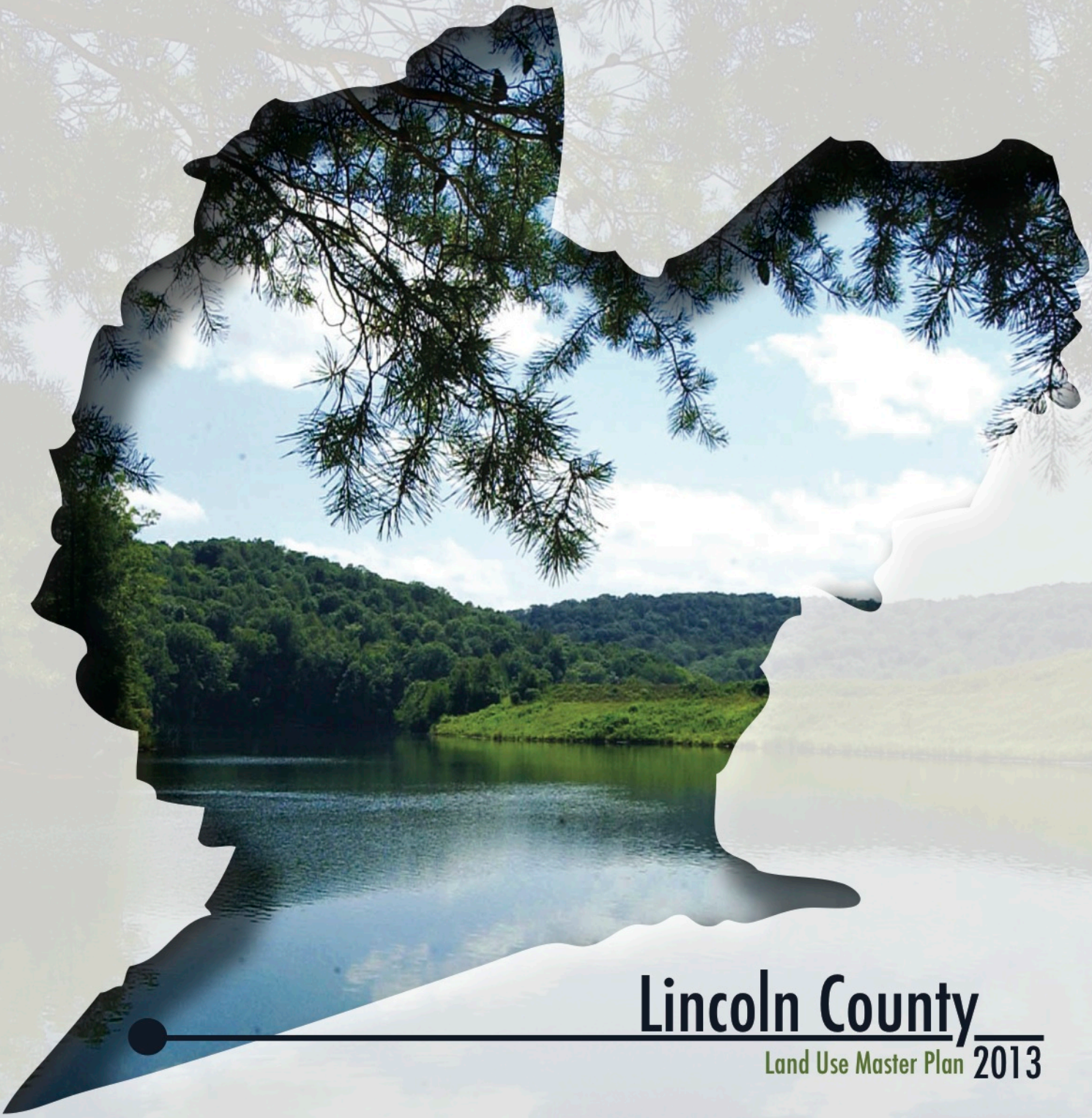


Lincoln County

Land Use Master Plan 2013

OCCD

Office of Coalfield Community Development
WV Division of Energy

Upper Mud River Lake, Lincoln County, West Virginia
(Photo from WV Department of Commerce)

Executive Summary

This Land Use Master Plan (LUMP) conveys information on Lincoln County's current demographic and geographic status. This plan will be used to evaluate the potential of post-mine sites for development, and evaluate Lincoln 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 Lincoln 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. To the knowledge of the researchers Lincoln County has not undertaken serious post-mine development. This plan will help Lincoln take advantage of its post-mine sites.

Lincoln County had a serious loss in population after 1980. Despite a recovery in 2000, the county is still projected to lose even more residents. The county's median age and age distribution indicate a population capable of productivity in the labor force.

Employment consists mainly of government services; trade, transportation, and utilities; education and healthcare; natural resources and mining; and construction. Government and natural resources are the major wage contributors: Government due to the sheer size of the sector in Lincoln County, and natural resources and mining because of the highly technical and therefore lucrative mining support activities. Even as Lincoln 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. Of particular note is the amount of income, as opposed to wages, derived from government transfers. Thirty-four percent of Lincoln County income is from government transfers. Alas, Lincoln 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.

Lincoln County's total enrollment dropped significantly until 2006, and continued to rise after Lincoln County regained control of the schools in 2009. Lincoln County's dropout rate is exceptionally low however. Lincoln County's residents have relatively poor education achievement overall, with almost a third 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. Lincoln 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.

Lincoln County also has one historic site 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 Lincoln County. The environment of the county should be considered in an overall development strategy. Lincoln County is heavily forested but contains no system of national or state parks, and has only three wildlife management areas. Lincoln County is also not on the list of air pollution non-attainment areas, which is positive. Lincoln 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 Lincoln 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 which is located closest to power lines, the answer is site ranking #4, permit ID S500806. However, if we wanted the site closer to water lines, the best site is site ranking #1, permit ID S500306.

Table C explains how each criterion contributes to the final total score and importance of the weights. Because of the assumption that one criterion may be more important than others (different weights), the site with higher absolute and relative scores is still able to receive a smaller total score than others. Site ranking #1 scores poorly in the many parts of the distance analysis, but is closer to important criteria like major highways and broadband.

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

Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	11.59	8.90	10.30	12.69	11.56	8
Proposed Highway	43.89	41.23	42.61	44.99	43.87	9
Intermodal Terminal Facilities	28.81	26.14	27.52	29.91	28.78	6
Interstate	34.54	33.51	34.62	29.55	34.52	8
National Waterway Network Ports	48.21	49.25	48.28	49.30	48.18	5
Sewer Treatment Facilities	8.58	9.63	8.66	9.68	8.55	7
Solid Waste Treatment Facilities	16.08	13.39	14.79	17.18	16.05	8
Tri-state Airport	55.75	56.80	55.83	56.84	55.72	3
Yeager Airport	43.18	40.50	41.89	44.27	43.15	3
Broadband	0.22	0.00	0.31	0.63	0.49	9
Gas Pipes	2.06	2.62	2.45	1.73	1.30	6
National Waterway Network	21.69	21.64	22.41	20.30	21.19	4
Power Lines	3.48	3.04	4.13	2.28	3.54	10
Oil Pipes	0.15	0.80	0.15	0.13	0.53	6
Railroad	2.54	2.18	3.22	1.48	2.69	5
Sewer Lines	6.76	6.17	7.23	6.05	7.15	8
Water Lines	0.26	0.33	0.32	0.61	0.60	10

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

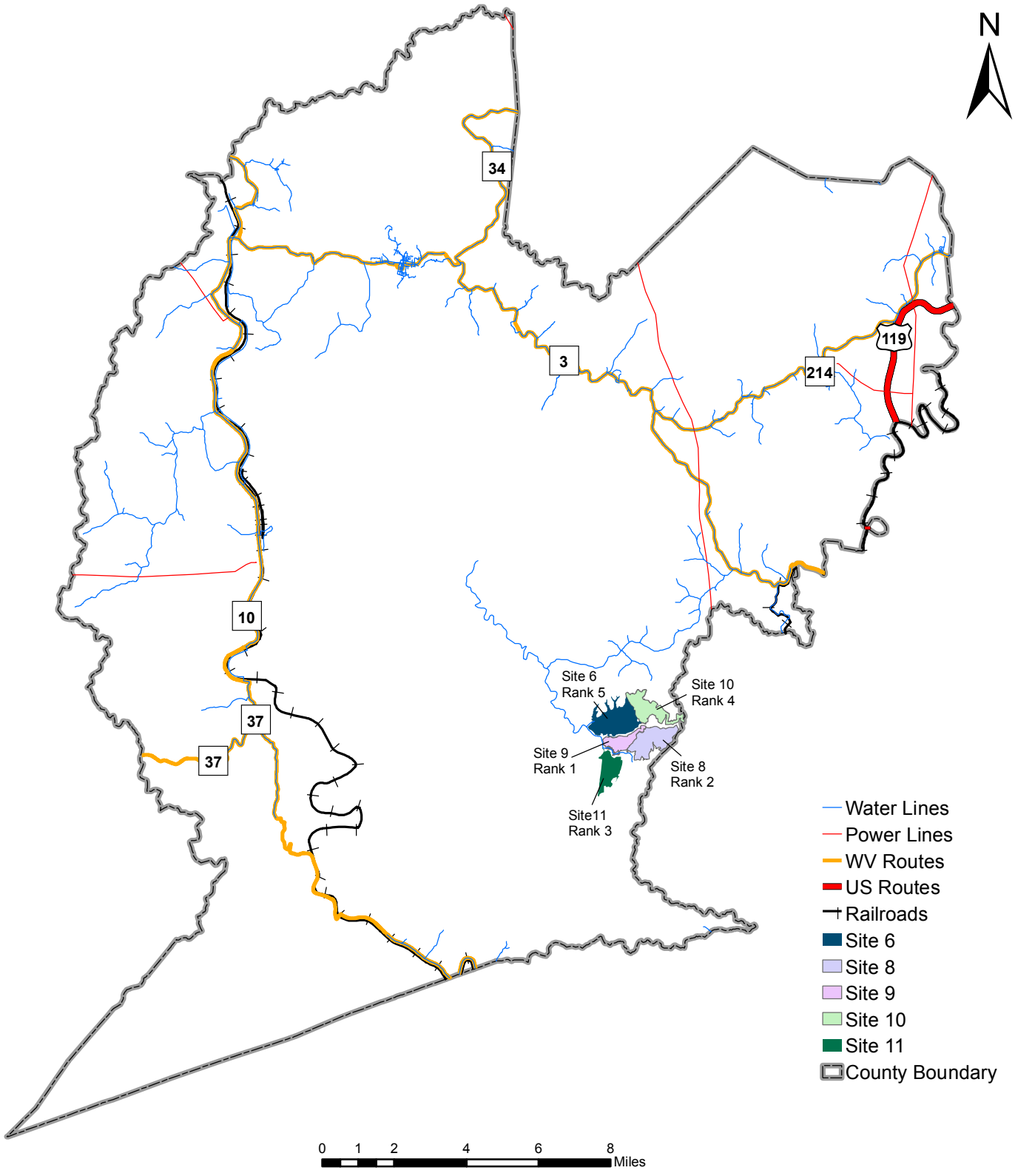
Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	20	42	20	10	20	8
Proposed Highway	2.25	4.5	4.5	2.25	4.5	9
Intermodal Terminal Facilities	4.5	6	6	1.5	4.5	6
Interstate	6	8	6	8	8	8
National Waterway Network Ports	3.75	2.5	3.75	2.5	3.75	5
Sewer Treatment Facilities	49	24.5	49	24.5	49	7
Solid Waste Treatment Facilities	18	40	40	18	24	8
Tri-state Airport	1.5	1.5	1.5	0.75	2.25	3
Yeager Airport	2.25	3	3	2.25	3	3
Broadband	90	90	90	67.5	67.5	9
Gas Pipes	60	30	45	60	60	6
National Waterway Network	2	2	1	3	2	4
Power Lines	100	100	75	100	75	10
Oil Pipes	60	30	60	60	30	6
Railroad	50	50	37.5	50	37.5	5
Sewer Lines	42	56	42	56	42	8
Water Lines	100	100	100	75	75	10
Total Score	611.25	590	584.25	541.25	508	

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

Suitability Ranking	1	2	3	4	5	Weight
Existing Highway	5	7	5	5	5	8
Proposed Highway	1	1	1	1	1	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	7	7	7	7	7	7
Solid Waste Treatment Facilities	3	5	5	3	3	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	10	10	10	10	10	6
National Waterway Network	1	1	1	1	1	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	7	7	7	7	7	8
Water Lines	10	10	10	10	10	10
Total Absolute Score	89	93	91	89	89	
Suitability Ranking	**1**	**2**	**3**	**4**	**5**	**Weight**
Existing Highway	5	7.5	5	2.5	5	8
Proposed Highway	2.5	5	5	2.5	5	9
Intermodal Terminal Facilities	7.5	10	10	2.5	7.5	6
Interstate	7.5	10	7.5	10	10	8
National Waterway Network Ports	7.5	5	7.5	5	7.5	5
Sewer Treatment Facilities	10	5	10	5	10	7
Solid Waste Treatment Facilities	7.5	10	10	7.5	10	8
Tri-state Airport	5	5	5	2.5	7.5	3
Yeager Airport	7.5	10	10	7.5	10	3
Broadband	10	10	10	7.5	7.5	9
Gas Pipes	10	5	7.5	10	10	6
National Waterway Network	5	5	2.5	7.5	5	4
Power Lines	10	10	7.5	10	7.5	10
Oil Pipes	10	5	10	10	5	6
Railroad	10	10	7.5	10	7.5	5
Sewer Lines	7.5	10	7.5	10	7.5	8
Water Lines	10	10	10	7.5	7.5	10
Total Relative Score	132.5	132.5	132.5	117.5	130	

Top Five Sites for Potential Development

Lincoln County



Source: Rahall Transportation Institute Analysis 2013

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Site's General Info

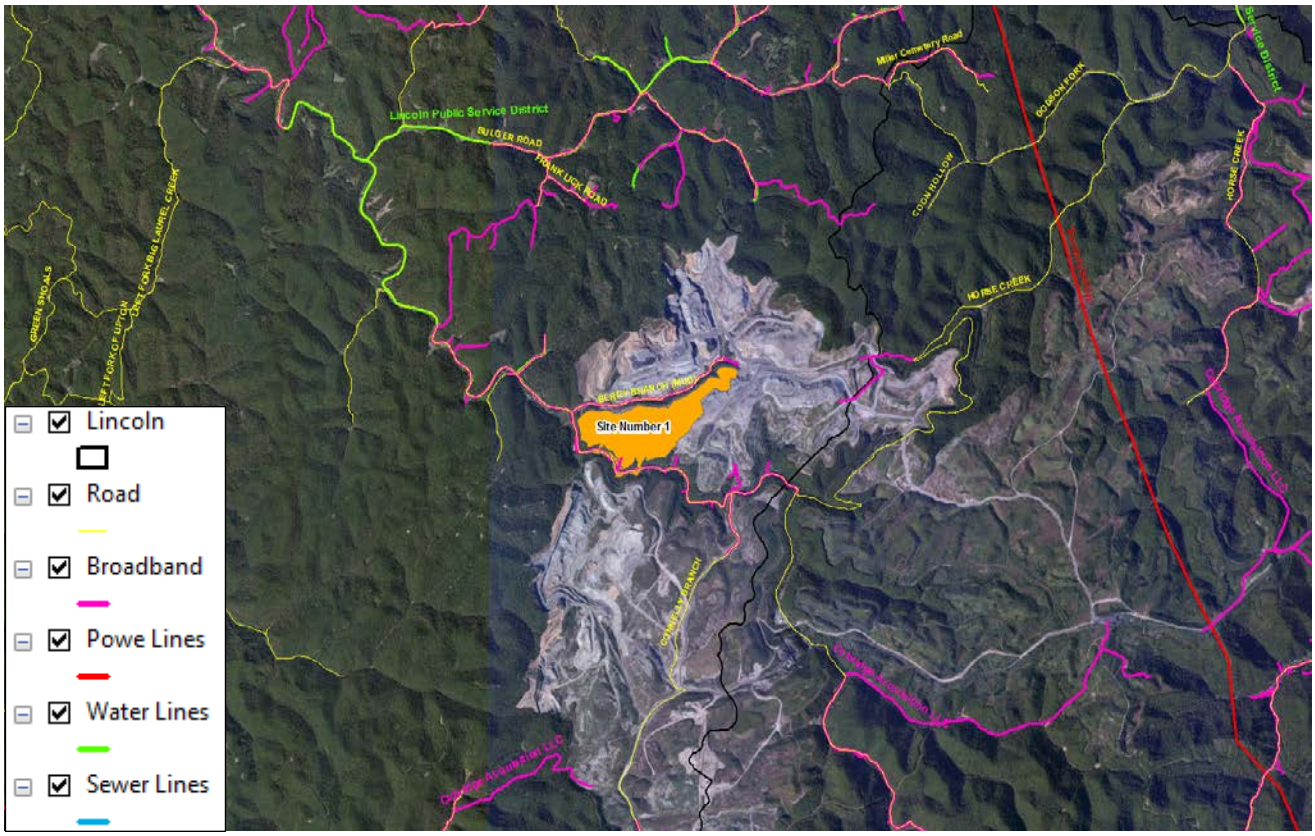
Permittee	Hobet Mining Llc
Facility Name	Surface Mine No. 44
Permit ID	S500306
Issue Date	11/17/2006
Expiration Date	221
Current Acres	221
Lat	38° 05' 55.0000"
Long	81° 58' 42.0000"
Nearest Post Office	Spurlockville

Site Number	**9**
Suitability Ranking	**1**
Total Score	**611.25**

Site #9 may not have the best score in many areas, but the scores it has in broadband, existing highway, water, and sewer treatment push the scores up, making this site a prime development site.

Distance Analysis Results

Existing Highway	11.59
Proposed Highway	43.89
Intermodal Terminal Facilities	28.81
Interstate	34.54
National Waterway Network Ports	48.21
Sewer Treatment Facilities	8.58
Solid Waste Treatment Facilities	16.08
Tri-state Airport	55.75
Yeager Airport	43.18
Broadband	0.22
Gas Pipes	2.06
National Waterway Network	21.69
Power Lines	3.48
Oil Pipes	0.15
Railroads	2.54
Sewer Lines	6.76
Water Lines	0.26



Site's General Info

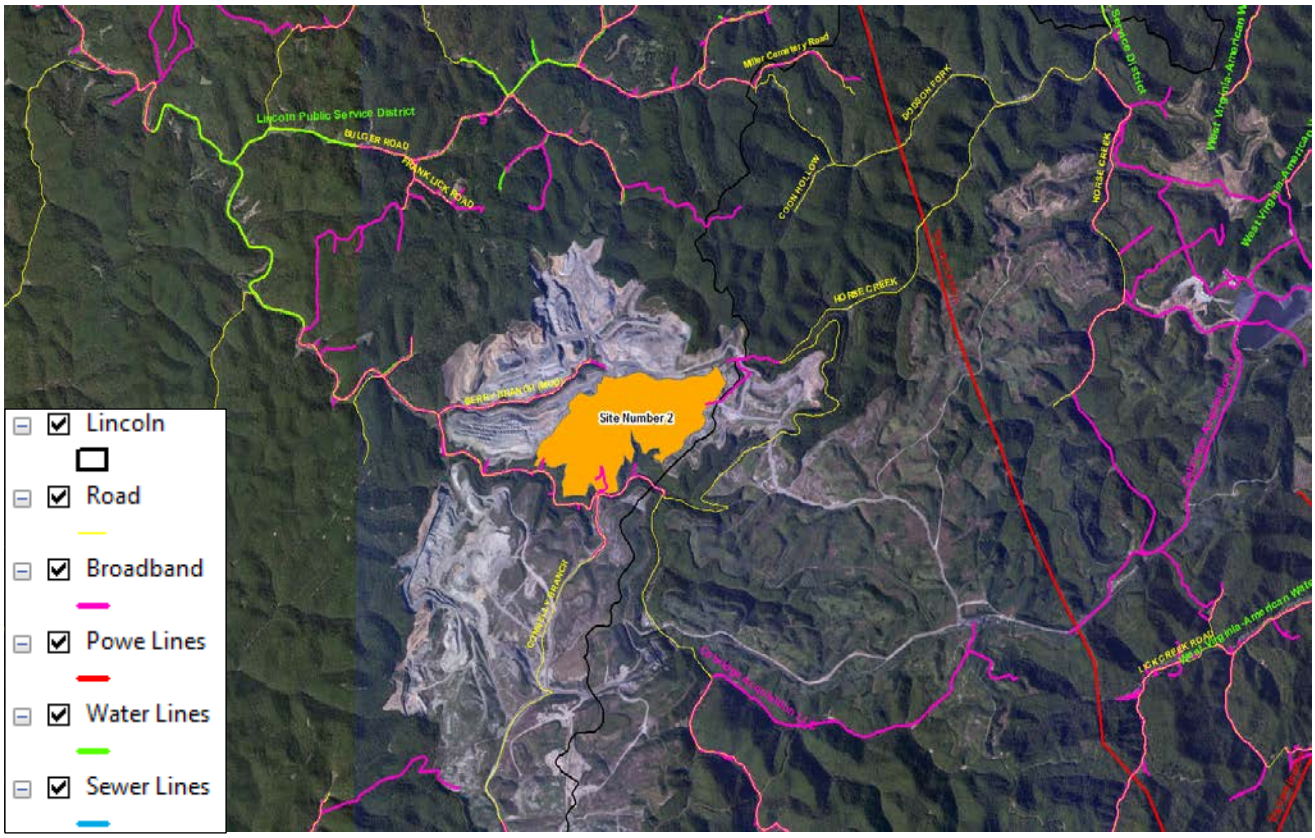
Permittee	Hobet Mining Llc
Facility Name	Westridge No. 3 Surface Mine
Permit ID	S500203
Issue Date	4/1/2004
Expiration Date	4/1/2014
Current Acres	479.72
Lat	38° 05' 38.0000"
Long	81° 58' 04.0000"
Nearest Post Office	Spurlockville

Site Number	**8**
Suitability Ranking	**2**
Total Score	**590**

Site #8 has great access to highway, broadband, and other critical infrastructure. This has given it high ranking, but is still in not as great a position as Site #9.

Distance Analysis Results

Existing Highway	8.90
Proposed Highway	41.23
Intermodal Terminal Facilities	26.14
Interstate	33.51
National Waterway Network Ports	49.25
Sewer Treatment Facilities	9.63
Solid Waste Treatment Facilities	13.39
Tri-state Airport	56.80
Yeager Airport	40.50
Broadband	0.00
Gas Pipes	2.62
National Waterway Network	21.64
Power Lines	3.04
Oil Pipes	0.80
Railroads	2.18
Sewer Lines	6.17
Water Lines	0.33



Site's General Info

Permittee	Hobet Mining Llc
Facility Name	Westridge No. 2 Surface Mine
Permit ID	S501101
Issue Date	7/10/2002
Expiration Date	7/10/2017
Current Acres	479
Lat	38° 05' 26.0000"
Long	81° 59' 15.0000"
Nearest Post Office	Spurlockville

Site Number	**11**
Suitability Ranking	**3**
Total Score	**584.25**

Site #11 is ranked number 3 due to the same factors as Sites 8 and 9. However, it does have slightly further distances to all of these features, giving it a slightly smaller score.

Distance Analysis Results

Existing Highway	10.30
Proposed Highway	42.61
Intermodal Terminal Facilities	27.52
Interstate	34.62
National Waterway Network Ports	48.28
Sewer Treatment Facilities	8.66
Solid Waste Treatment Facilities	14.79
Tri-state Airport	55.83
Yeager Airport	41.89
Broadband	0.31
Gas Pipes	2.45
National Waterway Network	22.41
Power Lines	4.13
Oil Pipes	0.15
Railroads	3.22
Sewer Lines	7.23
Water Lines	0.32

Site's General Info

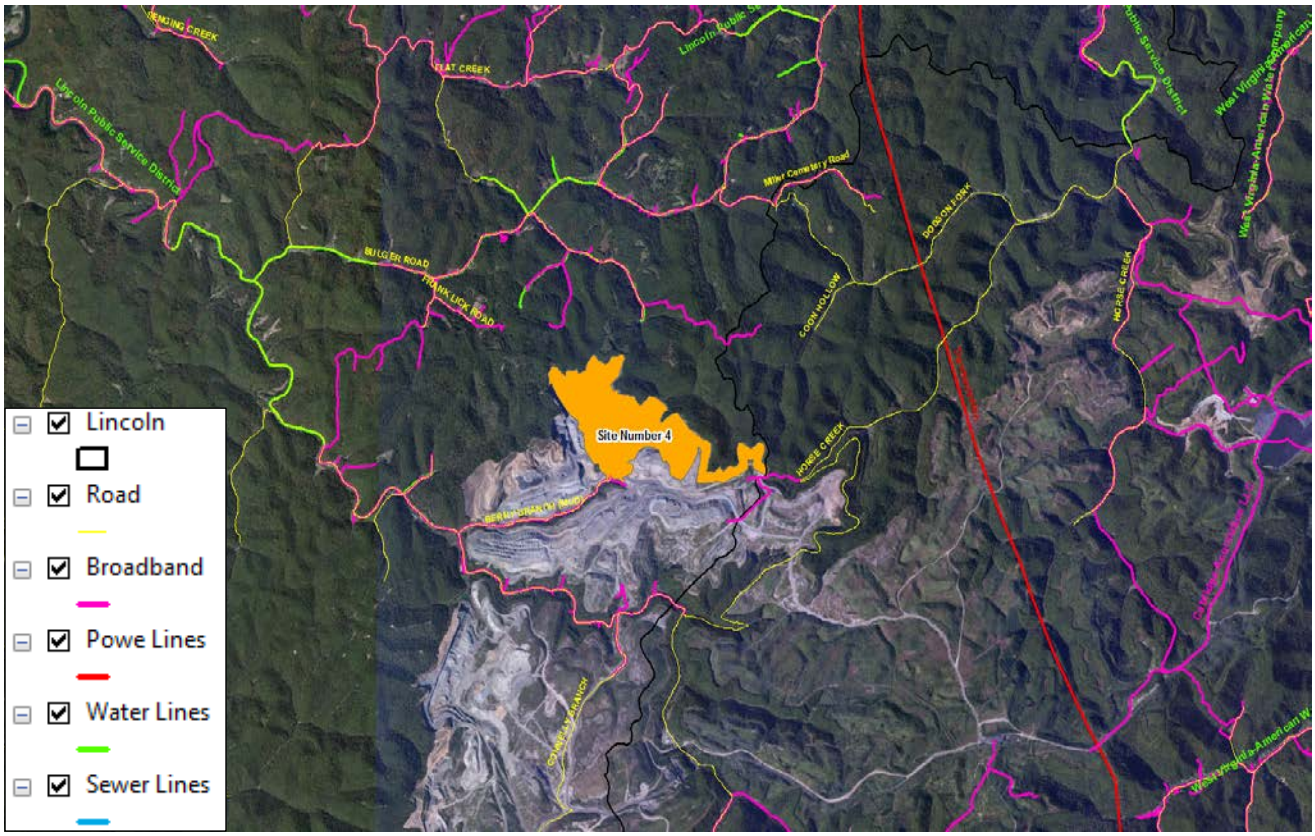
Permittee	Hobet Mining Llc
Facility Name	Surface Mine No. 22
Permit ID	S500806
Issue Date	6/19/2007
Expiration Date	6/19/2017
Current Acres	418.9
Lat	38° 06' 50.0000"
Long	81° 57' 42.0000"
Nearest Post Office	Spurlockville

Site Number	**10**
Suitability Ranking	**4**
Total Score	**541.25**

At first glance, Site #10 appears to be the most favorable for development, considering power lines, gas pipes, and other criteria. But those are not the high scoring criteria, and so Site #10 is ranked fourth.

Distance Analysis Results

Existing Highway	12.69
Proposed Highway	44.99
Intermodal Terminal Facilities	29.91
Interstate	29.55
National Waterway Network Ports	49.30
Sewer Treatment Facilities	9.68
Solid Waste Treatment Facilities	17.18
Tri-state Airport	56.84
Yeager Airport	44.27
Broadband	0.63
Gas Pipes	1.73
National Waterway Network	20.30
Power Lines	2.28
Oil Pipes	0.13
Railroads	1.48
Sewer Lines	6.05
Water Lines	0.61



Site's General Info

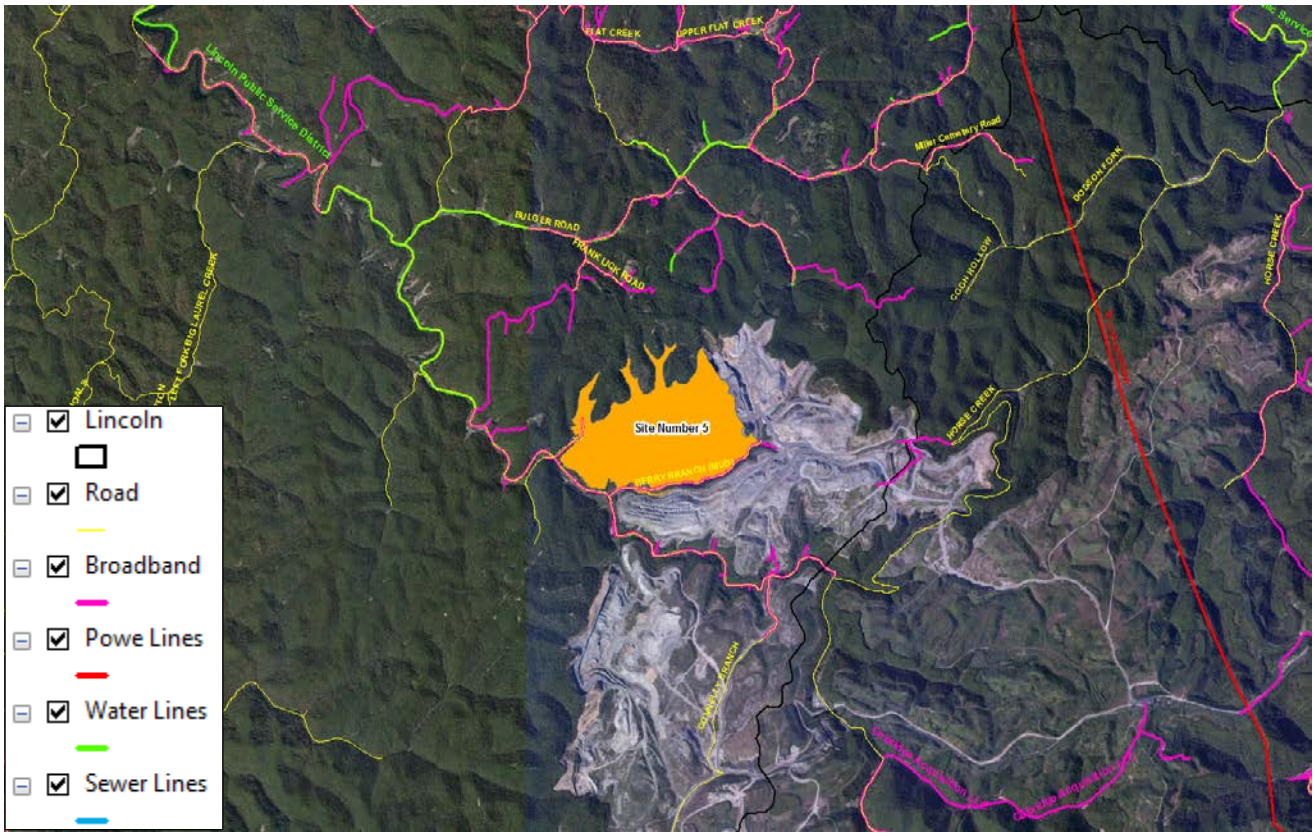
Permittee	Hobet Mining Llc
Facility Name	Surface Mine No. 45
Permit ID	S500207
Issue Date	12/19/2008
Expiration Date	12/19/2013
Current Acres	498.4
Lat	38° 06' 31.0000"
Long	81° 59' 02.0000"
Nearest Post Office	Spurlockville

Site Number	**6**
Suitability Ranking	**5**
Total Score	**508**

Site #6 is close to gas pipes and the National Waterway Network, but these are not high-scoring criteria. Therefore Site #6 is ranked fifth.

Distance Analysis Results

Existing Highway	11.56
Proposed Highway	43.87
Intermodal Terminal Facilities	28.78
Interstate	34.52
National Waterway Network Ports	48.18
Sewer Treatment Facilities	8.55
Solid Waste Treatment Facilities	16.05
Tri-state Airport	55.72
Yeager Airport	43.15
Broadband	0.49
Gas Pipes	1.30
National Waterway Network	21.19
Power Lines	3.54
Oil Pipes	0.53
Railroads	2.69
Sewer Lines	7.15
Water Lines	0.60



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 Lincoln County. Lincoln County's economy is dominated by government services, but the general revival in the coal industry has led to support services becoming a major player in the economy. The resulting combination has led to a constant increase in total wages. However, this has not translated to a complete revival in the county, as the population continues to decrease, age, and lack varied job opportunities. This plan will put focus on these issues, encouraging an analysis of the range of options available to policymakers.

II. Planning Area

Lincoln County was formed in 1867, four years after West Virginia became a state. It was formed from parts of Cabell, Putnam, Wayne, Logan, Boone, and Kanawha. The Lincoln County boundaries were changed twice afterwards in several different ways, until the final boundary change in 1869. 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, Lincoln began to slip. Some indications show a recovery in the natural resources sector, but more time is needed to monitor the recovery.[1]

Chuck Yeager, the first man to fly faster than sound, was born in Lincoln County.[2]

[1] Kirk, Brandon Ray, "Lincoln County," *The West Virginia Encyclopedia,* Accessed June 5, 2013, www.wvencyclopedia.org/articles/1403.
[2] Ibid.

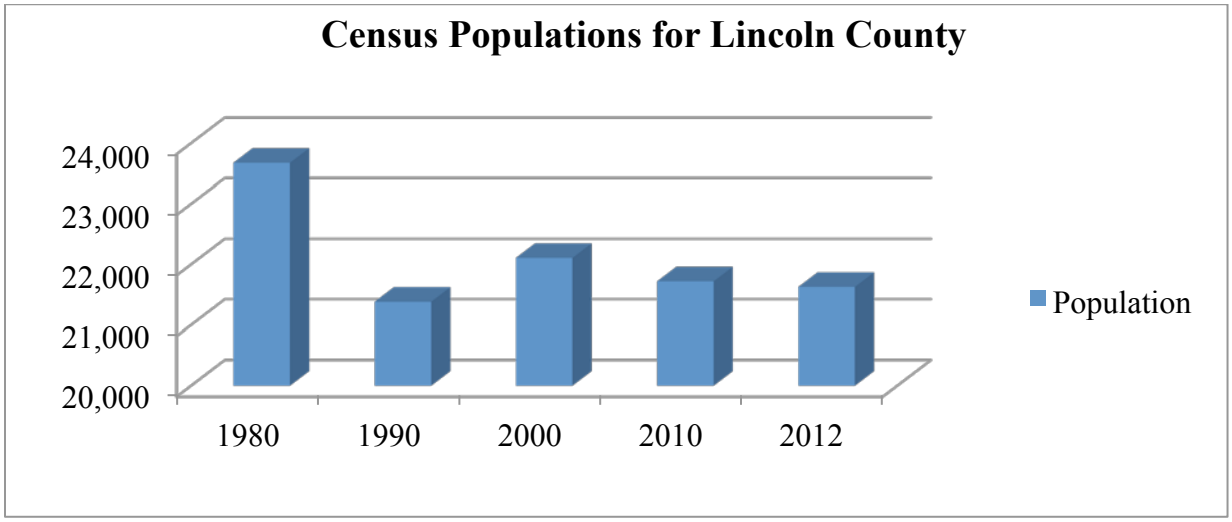
III. Existing Conditions

This information will provide a background understanding of the demographic trends in the county. This base information is meant to provide overall detail on Lincoln 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 Lincoln County in 2011 was 21,777 according to the 2011 American Community Survey (ACS) 5-year estimates, ranking it 32nd in county population among the 55 counties in West Virginia.[3] The decennial censuses show that Lincoln County had a dramatic drop in population between 1980 and 1990, slightly recovered, and now continues a very small decrease. The shape is odd considering the upward trajectory of most of the later statistics including wages and employment, but considering the slight differences in the changes statistical error cannot be ruled out.

