



2021

WEST VIRGINIA OFFICE OF BROADBAND
WEST VIRGINIA BROADBAND ENHANCEMENT COUNCIL

ANNUAL REPORT



EXECUTIVE SUMMARY

The West Virginia Department of Economic Development, Office of Broadband, and the West Virginia Broadband Enhancement Council jointly submit this 2021 Annual Report to the West Virginia Legislature, in compliance with W. Va. Code §31-G-1A-2(8). The agencies work collaboratively with a shared mission: to expand and improve broadband connectivity in West Virginia.

2021 sets the stage for significant broadband expansion in West Virginia. In 2021, Governor Justice launched West Virginia's Billion Dollar Broadband Strategy. The Governor announced the State's bold broadband initiative on Friday, October 15, 2021. Learn more about the Governor's announcement here: <https://governor.wv.gov/News/press-releases/2021/Pages/Gov.-Justice-announces-Billion-Dollar-Broadband-Strategy.aspx>.

Following the Governor's announcement, the West Virginia Legislature passed House Bill 339 on October 20, 2021. Through this legislation, the Legislature created the West Virginia Broadband Development Fund and allocated \$90 million of State and Local Fiscal Recovery Funds (SLFRF) funds, under the American Rescue Plan Act (ARPA), and \$10 million in General Revenue funds to broadband development.

The allocation of SLFRF and General Revenue funding provides a historic \$100 million investment that will supplement West Virginia's allocation of funds through the Capital Projects Funds (CPF), also part of the ARPA.

The ARPA CPF includes \$136 million for broadband development in West Virginia. The agencies continue to work closely with U.S. Department of the Treasury (U.S. Treasury) to expedite the State's utilization of CPF funding. The U.S. Treasury released guidance for the [Coronavirus Capital Projects Fund](#) (CPF) program on September 21, 2021.

The CPF program provides \$10 billion nationwide for eligible governments to carry out critical capital projects that directly enable work, education, and health monitoring, including remote options, in response to the COVID-19 public health emergency. The CPF Guidance, available at treasury.gov/CPF, describes how governments may access and use these funds.

The combination of SLFRF and CPF funding provides a total ARPA broadband investment of \$236 million in West Virginia. This funding represents a major transition to State-led broadband development through which states will oversee the investment of broadband funding.

In anticipation of the ARPA funding, the West Virginia Department of Economic Development, Office of Broadband, in coordination with the West Virginia Broadband Enhancement Council, developed and launched the West Virginia Broadband Investment Plan (WVBIP) in June 2021. The WVBIP includes four separate programs, each designed to meet West Virginia's broadband development needs. Briefly, the proposed programs include:

- a. Line Extension, Advancement and Development (LEAD): Expansions of existing fiber and cable networks
- b. GigReady: A state incentive for local governments and organizations to pool local ARPA allocations or other local funding
- c. Major Broadband Project Strategies (MPBS): Significant new networks or major expansions of existing networks, and
- d. Wireless Internet Networks (WIN): Expansions or upgrades of existing fixed wireless networks.

Applications for LEAD will be accepted with three monthly submission deadlines on November 30, 2021, December 30, 2021, and January 31, 2022. Applications for GigReady and MBPS will be accepted through January 31, 2022. While wireless projects do not appear eligible for funding under current ARPA guidelines, the WIN program is being developed and will launch in early 2022.

ADDRESS LEVEL BROADBAND MAPPING

Accurate data is the cornerstone of solid infrastructure planning and development. In late 2021, the West Virginia Office of Broadband created new address level broadband maps. The maps will support grant applications in the LEAD, GigReady and MBPS programs. Most importantly, however, the maps provide a more accurate foundation for investment decisions.

Under LEAD and GigReady, the need for broadband expansion is analyzed at the individual address level. Conversely, the MBPS data focuses on the need for broadband expansion within eligible service areas as determined by the Office of Broadband. West Virginia's broadband maps can be found here: <https://wv-capitol-wvbroadband.hub.arcgis.com/>.

The focus on broadband availability at the address level and service area levels represents a critical transition from relying on the generalized census block mapping system of the Federal Communications Commission (FCC). West Virginia's mapping initiative is continuously evolving and improving to more precisely identify served and unserved areas in West Virginia.

TO REPORT BROADBAND INFORMATION

The Office of Broadband utilized West Virginia's Statewide Addressing and Mapping System (SAMS) to develop the State's broadband mapping system. While the map represents significant advancement, it is not perfect. This mapping system may not include all address locations. Constituents may report any discrepancy to the Office of Broadband.

For addresses not shown in the maps, or for addresses classified as "Other" that lack access to broadband services (speeds of at least 25/3 Mbps), West Virginia residents may call (304) 352-4163 to provide the following information to the Office of Broadband:

- ❖ Full Name
- ❖ Full Address
- ❖ Address type (residential, commercial, etc.)
- ❖ Current Service Provider (if applicable)

WVBIP Broadband Webinars and Resources

All WVBIP webinar recordings are available at: broadband.wv.gov, along with other program resources.

To Report Broadband Information

Call the West Virginia Office of Broadband at 304-352-4163

MORE ABOUT: WEST VIRGINIA'S BILLION DOLLAR BROADBAND STRATEGY

CHARLESTON, WV – Gov. Jim Justice today unveiled a billion-dollar strategy to bring broadband availability to 200,000 more West Virginia homes and businesses. The plan will combine funding from federal, state, and local governments, along with matching investments from private-sector partners, to accelerate the expansion of high-speed internet to underserved areas of the state. The plan represents by far the largest investment in broadband in the state's history.

The Governor's strategy will add a \$236 million state broadband program to \$362 million in Federal Communications Commission funding and \$120 million from other state and federal sources, for a total of \$718 million in government funding expected to be allocated by fall 2022. The funds will be allocated through competitive programs that draw matching funds from private-sector and local government partners, generating more than \$1 billion in total broadband investment.

"This is surely a landmark day for West Virginia," Gov. Justice said. "We've been talking for years about how to fix the rural broadband problem. Now we're finally going to do it."

"West Virginia students deserve to be able to do their homework," Gov. Justice continued. "Our seniors deserve access to telehealth. Our businesses deserve to be able to reach their customers and suppliers. And all our residents deserve to be able to interact with their government, stay informed as citizens, and do all the hundreds of things that take high-speed internet. Starting today, we're going to make that possible."

"This couldn't have been done without the hard work and commitment of our Legislature," Gov. Justice added. "The state's legislative leaders, including President Blair and Speaker Hanshaw, along with all their members, deserve tremendous credit for their dedication to extending broadband to all West Virginians. It's an honor to work with them on this issue."

Governor Justice's broadband strategy focuses on coordinating a diverse set of federal, state, local, and private funding sources to maximize broadband expansion. The state has spent more than two years comprehensively mapping broadband access around the state, resulting in a detailed inventory of underserved locations that will allow pinpoint funding allocation.

The primary programs involved in the billion-dollar initiative are as follows:

(1) Rural Digital Opportunity Fund: The Federal Communications Commission's (FCC) Rural Digital Opportunity Fund (RDOF) offers internet service providers (ISPs) funding to extend service to underserved areas. The program centers on a reverse auction in which ISPs compete for grants to connect underserved census tracts, with each tract awarded to the ISP that can connect it with the least amount of federal subsidization.

Each participating ISP must provide the FCC a letter of credit for a portion of its grant award to ensure that its work is completed. This financial requirement creates a major hurdle for smaller ISPs. In September 2020, however, Gov. Justice issued an executive order, EO 66-20, under which the state provides a financial backstop for ISPs that win RDOF awards, opening the door to vastly expanded RDOF participation in West Virginia.

Thanks to Gov. Justice's financial commitment, West Virginia now has the highest per-capita rate of RDOF funding in the country at \$202 per person, for a total of \$362 million. This RDOF funding will be complemented by private investment from participating ISPs to create a minimum expected RDOF impact of \$500 million. The program is expected to provide broadband

availability to approximately 119,000 homes and businesses over five years.

(2) West Virginia State Broadband Initiative: The strategy's second major component will be operated by the state Office of Broadband and Broadband Council, using American Rescue Plan Act (ARPA) and state-budget funding. ARPA's Capital Projects Fund includes \$136 million for broadband in West Virginia. And – earlier today – Governor Justice placed on the Legislature's special session call an additional \$90 million appropriation of ARPA State Fiscal Recovery funds for broadband projects, along with a \$10 million appropriation of state general revenue funds for wireless broadband projects. These sources will provide \$236 million in combined funding for the state's own competitive broadband projects initiative.

Developed by the state Office of Broadband and Broadband Council in concert with leading national broadband experts, the state initiative comprises four award programs, each of which will allocate funds through a competitive application process:

Line Extension Advancement and Development (LEAD): The LEAD program will award competitive grants to ISPs to expand existing fiber and cable networks.

GigReady: Local governments in West Virginia have been allocated more than \$500 million from the ARPA Local Fiscal Recovery Fund, and many of them intend to invest that money in local broadband expansion. The GigReady Initiative will provide matching state funds for local governments that develop projects to pool their broadband investments.

Major Broadband Project Strategies (MBPS): The MBPS program will focus on large-scale multicounty projects that require additional resources to achieve rapid implementation.

Wireless Internet Networks (WIN): The WIN program will use \$10 million in state general revenue funds to expand and improve existing wireless internet networks. Wireless networks are

a specialized solution useful in remote or sparsely populated areas that are difficult to reach with fiber optic cable.

All four components of the state-based program will competitively score applications from prospective funding recipients and will award funds based on evaluations by independent national broadband experts. Evaluation criteria include matching-fund contributions, speed to market, technical feasibility, and digital equality (providing service to underserved areas and populations). Participating ISPs will be required to include a low-price service tier that is affordable for lower-income West Virginians.

The program's matching-funds requirement is expected to generate at least \$150 million in investment beyond the \$236 million state contribution, for a total state-based program impact of at least \$386 million.

(3) Other federal and state funding sources: Other existing funding sources, primarily federal, are expected to contribute at least \$120 million to broadband development in West Virginia over the next five years. These include the Federal Communications Commission, the United States Department of Agriculture, the Appalachian Regional Commission, and the National Telecommunications and Information Administration. The state Office of Broadband and Broadband Council will coordinate with those programs to ensure that state funds are allocated efficiently and maximum broadband coverage is obtained.

"Broadband is essential to modern life," said Secretary of Economic Development Mitch Carmichael. "This comprehensive strategy coordinates a wide variety of funding sources that add up to a record investment in high-speed internet."

INTRODUCTION

KEY PRIORITIES

West Virginia's leaders understand that broadband has moved beyond optional to essential. Four key priority areas were identified through the development of West Virginia's 2020-2025 Broadband Plan. These priority areas represent the important and essential services and functions related to:

- ❖ Economic Development
- ❖ Education
- ❖ Healthcare
- ❖ Public Safety

With these primary areas in mind, recent policy initiatives indicate that improving broadband and bridging the digital divide is one of the State's highest priorities. Broadband is the essential economic infrastructure that West Virginia needs to compete regionally, nationally and globally.

The West Virginia Broadband Enhancement Council and the West Virginia Office of Broadband continue to advocate for greater connectivity. This mission is strongly supported by the Governor Justice, the West Virginia Legislature, West Virginia Department of Economic Development, West Virginia Department of Commerce, West Virginia Office of Technology and numerous partners.

Nationally, West Virginia's Congressional representatives continue to support and enhance Federal programs for broadband development.

With this shared vision firmly in place, State policy is implemented to address barriers as they are identified.



2021 HIGHLIGHTS

The State of West Virginia has made great strides to advance broadband development in unserved areas, reflecting the State's ongoing commitment to improving broadband services for its citizens. Under the leadership and vision of Governor Jim Justice and the West Virginia Legislature, the State is creating and implementing innovative policies, procedures, and processes for facilitating broadband deployment. While the State faces significant challenges, including mountainous topography and areas of low population density, these challenges are being met with the innovation, vision, and collaboration necessary to create progress.

KEY PARTNERSHIPS

Communication with and cooperation among West Virginia's Internet Service Provider (ISP) community is essential to the expansion of broadband in West Virginia. A visionary culture that welcomes open dialogue among key stakeholders has enabled West Virginia to tackle issues that have previously impeded real progress. In addition, joint ventures and innovative partnerships between public agencies, private companies and investor-owned utilities demonstrate the collaboration needed to improve connectivity.

The West Virginia Broadband Enhancement Council and the West Virginia Office of Broadband strongly support these efforts and will continue working to develop a more connected West Virginia. Working collaboratively, West Virginia is pursuing primary goals to:

- ❖ Encourage the development of broadband infrastructure in the State
- ❖ Evaluate and map the broadband infrastructure and service systems through an Interactive Mapping Program and other data collection methods
- ❖ Eliminate barriers to broadband infrastructure development within the State
- ❖ Engage and mobilize the expertise, funding, and partners to facilitate the creation of reliable and affordable broadband service, and
- ❖ Expand economic development and represent the State in matters related to broadband infrastructure development.

Appreciation is extended to Tilson Technology Management, Inc., for significant contributions and commitment to broadband development in the State of West Virginia as the State's lead broadband consultant.

Additionally, West Virginia's long-standing partnership with Ookla continues to strengthen the State's growing ability to collect, analyze and visualize important broadband consumer speed test data.

2021: BROADBAND IN WEST VIRGINIA

West Virginia took major steps forward in 2021. West Virginia leaders recognize that broadband connectivity must be part of the State's overall economic development strategy. Essentially, broadband is a target industry poised for growth. West Virginia has a strong foundation with significant action underway to expand access to broadband services. The West Virginia Broadband Investment Plan places the highest priority on directing broadband development resources to areas with the greatest need.

4

Created the West Virginia Broadband Investment Plan with 4 Distinct Grant Programs

The West Virginia Office of Broadband launched the West Virginia Broadband Investment Plan (WVBIP). The WVBIP consists of four distinct grant programs designed to meet West Virginia's broadband development needs.

15

Created Address Level Broadband Maps with Input from 15 Private Sector Partners

The West Virginia Office of Broadband created address level broadband maps containing more than one million unique location data points. Fifteen of the State's Internet Service Providers submitted data to support the creation of the State's broadband mapping system.

\$100
MILLION

Created the West Virginia Broadband Development Fund with a \$100 Million Allocation

The Governor recommended and the West Virginia Legislature approved the allocation of \$100 million in American Rescue Plan Act, State Local Fiscal Recovery Funds, to create the West Virginia Broadband Development Fund.

2021 HIGHLIGHTS

1

West Virginia project teams compete and win, securing more than \$103 million in broadband infrastructure grant funding through various federal programs between 2017 and 2021, excluding FCC RDOF.

2

West Virginia ranked 16th in the nation for the amount of funding requested by states in the U.S. Department of Commerce, National Telecommunications and Information Administration's (NTIA's) Broadband Infrastructure Program.

