

McDowell County

Land Use Master Plan 2013



Executive Summary

This Land Use Master Plan (LUMP) conveys information on McDowell County's current demographic and geographic status. This plan will be used to evaluate the potential of post-mine sites for development, and evaluate McDowell 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 McDowell 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. McDowell has already taken some advantage of its inventory of post-mine sites. This plan will help McDowell further its plans for these sites.

McDowell County has been losing population since 1980, and records indicate the trend began in the 1950s. The county is projected to be the biggest loser of population in the State. The county's median age and age distribution indicate a population capable of productivity in the labor force, but participation is incredibly low.

Employment consists mainly of government services; trade, transportation, and utilities; and natural resources and mining. Government and natural resources are the major wage contributors: Government due to the sheer size of the sector in McDowell County, and natural resources and mining.

Even as McDowell County total wages have been on the rise, there is a significant lack of labor force participation in the county, indicating an increased apathy towards the labor force. Over two-thirds of the working age population is not in the labor force. This is the highest lack of participation in West Virginia. Also of particular note is the amount of income, as opposed to wages, derived from government transfers. Forty-three percent of McDowell County income is from government transfers, a ratio that has reached over fifty percent in the past. Alas, McDowell 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.

McDowell County's total enrollment has dropped precipitously despite the state takeover of schools in 2001. McDowell County's dropout rate is also rather high, which indicates a youth detached from their educational priorities. McDowell County's residents have relatively poor education achievement overall, with forty percent of residents not having a high school education or equivalent.

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. McDowell County

has various transportation options, but lacks a dedicated airport. Its rail system also cannot be categorized as extensive, and no major interstate traverses the county.

McDowell County also has 17 historic sites in the National Register and several pieces of historic architecture designated by the state. Historic preservation can be a basis for tourism, cultural identity, and community cohesion.

This plan also reviews energy and environmental issues in McDowell County. The environment of the county should be considered in an overall development strategy. McDowell County is heavily forested but contains no system of national or state parks, and has only three wildlife management areas. McDowell County is also not on the list of air pollution non-attainment areas, which is positive. McDowell County has a major oil field and a significant system of pipelines, but lacks in alternative energy possibilities at present.

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 McDowell 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. A workforce analysis was 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 of the five post-mine sites. In Tables A and B, distances and total scores are compared between sites, providing an idea of the more suitable sites under a considered criterion. For example, if we want to look for a site that is located closest to power lines, the answer is site ranking #5, permit ID S400406. However, if we wanted the site closer to water lines, the best site is site ranking #1, permit ID S400309.

Table C explains how each criterion contributes to the final total score and the importance of the weights. Because of the assumption that one criterion may be more important than the others (different weights), the site with higher absolute and relative scores is still able to receive a smaller total score than the other sites. Site ranking #1 is a good explanation of this situation. Site #1

has smaller absolute scores compared to sites ranking 3 and 4. Still, Site #1 receives a higher total score because the distances from

this site to major criteria (with weights from 8-10) are much shorter than the other two.

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

Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	0.85	1.54	0.56	0.56	2.35	8
Proposed Highway	3.86	0.18	0.75	0.75	5.91	9
Intermodal Terminal Facilities	63.74	59.42	57.79	57.79	65.42	6
Interstate	35.38	37.19	34.79	34.79	37.51	8
National Waterway Network Ports	123.56	120.56	118.93	118.93	125.24	5
Sewer Treatment Facilities	12.98	10.12	13.64	13.64	15.03	7
Solid Waste Treatment Facilities	0.94	2.18	2.39	2.39	1.67	8
Tri-state Airport	130.52	127.52	125.89	125.89	132.20	3
Yeager Airport	98.01	92.79	91.14	91.14	100.06	3
Broadband	0.65	0.30	0.29	0.29	0.62	9
Gas Pipes	8.19	5.11	4.95	4.95	9.06	6
National Waterway Network	2.54	0.90	3.28	3.28	3.53	4
Power Lines	0.21	0.49	0.47	0.47	0.10	10
Oil Pipes	2.60	1.29	1.34	1.34	2.65	6
Railroad	0.14	1.05	3.22	3.22	0.47	5
Sewer Lines	0.12	0.89	2.01	2.01	0.85	8
Water Lines	0.21	0.61	0.29	0.29	0.35	10

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

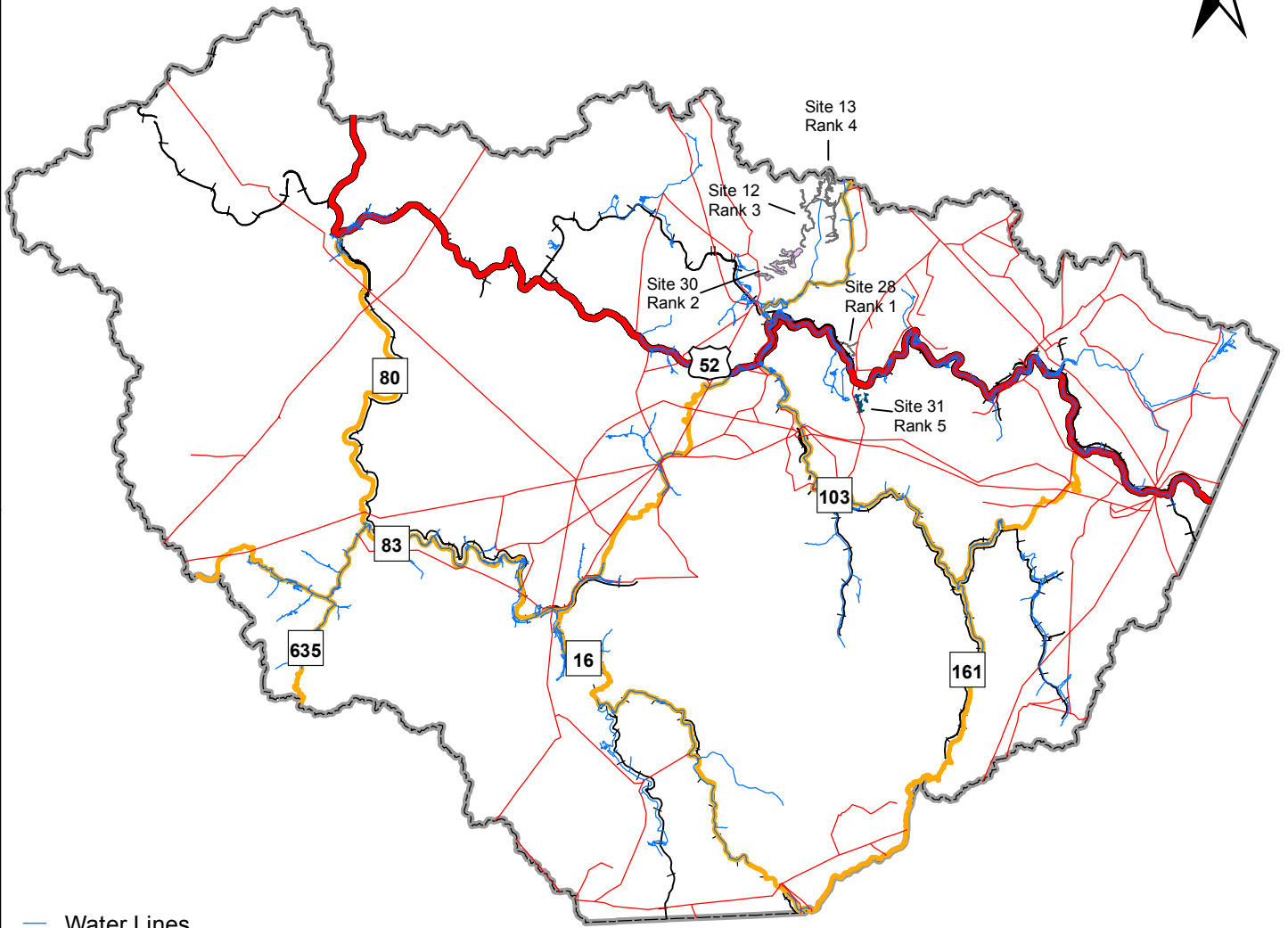
Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	80	80	80	80	60	8
Proposed Highway	90	90	90	90	63	9
Intermodal Terminal Facilities	6	6	6	6	6	6
Interstate	6	4	6	6	4	8
National Waterway Network Ports	5	5	5	5	5	5
Sewer Treatment Facilities	35	35	35	35	21	7
Solid Waste Treatment Facilities	80	80	80	80	80	8
Tri-state Airport	3	3	3	3	3	3
Yeager Airport	3	3	3	3	3	3
Broadband	67.5	90	90	90	67.5	9
Gas Pipes	31.5	42	60	60	31.5	6
National Waterway Network	40	40	40	40	40	4
Power Lines	100	75	75	75	100	10
Oil Pipes	45	60	45	45	45	6
Railroad	50	25	12.5	12.5	50	5
Sewer Lines	80	80	60	60	80	8
Water Lines	100	75	100	100	100	10
Total Score	822	793	790.5	790.5	759	












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

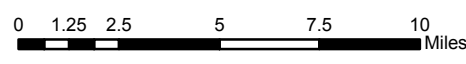
Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	10	10	10	10	10	8
Proposed Highway	10	10	10	10	7	9
Intermodal Terminal Facilities	1	1	1	1	1	6
Interstate	1	1	1	1	1	8
National Waterway Network Ports	1	1	1	1	1	5
Sewer Treatment Facilities	5	5	5	5	3	7
Solid Waste Treatment Facilities	10	10	10	10	10	8
Tri-state Airport	1	1	1	1	1	3
Yeager Airport	1	1	1	1	1	3
Broadband	10	10	10	10	10	9
Gas Pipes	7	7	10	10	7	6
National Waterway Network	10	10	10	10	10	4
Power Lines	10	10	10	10	10	10
Oil Pipes	10	10	10	10	10	6
Railroad	10	10	10	10	10	5
Sewer Lines	10	10	10	10	10	8
Water Lines	10	10	10	10	10	10
Total Absolute Score	117	117	120	120	112	
Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	10	10	10	10	7.5	8
Proposed Highway	10	10	10	10	10	9
Intermodal Terminal Facilities	10	10	10	10	10	6
Interstate	7.5	5	7.5	7.5	5	8
National Waterway Network Ports	10	10	10	10	10	5
Sewer Treatment Facilities	10	10	10	10	10	7
Solid Waste Treatment Facilities	10	10	10	10	10	8
Tri-state Airport	10	10	10	10	10	3
Yeager Airport	10	10	10	10	10	3
Broadband	7.5	10	10	10	7.5	9
Gas Pipes	7.5	10	10	10	7.5	6
National Waterway Network	10	10	10	10	10	4
Power Lines	10	7.5	7.5	7.5	10	10
Oil Pipes	7.5	10	7.5	7.5	7.5	6
Railroad	10	5	2.5	2.5	10	5
Sewer Lines	10	10	7.5	7.5	10	8
Water Lines	10	7.5	10	10	10	10
Total Relative Score	160	155	152.5	152.5	155	

Top Five Sites for Potential Development

McDowell County



-  Water Lines
-  Power Lines
-  WV Routes
-  US Routes
-  Site 12
-  Site 31
-  Site 13
-  Site 30
-  Railroads
-  Site 28
-  County Boundary



Source: Rahall Transportation Institute Analysis 2013

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www.njrati.org

Site's General Info

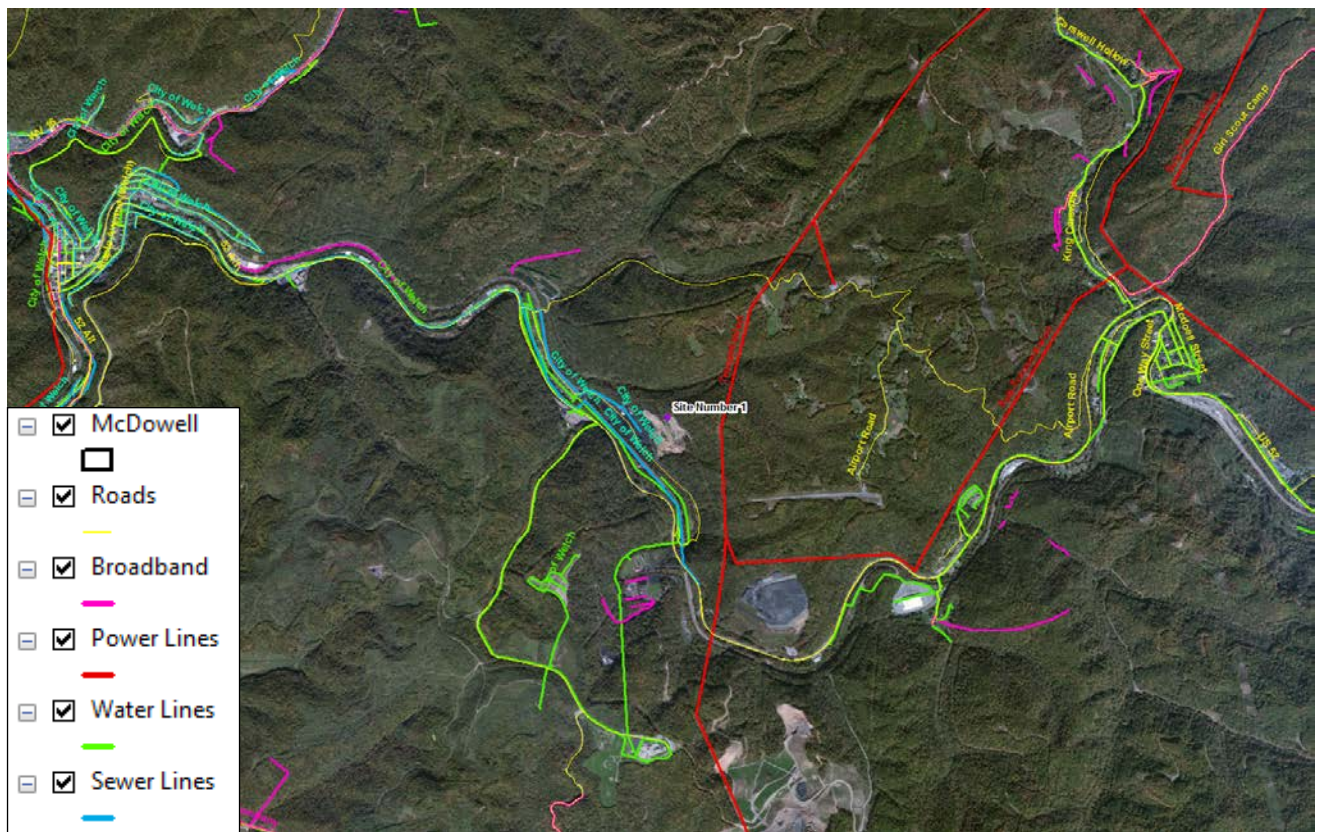
Permittee	Southern Minerals Inc
Facility Name	Superior Auger
Permit ID	S400309
Issue Date	6/3/2010
Expiration Date	6/3/2015
Current Acres	5.11
Lat	37° 25' 24.0000"
Long	81° 32' 30.0000"
Nearest Post Office	Kimball

Site Number	28
Suitability Ranking	1
Total Score	822

Site 28's major advantage is its proximity to power and water lines. This puts the site at number one in the rankings despite a lower score in broadband.

Distance Analysis Results

Existing Highway	0.85
Proposed Highway	3.86
Intermodal Terminal Facilities	63.74
Interstate	35.38
National Waterway Network Ports	123.56
Sewer Treatment Facilities	12.98
Solid Waste Treatment Facilities	0.94
Tri-state Airport	130.52
Yeager Airport	98.01
Broadband	0.65
Gas Pipes	8.19
National Waterway Network	2.54
Power Lines	0.21
Oil Pipes	2.60
Railroads	0.14
Sewer Lines	0.12
Water Lines	0.21



Site's General Info

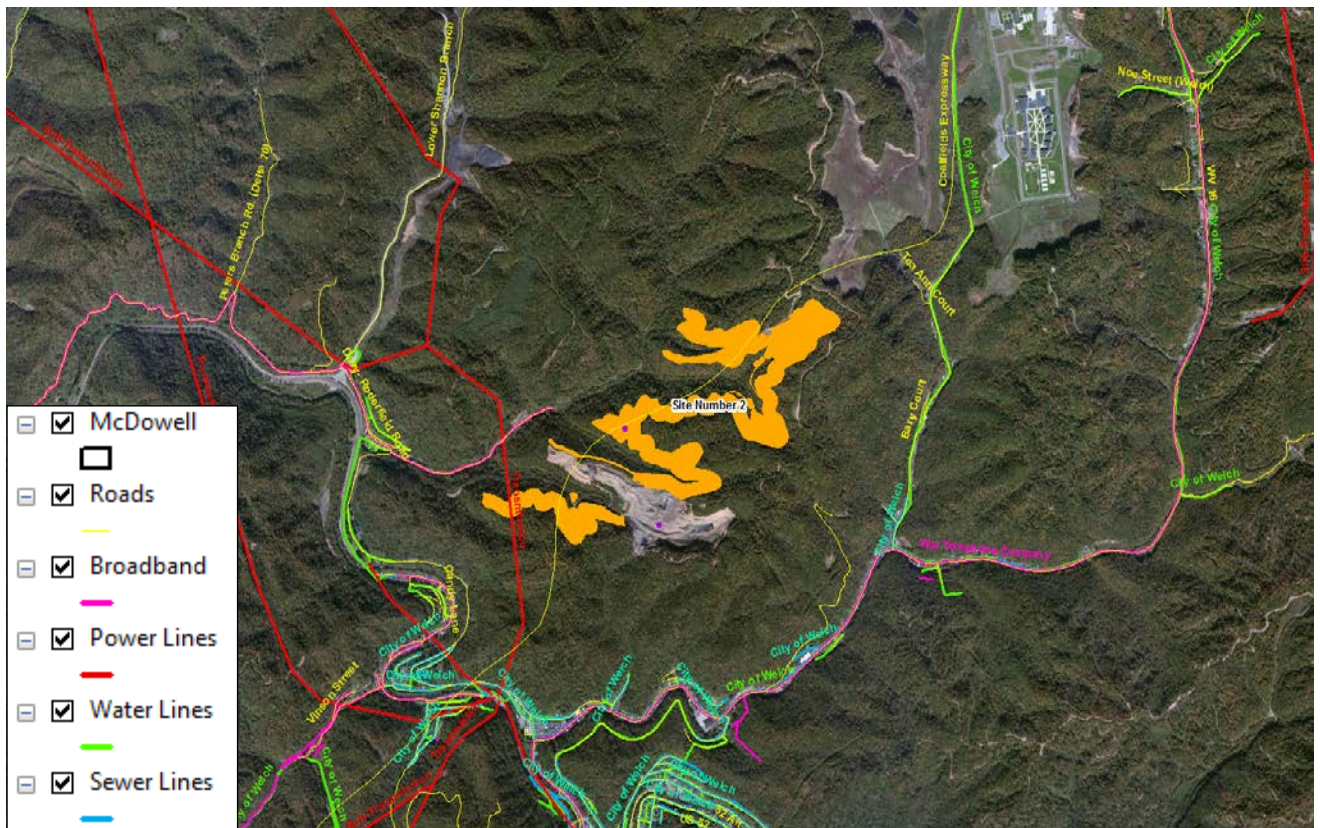
Permittee	Southern Minerals Inc
Facility Name	Upper Shannon Branch Mine No.2
Permit ID	S401809
Issue Date	1/18/2012
Expiration Date	1/18/2017
Current Acres	199
Lat	37° 27' 17.0000"
Long	81° 34' 58.0000"
Nearest Post Office	Welch

Site Number	30
Suitability Ranking	2
Total Score	793

Site number 30 scored well in broadband access, but fell in rankings on power and water lines. Still, its scores are high on transportation and other infrastructure.

Distance Analysis Results

Existing Highway	1.54
Proposed Highway	0.18
Intermodal Terminal Facilities	59.42
Interstate	37.19
National Waterway Network Ports	120.56
Sewer Treatment Facilities	10.12
Solid Waste Treatment Facilities	2.18
Tri-state Airport	127.52
Yeager Airport	92.79
Broadband	0.30
Gas Pipes	5.11
National Waterway Network	0.90
Power Lines	0.49
Oil Pipes	1.29
Railroads	1.05
Sewer Lines	0.89
Water Lines	0.61



Site's General Info

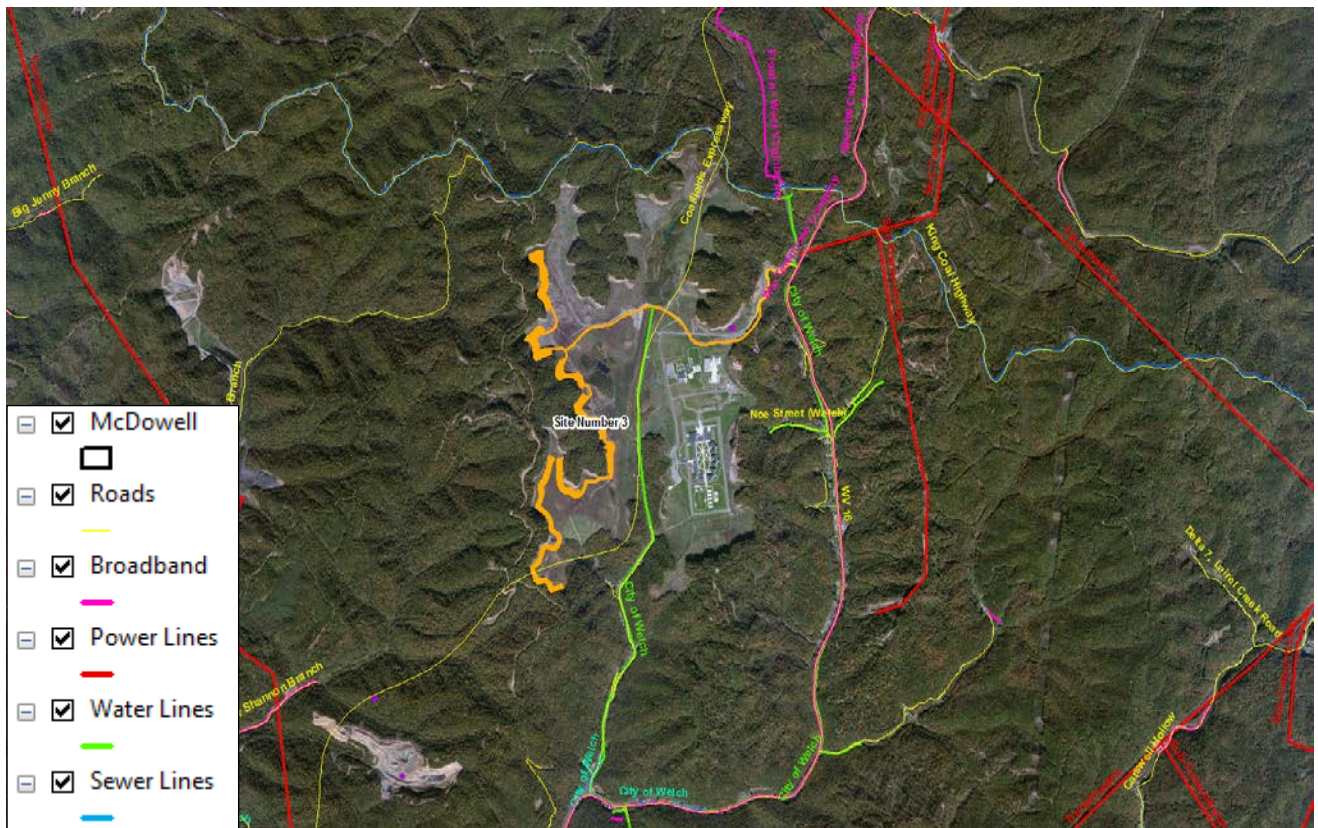
Permittee	Kentucky Fuel Corporation
Facility Name	Puncheoncamp Thin Seam Mine #2
Permit ID	S400305
Issue Date	10/3/2005
Expiration Date	10/3/2010
Current Acres	60.78
Lat	37° 28' 44.0000"
Long	81° 33' 03.0000"
Nearest Post Office	Welch

Site Number	12
Suitability Ranking	3
Total Score	790.5

Site 12 and Site 13 are tied with closer airport access, water line access, and interstate access relative to the other sites.

Distance Analysis Results

Existing Highway	0.56
Proposed Highway	0.75
Intermodal Terminal Facilities	57.79
Interstate	34.79
National Waterway Network Ports	118.93
Sewer Treatment Facilities	13.64
Solid Waste Treatment Facilities	2.39
Tri-state Airport	125.89
Yeager Airport	91.14
Broadband	0.29
Gas Pipes	4.95
National Waterway Network	3.28
Power Lines	0.47
Oil Pipes	1.34
Railroads	3.22
Sewer Lines	2.01
Water Lines	0.29



Site's General Info

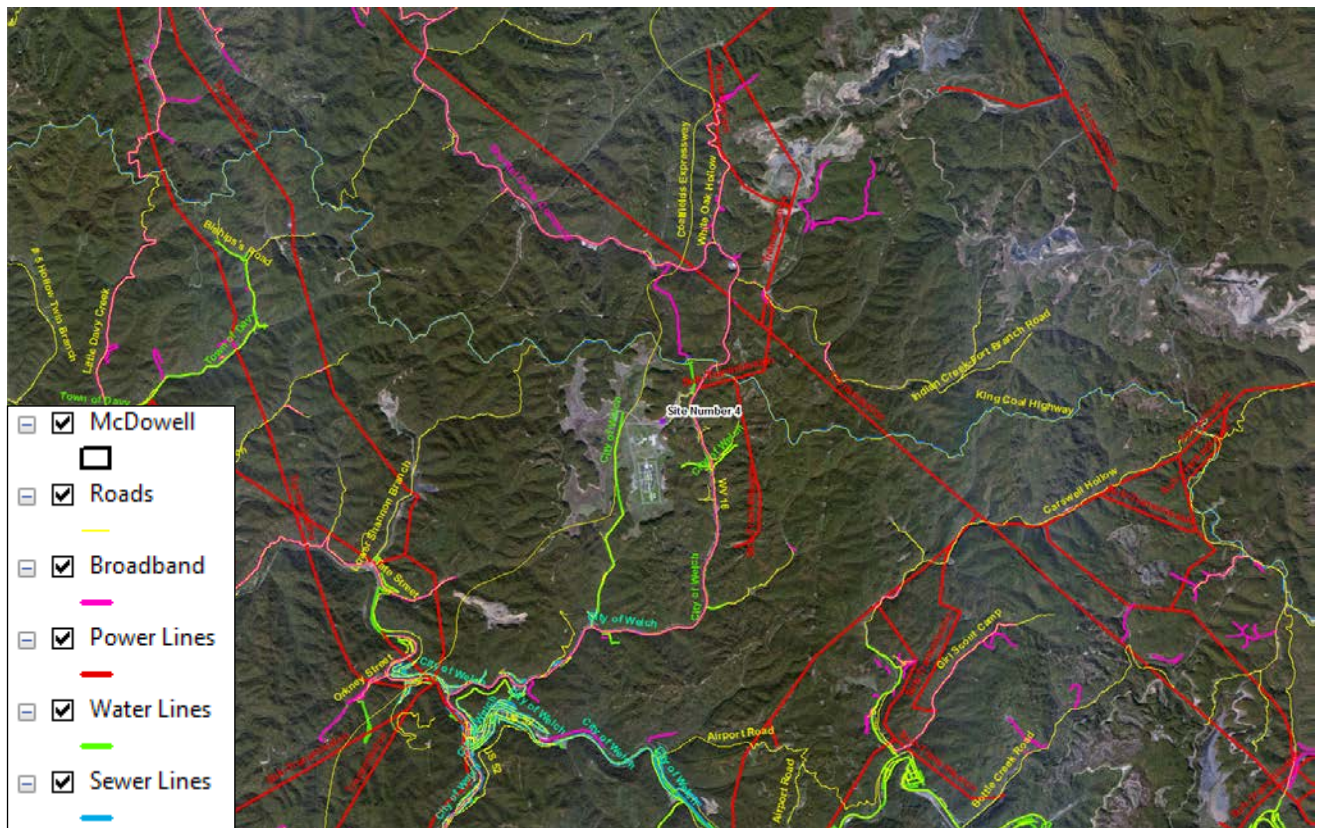
Permittee	Kentucky Fuel Corporation
Facility Name	Puncheoncamp Thin Seam Mine
Permit ID	S400504
Issue Date	12/20/2004
Expiration Date	12/20/2009
Current Acres	51.5
Lat	37° 28' 44.0000"
Long	81° 33' 03.0000"
Nearest Post Office	Welch

Site Number	13
Suitability Ranking	4
Total Score	790.5

Site 12 and Site 13 are tied with closer airport access, water line access, and interstate access relative to the other sites.

Distance Analysis Results

Existing Highway	0.56
Proposed Highway	0.75
Intermodal Terminal Facilities	57.79
Interstate	34.79
National Waterway Network Ports	118.93
Sewer Treatment Facilities	13.64
Solid Waste Treatment Facilities	2.39
Tri-state Airport	125.89
Yeager Airport	91.14
Broadband	0.29
Gas Pipes	4.95
National Waterway Network	3.28
Power Lines	0.47
Oil Pipes	1.34
Railroads	3.22
Sewer Lines	2.01
Water Lines	0.29



Site's General Info

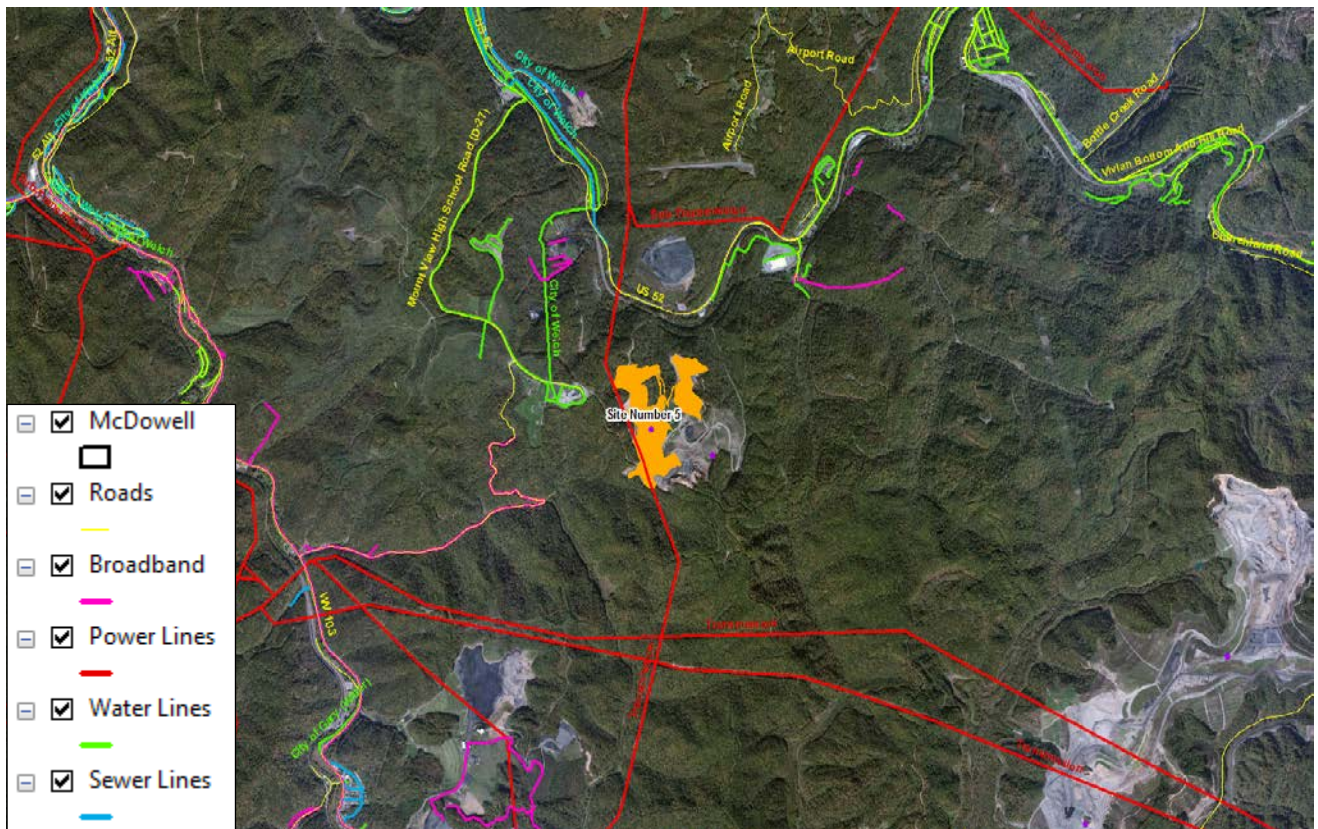
Permittee	Southern Minerals Inc
Facility Name	Big Four Surface Mine No. 2
Permit ID	S400406
Issue Date	9/27/2006
Expiration Date	9/27/2016
Current Acres	58.93
Lat	37° 24' 06.0000"
Long	81° 32' 07.0000"
Nearest Post Office	Wilcoe

Site Number	31
Suitability Ranking	5
Total Score	759

Site 31 has the best power line access besides Site 23 and also has better access to railroads. Interstate access, broadband, and gas pipes are behind the others however.

Distance Analysis Results

Existing Highway	2.35
Proposed Highway	5.91
Intermodal Terminal Facilities	65.42
Interstate	37.51
National Waterway Network Ports	125.24
Sewer Treatment Facilities	15.03
Solid Waste Treatment Facilities	1.67
Tri-state Airport	132.20
Yeager Airport	100.06
Broadband	0.62
Gas Pipes	9.06
National Waterway Network	3.53
Power Lines	0.10
Oil Pipes	2.65
Railroads	0.47
Sewer Lines	0.85
Water Lines	0.35



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.

This plan provides information and analysis specifically for McDowell County. McDowell County's economy is dominated by government services and natural resources, but that is only in the case of those employed. Almost two-thirds of the working age population in McDowell County is not in the labor force. Moreover, government transfers to individuals make up a significant amount of income, and several other factors show a county in distress. Though for some the trends are upward, for the vast majority the trends have no impact on life. This plan will put focus on these issues, encouraging an analysis of the range of options available to policymakers through land use.

II. Planning Area

McDowell County was formed in 1858, five years before West Virginia became a state. It was named after a former governor of Virginia, James McDowell. The McDowell County county seat was debated multiple times in the 19th century. The debates even began to lead to violence until Welch was chosen in 1892. As with many of the coalfield counties, the boom from natural resource extraction brought people and money to the area, but through the Great Depression and the withdrawal of many natural resource industries, McDowell began to slip. Though there are positive indications in the area of employment, the real struggles of McDowell County lie in the numbers of people not in the labor force and the lives of those living in poverty. In this lens the situation is dire, and an economic development plan is a matter of necessity.¹

¹ Myers, Mark S., "McDowell County," *The West Virginia Encyclopedia*, Accessed July 2, 2013, www.wvencyclopedia.org/articles/1631.

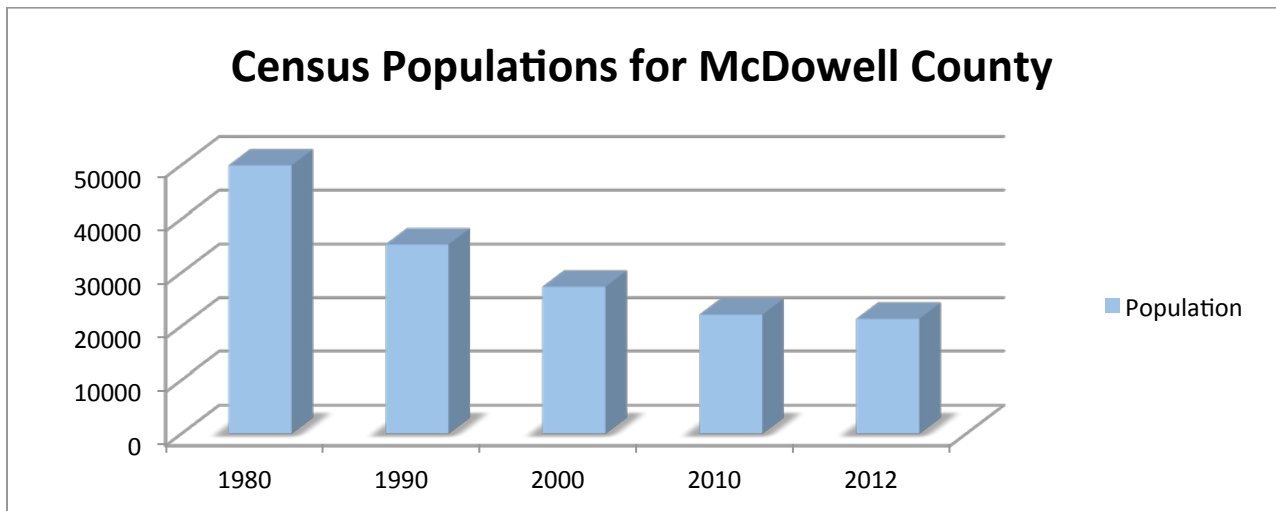
III. Existing Conditions

This information will provide a background understanding of the demographic trends in the county. This base information is meant to provide overall detail on McDowell 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 McDowell County in 2011 was 22,262 according to the 2011 American Community Survey (ACS) 5-year estimates, ranking it 31st in county population among the 55 counties in West Virginia.² The decennial censuses show that McDowell County has steadily lost population since the 1980s, and historical accounts indicate this trend can be traced to the 1950s³.

Figure 1



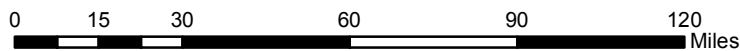
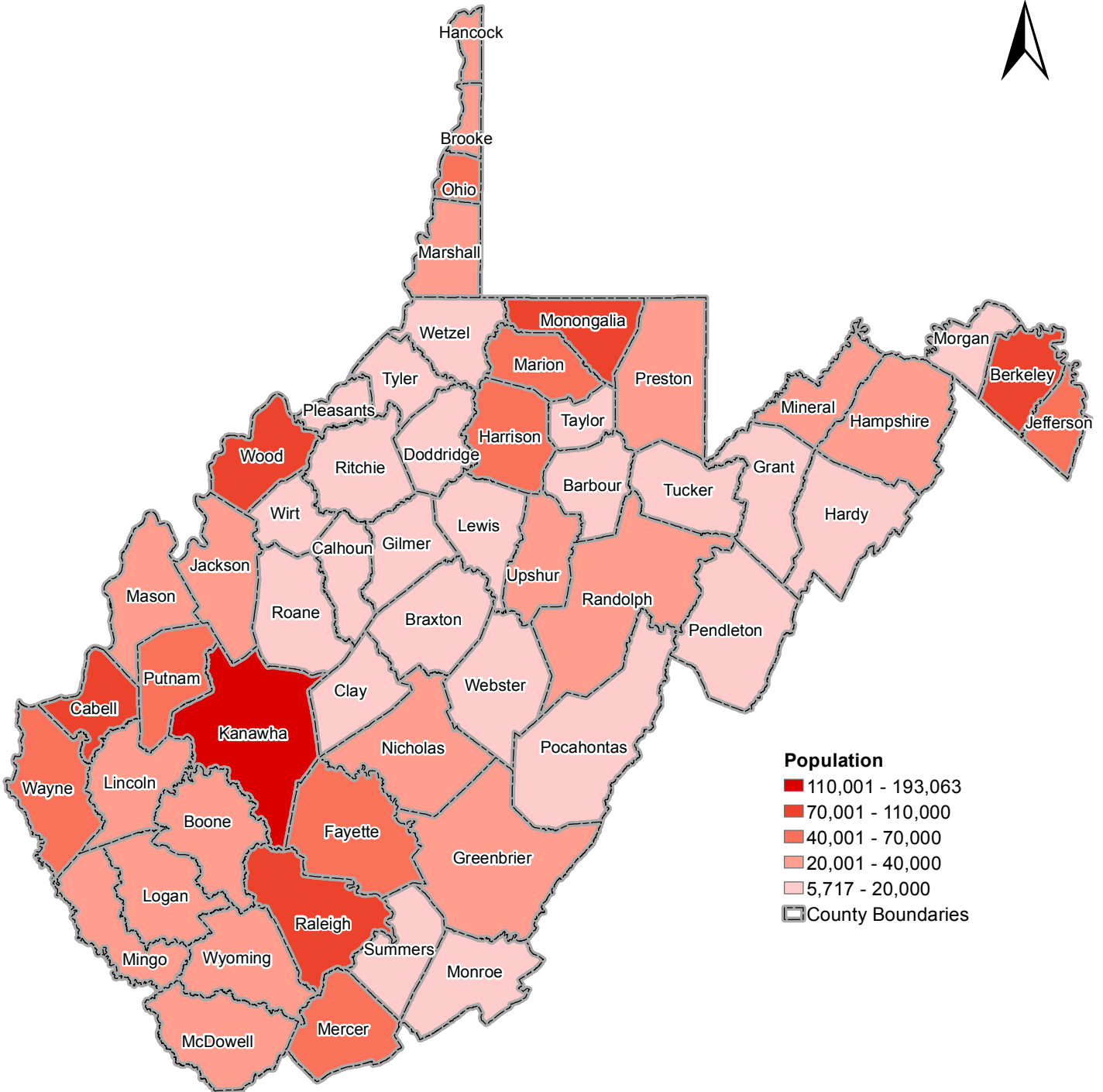
Source: Stats Indiana, USA Counties in Profile

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

² United States Census Bureau, "2011 American Community Survey 5-year Estimates," Accessed April 20, 2013, www.factfinder2.census.gov

³ Myers, Mark S., "McDowell County," *The West Virginia Encyclopedia*, Accessed July 2, 2013, www.wvencyclopedia.org/articles/1631.