Figure 1



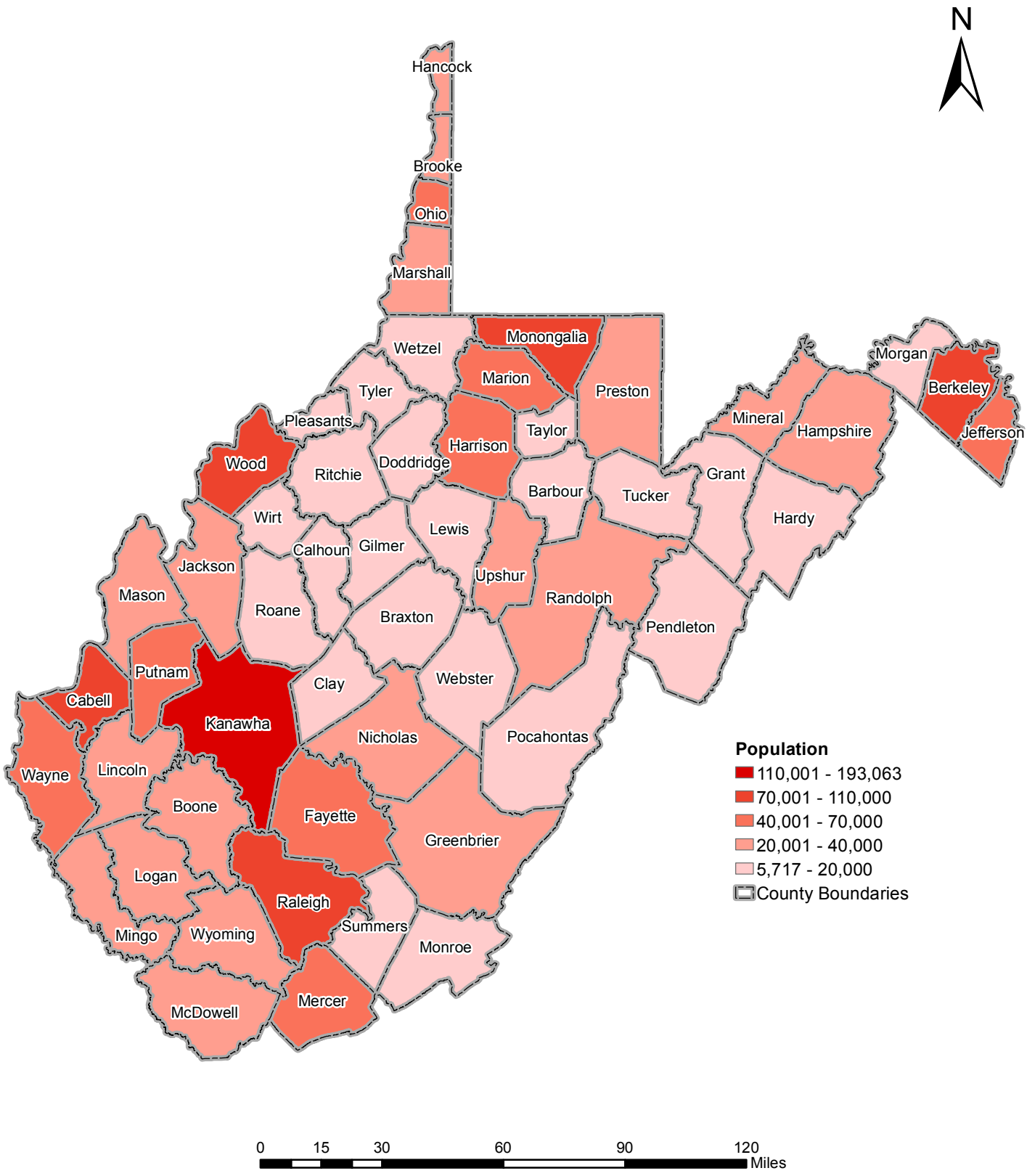
Source: Stats Indiana, USA Counties in Profile

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

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

Demographic

Population



Source: United States Census Bureau 2011

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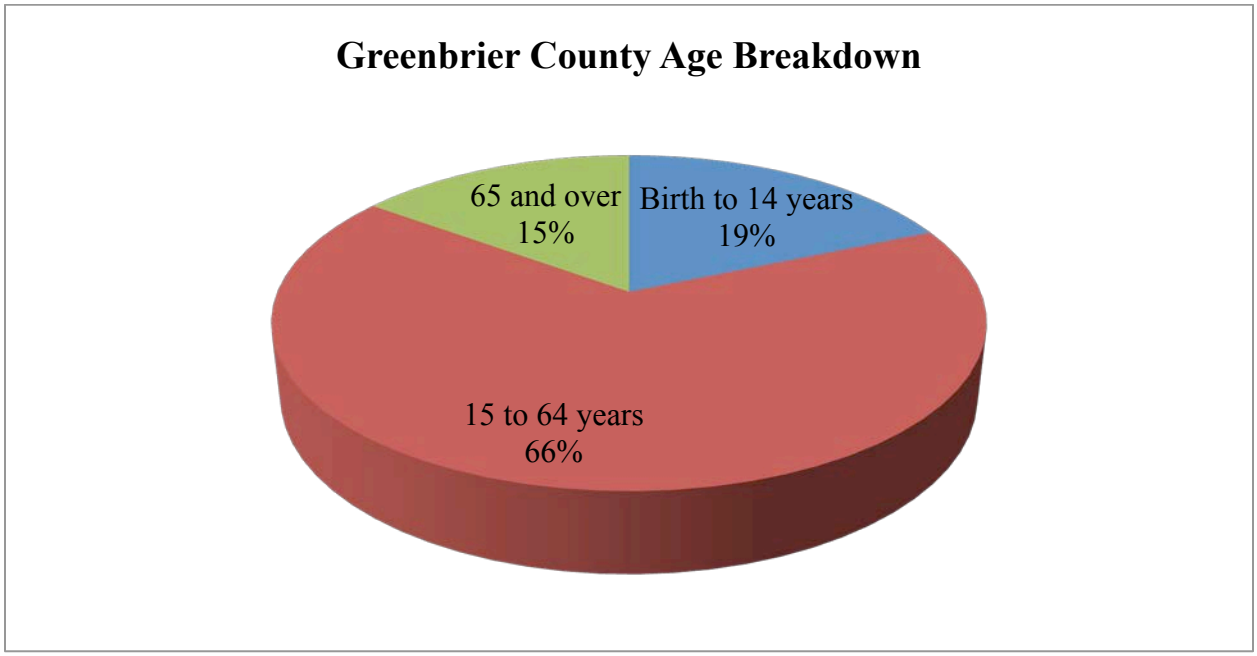
According to the ACS, 21 percent of Lincoln County residents are 60 years of age and over, while almost 17 percent are between 5 and 17 years of age and almost 6 percent are below the age of 5. As a result, approximately 3,000 people are of retirement age. The median age in Lincoln is 41.6, which is the same as the West Virginian median age (Map 2). The majority of the population is of working age, as denoted in Figure 2.

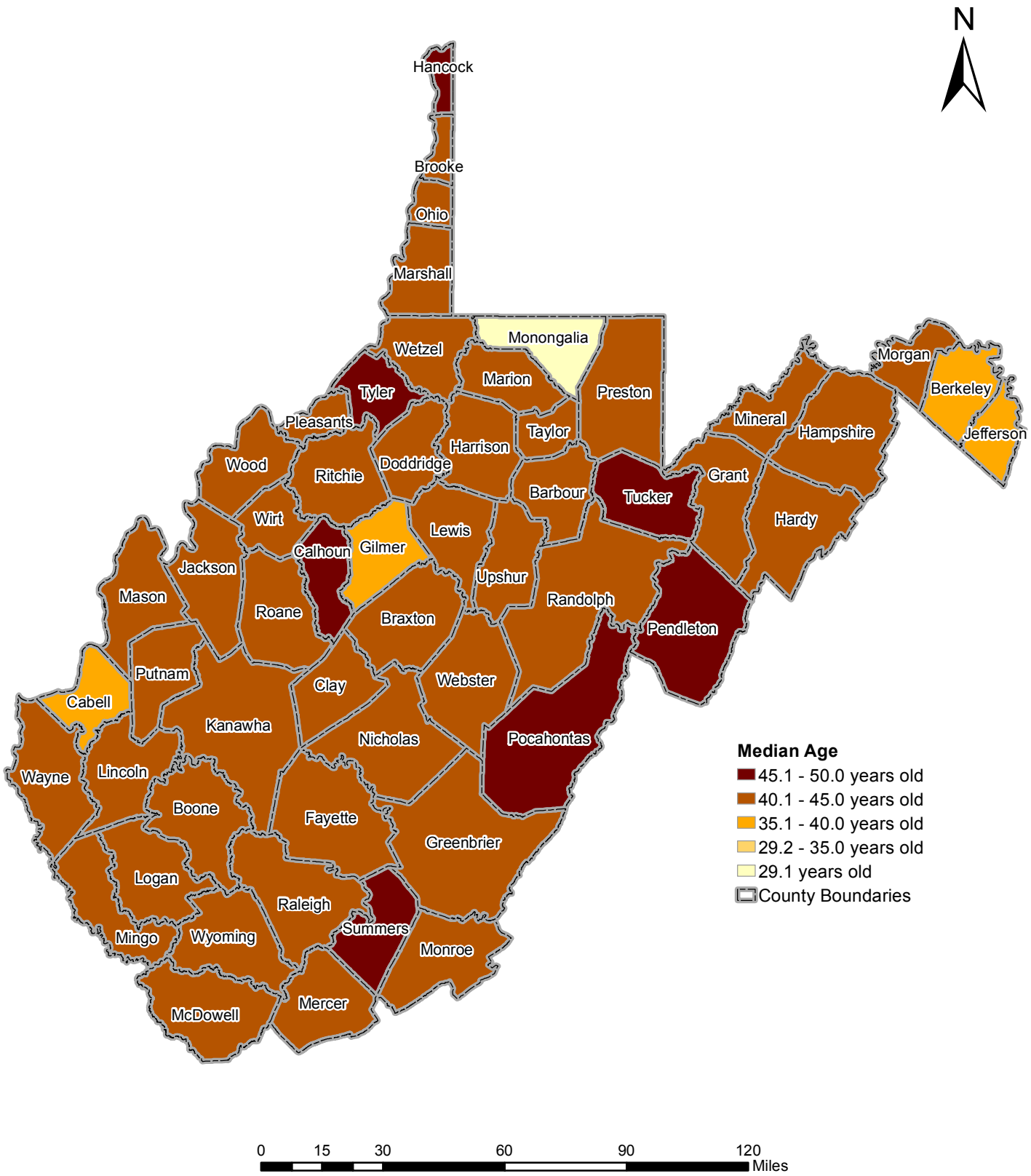
Figure 2



Source: 2011 American Community Survey 5-Year Estimate Calculation

Demographic

Median Age



Source: United States Census Bureau 2011

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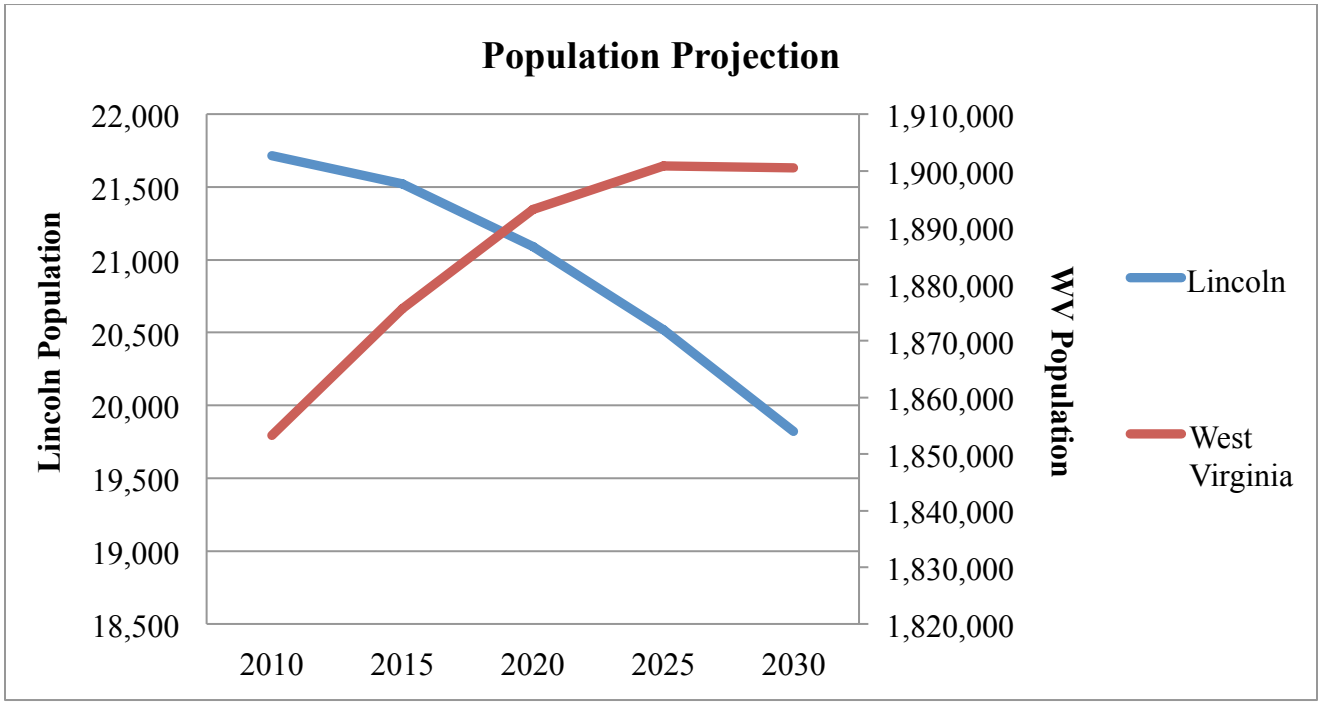
The Bureau of Business and Economic Research at West Virginia University projects an 8.7 percent decrease in the Lincoln County population between 2010 and 2030, which is significantly different from the projected growth of West Virginia.[4] The model for the projection is based on past population patterns and statistics, and should not be taken as permanent. The projected decrease may be derived from the large decrease from 1980 to 1990, the lack of a similar large increase between 1990 and 2000, and the short decrease from 2000 to 2010.

Figure 3



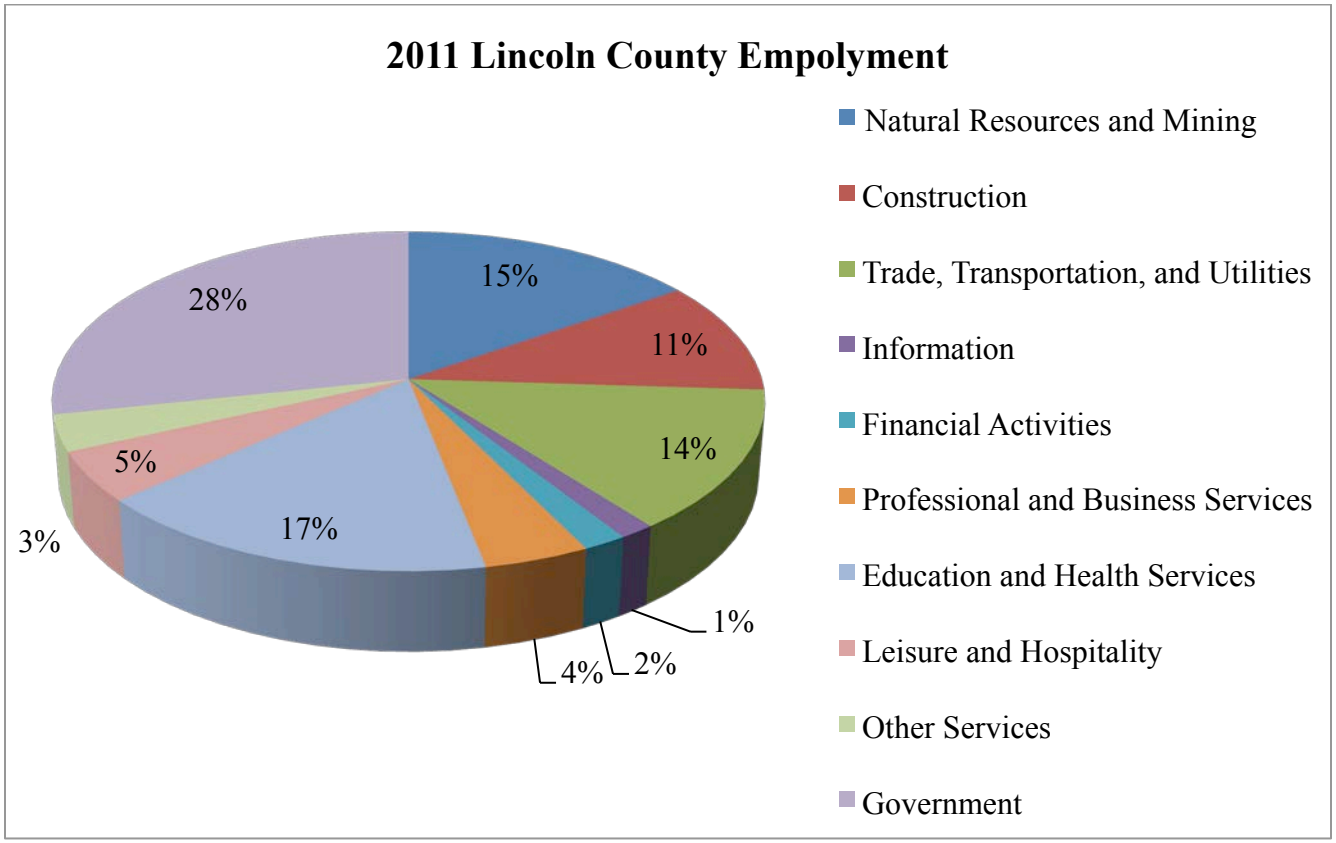
Source: WVU Bureau of Business and Economic Research

Employment

Workforce WV has a complete dataset on employment numbers and wages. The total number of employed in 2011 was 3,286. Approximately 28 percent of wage earners in Lincoln County worked in government, and about 80 percent of that number is local government, mostly through education services. Lincoln County government employment is consistent with West Virginia employment patterns as a whole, but Lincoln's is particularly high, being the primary employer by a wide margin. This makes Lincoln County highly susceptible to political whims and does not guarantee prosperity.

[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).

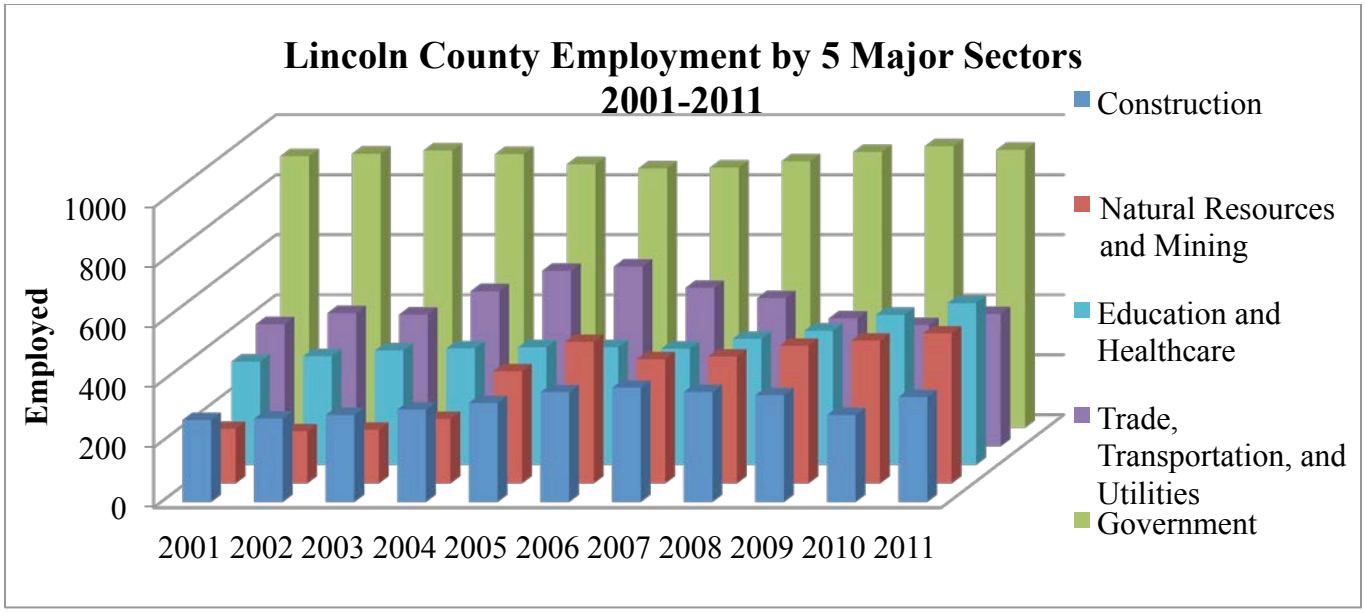
Figure 4



Source: Workforce WV

Five sectors have been the major contributors to employment throughout the past decade: Government; Education and Healthcare; Trade, Transportation and Utilities; Natural Resources and Mining; and Construction. Government has consistently been the highest employer, while the Trade, Transportation, and Utilities sector was second until 2009 when Education and Healthcare and Natural Resources and Mining overtook it. Education and Healthcare increased with a renewed focus on education as Lincoln County regained control of its school system from the state in 2007. The Natural Resources and Mining sector boomed with an unusually large number of permits being issued within the four year span from 2004 to 2008, indicating increased mining planning and activity in the county.

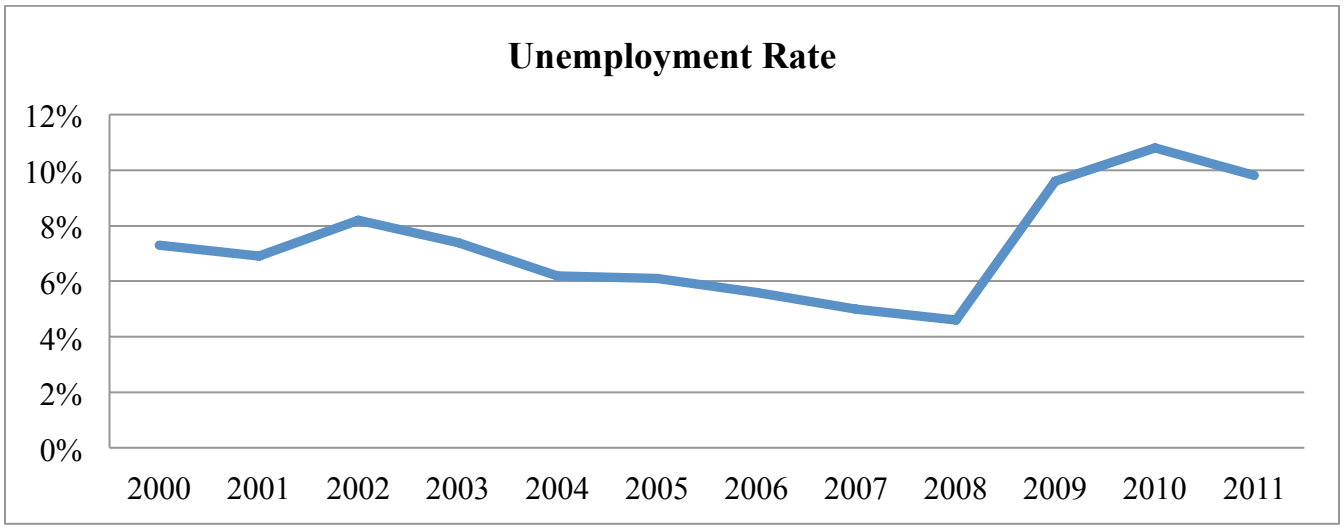
Figure 5



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, Lincoln's participation rate is at the bottom of the scale. This is a condition many coalfield counties face. Unemployment was decreasing until the recession in 2008 and natural resource sector cost cutting. (Figure 6). The disconnect between the low unemployment and low labor force participation over those five years can only be explained by a significant group of people giving up in the search for work. Map 4 provides 2011 unemployment rates for Lincoln compared with the rest of the State.

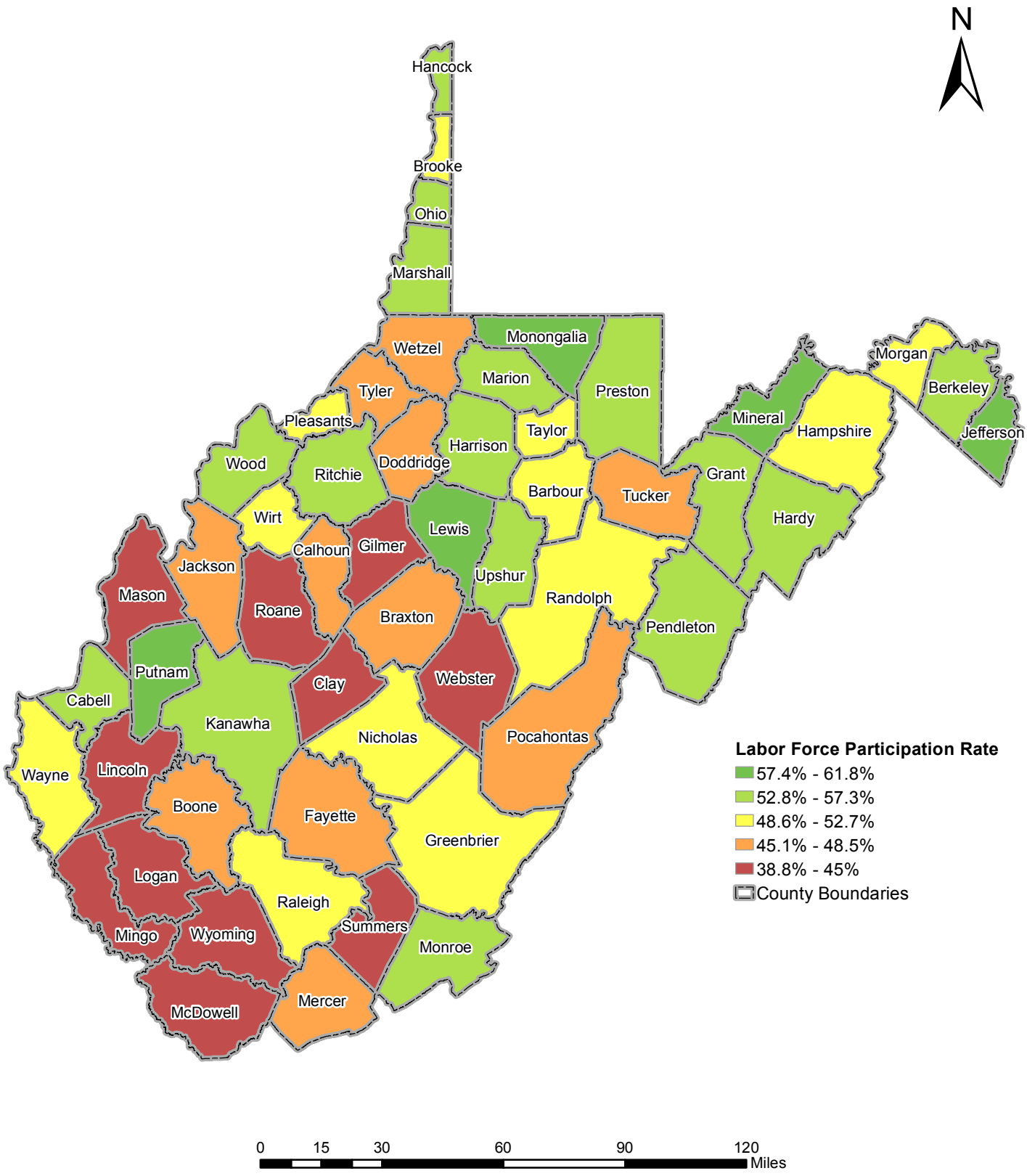
Figure 6



Source: Workforce WV

Demographic

Labor Force Participation Rate



Source: Workforce WV 2011

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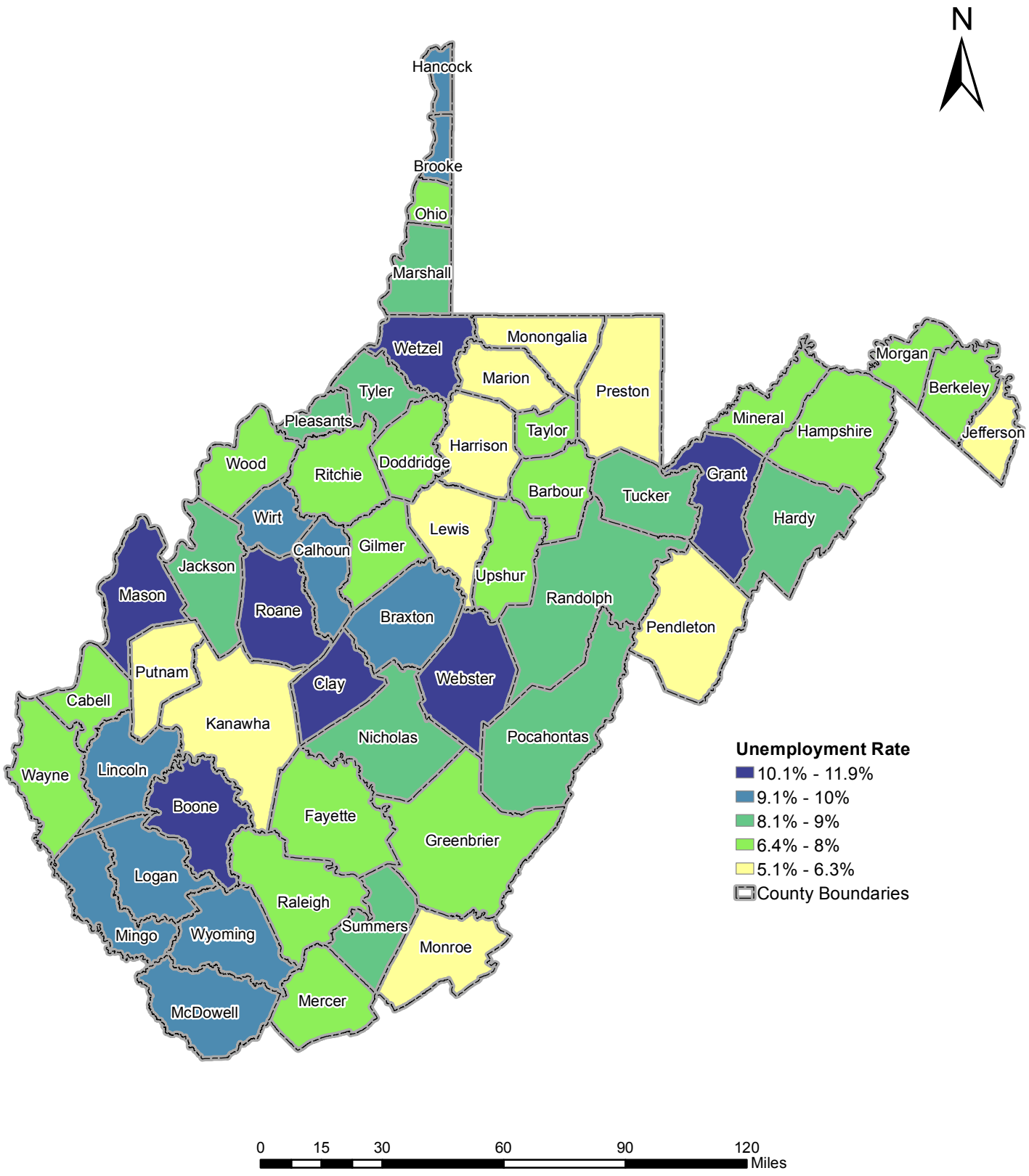
Demographic

Unemployment Rate



Source: Workforce WV 2011

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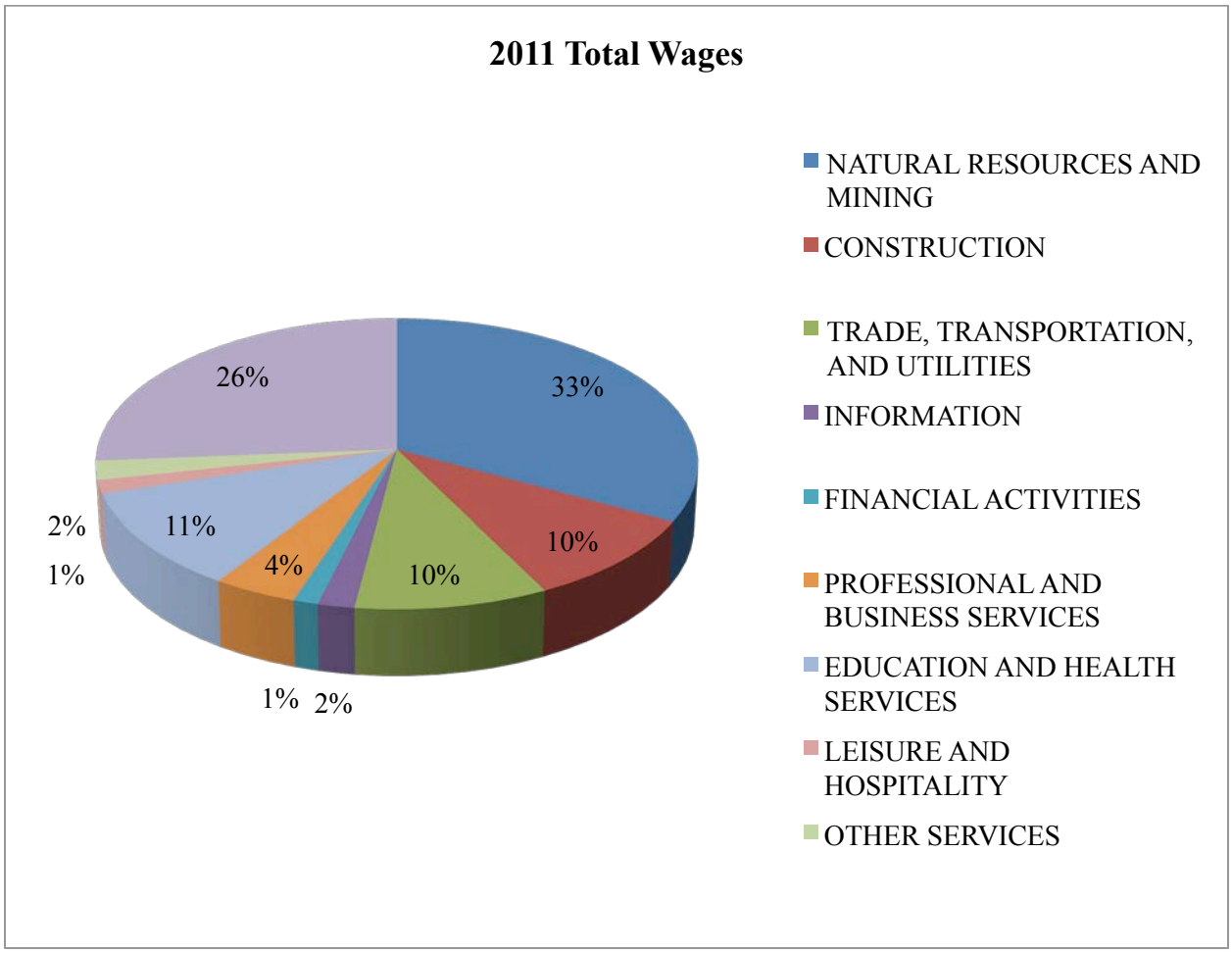
Wages and Income

Lincoln County's wage contributors vary widely in the level of contribution. The highest, Natural Resources and Mining, is because the majority of wages comes from the complex support activities for mining, such as exploration and geological analysis (Figure 7). Government is next because of the sheer size of the sector in the county, and the other sectors that are the top five employers are the next three wage contributors.