3

West Virginia residents value connectivity and have completed more than 9,000 speed tests and broadband surveys at broadband.wv.gov/speedtest, and nearly 1 million total Ookla speed tests in 2021.

4

The West Virginia Office of Broadband has analyzed more than one million distinct address locations and has identified approximately 300,000 locations in West Virginia that lack broadband internet service.

5

The State of West Virginia has allocated \$100 million to the newly created West Virginia Broadband Development Fund, marking a historic commitment to broadband development in West Virginia.

WEST VIRGINIA BROADBAND ENHANCEMENT COUNCIL

The West Virginia Broadband Enhancement Council was created in 2017. The Council has 13 voting members; as well as two Senate Appointees and two House of Delegates Appointees, one from each party, to serve as ex officio, nonvoting advisory members. The Council conducts a regular meeting on the second Thursday of each month, at 10:00 a.m., in the West Virginia Department of Commerce offices in Building 3 at the State Capitol Complex or virtually.

The Council builds upon input from numerous state agencies and recognizes the value of representation from urban and rural communities throughout West Virginia. The Council's composition, which includes a cross-section of state agency directors, legislative advisory members, business community leaders and both urban and residential users, ensures that multiple voices are heard, that West Virginia's needs are represented, and that viable solutions are thoughtfully pursued.

The Council is committed to enacting the provisions of House Bill 3093, which direct the development of policies, plans, and procedures to expand and enhance broadband access throughout West Virginia. The Council places a primary emphasis on the development of broadband infrastructure in unserved and underserved areas of the State as outlined in West Virginia Code § 31G-1-1, et seq:

<http://www.wvlegislature.gov/WVCODE/31G>.

The Council is created under the West Virginia Department of Commerce for administrative, personnel and technical support services. In July 2016, \$1,475,641, was transferred to the newly formed West Virginia Broadband Enhancement Council from the previous Broadband Deployment Fund to the Broadband Enhancement Fund in the West Virginia Department of Commerce. The Fund's beginning balance on July 1, 2020 was \$1,077,554. Fiscal Year 2020 expenses from July 1, 2020 through June, 30 2021 totaled \$322,467. With the addition of a Fiscal Year 2022 appropriation of \$500,000, the Broadband Enhancement Fund balance as of June 30, 2021 was \$1,255,086.

The Council's annual budget includes the purchase of the licensing necessary to continue speed testing and mapping projects, associated data subscriptions, software, marketing and communications, and other limited expenses. Additionally, the Council has approved the expenditure of funding for specific legal services and technical consulting services.

In 2021, House Bill 2002 amended West Virginia Code §31G to outline specific duties and authorities to be shared among West Virginia Broadband Enhancement Council the Office of Broadband.

For more information, visit the Council website at: broadband.wv.gov.

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WEST VIRGINIA OFFICE OF BROADBAND

The West Virginia Office of Broadband was created within the West Virginia Department of Economic Development upon passage of House Bill 2002 by the West Virginia Legislature in 2021. This legislation amended West Virginia Code §31G to outline specific duties and authorities to the Office of Broadband and the West Virginia Broadband Enhancement Council. This legislation transferred some duties and authority from the Council to the Office, assigned some distinct responsibilities to the Office, and identifies some areas in which the Council and the Office share responsibilities.

Distinct duties of the Office include:

- a. Gathering and report data regarding adoption rates of broadband by speed and community, residential and non-residential
- b. Gathering data regarding prices and fees charged for broadband, residential and non-residential
- c. Public awareness of issues concerning broadband service
- d. Reporting to the Joint Committee on Government and Finance annually
- e. Mapping, including annual publication of a statewide assessment, with the broadband availability map to be available online for public access, and centralized AREA mapping in GIS form for use by the private sector
- f. Creating guidelines and recommendations regarding voluntary donation program for easements for broadband service
- g. Making recommendations to the Legislature

Distinct authority of the Office includes:

- a. Soliciting, receiving, and dispensing funds from funding sources other than the Legislature
- b. Retaining outside expert consultants to assist with mapping
- c. Overseeing the use of conduit
- d. Making recommendations to the Legislature to expand broadband
- e. Making recommendations to the Legislature regarding an easement program
- f. Accepting voluntary donations of easements
- g. Establishing a voluntary data collection program
- h. Coordinating with Consumer Protection Division of the Attorney General's office regarding consumer protections

For more information, visit: broadband.wv.gov.

West Virginia Office of Broadband

West Virginia Department of Economic Development

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**WEST VIRGINIA
DEPARTMENT OF
ECONOMIC
DEVELOPMENT**

**OFFICE OF
BROADBAND**



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WEST VIRGINIA BROADBAND INVESTMENT PLAN

The West Virginia Department of Economic Development (WVDED), Office of Broadband, in coordination with the West Virginia Broadband Enhancement Council, will administer the West Virginia Broadband Investment Plan (WVBIP), utilizing funds allocated to the State of West Virginia through the Capital Projects Fund and State Local Fiscal Recovery Fund of the American Rescue Plan Act (ARPA), according to guidance published by the U.S. Treasury.

WVBIP Key Program Launch Dates

1. Program Procedures Released: Oct. 18, 2021
2. Procedural Rules Filed: Oct. 20, 2021
3. Target Area Maps Release 1: Oct. 26, 2021
4. GigReady Webinar: Oct. 27, 2021
5. LEAD Webinar: Nov. 3, 2021
6. MBPS Webinar: Dec. 1, 2021
7. Target Area Map Release 2: Dec. 9, 2021

CAPITAL PROJECTS FUND (CPF)

The State of West Virginia is prepared to administer a broadband infrastructure grant program based on the American Rescue Plan Act (ARPA) Capital Projects Fund (CPF). The WVBIP was developed to align with ARPA rules and guidance and other funds that may become available for broadband development in West Virginia.

The **ARPA CPF** includes \$136 million for broadband development in West Virginia. According to the U.S. Treasury:

“The focus of the Capital Projects Fund on the continuing need for connectivity in response to the COVID-19 pandemic complements the broader range of uses, including for broadband infrastructure, of the American Rescue Plan’s separate \$350 billion Coronavirus State and Local Fiscal Recovery Funds.”

STATE AND LOCAL FISCAL RECOVERY FUNDS (SLFRF)

While the Capital Projects Fund is specifically for broadband infrastructure, [State and Local Fiscal Recovery Funds](#) (SLFRF) can also be dedicated to broadband development. Recognizing this potential partnership, the WVBIP provides an opportunity to coordinate state and local ARPA funding. The State Fiscal Recovery Fund (SFRF) includes \$1,355,489,988 allocated to West Virginia. The Local Fiscal Recovery Fund includes funding for cities, counties, and non-entitlement entities in the following amounts:

- \$348,103,547 for 55 West Virginia Counties,
- \$168,188,715 for Nine West Virginia Cities, and
- \$162,490,814 for Non-Entitlement Entities

In October 2021, the West Virginia Legislature created the Broadband Development Fund and allocated \$90 million of SFRF funds and \$10 million in General Revenue funds to this initiative. This total was added to CPF funding for a total investment of \$236 million. The additional SFRF funds will be dedicated to the existing the LEAD, GigReady, and MPBS programs.

THE AMERICAN RESCUE PLAN ACT (ARPA) INCLUDES SPECIFIC GUIDANCE FOR BROADBAND DEVELOPMENT. UNDER ARPA, THE CAPITAL PROJECTS FUND INCLUDES \$136 MILLION FOR BROADBAND DEVELOPMENT IN WEST VIRGINIA.

The \$10 million allocation from General Revenue funds will be dedicated to the Wireless Internet Networks (WIN) program. The WIN program is in development and will launch in early 2022.

West Virginia is embarking on a mission to bridge the digital divide. The WVBIP is designed to integrate the need for broadband connectivity with practical solutions to help connect communities throughout West Virginia. Working together, West Virginia can achieve a more connected future.

WVBIP PROGRAMS

Under the WVBIP, the West Virginia Office of Broadband has established four grant programs for broadband infrastructure development in 2021. Each program maximizes the potential of broadband availability and adoption in West Virginia. The programs are designed to meet the goals established in the West Virginia Broadband Enhancement Council’s 2020-2025 Five-Year Plan.

The WVBIP will also incorporate State funding, and other federal funds allocated or available to West Virginia. The WVBIP may be expanded through the addition of new or modified programs.

- Complete WVBIP program resources are available at: <https://broadband.wv.gov>.
- WVBIP Target Area Maps are available at: <https://wv-capitol-wvbroadband.hub.arcgis.com>.

The WVBIP contains four well defined infrastructure grant programs, each designed to specific broadband development needs. Programs launched in 2021 include:

- LEAD: Line Extension Advancement and Development
- GigReady: Technical Assistance or Implementation Phases
- MBPS: Major Broadband Project Strategies
- WIN: Wireless Internet Networks

Each WVBIP program emphasizes last mile connections. According to U.S. Treasury guidelines, each program places an emphasis on locations without access to reliable wireline service of 25/3 Mbps. Funded projects must be capable of delivering, or be scalable to deliver, symmetrical 100 Mbps service while encouraging the deployment of fiber networks.

In keeping with West Virginia’s emphasis on public-private partnerships, the programs encourage networks owned or affiliated with local governments. To promote greater utilization of broadband service in West Virginia, the programs require participation in federal affordability programs and encourage the availability of a low-cost service.

Figure 1: WVBIP Funding Chart

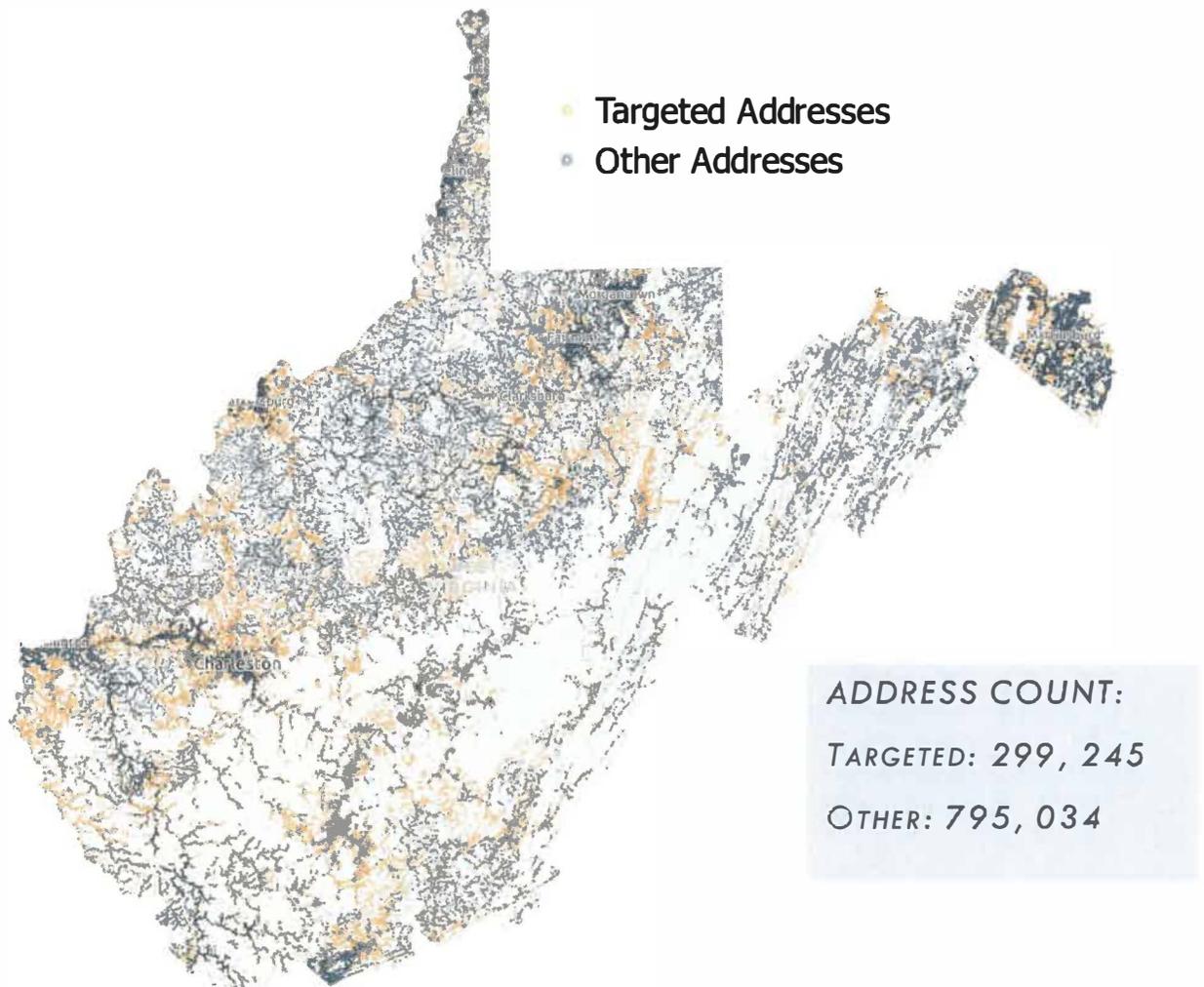
| Program | LEAD | GigReady | MBPS | *WIN |
|---------------------|--|--|--|--|
| Funding | \$30 Million | \$50 Million | \$50 Million | \$0 Million |
| Eligible Applicants | ISPs Operating Cable or Fiber Network | County, Municipal Governments, EDCs, EDAs, RPDCs, Private Partnerships Strongly Encouraged | ISPs Local Governments and Affiliated Organizations | ISPs with Existing Wireless Network <small>*Subject to ARPA Rules</small> |
| Speed Requirements | At Least 100/20, scalable to 100/100 Mbps 1000/500 Mbps Preferred | At Least 100/20, scalable to 100/100 Mbps 1000/500 Mbps Preferred | At Least 100/20, scalable to 100/100 Mbps 1000/500 Mbps Preferred | At Least 25/3, preferably 100/20 Mbps |
| Match Requirements | At Least \$500 per Passed Premise | At Least 25 Percent of Project Cost | At Least \$500 per Passed Premise | At Least \$400 per Covered Premise |

THE OFFICE OF BROADBAND RELEASED THE TARGET AREA MAP THAT IDENTIFIES ELIGIBILITY FOR GRANT FUNDING AT THE ADDRESS LEVEL FOR THE GIGREADY AND LEAD PROGRAMS. ADDRESSES WITHIN THESE TWO PROGRAMS ARE CLASSIFIED AS "TARGETED" AND "OTHER."

Targeted Addresses

- Addresses that are *estimated* to have no current access to internet service with at least 25 Mbps download and 3 Mbps upload (25/3 Mbps) speeds, not counting access to satellite or mobile wireless internet, and
- Not in an area with a binding commitment to a state, federal, or local entity to deliver mass-market broadband service of at least 25/3 Mbps, not counting commitments to expand access to satellite or mobile wireless internet.