Demographic Population



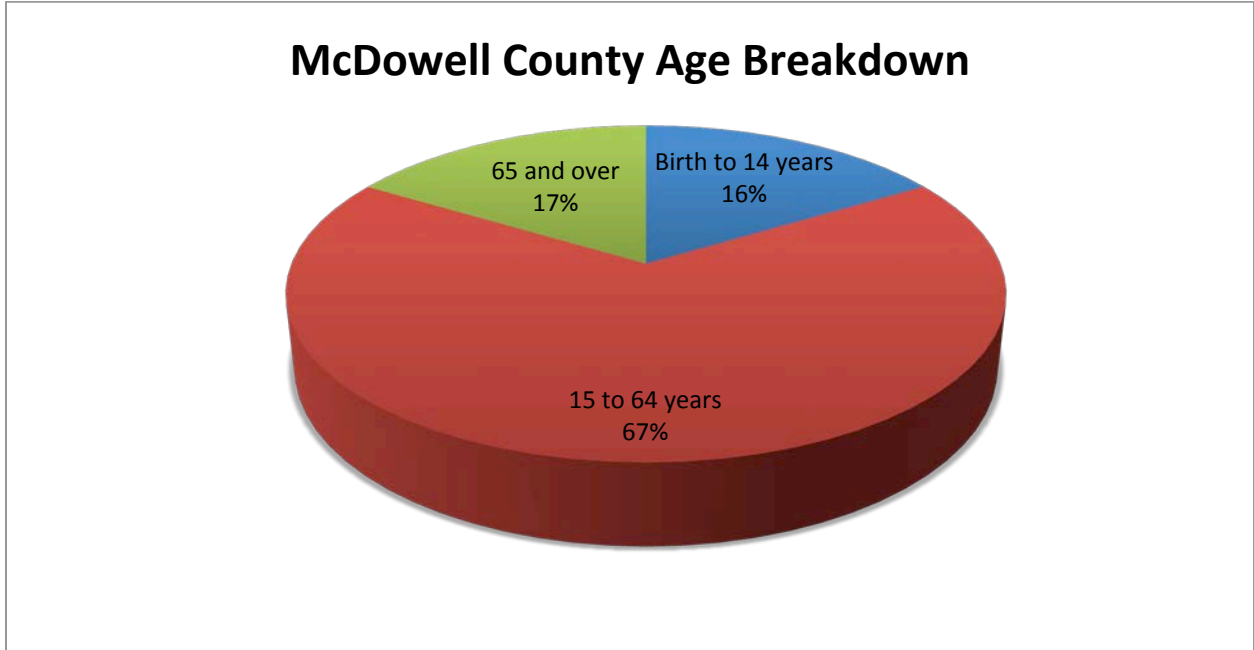
Source: United States Census Bureau 2011

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According to the ACS, 23 percent of McDowell County residents are 60 years of age and over, while almost 17 percent are between 5 and 19 years of age and almost 5 percent are below the age of 5. As a result, approximately 5,000 people are of retirement age. The median age in McDowell is 43.9, 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.

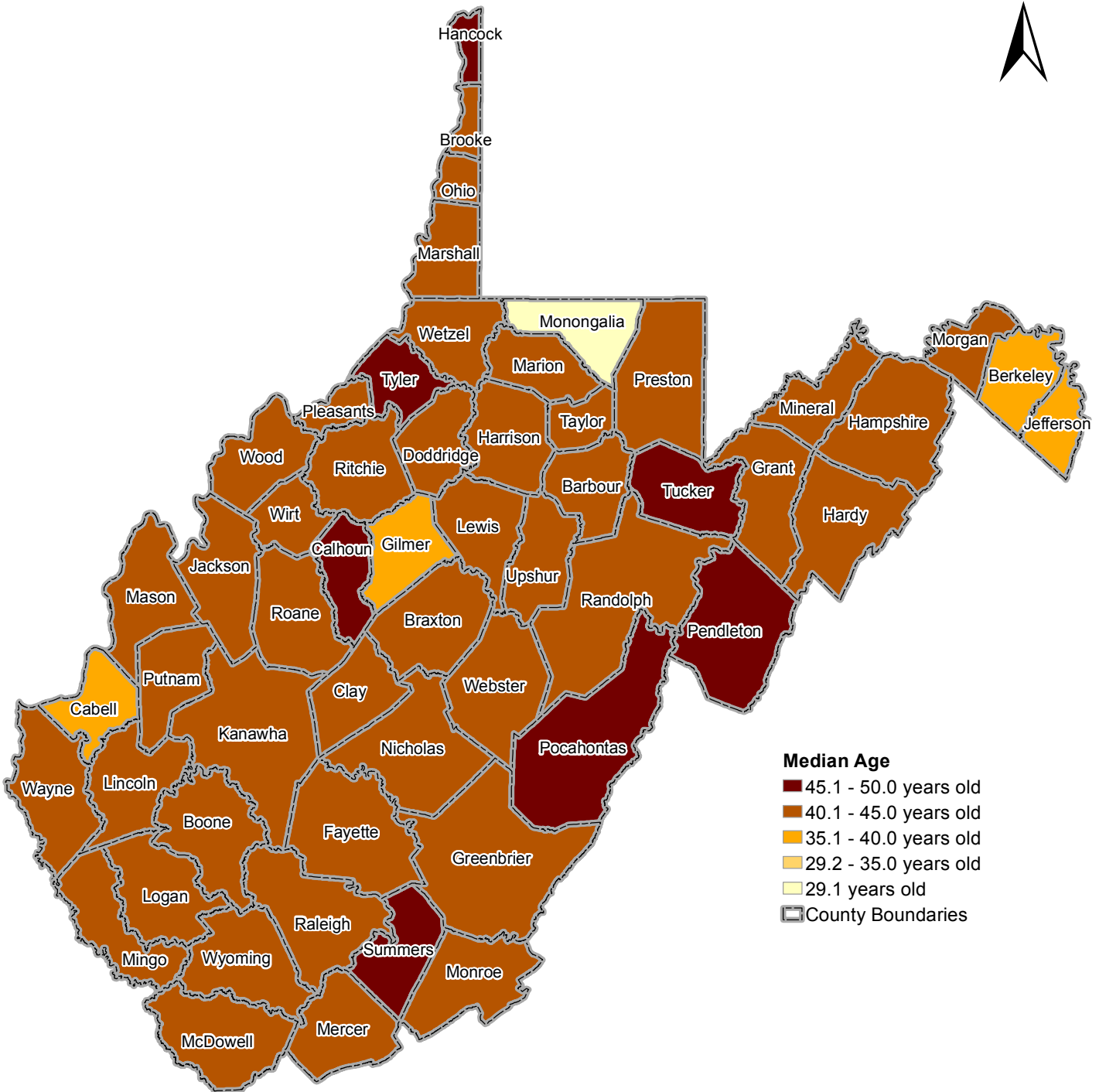
Figure 2



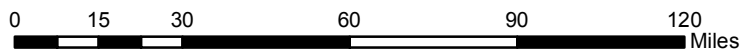
Source: 2011 American Community Survey 5-Year Estimate Calculation

Demographic

Median Age



Median Age
 ■ 45.1 - 50.0 years old
 ■ 40.1 - 45.0 years old
 ■ 35.1 - 40.0 years old
 ■ 29.2 - 35.0 years old
 ■ 29.1 years old
 □ County Boundaries



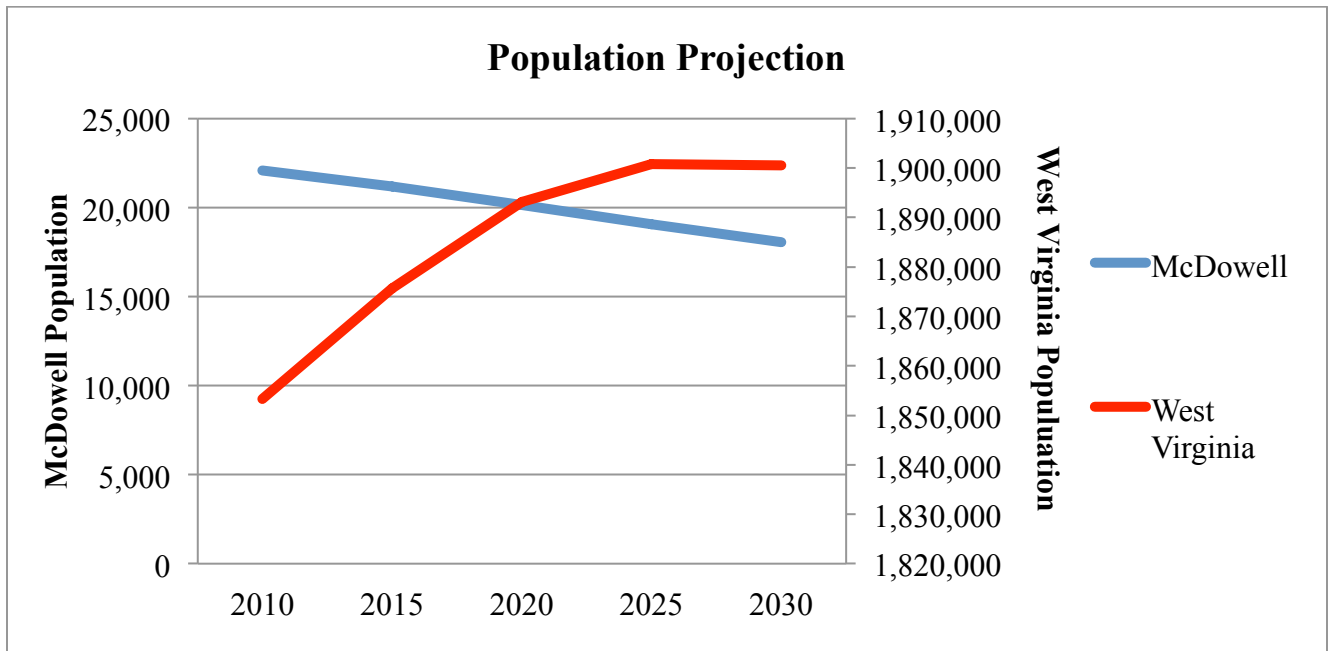
Source: United States Census Bureau 2011

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The Bureau of Business and Economic Research at West Virginia University projects an 18.3 percent decrease in the McDowell County population between 2010 and 2030, which is significantly different from the projected growth of West Virginia.⁴ The model for the projection is based on past population patterns and statistics, and should not be taken as permanent. The projected decrease is derived from the constant and continuous decrease in the McDowell County population, and is the largest decrease projected for all the counties. Without a sustained population, counties are not able to generate economic activity to fund infrastructure or meet basic needs, and this situation stands in stark relief in McDowell County.

Figure 3



Source: WVU Bureau of Business and Economic Research

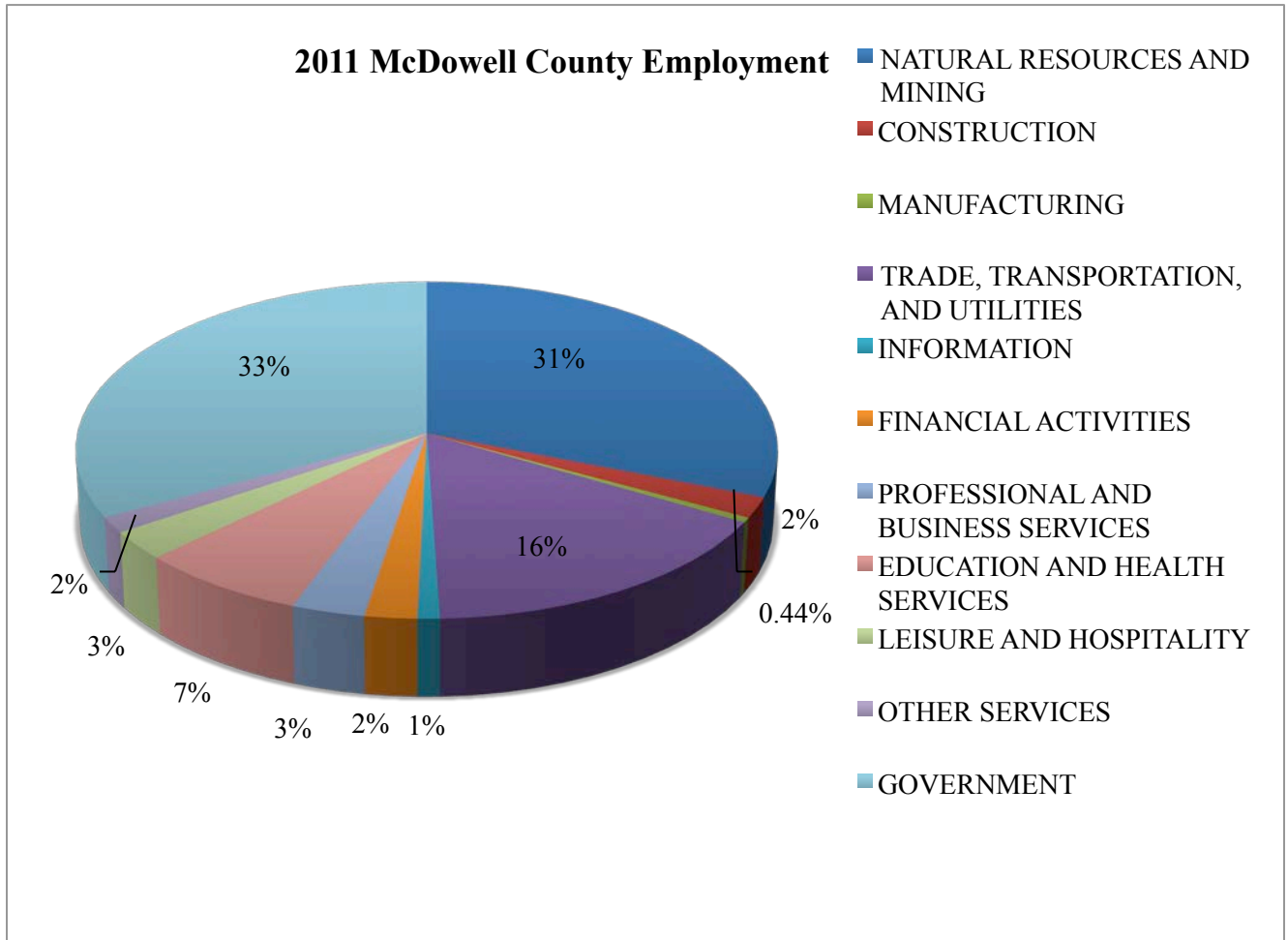
Employment

Workforce WV has a complete dataset on employment numbers and wages. The total number of employed in 2011 was 6,333. Approximately 33 percent of wage earners in McDowell County worked in government, and about half of that number is local government. McDowell County government employment is consistent with West Virginia employment patterns as a whole, but McDowell’s is particularly high, and no other sector is as large as government and natural resources. This is not a stable base of employment, being susceptible to recessions, mining industry changes, and political whims. However, it should be noted that local government jobs

⁴ 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).

include many services that few would consider doing without, including education, community health, and public safety workers.

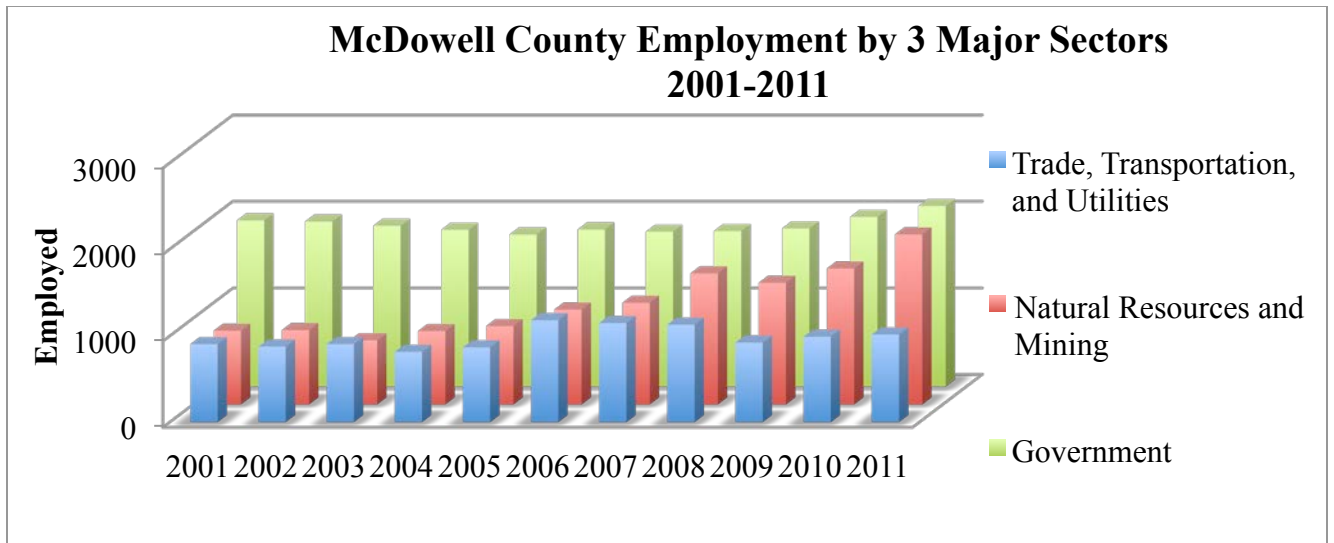
Figure 4



Source: Workforce WV

Three sectors have been the major contributors to employment throughout the past decade: Government; Trade, Transportation and Utilities; and Natural Resources and Mining. Government has consistently been the highest employer, while the Trade, Transportation, and Utilities sector was second until 2004 when Natural Resources and Mining overtook it. The Natural Resources and Mining sector boomed with an unusually large number of permits being issued starting in 2000, indicating increased mining planning and activity in the county.

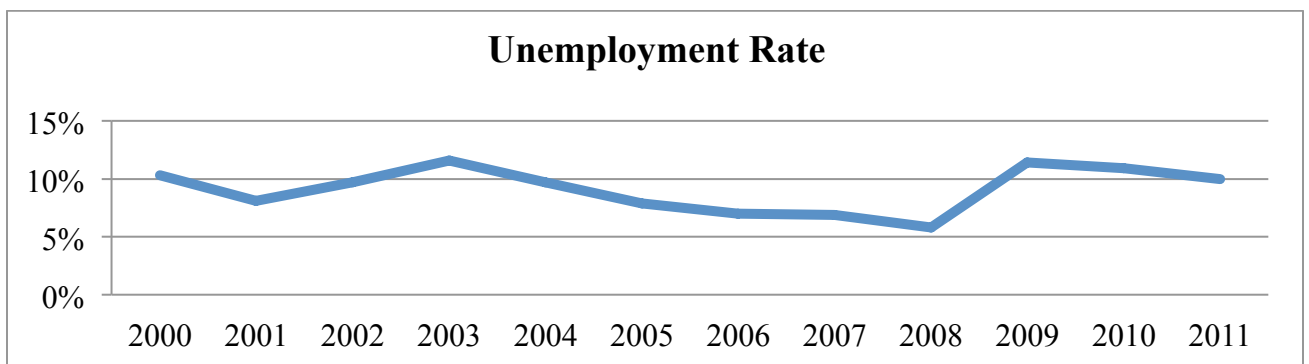
Figure 1



Source: Workforce WV

The civilian labor force in the county is one of the most interesting statistics when determining potential investors. As Map 3 shows, McDowell’s participation rate is at the bottom of the scale. This is a condition many coalfield counties face, but McDowell County is especially concerning. According to the ACS, only 30% of McDowell County adults are in the labor force. Of the 18,000 citizens over 16 years of age, almost 13,000 are not only unemployed, but they have stopped looking for work.⁵ Unemployment was decreasing until the recession in 2008 and natural resource sector cost cutting. (Figure 6). As mentioned previously, unemployment only deals with adults in the labor force, and does not fully reflect the number of adults not working. Map 4 provides 2011 unemployment rates for McDowell compared with the rest of the State.

Figure 2

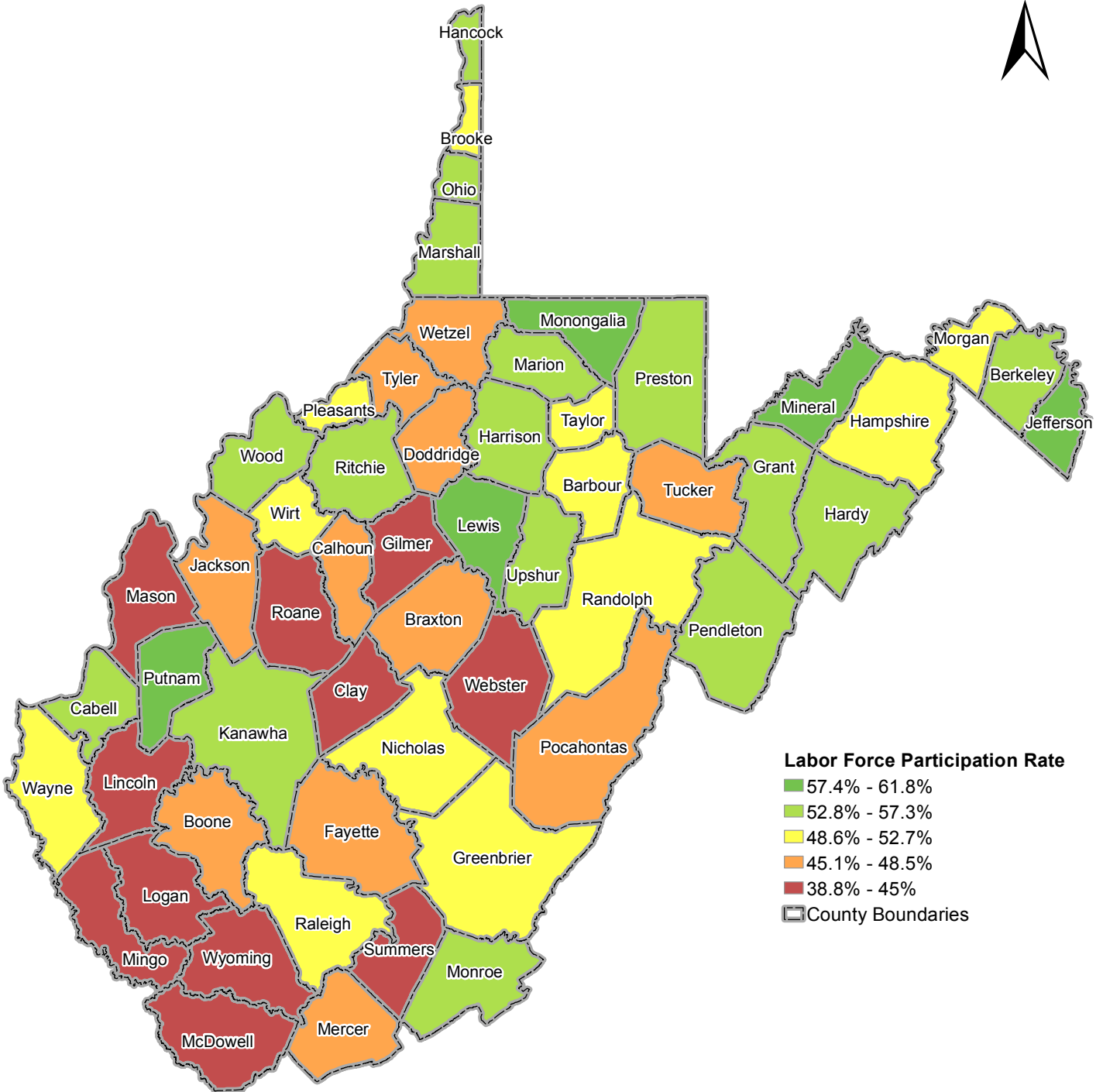


Source: Workforce WV

⁵ United States Census Bureau, “2011 American Community Survey 5-year Estimates,” Accessed April 20, 2013, www.factfinder2.census.gov

Demographic

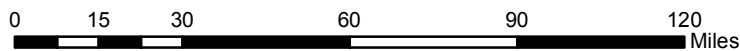
Labor Force Participation Rate



Labor Force Participation Rate

- 57.4% - 61.8%
- 52.8% - 57.3%
- 48.6% - 52.7%
- 45.1% - 48.5%
- 38.8% - 45%

□ County Boundaries



Source: United States Census Bureau 2011

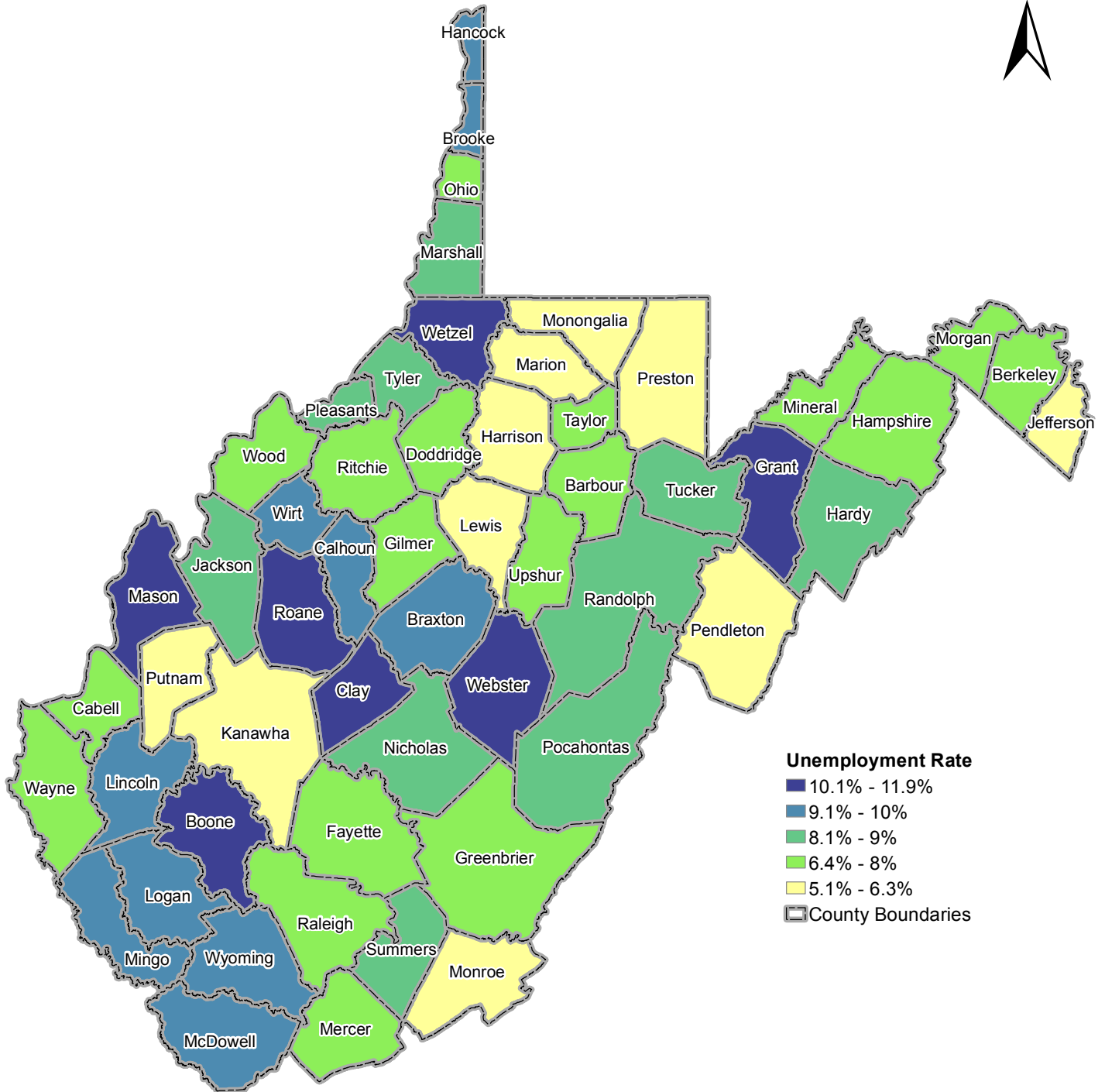
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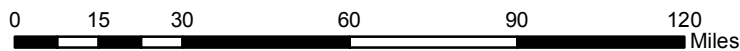


www.njrati.org

Demographic Unemployment Rate



Unemployment Rate
 ■ 10.1% - 11.9%
 ■ 9.1% - 10%
 ■ 8.1% - 9%
 ■ 6.4% - 8%
 ■ 5.1% - 6.3%
 □ County Boundaries



Source: United States Census Bureau 2011

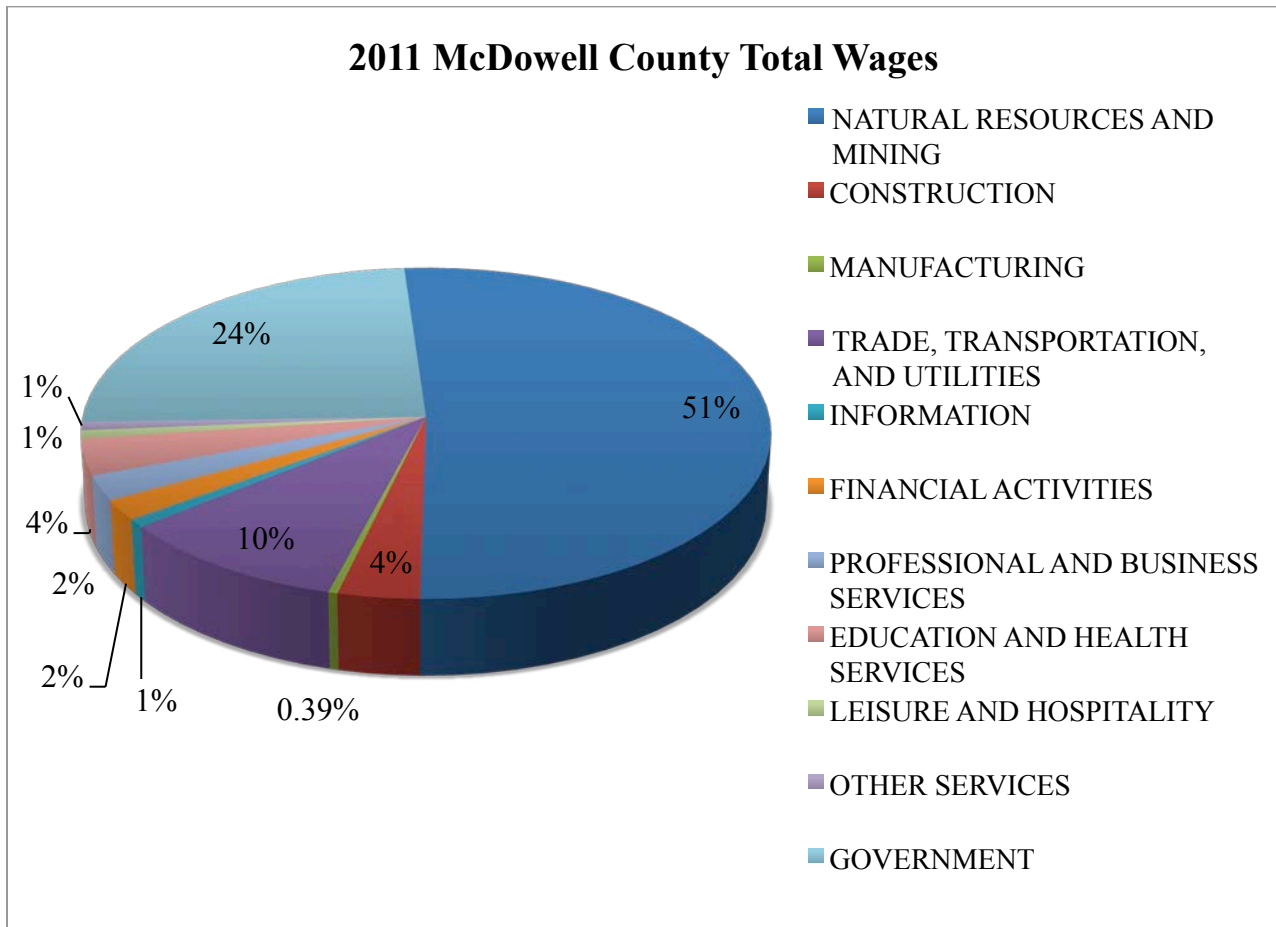
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Wages and Income

McDowell County's wage contributors are not varied. The highest, Natural Resources and Mining, makes up just over half of the total wages of McDowell County (Figure 7). Government is next because of the sheer size of the sector in the county, and Trade, Transportation, and Utilities makes up a tenth of wage contributions.

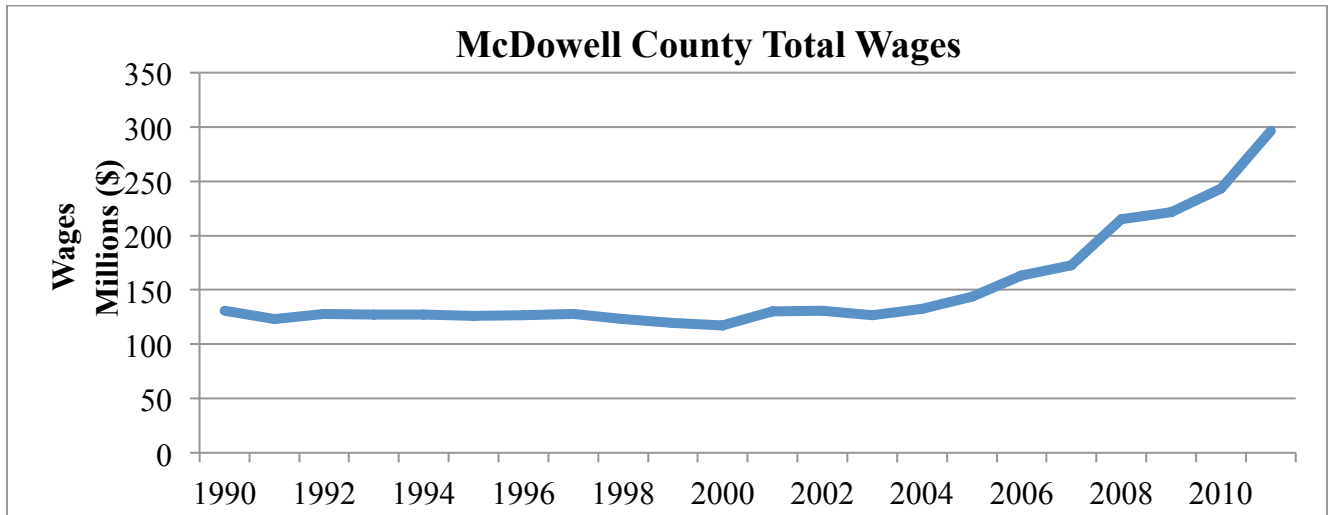
Figure 7



Source: Workforce WV

Historically, wages for McDowell County have shown little to no variation. Figure 8 shows total wages for McDowell County, which have recently shown an upward trajectory. Recession-endurable government jobs make up so much of the McDowell County portfolio that this outcome is mostly to be expected. However, such a situation is not inherently sustainable, as it is based on two very finite resources: resources to mine, and political acceptance of government spending. Also, the increasing wages only account for those employed, which is a small percentage of the total population in the case of McDowell County

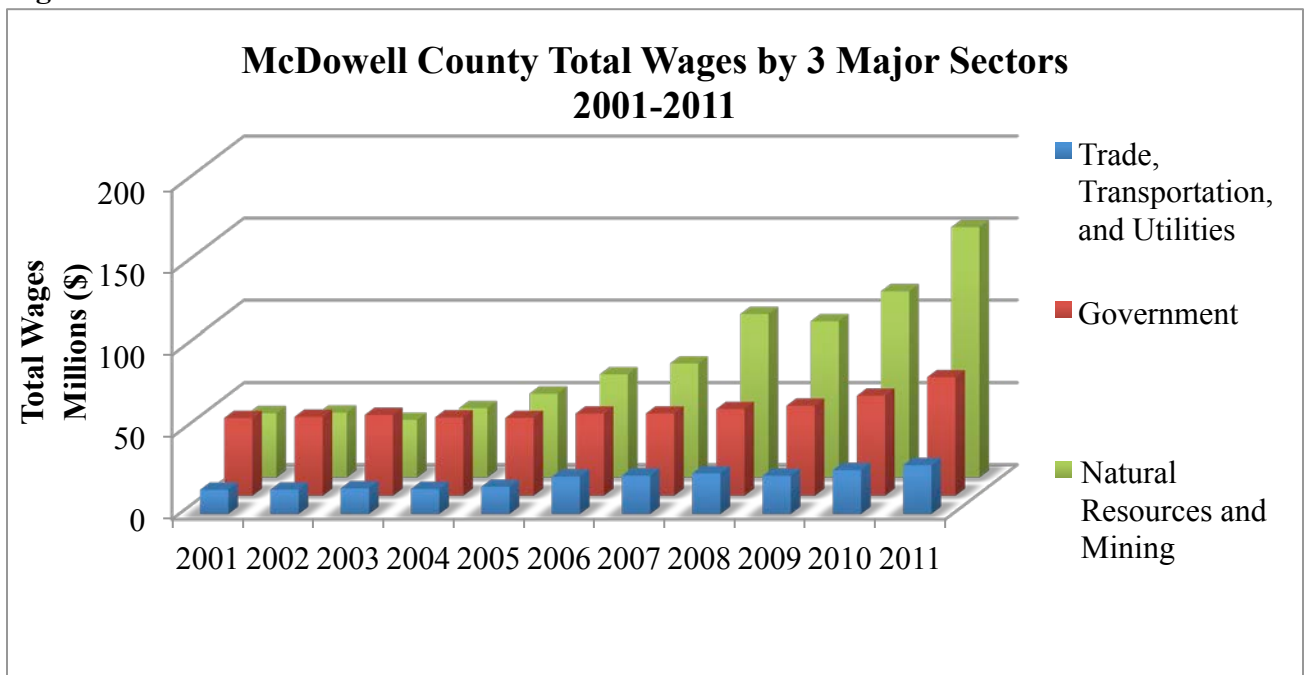
Figure 8



Source: Workforce WV

Figure 9 confirms the general trend in wages, also showcasing the dominance of two major sectors. Government has always been a major sector in McDowell, but around 2005 the expansion of coal mining, and the wages that come with it, becomes apparent.

Figure 9

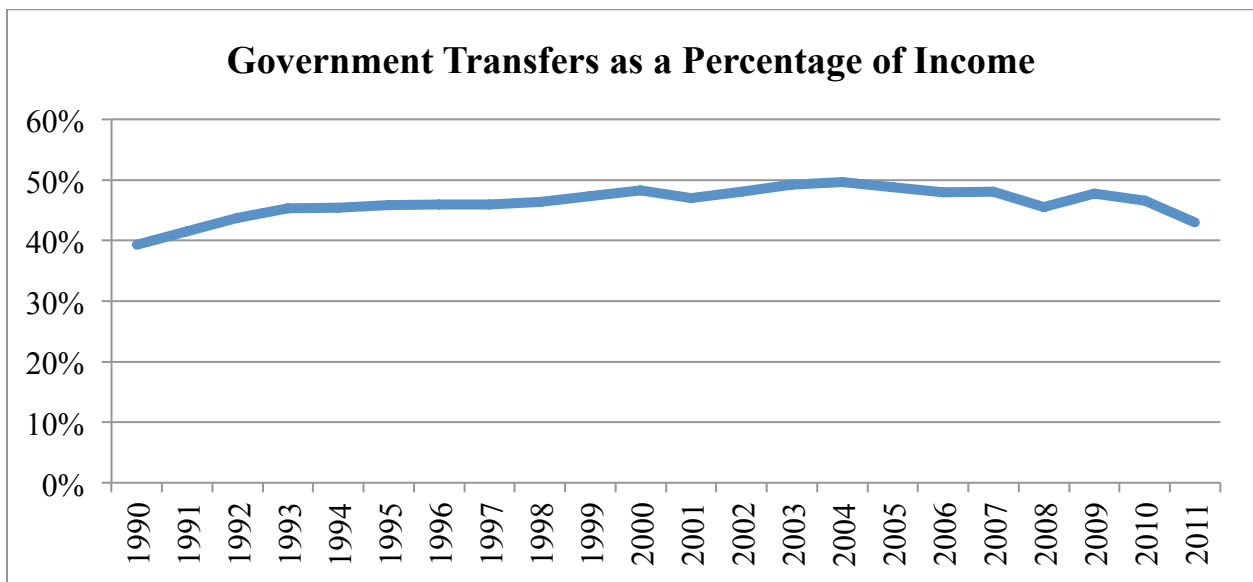


Source: Workforce WV

In most American counties, one would find that the majority of income for people stems from wages. In McDowell 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. For example, dividends from stockholdings are considered income, but not wages. The distinction is necessary in the case of McDowell County because in 2011, McDowell County wages were \$300 million for all industries.⁶ Income for the County was larger (around \$600 million). Though there are many components to income other than work earnings, 43 percent of total McDowell County income is derived from government transfers.⁷ Government transfers accounted for about 95 percent of total transfers to McDowell County, dwarfing transfers from private institutions such as charities. McDowell County has depended heavily on government transfers for the past 30 years, more so than most others, with said transfers consistently contributing about half of county income. This does not count the wages for government workers.