Figure 7

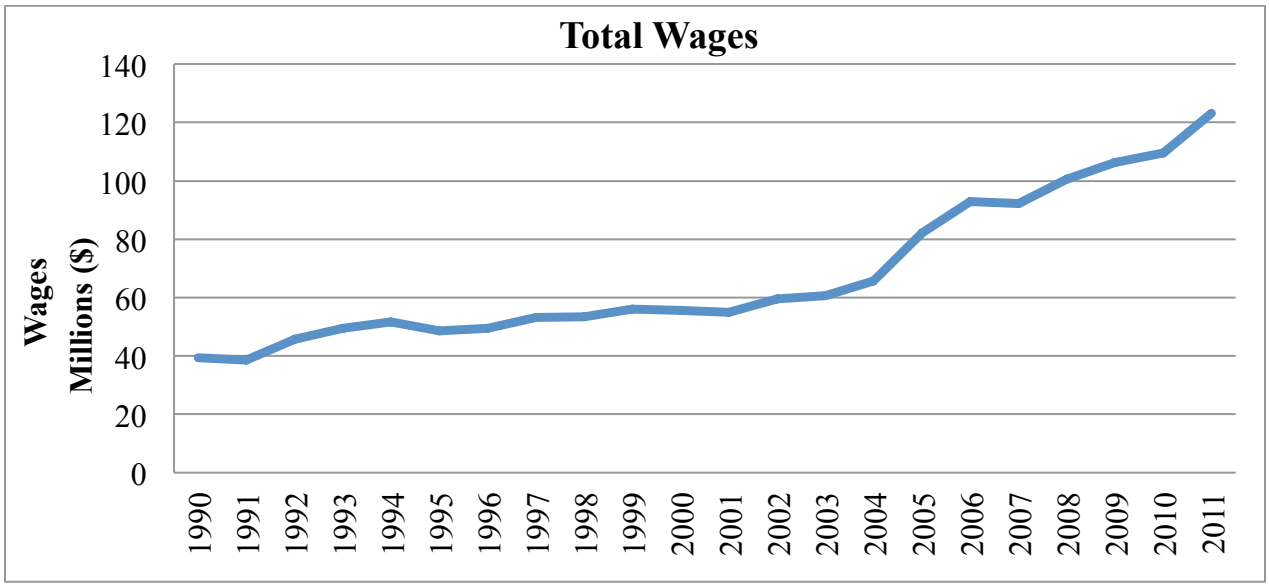


Source: Workforce WV

Historically, wages for Lincoln County have shown a tendency to rise. Lincoln County has managed to keep many of its support activities for mining and government jobs, allowing for wages to rise despite recession and cost-cutting factors that led to an increase in unemployment in other sectors. Figure 8 shows total wages for Lincoln County, which have consistently shown an upward trajectory. Recession-endurable government and mining-support jobs make up so much of the Lincoln 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.

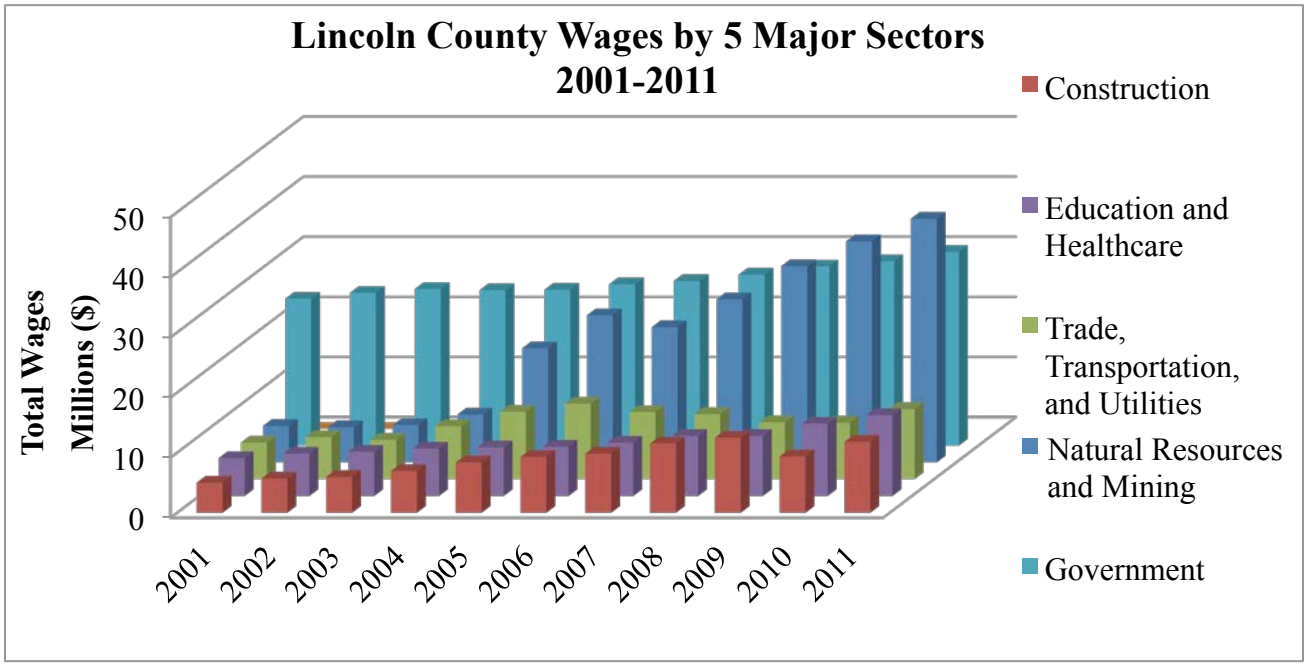
Figure 8



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 Lincoln, but around 2006 the expansion of mining support activities, and the wages that come with it, becomes apparent.

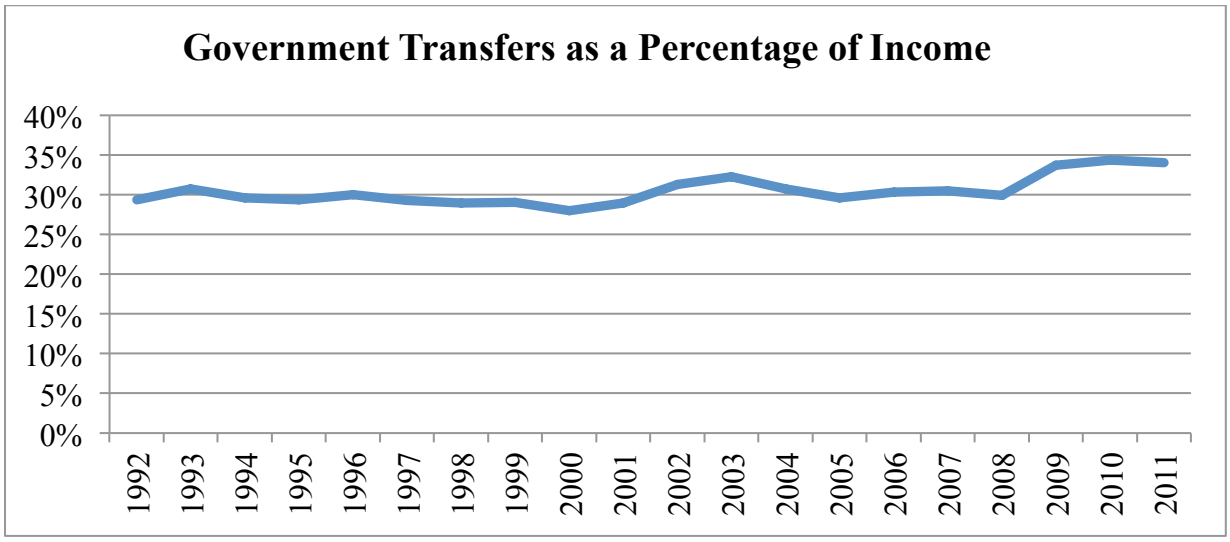
Figure 9



Source: Workforce WV

In most American counties, one would find that the majority of income for people stems from wages. In Lincoln County, however, an important distinction must be made between income and wages. Income is the total receipt of earnings resulting from any economic activity, while wages are derived from actual work in an employed setting. Therefore, dividends from stockholdings are considered income, but not wages. The distinction is necessary in the case of Lincoln County because in 2011, Lincoln County wages were $123 million for all industries.[5] Income for the County was larger (around $500 million). Though there are many components to income other than work earnings, 34 percent of total Lincoln County income is derived from government transfers.[6] Government transfers accounted for about 95 percent of total transfers to Lincoln County, dwarfing transfers from private institutions such as charities. Lincoln County has depended heavily on government transfers for the past 30 years, with said transfers consistently contributing about a third 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 Lincoln County is therefore made up of 34 percent government transfers and about 25 percent wages from work. Lincoln County has one of the highest ratios of government transfers, the 15th highest; however, multiple West Virginia counties surround Lincoln on the list. According to the BEA, per capita income was $24,722 for Lincoln County.

[5] "Employment and Wages – 2011 Lincoln County," Workforce WV, Accessed February 13, 2013, http://www.workforcewv.org/lmi/EW2011/ew11x059.htm

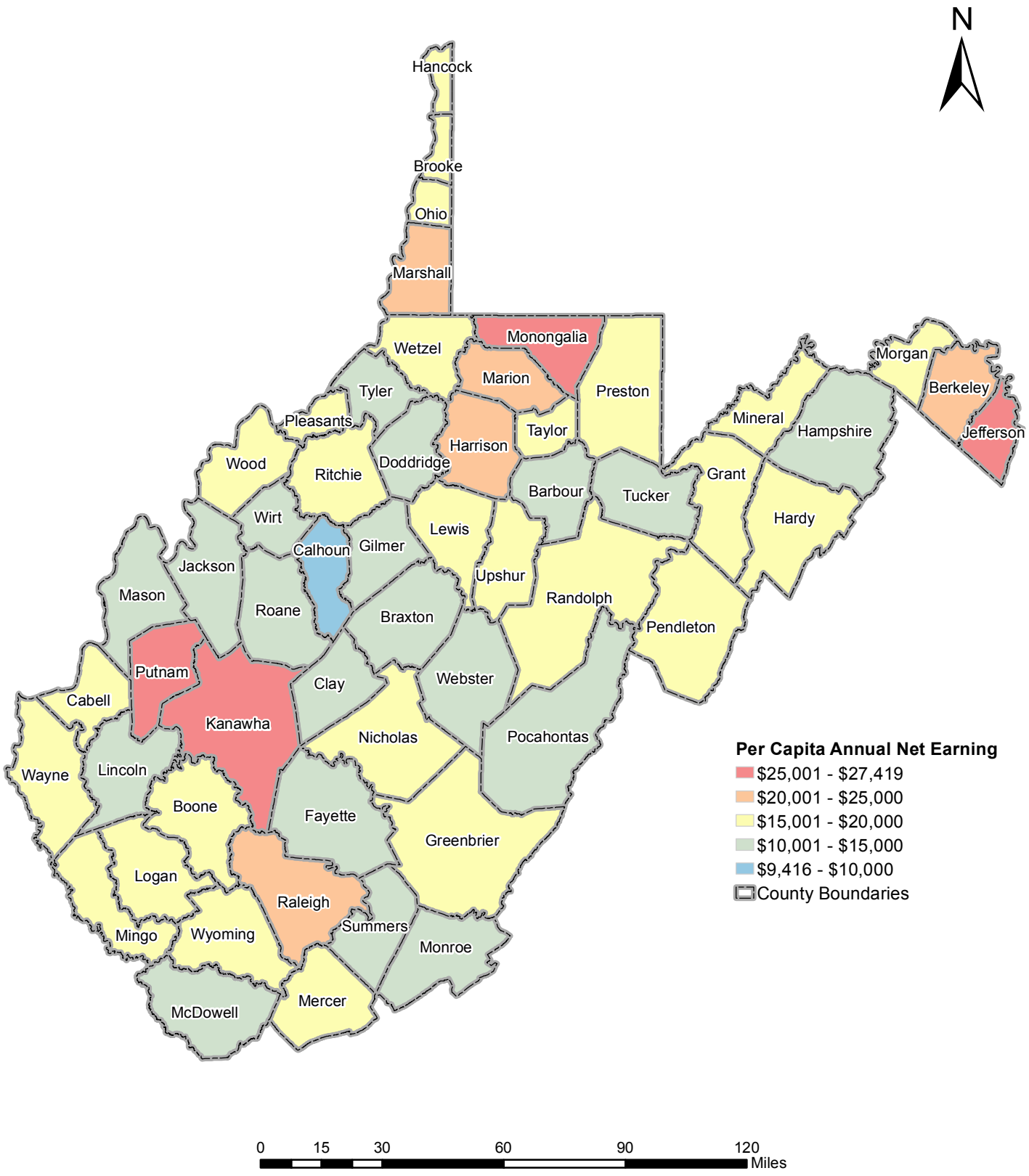
[6] "Tables CA 04 and CA 35 analysis," Bureau of Economic Analysis, Regional Economic Accounts, Local Area Person Income and Employment, Accessed February 13, 2013, http://www.bea.gov/regional/index.htm.

Earned income, or income from work, is displayed in Map 5, and Lincoln is ranked low in earned income in West Virginia.

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. Lincoln 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.

Demographic

Per Capita Annual Net Earning



Source: United States Census Bureau 2011

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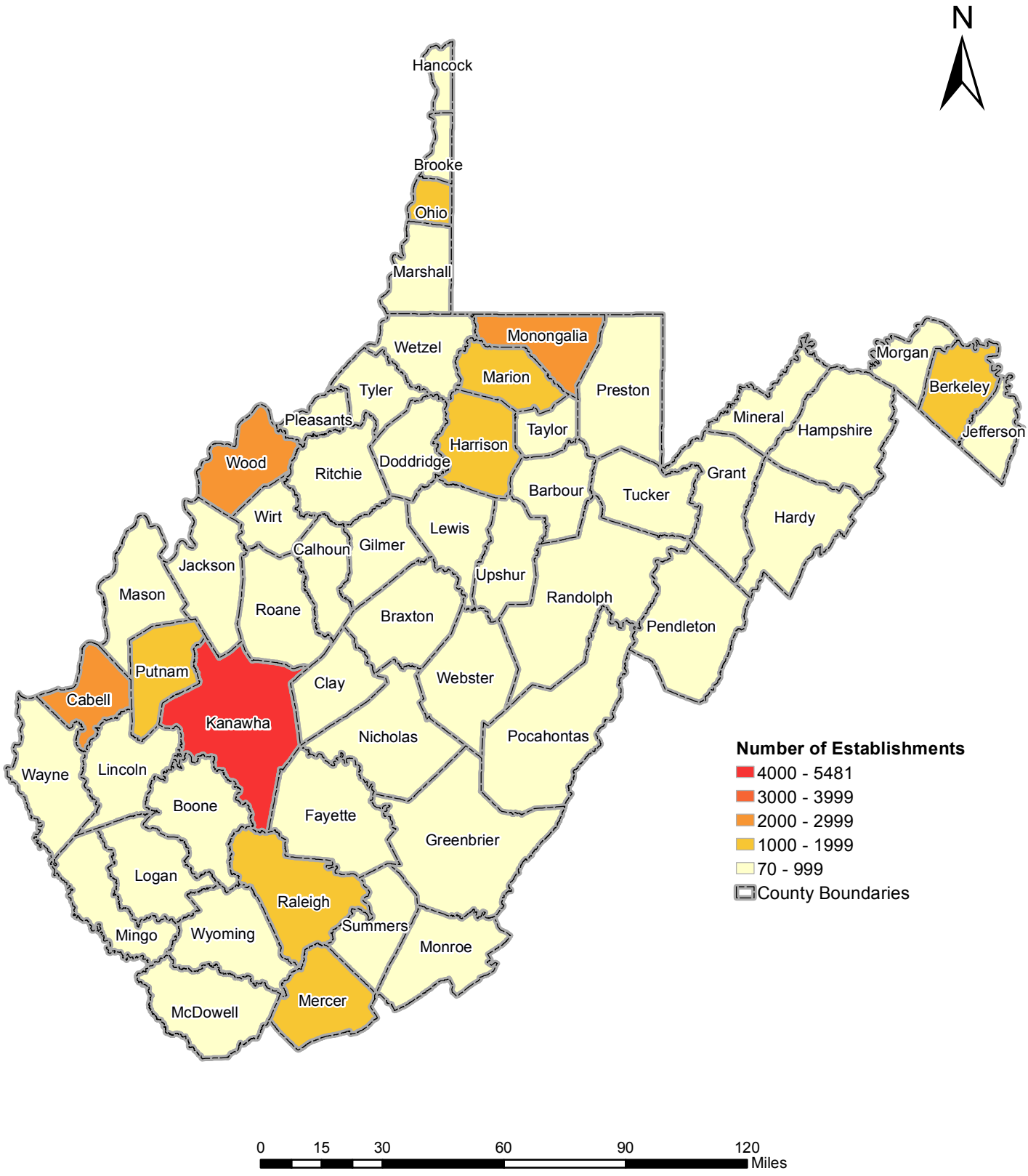
Demographic

Number of Establishments



Source: United States Census Bureau 2011

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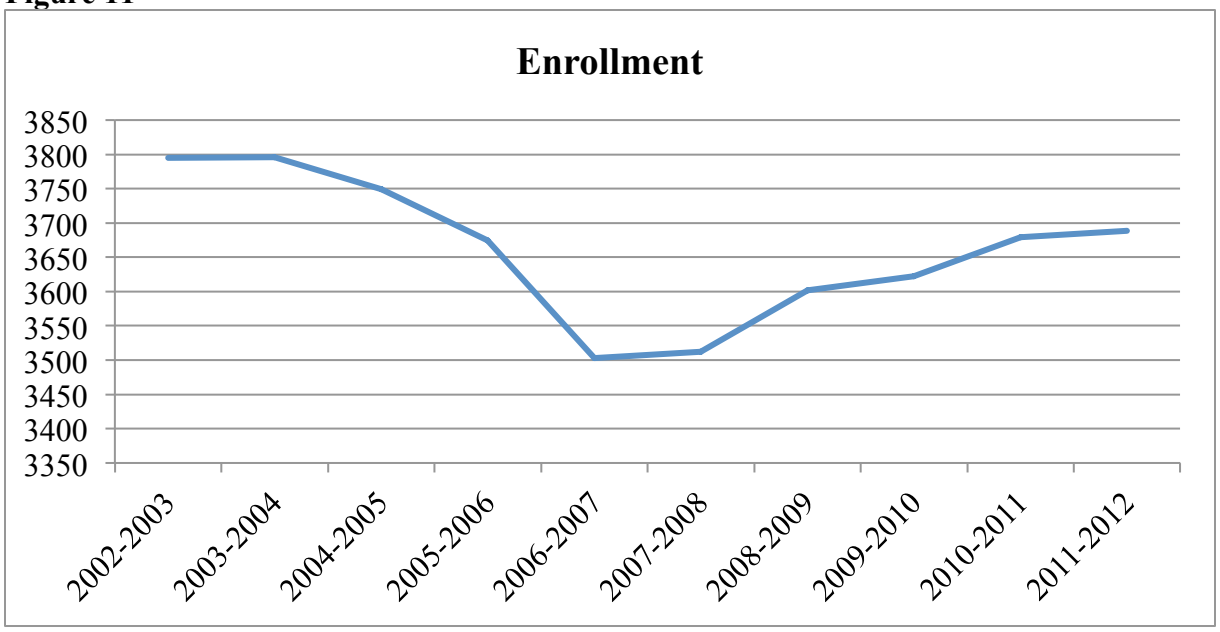
Education

Lincoln County has one high school, one middle school, one school of grades 5-8, two PK-8 schools, three PK-5 schools and one PK-4 school as of the 2011-2012 school year.[7]

Lincoln County 2nd month school enrollment steadily declined until 2006. The schools were under the control of the state until 2009, after a steady increase in enrollment had been detected for about three years. Lincoln 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

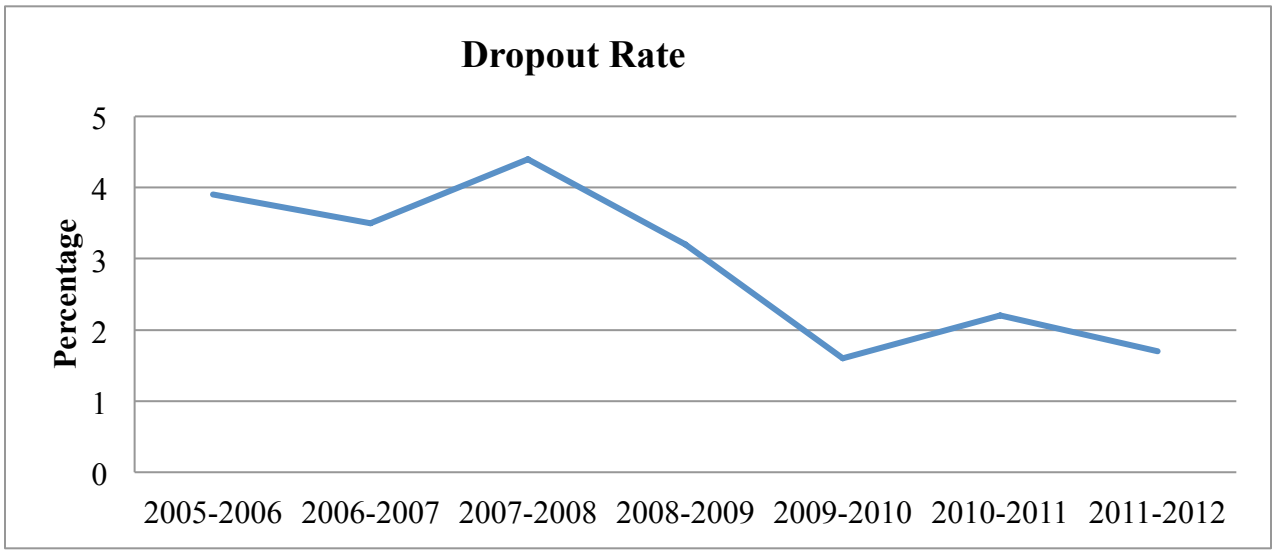


Source: WVEIS

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 a significant drop between 2007-2008 and 2009-2010 years. This could be due to the increasing wages of the middle class natural resources and mining workers beginning to require more education for their children (Figure 12).

[7] "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

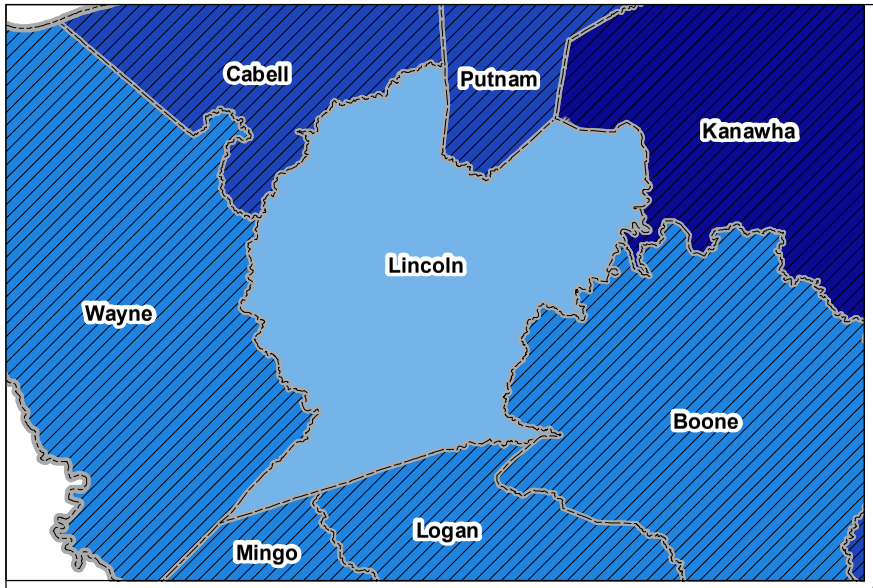


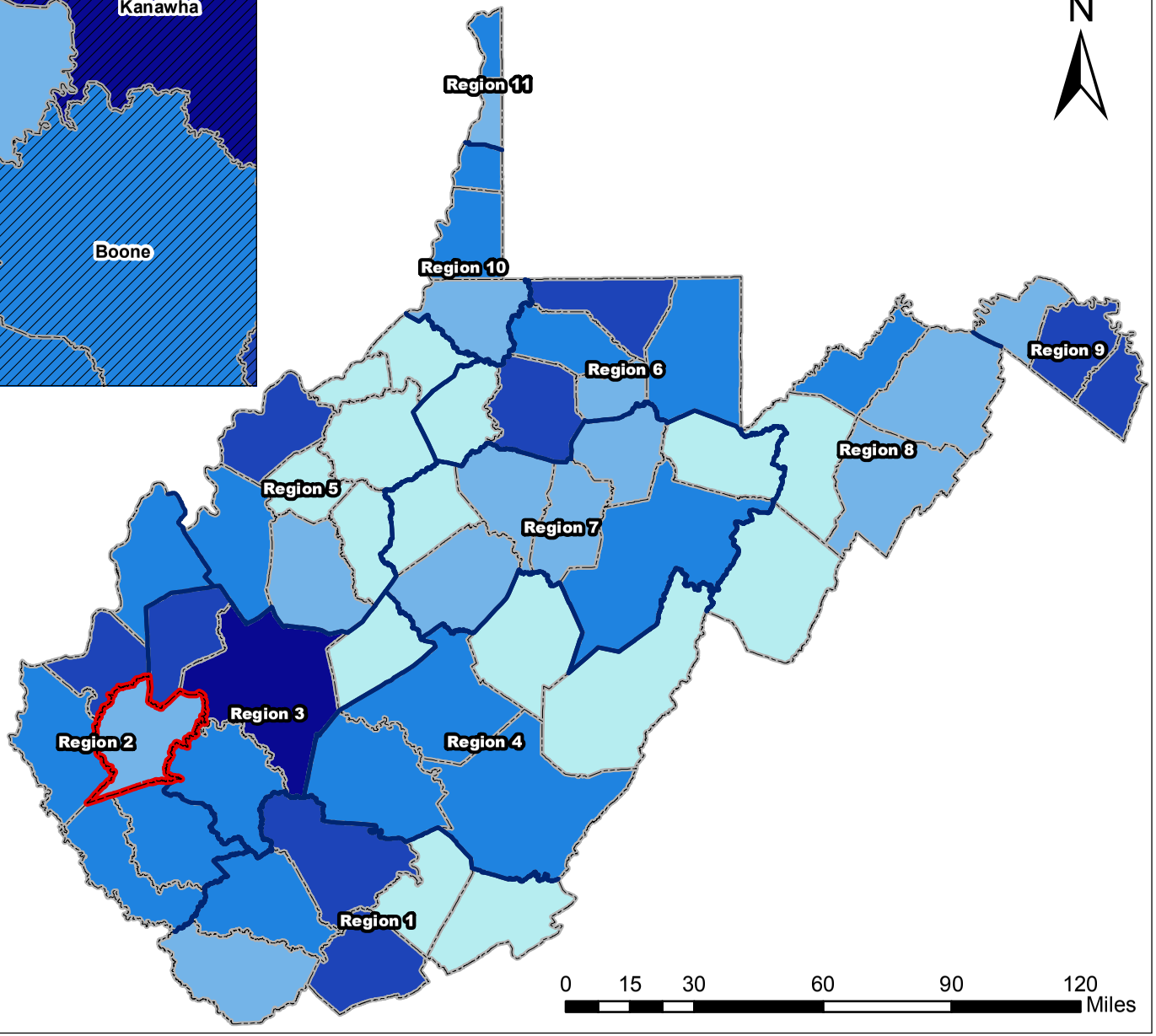
Source: WVEIS

Lincoln County currently has a low dropout rate. This is an achievement that not many counties in West Virginia share, and relative to Lincoln County's past performance. 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 Lincoln County is similar to those of the counties in the north-central area of West Virginia. The graduation rate is about average for the state. Lincoln County has several schools with large attendance; their locations are noted in Map 11. Not coincidentally, the major schools are located on the main roads in the county. The largest school by attendance in the county is Lincoln County 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

Lincoln County





N

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

0 15 30 60 90 120
Miles

Source: West Virginia Department of Education 2012

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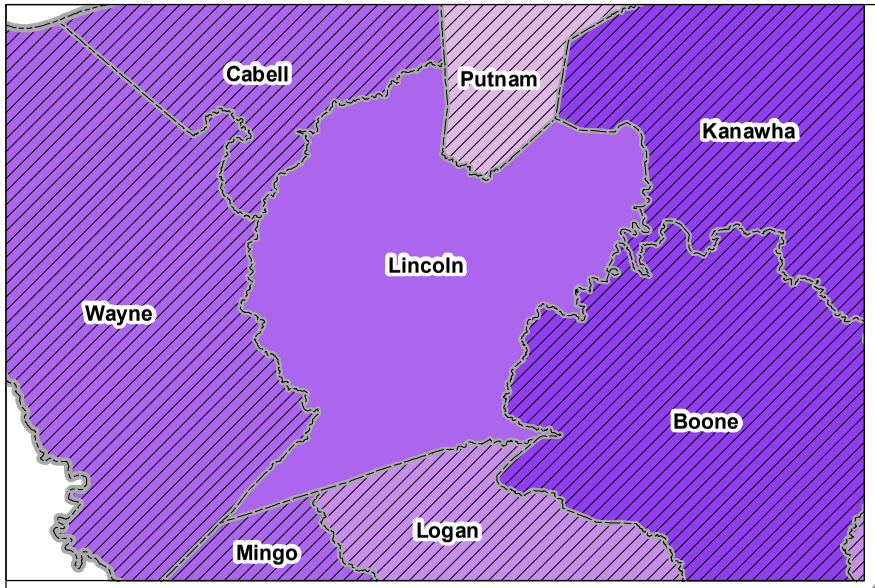
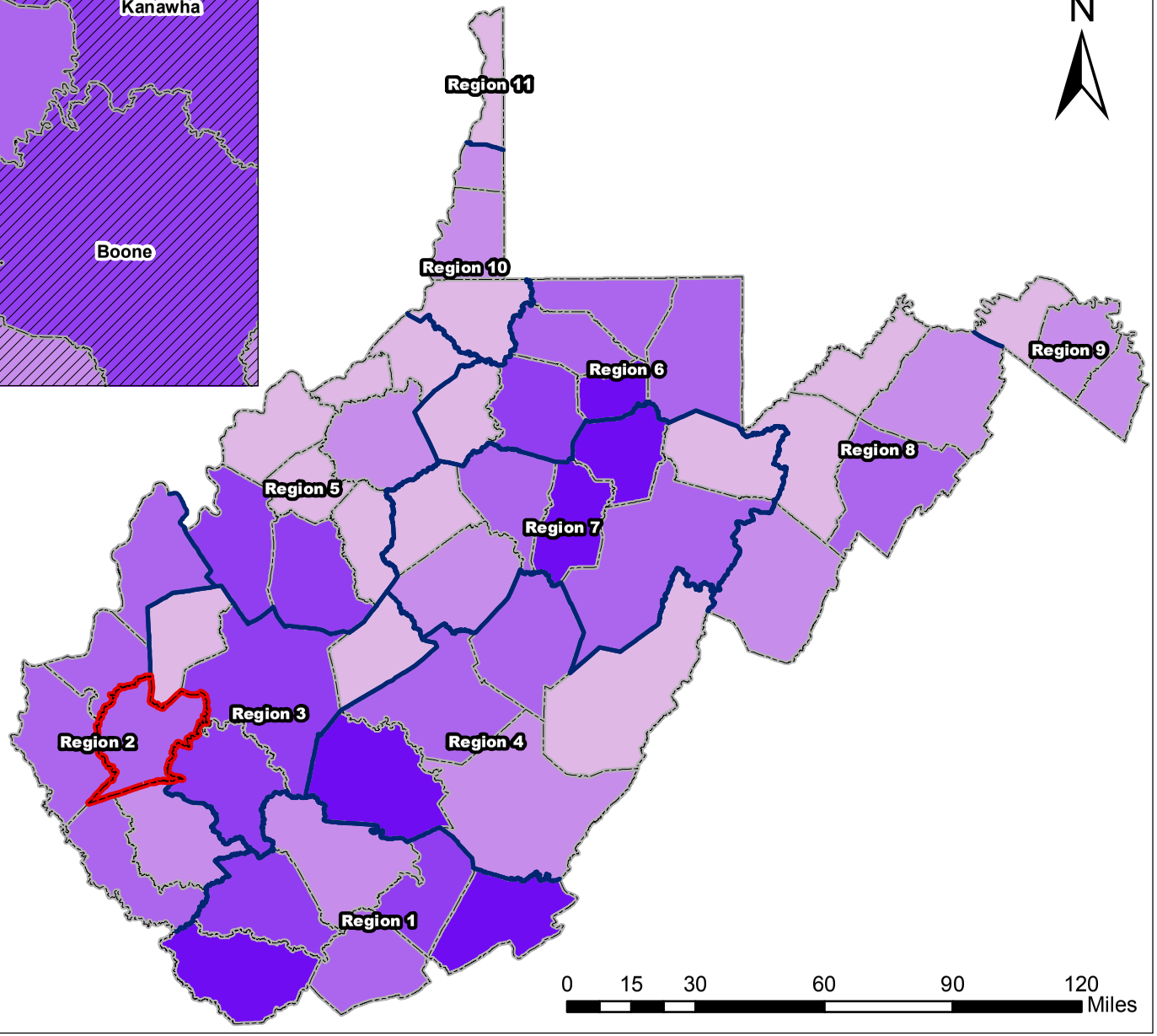
NCLB - Dropout Rate

Lincoln County





N

Planning Regions Line
0.40% - 1.70%
1.71% - 2.40%
2.41% - 3.10%
3.11% - 3.80%
3.81% - 4.70%
County Boundaries