All other addresses not classified as "Targeted" are classified as "Other."



VITA, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

LINE EXTENSION ADVANCEMENT AND DEVELOPMENT (LEAD)

The LEAD program is intended to fund service extensions of last-mile cable modem and fiber-to-the-premise broadband networks that can be constructed quickly. The program targets Internet Service Providers (ISPs) as primary applicants to expand existing networks to reach unserved locations at the end of line.

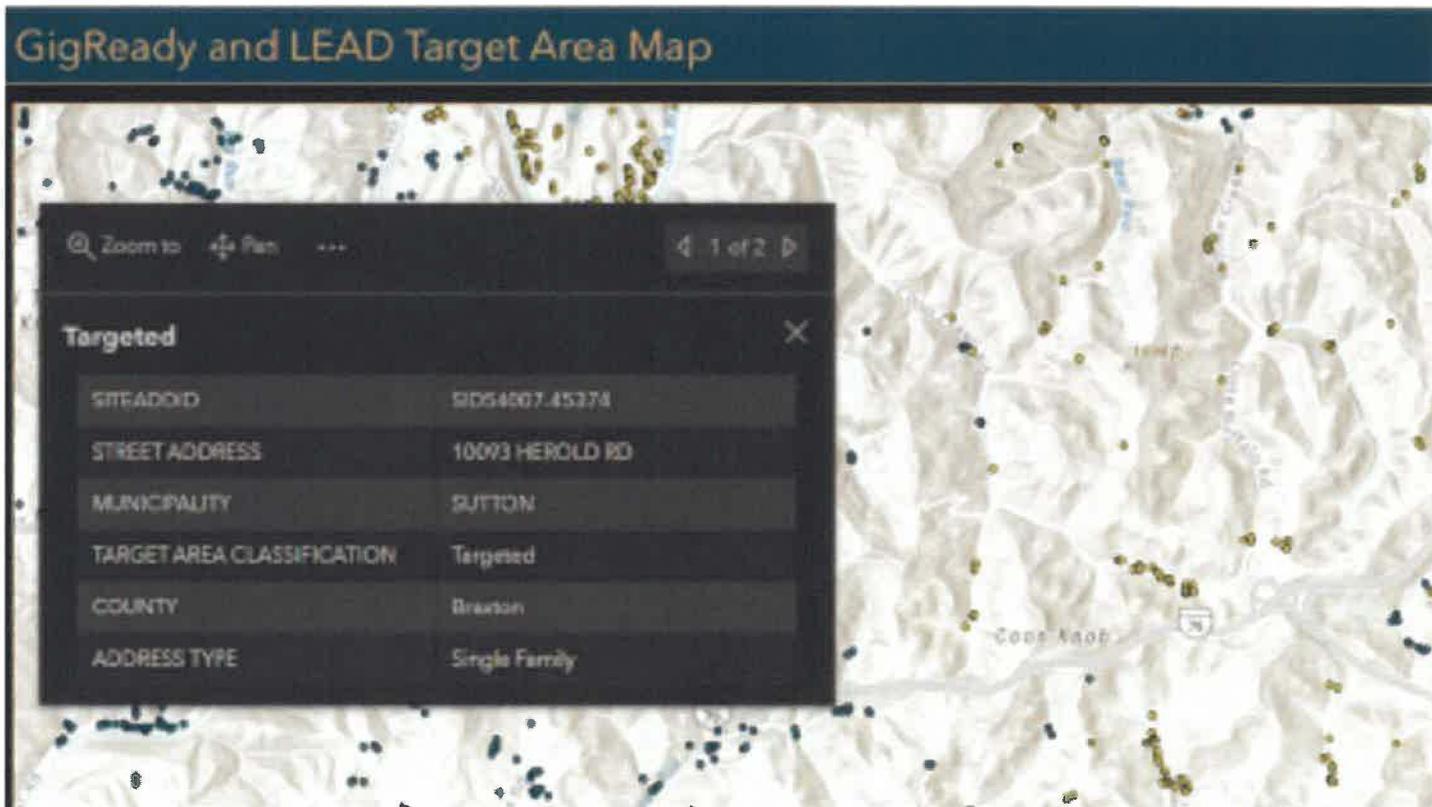
Due to high cost of fiber deployment and extensions of cable modem networks, ISPs have found it economically infeasible to expand into rural communities with low population densities and rugged terrain. The increasing demand for high-speed reliable internet has prevented rural communities from moving forward in receiving the same eco-digital benefits that more urbanized areas have adopted.

Implementing LEAD has sparked a significant shift in how the State maps broadband availability. Previously, the State relied on FCC Form 477 data that has made granular mapping difficult due its implications of census block level reporting. The program's core mapping focuses on broadband availability at the address level. The program defines projects and eligibility for funding within two classifications at the address:

- Targeted Addresses: Addresses estimated not to have current access to terrestrial internet service of 25/3 Mbps and not in an area with existing state, federal, or local funding, and
- Other Addresses

Figure 2: Target Area Addresses fields

Addresses with current or future access to service only by satellite providers or mobile wireless networks are considered Targeted if they are not also served by a terrestrial broadband provider of fixed home broadband service offering serves with a speed of at least 25/3 Mbps. Applicants are required to match at least \$500 per passed address.

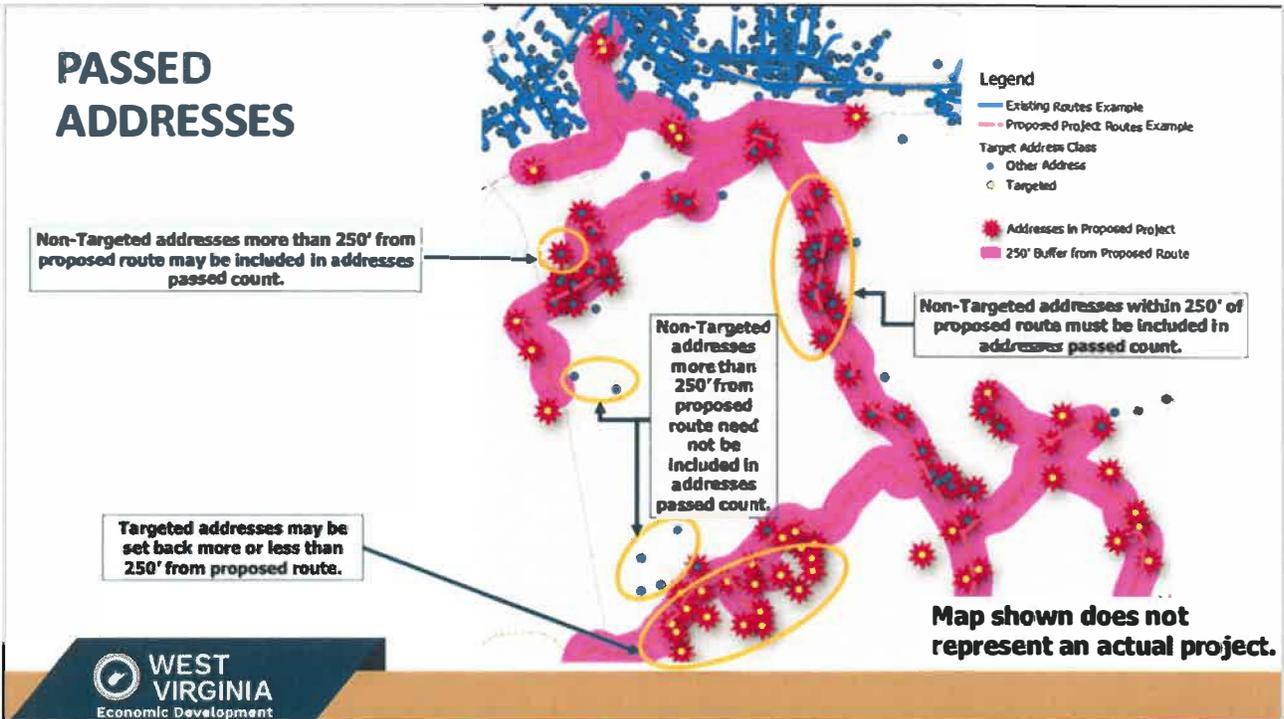


ELIGIBILITY CRITERIA



KEY REQUIREMENTS AND PREFERENCES FOR IMPLEMENTATION FUNDING

- Last-Mile, Unserved Project Focus**
 - Projects must extend last-mile service to unserved addresses in Target Area addresses.
 - Targeted addresses are estimated to have no access to internet service with speeds of at least 25/3 Mbps and are not in an area with an existing state, federal, or locally funded project to deliver broadband service of at least 25/3 Mbps speed.
 - Service by satellite providers or mobile wireless networks does not count.
- Speeds**
 - Projects with speeds of at least 1000/500 Mbps are encouraged.
 - Project must have speeds of at least 100/20 Mbps, scalable to 100/100 Mbps.
- Timeline**
 - Project must be completed within 12 months of award.
 - Customer drops at Targeted addresses may be reimbursed within 24 months of award.
 - 6-month extensions permitted for delays not caused by the applicant.
- Cost**
 - Proposed project costs must be reasonable and proportional to the difficulty of the project.
- Affordability**
 - Applicants will be required to participate in the FCC's Emergency Broadband Benefit (EBB) program and its successor.



GIGREADY INCENTIVE

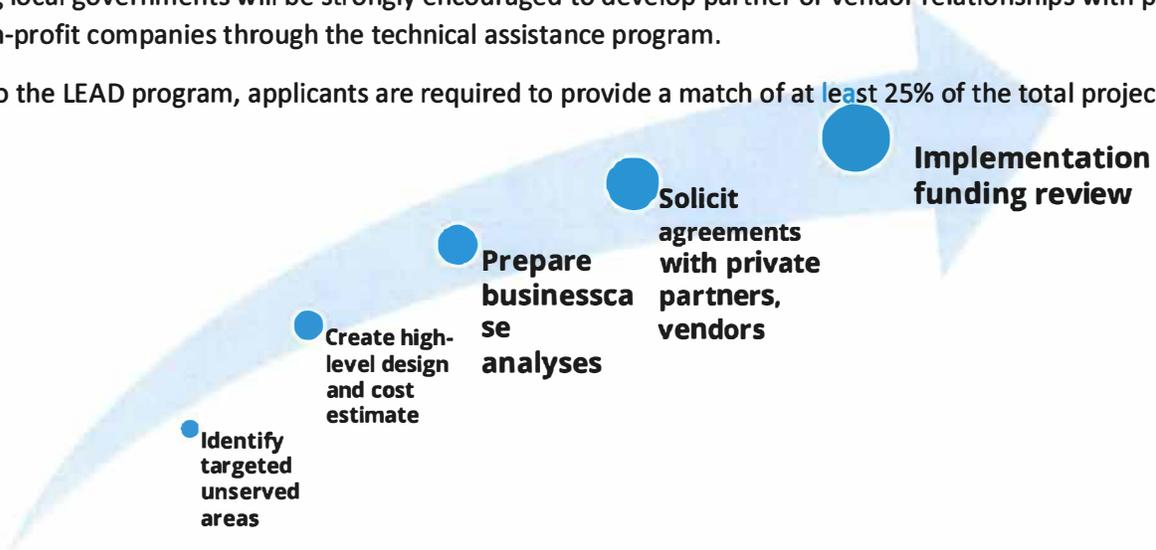
GigReady is designed to encourage the collaborative partnerships needed for successful broadband development. The program provides an opportunity for local governments and organizations to dedicate funds available through the American Rescue Plan Act (ARPA), or other local funding, to a broadband development initiative in partnership with agencies and offices.

The GigReady program will assist participants in two distinct phases. In Phase One, the program will provide technical assistance to help communities scope projects, select private partners and vendors, and complete other necessary steps in the broadband development process.

In Phase Two, upon completion of the technical assistance phase, participants may then be eligible for implementation funding through the GigReady program or other funding sources. Participants with qualifying, shovel ready projects that do not need technical assistance can apply to proceed directly to Phase Two by submitting a complete application, including all information listed as "optional" in the application.

County and municipal governments and affiliated organizations (economic development corporations, regional planning and development councils, etc.) may apply to participate. Regional consortia of local governments may participate. Participating local governments will be strongly encouraged to develop partner or vendor relationships with private for-profit or non-profit companies through the technical assistance program.

Compared to the LEAD program, applicants are required to provide a match of at least 25% of the total project costs.



ELIGIBILITY CRITERIA

KEY REQUIREMENTS AND PREFERENCES FOR IMPLEMENTATION FUNDING

| |
|---|
| Last-Mile, Unserved Project Focus |
| <ul style="list-style-type: none">• Projects must extend last-mile service to unserved addresses in Target Area addresses.• Targeted addresses are estimated to have no access to Internet service with speeds of at least 25/3 Mbps and are not in an area with an existing state, federal, or locally funded project to deliver broadband service of at least 25/3 Mbps speed.• Service by satellite providers or mobile wireless networks does not count.• Projects are encouraged to reach "end of the line" unserved addresses. |
| Speeds |
| <ul style="list-style-type: none">• Projects with speeds of at least 1000/500 Mbps are preferred.• Project must have speeds of at least 100/20 Mbps, scalable to 100/100 Mbps. |
| Timeline |
| <ul style="list-style-type: none">• Project must be completed within 24 months of award.• 6-month extensions permitted for delays not caused by the applicant. |
| Cost |
| <ul style="list-style-type: none">• Proposed project costs must be reasonable and proportional to the difficulty of the project. |
| Affordability |
| <ul style="list-style-type: none">• Applicants will be required to participate in the PCC's Emergency Broadband Benefit (EBB) program and its successor. |

MAJOR BROADBAND PROJECT STRATEGIES (MBPS)

The Major Broadband Project Strategies Program (MBPS) is designed for projects that can transform broadband availability across a significant extent of coverage in West Virginia. The Program will fund larger scale projects designed to serve large numbers of Targeted addresses.

MBPS focuses on larger projects than LEAD that may consist of new networks or major enlargements of existing networks. Compared to LEAD that focuses on funding for projects at the address level, MBPS defines projects by Eligible Service Areas. The mapping for Eligible Service Areas (ESAs) classified by city locations.

The Target Address map provides an estimate of the unserved addresses within Eligible Service Areas that are not part of another funded project. Winning projects will have an obligation to provide service to any unserved address within the awarded Eligible Service Areas.

