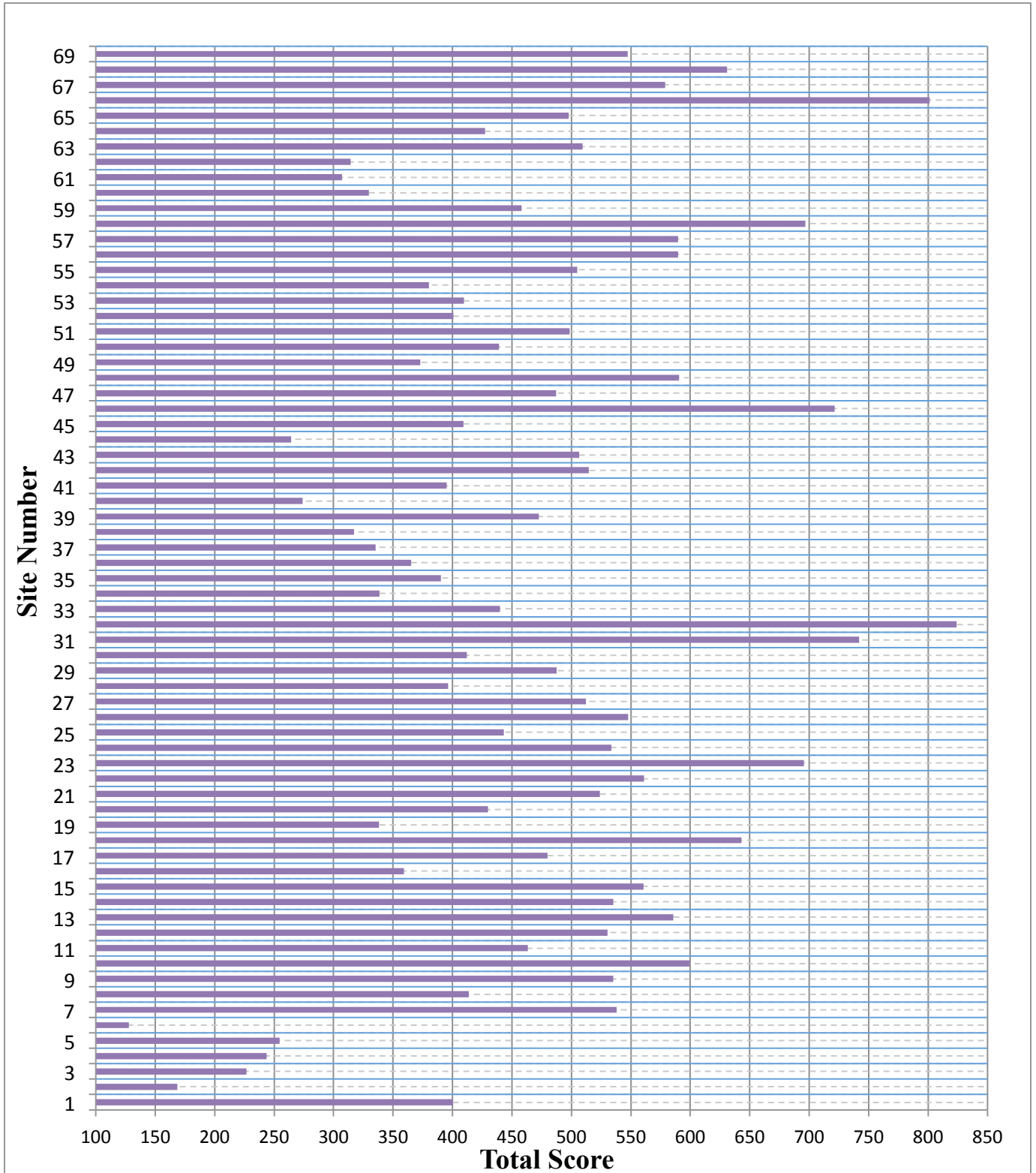
No.	Permittee	Permit_ID	Score
1	ARACOMA COAL COMPANY INC	S501306	400.25
2	ARGUS ENERGY WV LLC	S501107	168.75
3	ARGUS ENERGY WV LLC	S500997	226.75
4	ARGUS ENERGY WV LLC	S501694	243.75
5	ARGUS ENERGY WV LLC	S501900	254.75
6	ARGUS ENERGY WV LLC	S502698	128.00
7	CENTRAL APPALACHIA MINING, LLC	S500707	538.00
8	CENTRAL APPALACHIA MINING, LLC	S502508	413.75
9	CENTRAL APPALACHIA MINING, LLC	S400600	535.25
10	CENTRAL APPALACHIA MINING, LLC	S500403	599.50
11	CENTRAL APPALACHIA MINING, LLC	S501404	463.50
12	CENTRAL APPALACHIA MINING, LLC	S501901	530.50
13	CHAFIN BRANCH COAL CO LLC	S001078	585.75
14	CHAFIN BRANCH COAL CO LLC	S009085	535.25