0 15 30 60 90 120
Miles

Source: West Virginia Department of Education 2012

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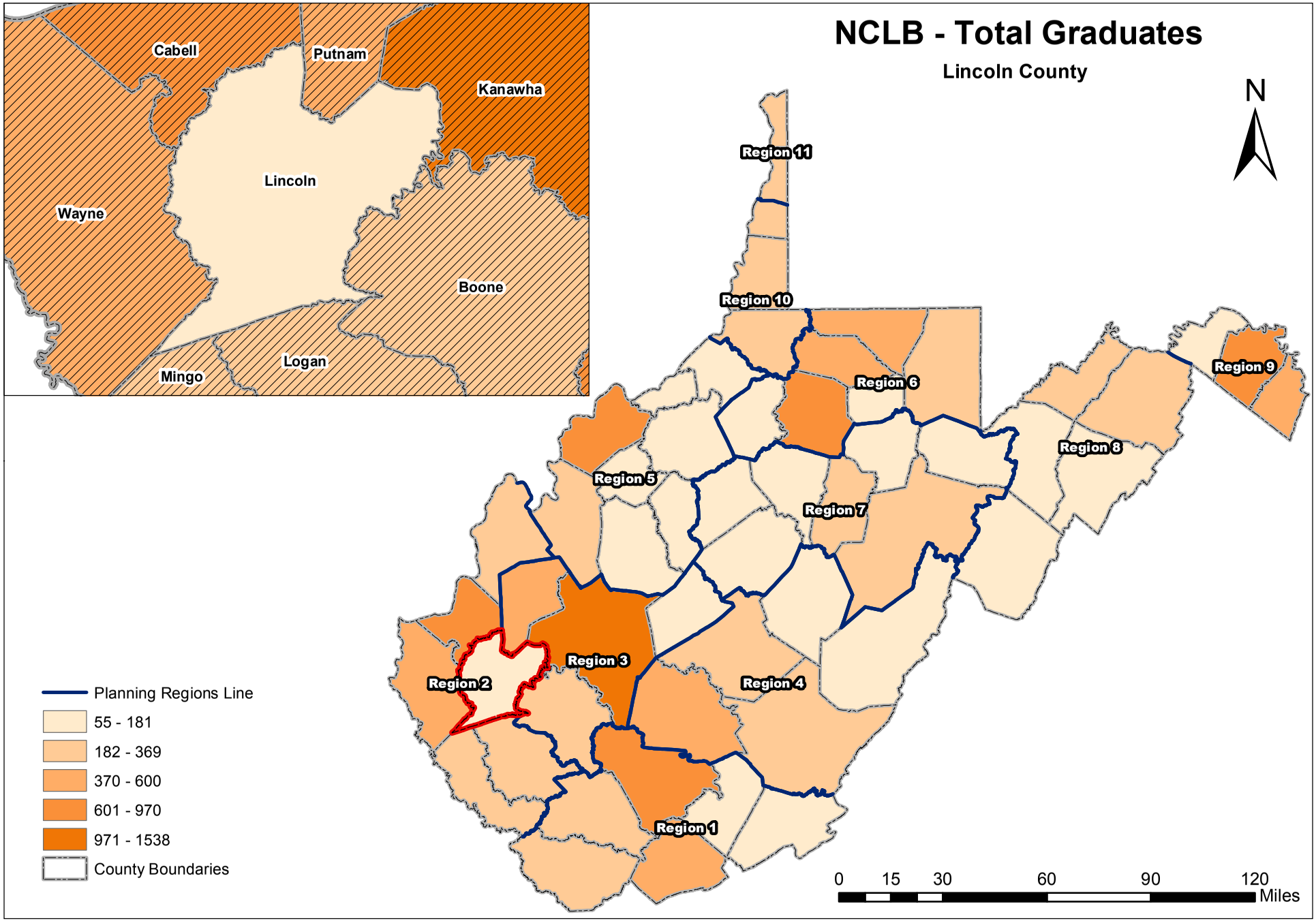
NCLB - Total Graduates

Lincoln County



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

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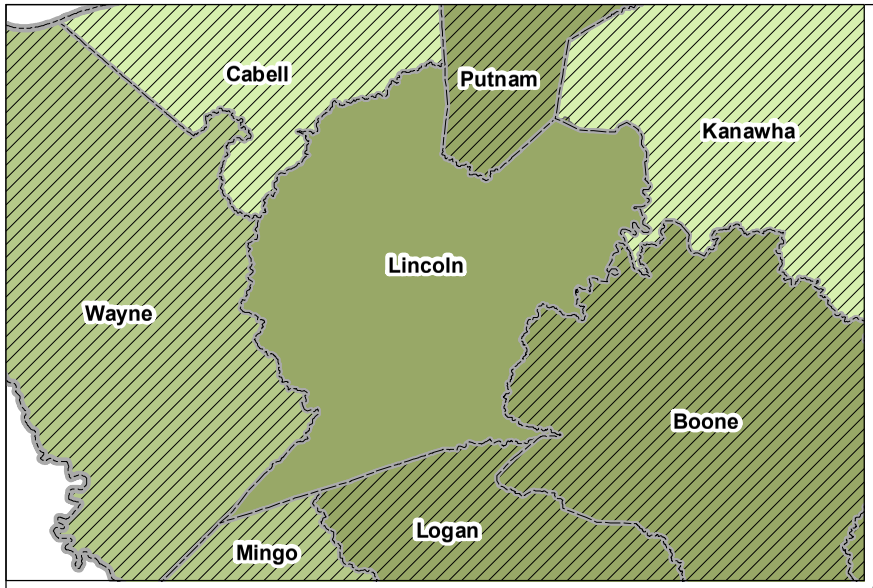
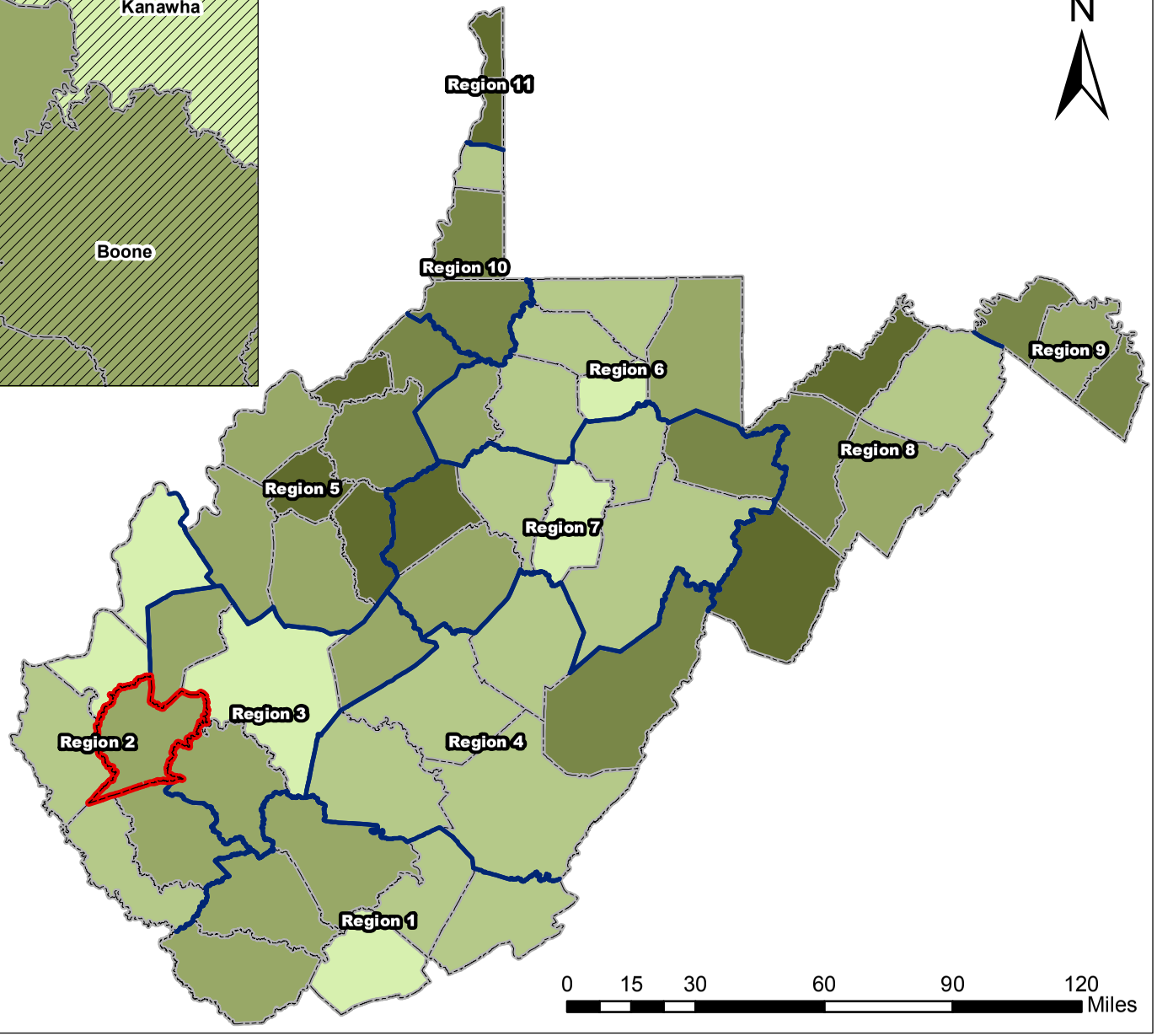
NCLB - Graduates Rate

Lincoln County





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

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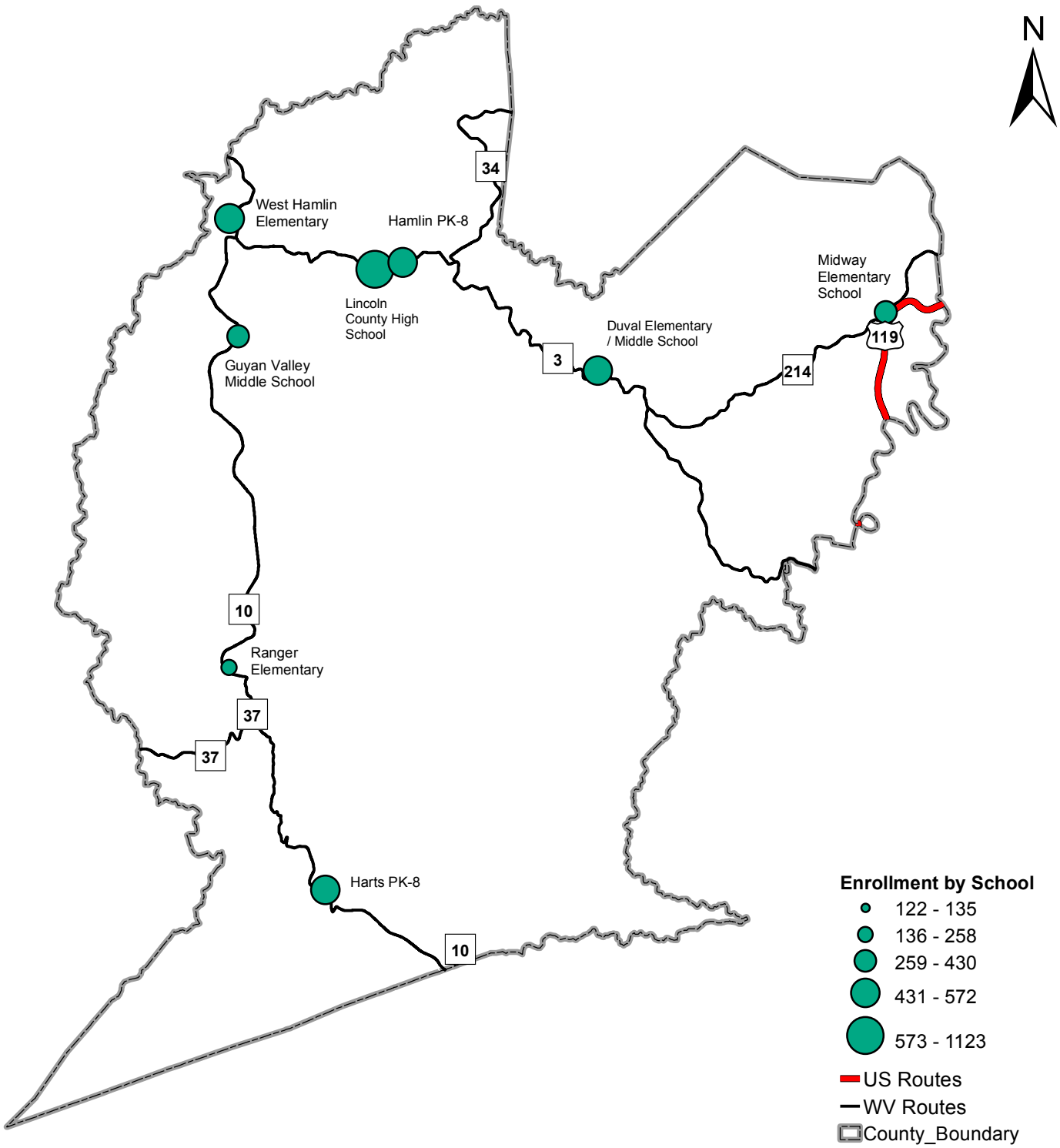
Total Attendance by School - 2012

Lincoln County



Source: West Virginia Department of Education 2012

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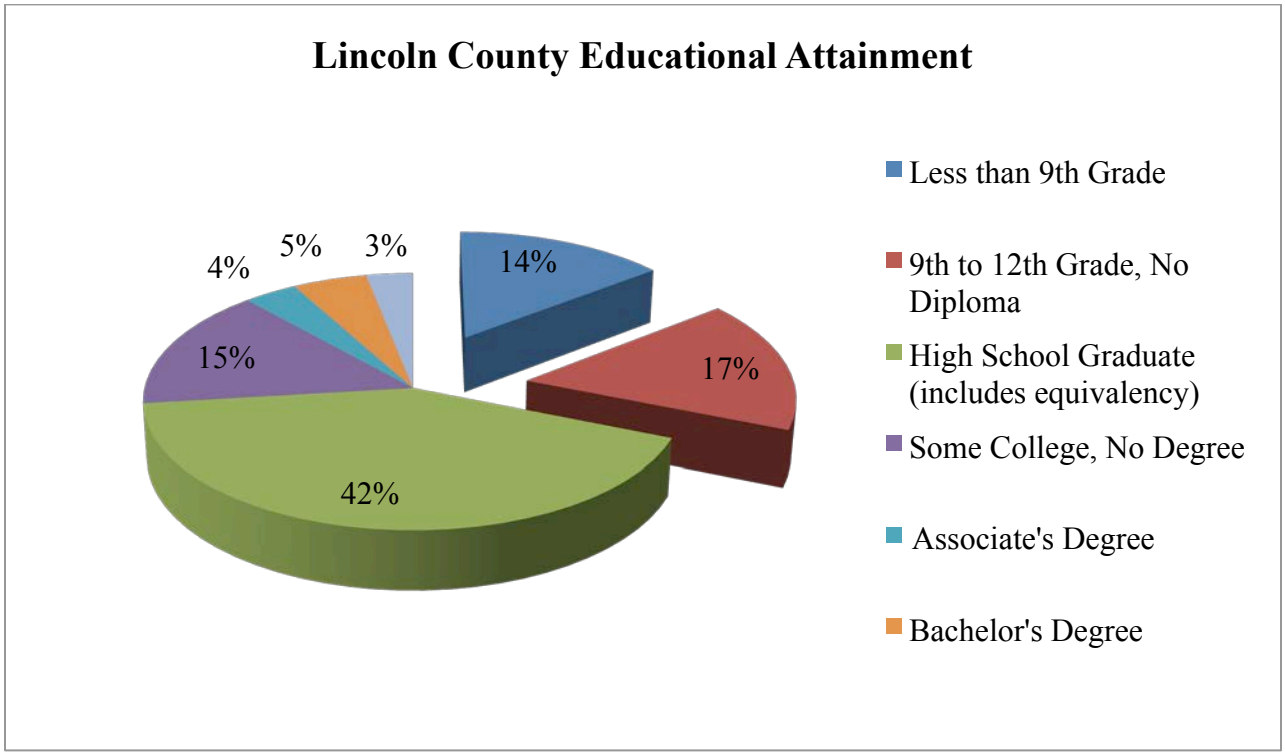
The ACS also maintains data on the educational attainment of the population that is 25 years and over. Forty-two percent of these residents have a high school diploma or equivalent. However, 31 percent have less than a high school diploma. This is a rather high number and particularly concerning when the relationship between education and jobs is considered.

Figure 13



Source: 2011 American Community Survey 5-Year Estimates

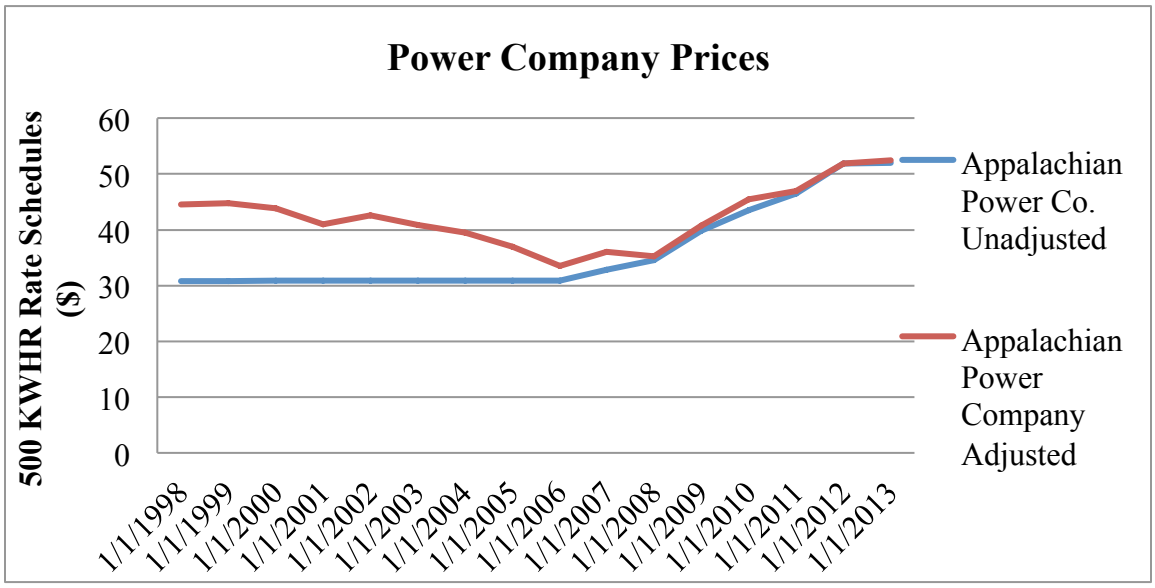
Utilities and Infrastructure

Lincoln County has 18 utility companies according to the West Virginia Public Service Commission (PSC). Economic development depends on infrastructure, and Lincoln 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 Lincoln 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 Lincoln 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. Lincoln County has 11 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, none located in Lincoln County.

Table 1: Lincoln County Water and Sewer Rates

Lincoln Public Service District	
Water Rates	
First 3000 gallons used per month	11.47 per 1000 gallons
Next 3000 gallons used per month	11.01 per 1000 gallons
Next 4000 gallons used per month	10.06 per 1000 gallons
Next 10000 gallons used per month	9.31 per 1000 gallons
Over 30000 gallons used per month	8.09 per 1000 gallons

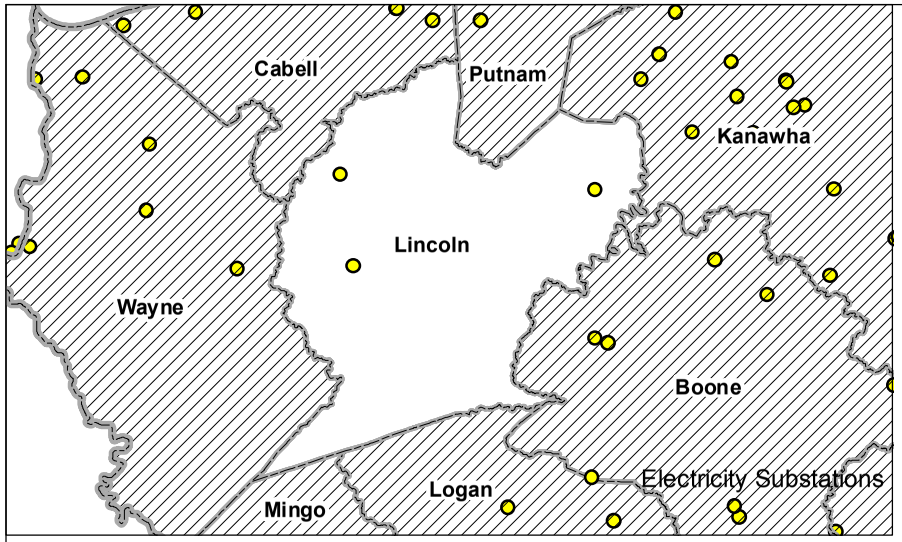
All Over 50000 gallons used per month	6.06 per 1000 gallons
Hamlin Public Service District	
Sewer Rates	
First 1000 gallons used per month	7.00 per 1000 gallons
Next 2000 gallons used per month	5.69 per 1000 gallons
Next 3000 gallons used per month	5.07 per 1000 gallons
Next 5000 gallons used per month	4.63 per 1000 gallons
Next 9000 gallons used per month	3.94 per 1000 gallons
All Over 20000 gallons used per month	3.50 per 1000 gallons
Branchland-Midkiff Public Service District	
Water Rates	
First 2000 gallons used per month	13.94 per 1000 gallons
Next 3000 gallons used per month	12.02 per 1000 gallons
Next 5000 gallons used per month	11.41 per 1000 gallons
Next 10000 gallons used per month	10.75 per 1000 gallons
All Over 20000 gallons used per month	9.49 per 1000 gallons
Pleasant View Public Service District	
Sewer Rates	
All amounts used per month	5.78 per 1000 gallons
Town of West Hamlin	
Water Rates	
First 2000 gallons used per month	8.48 per 1000 gallons
Next 4000 gallons used per month	8.31 per 1000 gallons
Next 4000 gallons used per month	8.07 per 1000 gallons
Next 10000 gallons used per month	7.84 per 1000 gallons
Next 10000 gallons used per month	7.74 per 1000 gallons
Over 30000 gallons used per month	7.66 per 1000 gallons
Sewer Rates	
First 3000 gallons used per month	8.40 per 1000 gallons
Next 7000 gallons used per month	7.20 per 1000 gallons
All Over 10000 gallons used per month	6.00 per 1000 gallons

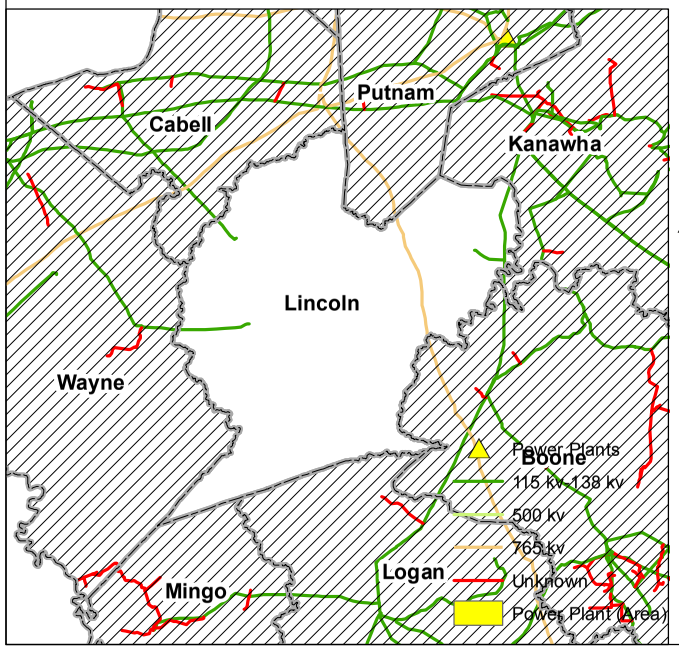
A private water company, West Virginia American Water Company, also services Lincoln County. The general service rates are listed in the table below, and are rounded to the nearest cent. The levels are higher than usual because the company services West Virginia's major cities as well as smaller municipalities.

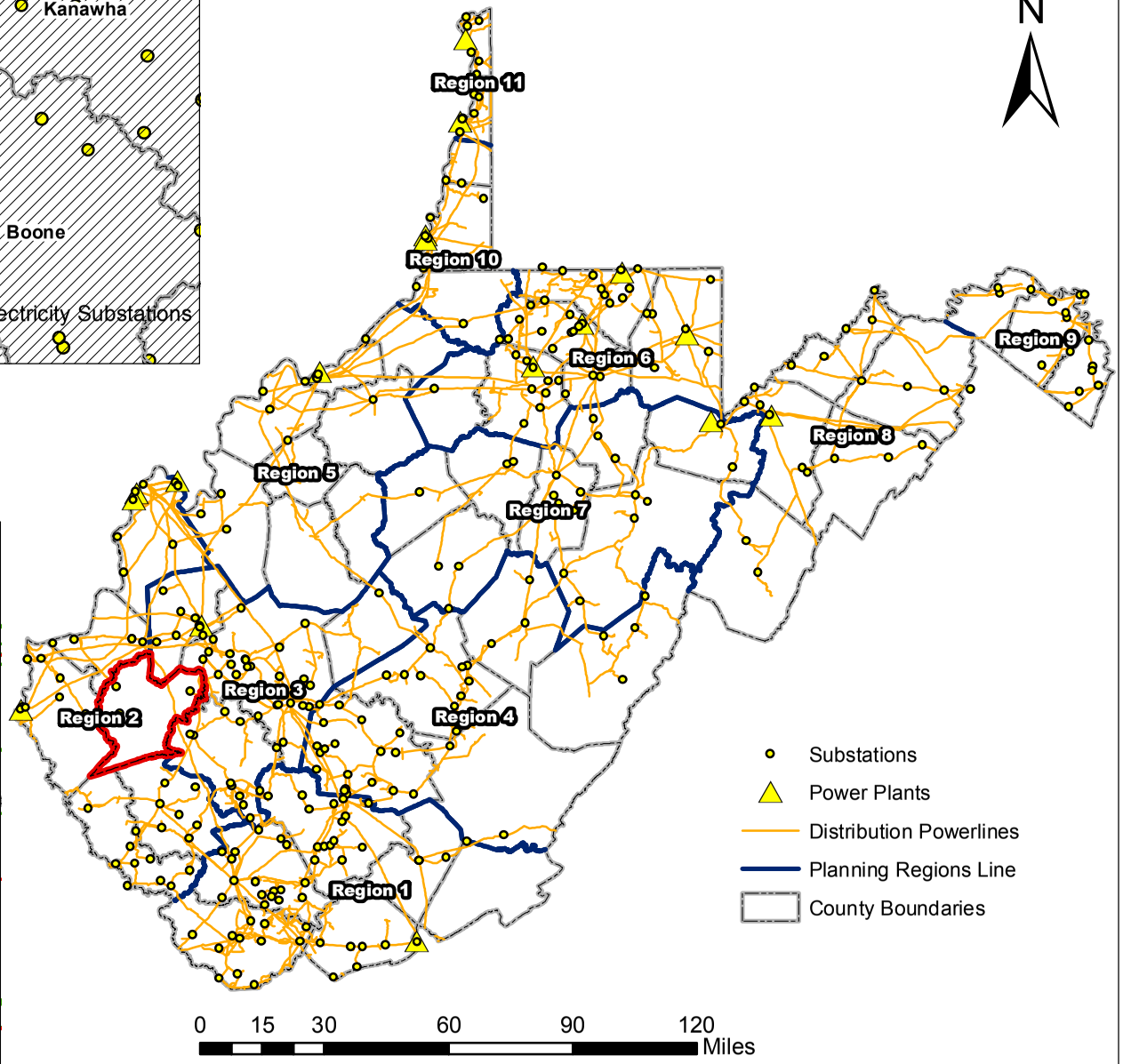
First 1500 gallons used per month	Minimum charge based on meter size
Next 28500 gallons used per month	9.61 per 1000 gallons
Next 870000 gallons used per month	6.33 per 1000 gallons
Next 81000000 gallons used per month	4.61 per 1000 gallons
All Over 9000000 gallons used per month	3.00 per 1000 gallons

Utilities - Electricity

Lincoln County







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

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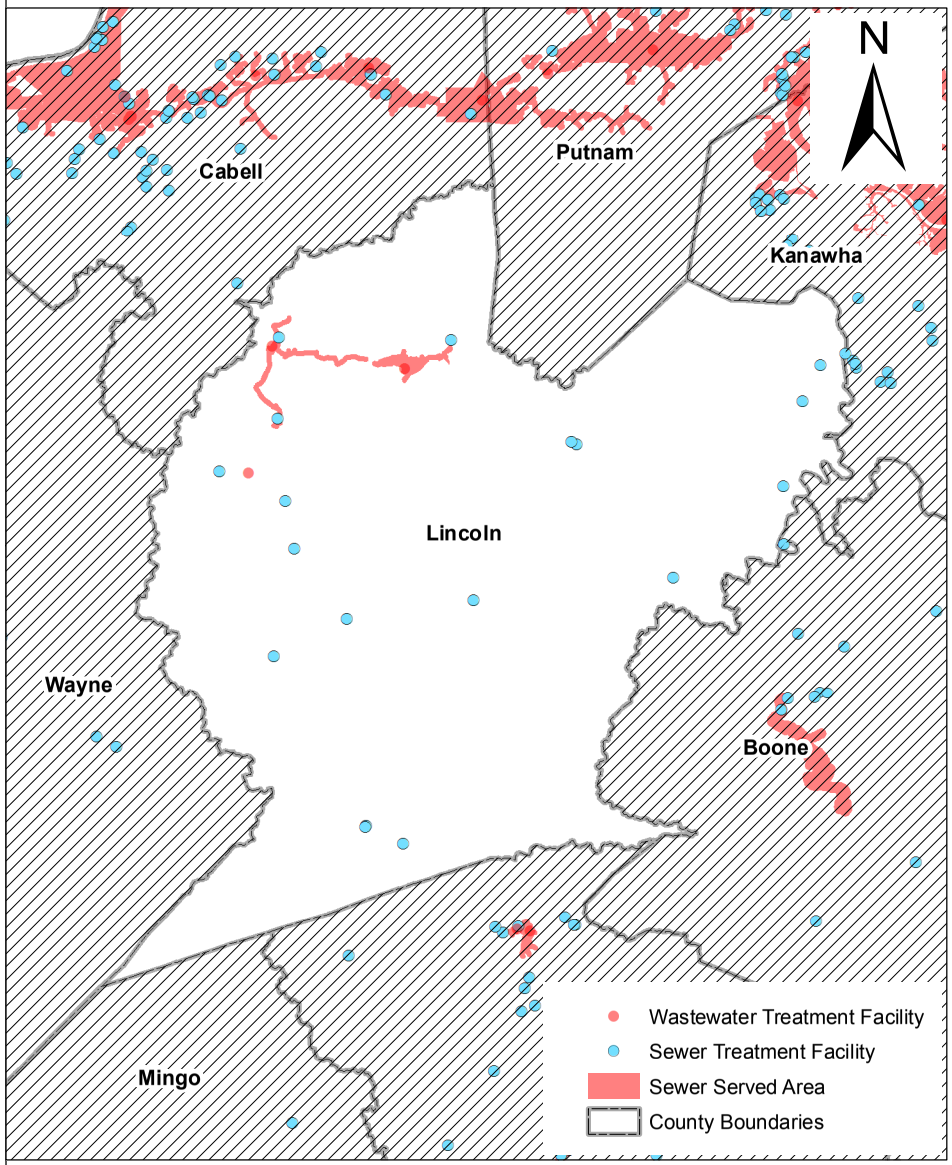
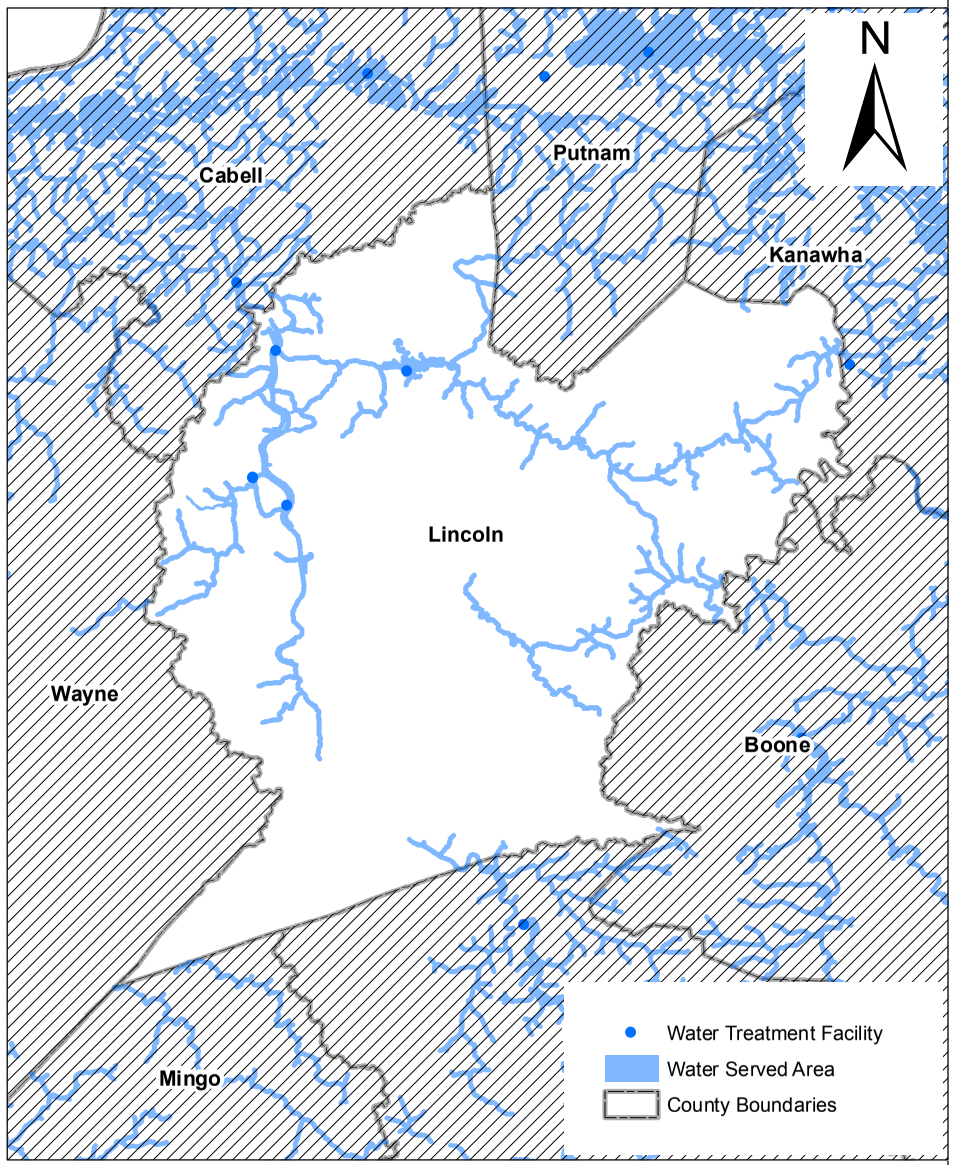
Utilities - Water and Sewer

Lincoln County





0 15 30 60 90 120
Miles

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

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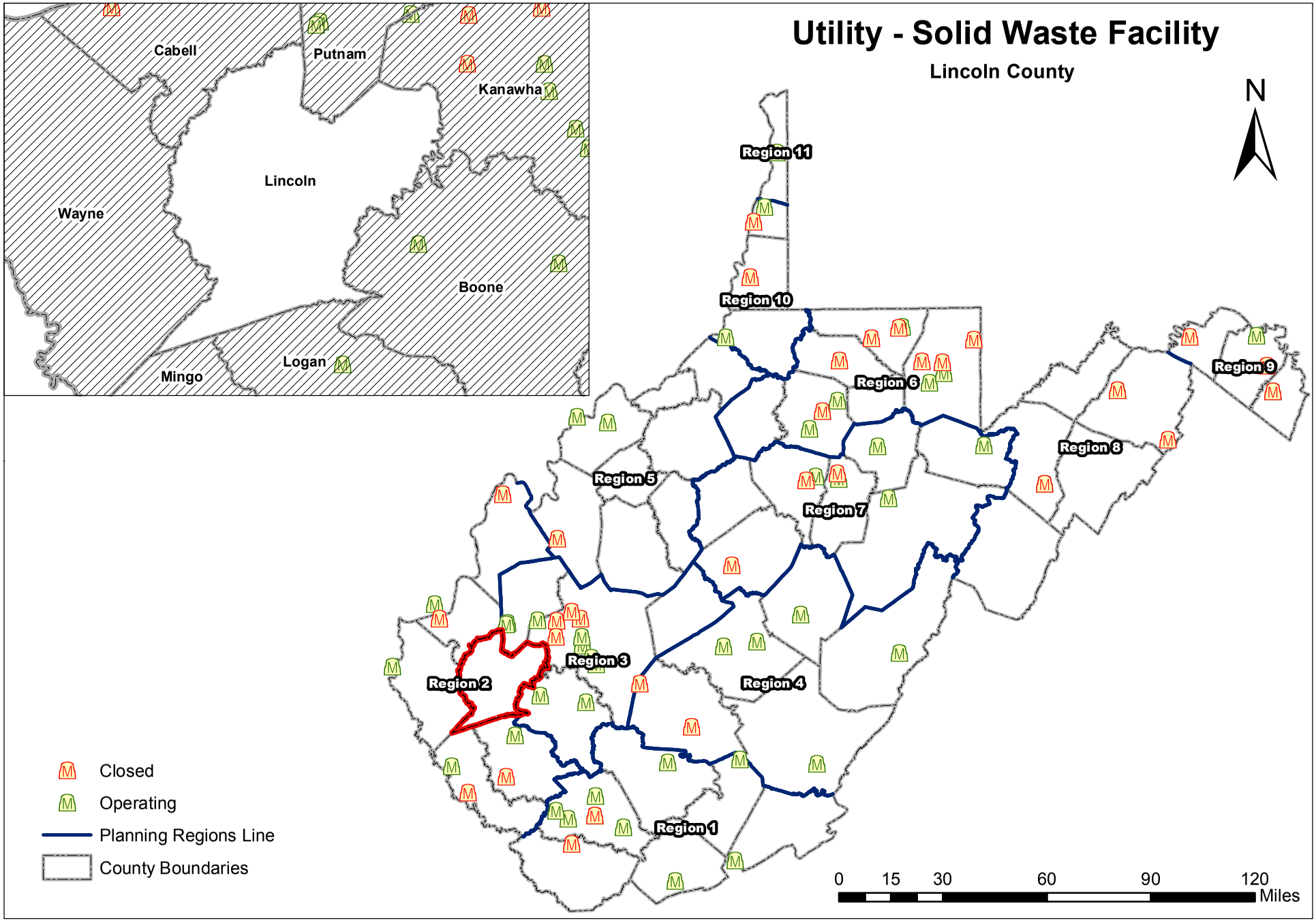
Utility - Solid Waste Facility

Lincoln County



Source: West Virginia Department of Environmental Protection 2002

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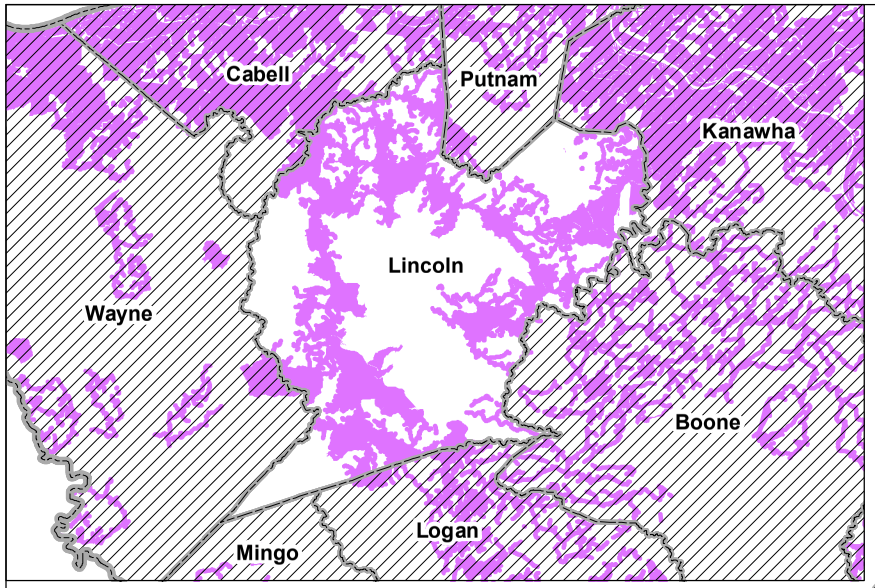
One essential modern convenience, now widely understood as an essential utility in a globalized world, is broadband access. The following 11 maps demonstrate Lincoln County's broadband infrastructure in relation to the State's. The largest number of providers in Lincoln County is 5 in the area closest to Kanawha County. Lincoln County broadband infrastructure more closely resembles the nearby coalfield counties rather than Kanawha, Putnam, and Cabell. 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. Though the lack of broadband is extensive, it actually ranks well compared to other coalfield counties, mostly due to its location near West Virginia's population centers.