Figure 10



Source: United States Bureau of Economic Analysis

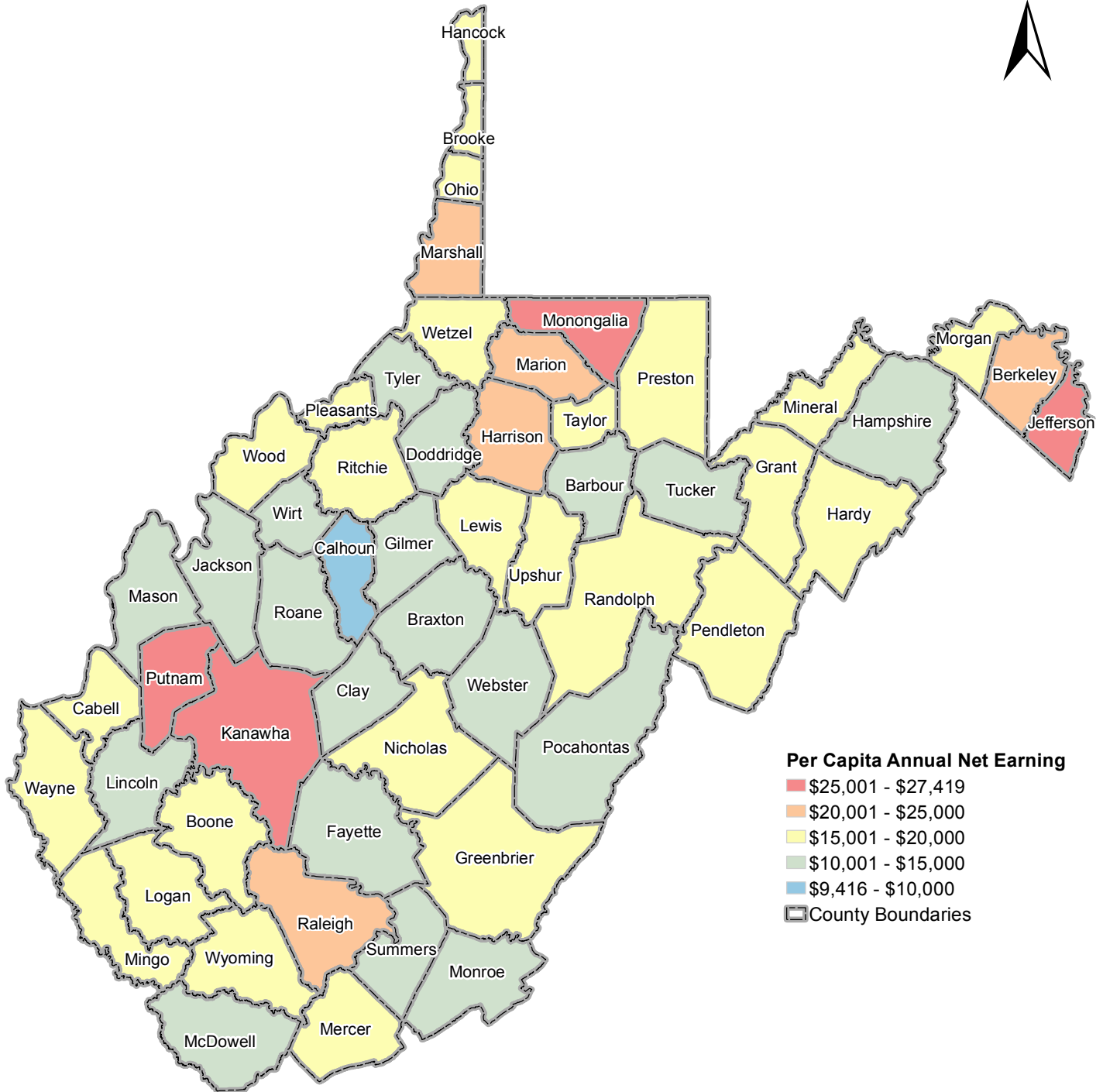
The total personal income of McDowell County is therefore made up of about half government transfers and half wages from work. McDowell County has the highest ratio of government transfers in the state; closely followed by Summers, Calhoun, and Webster Counties. According to the BEA, per capita income was \$27,360 for McDowell County. Earned income, or income from work, is displayed in Map 5, and McDowell is ranked low in earned income in West Virginia.

⁶ “Employment and Wages – 2011, McDowell County,” Workforce WV, Accessed February 13, 2013, <http://www.workforcewv.org/lmi/EW2011/ew11x059.htm>

⁷ “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>.

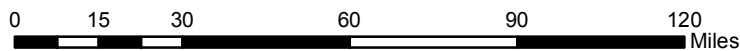
Demographic

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



Source: United States Census Bureau 2011

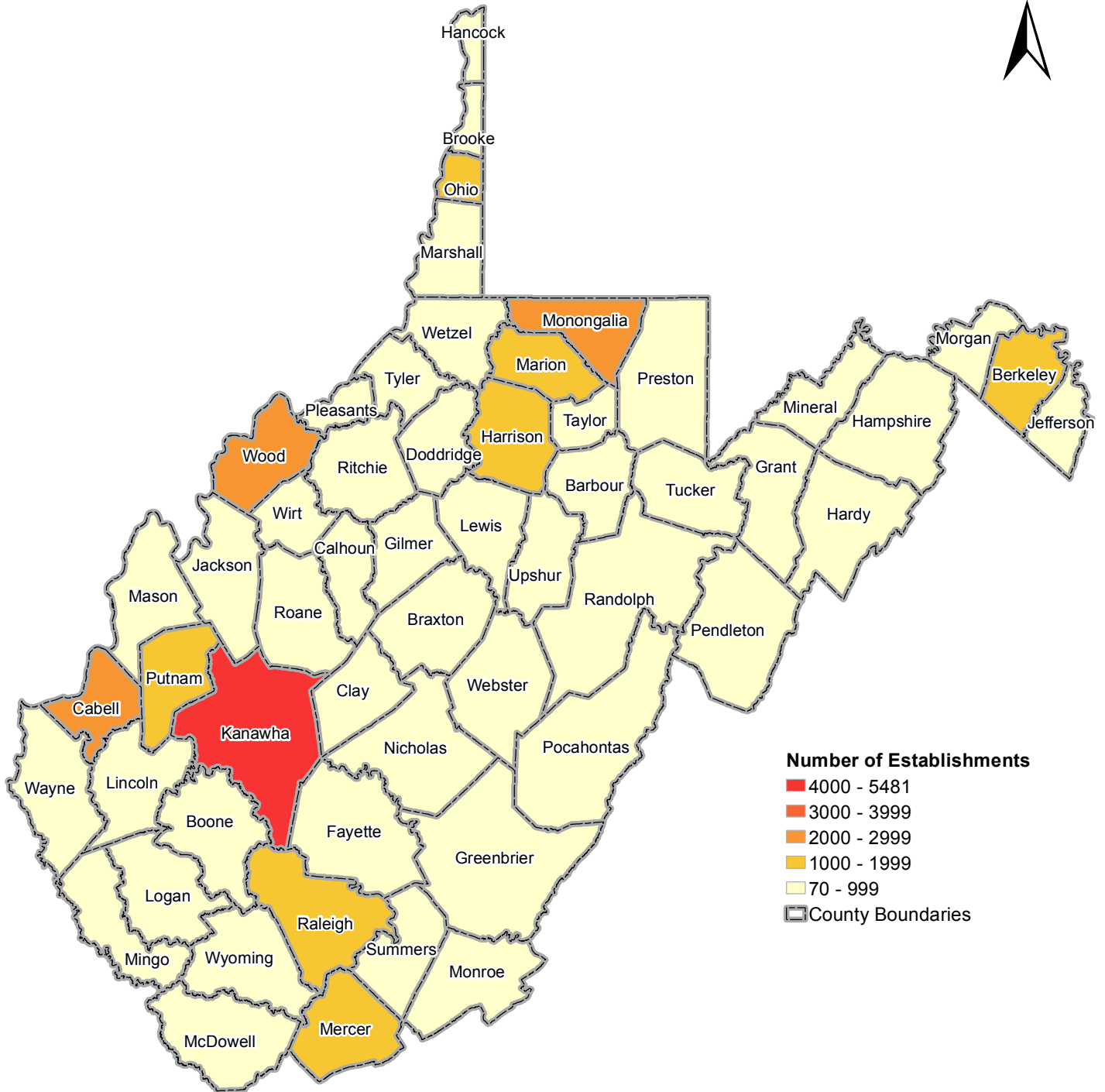
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Another measure of economic health is the number of establishments that do business in the area. Map 6 shows the number of establishments in each county in West Virginia. McDowell County appears to be at the lowest end of the spectrum. The number of establishments may be misleading, as the natural resources sector and government services are characterized by a small number of firms, or could characterize the dearth of economic activity in the county.

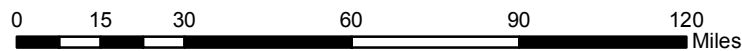
Demographic

Number of Establishments



Number of Establishments

- 4000 - 5481
- 3000 - 3999
- 2000 - 2999
- 1000 - 1999
- 70 - 999
- County Boundaries



Source: United States Census Bureau 2011

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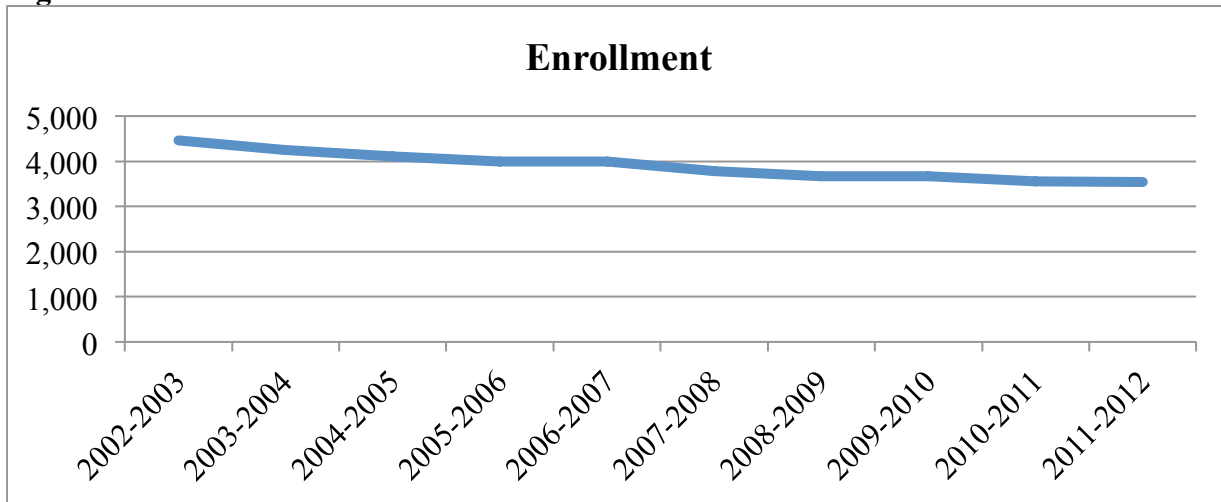


Education

McDowell County has two high schools, one middle school, six elementary schools, and one K-8 school as of the 2012-2013 school year.⁸ The public schools have been under state control since 2001.

McDowell County 2nd month school enrollment has steadily declined, reflecting the steady decline in population. McDowell 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

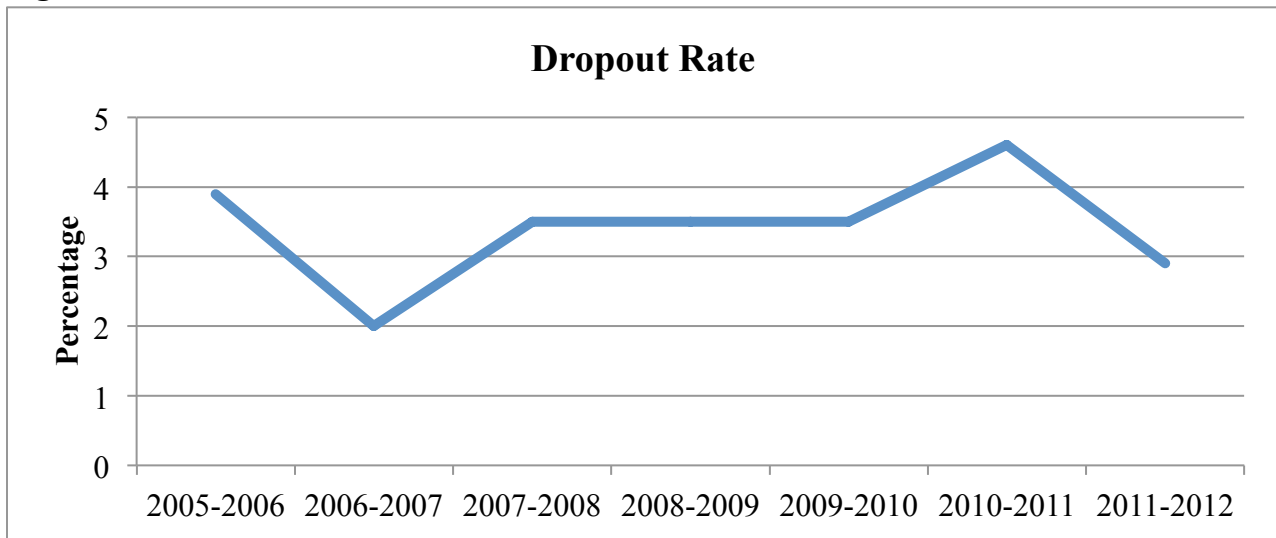


Source: WVEIS

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. Dropout rates are mostly patternless, with sharp drops and rises in the 2006-2007 and 2010-2011 years. (Figure 12). McDowell County currently has a higher dropout rate than many other West Virginia counties. This could be due to many different factors, including loss of interest and hope among youth, lack of apparent opportunities, and family issues.

⁸ "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=043.

Figure 12

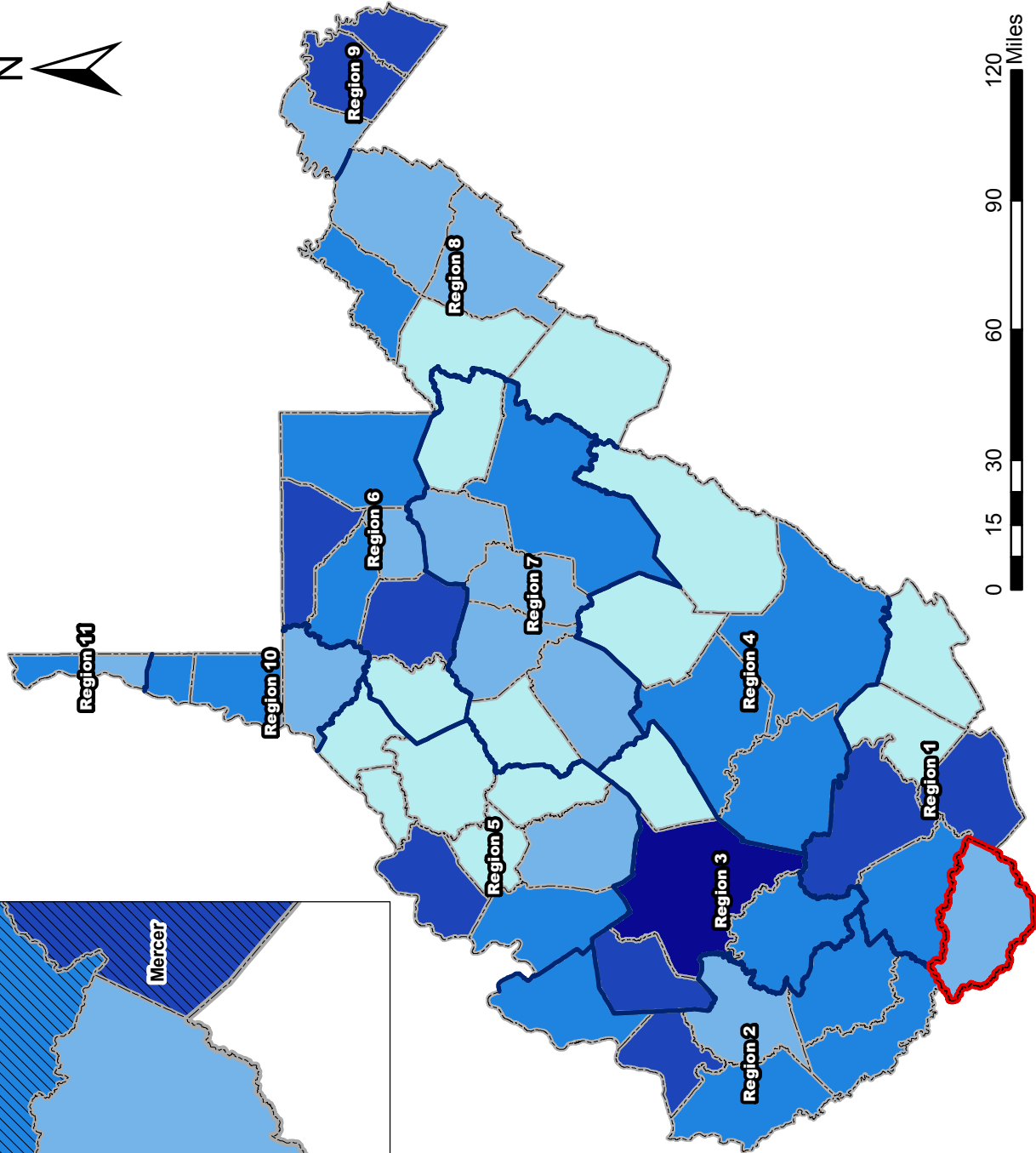
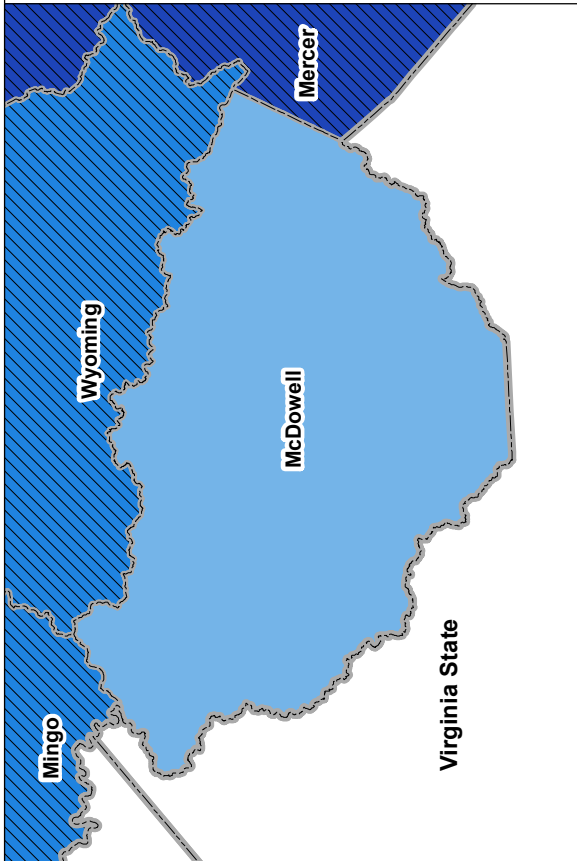


Source: WVEIS

Map 8 shows each county's dropout rate. Maps 9 and 10 show the total graduates and the graduation rate by county. The number of graduates in McDowell County is slightly higher than those of the counties in the north-central area of West Virginia. McDowell County's largest schools are located on the main roads of the County; their locations are noted in Map 11. The largest school by attendance in the county is Mount View High School. The significance of the locations of these schools is the access to major transportation routes. The schools appear to be built in order for parents and students to maintain steady access, which is important to discourage dropping out and to maintain attendance levels.

NCLB - Second Month Enrollment

McDowell County



- Planning Regions Line
- 943 - 2071
- 2072 - 3867
- 3868 - 8104
- 8105 - 17721
- 17722 - 28458
- County Boundaries

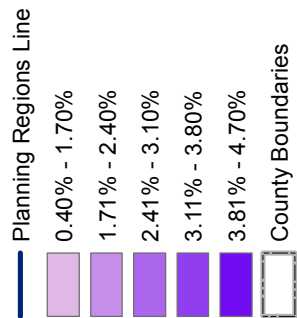
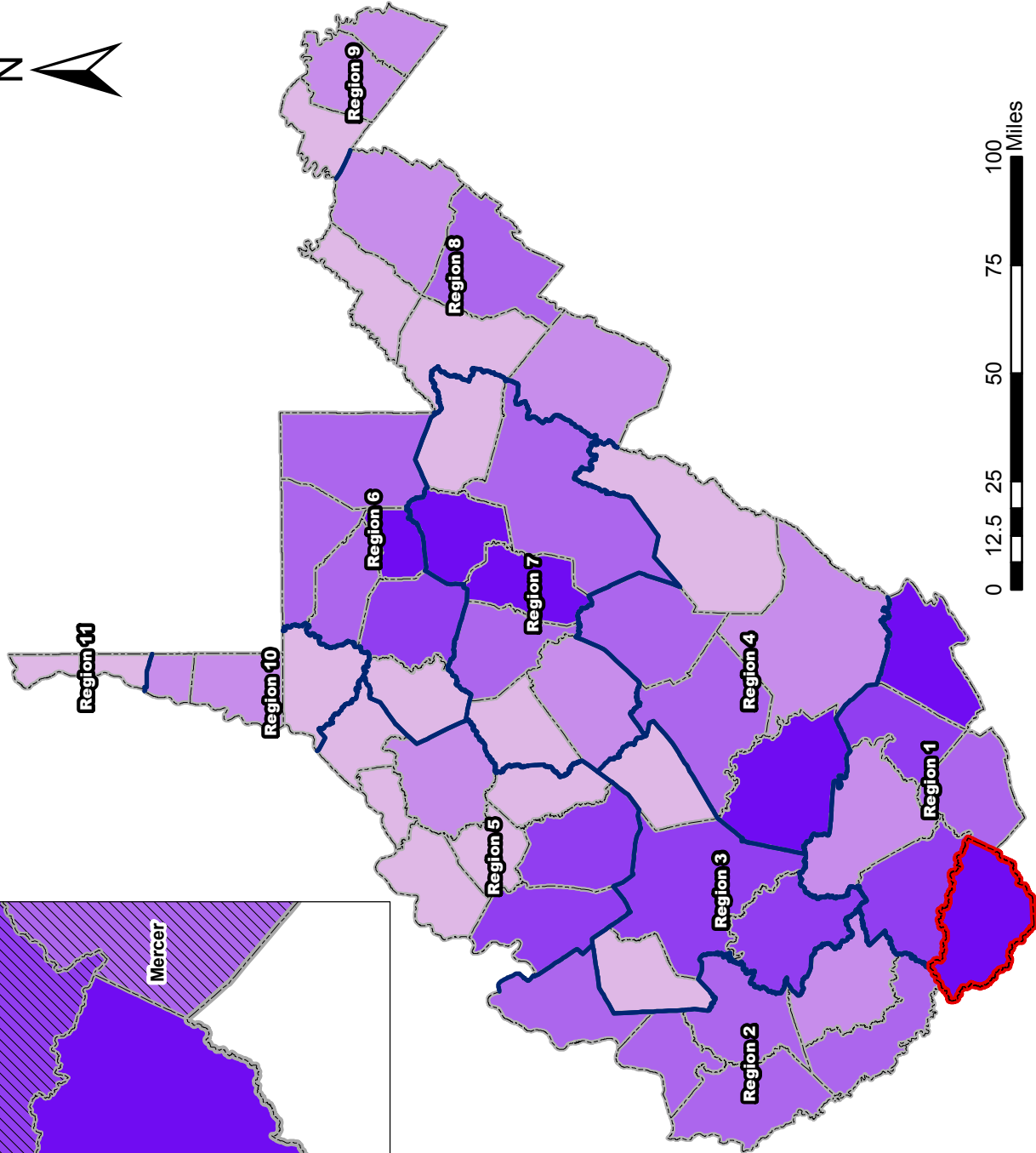
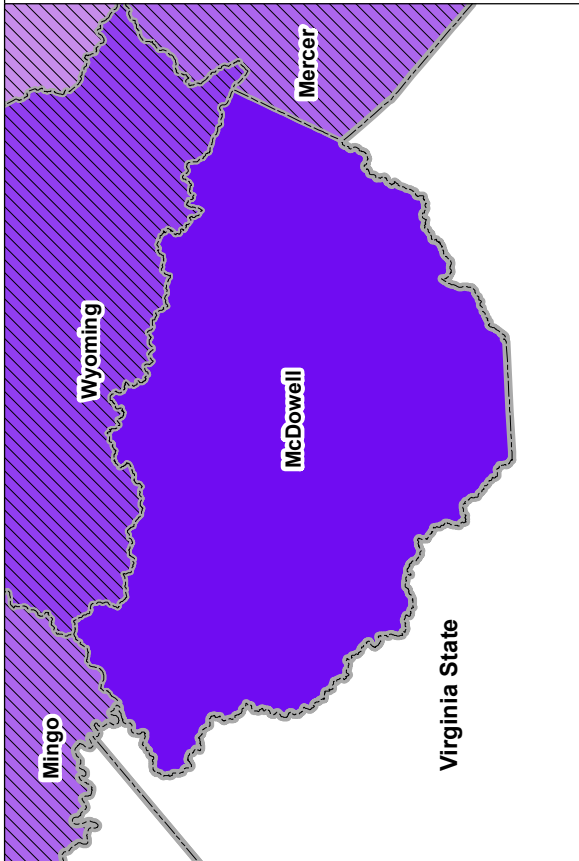
Source: West Virginia Department of Education 2012

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NCLB - Dropout Rate

McDowell County



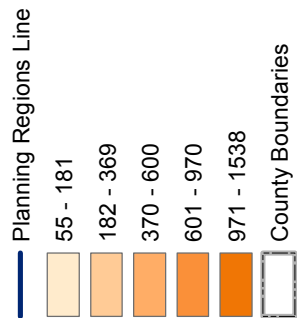
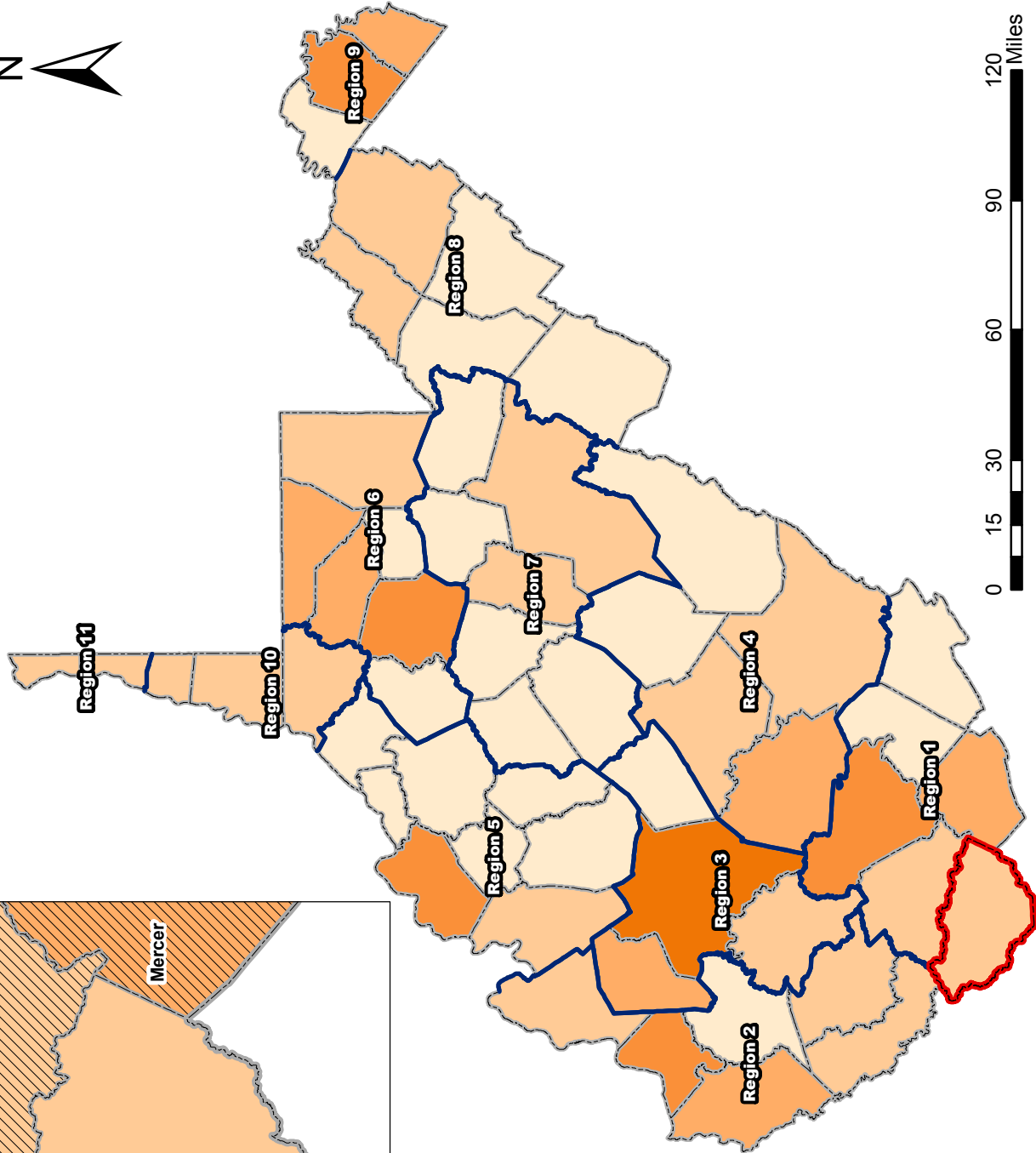
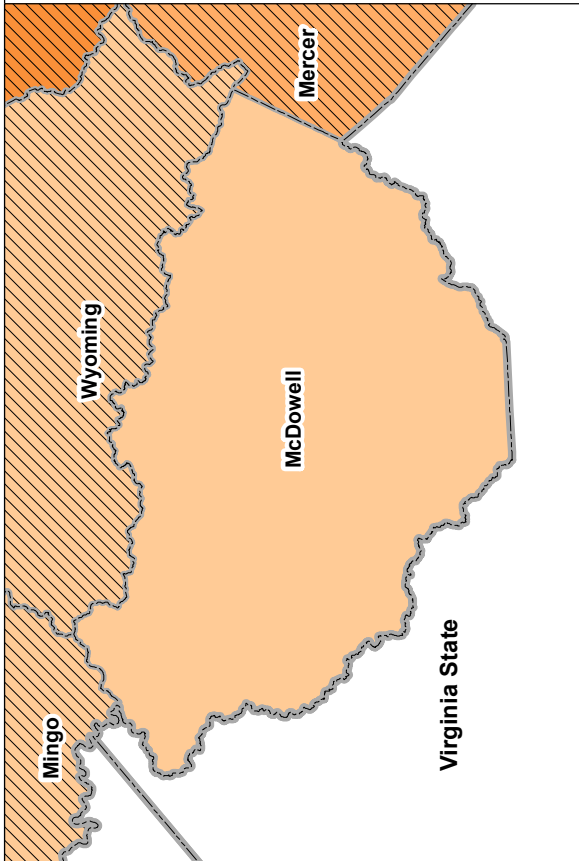
Source: West Virginia Department of Education 2012

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NCLB - Total Graduates

McDowell County



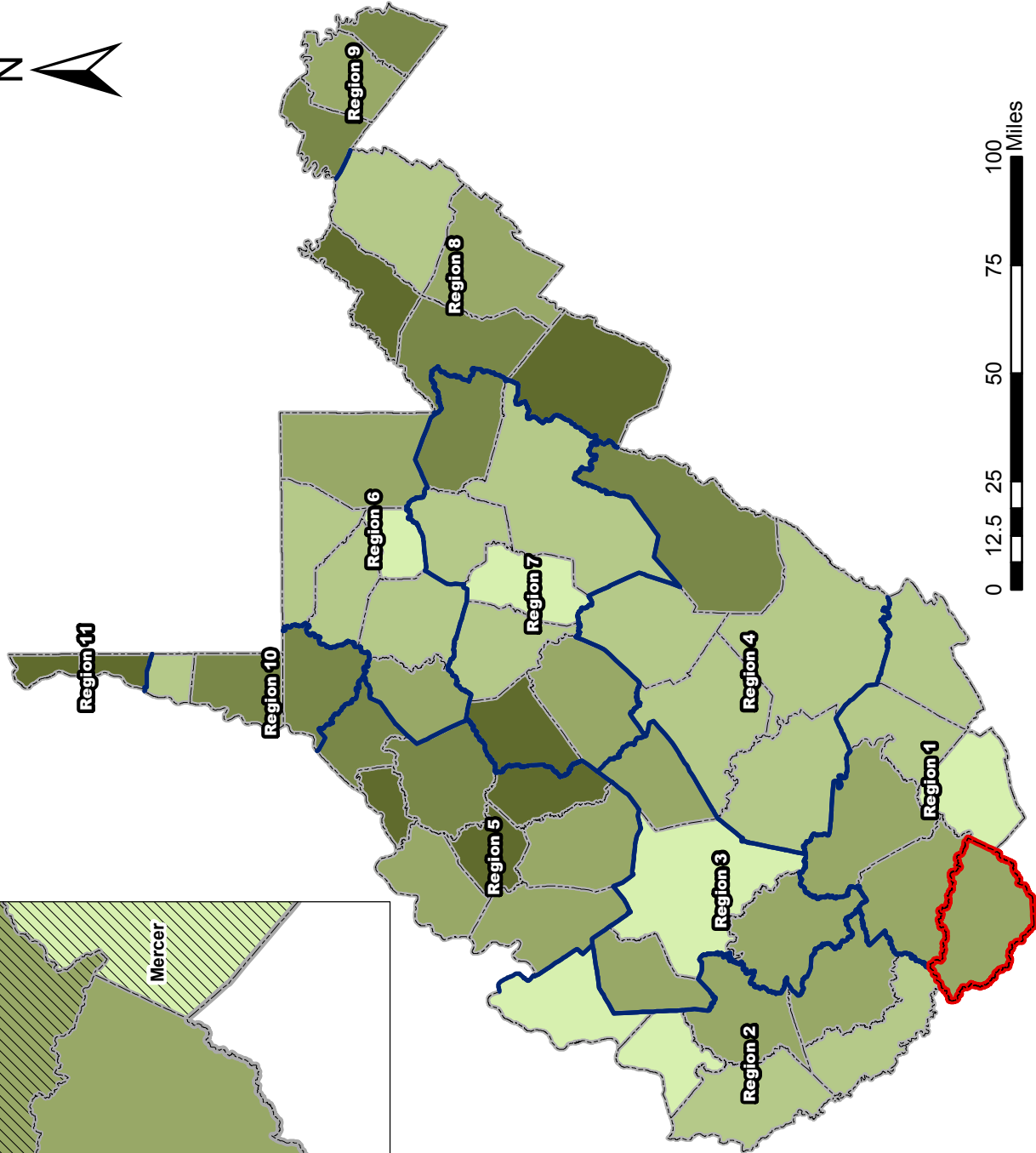
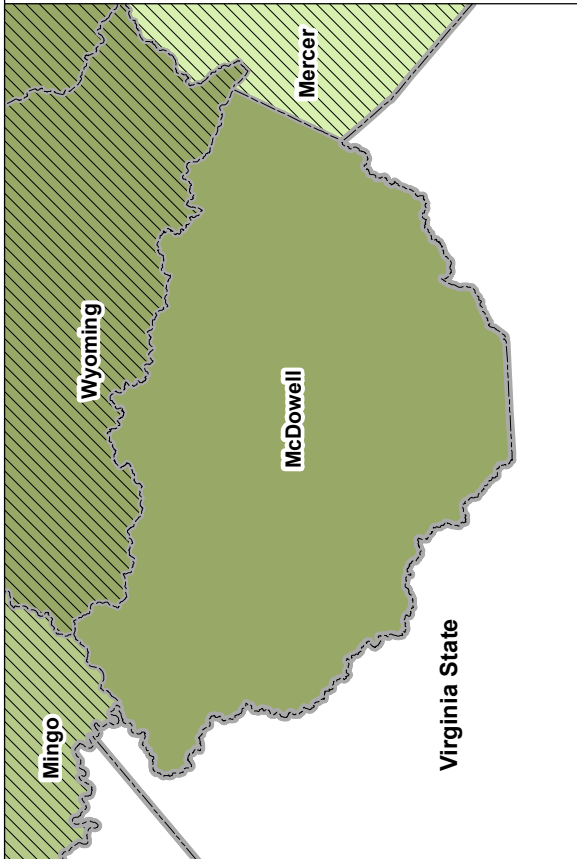
Source: West Virginia Division of Natural Resources, Statewide Addressing and Mapping 2008

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NCLB - Graduates Rate

McDowell 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

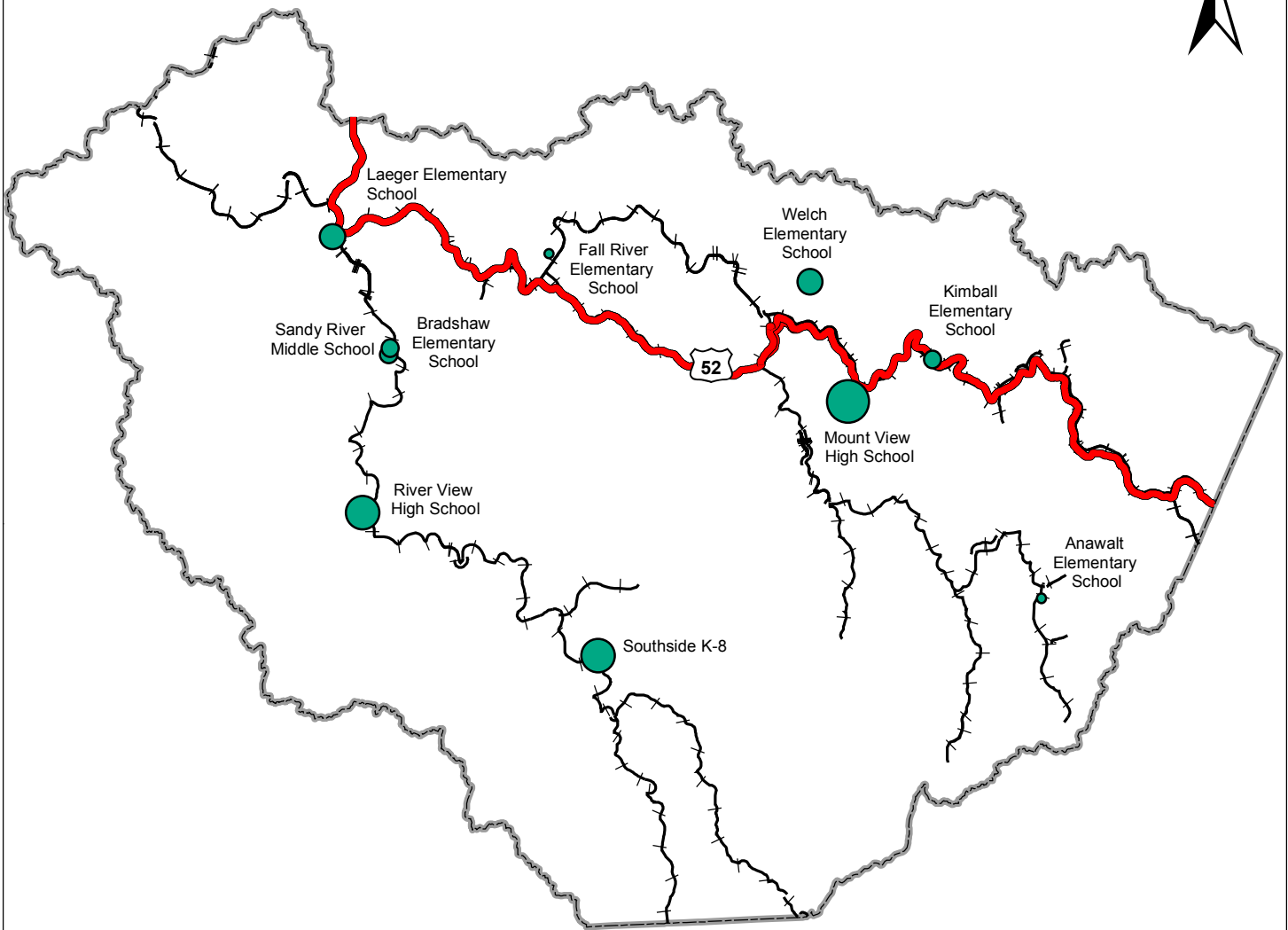
Source: West Virginia Division of Natural Resources, Statewide Addressing and Mapping 2008

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Total Attendance by School - 2012

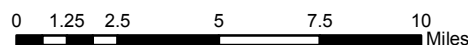
McDowell County



Enrollment by School

-  113 - 157
-  158 - 274
-  275 - 337
-  338 - 533
-  534 - 805

-  US Routes
-  Railroads
-  County Boundary



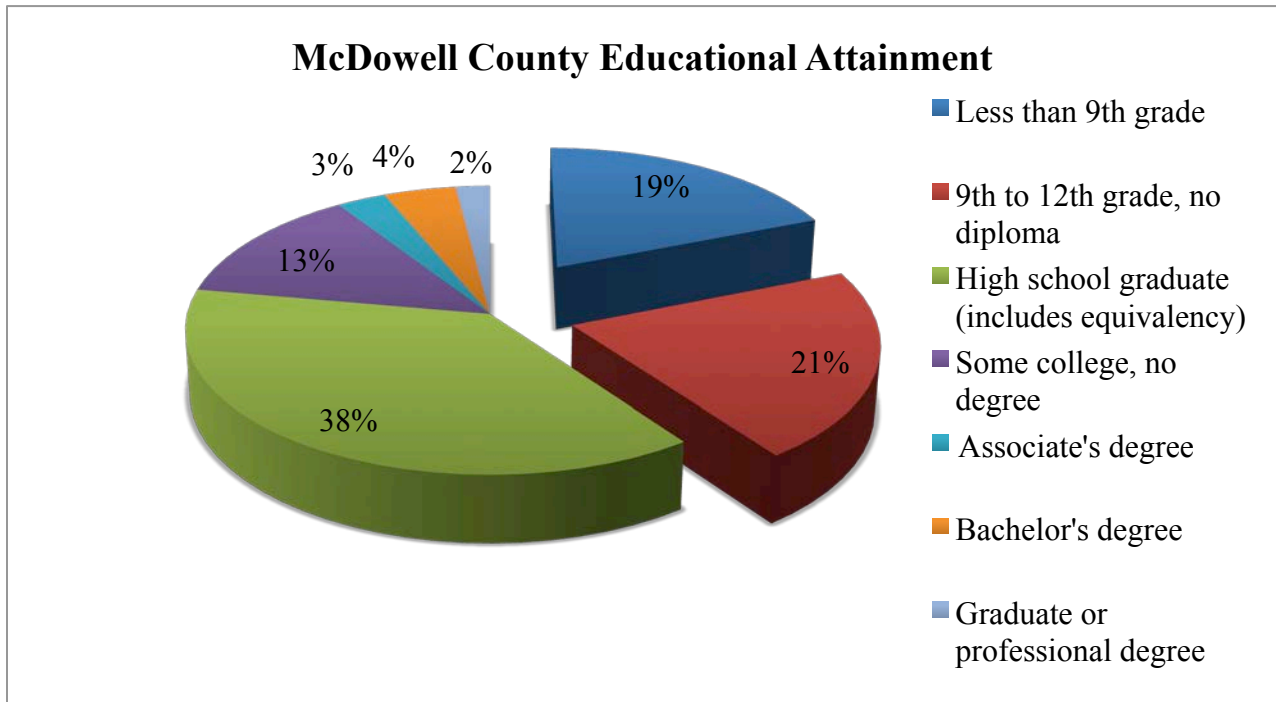
Source: West Virginia Department of Education 2012

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The ACS also maintains data on the educational attainment of the population that is 25 years and over. Forty percent have less than a high school diploma. This is a rather high number and particularly concerning when the relationship between education and jobs is considered.