No.	Permittee	Permit_ID	Score
15	CHAFIN BRANCH COAL CO LLC	S508286	560.50
16	CHAFIN BRANCH COAL CO LLC	S509087	359.00
17	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S502108	480.00
18	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S007280	643.00
19	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S009780	338.25
20	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S500188	430.00
21	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S503390	523.75
22	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S500395	561.25
23	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S501494	695.50
24	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S501994	533.50
25	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S501998	443.00
26	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S502399	547.75
27	COAL-MAC, INC. DBA PHOENIX COAL-MAC MINING, INC.	S506692	512.25
28	COBRA NATURAL RESOURCES LLC	S401395	396.50
29	COBRA NATURAL RESOURCES LLC	S503392	487.50
30	COBRA NATURAL RESOURCES LLC	S504988	412.00
31	CONSOL OF KENTUCKY INC	S501806	742.00
32	CONSOL OF KENTUCKY INC	S501807	824.00
33	CONSOL OF KENTUCKY INC	S502101	439.75
34	CONSOL OF KENTUCKY INC	S007382	338.50
35	CONSOL OF KENTUCKY INC	S017978	390.25

No.	Permittee	Permit_ID	Score
36	CONSOL OF KENTUCKY INC	Z000281	365.25
37	CONSOL OF KENTUCKY INC	S007384	335.50
38	CONSOL OF KENTUCKY INC	S009585	317.25
39	CONSOL OF KENTUCKY INC	S500402	472.50
40	CONSOL OF KENTUCKY INC	S500692	274.00
41	CONSOL OF KENTUCKY INC	S500700	395.25
42	CONSOL OF KENTUCKY INC	S500802	514.50
43	CONSOL OF KENTUCKY INC	S500905	506.50
44	CONSOL OF KENTUCKY INC	S502598	264.25
45	CONSOL OF KENTUCKY INC	S503288	409.25
46	CONSOL OF KENTUCKY INC	S503893	721.25
47	CONSOL OF KENTUCKY INC	S503993	487.25
48	CONSOL OF KENTUCKY INC	S504093	590.50
49	CONSOL OF KENTUCKY INC	S506291	373.00
50	DFM COAL, LLC	S400401	439.25
51	FRASURE CREEK MINING, LLC	S501006	498.50
52	FRASURE CREEK MINING, LLC	S501808	400.75
53	FRASURE CREEK MINING, LLC	S502201	409.75
54	GLEN ALUM OPERATIONS LLC	S400301	380.00
55	HAMPDEN COAL COMPANY LLC	S500410	505.00
56	HAMPDEN COAL COMPANY LLC	S500808	589.75
57	HAMPDEN COAL COMPANY LLC	S501310	589.75

No.	Permittee	Permit_ID	Score
58	HAMPDEN COAL COMPANY LLC	S004784	696.75
59	ICG EASTERN, LLC	S500801	458.00
60	ICG EASTERN, LLC	S501799	329.50
61	ICG EASTERN, LLC	S500999	307.00
62	KWV OPERATIONS LLC	S501294	314.50
63	PREMIUM ENERGY LLC	S501307	509.25
64	PREMIUM ENERGY LLC	S501608	427.50
65	PREMIUM ENERGY LLC	S400400	497.50
66	PREMIUM ENERGY LLC	S502099	801.50
67	TRACE CREEK COAL COMPANY	S008880	578.75
68	WHITE FLAME ENERGY INC	S501501	630.75
69	WHITE FLAME ENERGY INC	S502097	547.50

Figure 15: Mingo County's Suitability Model (Total Score of Each Surface Coal Mining Site)



Work Force Analysis

A work force analysis estimates total employment and unemployment within a certain distance, providing potential labor sources if an investment is made on the site. According to Gary Langer, the average one-way commute time is 26 minutes or 16 miles.¹³ It is reasonable to consider unemployment within 15 miles of the site as an upper limit for a potential employer. This data set does not provide a skill set analysis however; therefore employers may not find the labor skills they need. This dataset provides the pool of labor resources from which to choose.