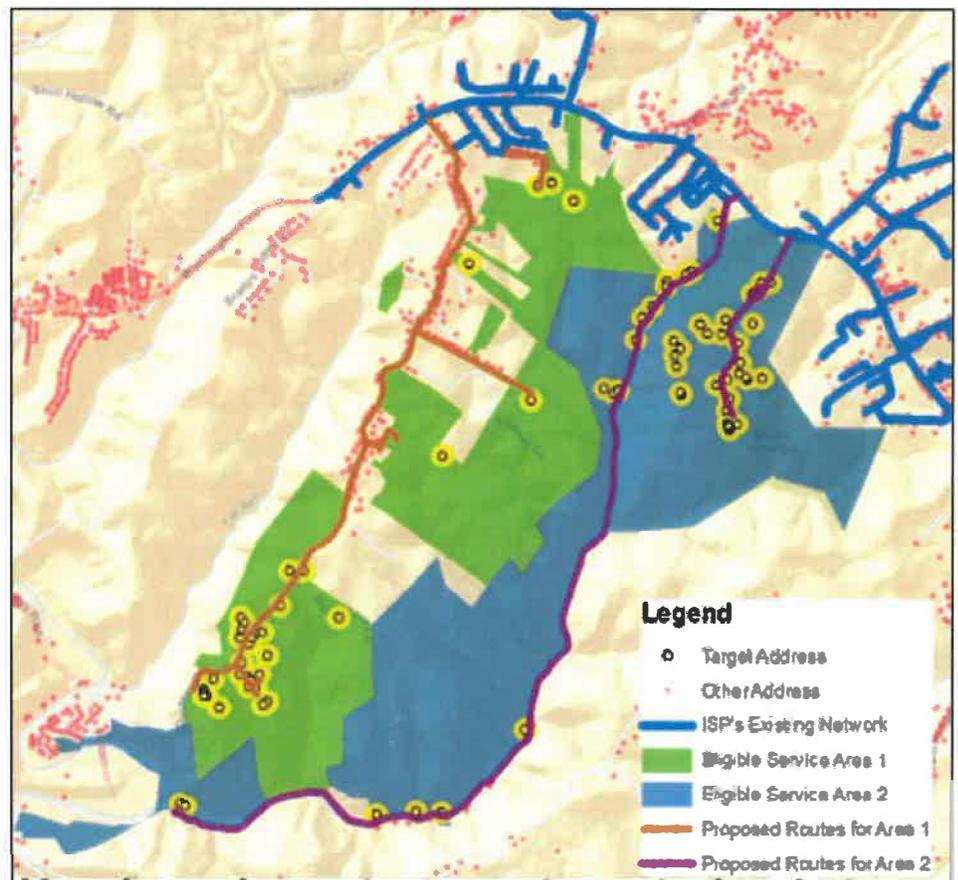
Eligible applicants include:

- Private for-profit or non-profit corporations
- Local governments
- EDAs
- EDCs
- RPDCs

Key Program Highlights:

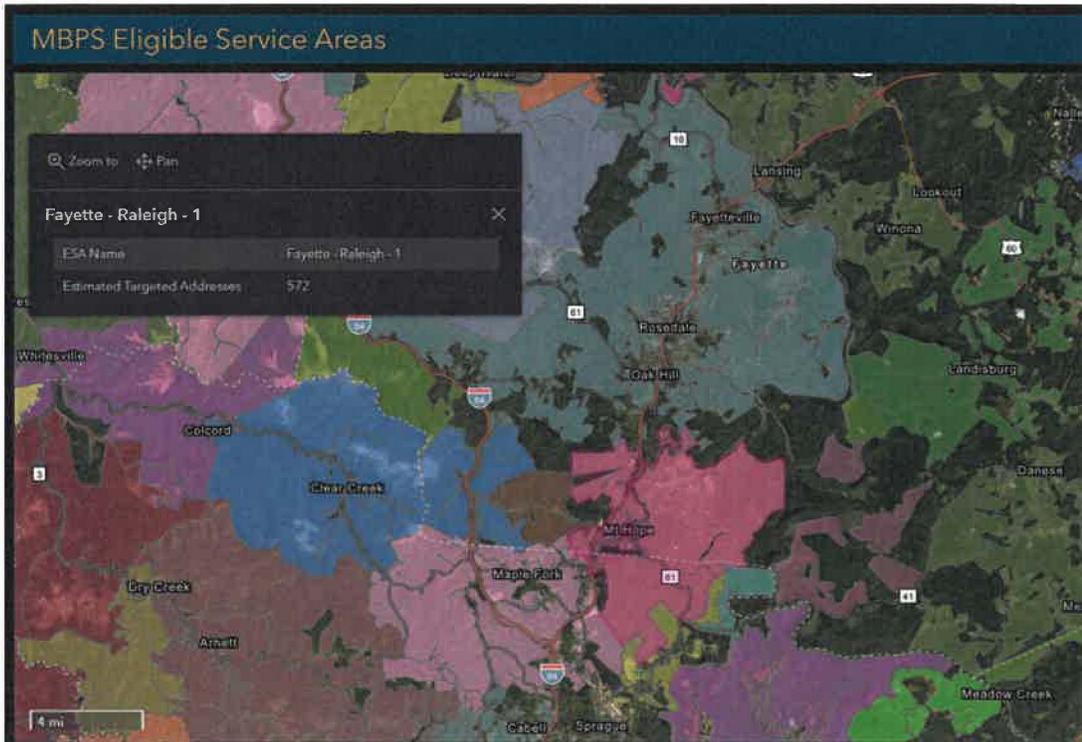
- Budget: \$40 Million
- Matching Funds: Minimum of \$500 per address passed or 25% of eligible project costs
- Size of Project: Approximately 5000 Targeted addresses or \$20 million
- Construction TimeLine: 24 months, with extension for cause

Figure 3: Example of MBPS project proposal



COMPARED TO LEAD, MBPS INTENDS TO COVER LARGE AREAS DESIGNATED AS “ELIGIBLE SERVICE AREAS” FOR MAJOR EXPANSIONS OR NETWORK UPDATES. THE PROGRAM REQUIRES THAT AWARDEES MUST BUILD OUT TO EVERY LOCATION WITHIN THE ELIGIBLE SERVICE AREA.

Figure 4: MBPS Eligible Service Area Map



ELIGIBILITY CRITERIA

KEY REQUIREMENTS

Last Mile, Unserved Project Focus

- Projects must extend **last-mile** service to unserved addresses in Target addresses in Eligible Service Areas or Additional Service Areas.
- Targeted addresses are estimated to have no access to internet service with speeds of at least 25/3 Mbps and are not in an area with an existing state, federal, or locally funded project to deliver broadband service of at least 25/3 Mbps speed.
- Service by satellite providers or mobile wireless networks does not count.

Speeds

- Projects with speeds of at least 1000/500 Mbps are encouraged.
- Project must have speeds of at least 100/20 Mbps, scalable to 100/100 Mbps.

Timeline

- Project must be completed within 24 months of award.
- 6-month extensions permitted for delays not caused by the applicant.

Cost

- Proposed project costs must be reasonable and proportional to the difficulty of the project.

Affordability

- Applicants will be required to participate in the FCC's Emergency Broadband Benefit (EBB) program and its successor.

Additional Criteria for Public Entities

- Strong governance and management structure
- Experience and capacity of the managers, partners, and vendors selected to build and operate the resulting project

Additional Criteria for Applicants not Local Governments

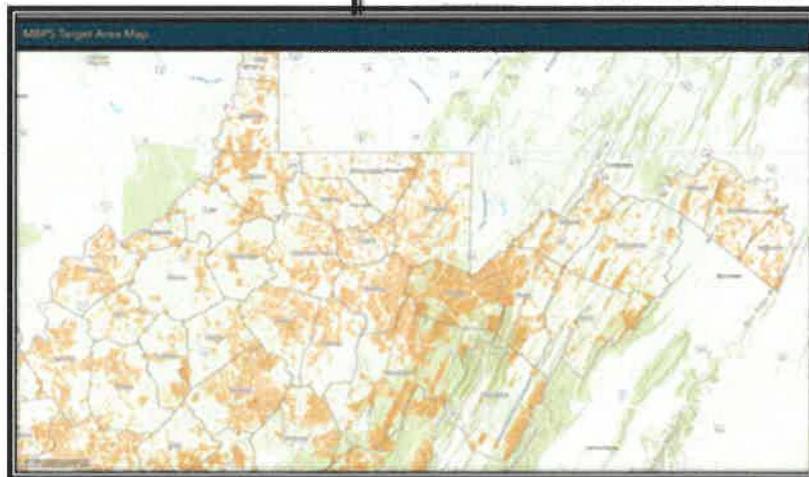
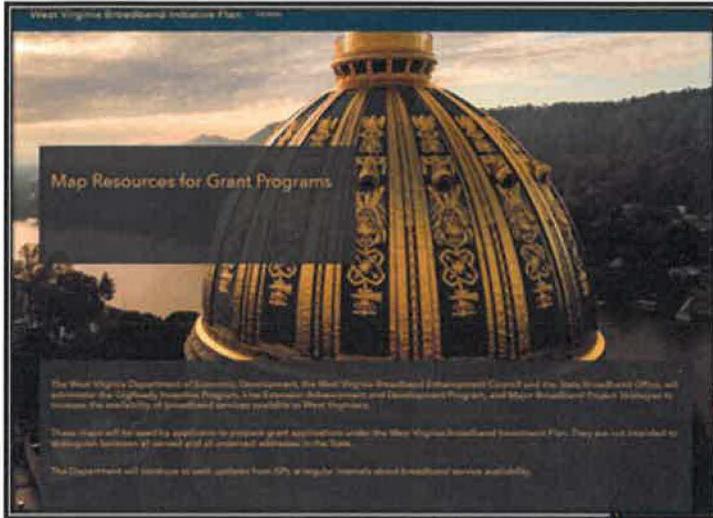
- Letters of support from the municipal or county legislative body or bodies in the Eligible Service Areas in the proposal

MAPPING RESOURCES FOR GRANT APPLICATIONS ARE AVAILABLE ON BROADBAND.WV.GOV. RESOURCES INCLUDE INTERACTIVE WEB MAPS AND DOWNLOADABLE DATA.

ELIGIBLE SERVICE AREAS: USED TO IDENTIFY PROPOSED PROJECT AREAS

TARGET ADDRESS MAP: USED TO GENERATE SETS OF ADDRESSES COVERED BY PROPOSED PROJECTS

FUNDED ADDRESSES: LOCATIONS WITHIN PROJECT AREAS FUNDED BY STATE, LOCAL, OR FEDERAL PROGRAMS



REQUEST FOR COMMENT ON UNSERVED AREAS

The West Virginia Office of Broadband conducted a Request for Comment on Unserved Areas from July 12, 2021 to September 7, 2021. The Request for Comment was developed to identify existing fiber and cable networks currently serving communities throughout West Virginia with broadband speeds of at least 25 Mbps download and 3 Mbps upload (25/3 Mbps).

PRELIMINARY TARGET AREA MAP

To begin this process, the Office of Broadband developed a Preliminary Target Area Map that utilized addresses derived from the Statewide Address and Mapping System (SAMS). Patterns of reported technology derived from Federal Communications Commission (FCC) Form 477 data and intersecting road segments were used to determine four preliminary address classifications for broadband availability. Initial classifications included:

- Unserved
- Likely Unserved
- Likely Served, and
- Funded

Target Area Addresses were initially classified as “Unserved” or “Likely Unserved.” Under the West Virginia Broadband Investment Plan (WVBIP), addresses were classified as unserved if they had no current access to internet service with at least 25/3 Mbps and are not in an area with an existing state, federal, or locally funded project to deliver mass-market broadband service with services of at least 25/3 Mbps.

Addresses with current or future access to service by satellite providers or mobile wireless networks are not considered served if they are not also served by a terrestrial broadband provider of fixed broadband service offering services with a speed of at least 25/3 Mbps. The Preliminary Target Area Map was informed but not fully determined by broadband speed and availability reported by Internet Service Providers (ISPs) to the FCC through its Form 477 process as of its first

2021 data broadband data release, which occurred in May of 2021. This release contained June 30, 2020, broadband data. Addresses located within census blocks that had no reported access to consumer terrestrial internet service of at least 25/3 Mbps were classified as “Unserved” unless they were also in an area with an existing state, federal, or locally funded project to deliver mass-market broadband service with services of at least 25/3 Mbps.

After the analysis of data received through the Request for Comment process, the Office of Broadband prepared the Target Area Address Map. Not all claims or data submissions were accepted as-is. In some cases, the Office used a conservative estimate about the extent of an ISP's service. Claims that could not be verified in some manner were not accepted. The Office of Broadband also compared survey and speed test information with information submitted by ISPs.

A primary goal of the WVBIP is to target available funding to unserved addresses and avoid duplication of previously funded projects to the extent practical. However, existing location information on the availability of broadband information from federal sources has well-known limitations. These limitations adversely affect the accuracy of broadband data and do not provide the specificity needed to determine which locations do or do not currently have access to broadband service.

ONE SERVED IS NOT ALL SERVED

FCC Form 477 data exaggerates the true extent of broadband service availability at the address level because the FCC instructs ISPs to report service in an entire census block, even if an ISP can provide service to a small part of a block—the “one-served-all-served” issue. This issue is especially pronounced in rural areas, where census blocks tend to be larger. For this reason, the Preliminary Target Area maps include addresses classified as “Likely Unserved.” Addresses shown as “Likely Unserved” are in census blocks that have reported access to consumer terrestrial internet service of at least 25/3 Mbps, but the Office of Broadband has preliminarily determined that they are more likely to be among the unserved addresses located within census blocks that are reported as served to the FCC.

THE WEST VIRGINIA BROADBAND INVESTMENT PLAN TARGETS ADDRESSES THAT ARE BOTH UNSERVED AND LACKING A COMMITTED, ENFORCEABLE PLANNED PROJECT THAT WILL BRING BROADBAND SERVICE TO THEM. "TARGETED" ADDRESSES ARE:

- ESTIMATED TO HAVE NO CURRENT ACCESS TO INTERNET SERVICE WITH AT LEAST 25 MBPS DOWNLOAD AND 3 MBPS UPLOAD (25/3 MBPS) SPEEDS, NOT COUNTING ACCESS TO SATELLITE OR MOBILE WIRELESS INTERNET, AND
- NOT IN AN AREA WITH A BINDING COMMITMENT TO A STATE, FEDERAL, OR LOCAL ENTITY TO DELIVER MASSMARKET BROADBAND SERVICE OF AT LEAST 25/3 MBPS, NOT COUNTING COMMITMENTS TO EXPAND ACCESS TO SATELLITE OR MOBILE WIRELESS INTERNET.

ALL ADDRESSES NOT CLASSIFIED AS "TARGETED" ARE CLASSIFIED AS "OTHER ADDRESS."