Figure 13



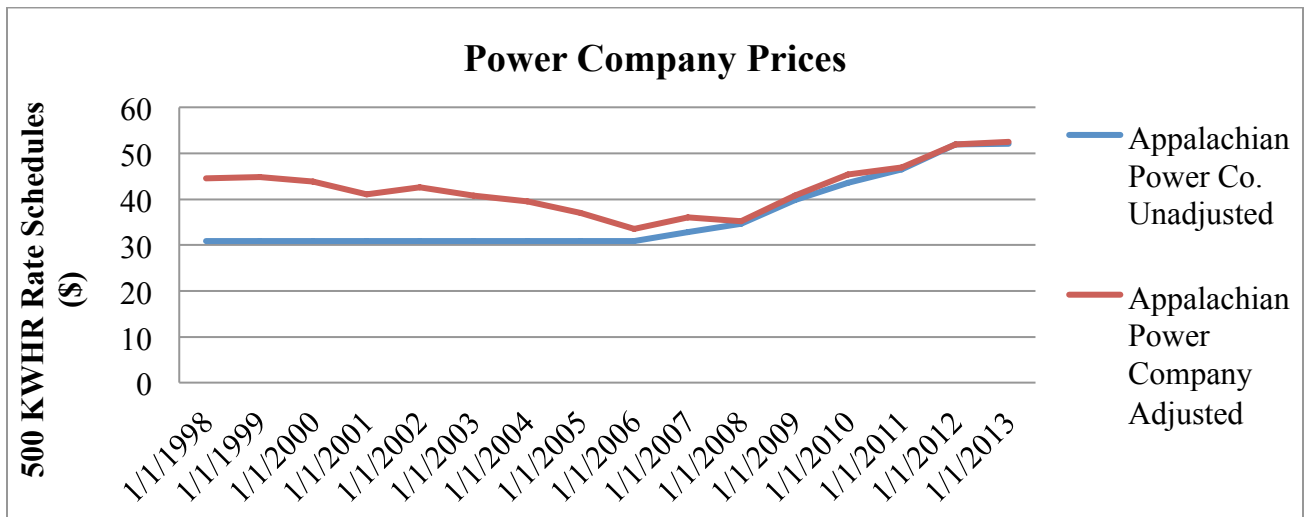
Source: 2011 American Community Survey 5-Year Estimates

Utilities and Infrastructure

McDowell County has 27 utility companies according to the West Virginia Public Service Commission (PSC). Economic development depends on infrastructure, and McDowell County has several providers of water and sewer, and one provider of electricity. Appalachian Power Company (American Electric Power) provides residential, industrial, and large-capacity service to McDowell 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 not 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 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. Map 12 also shows the distribution of power lines, plants, and substations within West Virginia and McDowell County.

The two other utilities of particular importance are water and sewer. Table 1 displays water and sewer metered rates for the providers of those services. They are all public services with varying rates and categories. McDowell County has 13 public 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 now closed one located in McDowell, as well as the operational landfill.

Table 1: McDowell County Water and Sewer Rates

McDowell County Public Service District	
Water Rates	
First 2000 gallons used per month	13.42 per 1000 gallons
Over 2000 gallons used per month	12.75 per 1000 gallons
City of Welch	
Water Rates	
First 3000 gallons used per month	7.50 per 1000 gallons
Next 7000 gallons used per month	7.00 per 1000 gallons
Next 190000 gallons used per month	5.00 per 1000 gallons
All Over 200000 gallons used per month	3.75 per 1000 gallons
Next 9000 gallons used per month	3.94 per 1000 gallons

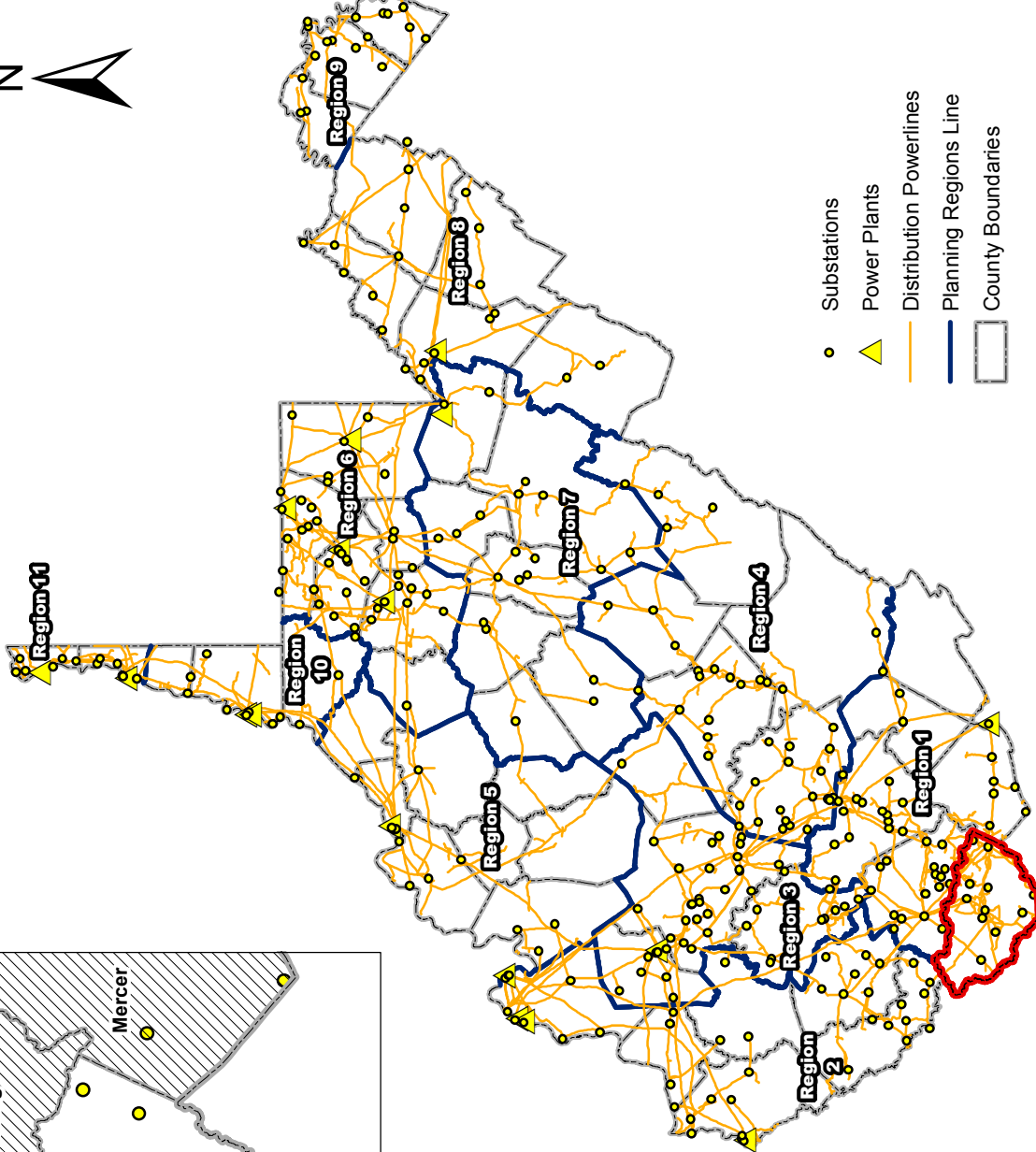
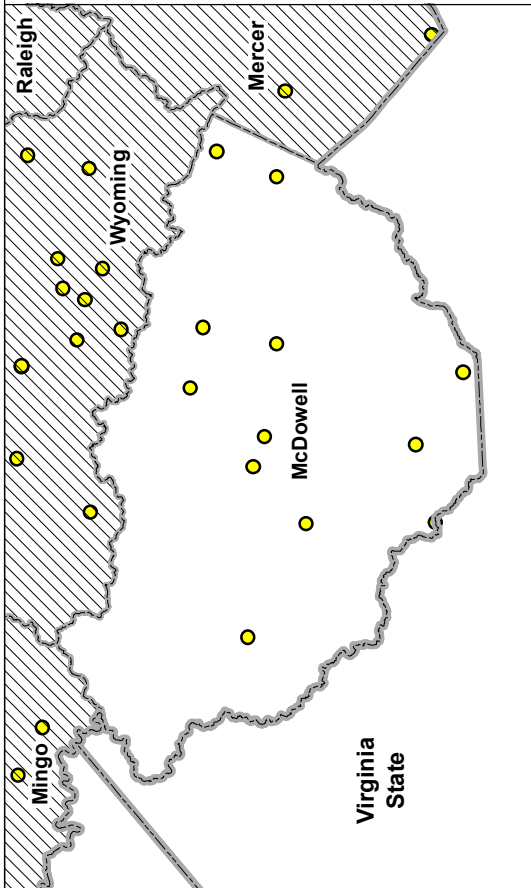
Sewer Rates	
First 10000 gallons used per month	9.00 per 1000 gallons
Next 40000 gallons used per month	7.00 per 1000 gallons
Next 200000 gallons used per month	7.00 per 1000 gallons
All Over 250000 gallons used per month	7.00 per 1000 gallons
City of Gary	
Water Rates	
All amounts used per month	8.12 per 1000 gallons
Sewer Rates	
All amounts used per month	4.06 per 1000 gallons
City of War	
Water Rates (upon completion of case no. 12-0333-W-CN)	
First 2000 gallons used per month	12.75 per 1000 gallons
Next 8000 gallons used per month	9.28 per 1000 gallons
Next 30000 gallons used per month	5.04 per 1000 gallons
Next 60000 gallons used per month	4.74 per 1000 gallons
All Over 100000 gallons used per month	4.42 per 1000 gallons
Sewer Rates	
First 2000 gallons used per month	13.30 per 1000 gallons
Next 3000 gallons used per month	9.35 per 1000 gallons
Next 5000 gallons used per month	8.25 per 1000 gallons
Next 30000 gallons used per month	7.25 per 1000 gallons
Next 60000 gallons used per month	7.00 per 1000 gallons
All Over 100000 gallons used per month	4.17 per 1000 gallons
City of Keystone	
Water Rates	
First 3000 gallons used per month	6.75 per 1000 gallons
Next 7000 gallons used per month	2.00 per 1000 gallons
Over 10000 gallons used per month	1.00 per 1000 gallons
Town of Bradshaw	
Water Rates	
First 4500 gallons used per month	16.05 per 1000 gallons
Next 5000 gallons used per month	3.75 per 1000 gallons
Next 15000 gallons used per month	3.00 per 1000 gallons
Next 30000 gallons used per month	2.75 per 1000 gallons
Next 60000 gallons used per month	2.25 per 1000 gallons
All Over 100000 gallons used per month	.50 per 1000 gallons
Sewer Rates	
General Customer	32.44 per month
Junior High School	119.44 per month
Elementary School	89.58 per month
Laundromat	119.44 per month

Town of Davy		
Water Rates		
First 3000 gallons used per month	32.00 for 0-3000 gallons	
Over 3000 gallons used per month	10.00 per 1000 gallons	
Town of Northfork		
Water Rates		
	Residential	Commercial
First 3000 gallons used per month	9.50 per 1000 gallons	11.00 per 1000 gallons
Next 3000 gallons used per month	1.50 per 1000 gallons	
Next 4000 gallons used per month	1.20 per 1000 gallons	
All Over 10000 gallons used per month	1.00 per 1000 gallons	

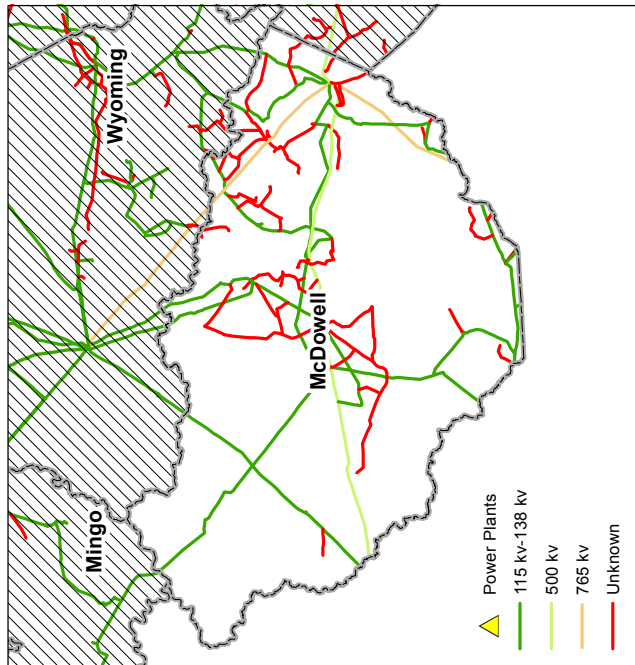
A private water company, Hampton Roads Water System, also services McDowell County, and charges a flat rate of \$10 per customer per month. Two water associations serve smaller areas of the county as well: Crumpler Community Water Association, Inc. services Crumpler and charges a flat rate of \$45 per customer per quarter, and O'Toole Water Association, Inc. charges a flat rate of \$15 per month. A sewer and water system is operated by Ashland Community Utility Company, but no rate information is found with the Public Service Commission.

Utilities - Electricity

McDowell County



● Electricity Substations



▲ Power Plants
 115 kv-138 kv
 500 kv
 765 kv
 Unknown

● Substations
 ▲ Power Plants
 — Distribution Powerlines
 — Planning Regions Line
 □ County Boundaries



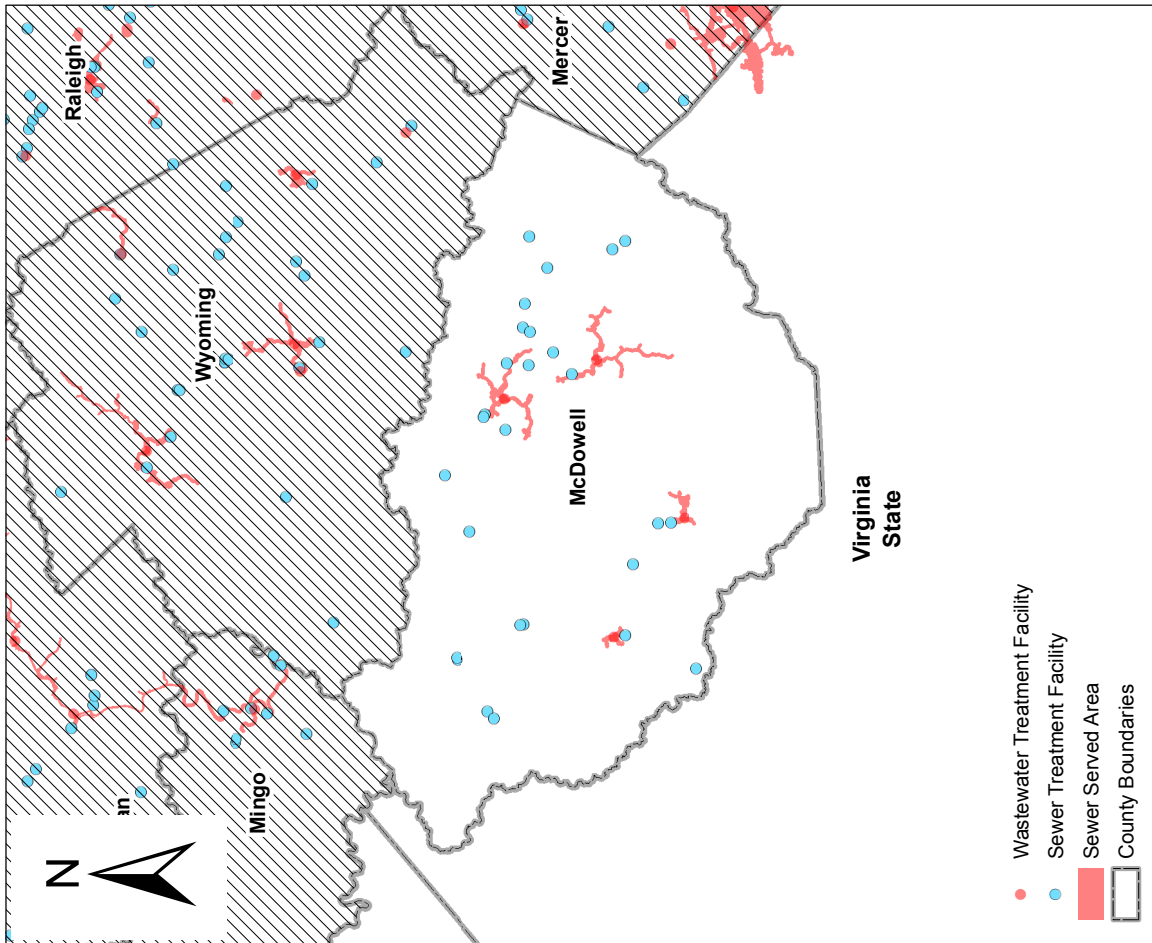
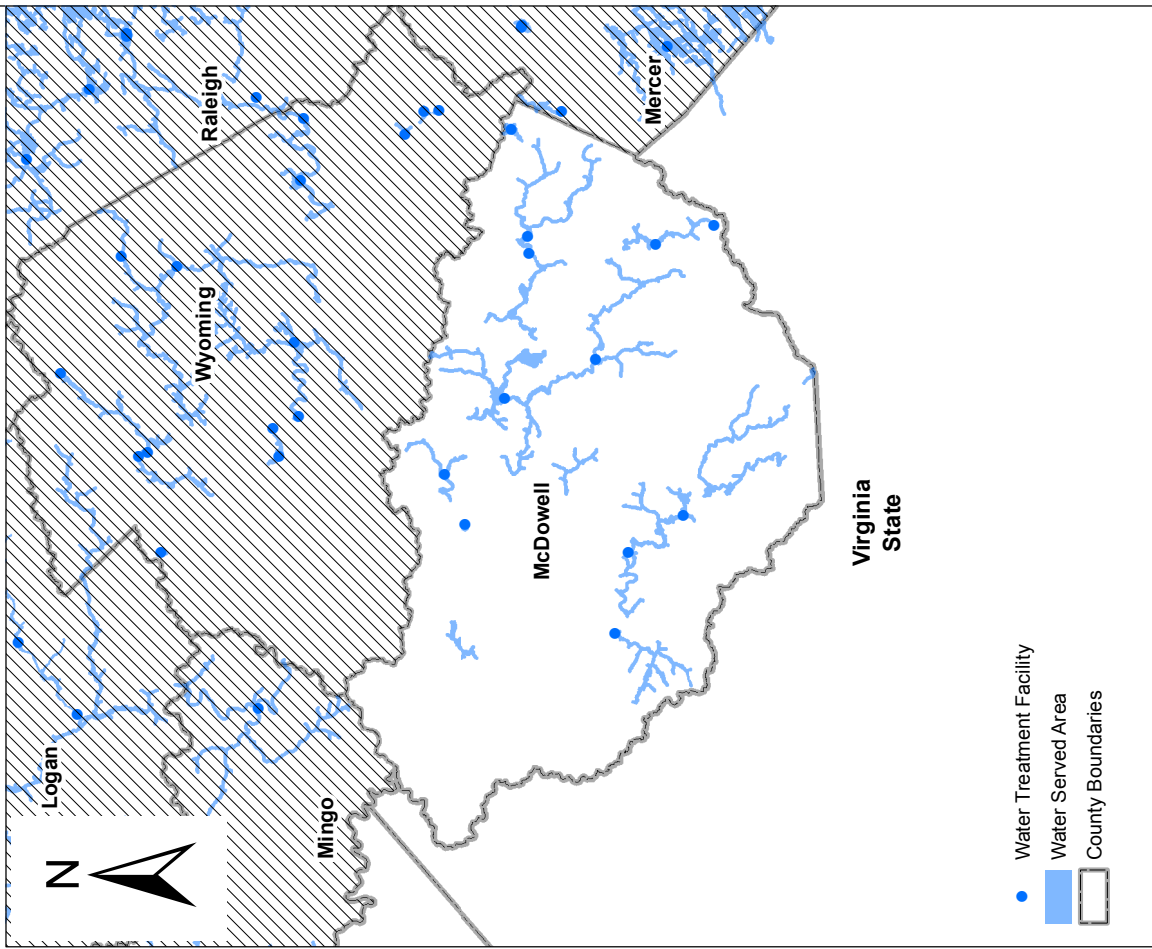
Source: West Virginia Division of Natural Resources, Statewide Addressing and Mapping 2008

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Utilities - Water and Sewer

McDowell County



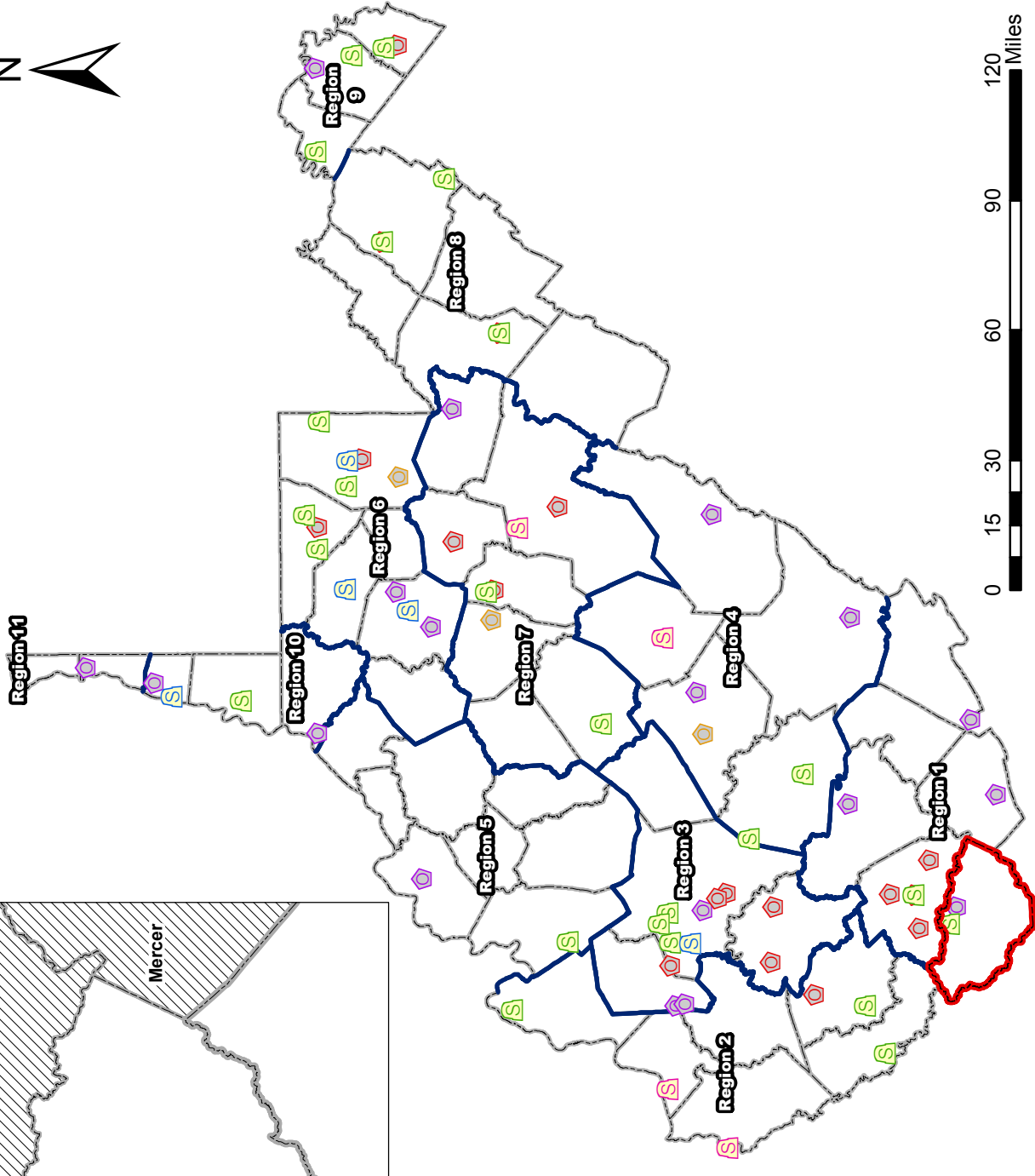
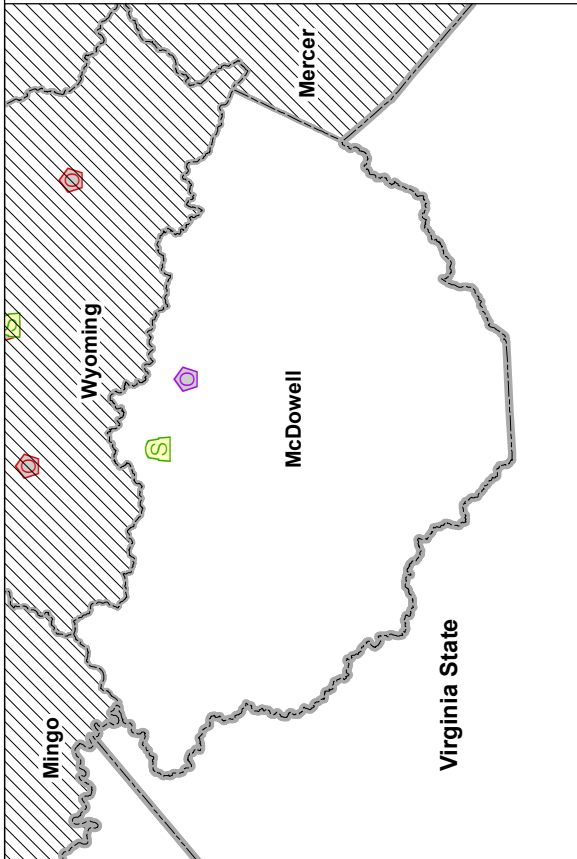
Source: West Virginia Infrastructure and Jobs Development Council N.A.

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Utility - Solid Waste Facility






McDowell County



Non Operational Facility

-  Post-closure status
-  Closure status
-  A non LCAP** facility

Operational Facility

-  Operational landfill
-  Solid waste transfer station
-  operational tire monofill
-  Planning Regions Line
-  County Boundaries

** Landfill Closure Assistance Program

Source: West Virginia Solid Waste Management Board 2012

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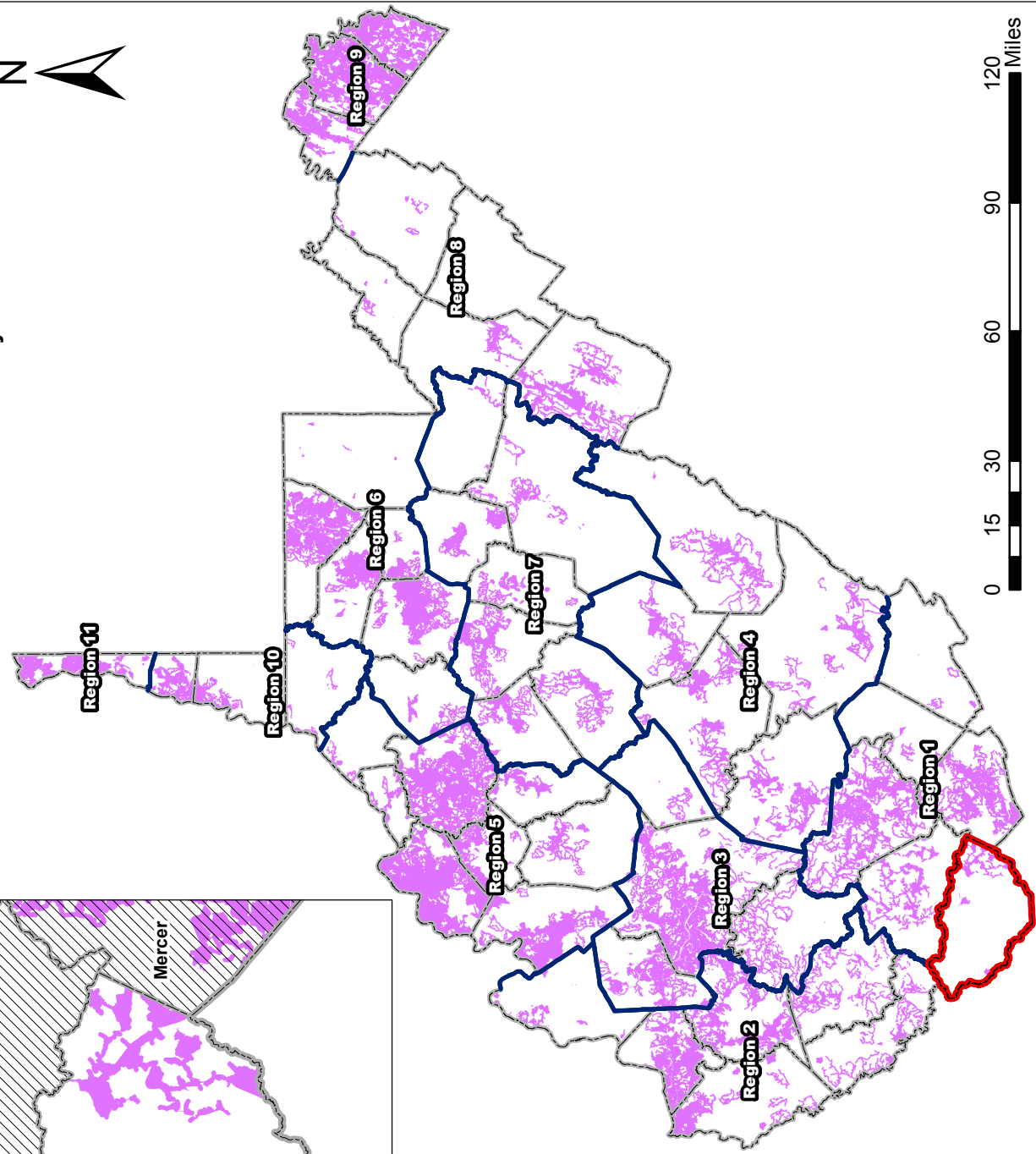
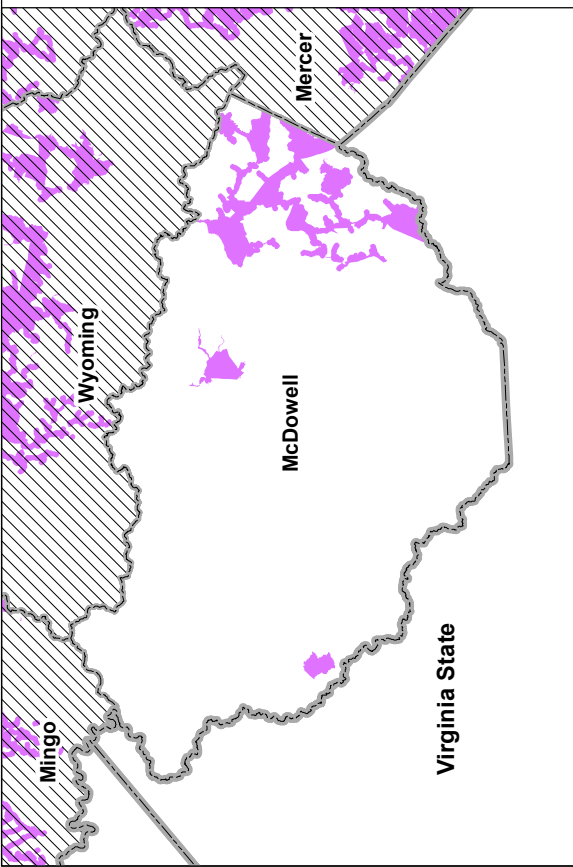
One essential modern convenience, now widely understood as an essential utility in a globalized world, is broadband access. The following 11 maps demonstrate McDowell County's broadband infrastructure in relation to the State's. The largest number of providers in McDowell County is 3 in Welch. McDowell County broadband infrastructure closely resembles the other coalfield counties rather than neighboring Mercer. Of particular note is the distinct lack of fixed wireless, the connection of two fixed points wirelessly by radio or other links, and the rather large swaths of area without broadband coverage.