Table 15: Number of employed and unemployed within radius of 5, 10 and 15 miles from the site

Site No.	Permit_ID	Emp_05	Unemp_05	Emp_10	Unemp_10	Emp_15	Unemp_15
1	S501306	654	116	2354	416	5808	1278
2	S501107	162	63	764	263	1852	476
3	S500997	628	234	1832	468	3707	698
4	S501694	582	225	1731	458	3385	635
5	S501900	220	79	1038	281	2518	516
6	S502698	221	86	903	296	2096	503
7	S500707	952	344	2994	997	6135	1621
8	S502508	1104	403	3157	1036	6131	1625
9	S400600	971	356	3120	1005	6422	1626
10	S500403	968	362	3631	1078	6563	1618
11	S501404	1106	412	3971	1134	6727	1637
12	S501901	758	270	2788	941	6116	1595
13	S001078	1063	315	2120	679	3196	1052
14	S009085	804	236	2052	663	3419	1067
15	S508286	1295	393	2461	811	3573	1126
16	S509087	657	189	1651	505	2759	922
17	S502108	1213	128	5179	1083	7232	1767
18	S007280	808	82	3934	829	7245	1764
19	S009780	956	312	3726	1067	7262	1752
20	S500188	894	251	3667	1003	7513	1809
21	S503390	1283	401	4023	1130	7376	1758
22	S500395	939	130	4246	939	7375	1791
23	S501494	835	80	3866	749	6931	1674
24	S501994	1164	378	3843	1108	7281	1744
25	S501998	862	304	3621	1051	6966	1706

¹³ Gary Langer, "Poll: Traffic in the United States," ABC News Online, February 13, 2005, Accessed March 1, 2013, <http://abcnews.go.com/Technology/Traffic/story?id=485098&page=1>.

Site No.	Permit_ID	Emp_05	Unemp_05	Emp_10	Unemp_10	Emp_15	Unemp_15
26	S502399	1032	162	4469	1002	7393	1792
27	S506692	1042	377	3717	1100	6834	1690
28	S401395	1364	454	3085	1035	4189	1263
29	S503392	1027	364	3440	1078	4870	1365
30	S504988	1370	459	3153	1047	4305	1281
31	S501806	2473	398	4592	849	6229	1432
32	S501807	2873	479	4984	963	6618	1573
33	S502101	672	255	2115	495	4628	905
34	S007382	723	263	2170	502	4709	917
35	S017978	726	263	2115	499	4561	880
36	Z000281	769	266	2296	512	4893	954
37	S007384	658	254	1992	488	4255	822
38	S009585	584	228	1807	473	3678	707
39	S500402	976	121	3864	680	6375	1489
40	S500692	912	237	2810	550	5357	1094
41	S500700	698	260	2061	494	4428	854
42	S500802	569	222	1853	473	4045	793
43	S500905	2223	327	4715	879	6178	1414
44	S502598	862	247	2627	538	5207	1031
45	S503288	932	226	2773	544	5433	1125
46	S503893	1539	217	4348	827	5886	1301
47	S503993	2029	289	4679	879	6113	1389
48	S504093	2224	347	4347	813	6053	1364
49	S506291	854	226	2480	521	5257	1052
50	S400401	1377	472	3244	1073	4389	1302
51	S501006	729	209	1861	579	2875	969
52	S501808	689	200	2029	640	3017	1020
53	S502201	983	301	2334	758	3354	1100
54	S400301	1241	432	3162	1060	4412	1315
55	S500410	955	286	2328	768	3692	1127
56	S500808	1052	314	2292	752	3575	1112
57	S501310	1052	314	2292	752	3575	1112
58	S004784	1059	314	2231	727	3487	1096
59	S500801	449	176	1510	434	3388	668
60	S501799	467	182	1558	447	3189	624
61	S500999	463	181	1547	446	3076	603
62	S501294	1348	485	3331	1084	5199	1452