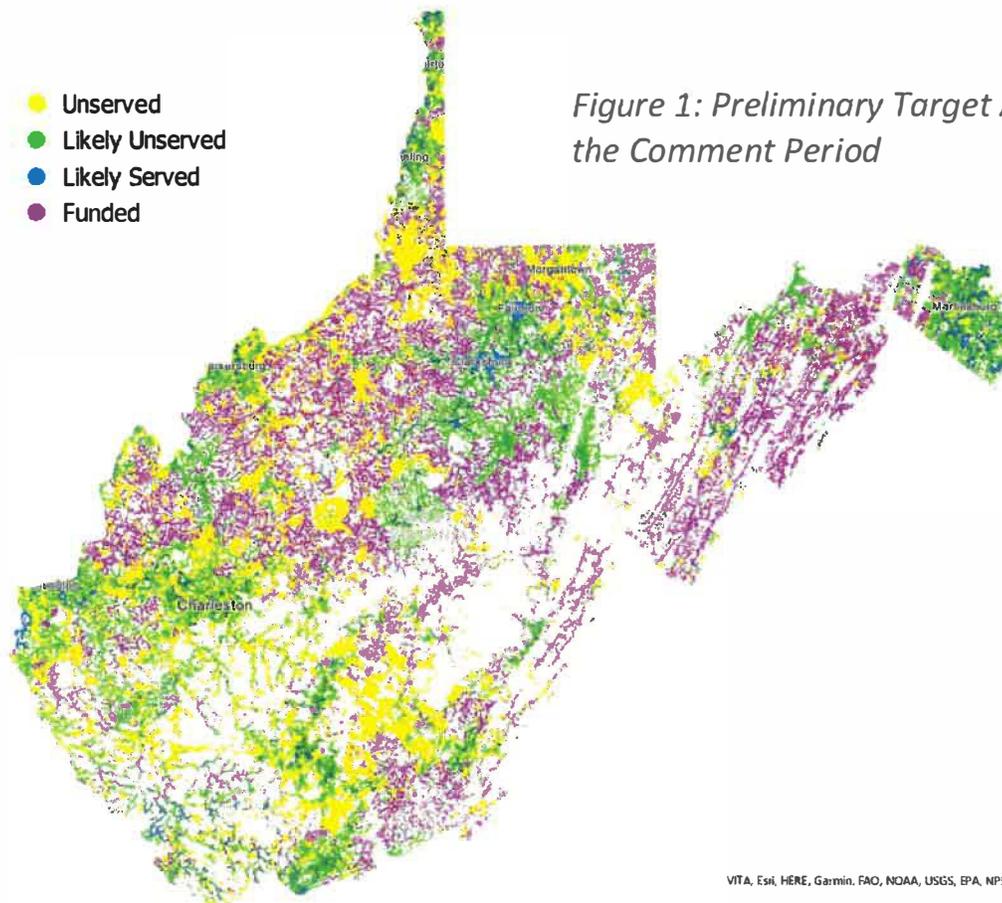


Figure 1: Preliminary Target Addresses for the Comment Period

VITA, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

THE OFFICE OF BROADBAND ISSUED A REQUEST FOR COMMENT ON UNSERVED AREAS IN JULY 2021 TO GATHER ADDRESS LEVEL BROADBAND DATA.

WEST VIRGINIA'S INTERNET SERVICE PROVIDERS PARTICIPATED IN THIS PROCESS, ENABLING THE STATE TO CREATE ADDRESS LEVEL BROADBAND MAPS BASED UPON MORE ACCURATE DATA. THE OFFICE OF BROADBAND WILL CONTINUE TO REFINE THE MAPPING PROCESS THROUGH FUTURE DATA REQUESTS.

2021 DATA AUDIT AND FIELD VERIFICATION

During the 2021 Request for Comment on Unserved Areas, the Office of Broadband collected and analyzed broadband data based upon locations in the Statewide Address and Mapping System (SAMS). A total of 15 unique responses from West Virginia’s Internet Service Provider (ISP) community were accepted during the Request for Comment period.

To support the data analysis process, the Office of Broadband authorized data audits and field verifications at random locations throughout West Virginia. As indicated in Figure 2, 88 separate field verification visits were conducted to include a review of eight separate companies. Field verifications were conducted in 12 counties between September 15, 2021, and October 8, 2021.

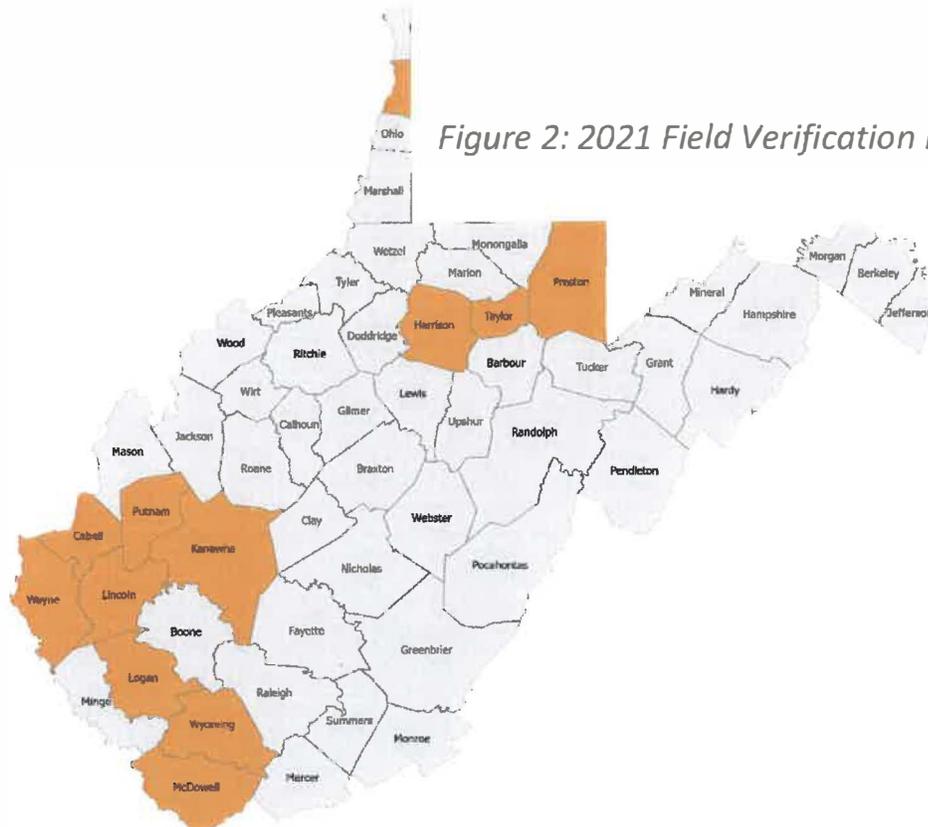
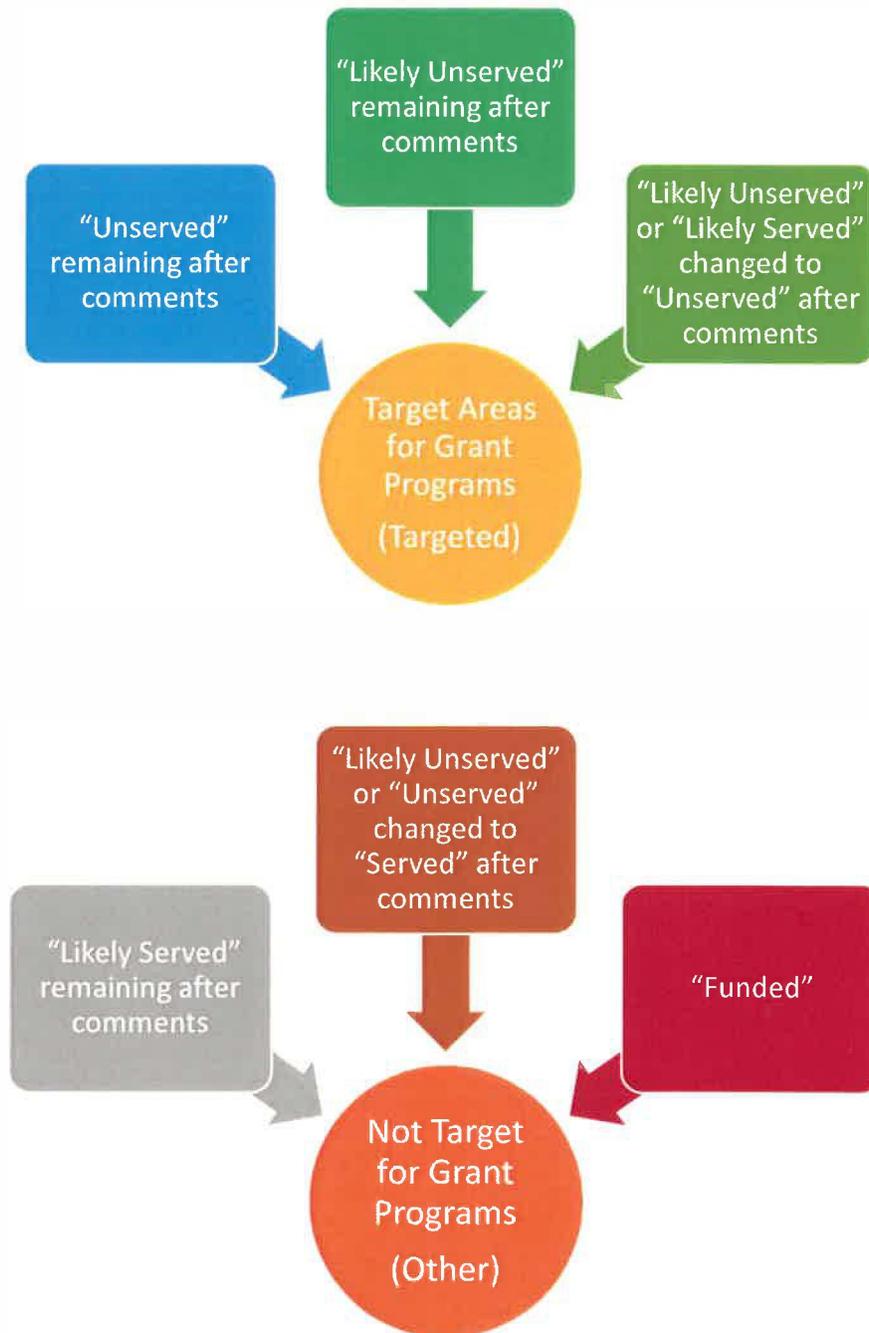


Figure 2: 2021 Field Verification Locations

| ISP | Counties | Date(s) | Inspections |
|--------------------|------------------------------------|-------------------|-------------|
| Alpha Technologies | Putnam | 9-15-21 | 2 |
| Charter | Harrison & Taylor | 9-16-21 | 8 |
| Armstrong | Lincoln & Wayne | 9-20-21 | 8 |
| Shentel | Lincoln, Logan & Wyoming | 9-20-21 & 9-22-21 | 15 |
| A&A | McDowell | 9-21-21 | 5 |
| Prodigi | Preston | 9-23-21 | 9 |
| Blue Devil | Brooke | 9-28-21 | 9 |
| Suddenlink | Kanawha, Putnam, Cabell, & Lincoln | 10-7-21 & 10-8-21 | 32 |
| 8 | 12 | 9 | 88 |

DEFINING ELIGIBLE AREAS FOR GRANT PROGRAMS

CLASSIFICATION OF ADDRESSES FOR GRANT PROGRAM BASED ON PRELIMINARY MAPS AND COMMENTS

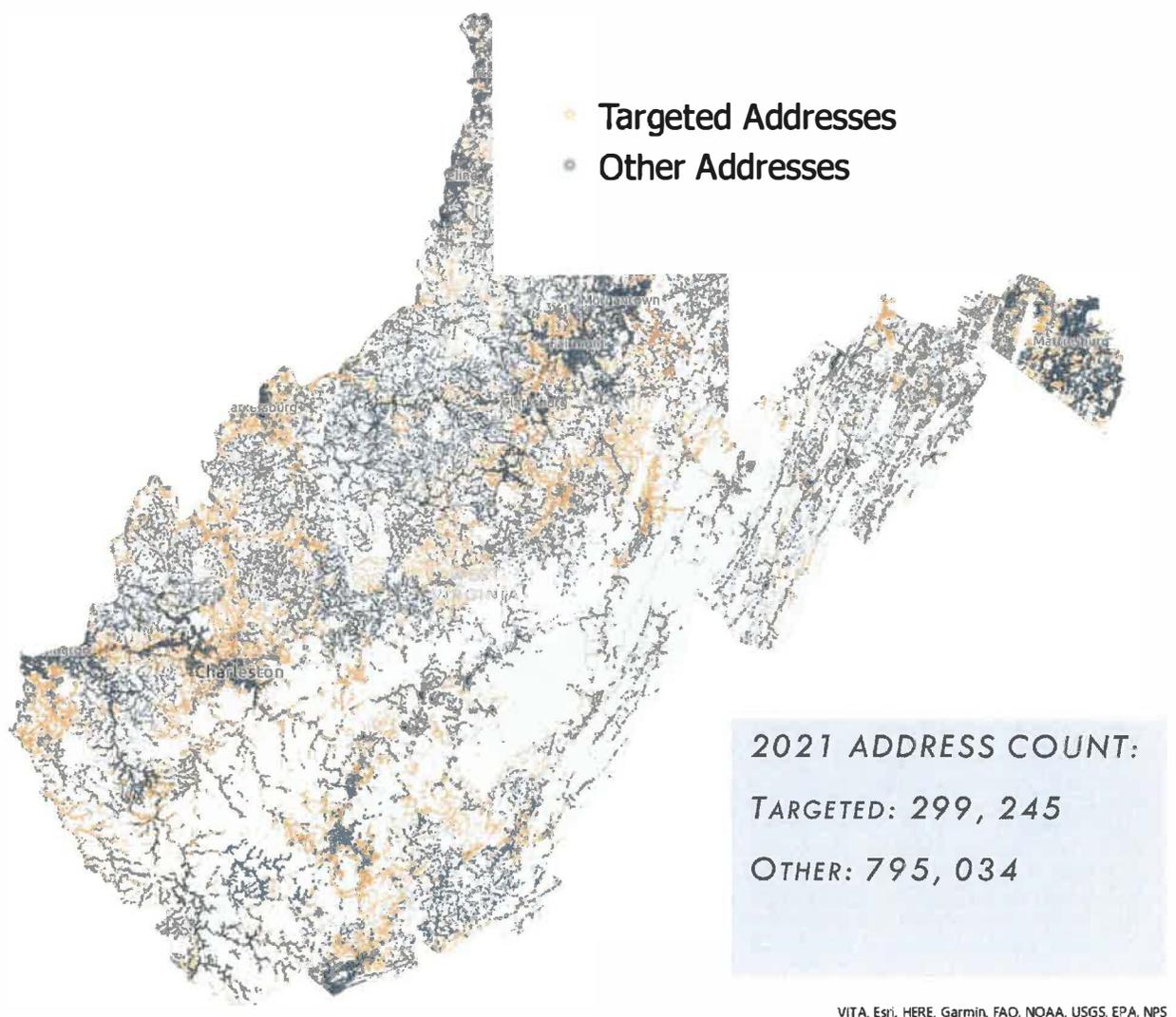


THE 2021 REQUEST FOR COMMENT ON UNSERVED AREAS WAS DESIGNED TO CREATE ELIGIBILITY MAPS FOR GIGREADY AND LEAD PROGRAMS. AFTER PROVIDING A DESKTOP AND FIELD ANALYSIS OF DATA SUBMITTED DURING THE COMMENT PERIOD, ADDRESSES WERE CLASSIFIED INTO TWO CLASSIFICATIONS: TARGETED AND OTHER. THE FINAL ANALYSIS RESULTED IN THE FOLLOWING CLASSIFICATIONS:

TARGETED ADDRESSES: 299,245

OTHER ADDRESSES: 795,034

Figure 3: Target Area Addresses for GigReady and LEAD grant programs



WEST VIRGINIA BROADBAND DEVELOPMENT FUND

With the passage of House Bill 339 in 2021, the West Virginia Legislature created the Broadband Development Fund in the State Treasury under West Virginia Code §31G-1A-7.