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 show 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 McDowell 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

McDowell County



-  Planning Regions Line
-  Cable and FTTP
-  County Boundaries

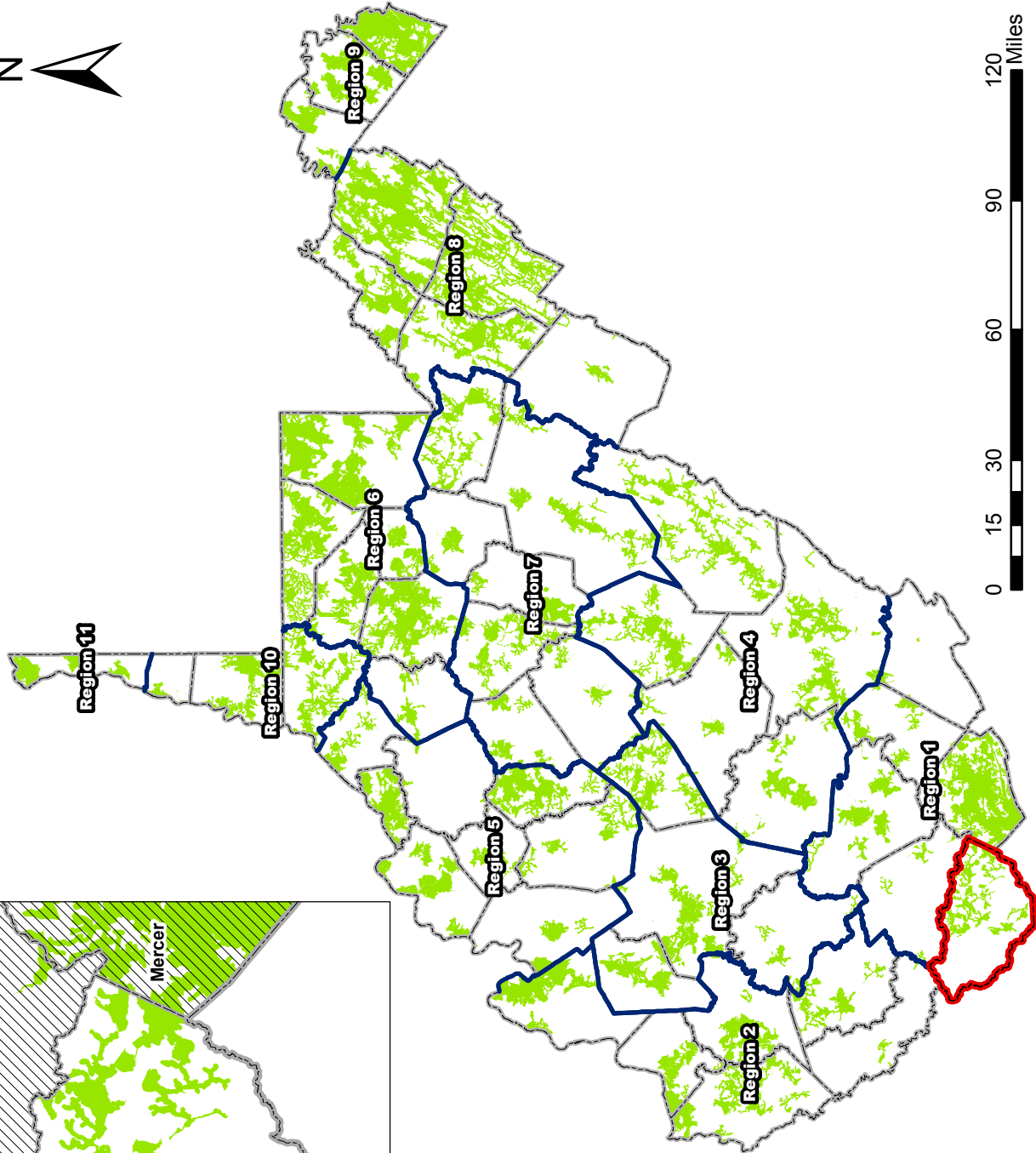
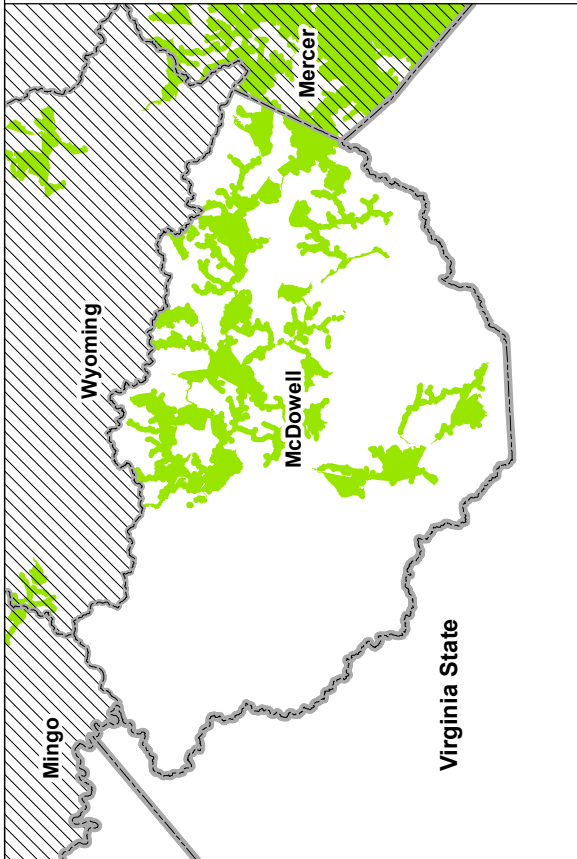
Source: West Virginia Broadband Mapping Program 2012




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Broadband - Internet DS, LBPL, Other Copper

McDowell County



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



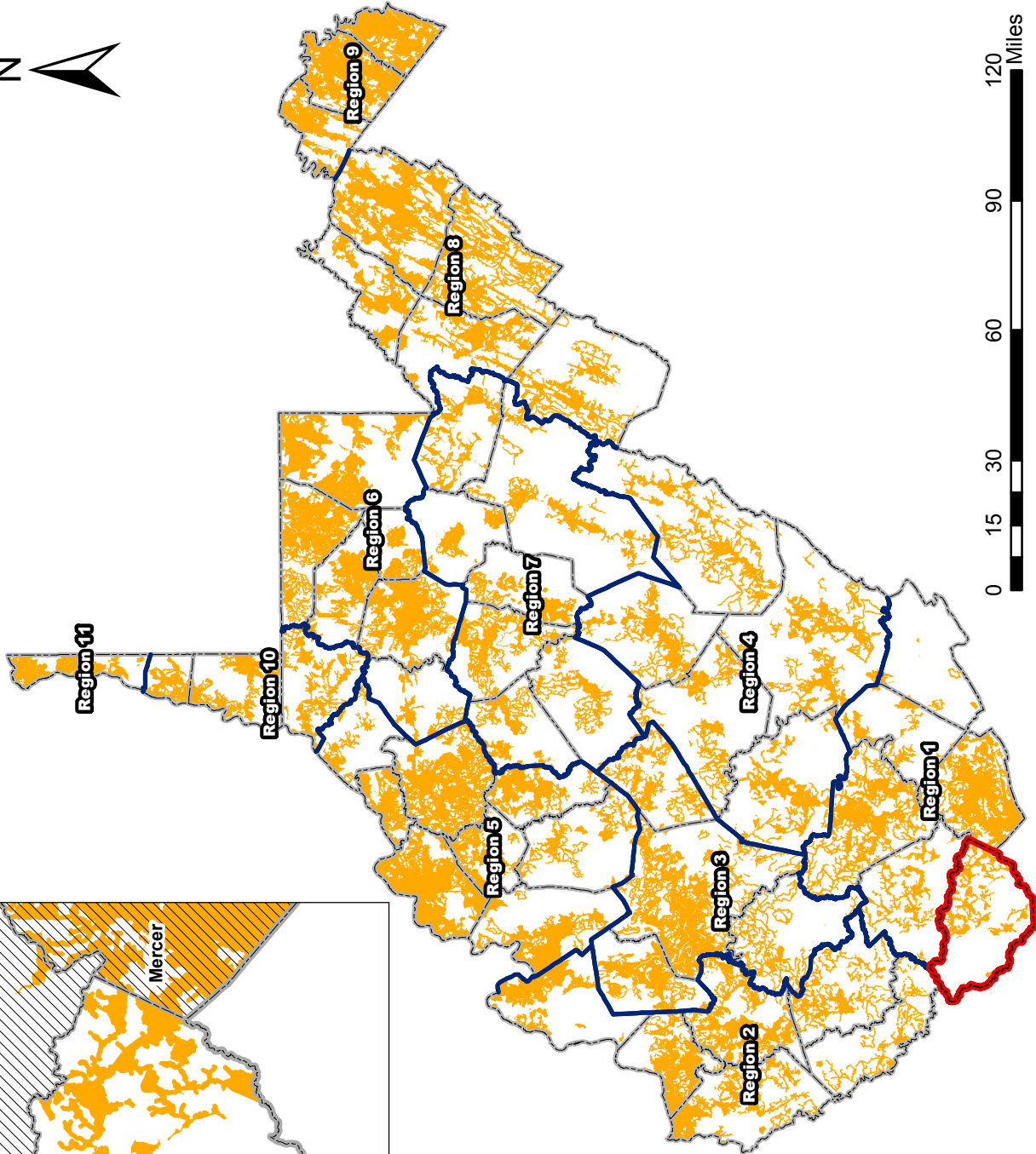
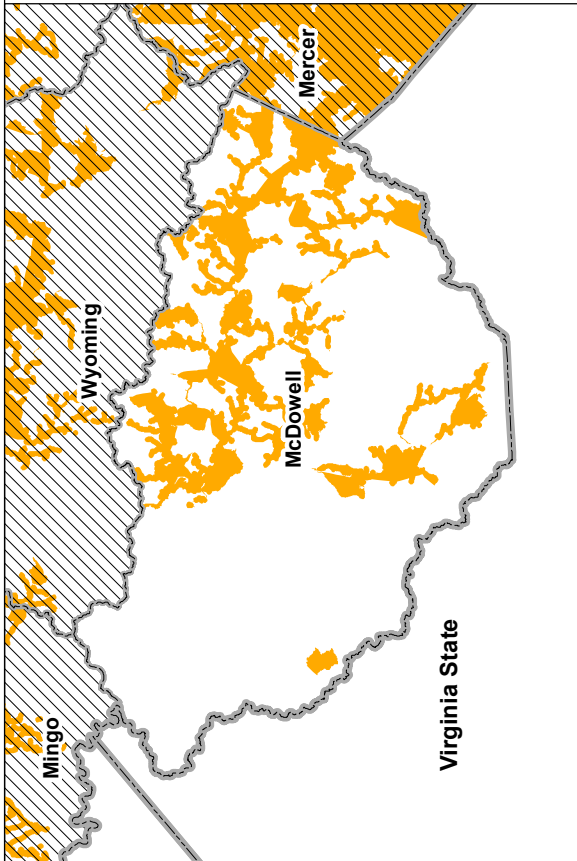
Source: West Virginia Broadband Mapping Program 2012




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Broadband - Internet Wireline Coverage

McDowell County



-  Planning Regions Line
-  Wireline Coverage
-  County Boundaries

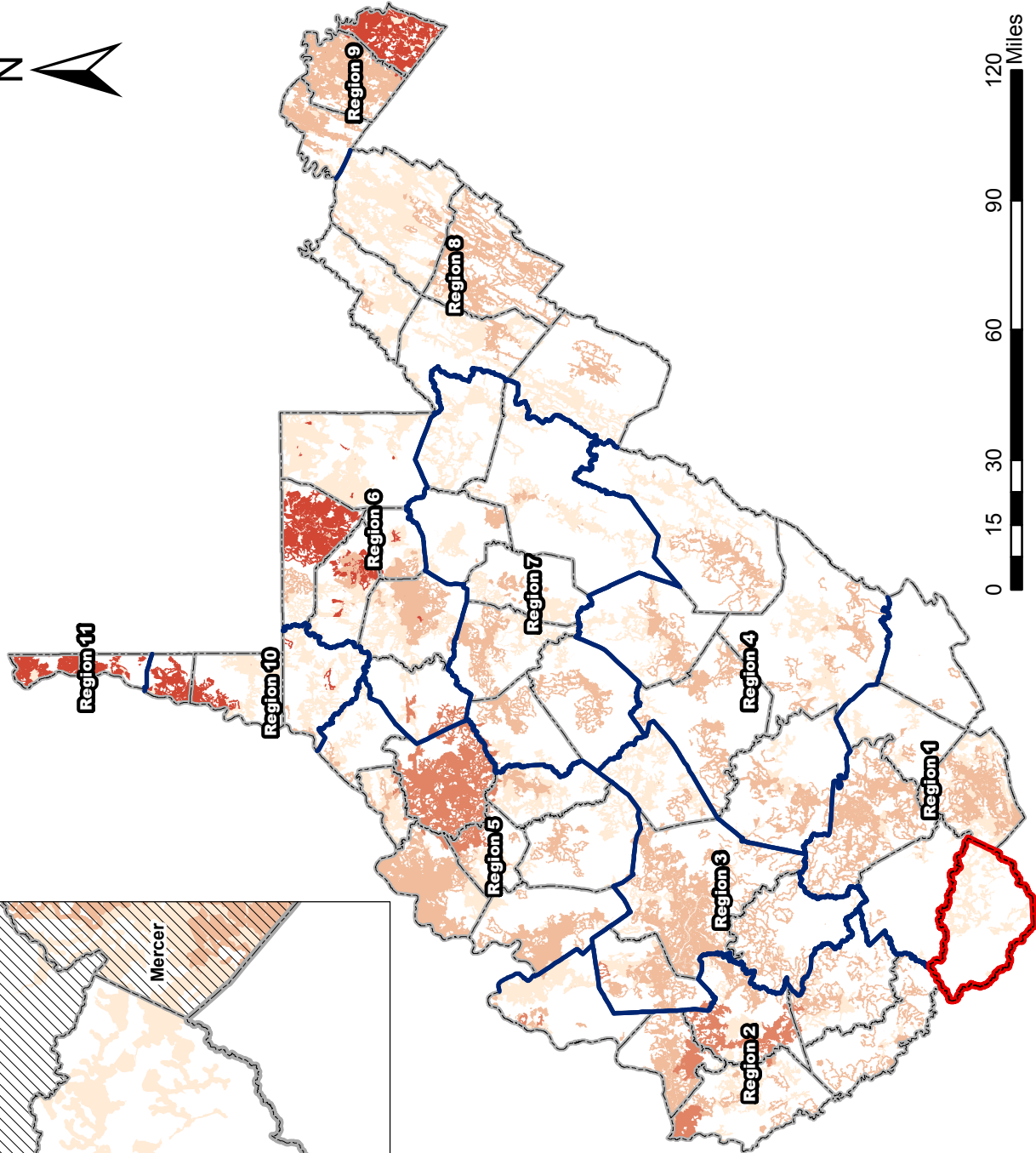
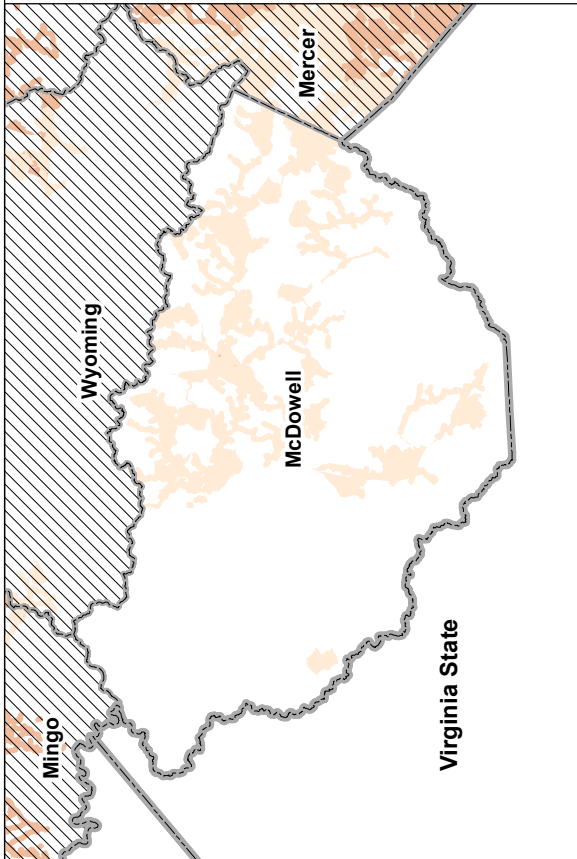
Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet MaxUp Speed Wireline

McDowell County



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

Source: West Virginia Broadband Mapping Program 2012

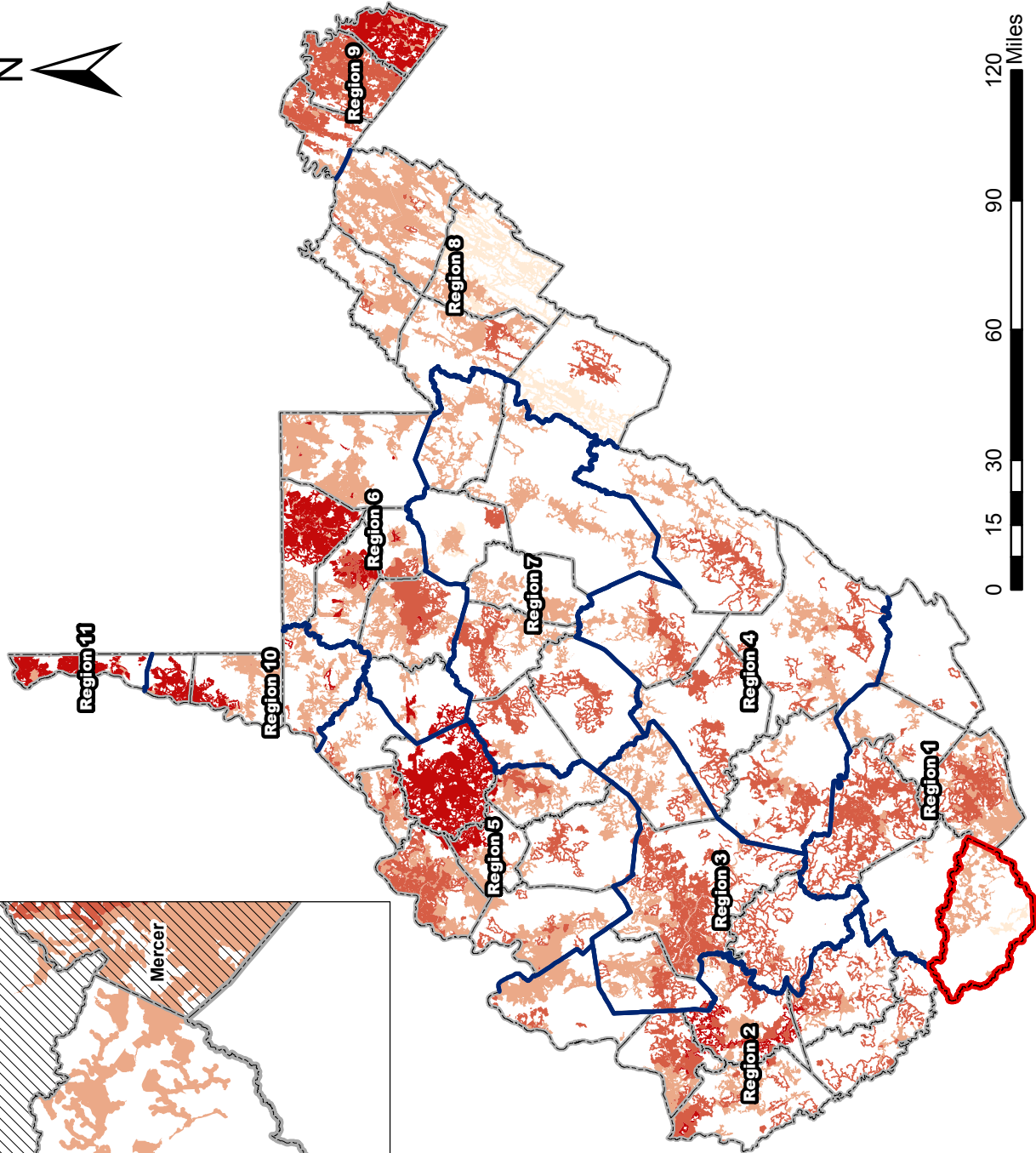
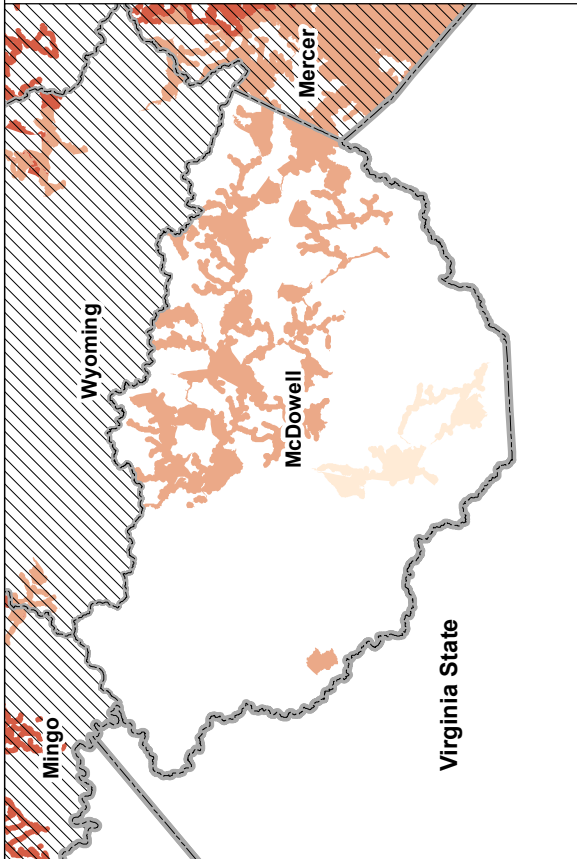
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Broadband - Internet MaxDown Speed Wireline

McDowell County



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



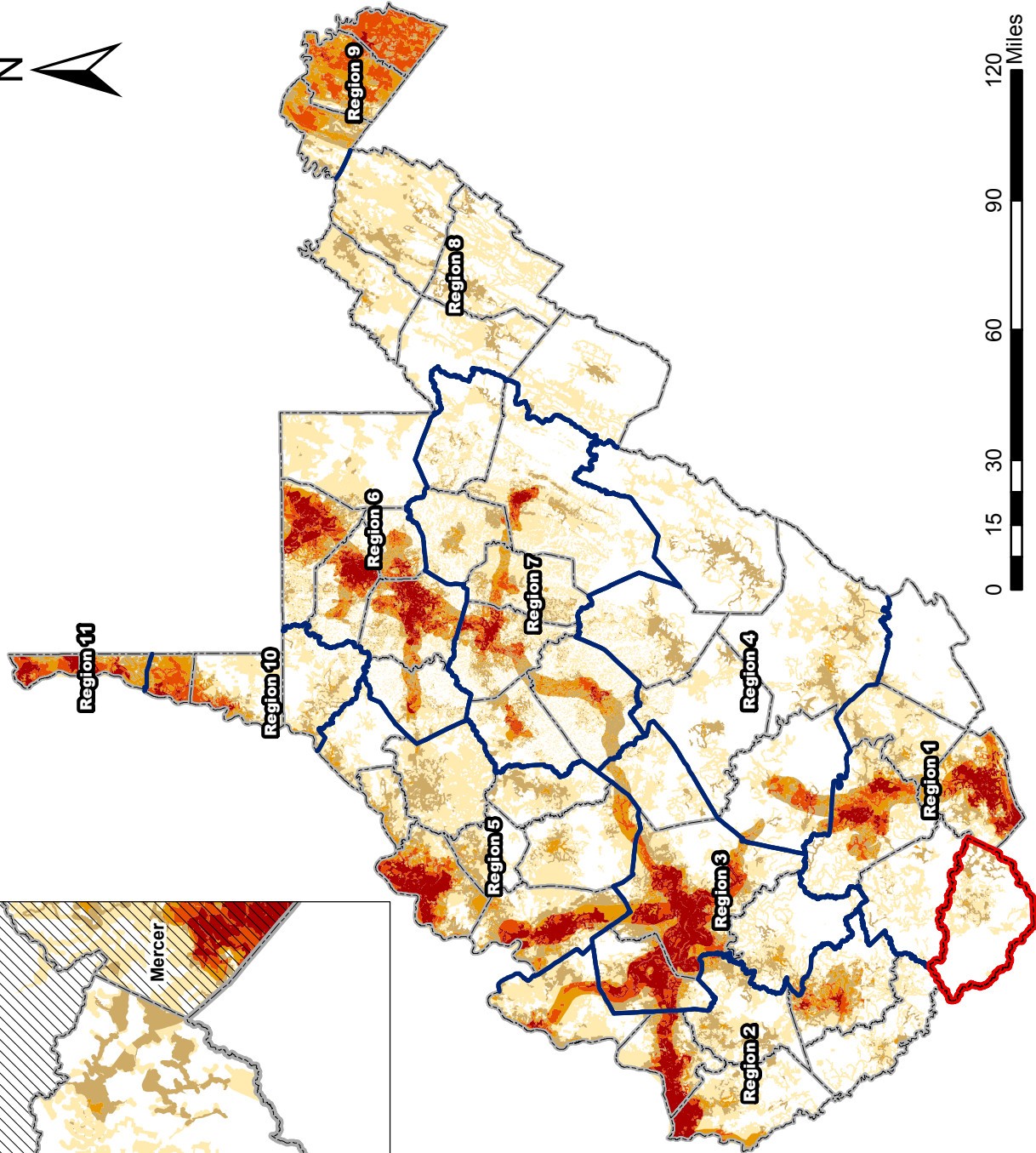
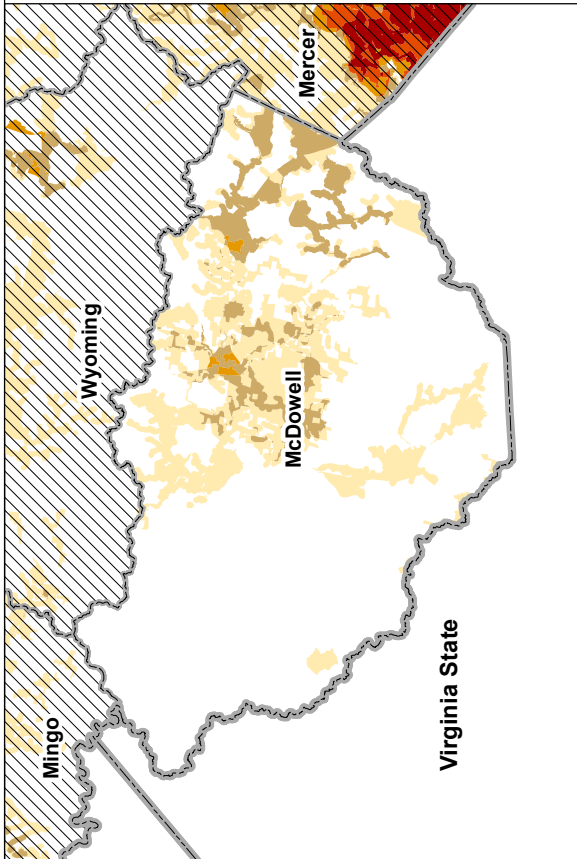
Source: West Virginia Broadband Mapping Program 2012

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Broadband - Internet Total Number of Providers

McDowell County



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



Source: West Virginia Broadband Mapping Program 2012

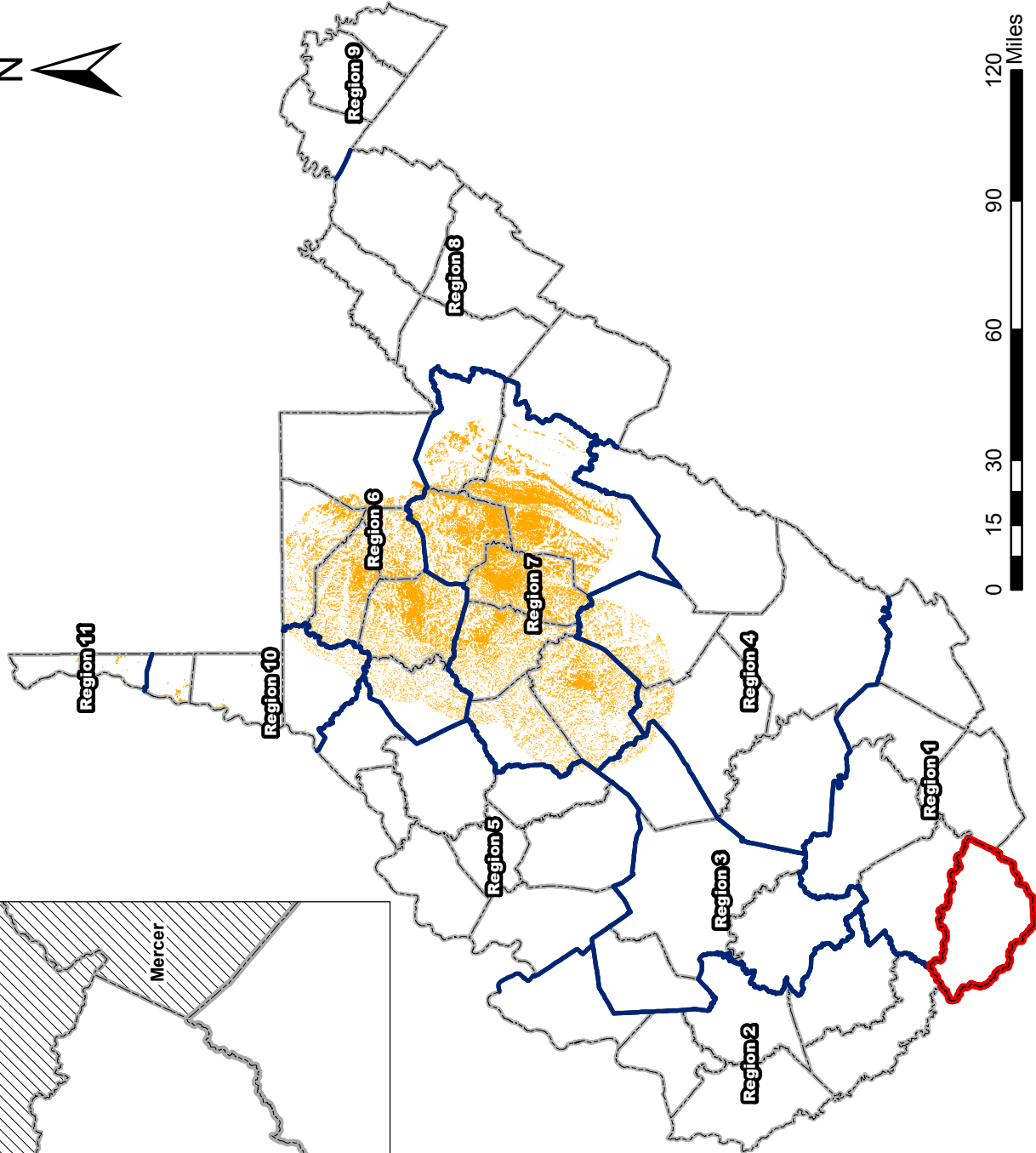
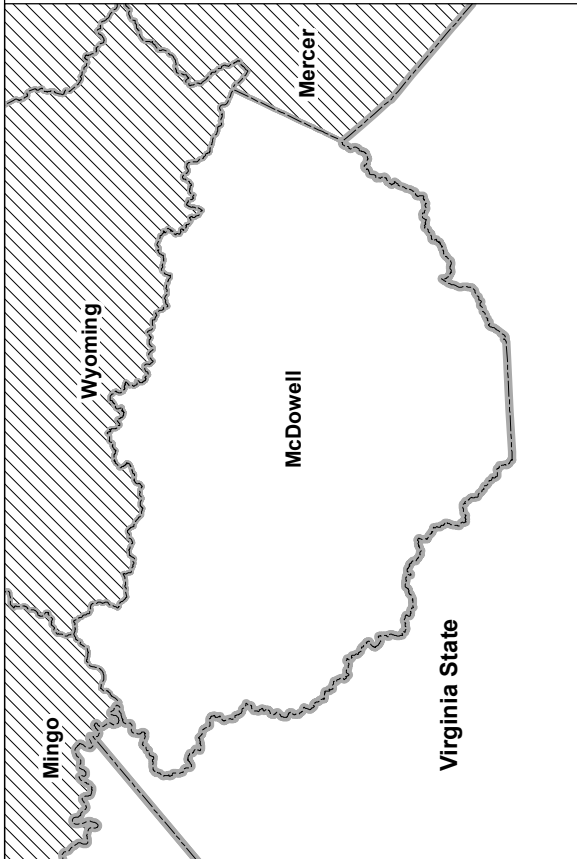
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Broadband - Internet Fixed Wireless Coverage

McDowell County



-  Planning Regions Line
-  Fixed Wireless
-  County Boundaries



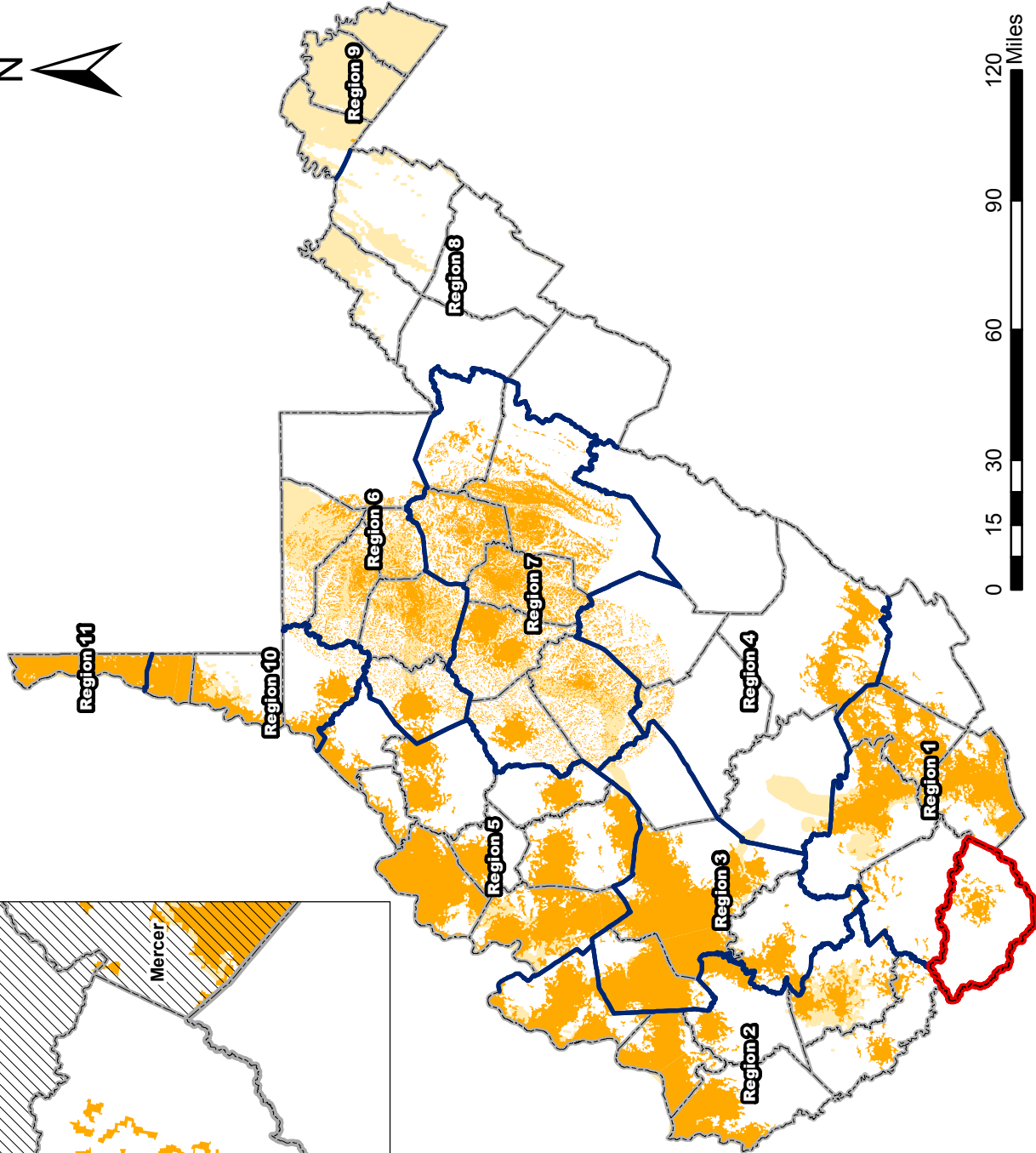
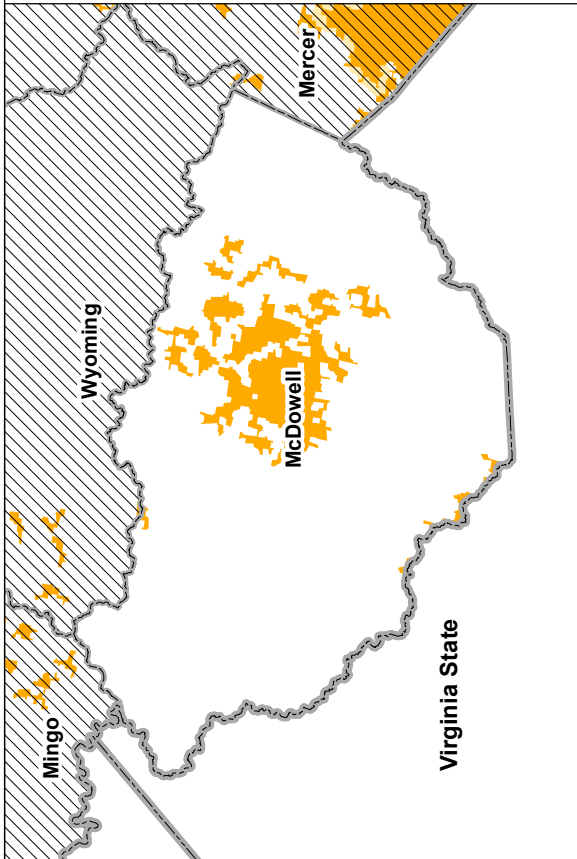
Source: West Virginia Broadband Mapping Program 2012





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Broadband - Internet MaxDown Speed Wireless

McDowell County



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



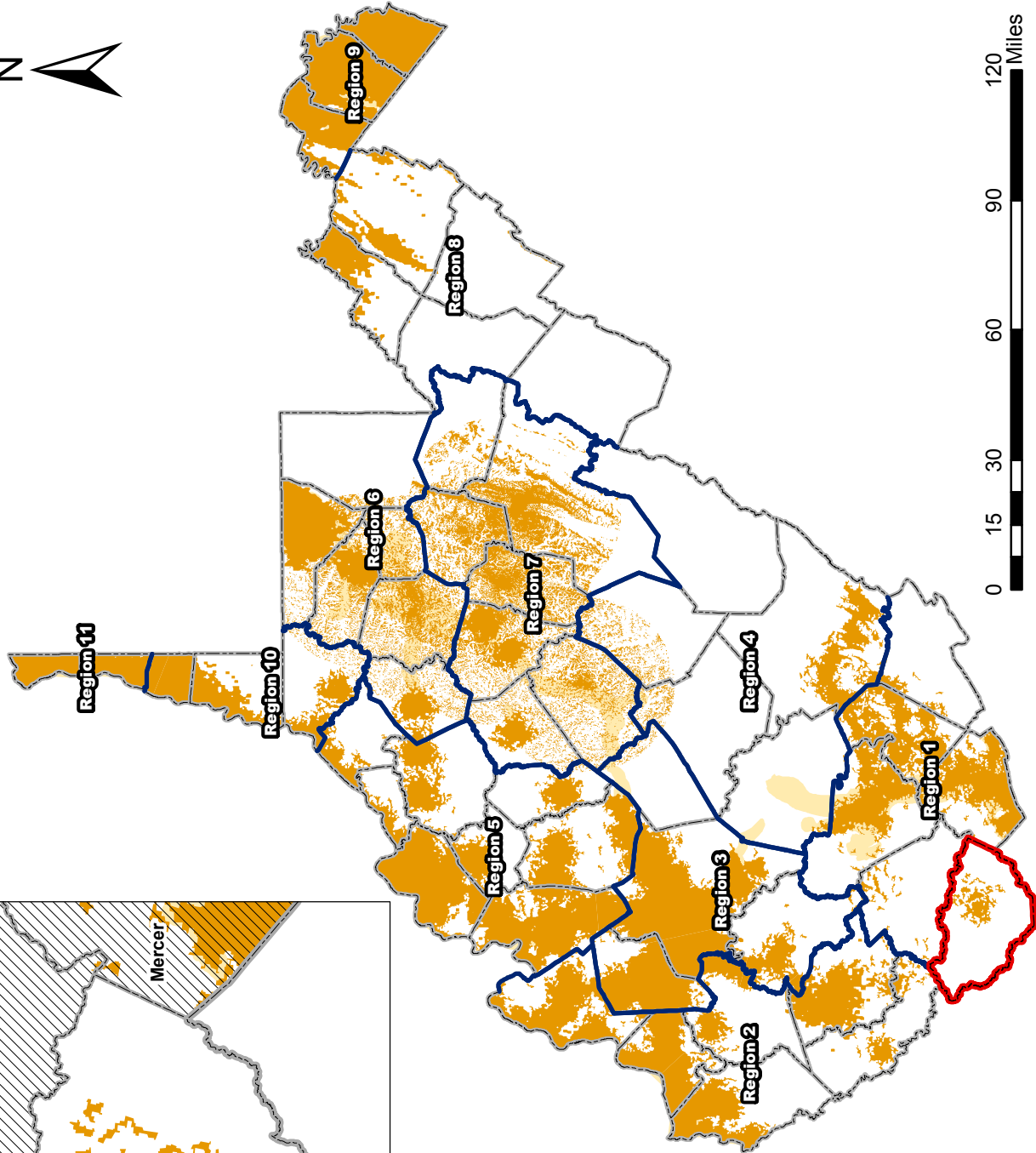
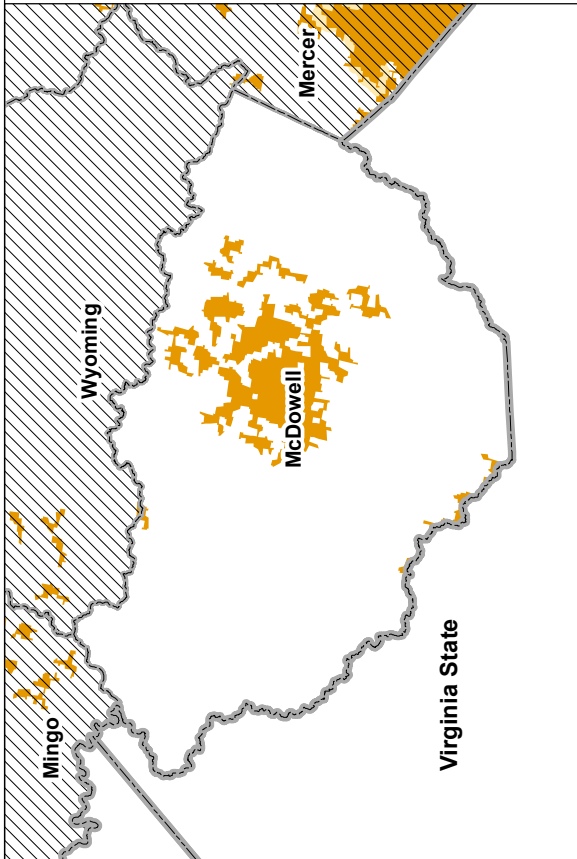
Source: West Virginia Broadband Mapping Program 2012





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Broadband - Internet MaxUp Speed Wireless

McDowell County



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



Source: West Virginia Broadband Mapping Program 2012

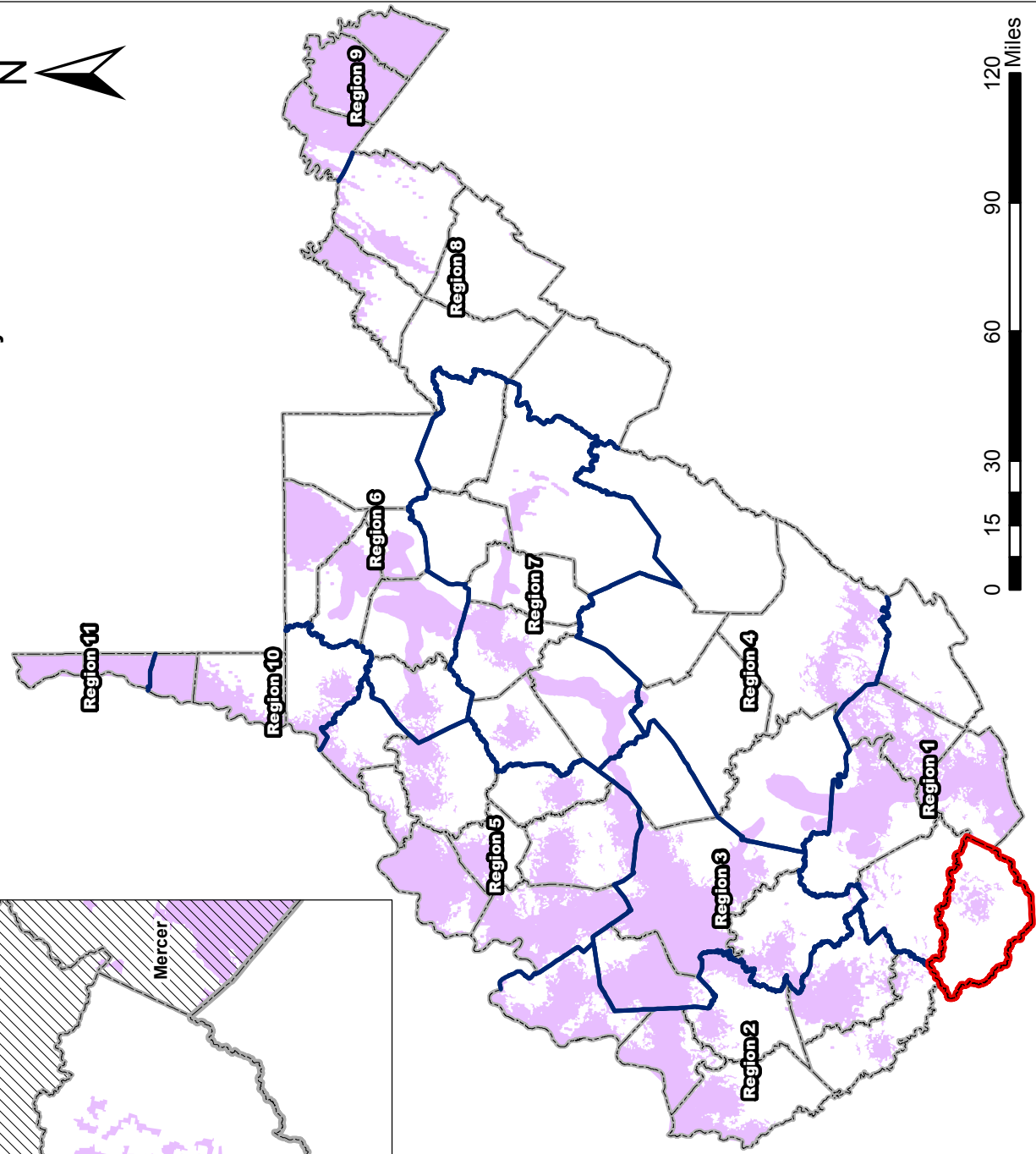
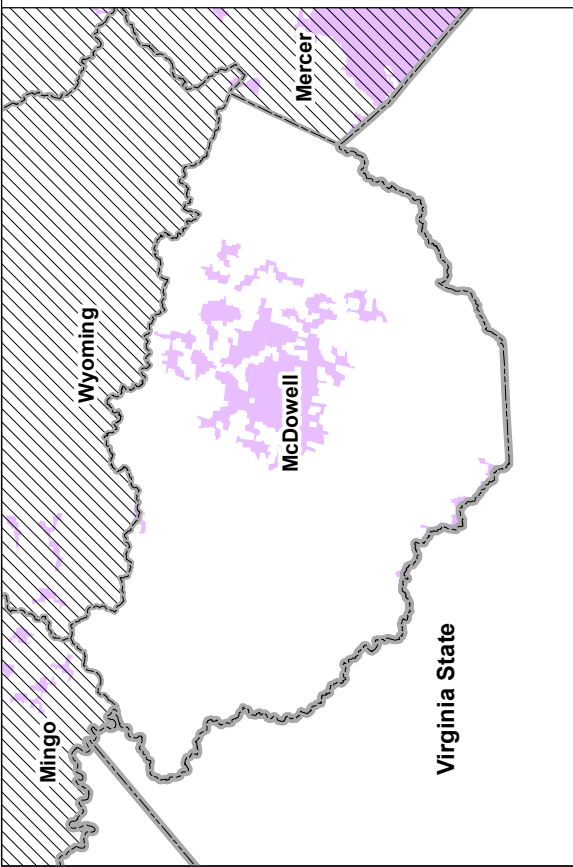
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Broadband - Internet Mobile Wireless Coverage