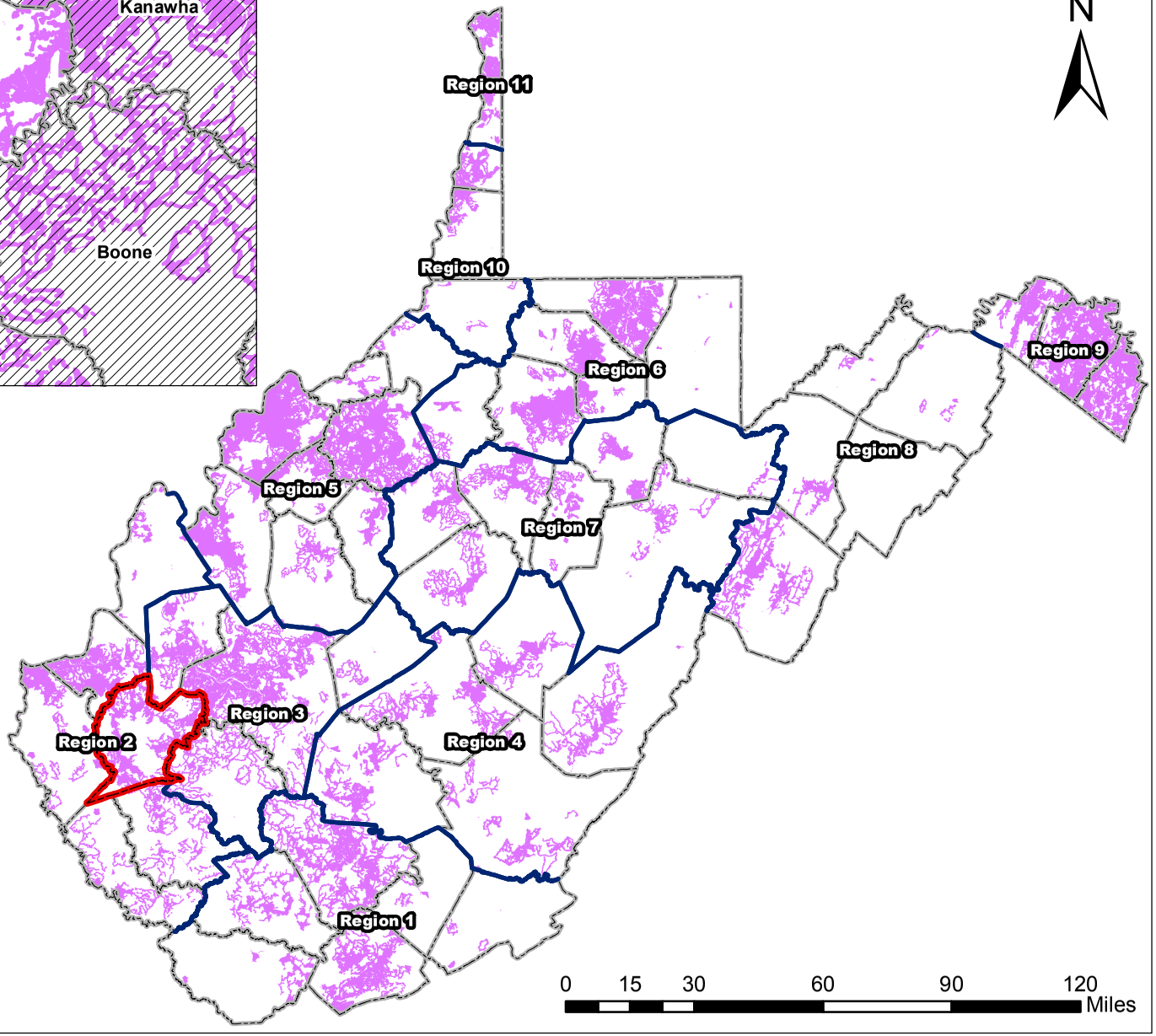
Map 15 shows physical cable infrastructure running from ISPs to other structures. DSL, BPL, and other copper represent the transferal system of broadband (Map 16). Map 17 shows the entire wire system, represented by physical wires, while Maps 18 and 19 show the maximum uploading and downloading speeds 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 Lincoln 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

Lincoln County





N

Planning Regions Line
Cable and FTTP
County Boundaries

0 15 30 60 90 120
Miles

Source: West Virginia Broadband Mapping Program 2012

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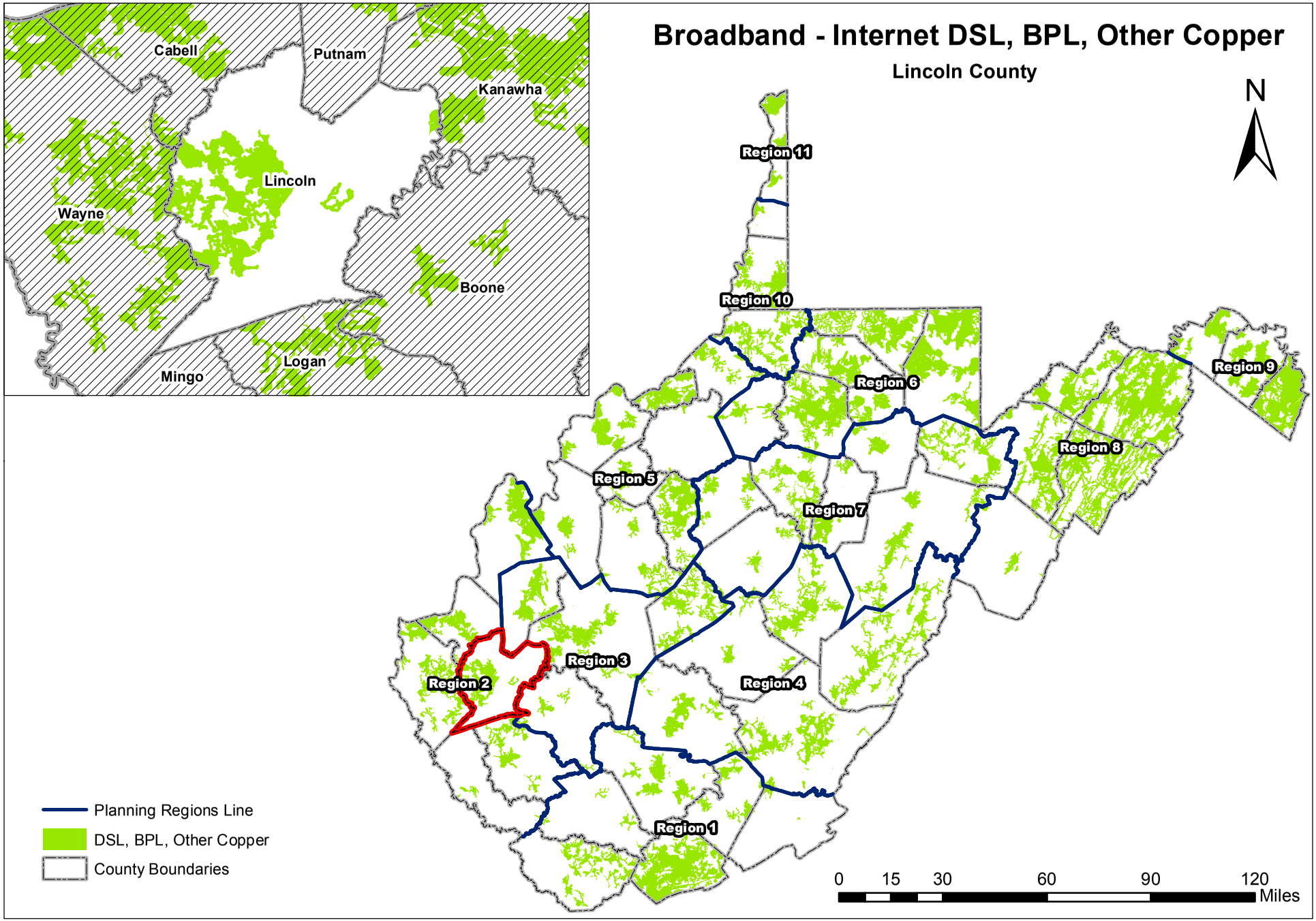
Broadband - Internet DSL, BPL, Other Copper

Lincoln County



Source: West Virginia Broadband Mapping Program 2012

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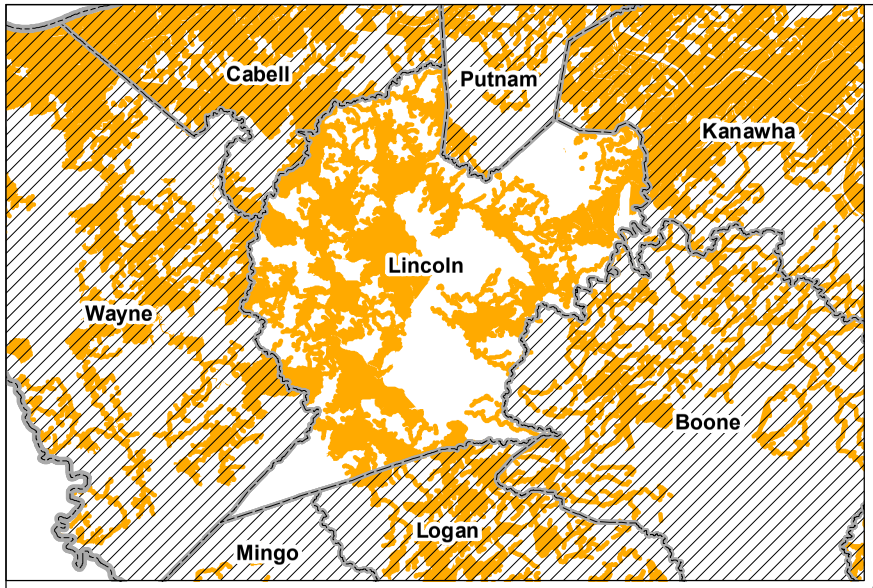
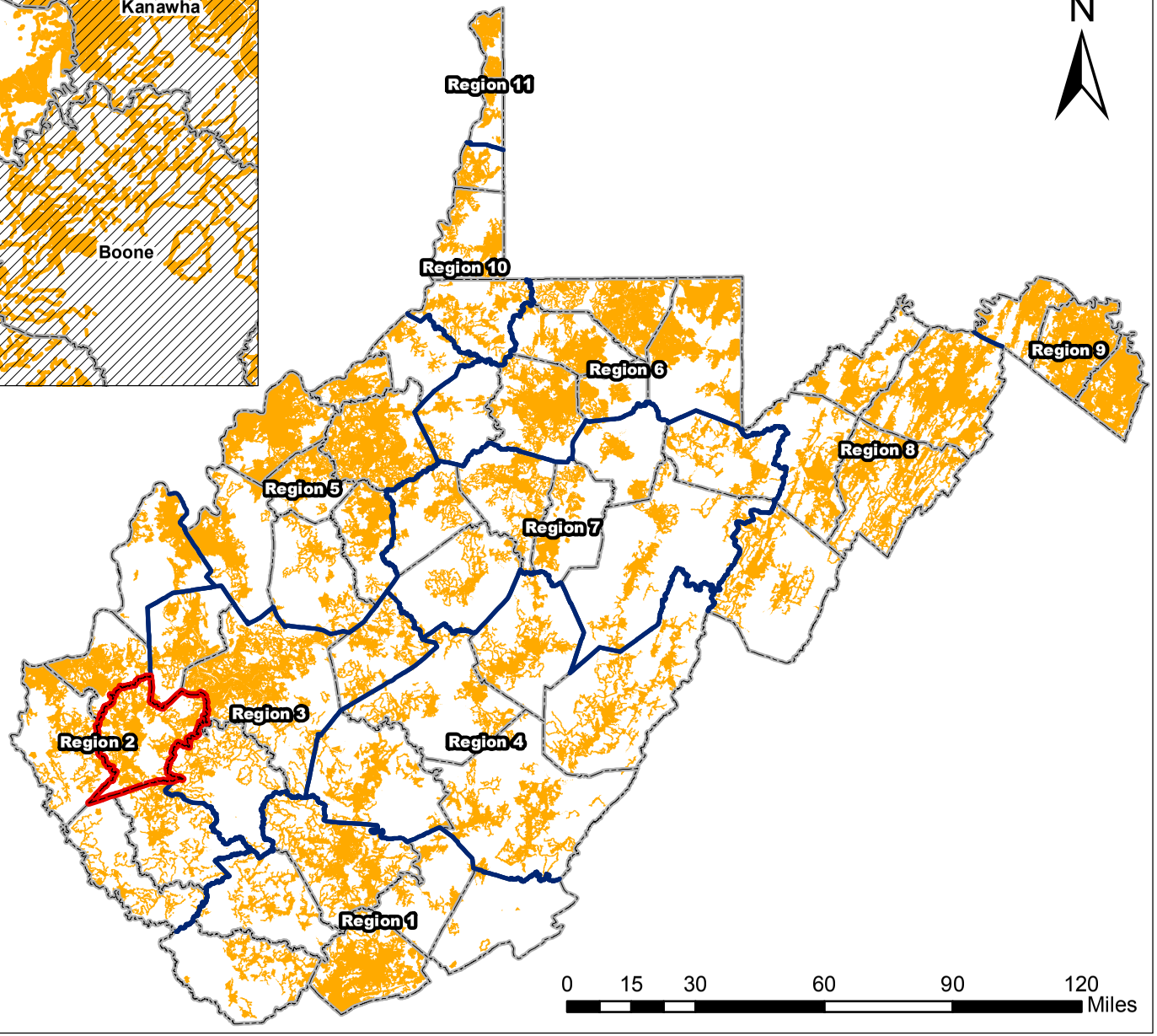
Broadband - Internet Wireline Coverage

Lincoln County





Planning Regions Line
Wireline Coverage
County Boundaries

Source: West Virginia Broadband Mapping Program 2012

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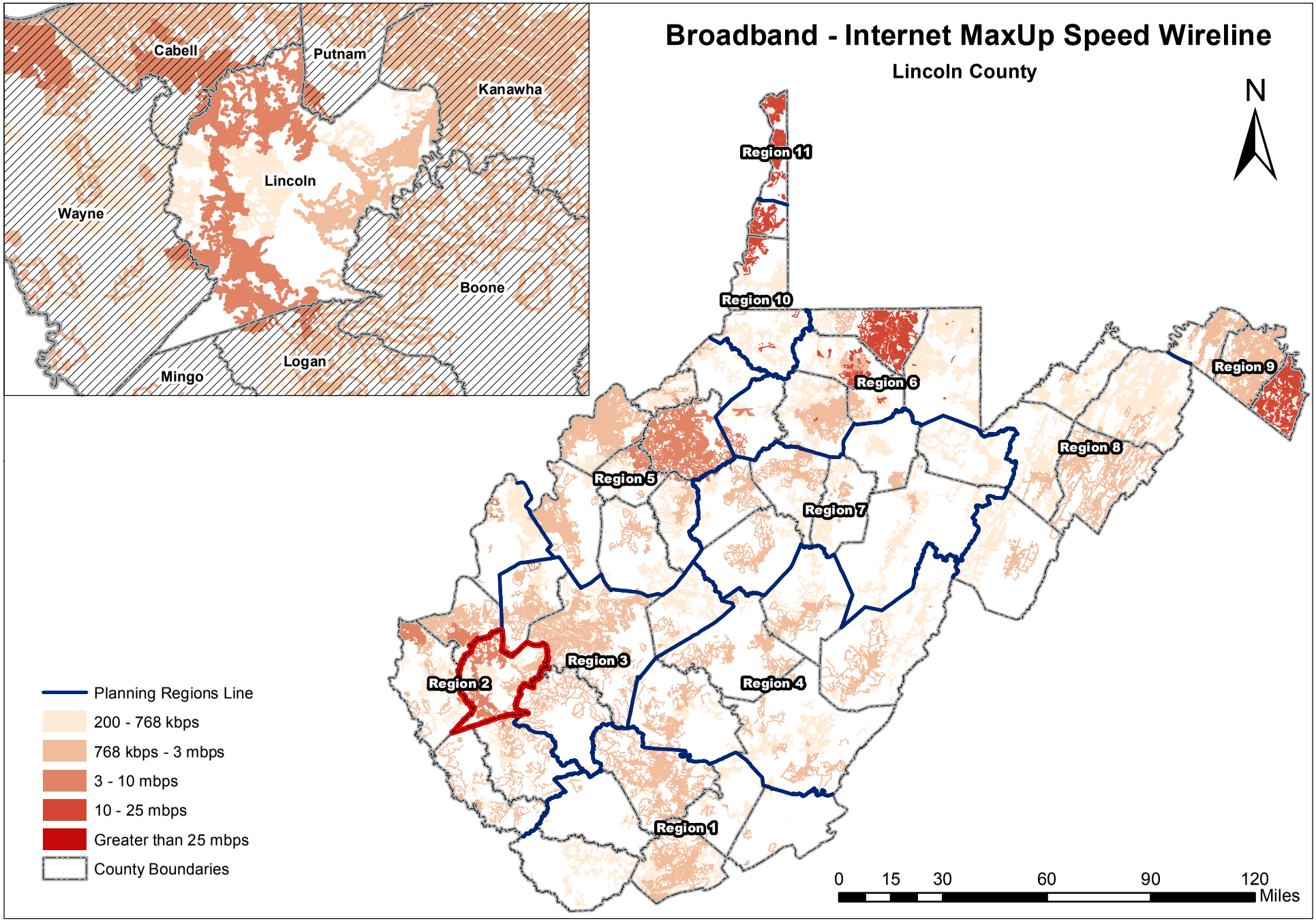
Broadband - Internet MaxUp Speed Wireline

Lincoln County



Source: West Virginia Broadband Mapping Program 2012

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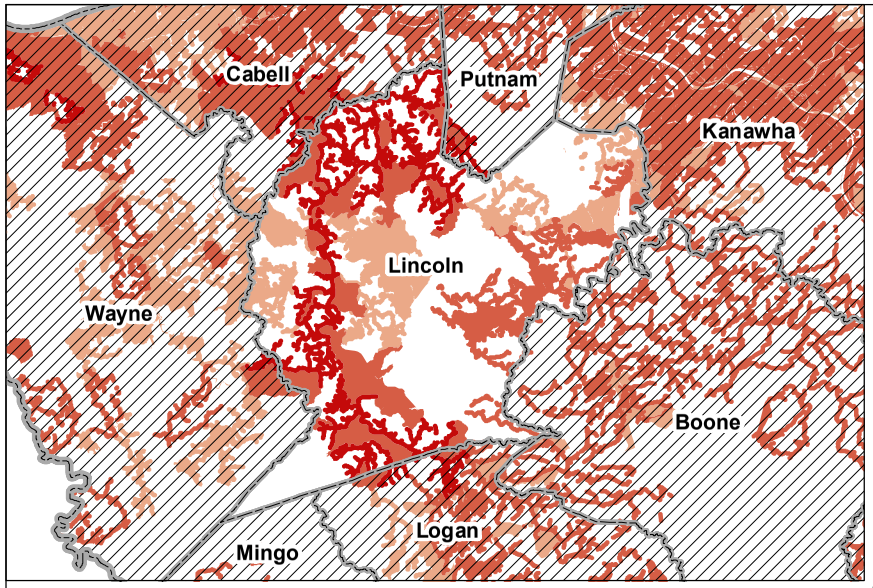
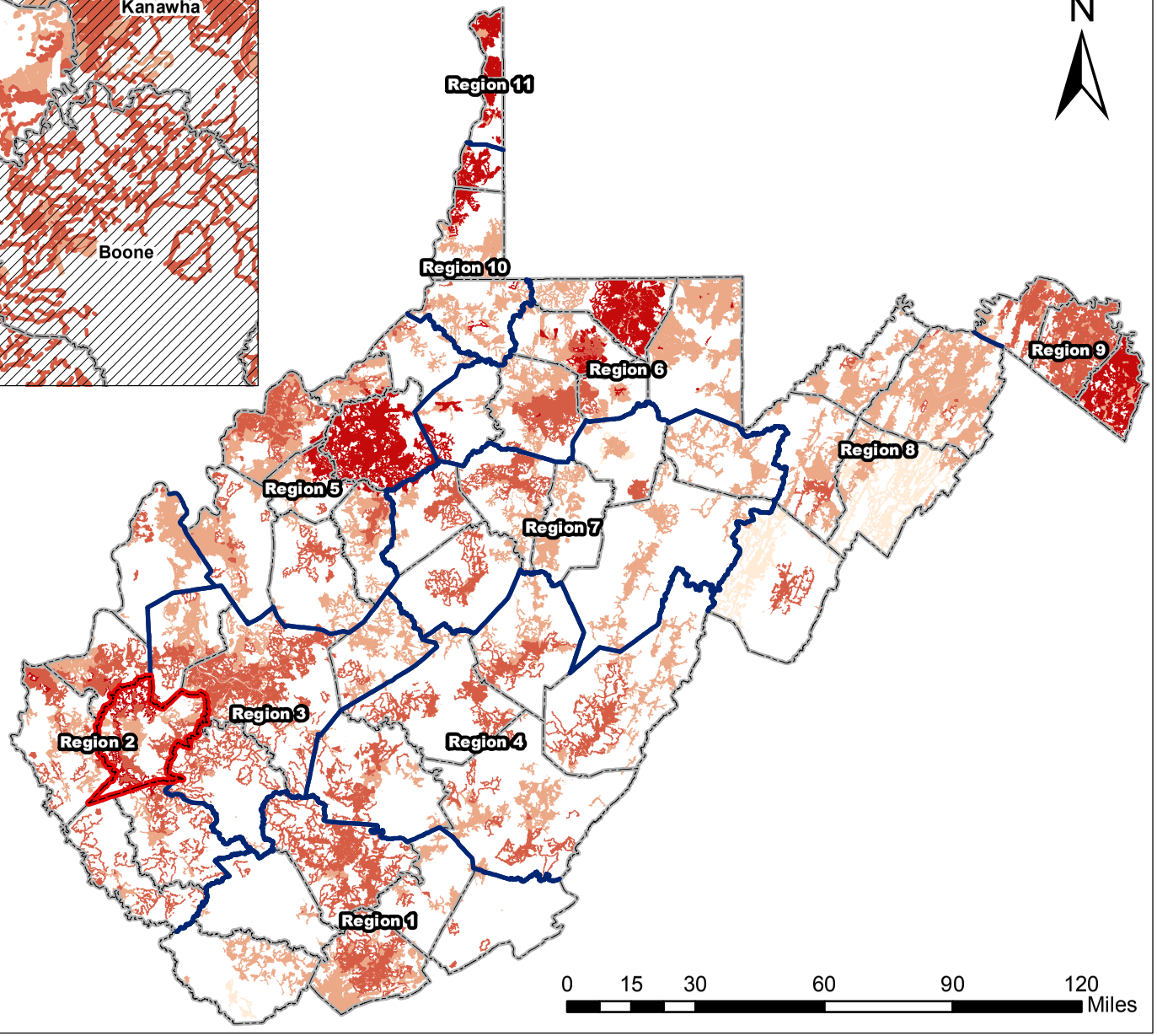
Broadband - Internet MaxDown Speed Wireline

Lincoln County





Source: West Virginia Broadband Mapping Program 2012

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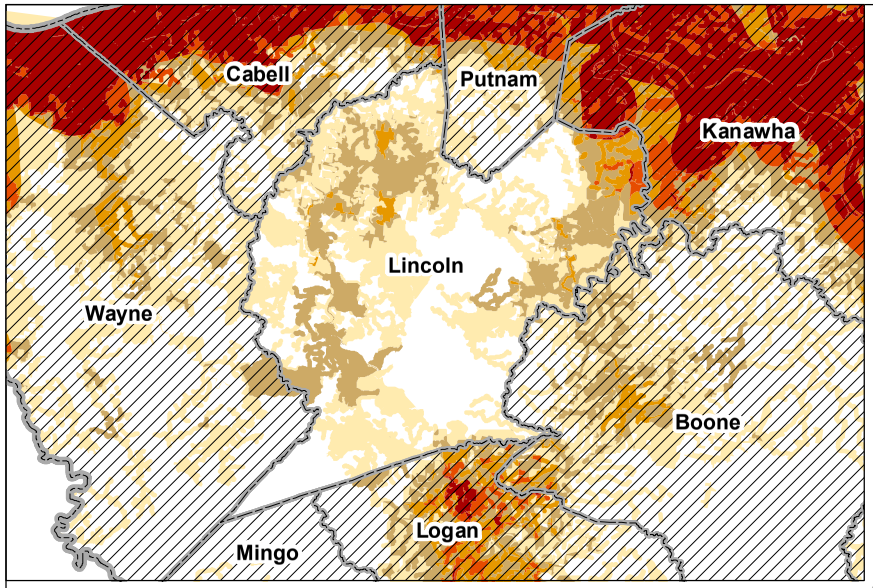
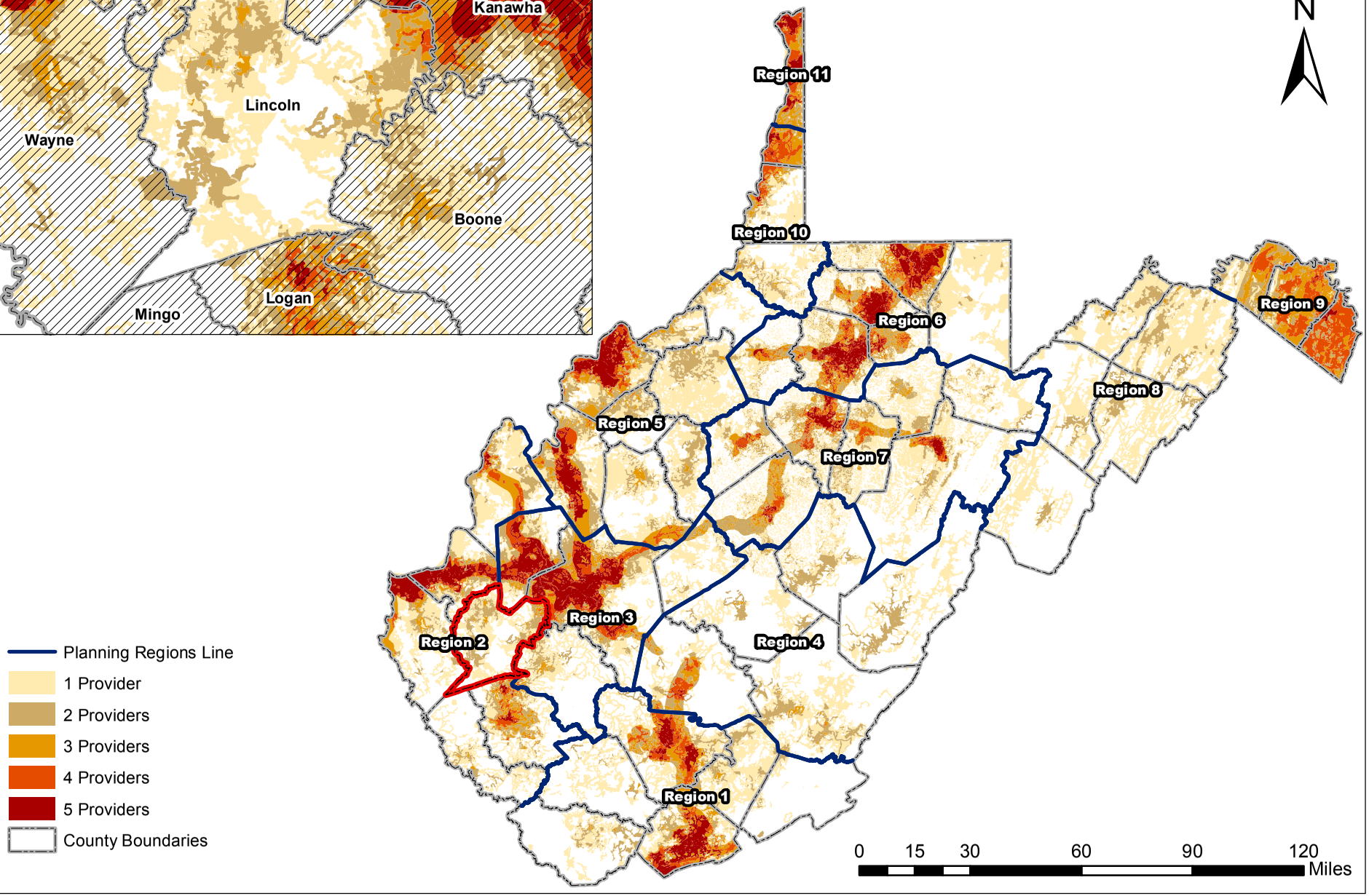
Broadband - Internet Total Number of Providers

Lincoln County





Source: West Virginia Broadband Mapping Program 2012

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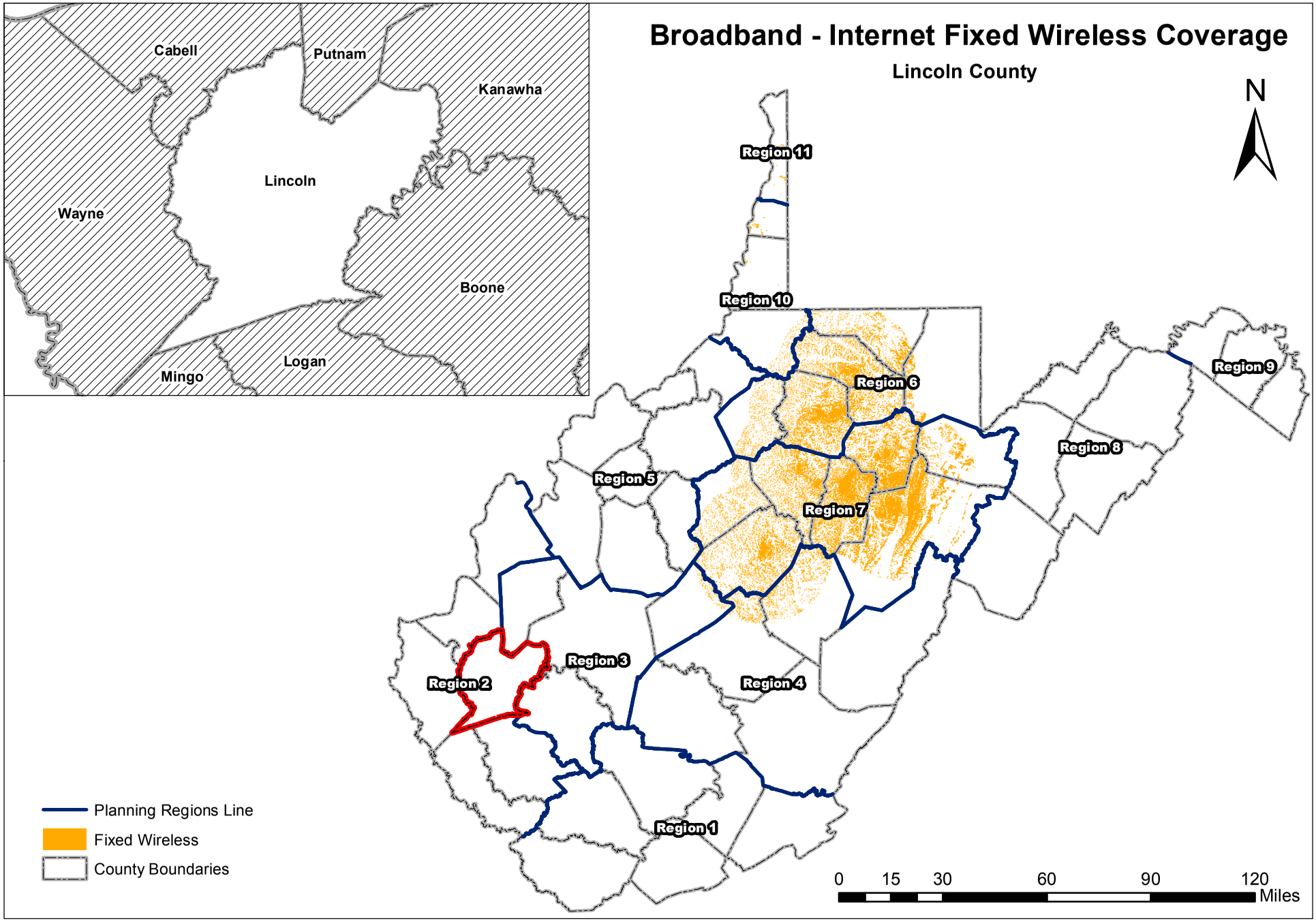
Broadband - Internet Fixed Wireless Coverage