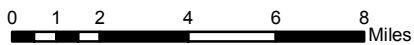
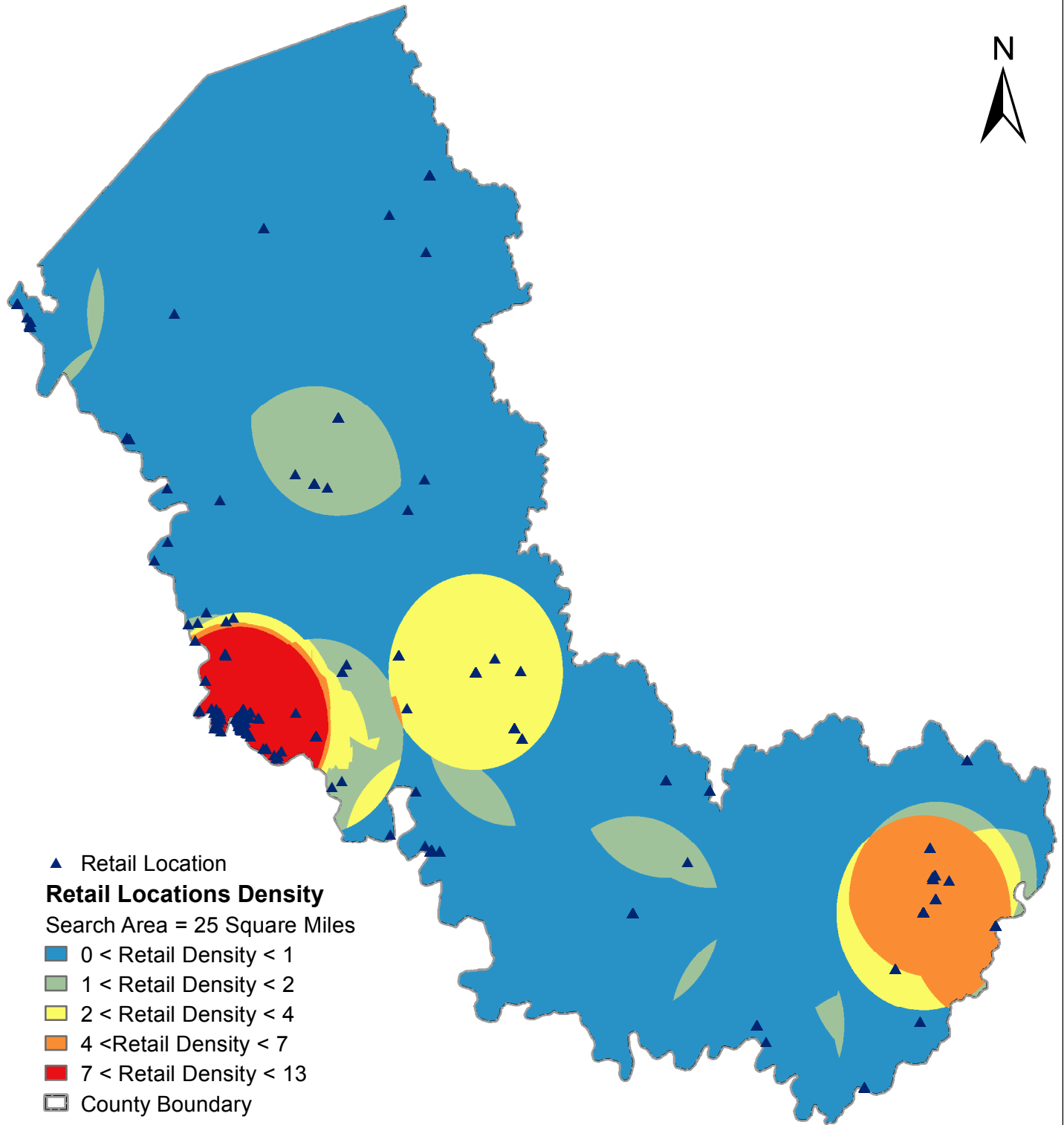
Site No.	Permit_ID	Emp_05	Unemp_05	Emp_10	Unemp_10	Emp_15	Unemp_15
63	S501307	1214	449	3682	1127	5873	1548
64	S501608	1154	398	3304	1059	4583	1321
65	S400400	1223	400	3006	999	4249	1260
66	S502099	1257	380	2492	826	3673	1137
67	S008880	1037	113	4254	784	6521	1538
68	S501501	1736	383	5340	1167	7130	1715
69	S502097	1535	394	5237	1246	7341	1753

Retail Location Analysis

A retail location analysis is a density analysis which depicts a number of retailers within 25 square miles of any certain location in the county (Map 41). The result, as shown on the map, is displayed in blue-to-red color for retail's density from low to high. Normally, the area with a high density of retailers indicates an already developed and populated community which possibly has the highest opportunity as well as the heaviest competition. The areas with low retail density showcase where population is lowest, but also where competition is lowest and which may provide retail opportunities.

Retail Location Density

Mingo County



Data Source: ESRI 2011

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V. Conclusion

Mingo County has a very unique history when it comes to land. After growing successfully during the coal industry's heyday, the county has suffered in a consistent decline. A quick demographic study looks like some of these problems may be changing for the better, while some forecasts are not so optimistic. Beneath it all natural resources and mining is still the prime economic mover in the area, and finding a use for post-mine sites is essential to encourage continued development and reversing many of the trends in Mingo County.

This plan has identified and displayed the top five post-mine sites that are available for development. These sites have the integral tools that researchers have shown can assist in spatial development. Though success is not guaranteed, this overview combined with careful strategic planning can bring about the changes in the trends that are necessary for Mingo County to thrive. Already this is being done, with the development of the Air Park, the building of a consolidated school, and the opening of the King Coal Highway. These and other projects have already brought success to Mingo County, and building on that success is the purpose of the land use master plan.

Through a site distance analysis and complete demographic calculation, this plan provides the most comprehensive understanding of the economic state of Mingo County and the potential of its land. By analyzing specific infrastructures and demographics, policymakers can begin attracting investors to post-mine sites, and continue the process of developing the economy. This plan provides strategic information, the choice as to how to utilize this information belongs with the administrators and people of the county.