McDowell County



- Planning Regions Line
- Mobile Wireless
- County Boundaries

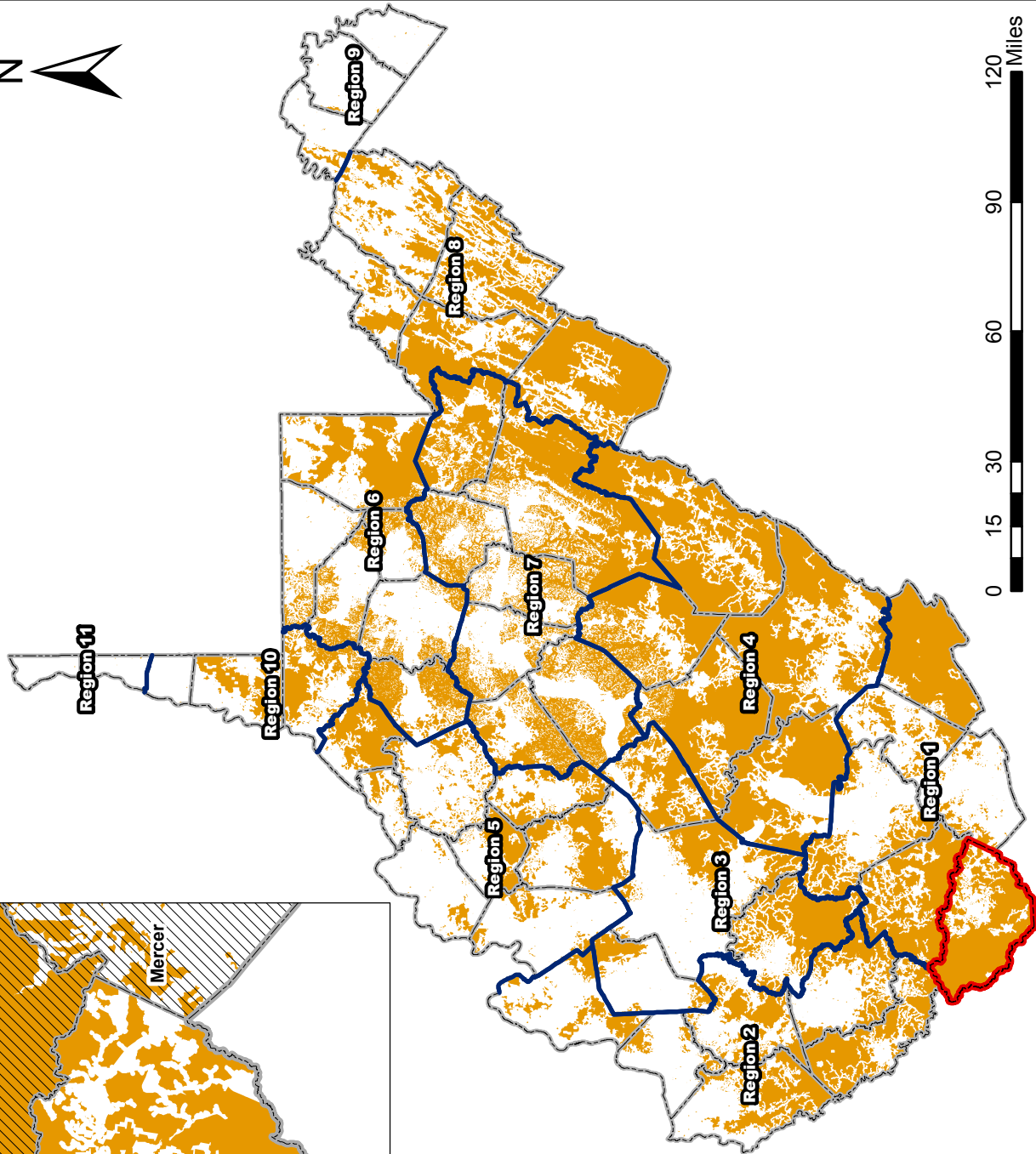
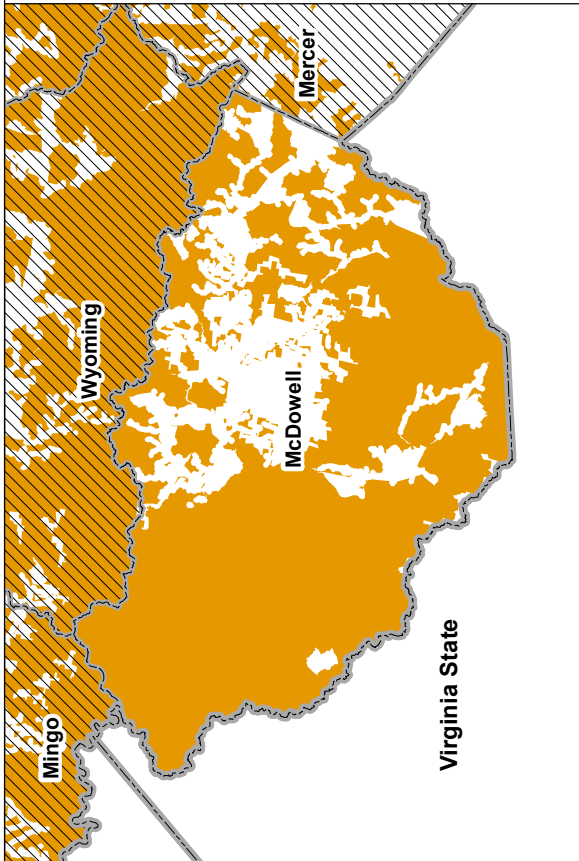
Source: West Virginia Broadband Mapping Program 2012




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Broadband - No Broadband Coverage

McDowell County



-  Planning Regions Line
-  No Coverage Reported
-  County Boundaries



Source: West Virginia Broadband Mapping Program 2012

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Transportation

Highways

McDowell County is crossed by US Route 52 as well as State Routes 16, 80, 83, 103, 161, and 635 (Map 26).

Rail

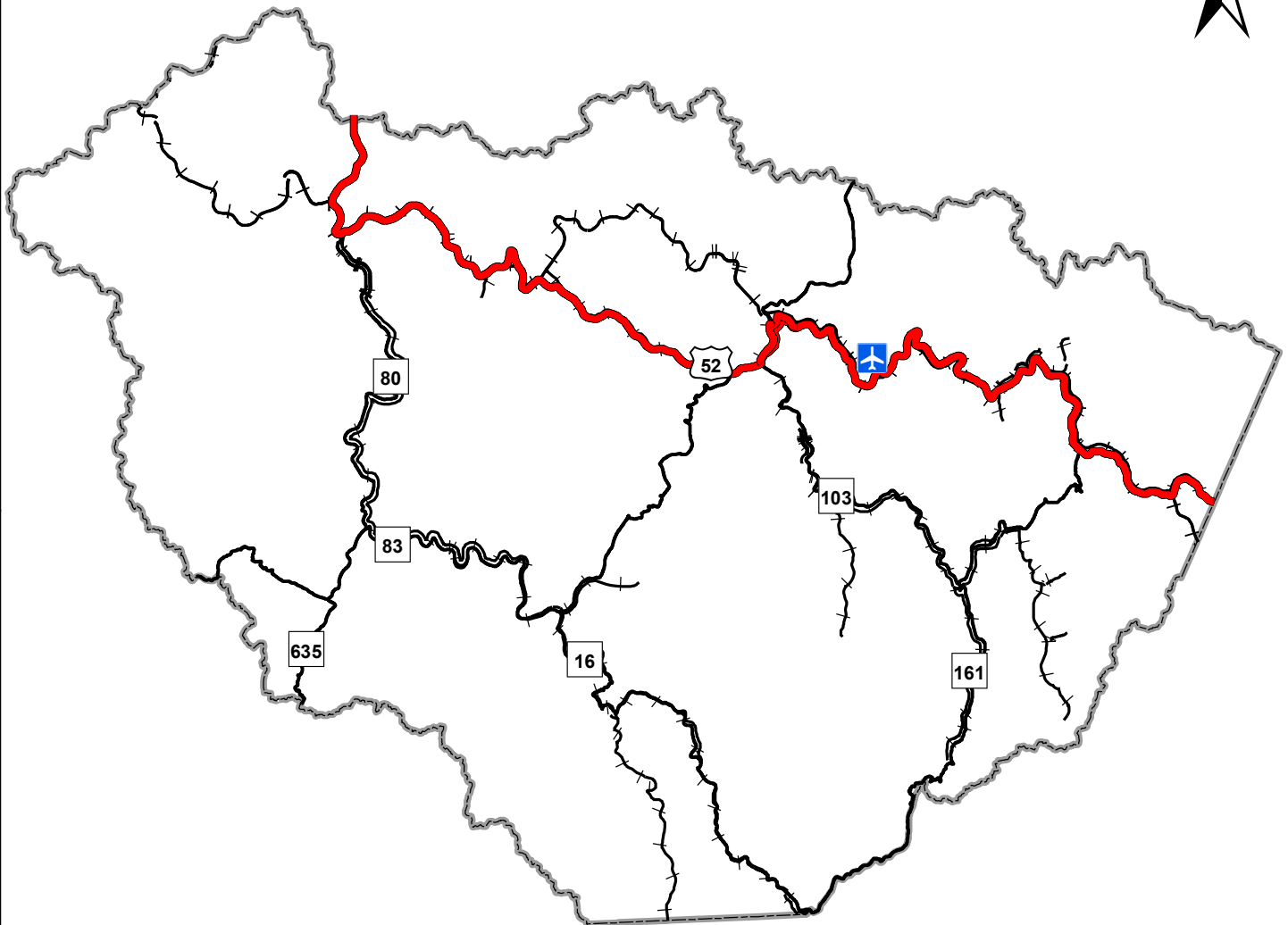
CSX owns and operates several miles of track in the county.






Air

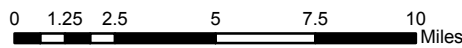
McDowell County recently closed the Welch Municipal Airport indefinitely. Map 26 shows the location of the airport structure.

Transportation

McDowell County



-  Airport
-  WV Routes
-  US Routes
-  Railroads
-  County Boundary



Source: 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

As a historical depressed county, McDowell County has been involved in several economic redevelopment projects. The West Virginia Coal Association has identified several sites as post-mine economic development sites. These sites represent several popular options in post-mine site development.

Coalfields Expressway

The Coalfields Expressway is designated as U.S. Route 121. It is a four-lane, 62-mile long highway that will travel from Beckley, WV to Pound, VA, intersecting with part of Interstate 77.⁹ It is named the “Coalfields Expressway” because it runs through coalfield counties as well as some post-mine land sites. Like the proposed King Coal Highway, the Coalfields Expressway is meant to improve infrastructure, bringing jobs and economic activity to these rural, poorer communities.

McDowell County Industrial Park

The Indian Ridge Industrial Park is a 5,900-acre park located near Welch.¹⁰ This park is being constructed in tandem with the Coalfields Expressway, to take advantage of the development the construction of the expressway will bring. Industrial parks are also popular uses of post-mine sites.

Mount View High School

Mount View High School was constructed on a former strip mine in McDowell County. It is currently the largest school in the county, with a second month enrollment of 805 students. High schools are one of the many options for post-mine sites, providing education essential to success in today’s economy, one of the most important government priorities.

Federal Correctional Institution

Every site has its usefulness, and the same applies to the Federal Correctional Institution in McDowell. A medium-security all-male prison, it is located about four miles north of Welch. Prisons still have a major effect on economic development, ensuring protection of citizens so that they may continue to conduct their business without fear or force, and potentially providing local jobs and wages.

⁹ Brinks, Travis, “Coalfields Expressway Project Moving Forward,” WV Metro News, June 9, 2013, Accessed July 1, 2013, <http://wvmetronews.com/coalfields-expressway-project-moving-forward/>.

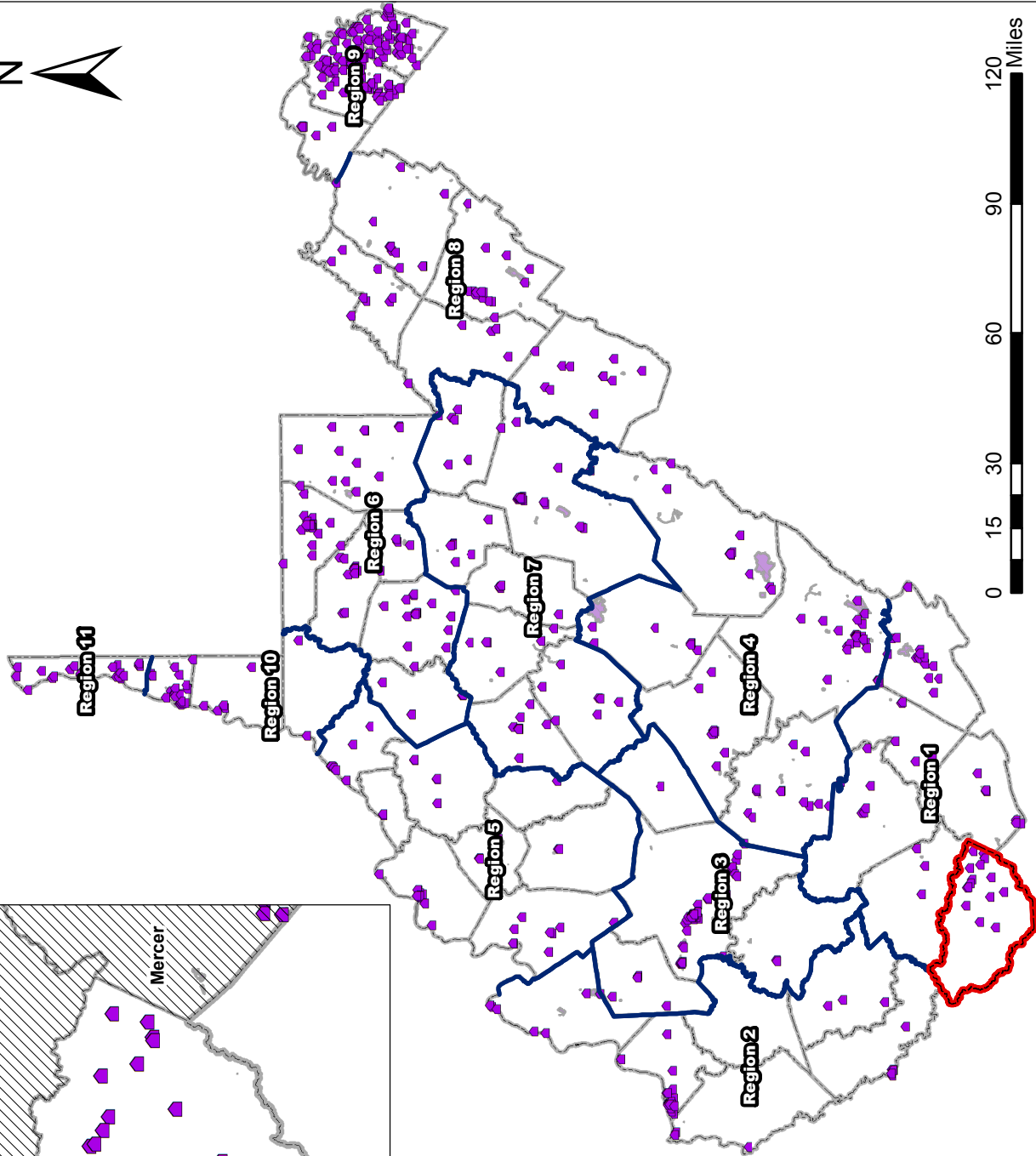
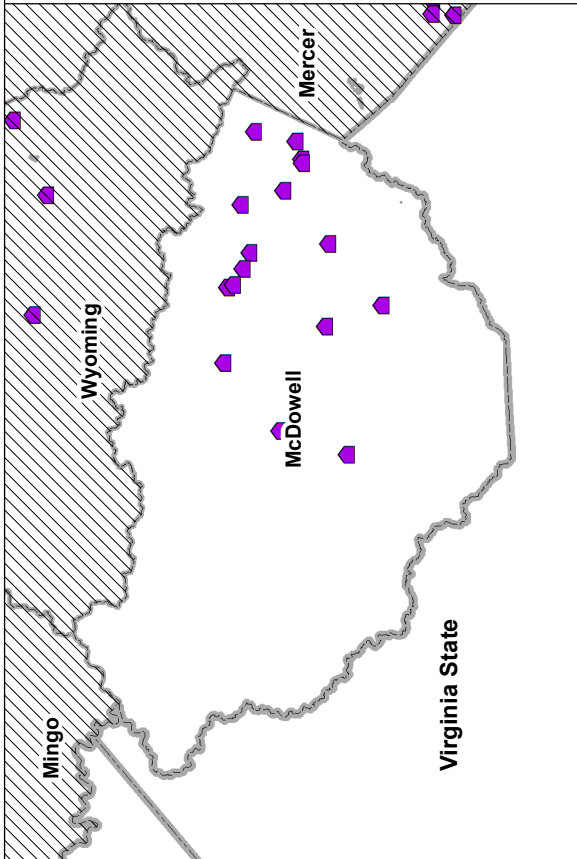
¹⁰ “Indian Ridge Industrial Park,” West Virginia Site Selector, West Virginia Development Office, Accessed July 8, 2013, <http://www.wvcommerce.org/business/siteselector/listing/Indian-Ridge-Industrial-Park/10305/default.aspx>.





Historic Preservation

Historic preservation will be essential in a county steeped in coal mining history. McDowell County has 17 listings in the National Register of Historic Places. These include many old company stores and houses dating back to the glory days of coal mining (Map 27). However, other historic areas have been designated by West Virginia. Map 28 gives a spatial position to each designated State historic piece of architecture.

National Register of Historic Place

McDowell County



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

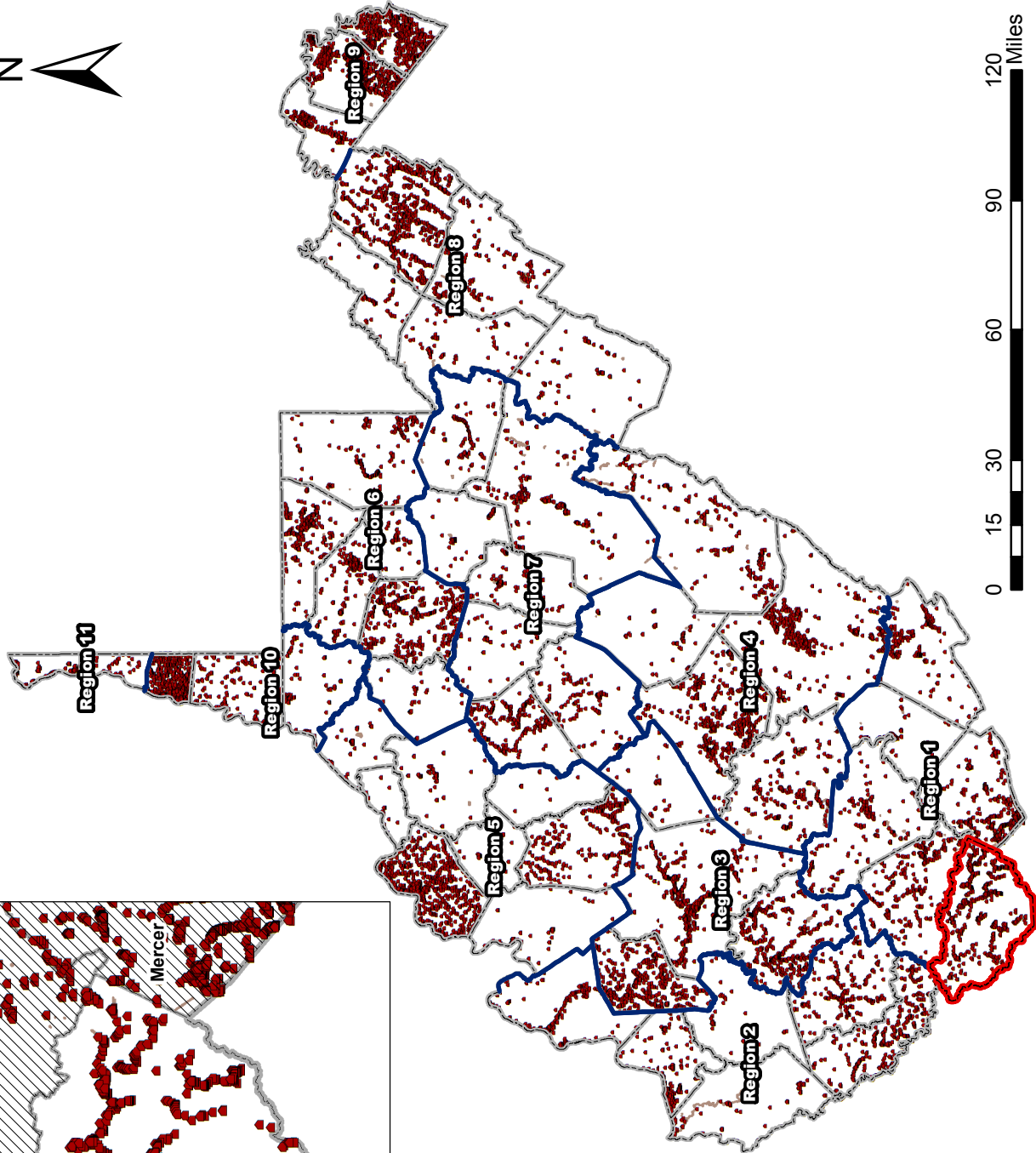
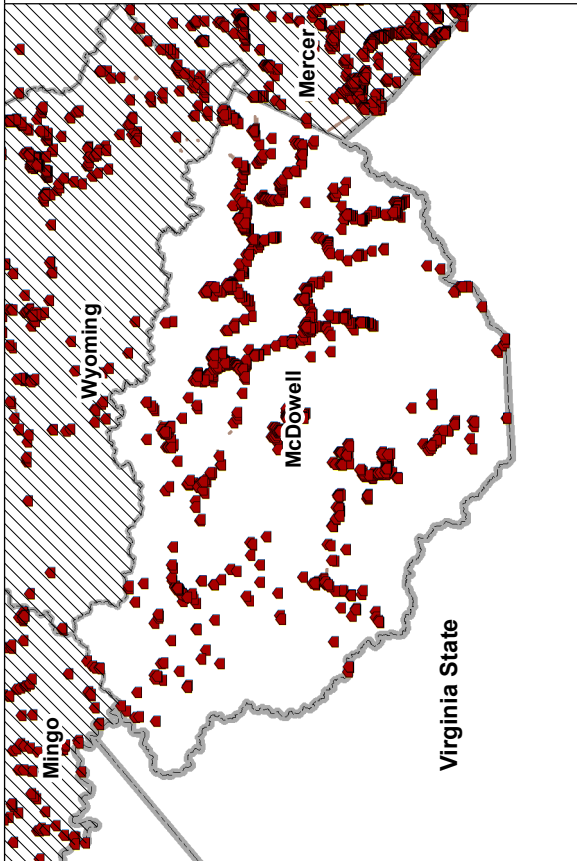
Source: West Virginia State Historic Preservation Office 2012

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State Historic Architecture

McDowell County



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



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. McDowell County has several advantages in these areas that can be utilized to the advantage of the citizens.

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. McDowell County's system is not extensive and is very sporadic (Map 29).

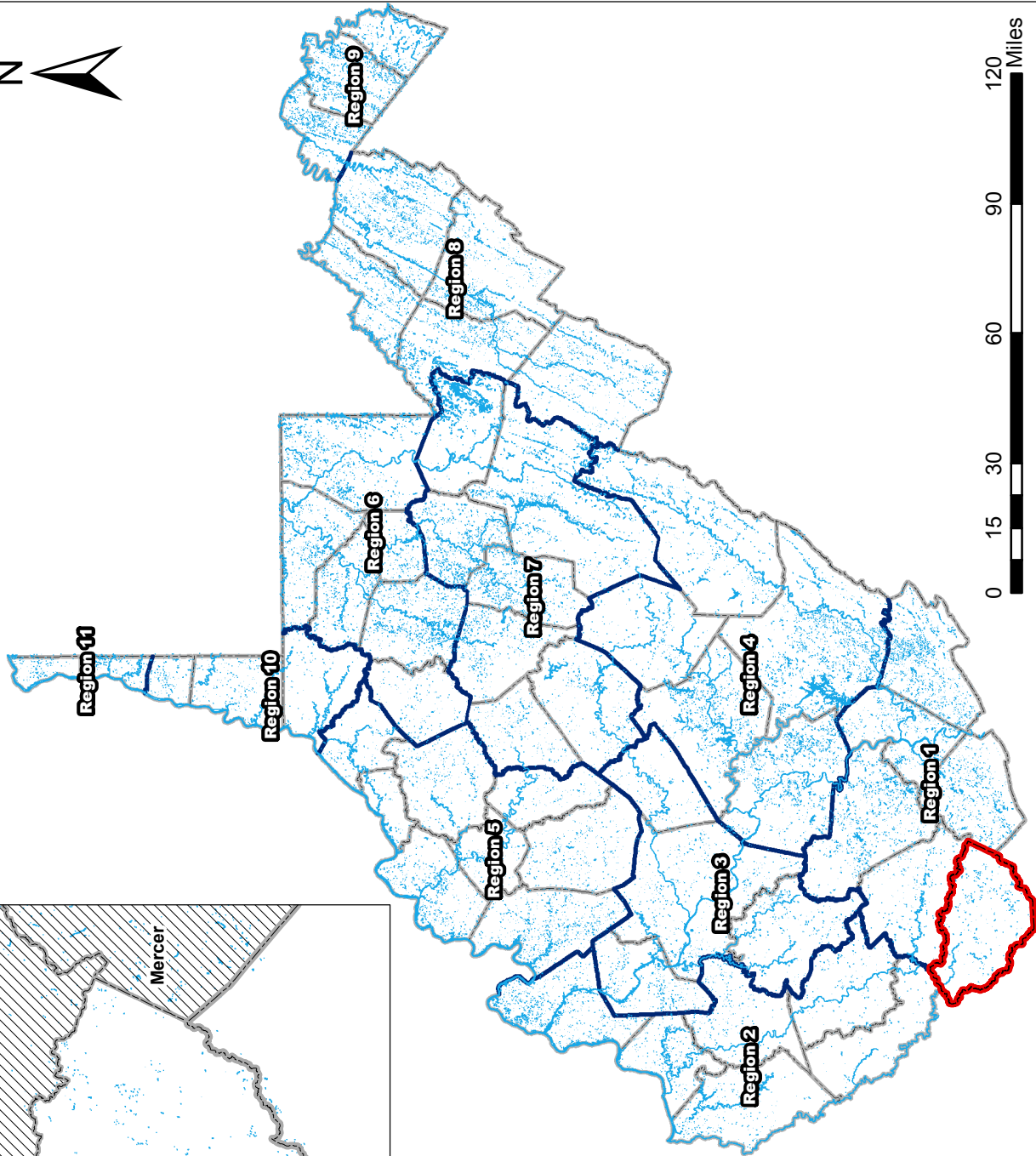
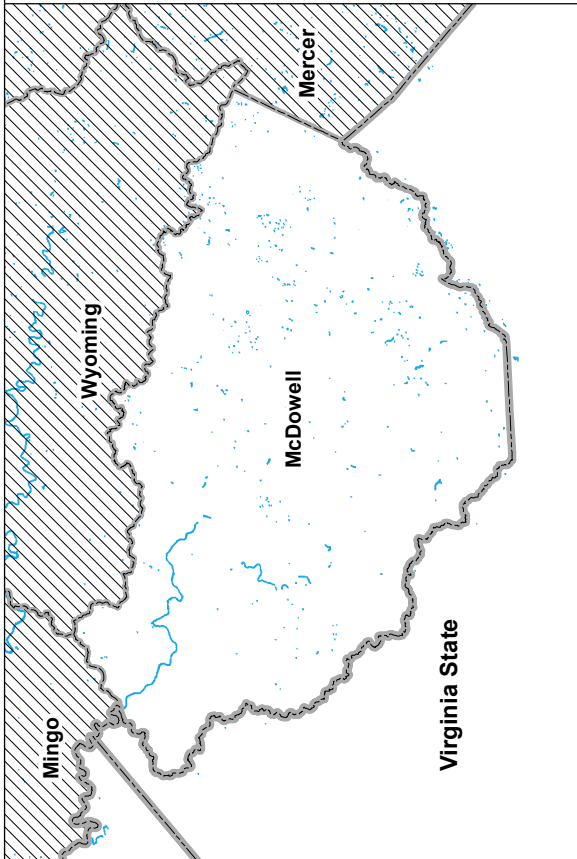
The State also possesses a respectable amount of park and forest land. Most of this land is located in the eastern portion of the State, the area that contains the main part of the Appalachian Mountain range. McDowell contains no national or state parks or forest lands but does possess four wildlife management areas (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."¹¹ 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; McDowell County is not among them (Map 31).

¹¹ "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

McDowell County



-  Planning Regions Line
-  National Wetlands Inventory
-  County Boundaries



Source: United States Fish and Wildlife Service 1996

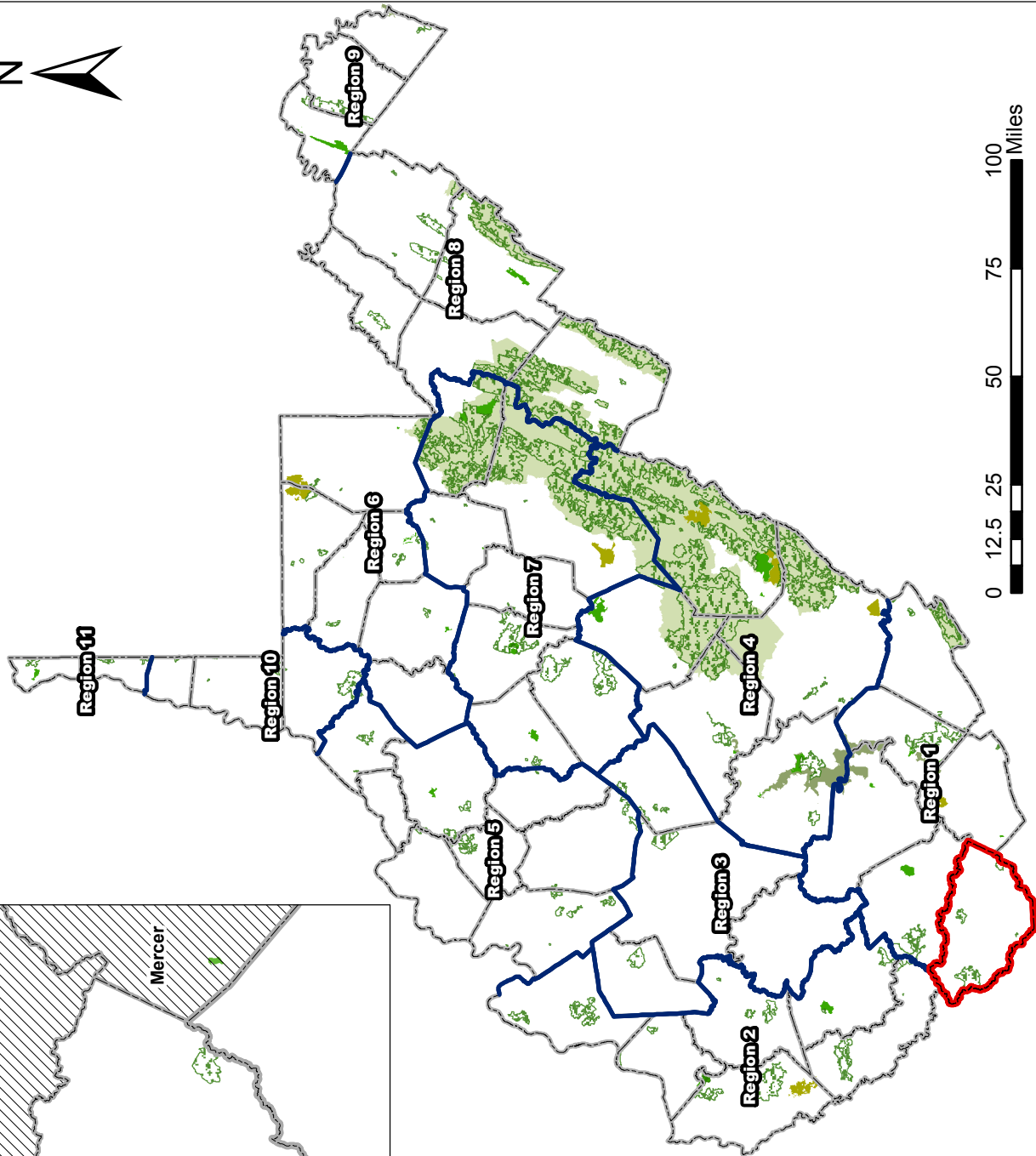
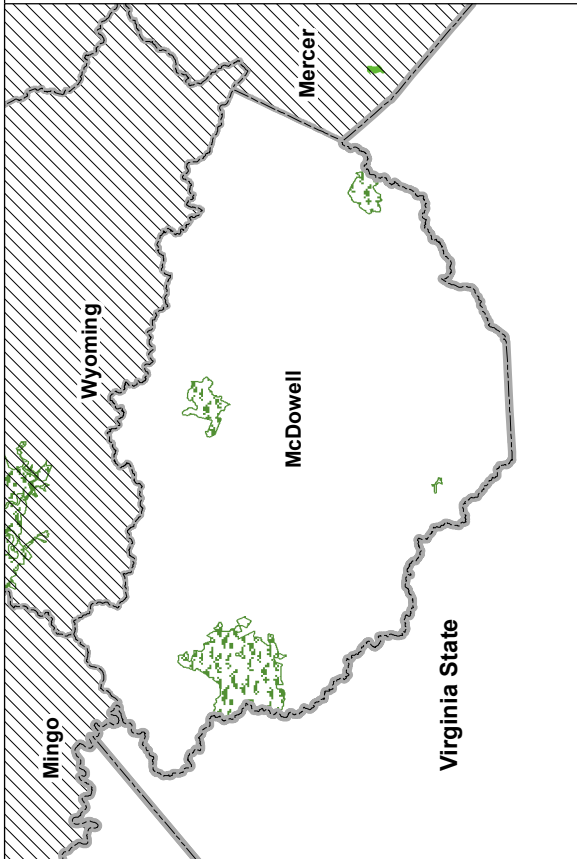
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Public Land - Parks and Forests

McDowell County



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

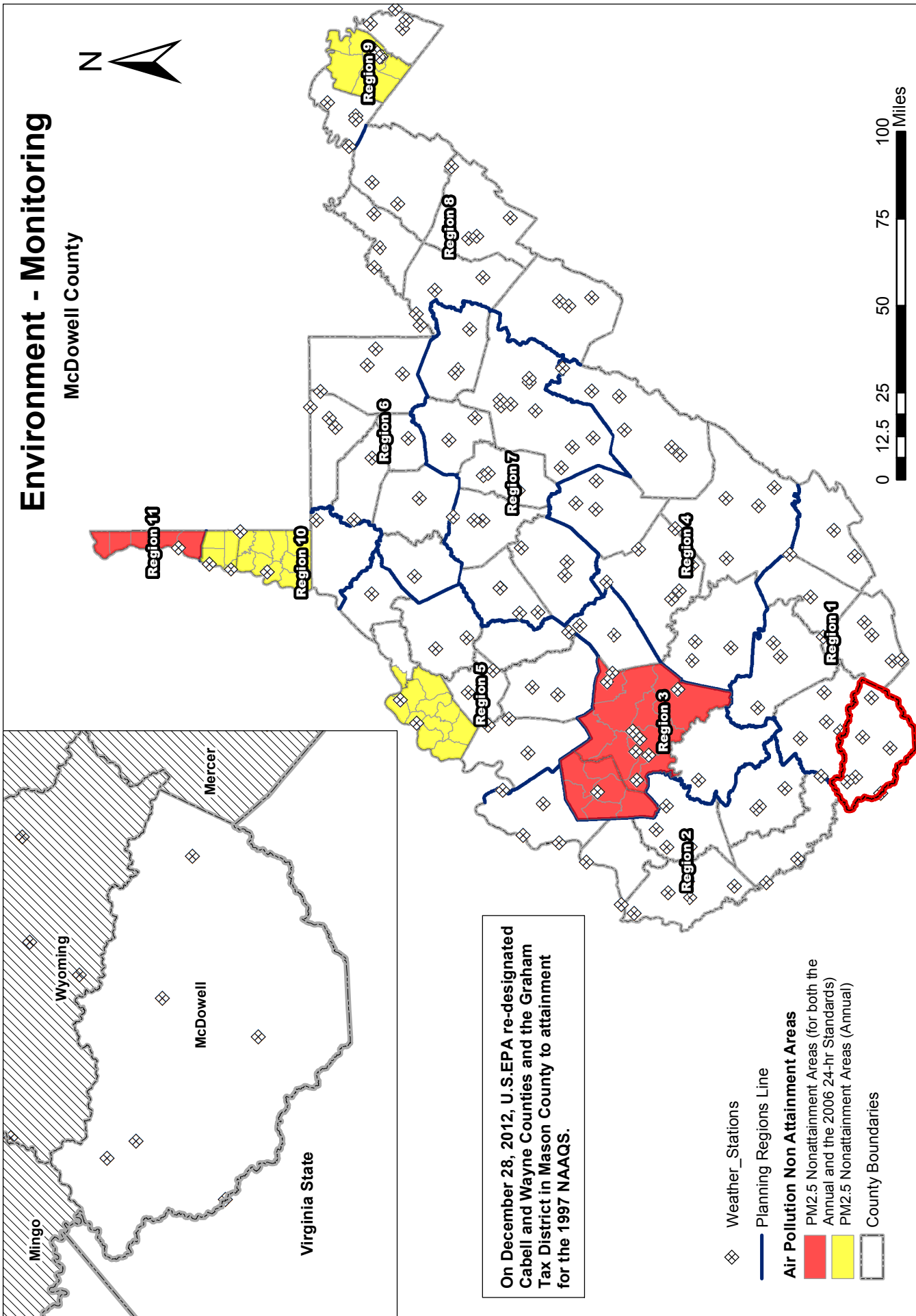
Source: Wildlife Management Areas: West Virginia Division of Natural Resources 2002; State Forest: West Virginia Division of Forestry 2004; State Park: West Virginia Division of Natural Resources, Natural Resource Analysis Center 2000; National Forest: United States Forest Service 2003; National Park: United States National Park Service 2003

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Environment - Monitoring

McDowell 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

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, and West Virginia has access to this sort of energy in a number of ways.

McDowell County has no oil fields but is a highway of sorts for gas, containing two compression stations and miles of gas pipe (Map 32). McDowell County play in the Marcellus shale appears to be very uncertain based on estimated shale thickness, but the county has a number of permitted and completed Marcellus wells (Map 33). The Marcellus Shale will continue to be a major player in West Virginia's energy layout for the foreseeable future, and as technology improves recoverability may also.