According to this Legislation, the fund shall be administered by the Secretary of the West Virginia Department of Economic Development (WVDED) and shall consist of all moneys made available for the purposes of this article from any source, including, but not limited to, all gifts, grants, bequests or transfers from any source, any moneys that may be appropriated to the fund by the Legislature, and all interest or other return earned from investment of the fund.

The Broadband Development Fund may only be used for the following purposes:

- (1) Expenses for the administration of the Office of Broadband;
- (2) Line extension advancement and development projects, including expansion of existing fiber and cable networks;
- (3) Major broadband project strategies, including new networks or major expansions of existing networks;
- (4) GigReady incentive projects, including a state incentive for ISP and local governments and organizations to pool some of their federal American Rescue Plan Act allocations or other local funding; and
- (5) Wireless Internet Networks, including expansions or upgrades of existing fixed wireless networks.

The WVDED Office of Broadband has identified preliminary allocations under the West Virginia Broadband Investment Plan as shown below. These allocations may be adjusted based upon demonstration of need with the WVBIP programs.

PRELIMINARY FUNDING ALLOCATIONS

| Program | LEAD | GigReady | MBPS | *WIN |
|---------------------|--|--|--|---|
| Funding | \$10 Million | \$40 Million | \$40 Million | \$10 Million |
| Eligible Applicants | ISPs Operating Cable or Fiber Network | County, Municipal Governments, EDCs, EDAs, RPDCs, Private Partnerships Strongly Encouraged | ISPs Local Governments and Affiliated Organizations | ISPs with Existing Wireless Network *Subject to ARPA Rules |
| Speed Requirements | At Least 100/20, scalable to 100/100 Mbps 1000/500 Mbps Preferred | At Least 100/20, scalable to 100/100 Mbps 1000/500 Mbps Preferred | At Least 100/20, scalable to 100/100 Mbps 1000/500 Mbps Preferred | At Least 25/3, preferably 100/20 Mbps |
| Match Requirements | At Least \$500 per Passed Premise | At Least 25 Percent of Project Cost | At Least \$500 per Passed Premise | At Least \$400 per Covered Premise |

BROADBAND SPEED TESTS AND SURVEYS

The West Virginia Broadband Enhancement Council has continued to put broadband connections to the test by utilizing the speed test data points in Ookla Speed Tests. The digital transition to remote work, education and telemedicine has made high-speed reliable broadband critical for those who depend on connectivity.

Speed Test by Ookla is a broadband analytical web service that measures performance of internet access with metrics such as download and upload speeds, latency, and jitter. The granular data has enabled government agencies throughout the nation to make data-driven investment and policy decisions. Data can be implemented across three key focus areas:

- ❖ Broadband adoption
- ❖ Broadband availability, and
- ❖ Broadband performance

In areas where high performance infrastructure is located such as fiber optics, speed tests can identify gaps in broadband adoption by assessing performance speeds or identify end-users who are being provided other services.

Broadband availability can be measured by analyzing trends for reliable speeds and their geographical extent. Typically, high speeds are found in densely populated areas where providers can achieve a feasible return-on-investment (ROI). The downtrend in speeds begins where communities become rural and less densely populated. The data may also be used to challenge Federal Communications Commission (FCC) data that generalizes available services within a census block.

Broadband performance is a critical metric to assess whether providers are delivering services that are advertised to end-users. For monitoring new investments, speed tests can be utilized to ensure providers are meeting their obligation requirements.

COMMUNITY SURVEYS

The Broadband Enhancement Council has worked to improve broadband mapping with initiating the collection of speed tests by leveraging surveys and JavaScript language to ensure overall accuracy.

Coinciding with the launch of the Line Extension Advancement and Development (LEAD) program under the West Virginia Broadband Investment Plan, the Council deployed a new version of broadband availability surveys that captured home addresses and speed test results. This data collection activity gave West Virginia residents a chance to indicate a home address not included in the Statewide Address and Mapping System (SAMS) and the status of broadband connectivity.

Along with this initiative, the Office of Broadband launched a marketing campaign to crowdsource speed tests and surveys. The marketing campaign consisted of text messaging to residents in areas where broadband availability has been difficult to identify. Through this initiative, the Council has collected more than 9,000 surveys that included speed test results.

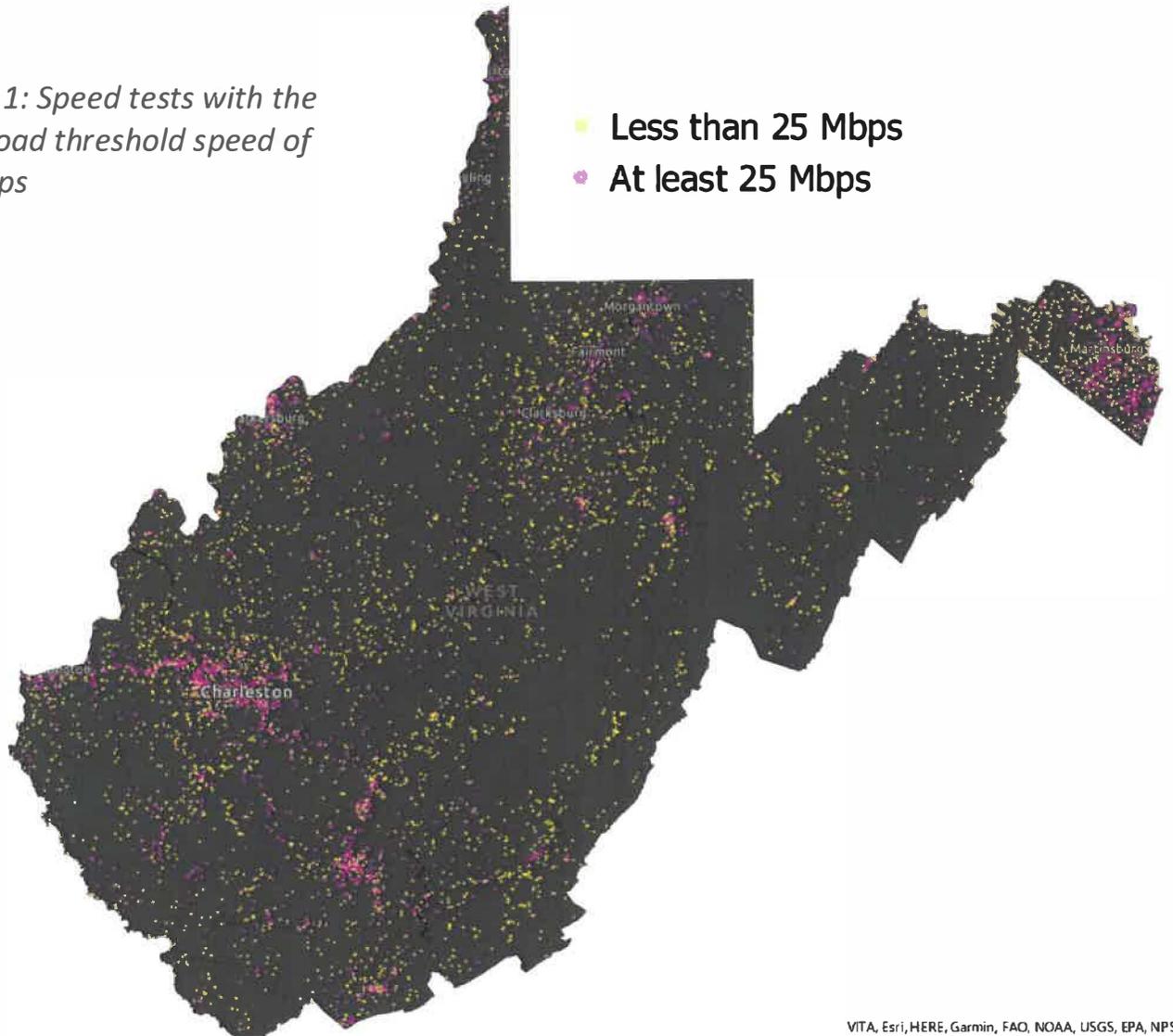
SPEED TEST CUSTOM SURVEY

The Council's online survey captures speed tests taken at <https://broadband.wv.gov/> through the Speed Test Custom portal. The portal passes results from the speed test to a web browser where information can be recorded into the survey. Download and upload speeds, latency, and jitter are recorded from Speed Test Custom. The survey includes the following data points:

- ❖ Home address from which the speed test is taken
- ❖ Type of location
- ❖ Type of internet service
- ❖ Current provider
- ❖ Subscribed to speeds of 25/3 Mbps
- ❖ Affordability
- ❖ Connected to Wi-Fi or Ethernet
- ❖ Device
- ❖ Satisfaction

THROUGH BROADBAND.WV.GOV, A TOTAL OF 9,211 SPEEDS TESTS AND SURVEY RESPONSES WERE GATHERED IN 2021. FIGURE 1 SHOWS SPEED TESTS THROUGHOUT THE STATE WITH TWO CLASSIFICATIONS: "LESS THAN 25 MBPS" AND "AT LEAST 25 MBPS." HIGH DENSITY OF SPEEDS OF AT LEAST 25 MBPS ARE FOUND TO BE IN IN DENSELY POPULATED CITIES SUCH AS MORGANTOWN, CLARKSBURG, AND FAIRMONT. OUTSIDE OF THESE POPULATED METROPOLITAN AREAS, BROADBAND SPEEDS BECOME LESS PREVALENT.

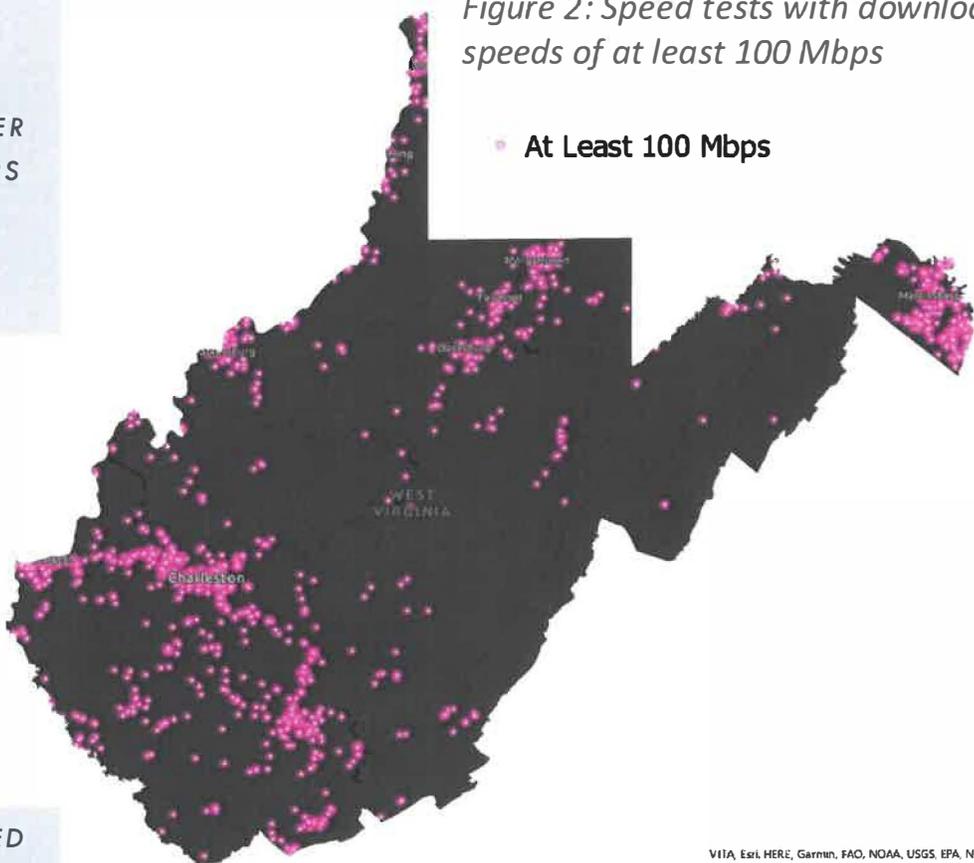
Figure 1: Speed tests with the download threshold speed of 25 Mbps



VITA, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

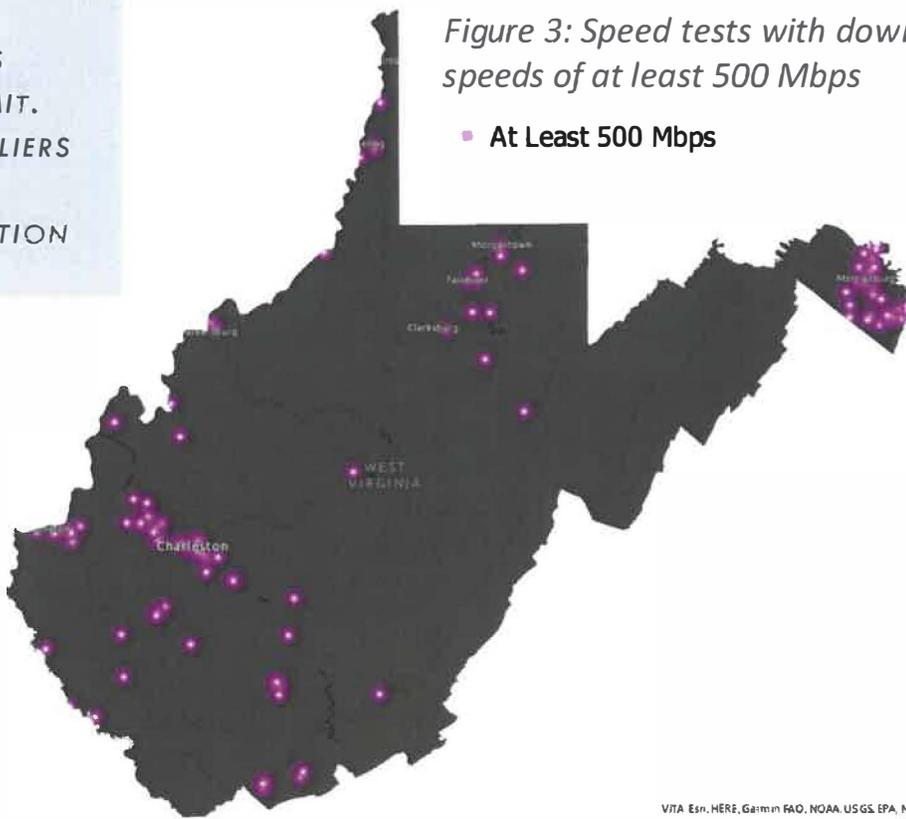
Figure 2: Speed tests with download speeds of at least 100 Mbps

AS THE DOWNLOAD SPEED THRESHOLD INCREASES, FEWER TESTS OF AT LEAST 100 MBPS WERE FOUND WITHIN RURAL COMMUNITIES.