Lincoln County



Source: West Virginia Broadband Mapping Program 2012

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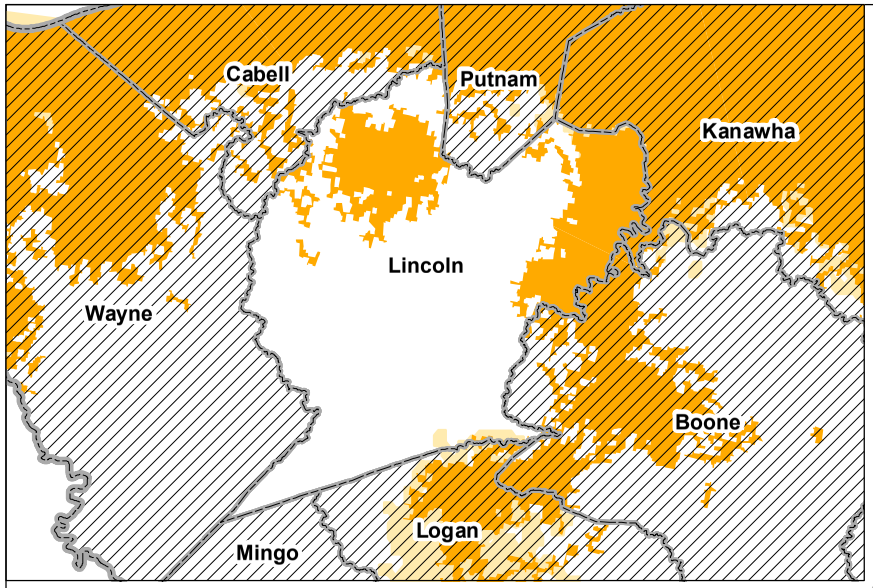
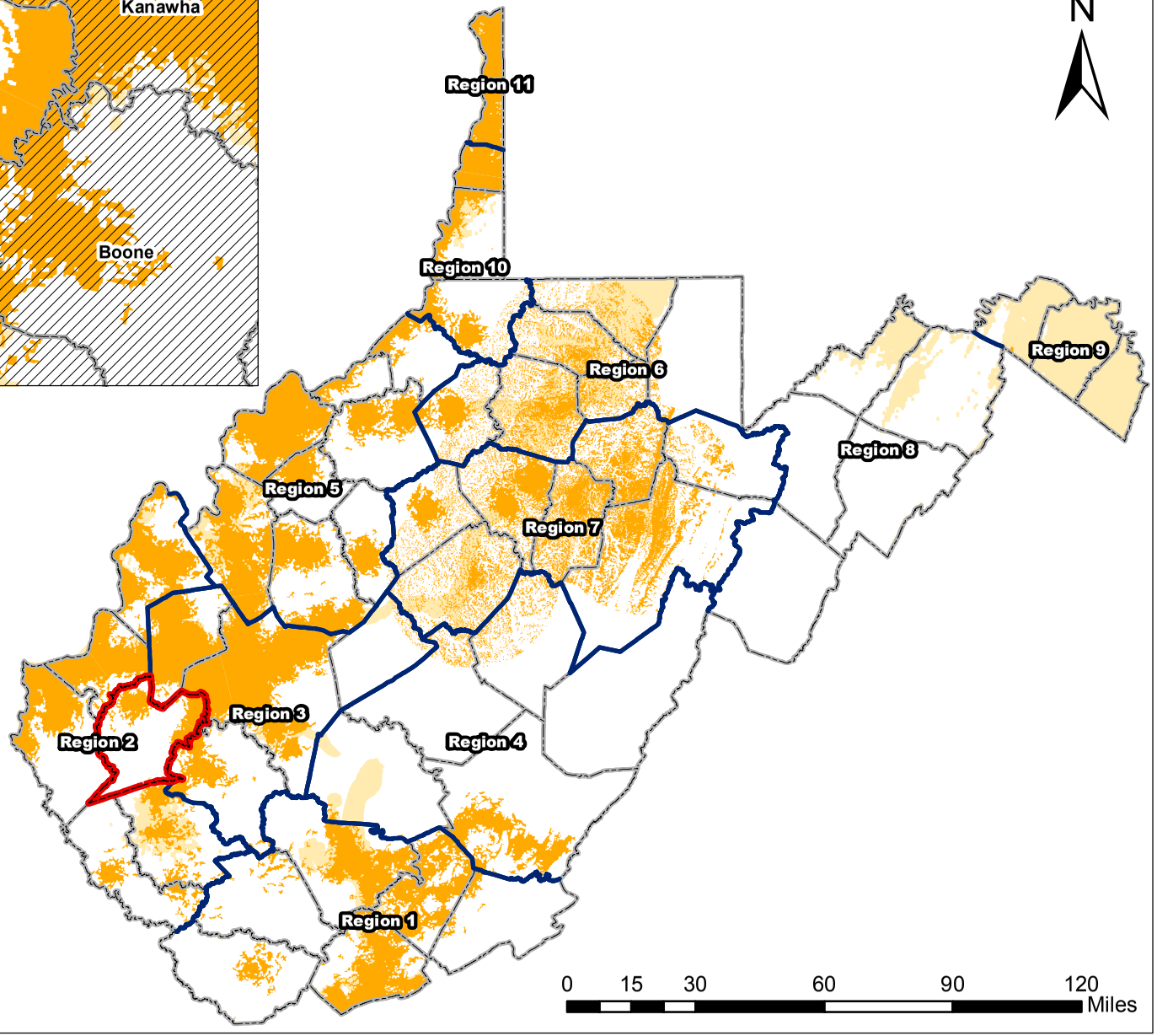
Broadband - Internet MaxDown Speed Wireless

Lincoln County





N

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

0 15 30 60 90 120
Miles

Source: West Virginia Broadband Mapping Program 2012

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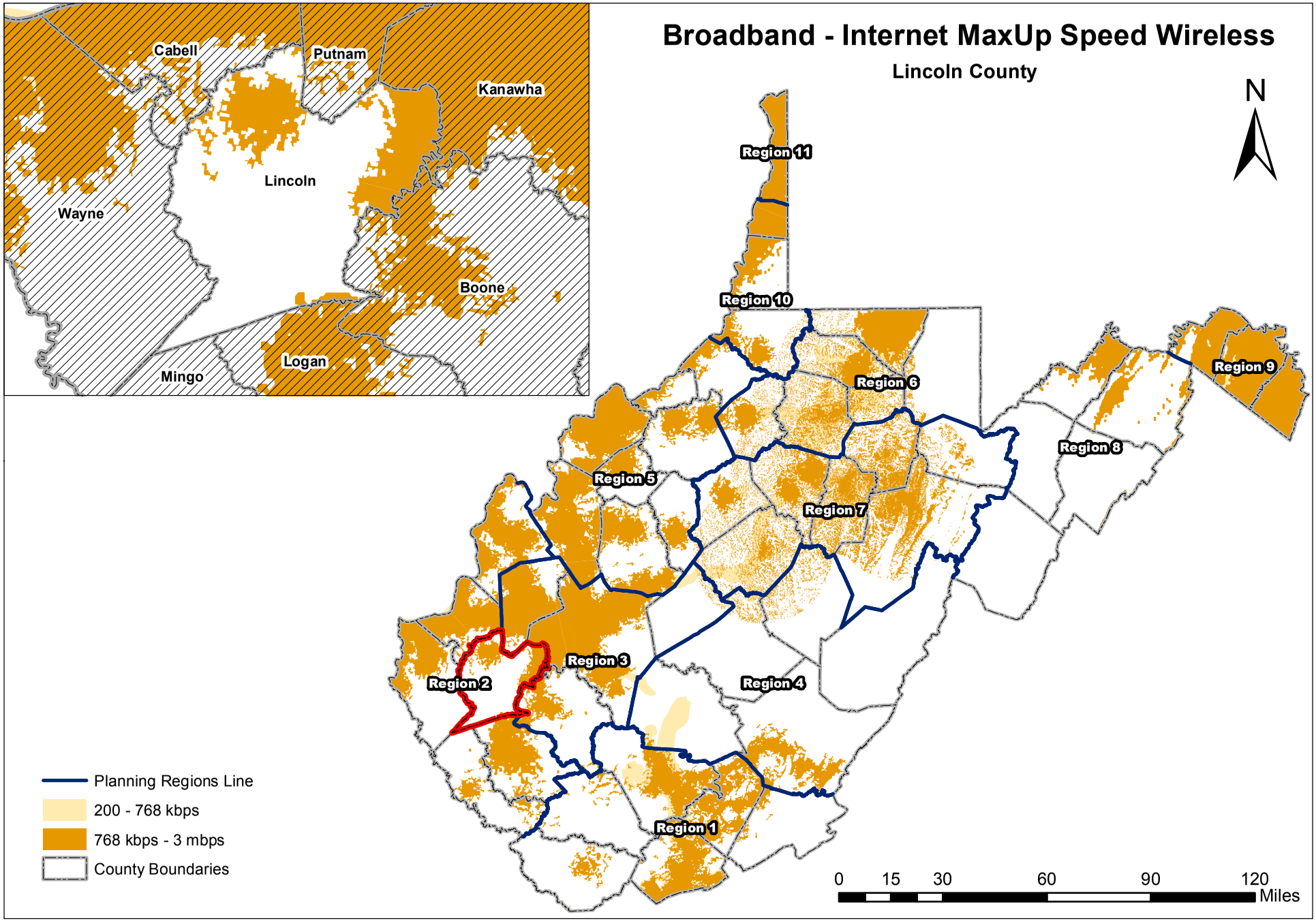
Broadband - Internet MaxUp Speed Wireless

Lincoln County



Source: West Virginia Broadband Mapping Program 2012

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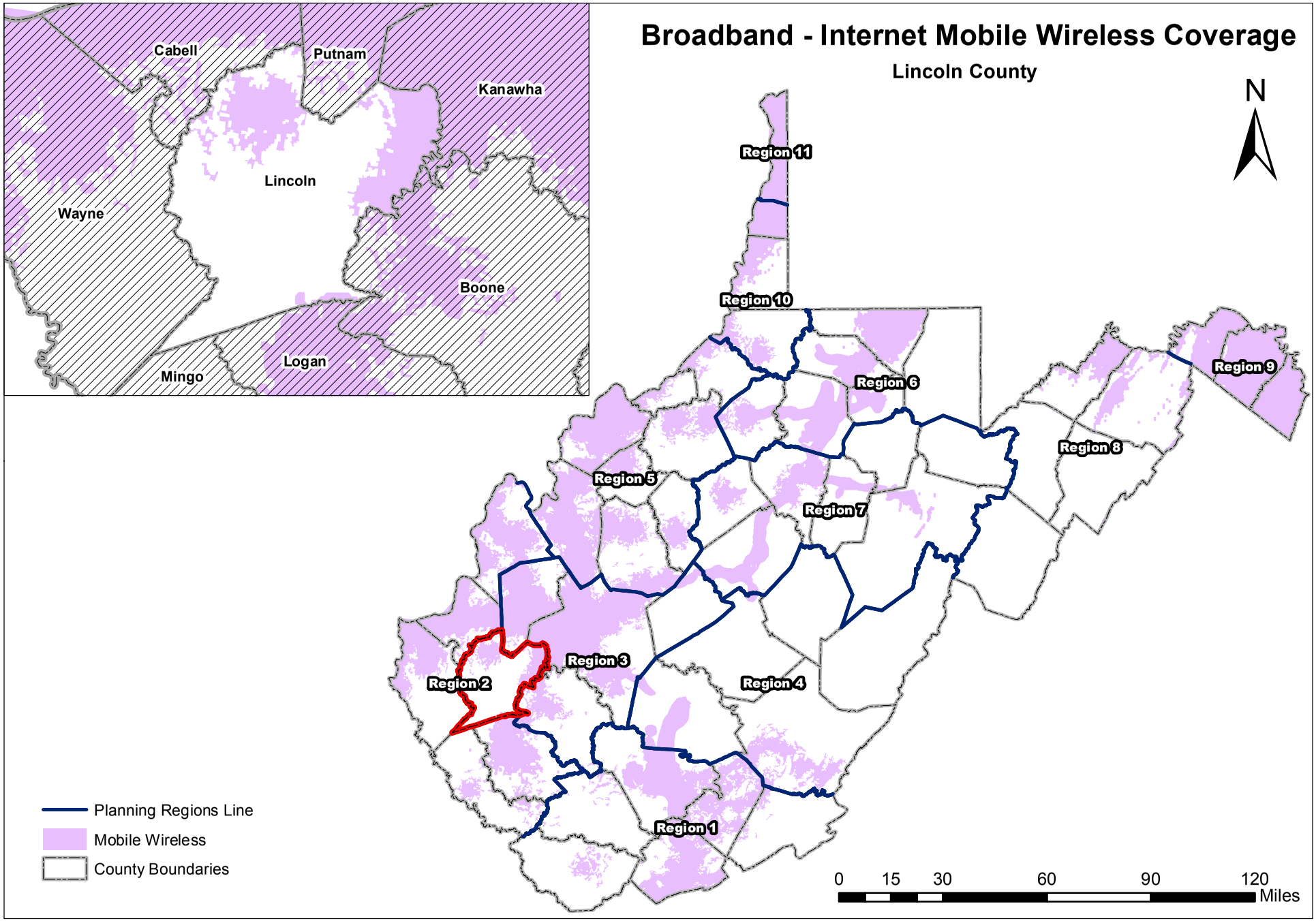
Broadband - Internet Mobile Wireless Coverage

Lincoln County



Source: West Virginia Broadband Mapping Program 2012

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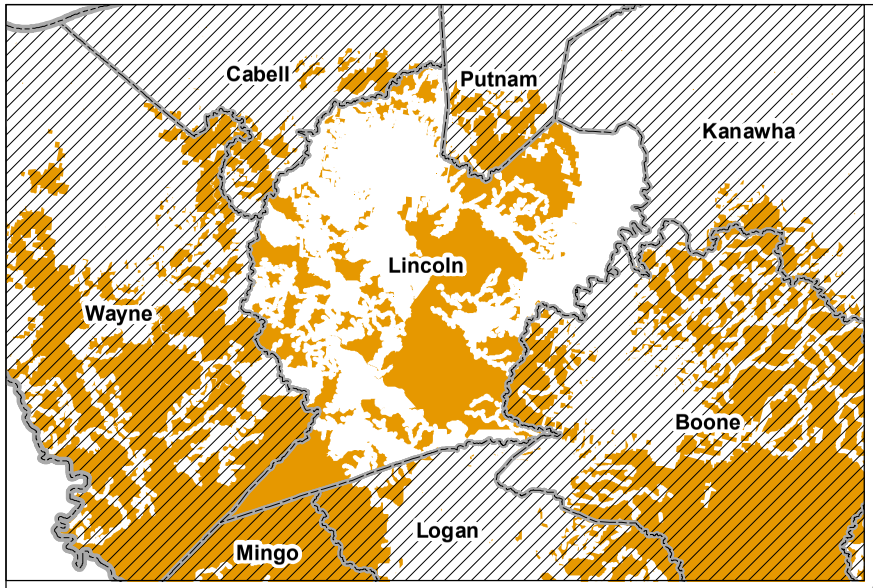
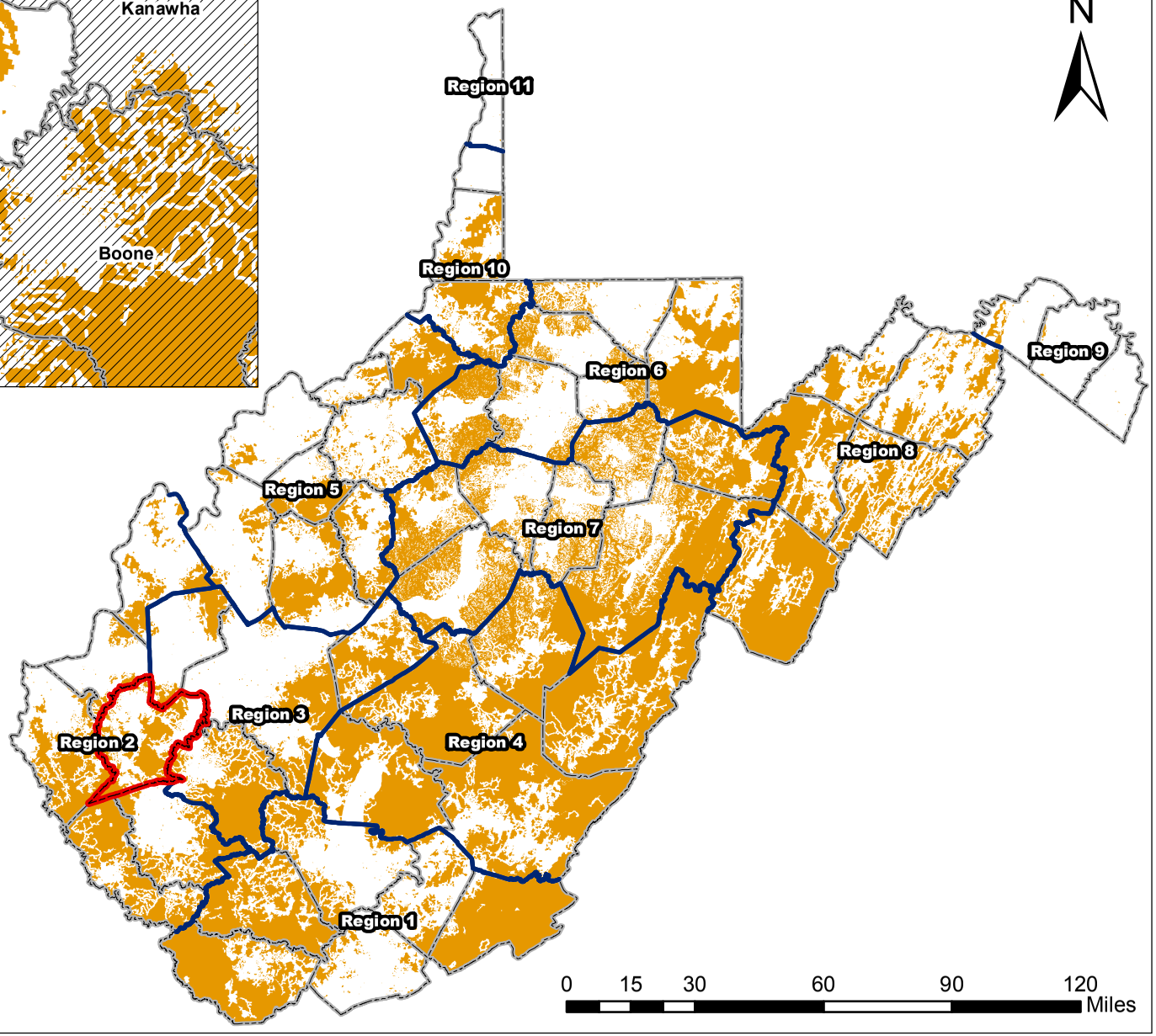
Broadband - No Broadband Coverage

Lincoln County





Source: West Virginia Broadband Mapping Program 2012

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Transportation

Highways

Lincoln County is crisscrossed by US Route 119 as well as State Routes 3, 10, 34, 37, and 214 (Map 26).

Rail

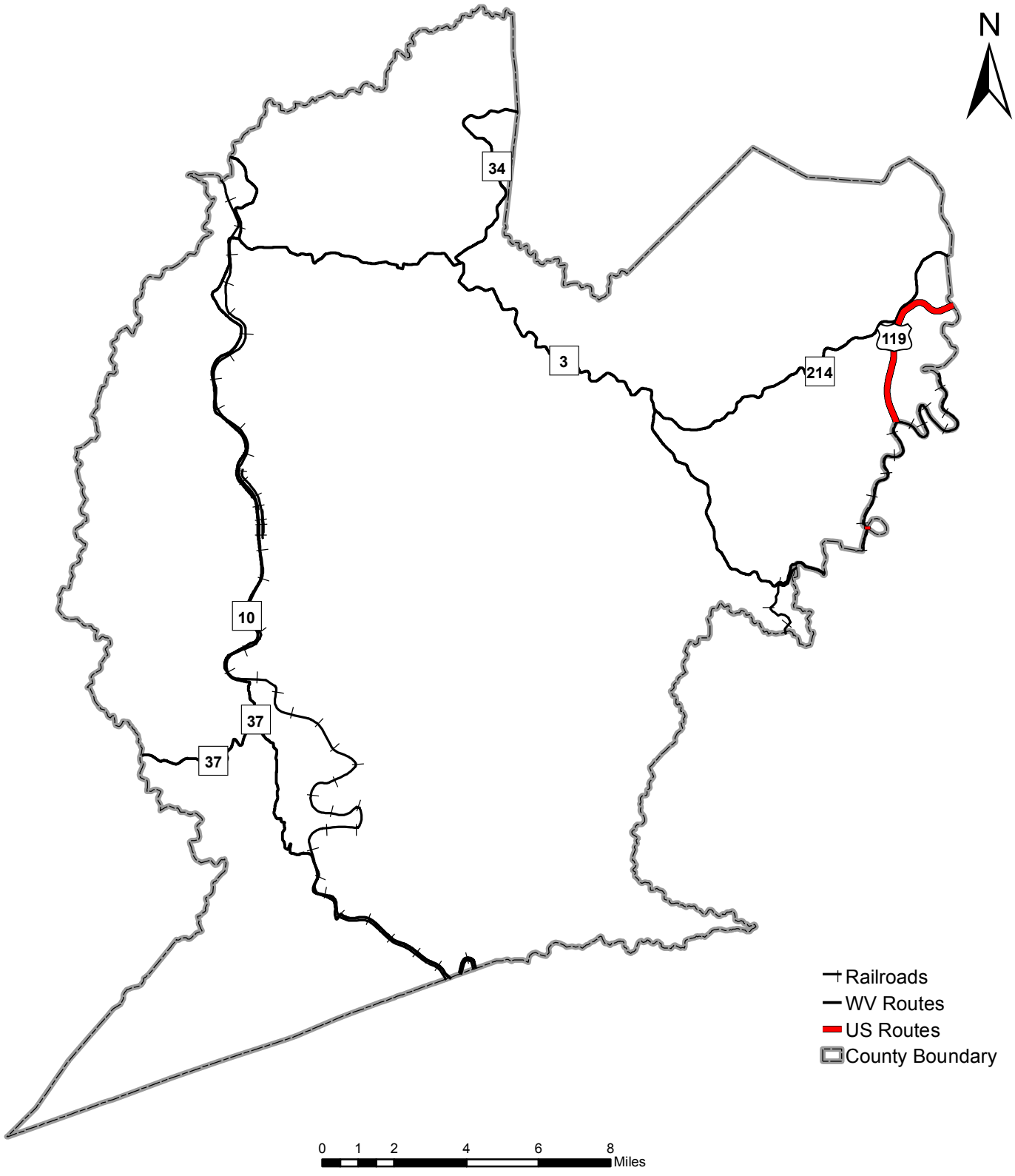
CSX owns and operates several miles of track in the county.

Air

Lincoln County has no airports itself, but is near Yeager and Tri-state Airports because of its proximity to Kanawha and Cabell counties respectively.

Transportation

Lincoln County



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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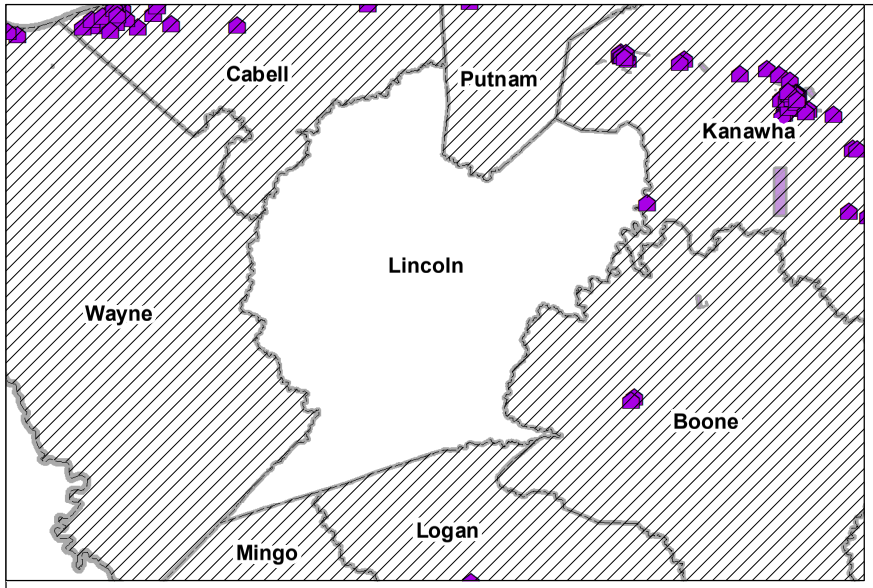
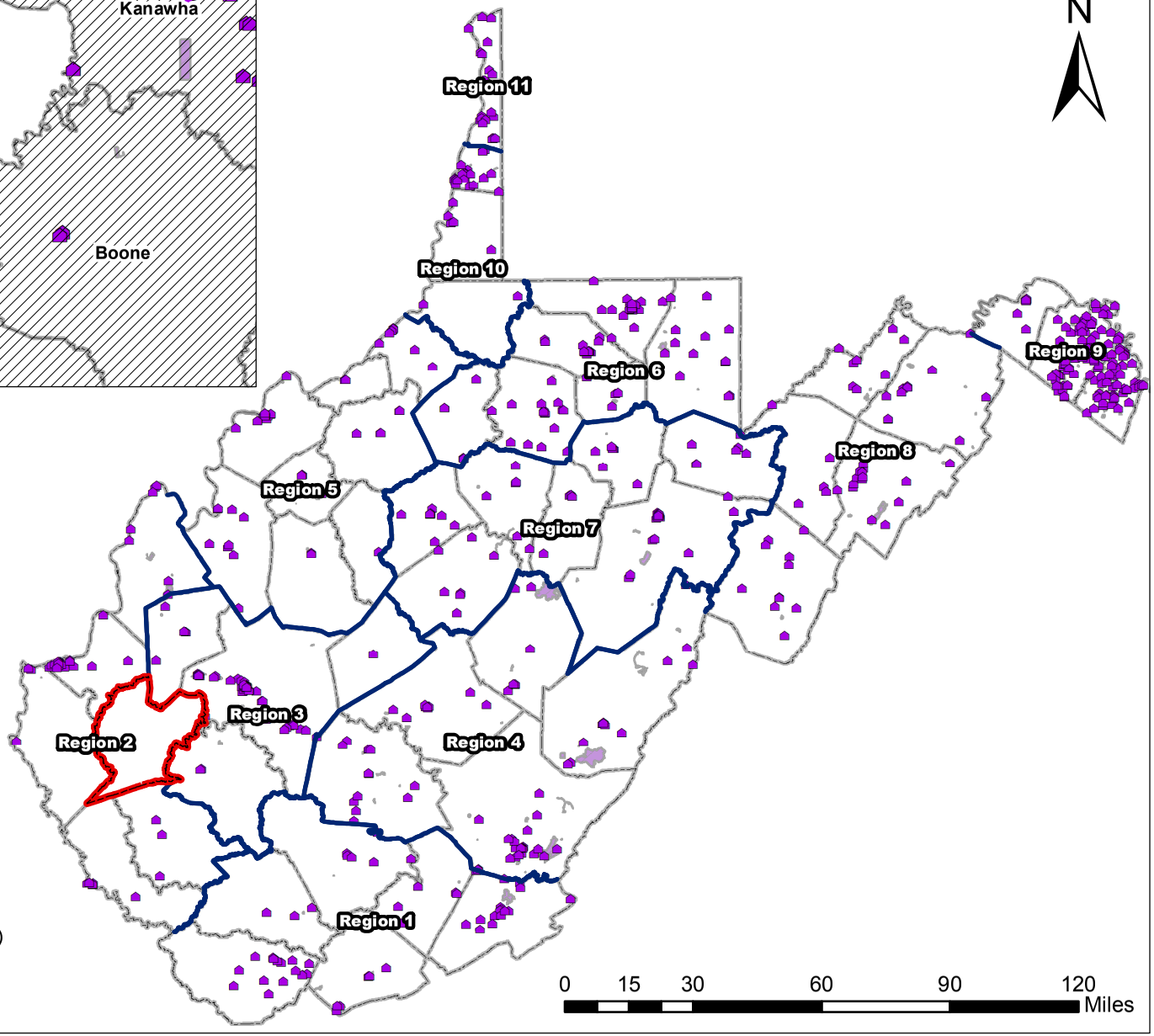
Historic Preservation

Historic preservation will be essential in a county steeped in coal mining history. Lincoln County has a single listing in the National Register of Historic Places, Holley Hills Estate. The farm was built in 1885 with six other supporting buildings (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

Lincoln County





Source: West Virginia State Historic Preservation Office 2012

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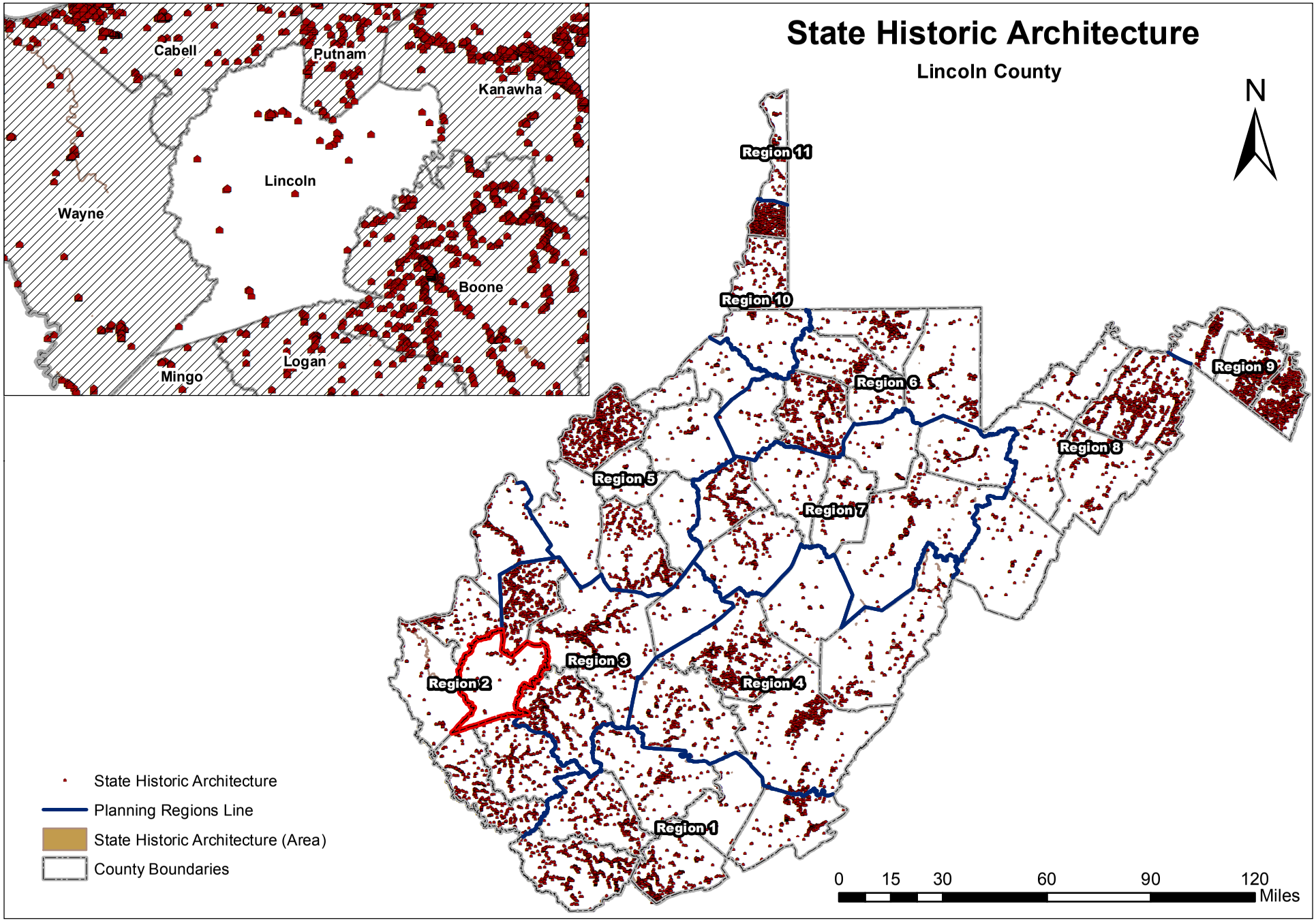
State Historic Architecture

Lincoln County



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. Lincoln 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. Lincoln County's system is not very extensive, but does have one main line that traverses the county from north to south (Map 29).

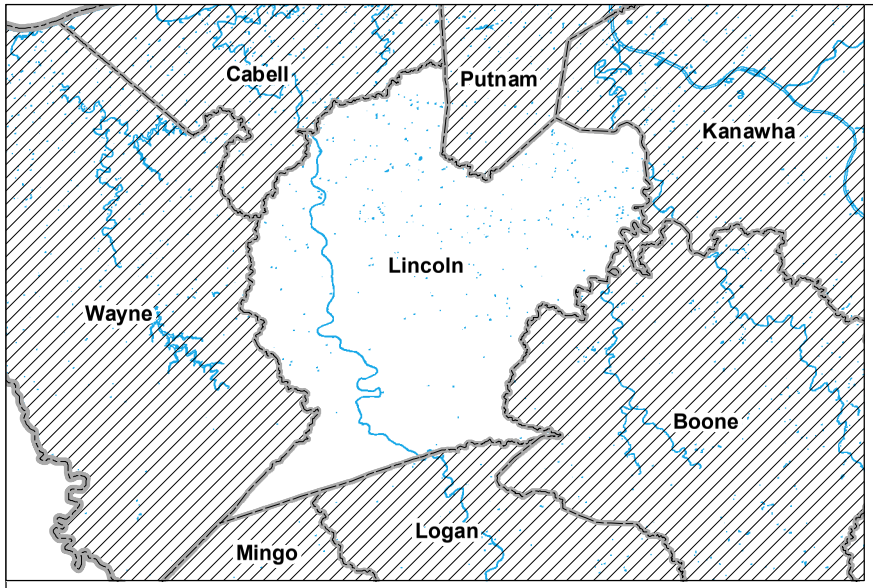
The State also possesses a respectable amount of park and forest land. Most of this land is located in the eastern portion of the State, the area that contains the main part of the Appalachian Mountain range. Lincoln contains no national or state parks or forest lands but does possess three visible wildlife management areas (Map 30).