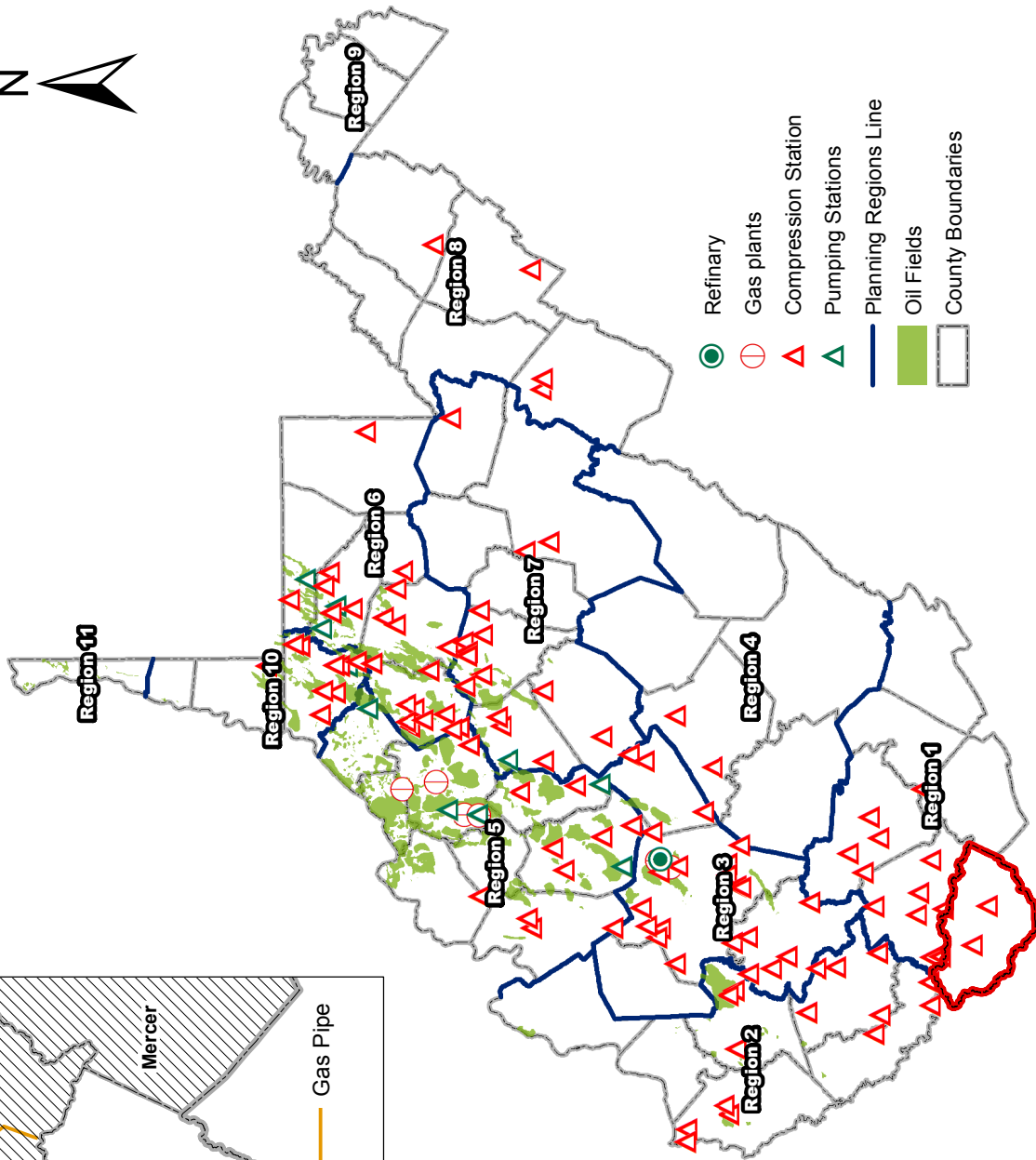
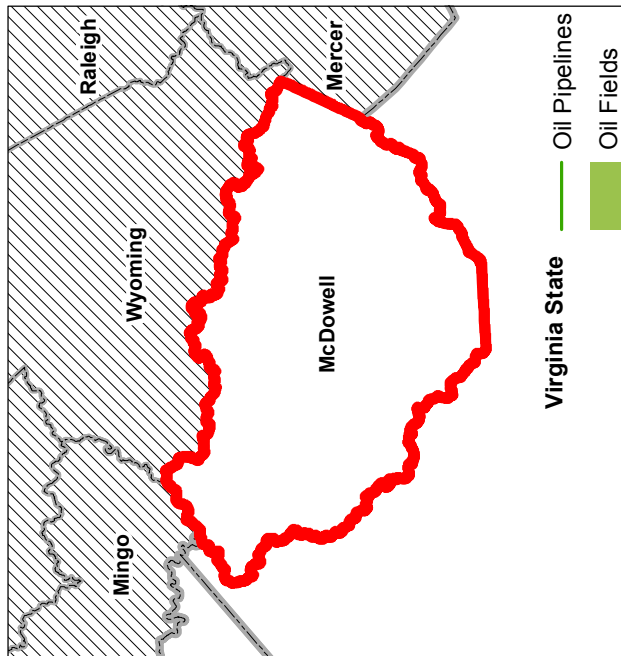
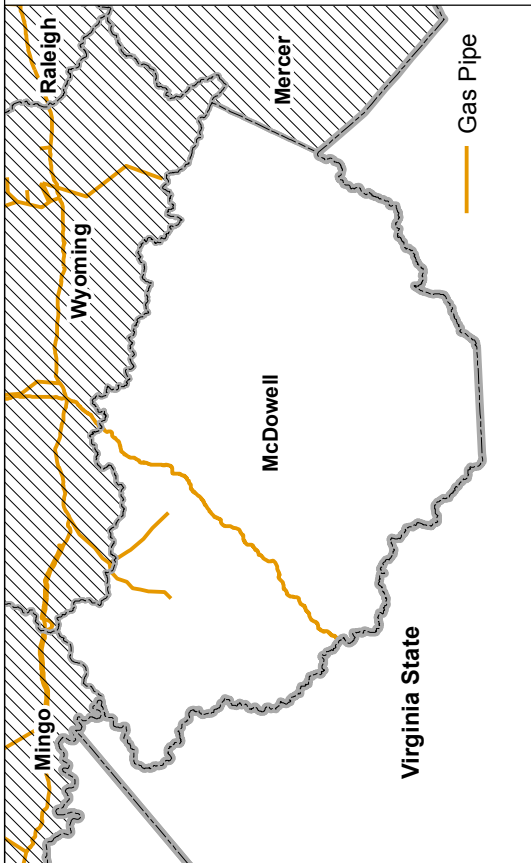
Potential renewable energy sources were also examined. Wood byproducts are a potential energy source classified as biomass energy. Naturally it is most useful in areas with a great deal of wood products. West Virginia is one of the most forested States in the country. McDowell County appears to be one of the most forested counties in West Virginia (Map 34). However, it appears McDowell County is not a major player in producing energy by wood byproducts, and for which byproducts are readily available (Maps 35 and 36). This indicates that there may be some potential to develop this market. 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.¹² 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 McDowell does not appear to be a favorable location for development. Wind development was only fair, but solar development appears to be on the high end of the spectrum for the easternmost parts of the county. Compared with the nation, however, that potential is still limited. Still, technology is not predictable, and improvements could occur in each of these resource areas that will make generation more feasible. Efforts to monitor research in all these areas should be undertaken to make use of any potential developments.¹³

¹² Kent, Calvin, Risch, Christine, and Pardue, Elizabeth. *Renewable Energy Policy: Opportunities for West Virginia*. Center for Business and Economic Research, Huntington, WV (2012).

¹³ Ibid.

Energy - Gas and Oil

McDowell County



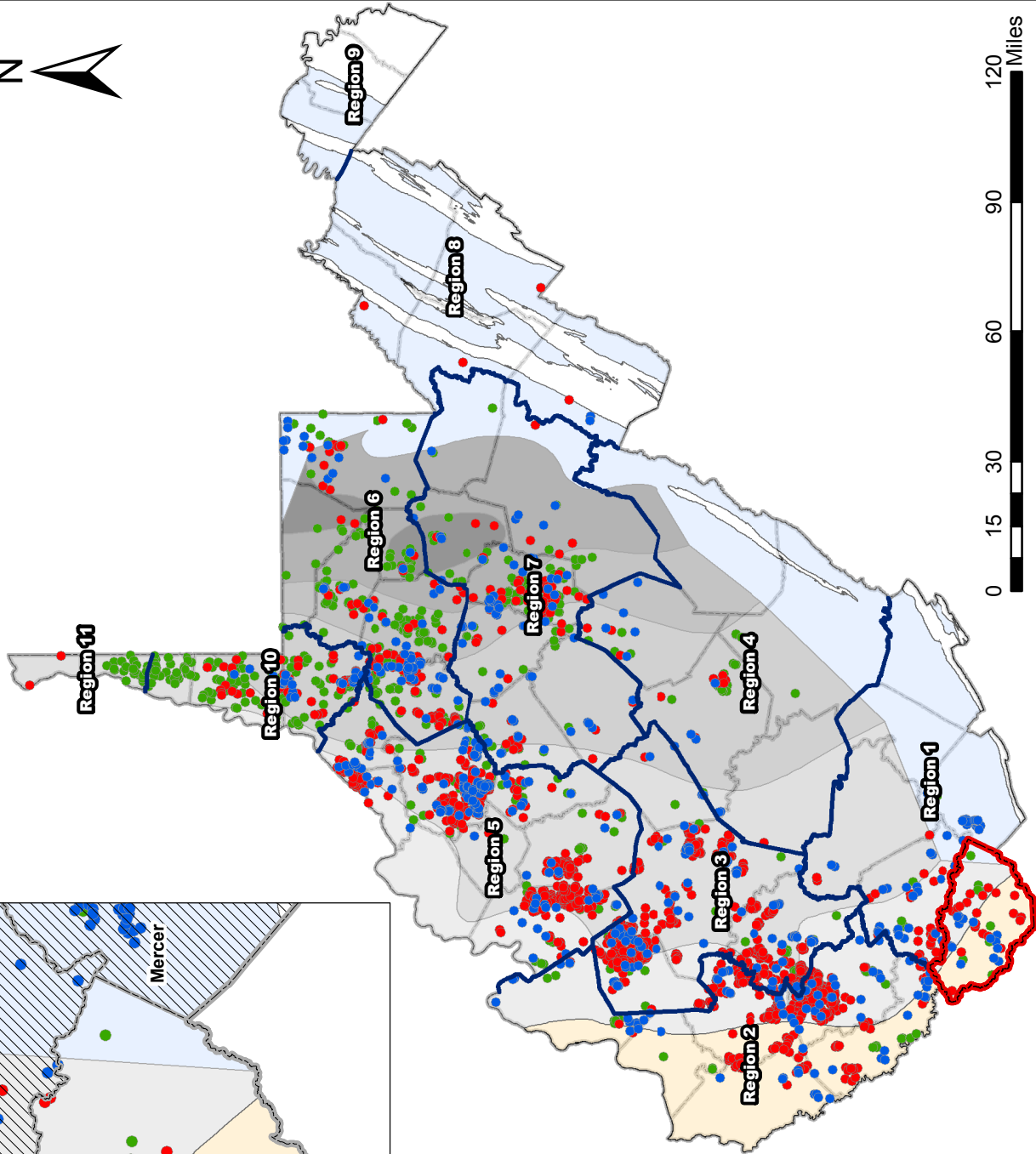
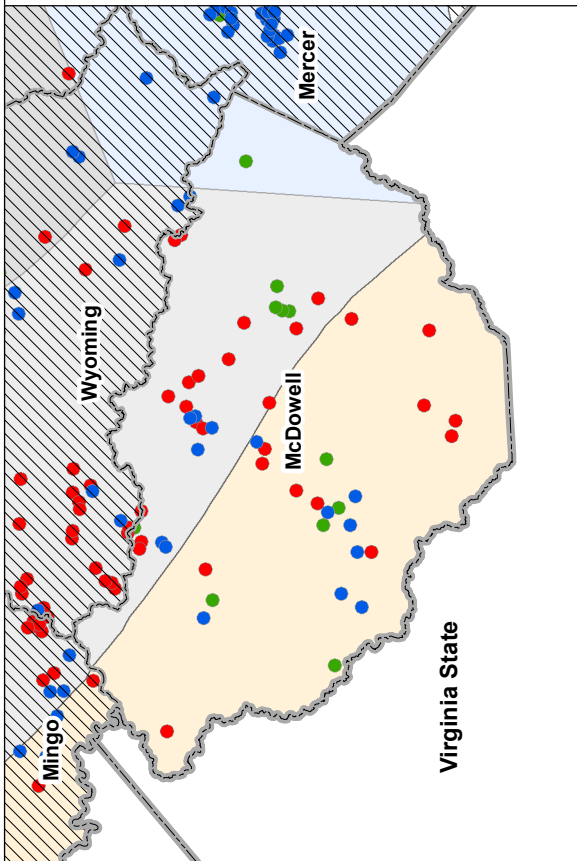
Source: West Virginia Geological and Economic Survey 2007

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Energy - Marcellus Wells

McDowell 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

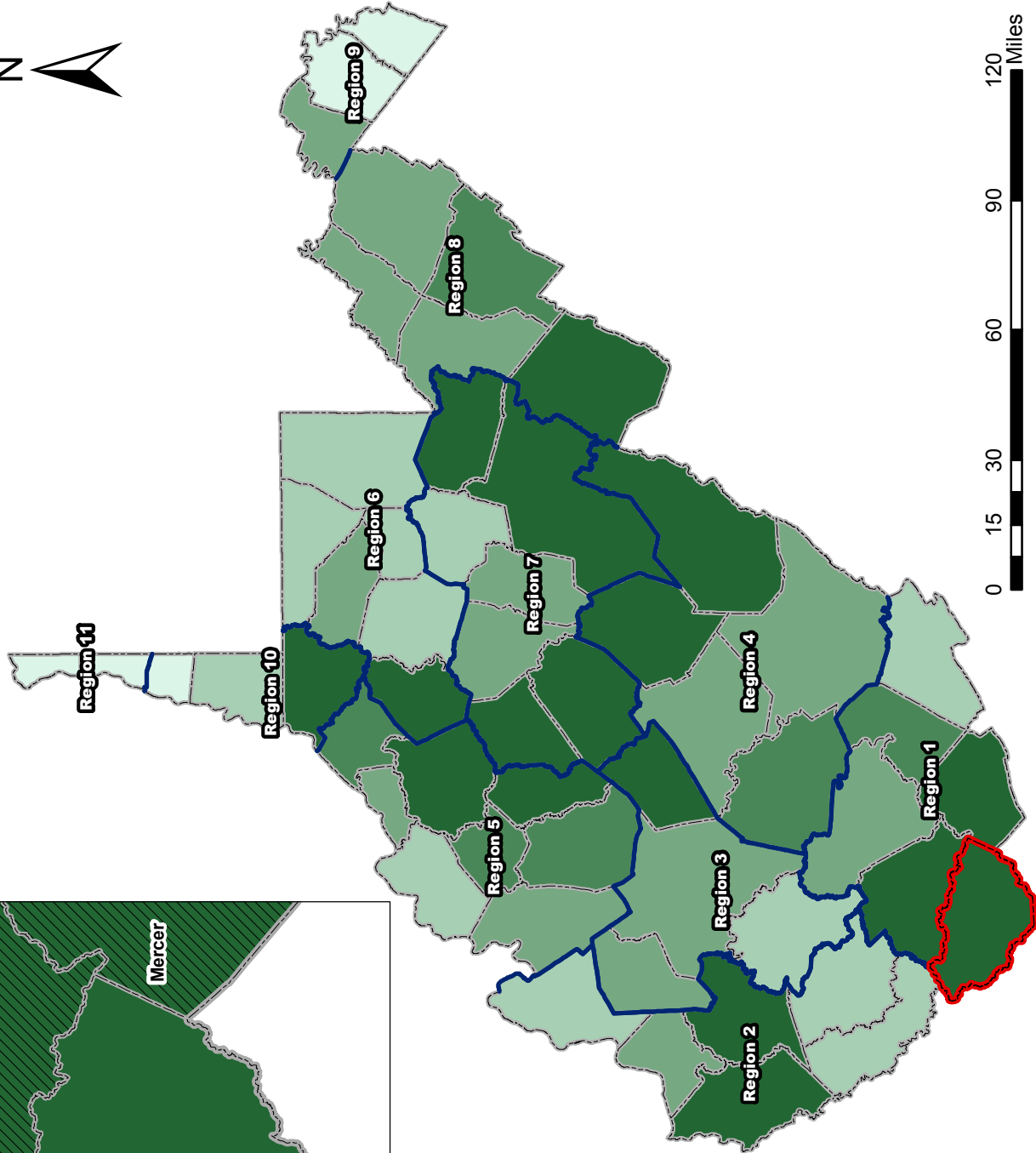
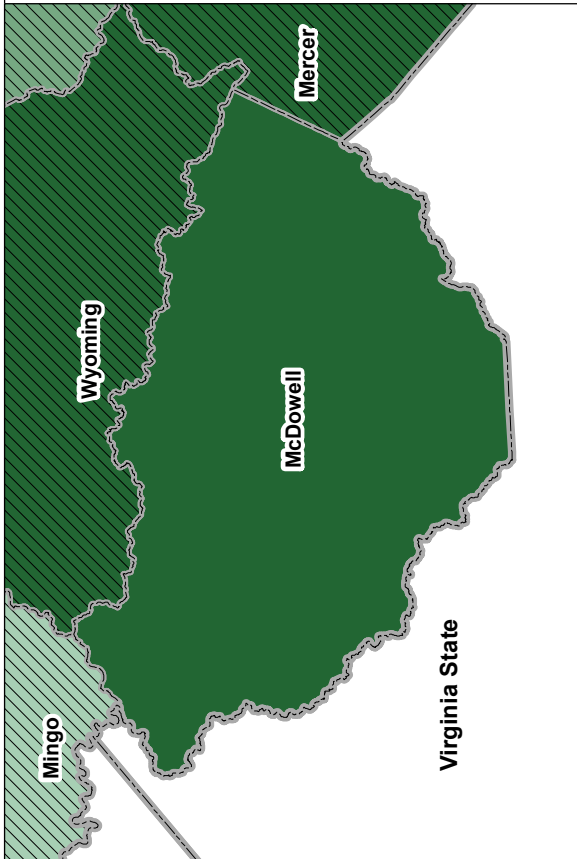
Source: West Virginia Geological and Economic Survey 2012

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Energy - Percent Forest Coverage

McDowell County



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

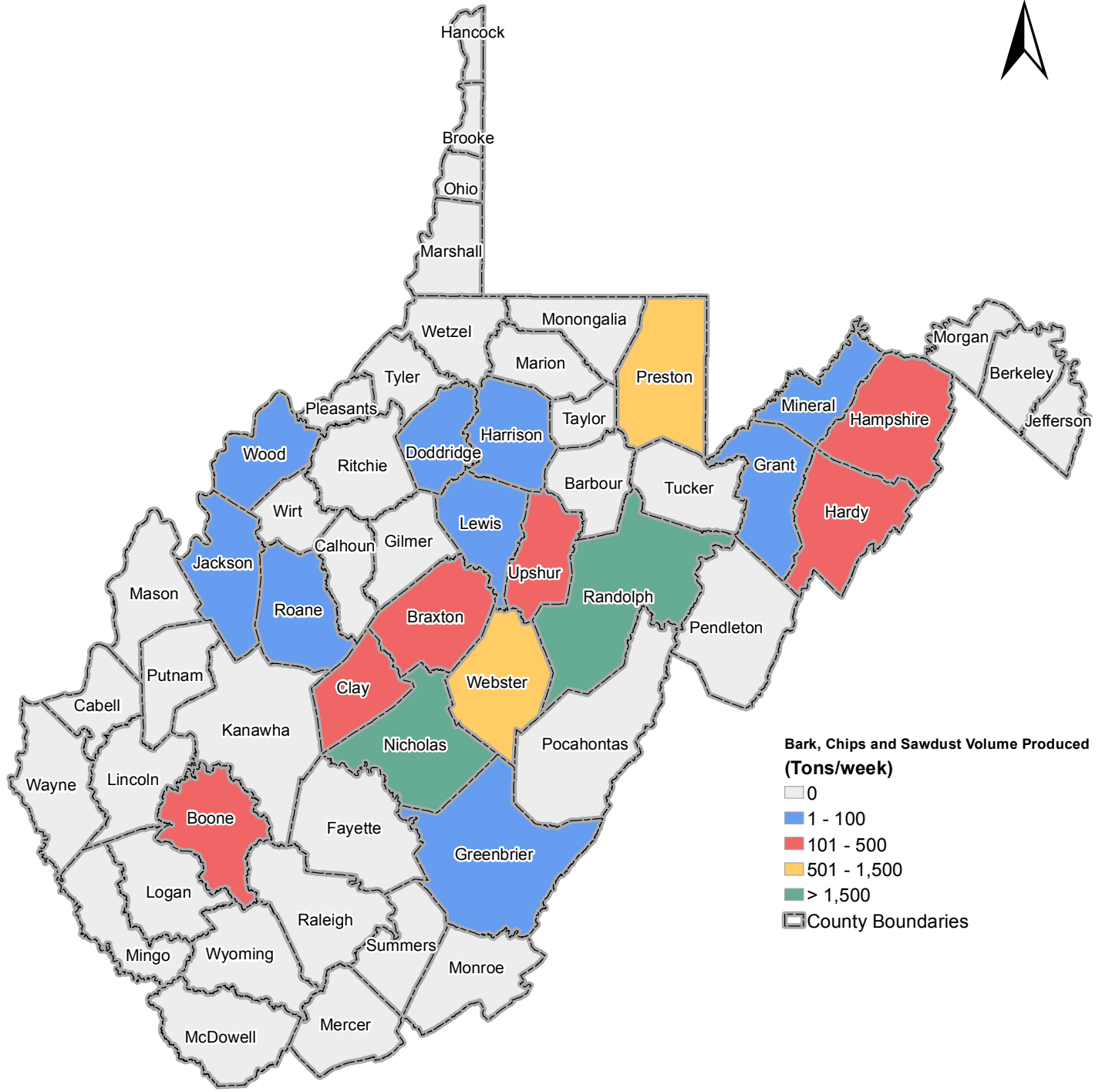
Source: Rahaal Transportation Institute 2013

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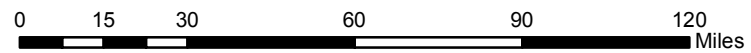
Renewable Energy - Wood By Products

Bark, Chip and Sawdust Volume Produced - McDowell County



Bark, Chips and Sawdust Volume Produced (Tons/week)

- 0
- 1 - 100
- 101 - 500
- 501 - 1,500
- > 1,500
- County Boundaries



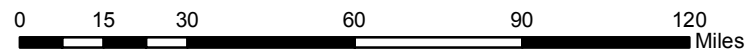
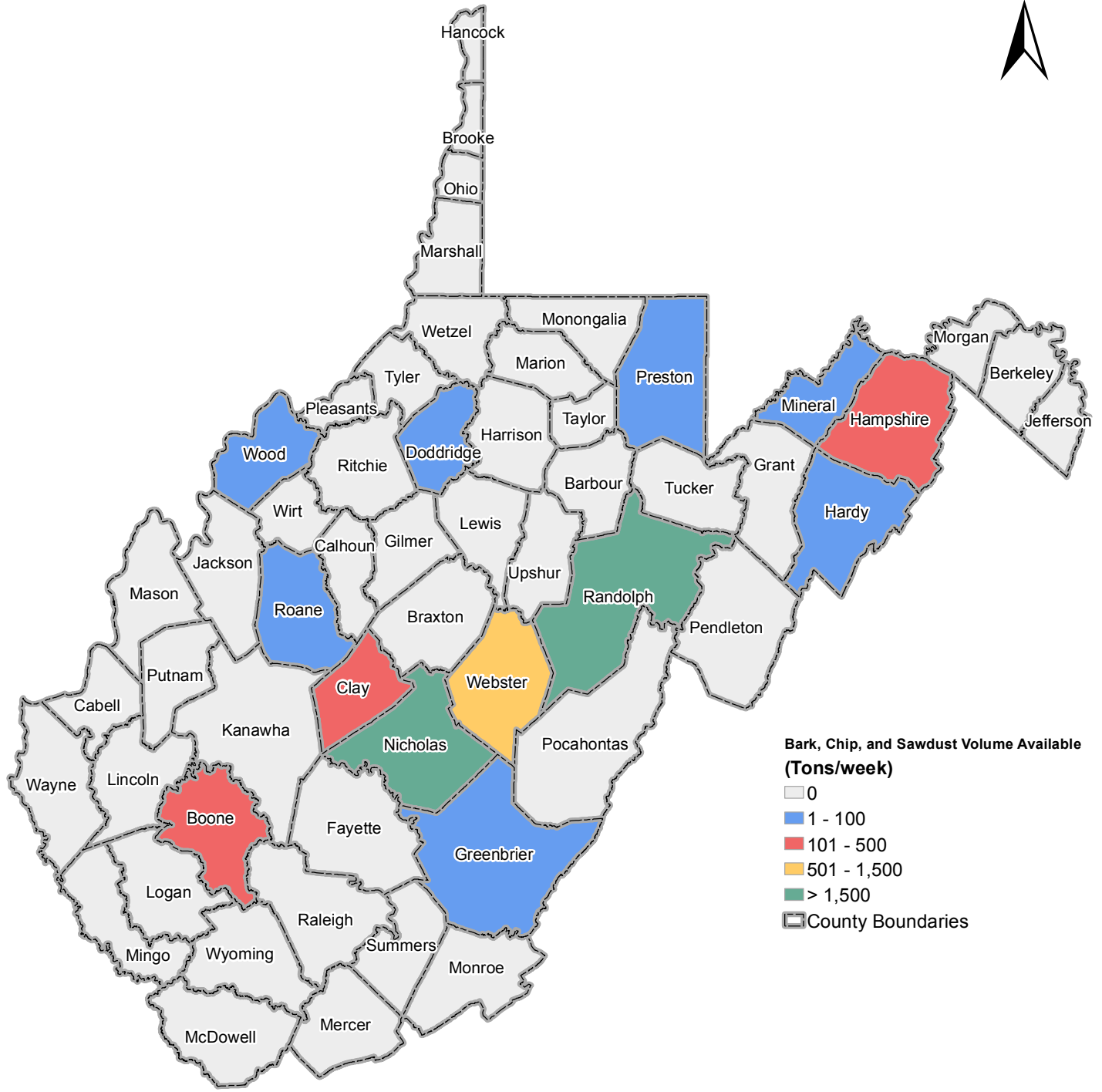
Source: Appalachian Hardwood Center 2011

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Renewable Energy - Wood By Products

Bark, Chip, and Sawdust Volume Available - McDowell County

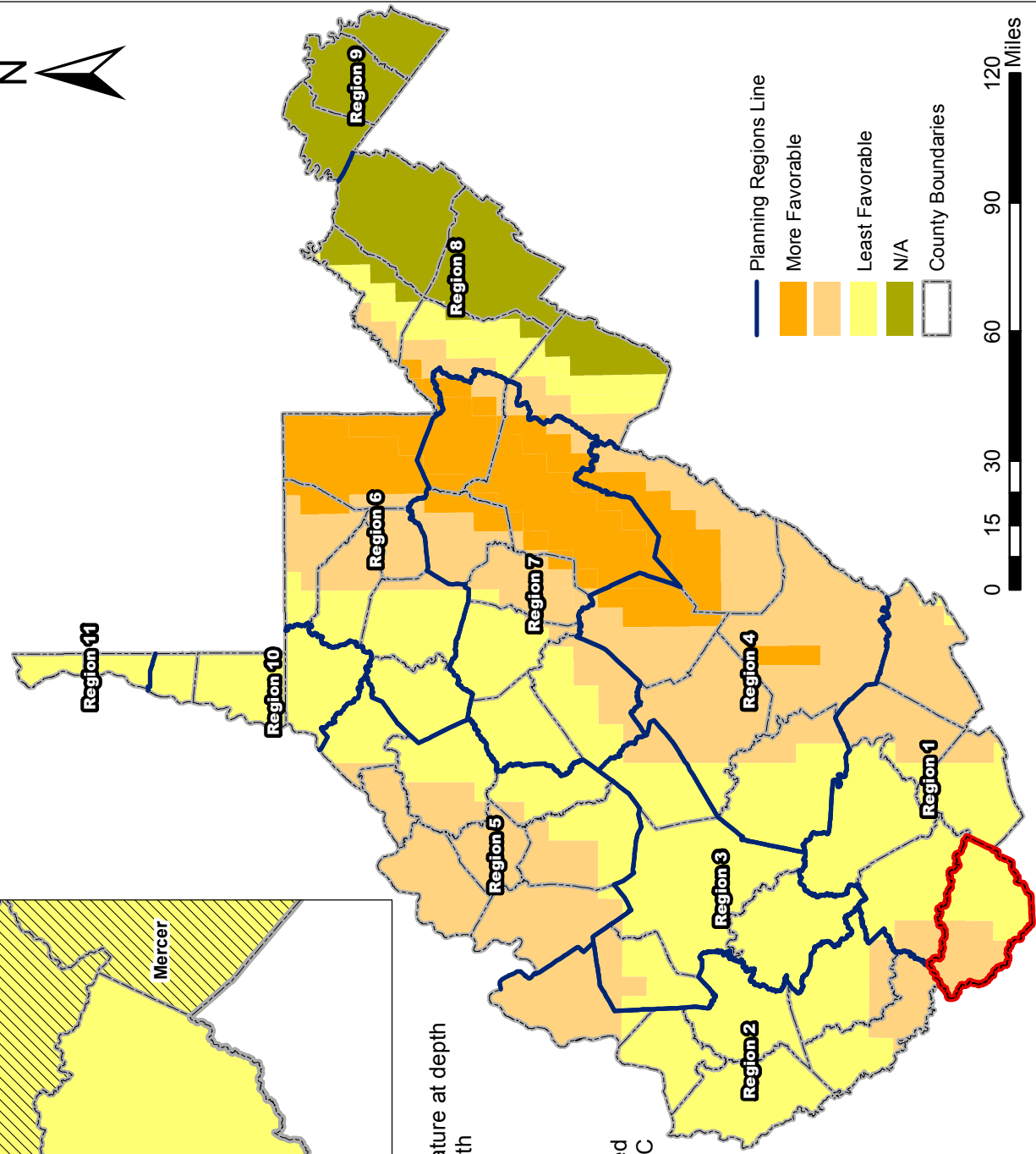
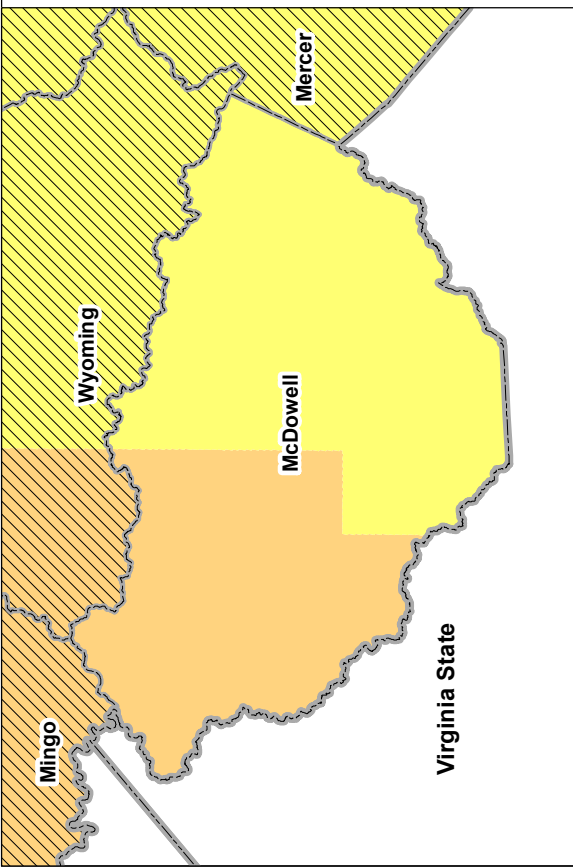


Source: Appalachian Hardwood Center 2011

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www.njrati.org

Energy - Geothermal Resource of Greenbrier County Favorability of Deep Enhanced Geothermal Systems



— Source data for deep EGS includes temperature at depth from 3 to 10 km and analyses (for regions with temperatures \geq 150 degrees C).

— Class values reflect relative favorability, with 1 being more favorable, 3 being least favorable, and "N/A" regions not having been assessed due to temperatures less than 150 degrees C at 10 km depth.

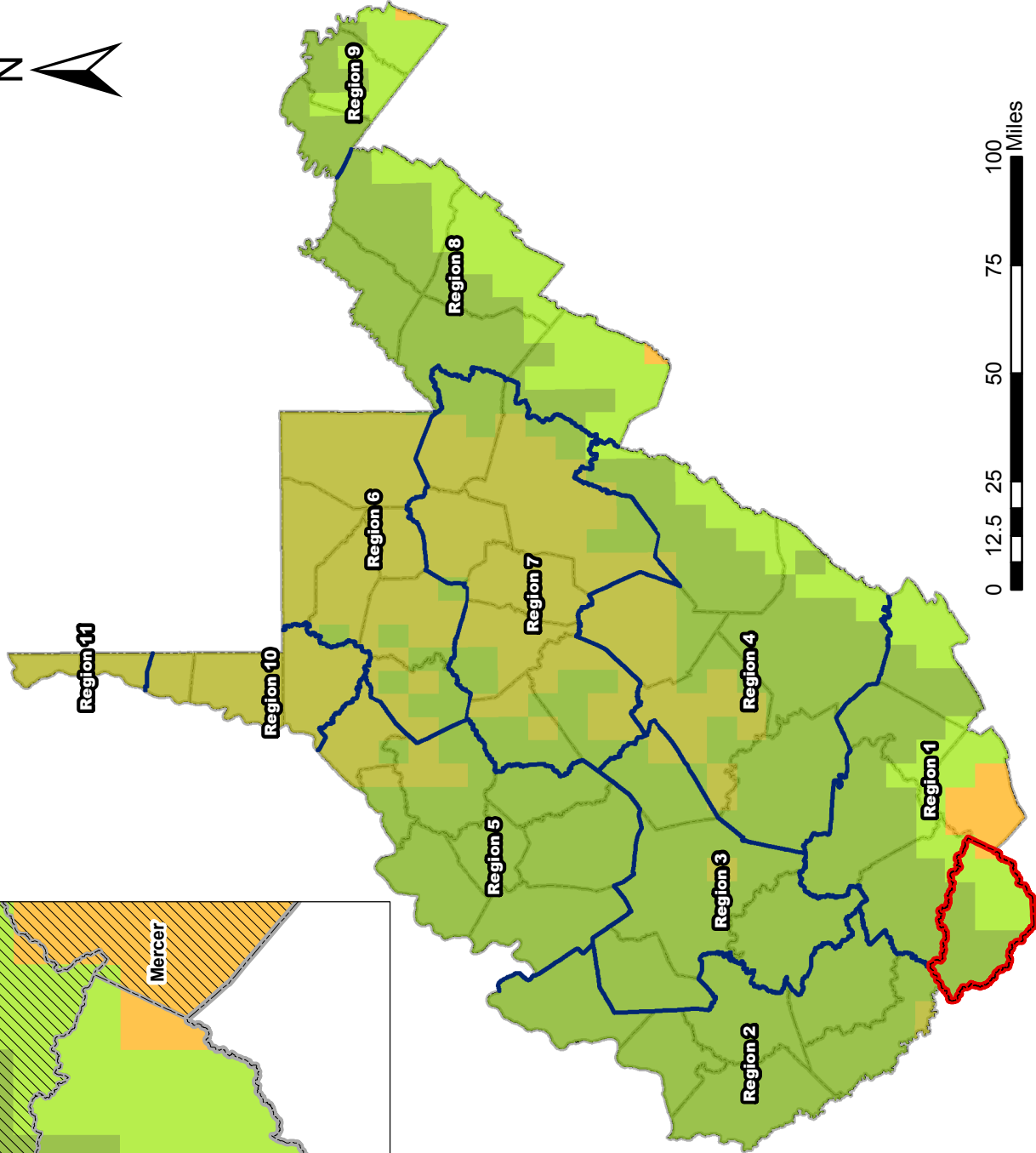
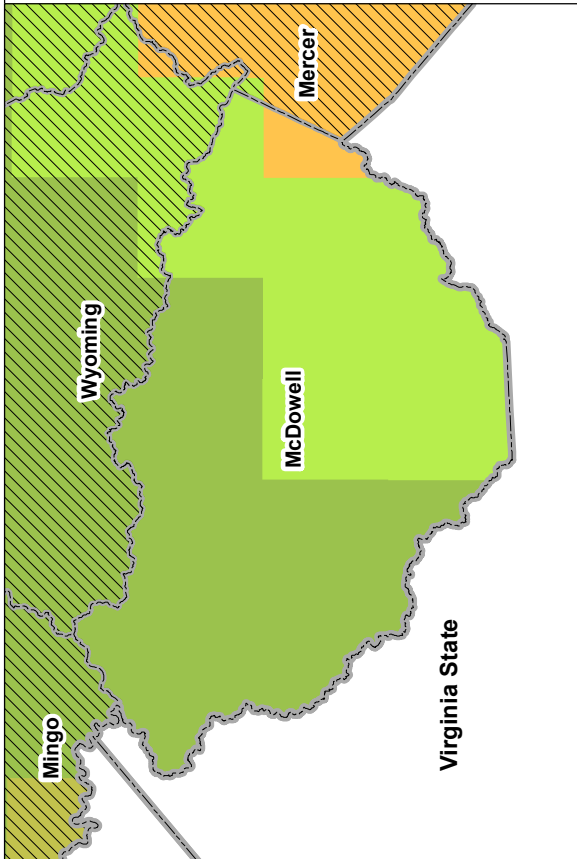
Source: National Renewable Energy Laboratory 2009

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Solar - Renewable Energy

McDowell 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

Source: National Renewable Energy Laboratory 2012

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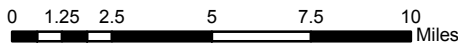


Renewable Energy-Wind

McDowell County



- US Routes
 - WV Routes
- Elevation (Feet)**
- 900 - 1540
 - 1541 - 1900
 - 1901 - 2160
 - 2161 - 2520
 - 2521 - 3100
- 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

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 McDowell. 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 given 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.

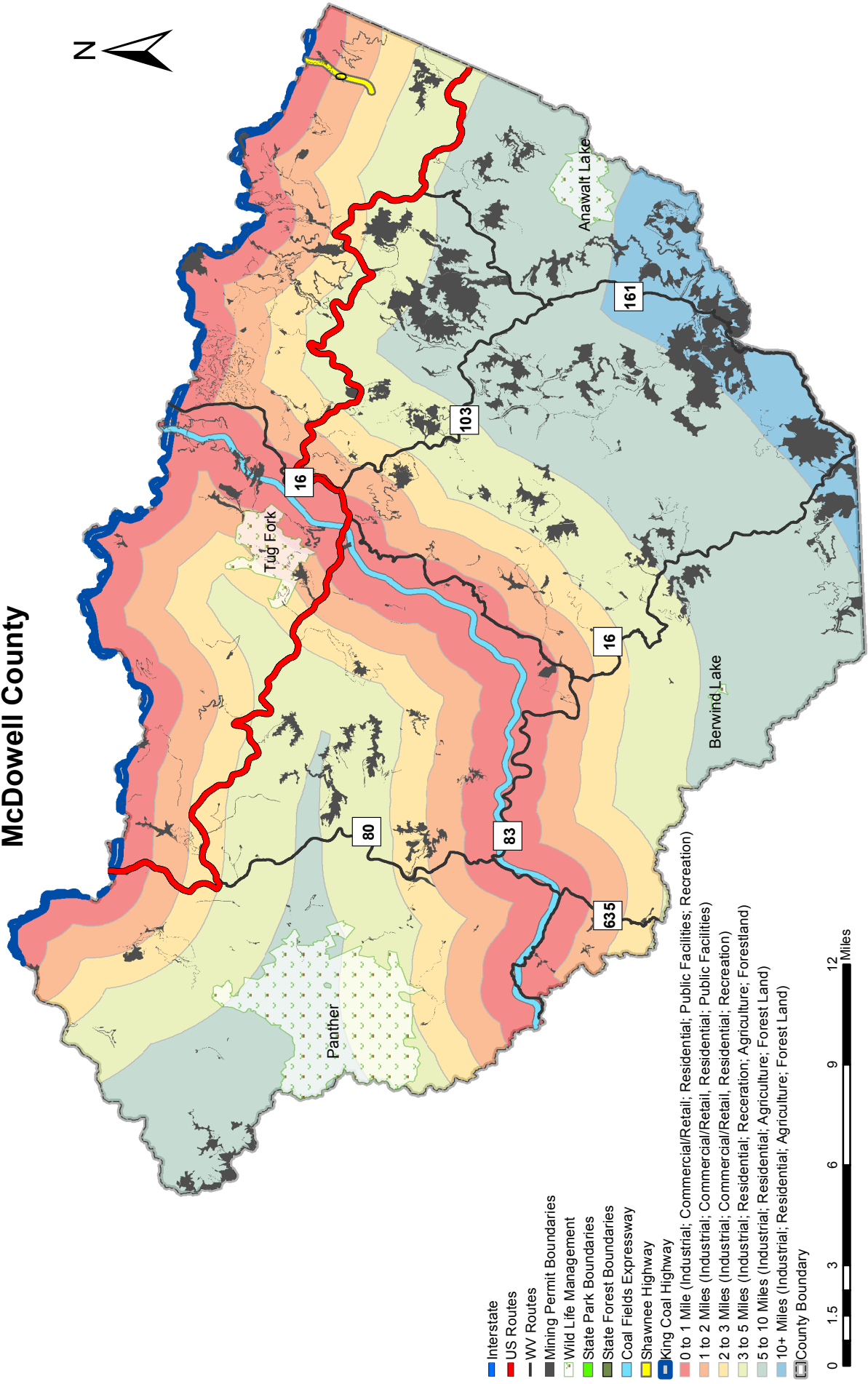
Table 2: Smart Planning Utilizations

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 the county economic development authority as designated by West Virginia Code Chapter 05B Article 2A.