ADOPTION OF TOP-TIER SPEED PACKAGES ARE LESS COMMON OUTSIDE OF POPULATED AREAS. SPEED TESTS WILL ONLY MEASURE AN END-USER'S SUBSCRIPTION SPEED LIMIT. HOWEVER, SPATIAL OUTLIERS CAN DEMONSTRATE AVAILABILITY AND ADOPTION

Figure 3: Speed tests with download speeds of at least 500 Mbps



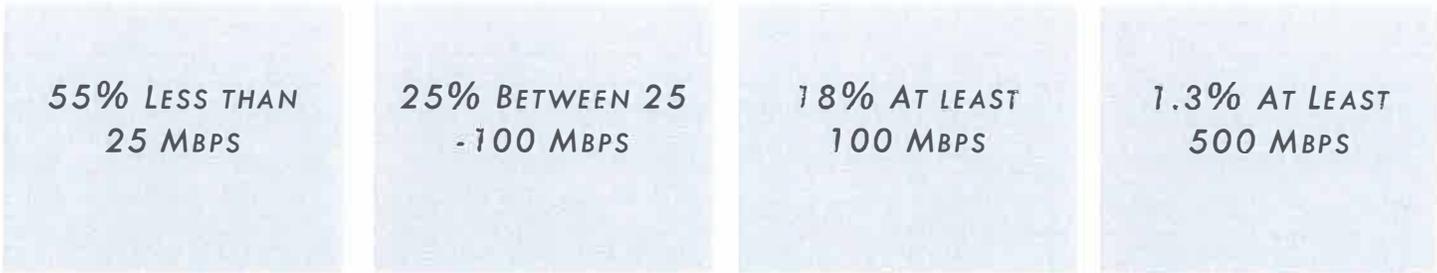
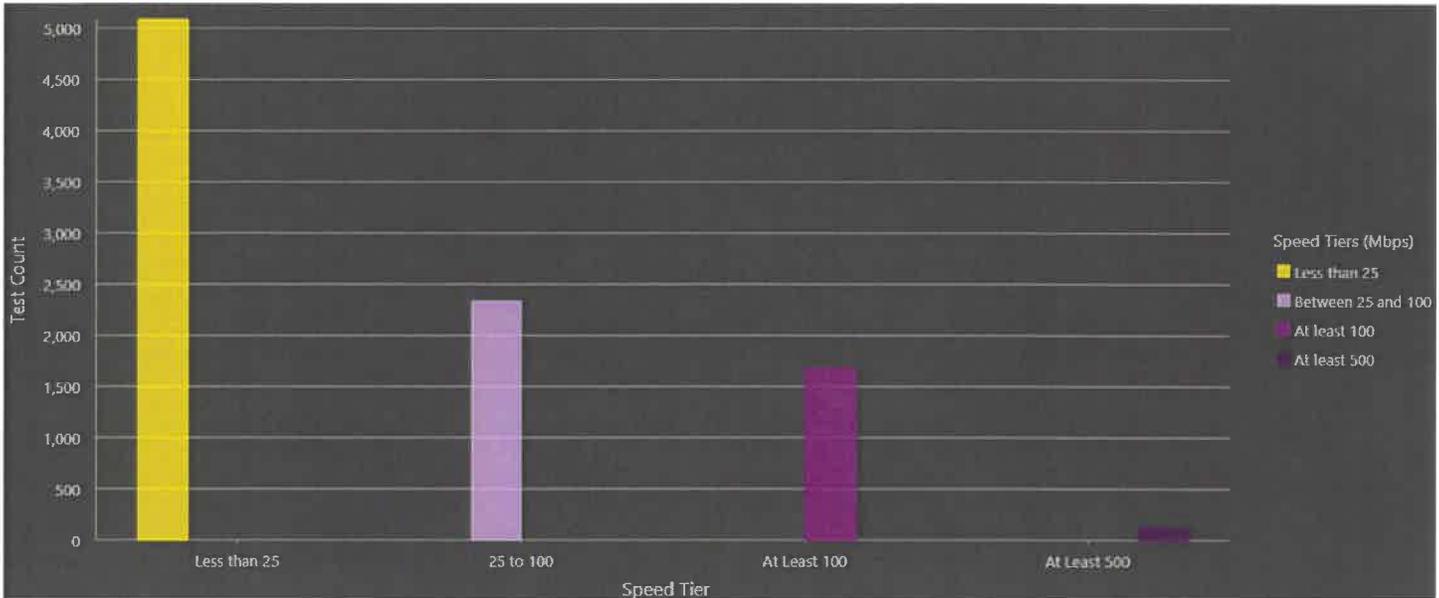
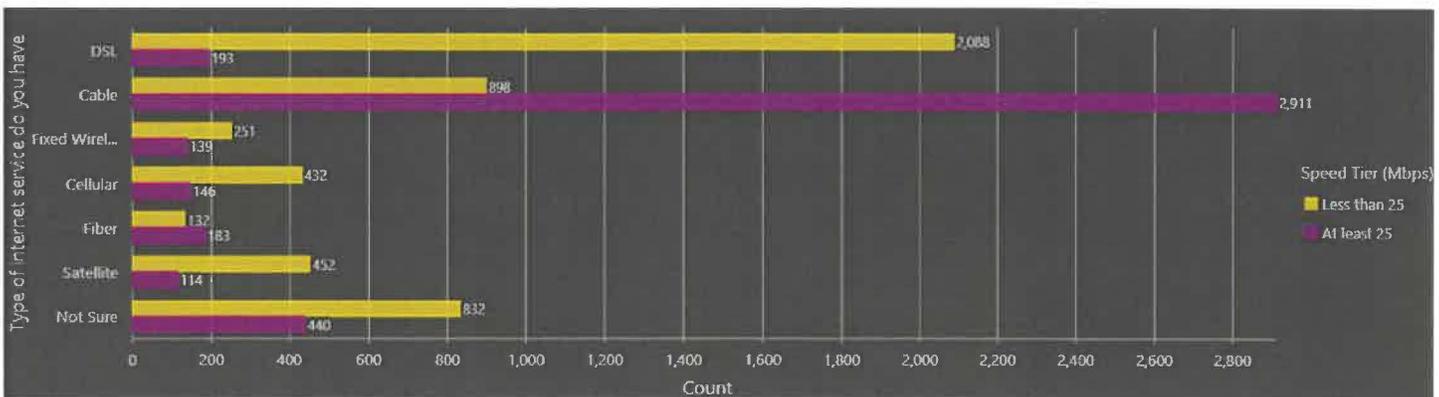


Figure 4: Comparison of speed tiers by test count



SIX DIFFERENT TECHNOLOGIES OF TRANSMISSION WERE IDENTIFIED: DSL, CABLE, FIXED WIRELESS, CELLULAR, FIBER, AND SATELLITE. FIGURE 5 DEMONSTRATES THAT DSL FAILS TO MEET A DOMINANT RATIO OF SERVED: UNSERVED SPEED TESTS. DSL, SATELLITE AND CELLULAR CONNECTIVITY MAY POSE AS A BARRIERS FOR END-USERS TO RECEIVE RELIABLE SERVICES.

Figure 5: Comparison of speed tiers by technology



DEMONSTRATED IN FIGURES 6 AND 7, CABLE SHOWS TO HAVE THE MOST RESPONSES THAT IMPLY SERVICES ARE NOT AFFORDABLE AND NOT PROVIDING CUSTOMER SATISFACTION. IN SOME AREAS OF THE STATE, CABLE DOCSIS NETWORKS MAY HAVE BECOME CONGESTED WHERE END-USERS MAY NOT RECEIVE THE SERVICE THEY ARE SUBSCRIBED TO.

Figure 5: Comparison of affordability by technology type

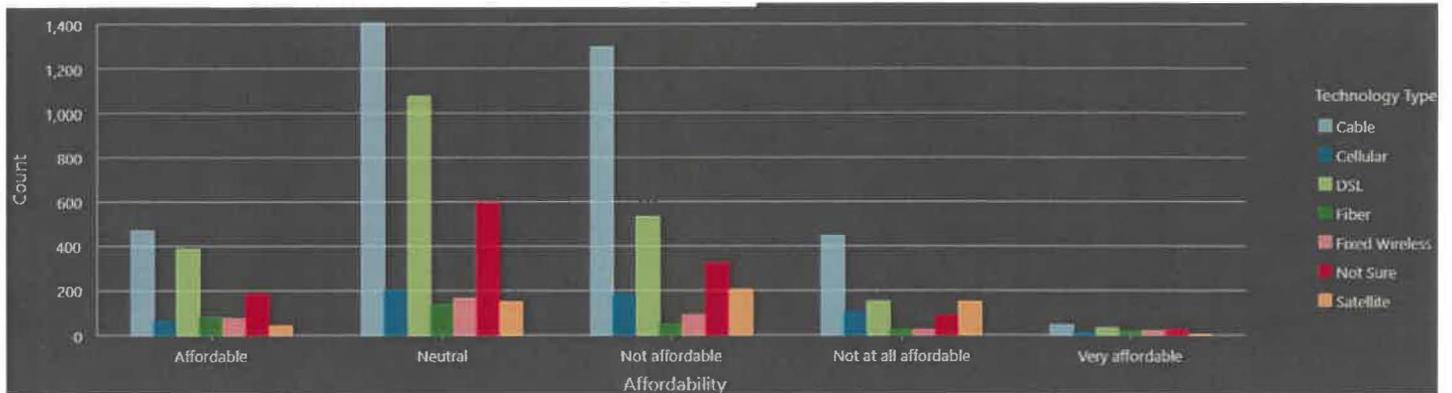
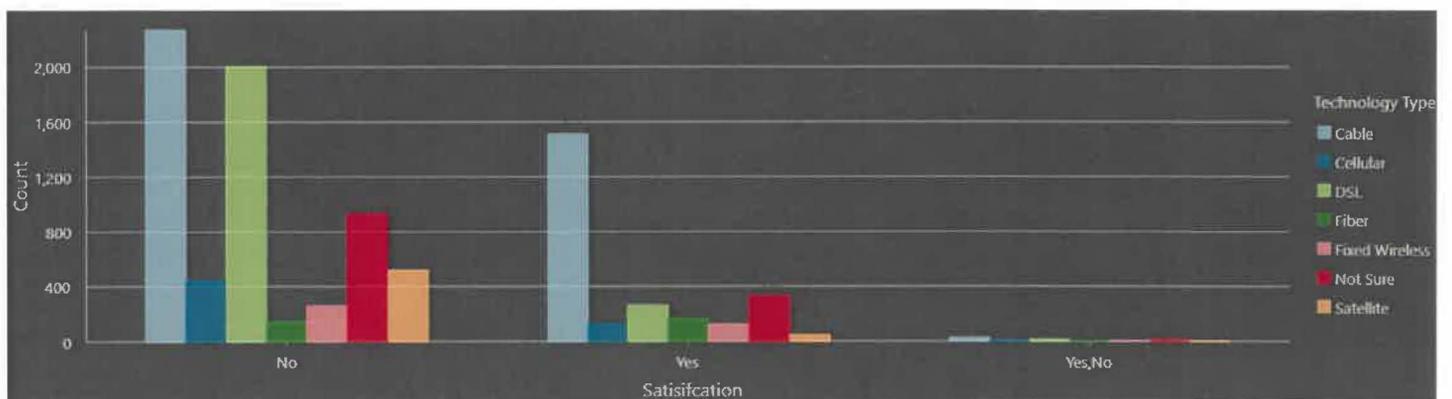


Figure 7: Comparison of satisfaction by technology type



SPEED TEST INTELLIGENCE

In addition to Speed Test Custom, implemented by the Council has implemented to capture speed results into surveys, data points are also collected from Ookla's Speed Test Intelligence (STI). STI consists of hundreds of thousands of data points taken through multiple platforms that can be analyzed to identify areas in need of further investigation for broadband development.

Ookla data includes a variety of metrics from adaptive primary resolution for video to RSSI signals for measuring mobile broadband. The Council focuses on metrics for broadband such as download, upload, and latency speeds. The data can be used to measure availability, adoption, and performance. Trends can be identified to help support data-driven policy and investment decisions. However, data must be used to support decisions rather than interpreted at face-value.

Speed tests results are deployed through a variety of platforms that vary in location accuracy. Geographic coordinates are delivered with a maximum of three decimal degrees that account for an estimated 110m.

Below are definitions related to speed test reviews:

- ❖ **All Fixed:** Fixed broadband results across all testing platforms, except mobile broadband. These tests are sufficient for measuring aggregate values within large geographic boundaries and challenging ISP performance.
- ❖ **All Wi-Fi:** Wi-Fi results from the mobile apps and native desktop apps. Wi-Fi connectivity tends to decrease broadband speeds when accessing the internet through a modem. Modems and routers vary in quality that may not always deliver consistent speeds. Today, Wi-Fi connectivity is becoming popular with the use of devices such as mobile phones, laptops, or tablets.
- ❖ **Desktop:** Results from macOS and Windows applications. Desktop results typically do not have GPS embedded into the platform which makes spatial analysis less granular. However, the data is useful for measuring performance speeds of ISPs.
- ❖ **Ethernet** – Results from the Desktop platform, but with an ethernet connection. An ethernet

connection can usually provide faster, more reliable speeds than a Wi-Fi connection. However, ethernet connection is becoming less popular with residential broadband usage.