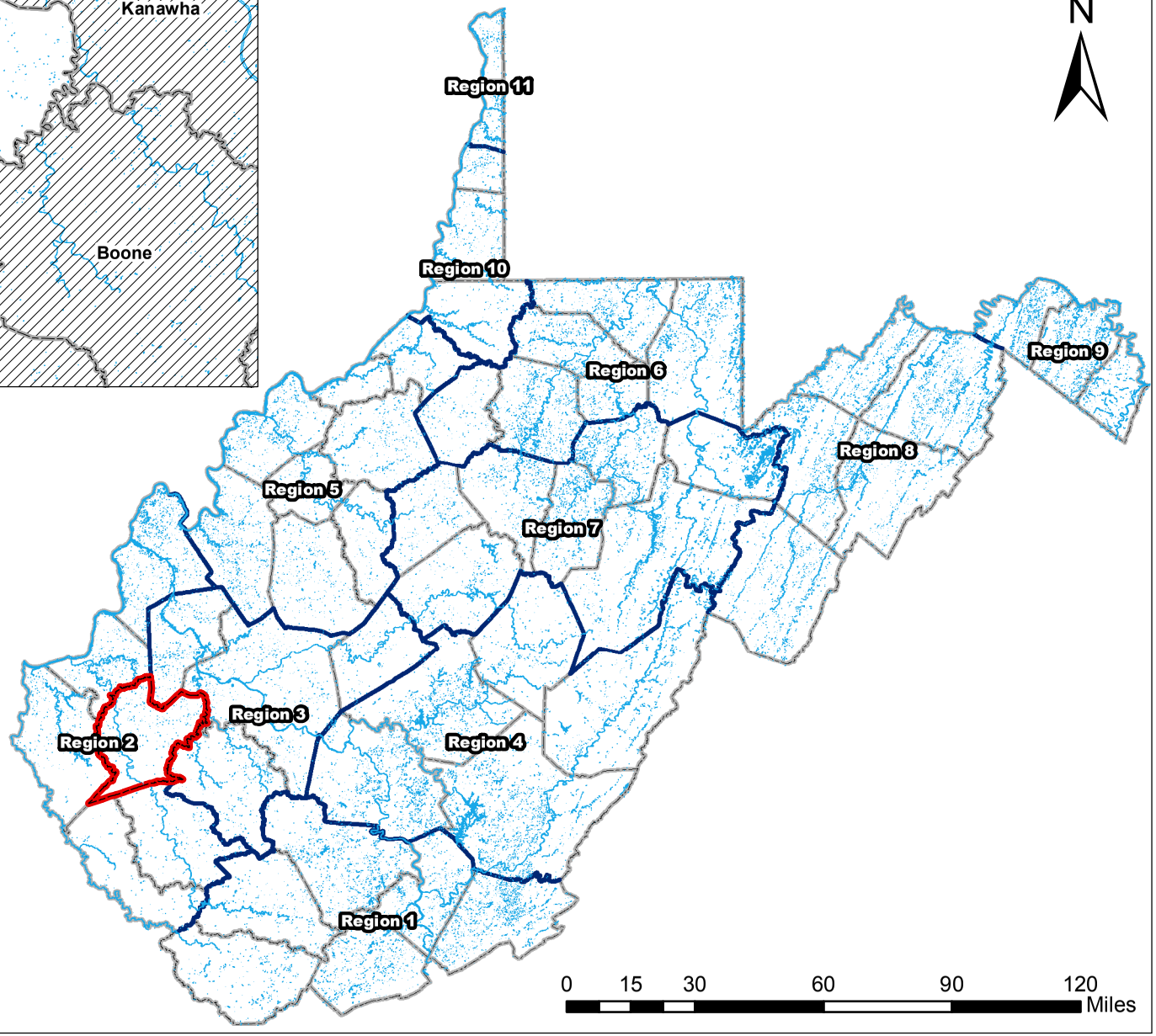
Air quality is a necessary environmental health benchmark that can determine the health and vitality of an area's residents. The air pollution non-attainment areas are "areas of the country where air pollution levels persistently exceed the national ambient air quality standards."[8] There are six full 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; Lincoln County is not among them (Map 31).

[8] "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

Lincoln County





Source: United States Fish and Wildlife Service 1996

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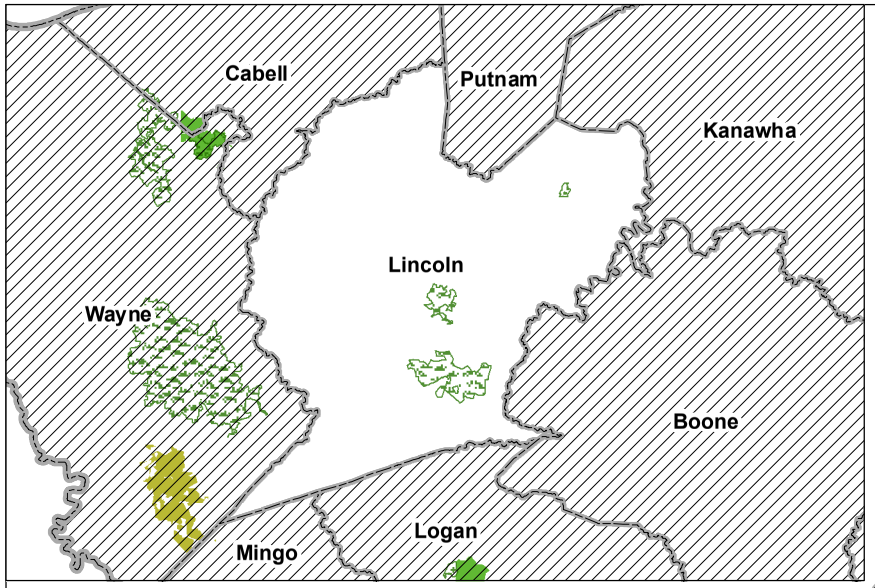
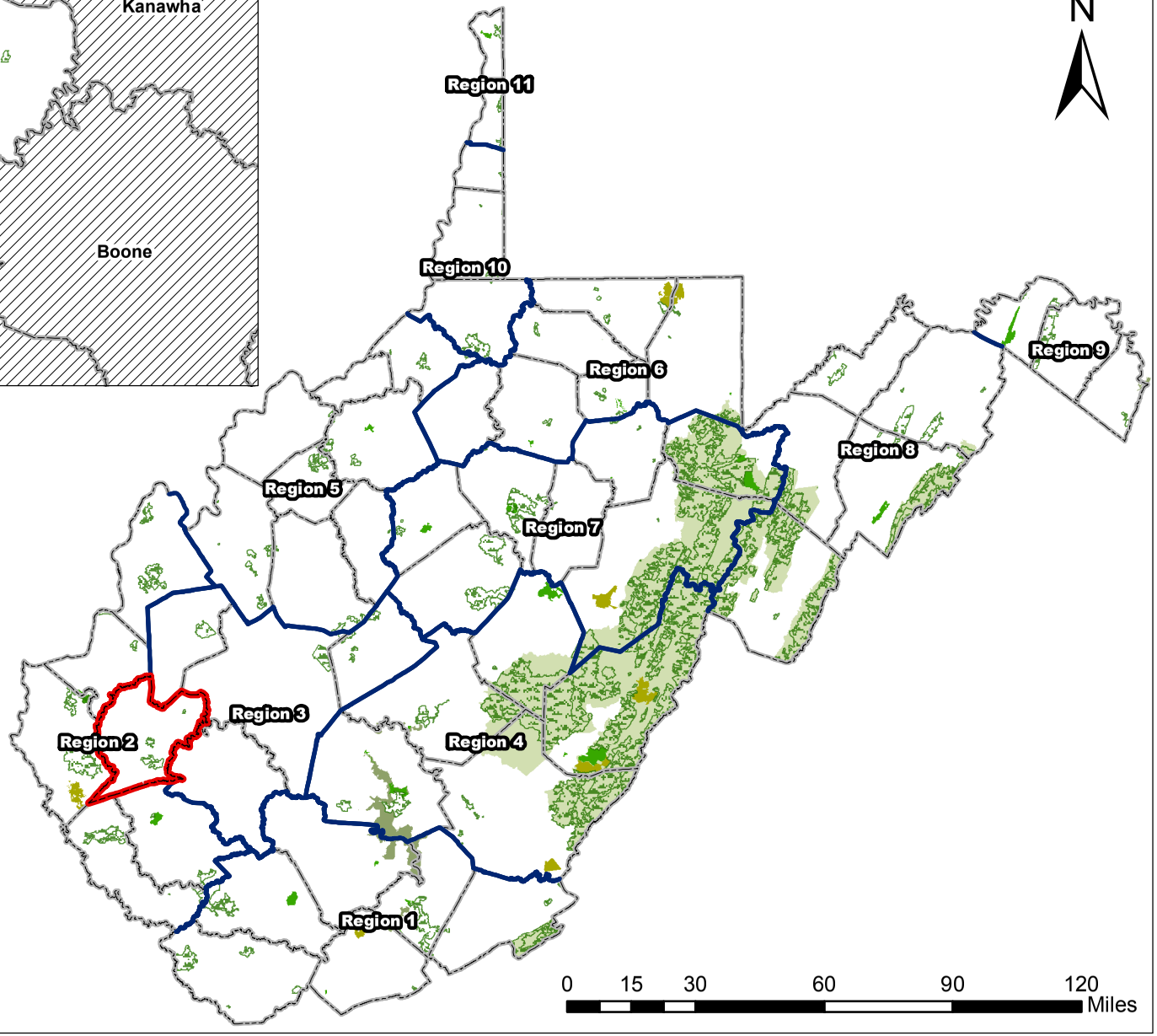
Public Land - Parks and Forests

Lincoln County





N

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

0 15 30 60 90 120
Miles

Source: Wildlife Management Areas; West Virginia Division of Natural Resources 2002; State Forest; West Virginia Division of Forestry 2004; State Park; West Virginia Division of Natural Resources, Natural Resource Analysis Center 2000 National Forest; United States Forest Service 2005; National Park; United States National Park Service 2003

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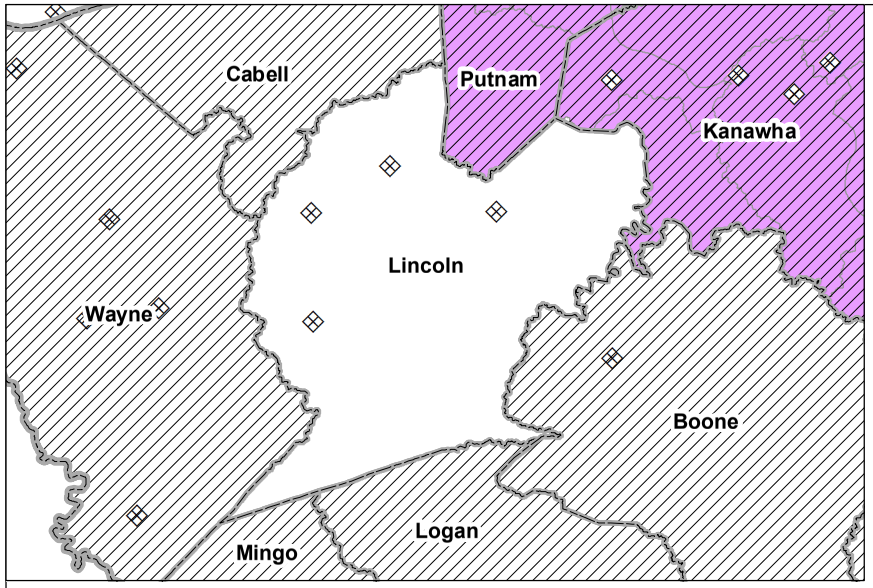
Environment - Monitoring

Lincoln County



N

Region 11
Region 10
Region 9
Region 6
Region 8
Region 5
Region 7
Region 3
Region 2
Region 4
Region 1

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

0 15 30 60 90 120 Miles

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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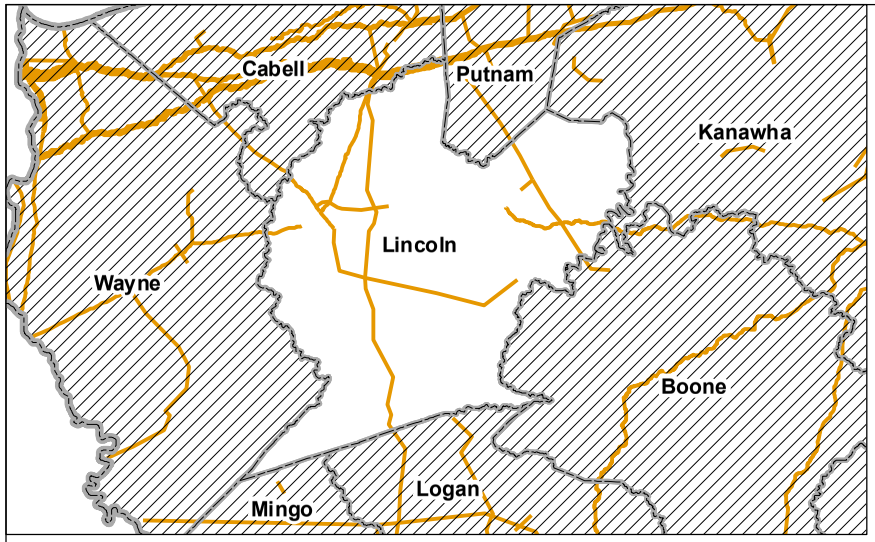
West Virginia's past and most likely its future are defined by energy. Besides coal, other options for energy have been investigated in the State. Gas and oil are of course the main energy staples in the nation, and West Virginia has access to this sort of energy in a number of ways. Lincoln County has a major oil field in its northeastern section, and pipelines running across the northern and eastern sections. It also has an extensive system of gas pipelines (Map 32). Lincoln County was also a player in the development of the Marcellus Shale, and has a number of wells, though surveys show that about half the county is still in the possible or uncertain existence range (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. Lincoln County has developed its current system to meet current energy needs.

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. Lincoln County appears to be one of the most forested counties in West Virginia (Map 34). However, it appears Lincoln 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.[9] None of these sources was "likely to provide fuel or electricity at a lower cost" then 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 Lincoln does not appear to be a favorable location for development. It is also not favorable for wind and solar development. 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.[10]

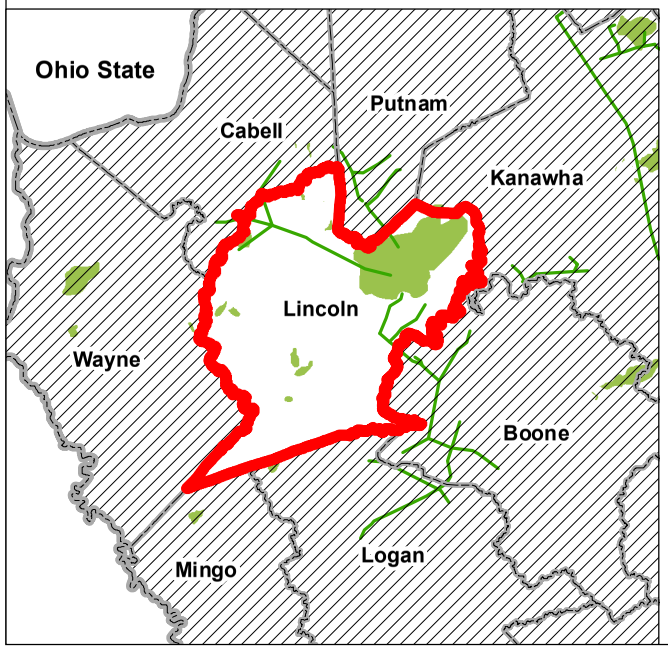
[9] Kent, Calvin, Risch, Christine, and Pardue, Elizabeth. *Renewable Energy Policy: Opportunities for West Virginia.* Center for Business and Economic Research, Huntington, WV (2012).
[10] Ibid.

Energy - Gas and Oil

Lincoln County

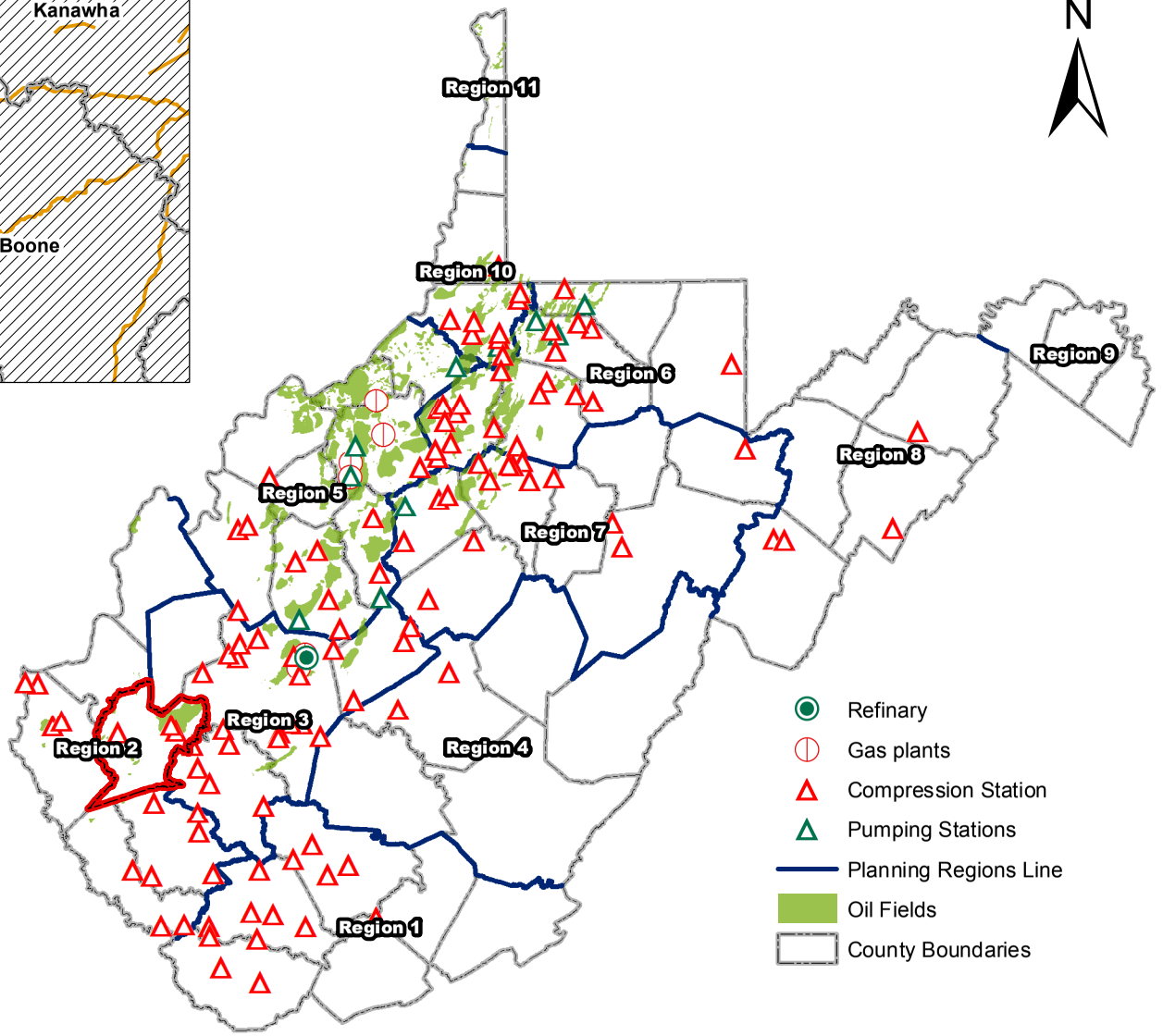


Gas Pipe



Oil Pipelines

Oil Fields



Source: West Virginia Geological and Economic Survey 2007

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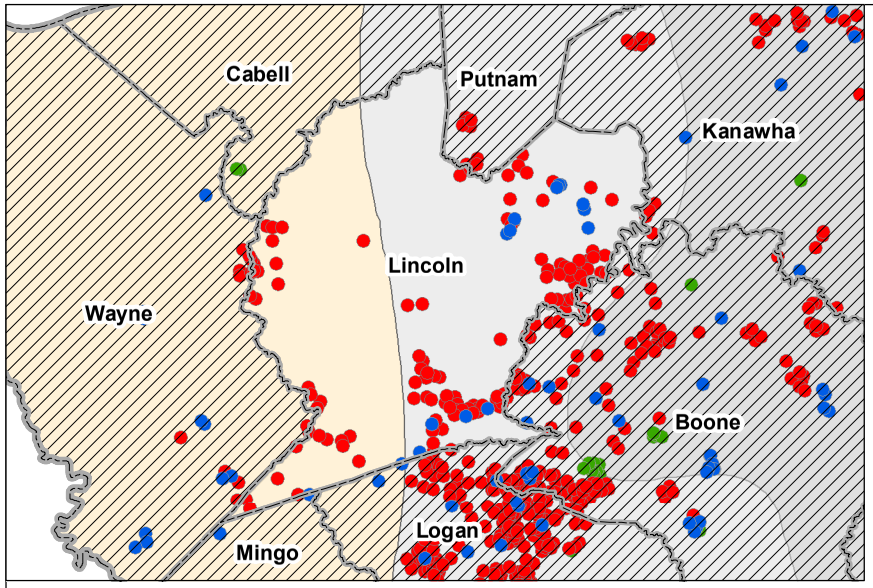
Energy - Marcellus Wells

Lincoln County



N

Region 11
Region 10
Region 9
Region 6
Region 8
Region 5
Region 7
Region 3
Region 2
Region 4
Region 1

- 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

0 15 30 60 90 120 Miles

Source: West Virginia Geological and Economic Survey 2012

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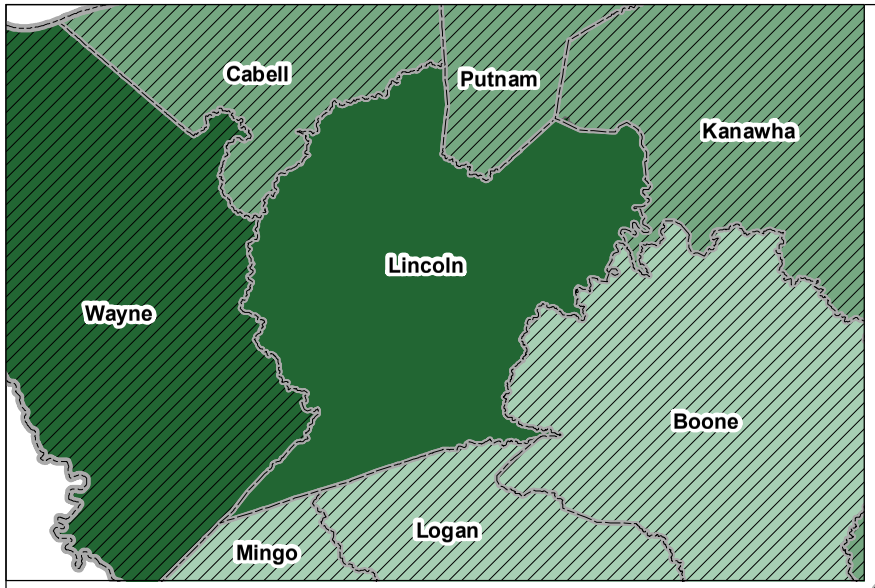
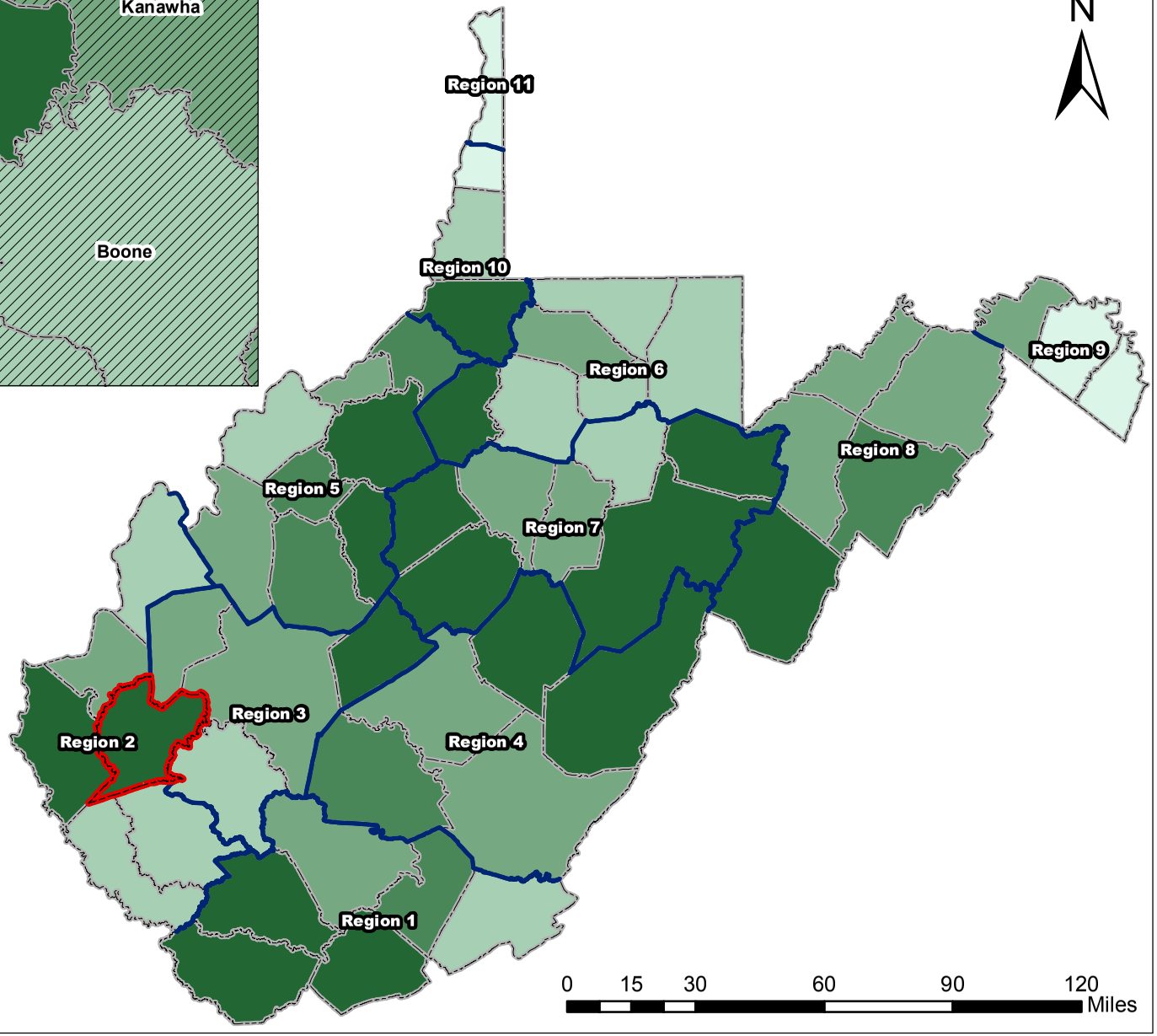
Energy - Percent Forest Coverage

Lincoln County





N

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

0 15 30 60 90 120
Miles

Source: Rahall Transportation Institute 2013

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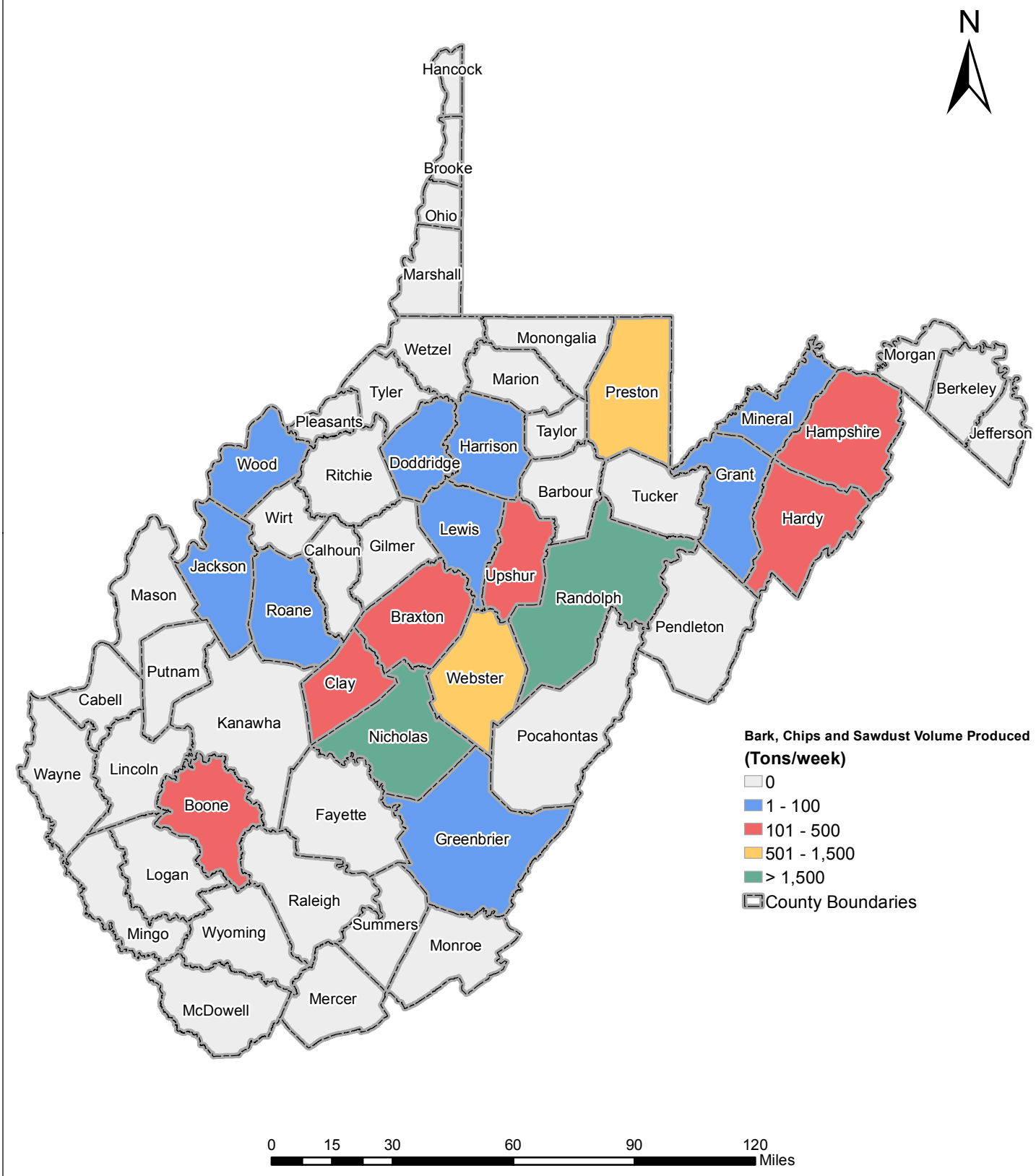
Renewable Energy - Wood By Products

Bark, Chip and Sawdust Volume Produced - Lincoln County



Source: Appalachian Hardwood Center 2011

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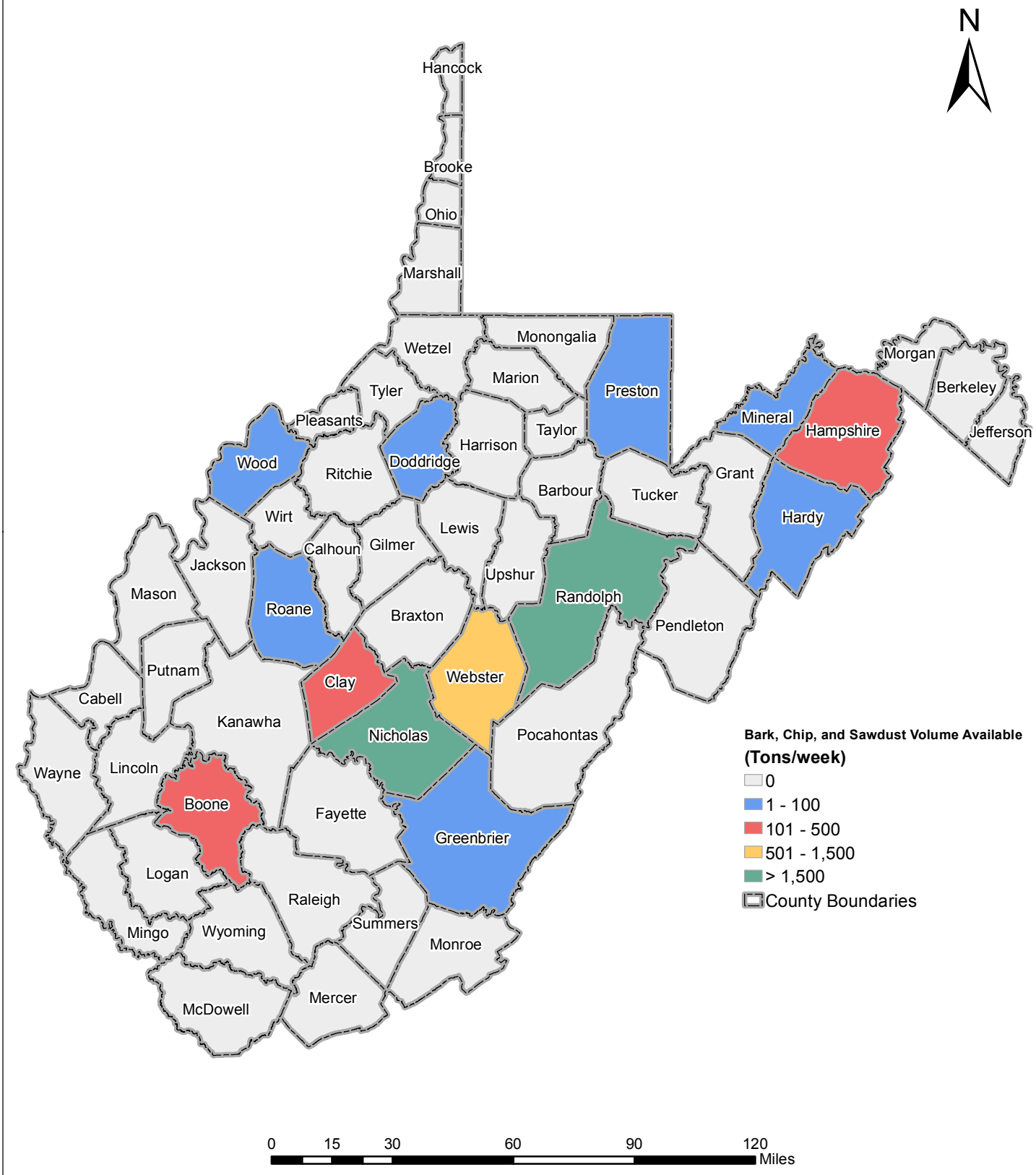
Renewable Energy - Wood By Products