Landuse Criteria

McDowell County



- Interstate
- US Routes
- WV Routes
- Mining Permit Boundaries
- Wild Life Management
- State Park Boundaries
- State Forest Boundaries
- Coal Fields Expressway
- Shawnee Highway
- King Coal Highway
- 0 to 1 Mile (Industrial; Commercial/Retail; Residential; Public Facilities; Recreation)
- 1 to 2 Miles (Industrial; Commercial/Retail; Residential; Public Facilities)
- 2 to 3 Miles (Industrial; Commercial/Retail; Residential; Recreation)
- 3 to 5 Miles (Industrial; Residential; Agriculture; Forestland)
- 5 to 10 Miles (Industrial; Residential; Agriculture; Forest Land)
- 10+ Miles (Industrial; Residential; Agriculture; Forest Land)
- County Boundary



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 mines sites located in McDowell County to produce an inventory of sites for analysis. The source for site information was primarily the West Virginia Department of Environment 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.

Some mine sites are active sites where mining is currently going on and other sites are in various phases of bond. The potential mining site for development is the one that is not complete released or still active. There are 33 potential mining sites for development in McDowell County, which are included in the following table.

Table 3: McDowell County Potential Surface Mine Sites for Development

Site No.	Permittee	Permit_ID	Facility Name	Acres	Expiration Date	Nearest Post Office
1	Baystar Coal Company Inc	S400698	Newhall surface mine	52.43	9/6/16	Cucumber
2	Black Wolf Mining Company	S400307	Red Hawk Surface Mine	311.89	2/23/14	Cucumber
3	Black Wolf Mining Company	S400200	Navaro Surface Mine No. 2	301.26	2/21/13	Elbert & Thorpe
4	Black Wolf Mining Company	S400597	NAVARO SURFACE MINING OPERATIO	177.58	10/15/12	Elbert
5	Bluestone Coal Corporation	S007282	RED FOX SURFACE MINE	1292.36	8/2/17	unknown

Site No.	Permittee	Permit_ID	Facility Name	Acres	Expiration Date	Nearest Post Office
6	Bluestone Coal Corporation	S401996	12 SEAM AUGER MINE	36.84	12/18/16	Keystone
7	Consolidation Coal Company	S400501	Amonate Auger No. 1	42.57	9/6/06	Valls creek
8	Consolidation Coal Company	S400403	Amonate Auger No. 2	221.53	11/21/13	Valls creek
9	Gmax Inc	S401110	Spice Creek Strip	122.12	7/5/16	Gary
10	Gs Energy, Llc	S400507	Garland Surface Mine	253.71	1/27/16	Avondale
11	Justice Highwall Mining, Inc.	S400905	Big Br. Highwall Mine Poca #12	219.6	11/3/16	Northfork
12	Kentucky Fuel Corporation	S400305	Puncheoncamp Thin Seam Mine #2	60.78	10/3/10	Welch
13	Kentucky Fuel Corporation	S400504	Puncheoncamp Thin Seam Mine	51.5	12/20/09	Welch
14	Met Resources, Llc	S402309	Puncheoncamp Surface Mine	174.54	3/20/17	Anawalt
15	Mid-Vol Coal Sales, Inc.	S400609	State Line Strip	360.46	4/4/17	Jenkinjones
16	Mid-Vol Coal Sales, Inc.	S400709	Dry Branch Surface Mine	259.52	3/25/16	Anawalt
17	Mid-Vol Coal Sales, Inc.	S400906	Paradise Surface Mine	375.86	3/24/18	Squire

Site No.	Permittee	Permit_ID	Facility Name	Acres	Expiration Date	Nearest Post Office
18	Mid-Vol Coal Sales, Inc.	S006879	FREEMAN BRANCH SURFACE MINE	180	7/8/07	Skygusty
19	Mid-Vol Coal Sales, Inc.	S400198	Road Fork Surface Mine No. 3	87	12/17/14	Jenkinjones
20	Mid-Vol Coal Sales, Inc.	S400700	Harmon Branch Auger	65.9	4/30/16	Thorpe
21	Mid-Vol Coal Sales, Inc.	S400705	Eckman No. 2	444.14	2/5/17	Thorpe
22	Mid-Vol Coal Sales, Inc.	S400797	FREEMAN BRANCH #2	487.43	12/5/17	Elbert
23	Mid-Vol Coal Sales, Inc.	S401096	ECKMAN SURFACE MINE NO. 1	572.11	8/14/16	Eckman
24	Mid-Vol Coal Sales, Inc.	S401500	Route 161 Surface Mine	141.88	1/23/14	Jenkinjones
25	Mid-Vol Coal Sales, Inc.	S401999	Proposed Cactus Ridge Surface	686.13	11/16/15	Squire
26	Mid-Vol Coal Sales, Inc.	S402089	N/A	48.84	10/23/14	Jenkinjones
27	Mid-Vol Coal Sales, Inc.	S403192	N/A	342.25	10/15/13	Jenkinjones
28	Southern Minerals Inc	S400309	Superior Auger	5.11	6/3/15	Kimball
29	Southern Minerals Inc	S400909	Upper Shannon Branch Mine No.	86.63	9/30/15	Welch

Site No.	Permittee	Permit_ID	Facility Name	Acres	Expiration Date	Nearest Post Office
30	Southern Minerals Inc	S401809	Upper Shannon Branch Mine No.2	199	1/18/17	Welch
31	Southern Minerals Inc	S400406	Big Four Surface Mine No. 2	58.93	9/27/16	Wilcoe
32	Southern Minerals Inc	S401201	Big Four Surface Mine	100.93	10/23/12	Welch
33	Twin Star Mining Inc	S401197	Bull Creek Surface Mine No. 1	251	4/28/13	Panther

Site Analysis (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	Proposed Highway
1	S400698	51.13	I77	1.27	S16	0.75	Delta 55, Six Bottom Road	13.73
2	S400307	53.77	I77	4.65	S16	0.24	Berwind Lookout Tower Rd.	14.77
3	S400200	37.25	I77	7.51	US-52	0.47	Coney Island-Filbert- Up #9	8.85
4	S400597	39.07	I77	9.34	US-52	0.77	Left Fork At Elbert	10.67
5	S007282	42.80	I77	3.35	S16	0.04	Dogwood Gap-Brewsterdale Rd	22.62
6	S401996	27.79	I77	5.17	US-52	0.53	Old Delta 17, Steel Road	0.94
7	S400501	54.41	I77	7.53	S16	0.96	Vall Creek Rt. Fork	20.04
8	S400403	46.98	I77	0.78	S16	0.73	WV 16	16.87

Site No.	Permit_ID	Interstate (IS)	Name - IS	Existing Highway (EH)	Name - EH	Paved Road	Paved Road Name	Proposed Highway
9	S401110	42.93	I77	13.22	US-52	0.65	Coney Island-Filbert- Up #9	14.56
10	S400507	55.70	I77	6.66	US-52	0.52	CRANE CREEK	6.15
11	S400905	32.86	I77	2.68	US-52	0.75	Bottle Creek Road	9.92
12	S400305	34.79	I77	0.56	S16	0.07	Indian Ridge Industrial Park	0.75
13	S400504	34.79	I77	0.56	S16	0.07	Indian Ridge Industrial Park	0.75
14	S402309	20.94	I77	1.18	US-52	0.58	Peeled Chestnut Ridge	9.42
15	S400609	36.15	I77	7.56	S16	0.31	WV 161	19.38
16	S400709	25.17	I77	3.05	US-52	0.66	WV 161	8.96
17	S400906	38.06	I77	6.45	S16	0.72	WV 161	21.30
18	S006879	35.28	I77	9.17	S16	0.66	WV 161	18.52
19	S400198	33.83	I77	10.06	S16	0.40	WV 161	17.07
20	S400700	32.69	I77	6.53	US-52	0.16	Harmon Branch road	9.75
21	S400705	31.94	I77	4.79	US-52	0.40	Jarrett Hollow-Leslie Branch	9.00
22	S400797	44.82	I77	15.12	US-52	0.91	Coney Island-Filbert- Up #9	16.46
23	S401096	30.86	I77	3.71	US-52	0.33	Jarrett Hollow-Leslie Branch	7.93
24	S401500	35.51	I77	7.77	S16	0.11	WV 161	18.74
25	S401999	38.31	I77	6.91	S16	1.06	WV 161	21.52
26	S402089	34.64	I77	9.25	S16	0.42	WV 161	17.87
27	S403192	35.28	I77	9.17	S16	0.66	WV 161	18.52
28	S400309	35.38	I77	0.85	US-52	0.14	OLD 52/AIRPORT ROAD	3.86
29	S400909	37.74	I64	1.76	S16	0.39	Coalfields Expressway	0.21

Site No.	Permit_ID	Interstate (IS)	Name - IS	Existing Highway (EH)	Name - EH	Paved Road	Paved Road Name	Proposed Highway
30	S401809	37.19	I64	1.54	S16	0.02	Coalfields Expressway	0.18
31	S400406	37.51	I77	2.35	US-52	0.37	Mount View High School Road (D-27)	5.91
32	S401201	34.34	I77	0.68	US-52	0.64	US 52	5.67
33	S401197	65.04	I64	14.69	US-52	0.80	Right Fork Of Bull Creek Rd	11.07

Table 5: Distances from Sites to Major Airports

Site No.	Permit_ID	Permittee	Tri-State	Yeager
1	S400698	Baystar Coal Company Inc	137.89	113.27
2	S400307	Black Wolf Mining Company	136.84	115.27
3	S400200	Black Wolf Mining Company	133.89	103.56
4	S400597	Black Wolf Mining Company	135.71	105.38
5	S007282	Bluestone Coal Corporation	145.79	120.98
6	S401996	Bluestone Coal Corporation	136.68	99.33
7	S400501	Consolidation Coal Company	142.12	120.03
8	S400403	Consolidation Coal Company	140.03	116.43
9	S401110	Gmax Inc	139.57	109.25
10	S400507	Gs Energy, Llc	117.01	106.48
11	S400905	Justice Highwall Mining, Inc.	137.20	104.66
12	S400305	Kentucky Fuel Corporation	125.89	91.14
13	S400504	Kentucky Fuel Corporation	125.89	91.14
14	S402309	Met Resources, Llc	143.74	106.37

Site No.	Permit ID	Permittee	Tri-State	Yeager
15	S400609	Mid-Vol Coal Sales, Inc.	144.69	114.36
16	S400709	Mid-Vol Coal Sales, Inc.	142.93	105.94
17	S400906	Mid-Vol Coal Sales, Inc.	146.60	116.26
18	S006879	Mid-Vol Coal Sales, Inc.	143.82	113.50
19	S400198	Mid-Vol Coal Sales, Inc.	142.37	112.05
20	S400700	Mid-Vol Coal Sales, Inc.	134.78	104.46
21	S400705	Mid-Vol Coal Sales, Inc.	136.63	105.96
22	S400797	Mid-Vol Coal Sales, Inc.	141.46	111.15
23	S401096	Mid-Vol Coal Sales, Inc.	137.59	104.86
24	S401500	Mid-Vol Coal Sales, Inc.	144.06	113.73
25	S401999	Mid-Vol Coal Sales, Inc.	146.85	116.50
26	S402089	Mid-Vol Coal Sales, Inc.	143.18	112.85
27	S403192	Mid-Vol Coal Sales, Inc.	143.82	113.50
28	S400309	Southern Minerals Inc	130.52	98.01
29	S400909	Southern Minerals Inc	128.06	93.32
30	S401809	Southern Minerals Inc	127.52	92.79
31	S400406	Southern Minerals Inc	132.20	100.06
32	S401201	Southern Minerals Inc	132.33	99.85
33	S401197	Twin Star Mining Inc	108.86	107.03

Table 6: Shortest Distances from Sites to Other Transportation Methods

Site No.	Permit_ID	Railroad (RR)	Owner (RR)	Intermodal Terminal Facility (CSXT)	National Network Waterway (Big Sandy Rivers)	Huntington Port
1	S400698	0.82	NS	71.11	10.50	130.93
2	S400307	0.61	NS	70.07	11.36	129.89
3	S400200	0.54	NS	67.11	6.44	126.93
4	S400597	1.15	NS	68.93	7.19	128.75
5	S007282	2.00	NS	79.01	13.61	138.83
6	S401996	1.35	NS	68.59	9.17	129.73
7	S400501	1.46	NS	75.34	16.07	135.17
8	S400403	0.68	NS	73.26	14.44	133.08
9	S401110	1.25	NS	72.79	8.92	132.61
10	S400507	0.83	NS	50.23	3.69	110.05
11	S400905	1.07	NS	70.42	6.64	130.24
12	S400305	3.22	NS	57.79	3.28	118.93
13	S400504	3.22	NS	57.79	3.28	118.93
14	S402309	1.01	NS	75.65	11.40	136.79
15	S400609	0.90	NS	77.91	13.46	137.73
16	S400709	1.01	XXXX	75.23	10.09	135.97
17	S400906	1.77	NS	79.82	12.40	139.64
18	S006879	0.58	NS	77.05	12.03	136.87
19	S400198	0.43	NS	75.59	12.22	135.41
20	S400700	0.25	NS	68.00	6.25	127.83

Site No.	Permit_ID	Railroad (RR)	Owner (RR)	Intermodal Terminal Facility (CSXT)	National Network Waterway (Big Sandy Rivers)	Huntington Port
21	S400705	1.00	NS	69.85	6.30	129.68
22	S400797	1.43	NS	74.68	11.41	134.50
23	S401096	1.40	NS	70.81	6.47	130.64
24	S401500	0.25	NS	77.28	12.95	137.10
25	S401999	1.94	NS	80.07	12.06	139.90
26	S402089	0.49	NS	76.40	12.81	136.23
27	S403192	0.58	NS	77.05	12.03	136.87
28	S400309	0.14	NS	63.74	2.54	123.56
29	S400909	0.91	NS	59.96	0.86	121.11
30	S401809	1.05	NS	59.42	0.90	120.56
31	S400406	0.47	NS	65.42	3.53	125.24
32	S401201	0.58	NS	65.56	3.84	125.38
33	S401197	4.33	XXXX	42.09	4.22	101.91

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	S400698	3.62	City of War Sewer Department	0.83	McDowell County Public Service District
2	S400307	2.69	City of War Sewer Department	0.57	McDowell County Public Service District
3	S400200	0.29	City of Gary (Sewer)	0.53	City of Gary (Water)
4	S400597	1.10	City of Gary (Sewer)	1.07	City of Gary (Water)
5	S007282	5.12	City of Gary (Sewer)	1.49	McDowell County Public Service District
6	S401996	6.91	City of Welch	1.61	McDowell County Public Service District
7	S400501	6.21	City of War Sewer Department	1.94	McDowell County Public Service District
8	S400403	5.96	City of War Sewer Department	0.73	McDowell County Public Service District
9	S401110	1.21	City of Gary (Sewer)	1.06	City of Gary (Water)
10	S400507	3.33	Town of Bradshaw	3.38	McDowell County Public Service District
11	S400905	4.19	City of Welch	1.00	McDowell County Public Service District
12	S400305	2.01	City of Welch	0.29	City of Welch
13	S400504	2.01	City of Welch	0.29	City of Welch
14	S402309	5.54	City of Gary (Sewer)	1.00	McDowell County Public Service District
15	S400609	5.02	City of Gary (Sewer)	3.45	McDowell County Public Service District
16	S400709	3.90	City of Gary (Sewer)	0.91	Anawalt Municipal Water Works
17	S400906	3.76	City of Gary (Sewer)	3.27	McDowell County Public Service District
18	S006879	3.71	City of Gary (Sewer)	2.34	McDowell County Public Service District
19	S400198	4.59	City of Gary (Sewer)	1.40	McDowell County Public Service District
20	S400700	0.16	City of Gary (Sewer)	0.16	City of Gary (Water)

Site No.	Permit ID	Sewer Lines	Public Utility - SL	Water Lines	Public Utility - WL
21	S400705	0.77	City of Gary (Sewer)	0.76	City of Gary (Water)
22	S400797	2.93	City of Gary (Sewer)	2.62	McDowell County Public Service District
23	S401096	1.78	City of Gary (Sewer)	1.22	McDowell County Public Service District
24	S401500	4.65	City of Gary (Sewer)	2.80	McDowell County Public Service District
25	S401999	3.41	City of Gary (Sewer)	3.16	McDowell County Public Service District
26	S402089	4.82	City of Gary (Sewer)	2.21	McDowell County Public Service District
27	S403192	3.71	City of Gary (Sewer)	2.34	McDowell County Public Service District
28	S400309	0.12	City of Welch	0.21	City of Welch
29	S400909	0.56	City of Welch	0.55	City of Welch
30	S401809	0.89	City of Welch	0.61	McDowell County Public Service District
31	S400406	0.85	City of Welch	0.35	City of Welch
32	S401201	1.07	City of Welch	0.68	City of Welch
33	S401197	11.30	Justice Public Service District	8.04	Town of Gilbert Water Works

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

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
1	S400698	0.42	War Telephone Company	1.31	Sub-Transmission	Unknown
2	S400307	0.57	War Telephone Company	0.62	Sub-Transmission	Unknown
3	S400200	0.47	Shentel Cable Company	1.58	Transmission	115-138
4	S400597	0.90	Citizens Telecommunications Company of West Virginia	2.37	Transmission	115-138
5	S007282	1.48	War Telephone Company	0.12	Sub-Transmission	Unknown
6	S401996	0.43	Shentel Cable Company	0.36	Sub-Transmission	Unknown
7	S400501	0.96	War Telephone Company	0.01	Transmission	115-138
8	S400403	0.39	War Telephone Company	1.01	Transmission	115-138
9	S401110	0.65	Shentel Cable Company	4.10	Transmission	115-138
10	S400507	2.41	Frontier West Virginia, Inc.	1.21	Transmission	115-138

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
11	S400905	0.81	Citizens Telecommunications Company of West Virginia	0.84	Transmission	765
12	S400305	0.29	War Telephone Company	0.47	Sub-Transmission	Unknown
13	S400504	0.29	War Telephone Company	0.47	Sub-Transmission	Unknown
14	S402309	0.74	Citizens Telecommunications Company of West Virginia	0.07	Sub-Transmission	Unknown
15	S400609	1.32	Shentel Cable Company	0.95	Transmission	765
16	S400709	0.57	Citizens Telecommunications Company of West Virginia	0.59	Sub-Transmission	Unknown
17	S400906	1.87	Shentel Cable Company	0.83	Sub-Transmission	Unknown
18	S006879	0.55	Shentel Cable Company	1.93	Sub-Transmission	Unknown
19	S400198	0.74	Shentel Cable Company	0.84	Transmission	765
20	S400700	0.87	Shentel Cable Company	0.85	Transmission	500

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
21	S400705	1.40	Shentel Cable Company	0.17	Transmission	500
22	S400797	1.07	Shentel Cable Company	2.04	Sub-Transmission	Unknown
23	S401096	1.12	Shentel Cable Company	0.60	Transmission	115-138
24	S401500	0.69	Shentel Cable Company	1.08	Transmission	765
25	S401999	1.86	Shentel Cable Company	1.14	Sub-Transmission	Unknown
26	S402089	0.69	Shentel Cable Company	0.71	Transmission	765
27	S403192	0.55	Shentel Cable Company	1.93	Sub-Transmission	Unknown
28	S400309	0.65	Citizens Telecommunications Company of West Virginia	0.21	Transmission	115-138
29	S400909	0.58	War Telephone Company	0.58	Transmission	115-138
30	S401809	0.30	Shentel Cable Company	0.49	Transmission	115-138

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
31	S400406	0.62	Citizens Telecommunications Company of West Virginia	0.10	Transmission	115-138
32	S401201	0.86	Citizens Telecommunications Company of West Virginia	0.34	Transmission	115-138
33	S401197	6.09	Frontier West Virginia, Inc.	5.79	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	S400698	28.17	McDowell Co. Landfill	9.47	WAR CITY OF
2	S400307	29.65	McDowell Co. Landfill	8.11	WAR CITY OF
3	S400200	18.52	McDowell Co. Landfill	4.09	GARY CITY OF
4	S400597	20.34	McDowell Co. Landfill	5.92	GARY CITY OF
5	S007282	36.00	McDowell Co. Landfill	16.86	Junction 161 & 84 MHP
6	S401996	24.44	McDowell Co. Landfill	5.26	
7	S400501	34.93	McDowell Co. Landfill	13.40	WAR CITY OF
8	S400403	31.32	McDowell Co. Landfill	11.30	WAR CITY OF
9	S401110	24.23	McDowell Co. Landfill	9.80	GARY CITY OF

Site No.	Permit_ID	Sewer Treatment (ST)	Facility Name (ST)	Solid Waste Treatment (SWT)	Facility Name (SWT)
10	S400507	21.22	McDowell Co. Landfill	2.29	Sandy River Middle School WTP
11	S400905	19.67	McDowell Co. Landfill	2.70	Kimball Elementary School
12	S400305	13.64	McDowell Co. Landfill	2.39	John D. Rockefeller IV Industrial Pk
13	S400504	13.64	McDowell Co. Landfill	2.39	John D. Rockefeller IV Industrial Pk
14	S402309	28.56	McDowell Co. Landfill	6.40	
15	S400609	29.34	McDowell Co. Landfill	10.20	Junction 161 & 84 MHP
16	S400709	27.56	McDowell Co. Landfill	2.20	Junction 161 & 84 MHP
17	S400906	31.25	McDowell Co. Landfill	12.11	Junction 161 & 84 MHP
18	S006879	28.48	McDowell Co. Landfill	9.34	Junction 161 & 84 MHP
19	S400198	27.03	McDowell Co. Landfill	7.88	Junction 161 & 84 MHP
20	S400700	19.41	McDowell Co. Landfill	4.99	GARY CITY OF
21	S400705	21.26	McDowell Co. Landfill	4.37	ELIZABETH BREWERY APTS.
22	S400797	26.13	McDowell Co. Landfill	11.70	GARY CITY OF
23	S401096	22.22	McDowell Co. Landfill	3.30	ELIZABETH BREWERY APTS.
24	S401500	28.70	McDowell Co. Landfill	9.56	Junction 161 & 84 MHP
25	S401999	31.48	McDowell Co. Landfill	12.33	Junction 161 & 84 MHP
26	S402089	27.83	McDowell Co. Landfill	8.69	Junction 161 & 84 MHP
27	S403192	28.48	McDowell Co. Landfill	9.34	Junction 161 & 84 MHP
28	S400309	12.98	McDowell Co. Landfill	0.94	
29	S400909	10.34	McDowell Co. Landfill	2.40	WELCH CITY OF
30	S401809	10.12	McDowell Co. Landfill	2.18	WELCH CITY OF

Site No.	Permit_ID	Sewer Treatment (ST)	Facility Name (ST)	Solid Waste Treatment (SWT)	Facility Name (SWT)
31	S400406	15.03	McDowell Co. Landfill	1.67	Tom's Mountain MHP
32	S401201	14.80	McDowell Co. Landfill	1.38	KMart #3961
33	S401197	30.70	McDowell Co. Landfill	12.15	Panther State Forest

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	S400698	11.28	Dominion Transmission Inc.	1.33	Unknown
2	S400307	10.62	Dominion Transmission Inc.	0.65	Unknown
3	S400200	11.11	Dominion Transmission Inc.	2.12	C
4	S400597	10.90	Dominion Transmission Inc.	2.98	C
5	S007282	15.76	Dominion Transmission Inc.	4.58	Unknown
6	S401996	2.08	Dominion Transmission Inc.	0.96	Unknown
7	S400501	13.02	Dominion Transmission Inc.	0.15	Unknown
8	S400403	13.69	Dominion Transmission Inc.	1.98	Unknown
9	S401110	12.69	Dominion Transmission Inc.	3.62	C
10	S400507	0.44	Dominion Transmission Inc.	0.21	CL
11	S400905	4.85	Dominion Transmission Inc.	1.59	CN
12	S400305	4.95	Columbia Gas Transmission Corp.	1.34	CN
13	S400504	4.95	Columbia Gas Transmission Corp.	1.34	CN
14	S402309	7.25	Dominion Transmission Inc.	0.37	CN
15	S400609	15.52	Dominion Transmission Inc.	6.19	CN

Site No.	Permit_ID	Gas Pipe (GP)	Company Name (GP)	Oil Pipe (OP)	Company Name (OP)
16	S400709	7.82	Dominion Transmission Inc.	0.76	CN
17	S400906	15.64	Dominion Transmission Inc.	5.71	C
18	S006879	14.39	Dominion Transmission Inc.	5.49	CN
19	S400198	13.32	Dominion Transmission Inc.	4.02	CN
20	S400700	9.20	Dominion Transmission Inc.	3.45	C
21	S400705	8.45	Dominion Transmission Inc.	4.09	C
22	S400797	14.42	Dominion Transmission Inc.	5.41	C
23	S401096	7.42	Dominion Transmission Inc.	3.53	Unknown
24	S401500	14.87	Dominion Transmission Inc.	5.60	CN
25	S401999	15.49	Dominion Transmission Inc.	5.37	C
26	S402089	14.18	Dominion Transmission Inc.	4.80	CN
27	S403192	14.39	Dominion Transmission Inc.	5.49	CN
28	S400309	8.19	Dominion Transmission Inc.	2.60	Unknown
29	S400909	5.45	Dominion Transmission Inc.	1.34	C
30	S401809	5.11	Dominion Transmission Inc.	1.29	C
31	S400406	9.06	Dominion Transmission Inc.	2.65	C
32	S401201	8.89	Dominion Transmission Inc.	2.88	C
33	S401197	6.06	Columbia Gas Transmission Corp.	6.08	CL

Suitability Model

The suitability model for McDowell 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 researcher, 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, our own research on the existing conditions in McDowell County and expert advice about important factors to site development.¹⁴ Then, scores for each site are given by comparing the closest distance from the site to all factors within given distance thresholds. There are three sets of scores in this suitability model: **absolute scores**, **relative scores** 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 sharpen difference between all sites in a certain category and therefore aid the decision maker. For example, two sites may 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.

¹⁴ Joseph, M. (2006). A Decision-Support Model of Land Suitability Analysis for the Ohio Lake Erie Balanced Growth Program. EcoCity Cleveland.

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

$$\text{Total score of site A} = \sum (\text{absolute score} \times \text{relative score} \times \text{weight})_{ci} / 10 \quad (\text{ci: criteria i})$$

Sites with higher total scores reveal a higher chance of being developed. Total score will vary according to a combination of three components: weights, absolute scores, and relative scores. In this report, 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 McDowell 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 McDowell 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	
		10	7.5	5	2.5	
No.	Criteria	Min	Q1	Q2	Q3	Max
1	Interstate	-	-	-	-	-
2	Existing Highway	0.56	1.65	5.17	8.47	15.12
3	Proposed Highway	0.18	6.03	10.67	18.20	22.62
4	Yeager Airport	42.09	65.49	70.81	76.02	80.07
5	Tri-State Airport	20.94	34.09	36.15	42.86	65.04
6	National Waterway Network Ports	101.91	125.31	130.64	136.51	139.90
7	Sewer Treatment Facilities	10.12	18.97	26.13	29.02	36.00
8	Solid Waste Treatment Facilities	0.94	2.39	6.40	10.00	16.86
9	National Waterway Network	108.86	132.27	137.59	143.46	146.85
10	Intermodal Terminal Facilities	91.14	101.81	106.48	113.61	120.98
11	Sewer Lines	0.29	0.55	0.69	1.09	6.09
12	Railroads	0.44	6.66	10.62	14.28	15.76
13	Water Lines	0.86	4.03	9.17	12.14	16.07
14	Power Lines	0.01	0.42	0.83	1.26	5.79
15	Gas Pipes	0.15	1.33	2.88	5.08	6.19
16	Pipe Lines	0.14	0.58	1.00	1.41	4.33
17	Broadband	0.12	1.09	3.41	4.74	11.30

3. McDowell County’s Suitability Model:

Table 14 shows the total scores of all studied sites in McDowell County. Site No-28 (Permit ID = S400309) has the highest score of 822. 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 33 potential development sites of McDowell County, it is easy to notice the top five most suitable sites for investment.

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 McDowell 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.

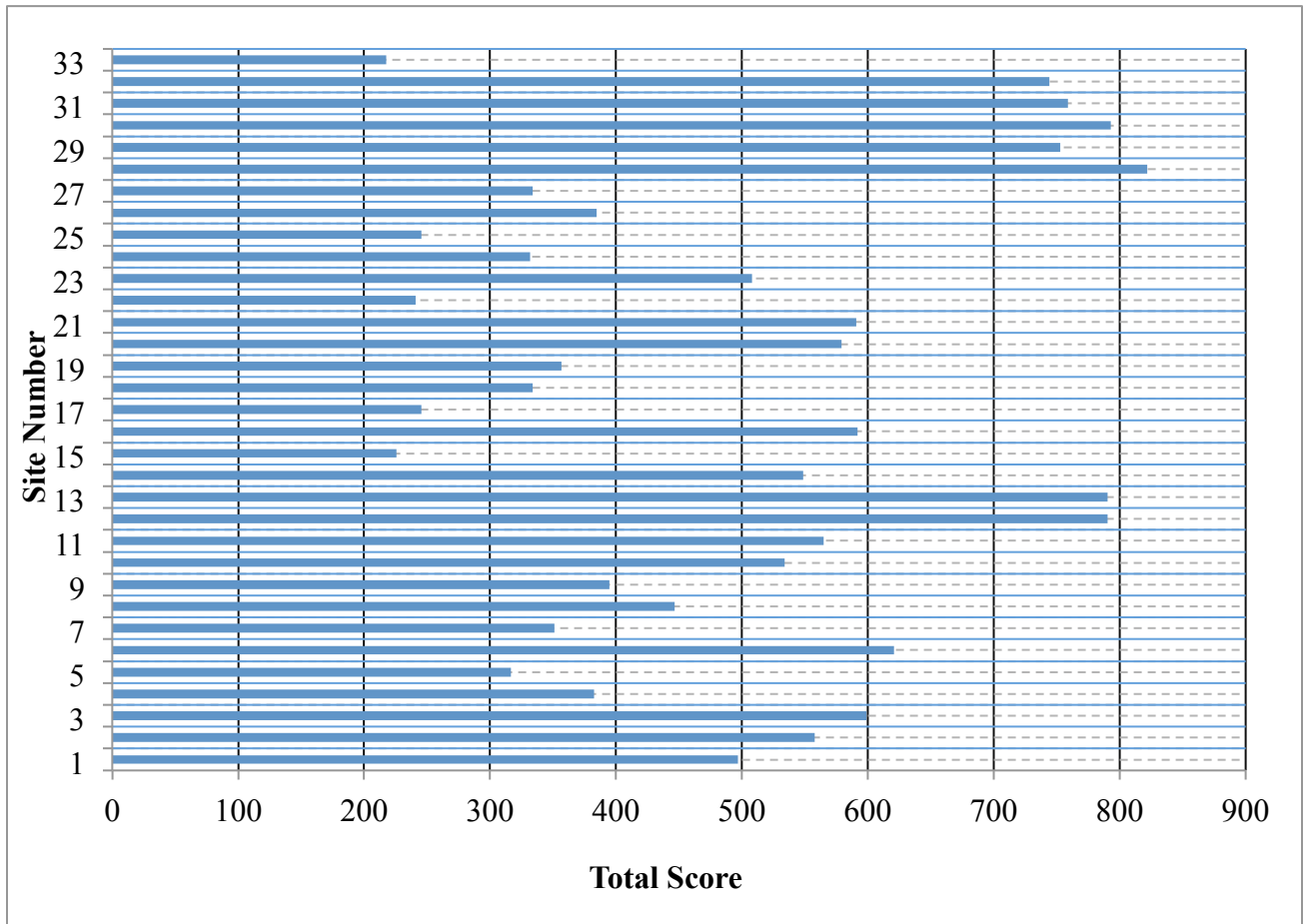
Table 14: Total score of all surface coal mining sites in McDowell County

Site No.	Permittee	Permit_ID	Score
1	Baystar Coal Company Inc	S400698	497
2	Black Wolf Mining Company	S400307	558
3	Black Wolf Mining Company	S400200	599
4	Black Wolf Mining Company	S400597	382.75
5	Bluestone Coal Corporation	S007282	316.75
6	Bluestone Coal Corporation	S401996	620.75
7	Consolidation Coal Company	S400501	351.25
8	Consolidation Coal Company	S400403	446.5
9	Gmax Inc	S401110	394.75

Site No.	Permittee	Permit_ID	Score
10	Gs Energy, Llc	S400507	533.75
11	Justice Highwall Mining, Inc.	S400905	564.75
12	Kentucky Fuel Corporation	S400305	790.5
13	Kentucky Fuel Corporation	S400504	790.5
14	Met Resources, Llc	S402309	548.5
15	Mid-Vol Coal Sales, Inc.	S400609	225.75
16	Mid-Vol Coal Sales, Inc.	S400709	592
17	Mid-Vol Coal Sales, Inc.	S400906	245.25
18	Mid-Vol Coal Sales, Inc.	S006879	333.75
19	Mid-Vol Coal Sales, Inc.	S400198	356.5
20	Mid-Vol Coal Sales, Inc.	S400700	579.25
21	Mid-Vol Coal Sales, Inc.	S400705	590.75
22	Mid-Vol Coal Sales, Inc.	S400797	240.75
23	Mid-Vol Coal Sales, Inc.	S401096	508.25
24	Mid-Vol Coal Sales, Inc.	S401500	332
25	Mid-Vol Coal Sales, Inc.	S401999	245.25
26	Mid-Vol Coal Sales, Inc.	S402089	384.5
27	Mid-Vol Coal Sales, Inc.	S403192	333.75
28	Southern Minerals Inc	S400309	822
29	Southern Minerals Inc	S400909	753
30	Southern Minerals Inc	S401809	793

Site No.	Permittee	Permit_ID	Score
31	Southern Minerals Inc	S400406	759
32	Southern Minerals Inc	S401201	744
33	Twin Star Mining Inc	S401197	217.5

Figure 15: McDowell 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.¹⁵ 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 employment and unemployment within radius of 5, 10 and 15 miles from the site

Site No.	Permit_ID	Emp_05	Unemp_05	Emp_10	Unemp_10
1	S400698	652	49	2251	322
2	S400307	634	44	1961	297
3	S400200	1075	180	3958	680
4	S400597	1099	195	3873	704
5	S007282	436	33	1645	234
6	S401996	1145	316	2884	663
7	S400501	302	19	1026	122
8	S400403	433	26	1295	146
9	S401110	945	165	3214	551
10	S400507	663	153	2992	820
11	S400905	1461	322	3485	727
12	S400305	974	98	2939	422
13	S400504	974	98	2939	422
14	S402309	1209	364	2922	697
15	S400609	487	80	1836	311
16	S400709	1327	357	3229	728
17	S400906	586	83	2050	324
18	S006879	668	120	2254	392
19	S400198	682	142	2387	470
20	S400700	1279	235	4001	765
21	S400705	1375	267	3945	772
22	S400797	715	119	2380	398
23	S401096	1500	310	3823	770
24	S401500	560	100	2007	351

¹⁵ 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>.

Rank	Permit_ID	Emp_05	Unemp_05	Emp_10	Unemp_10
25	S401999	620	88	2132	336
26	S402089	592	116	2126	398
27	S403192	668	120	2254	392
28	S400309	1416	175	3829	636
29	S400909	1238	114	3270	431
30	S401809	1213	108	3182	405
31	S400406	1366	196	4077	707
32	S401201	1374	205	4105	728
33	S401197	207	117	936	521

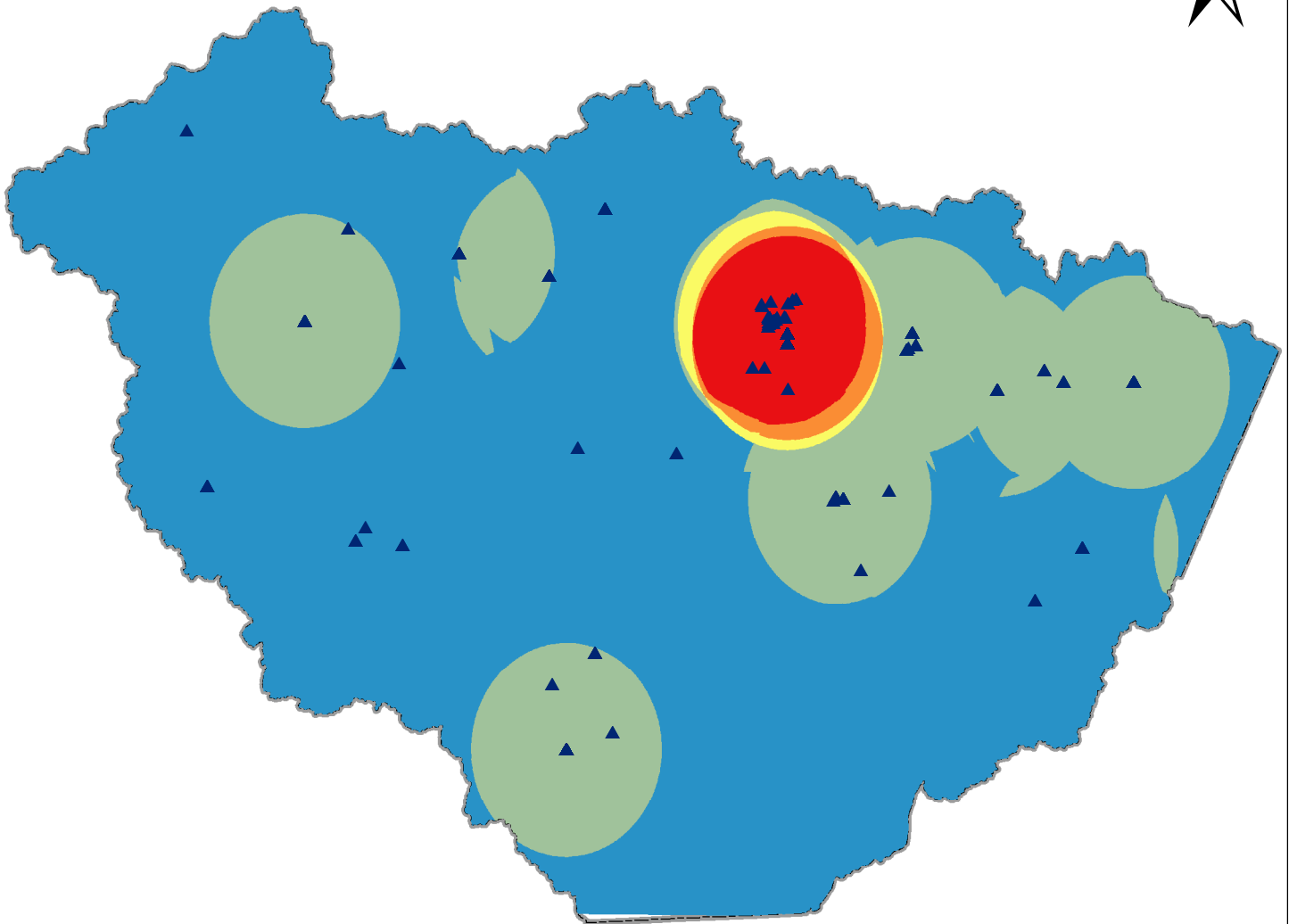
In McDowell County's case, these resources may not be as useful as they would be in other counties. The table does not consider those who are not in the labor force but are still capable of working. This variable should also be considered when determining work force needs.

Retail Location Analysis

A retail location analysis is a hot spot analysis that 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

McDowell County



▲ Retails_Location

Retail Locations Density

Search Area = 25 Square Miles

0 < Retail Density < 1

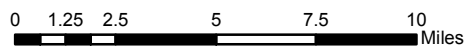
1 < Retail Density < 4

4 < Retail Density < 8

8 < Retail Density < 12

12 < Retail Density < 16

□ County_Boundary



Source: ESRI 2011

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V. Conclusion

McDowell County has endured several adverse shocks in the past decade, and continues to be deemed a county in distress. Due to government services and the sustainment of mining jobs, wages have been steadily growing in the county for those employed. However, these two sectors may not continue to be stable, aging and educational issues persist, and two-thirds of working age individuals are not in the labor force or looking for work. McDowell County has several sites that are highly suitable for post-mine land use development, and these resources must be utilized if McDowell is to revive.

This plan has identified and displayed the five post-mine sites that are most suitable 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 McDowell County to recover and eventually thrive.

Through a site distance analysis and complete demographic calculation, this plan provides the most comprehensive understanding of the economic state of McDowell 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.