Bark, Chip, and Sawdust Volume Available - Lincoln County



Source: Appalachian Hardwood Center 2011

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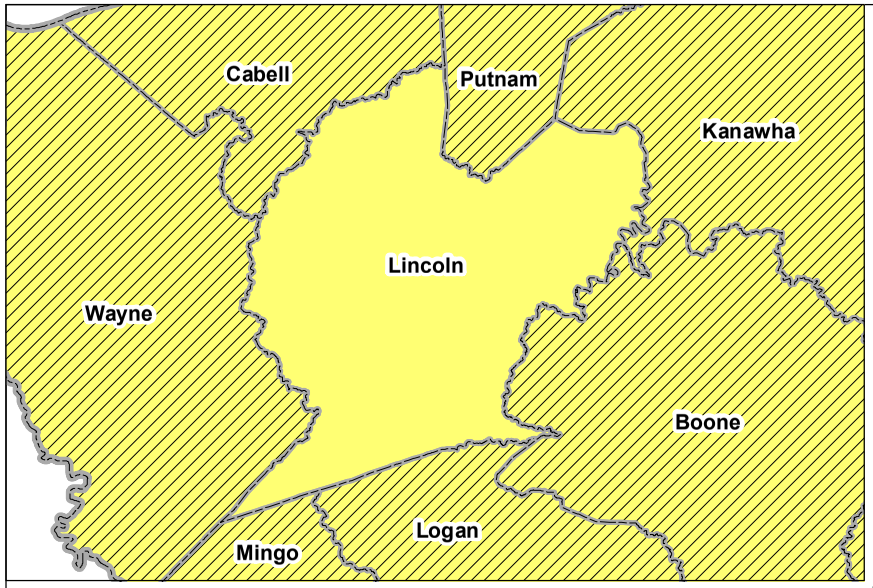
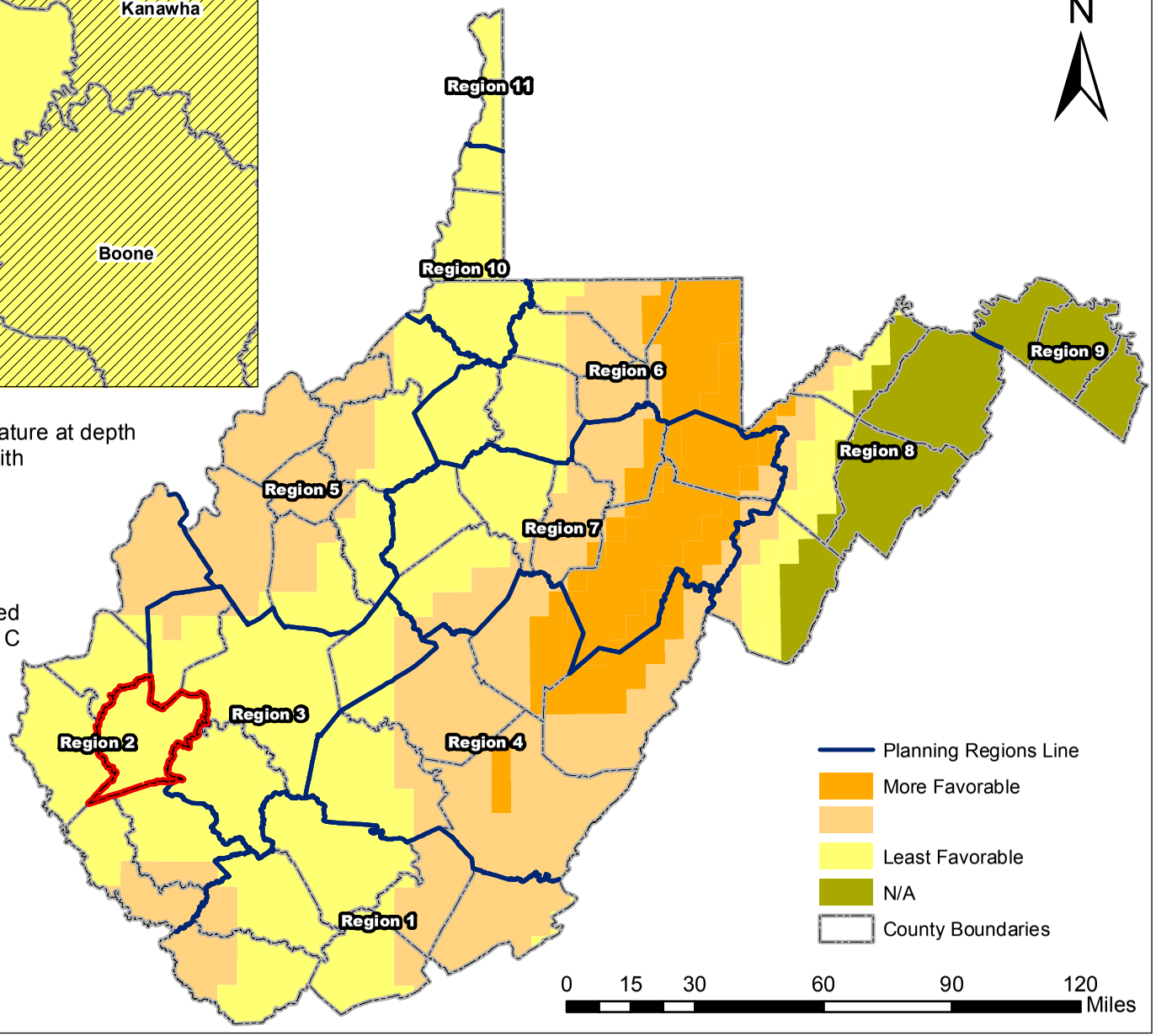
Energy - Geothermal Resource of Greenbrier County

Favorability of Deep Enhanced Geothermal Systems



_ Source data for deep EGS includes temperature at depth from 3 to10 km and analyses (for regions with temperatures >= 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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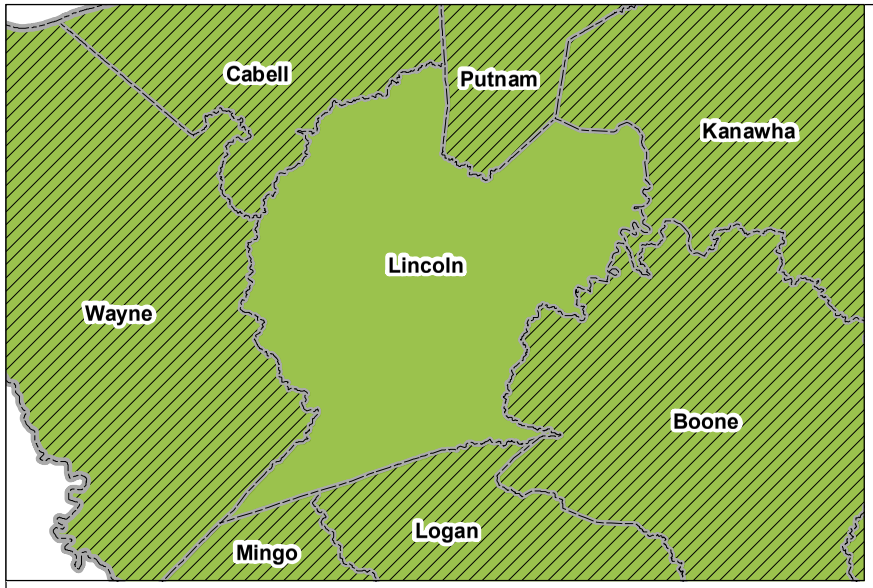
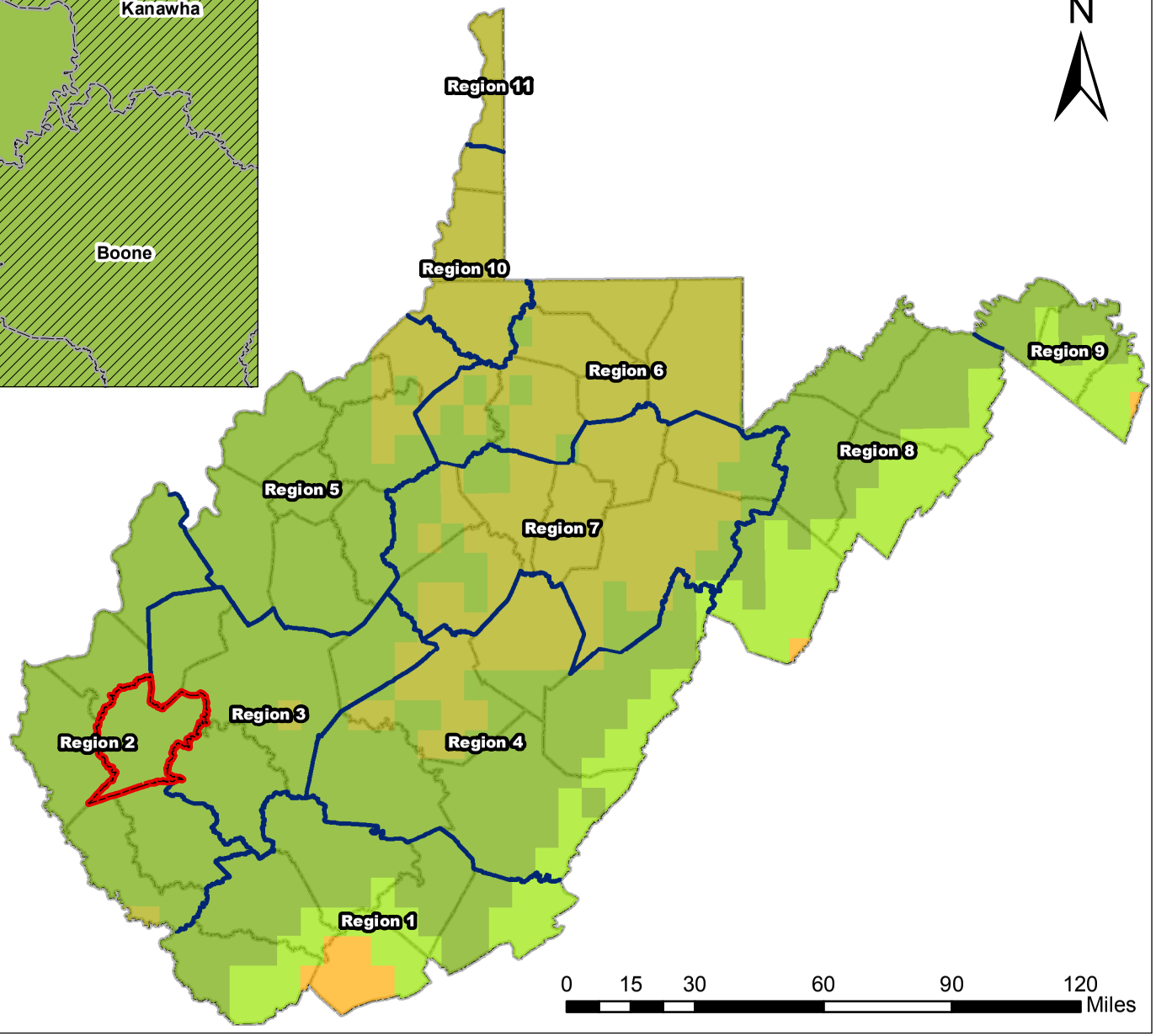
Solar - Renewable Energy

Lincoln County





Source: National Renewable Energy Laboratory 2012

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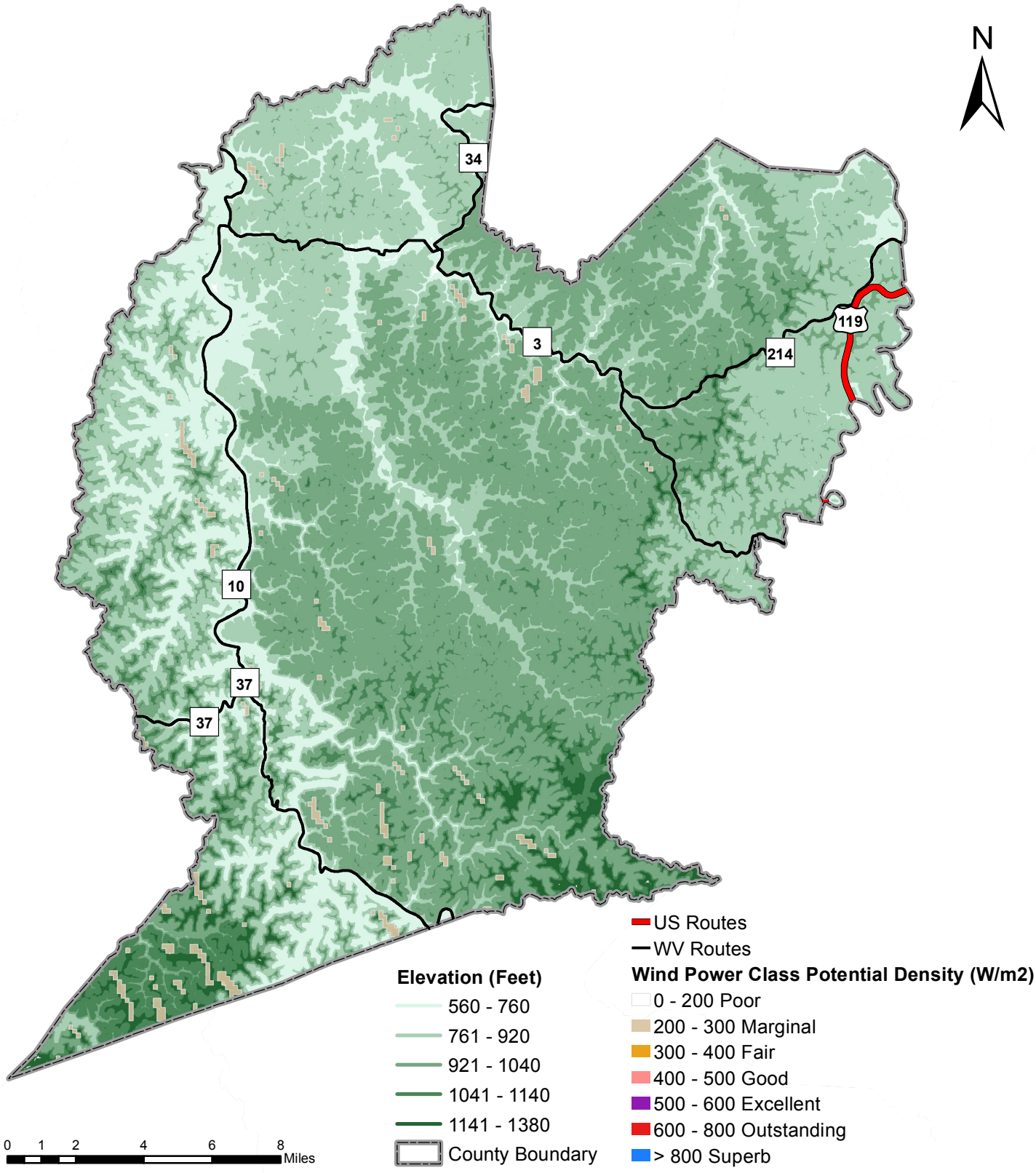
Renewable Energy-Wind

Lincoln County



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 Lincoln. 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.

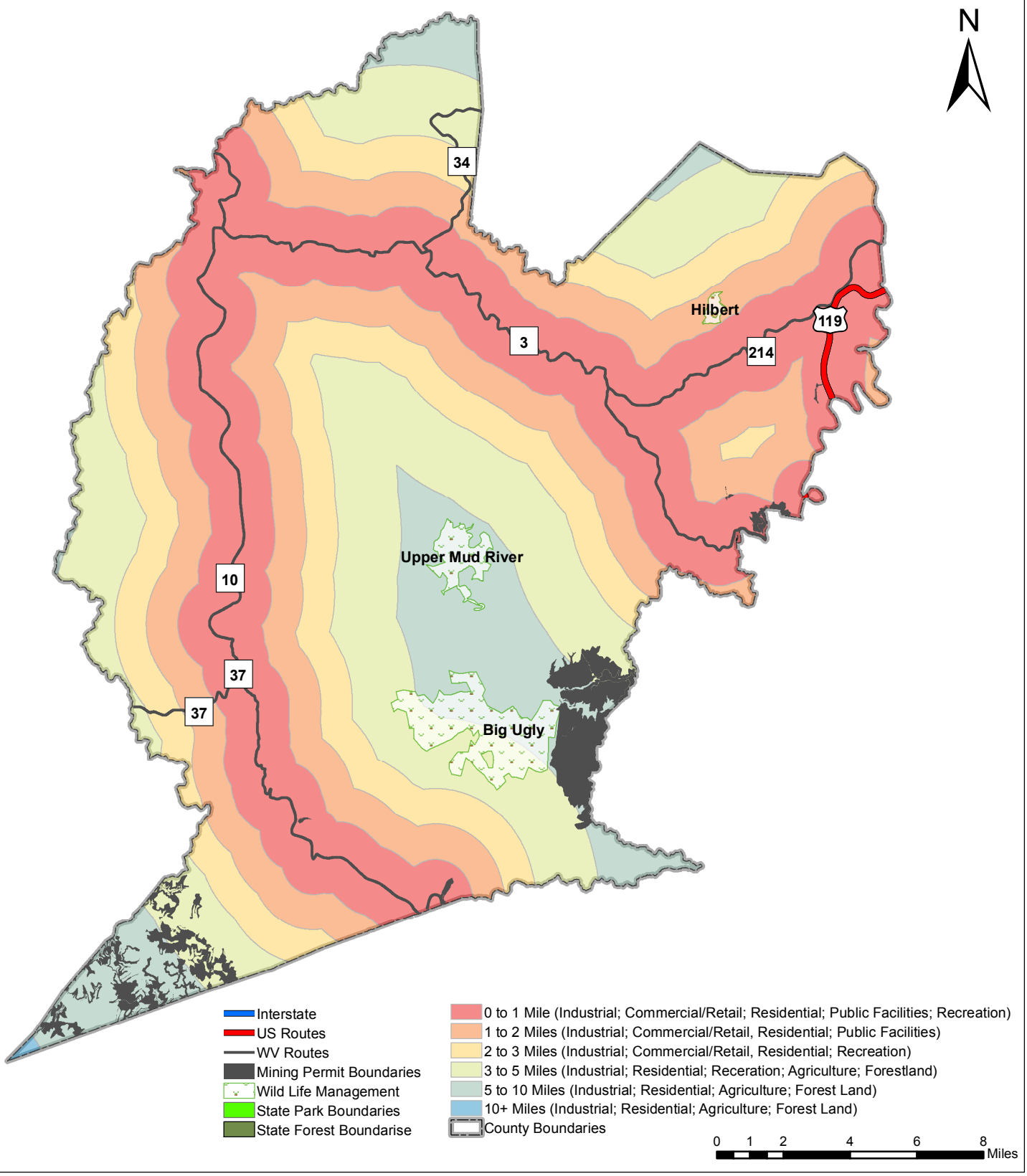
Table 2: Smart Planning Utilizations

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

Lincoln County



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 Lincoln 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.

According to the initial data collection there are an estimated five mine sites in the county. Some of them 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 11 potential mining sites for development in Lincoln County, which are included in the following table.

Table 3: Lincoln County Potential Surface Mine Sites for Development

Site No.	Permittee	Permit_ID	Facility Name	Acres	Expiration Date	Nearest Post Office
1	Argus Energy Wv Llc	S500407	East Fork South Surface Mine	74.4	4/3/18	Wilsondale
2	Argus Energy Wv Llc	S500706	Pretty Branch Surface Mine	74.7	5/23/17	Harts
3	Argus Energy Wv Llc	S501899	Witcher Fork Surface Mine	48.2	10/1/11	Wilsondale
4	Argus Energy Wv Llc	S502500	Rollem Fork No. 2 Extension	457.1	2/5/17	Harts
5	Argus Energy Wv Llc	S502797	Copley Trace No 1 Surface Mine	424.97	12/22/12	Wilsondale
6	Hobet Mining Llc	S500207	Surface Mine No. 45	498.4	12/19/13	Spurlockville
7	Hobet Mining Llc	S503308	Chestnut Oak Surface Mine	260.4	7/21/15	Spurlockville
8	Hobet Mining Llc	S500203	Westridge No. 3 Surface Mine	479.72	4/1/14	Spurlockville

Site No.	Permittee	Permit_ID	Facility Name	Acres	Expiration Date	Nearest Post Office
9	Hobet Mining Llc	S500306	Surface Mine No. 44	221	11/17/16	Spurlockville
10	Hobet Mining Llc	S500806	Surface Mine No. 22	418.9	6/19/17	Spurlockville
11	Hobet Mining Llc	S501101	Westridge No. 2 Surface Mine	479	7/10/17	Spurlockville

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	King Coal Highway
1	S500407	48.05	I64	11.61	S152	0.30	Twelvepole Creek	27.35
2	S500706	41.89	I64	8.17	S10	0.46	Kiah Creek Road	31.93
3	S501899	43.78	I64	9.04	S10	0.05	Laurel Branch	29.20
4	S502500	42.22	I64	7.49	S10	0.63	Frances Branch	31.97
5	S502797	45.00	I64	10.25	S10	0.45	Paulsen Road	29.64
6	S500207	34.52	I64	11.56	US-119	0.49	Berry Branch (Mud)	43.87
7	S503308	42.23	I64	6.80	S10	0.98	Rosewood Road	36.38
8	S500203	33.51	I64	8.90	US-119	0.11	Upper Mud River	41.23

Rank	Permit_ID	Interstate (IS)	Name - IS	Existing Highway (EH)	Name - EH	Paved Road	Paved Road Name	King Coal Highway
9	S500306	34.54	I64	11.59	US-119	0.22	Berry Branch (Mud)	43.89
10	S500806	29.55	I64	12.69	US-119	0.63	Right Fork Flat Creek	44.99
11	S501101	34.62	I64	10.30	US-119	0.31	Upper Mud River	42.61

Table 5 Distances from Sites to Major Airports

Site No.	Permit_ID	Permittee	Tri-State	Yeager
1	S500407	Argus Energy Wv Llc	50.76	70.15
2	S500706	Argus Energy Wv Llc	49.29	65.60
3	S501899	Argus Energy Wv Llc	51.19	65.47
4	S502500	Argus Energy Wv Llc	50.35	64.93
5	S502797	Argus Energy Wv Llc	52.41	66.69
6	S500207	Hobet Mining Llc	55.72	43.15
7	S503308	Hobet Mining Llc	60.28	49.54
8	S500203	Hobet Mining Llc	56.80	40.50
9	S500306	Hobet Mining Llc	55.75	43.18
10	S500806	Hobet Mining Llc	56.84	44.27
11	S501101	Hobet Mining Llc	55.83	41.89

Table 6: Shortest Distances from Sites to Other Transportation Methods

Site No.	Permit_ID	Railroad (RR)	Owner (RR)	Intermodal Terminal Facility (CSXT)	National Waterway Network (Rivers)	Name-Rivers	Huntington Port
1	S500407	8.81	CSXT	33.22	9.83	Big Sandy River	52.44
2	S500706	5.93	CSXT	29.72	12.14	Big Sandy River	46.28
3	S501899	6.02	CSXT	28.55	12.59	Big Sandy River	48.17
4	S502500	4.46	CSXT	29.04	13.66	Big Sandy River	47.34
5	S502797	6.86	CSXT	29.76	11.86	Big Sandy River	49.39
6	S500207	2.69	XXXX	28.78	21.19	Kanawha River	48.18
7	S503308	4.43	XXXX	21.25	23.69	Kanawha River	53.17
8	S500203	2.18	XXXX	26.14	21.64	Kanawha River	49.25
9	S500306	2.54	XXXX	28.81	21.69	Kanawha River	48.21
10	S500806	1.48	XXXX	29.91	20.30	Kanawha River	49.30
11	S501101	3.22	XXXX	27.52	22.41	Kanawha River	48.28

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	S500407	11.27	Kermit Municipal Sewer Department	1.78	Mingo County Public Service District
2	S500706	11.93	Town of Chapmanville (Sewer)	3.65	Mingo County Public Service District
3	S501899	10.95	Town of Chapmanville (Sewer)	2.20	Mingo County Public Service District
4	S502500	10.50	Town of Chapmanville (Sewer)	4.12	Mingo County Public Service District
5	S502797	11.11	Town of Chapmanville (Sewer)	1.11	Mingo County Public Service District
6	S500207	7.15	Boone County Public Service District (Sewer)	0.60	Lincoln Public Service District
7	S503308	6.53	Town of Chapmanville (Sewer)	1.61	Lincoln Public Service District
8	S500203	6.17	Boone County Public Service District (Sewer)	0.33	Lincoln Public Service District
9	S500306	6.76	Boone County Public Service District (Sewer)	0.26	Lincoln Public Service District
10	S500806	6.05	Boone County Public Service District (Sewer)	0.61	Lincoln Public Service District
11	S501101	7.23	Boone County Public Service District (Sewer)	0.32	Lincoln Public Service District

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

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
1	S500407	1.43	Citizens Telecommunications Company of West Virginia	6.13	Sub-Transmission	Unknown
2	S500706	1.25	Citizens Telecommunications Company of West Virginia	9.06	Sub-Transmission	Unknown
3	S501899	2.81	Citizens Telecommunications Company of West Virginia	7.95	Sub-Transmission	Unknown

Site No.	Permit_ID	Broadband	Provider	Power Lines	Type	Size_kV
4	S502500	1.55	Armstrong Holdings, Inc.	9.86	Sub-Transmission	Unknown
5	S502797	3.06	Citizens Telecommunications Company of West Virginia	6.92	Sub-Transmission	Unknown
6	S500207	0.49	Cebridge Acquisition LLC	3.54	Transmission	765
7	S503308	0.82	Cebridge Acquisition LLC	5.23	Transmission	765
8	S500203	0.00	Cebridge Acquisition LLC	3.04	Transmission	765
9	S500306	0.22	Cebridge Acquisition LLC	3.48	Transmission	765
10	S500806	0.63	Cebridge Acquisition LLC	2.28	Transmission	765
11	S501101	0.31	Cebridge Acquisition LLC	4.13	Transmission	765

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	S500407	11.86	Community Bldg.	25.42	Mingo County Transfer
2	S500706	8.71	A,B,C,D, EAST LYNN UPPER EF	25.36	Refuse Disposal
3	S501899	10.08	Harts High School	24.19	Refuse Disposal
4	S502500	9.53	Harts High School	24.69	Refuse Disposal
5	S502797	11.29	Harts High School	25.41	Refuse Disposal
6	S500207	8.55	Upper Mud Recreation Fac.	16.05	Boone County #1
7	S503308	9.03	Logan Construction Wk Cntr	16.22	Refuse Disposal
8	S500203	9.63	Upper Mud Recreation Fac.	13.39	Boone County #1
9	S500306	8.58	Upper Mud Recreation Fac.	16.08	Boone County #1
10	S500806	9.68	Upper Mud Recreation Fac.	17.18	Boone County #1
11	S501101	8.66	Upper Mud Recreation Fac.	14.79	Boone County #1

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	S500407	2.51	Columbia Gas Transmission Corp.	0.39	CL
2	S500706	4.65	Columbia Gas Transmission Corp.	0.19	CL
3	S501899	3.35	Columbia Gas Transmission Corp.	1.31	CL
4	S502500	5.27	Columbia Gas Transmission Corp.	1.04	CL
5	S502797	2.30	Columbia Gas Transmission Corp.	1.74	CL
6	S500207	1.30	Columbia Gas Transmission Corp.	0.53	CL

Site No.	Permit_ID	Gas Pipe (GP)	Company Name (GP)	Oil Pipe (OP)	Company Name (OP)
7	S503308	3.52	Columbia Gas Transmission Corp.	0.47	CL
8	S500203	2.62	Columbia Gas Transmission Corp.	0.80	CL
9	S500306	2.06	Columbia Gas Transmission Corp.	0.15	CL
10	S500806	1.73	Columbia Gas Transmission Corp.	0.13	CL
11	S501101	2.45	Columbia Gas Transmission Corp.	0.15	CL

Suitability Model

The suitability model for Lincoln 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 Lincoln County and expert advice about important factors to site development.[11] 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.

[11] 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:

Total score of site A = $\sum$ (absolute score x relative score x weight)$_{ci}$ / 10 (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 Lincoln 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 Lincoln County land suitability model. The total number of coal mining sites will be equally distributed in each group. The relative score differs from the absolute score in two ways. First, thresholds for relative scores are derived only from real distances from the sites to the features (criteria). It is not affected by personal opinion and does not consider either traveling method or nature of criteria.

Table 13: Relative Scoring System

	Threshold (Distances in miles)	**Min - Q1**	**Q1 - Q2**	**Q2 - Q3**	**Q3 – Max**
	Relative Score	10	7.5	5	2.5
No.	**Criteria**	**Min**	**Q1**	**Q2**	**Q3**	**Max**
1	Interstate	6.80	8.17	10.25	11.59	12.69
2	Existing Highway	27.35	29.64	36.38	43.87	44.99
3	Proposed Highway	21.25	27.52	28.81	29.76	33.22
4	Yeager Airport	29.55	34.52	41.89	43.78	48.05
5	Tri-State Airport	46.28	48.17	48.28	49.39	53.17
6	National Waterway Network Ports	8.55	8.66	9.53	10.08	11.86
7	Sewer Treatment Facilities	13.39	16.05	17.18	25.36	25.42
8	Solid Waste Treatment Facilities	49.29	50.76	55.72	56.80	60.28
9	National Waterway Network	40.50	43.15	49.54	65.60	70.15
10	Intermodal Terminal Facilities	0.00	0.31	0.82	1.55	3.06
11	Sewer Lines	1.30	2.06	2.51	3.52	5.27
12	Railroads	9.83	12.14	20.30	21.69	23.69
13	Water Lines	2.28	3.48	5.23	7.95	9.86
14	Power Lines	0.13	0.15	0.47	1.04	1.74
15	Gas Pipes	1.48	2.54	4.43	6.02	8.81
16	Pipe Lines	6.05	6.53	7.23	11.11	11.93
17	Broadband	0.26	0.33	1.11	2.20	4.12

3. Lincoln County's Suitability Model:

Table 14 shows the total scores of all studied sites in Lincoln County. Site No-9 (Permit ID = S500306) has the highest score of 611.25. 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 11 potential development sites of Lincoln County, it is easy to notice to see all the sites and determine that Sites No. 9, 8, and 11 are the 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.

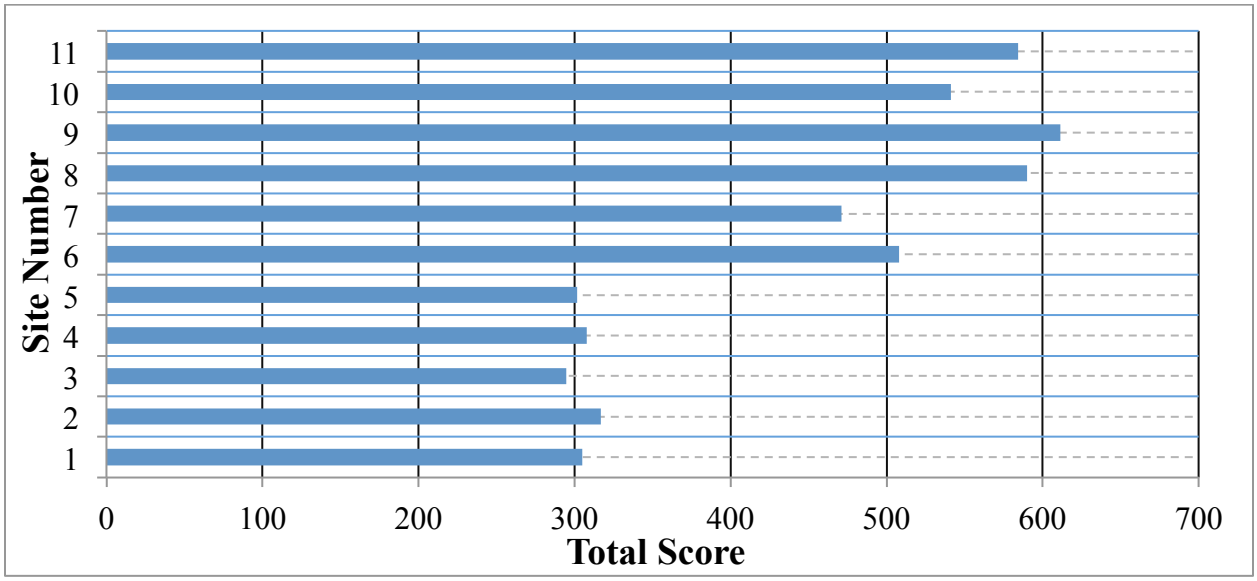
Besides a distance analysis, a suitability model for Lincoln is supported by demographic data as well as two additional analyses, which are retail location density and workforce analysis (shown on Table 15 and Map 41 below). The best decision will be made with careful consideration of the suitability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

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

Site No.	Permittee	Permit_ID	Score
1	Argus Energy Wv Llc	S500407	305
2	Argus Energy Wv Llc	S500706	317
3	Argus Energy Wv Llc	S501899	294.75
4	Argus Energy Wv Llc	S502500	308
5	Argus Energy Wv Llc	S502797	301.5
6	Hobet Mining Llc	S500207	508
7	Hobet Mining Llc	S503308	471.25
8	Hobet Mining Llc	S500203	590
9	Hobet Mining Llc	S500306	611.25

Site No.	Permittee	Permit_ID	Score
10	Hobet Mining Llc	S500806	541.25
11	Hobet Mining Llc	S501101	584.25

Figure 15: Lincoln 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.[12] 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

Rank	Permit_ID	Emp_05	Unemp_05	Emp_10	Unemp_10	Emp_15	Unemp_15
1	S500407	440	120	2101	466	4743	1093
2	S500706	507	137	1847	440	4281	1015
3	S501899	238	50	938	218	2008	565
4	S502500	505	106	1558	410	2586	764
5	S502797	474	100	1409	345	2404	695
6	S500207	696	147	1723	456	2766	815
7	S503308	394	83	1228	287	2206	624
8	S500203	373	103	1785	402	4295	961
9	S500306	408	113	1930	434	4497	1025
10	S500806	422	105	1970	425	4503	995
11	S501101	437	123	1909	439	4457	1032

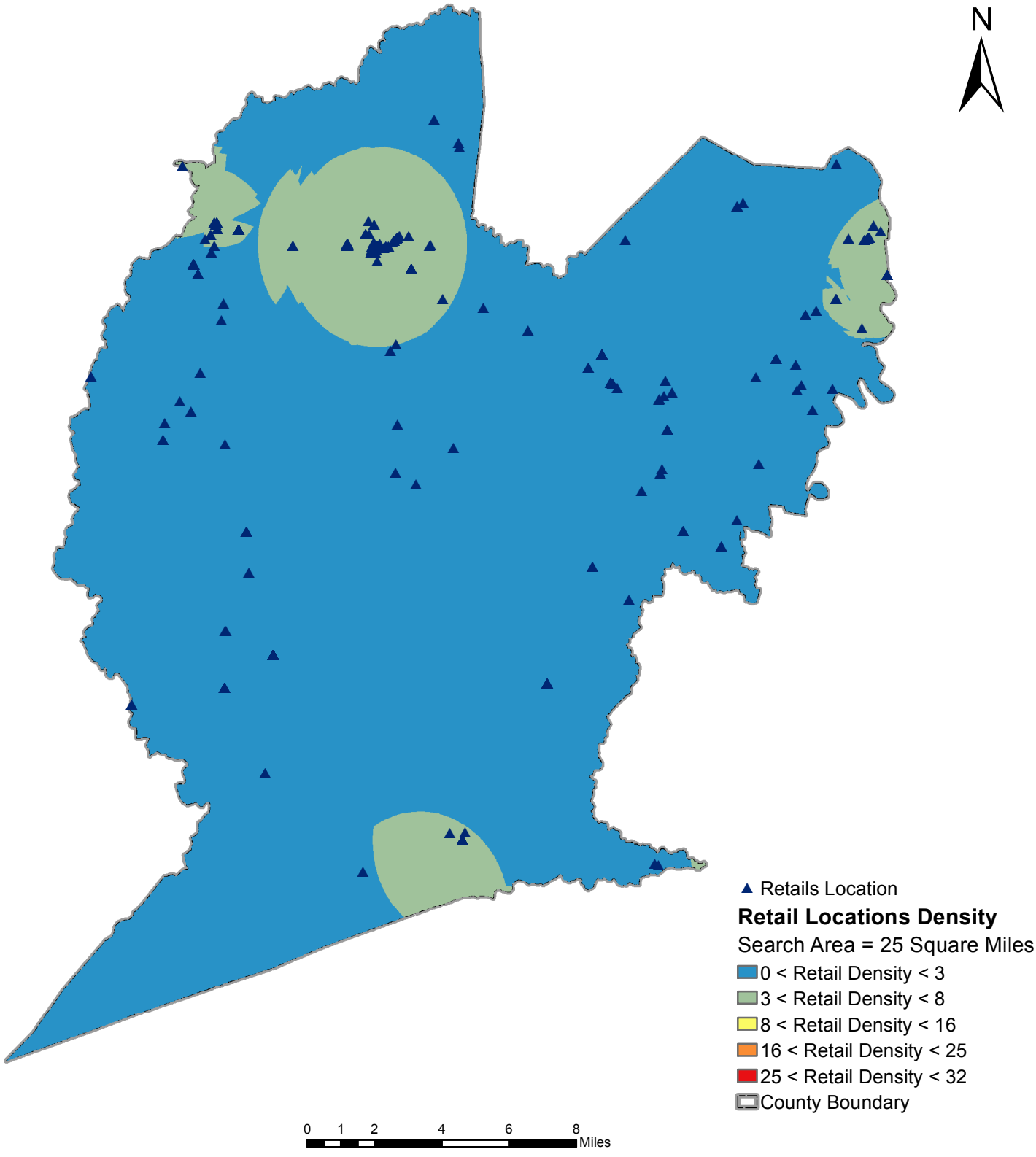
Retail Location Analysis

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.

[12] 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.

Retail Location Density

Lincoln County



Source: ESRI 2011

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V. Conclusion

Lincoln County has endured several adverse shocks in the past decade, and it is too early in the analysis to declare a full recovery from those shocks. Due to government services and the sustainment of mining support jobs, wages have been steadily growing in the county. However, these two sectors may not continue to be stable, aging and educational issues persist, and post-mine land use has not been active. This plan could be useful in furthering Lincoln's growth despite the small inventory of mine sites.

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 Lincoln County to thrive.

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