- ❖ **High Latency:** Tests results from All Fixed technology types that have a latency greater than 16ms.
- ❖ **Low Latency:** Test results from All Fixed technology types that have a latency less than or equal to 16 ms.
- ❖ **Mobile Wi-Fi:** Results from the mobile Speedtest apps on iOS and Android taken over a Wi-Fi connection. Ookla provides mobile applications where fixed broadband connectivity can be measured. This provides the most accurate geographic location with GPS chips embedded into the devices.
- ❖ **Web:** Test results from Speedtest.net using a fixed line connection. Tests taken from Speedtest.net are less granular than tests taken on mobile devices. However, the data is still beneficial for measuring aggregates for geographic boundaries such as postal codes.
- ❖ **Download:** The speed of data that is pulled from a server to a local location.
- ❖ **Upload:** The speed of data that is transferred from a local location to the internet.
- ❖ **Latency:** Latency is the reaction time of a network that measures the speed it takes for data to travel between a sever and end-user location.

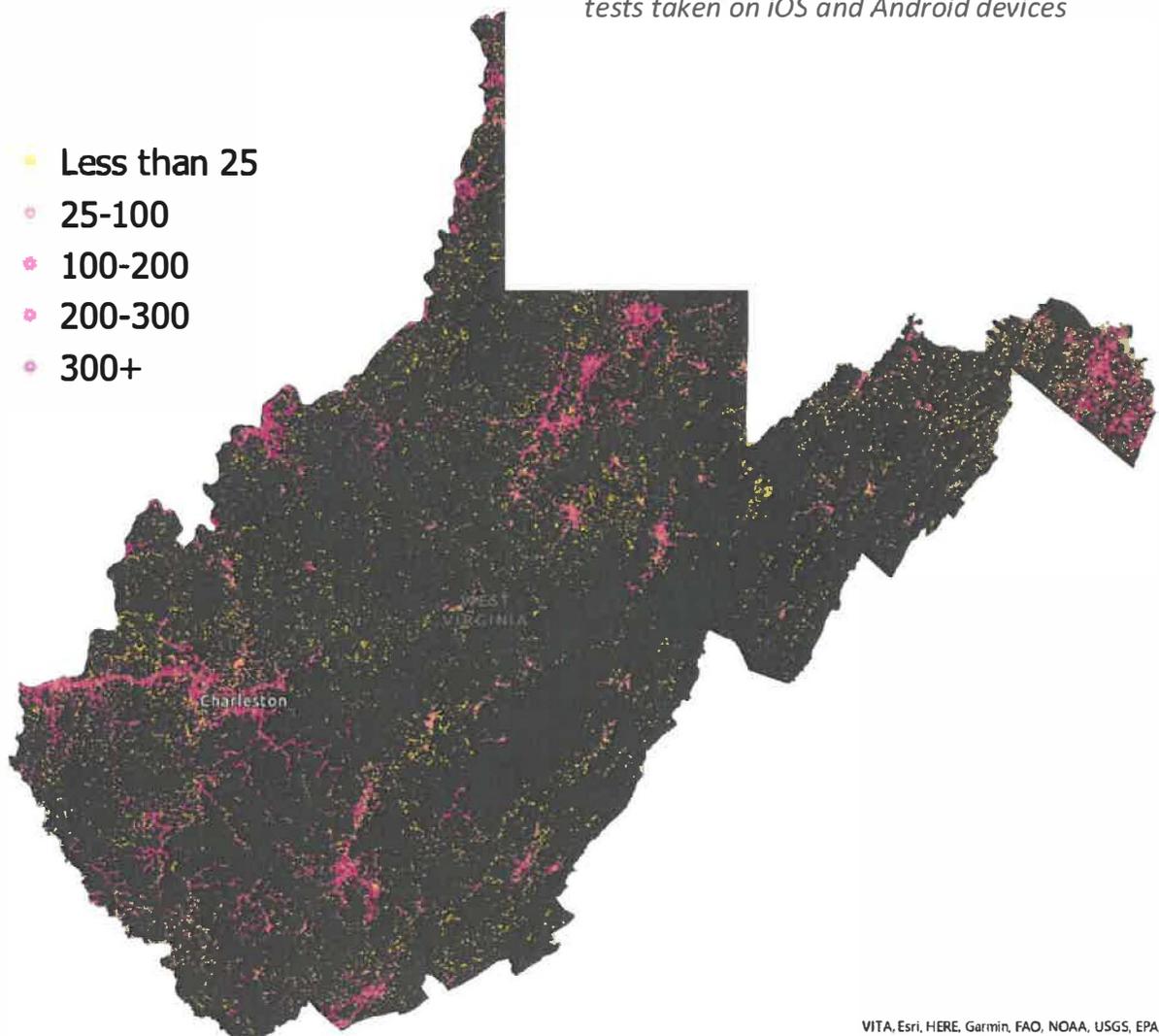
Speed test data was used to calculate aggregates values within postal codes, counties, and statewide. The data can also be used to track progress over time to measure broadband development in the West Virginia.

Grant programs under the WVBIP include post-award monitoring that requires awardees to file data on availability and adoption. The Office of Broadband will utilize speed tests to validate performance of these new networks to ensure that awardees meet program performance requirements.

AT THE STATEWIDE LEVEL, A TOTAL OF 950,364 TESTS WERE TAKEN ACROSS ALL PLATFORMS IN 2021. FIGURE 6 SHOWS SPEED TESTS FOR MOBILE DEVICES ONLY TO ENSURE SPATIAL ACCURACY FOR MAP VISUALIZATION. TESTS WERE MEASURED FOR FIXED BROADBAND (NOT MOBILE).

HIGH-SPEED BROADBAND SERVICES CAN BE SEEN IN PURPLE HOT SPOTS WHERE POPULATION DENSITY IS HIGHER. AS COMMUNITIES BECOME MORE RURAL, THE NUMBER OF SPEEDS OF ABOVE 25 MBPS COME LESS COMMON. IN THESE RURAL COMMUNITIES, THERE IS A LACK OF RELIABLE INFRASTRUCTURE TO PROVIDE RESIDENTS WITH SPEEDS NECESSARY TODAY.

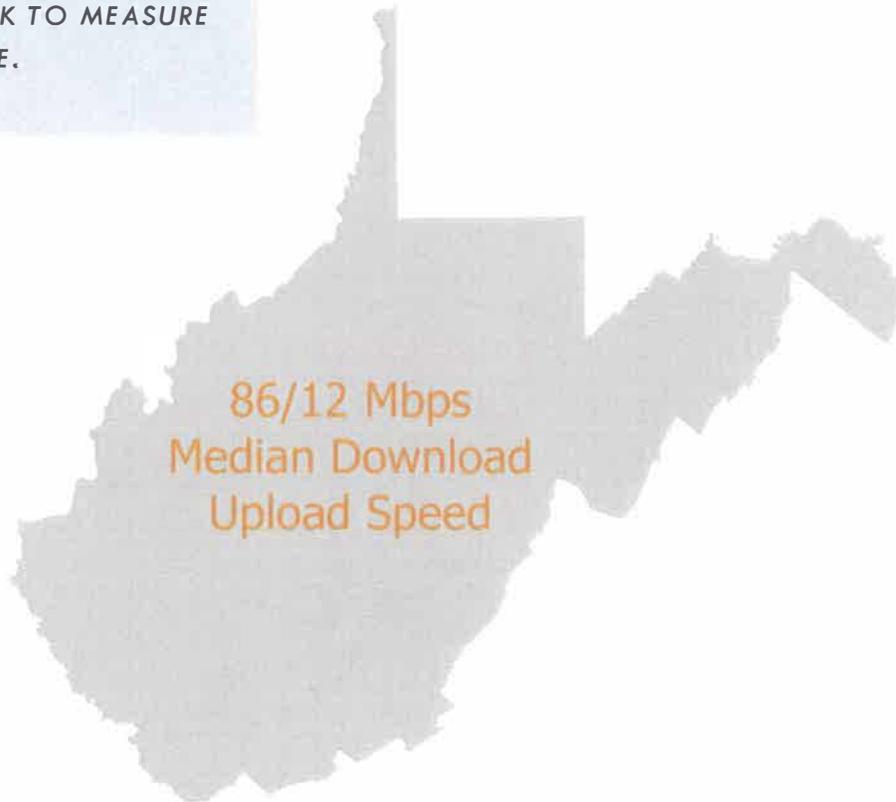
Figure 8: Speed test download tiers in Mbps for tests taken on iOS and Android devices



VITA, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

FIGURE 9 REPRESENTS THE AGGREGATED MEDIAN DOWNLOAD AND UPLOAD SPEED OF SPEED TESTS TAKEN FROM JANUARY – NOVEMBER OF 2021. THIS NUMBER SHOULD SERVE AS BENCHMARK TO MEASURE PROGRESS OVER TIME.

Figure 9: Statewide aggregate median speed



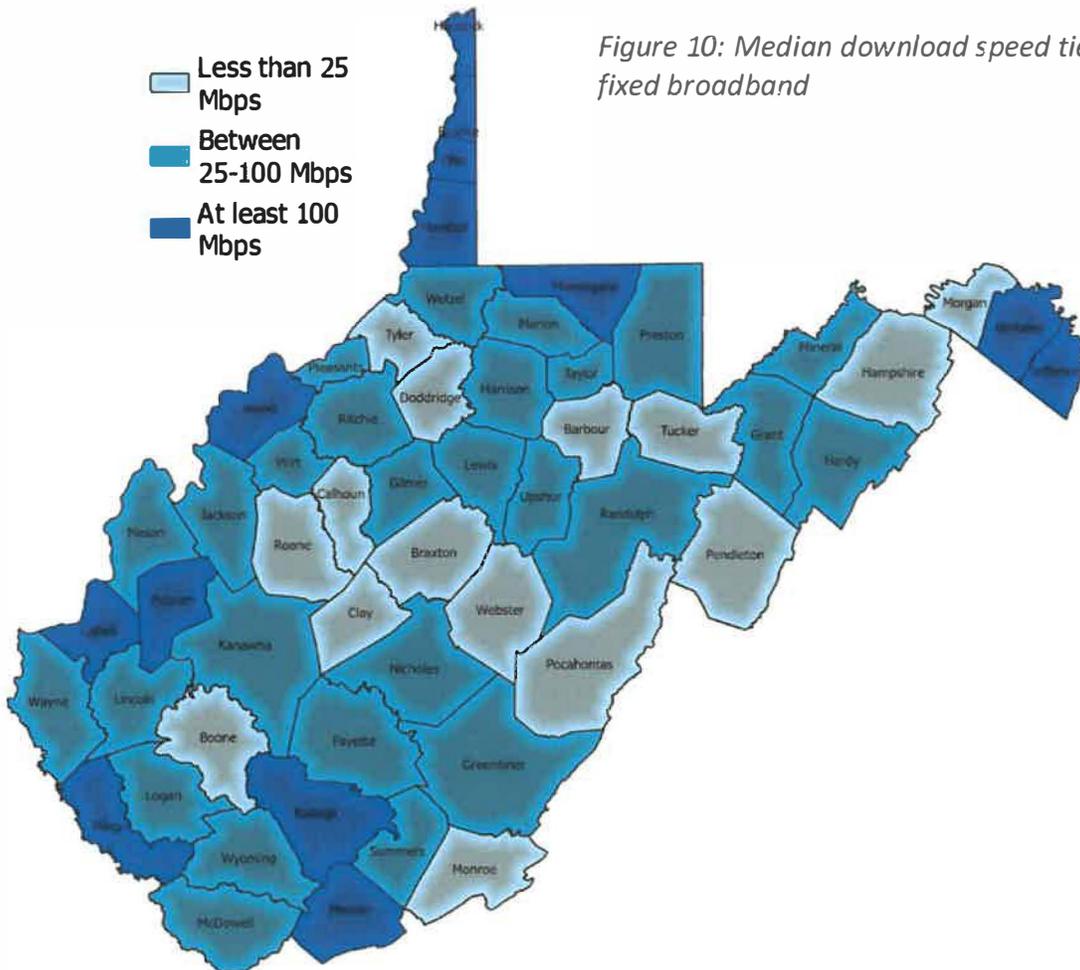
| Platform | Median Download | Median Upload | Median Latency | Mean Download | Mean Upload | Mean Latency |
|--|-----------------|---------------|----------------|---------------|-------------|--------------|
| Statewide Speed Test Results (Download/Upload in Mbps, Latency in ms) | | | | | | 39 |
| All Wifi | 84.64 | 11.75 | 16 | 136.68 | 18.46 | 41 |
| Desktop | 160.96 | 19.50 | 13 | 256.86 | 31.64 | 34 |
| Ethernet | 282.10 | 23.01 | 12 | 358.13 | 40.60 | 30 |
| High Latency | 51.38 | 9.12 | 29 | 117.91 | 14.80 | 69 |
| Low Latency | 103.52 | 17.50 | 11 | 183.40 | 26.18 | 11 |
| Mobile Wifi | 85.51 | 11.67 | 16 | 136.06 | 18.15 | 41 |
| Web | 83.90 | 11.705 | 16 | 160.36 | 22.35 | 38 |
| Mobile Broadband | 16.66 | 5.09 | 55 | 33.84 | 8.80 | 68 |

MORE ABOUT SPEED TEST INTELLIGENCE

Speed tests taken with a desktop or connected through ethernet provide the best results. However, according to number of tests taken and unique IP addresses analyzed, they are the most uncommon forms of connection. A total of 506,047 speed tests were taken with a Wi-Fi connection, which accounts for 53% of all speed tests taken in West Virginia during 2021.

Shifting the focus to IP addresses, 172,375 unique IP addresses were identified for fixed broadband speed test results. A total of 104,061 unique IP addresses were identified that accessed the internet through Wi-Fi where only 8,613 and 5,054 IP addresses were identified for desktop and ethernet connectivity. With 60% of IP addresses connected to Wi-Fi, the data suggests that most end-users in West Virginia access the internet through a Wi-Fi connection. This demonstrates the digital behavior end-users have when accessing internet connectivity. However, accessing the internet through a Wi-Fi connection does not always provide the best theoretical speeds and end-user can receive. That data may imply that market advancement should look to improve network infrastructure such as FTTP technology and improved router or modem devices.

Programs such as the FCC's Emergency Connectivity Fund provides opportunity for low-income families to be provided equipment to improve their overall broadband connectivity. The Office of Broadband will continue to provide resources to educate the public on best broadband practices and improve adoption rates.



MEASURING LATENCY

Although it is important to measure download and upload speeds, latency is another important metric to measure performance regarding how society accesses the internet today. Latency is the time it takes for information to be sent from the source where the information is being sent from to the end-users. Blocks of information are data packets that travel between servers to end-user's device. Digital behaviors such as streaming, gaming, or working remotely require low latency speeds to prevent disruptions or slowdowns. A standard threshold for optimal latency speeds is 16ms. Figure 9 shows the median latency aggregate value for each county in West Virginia.

Figure 11: Median latency speeds (ms) across counties

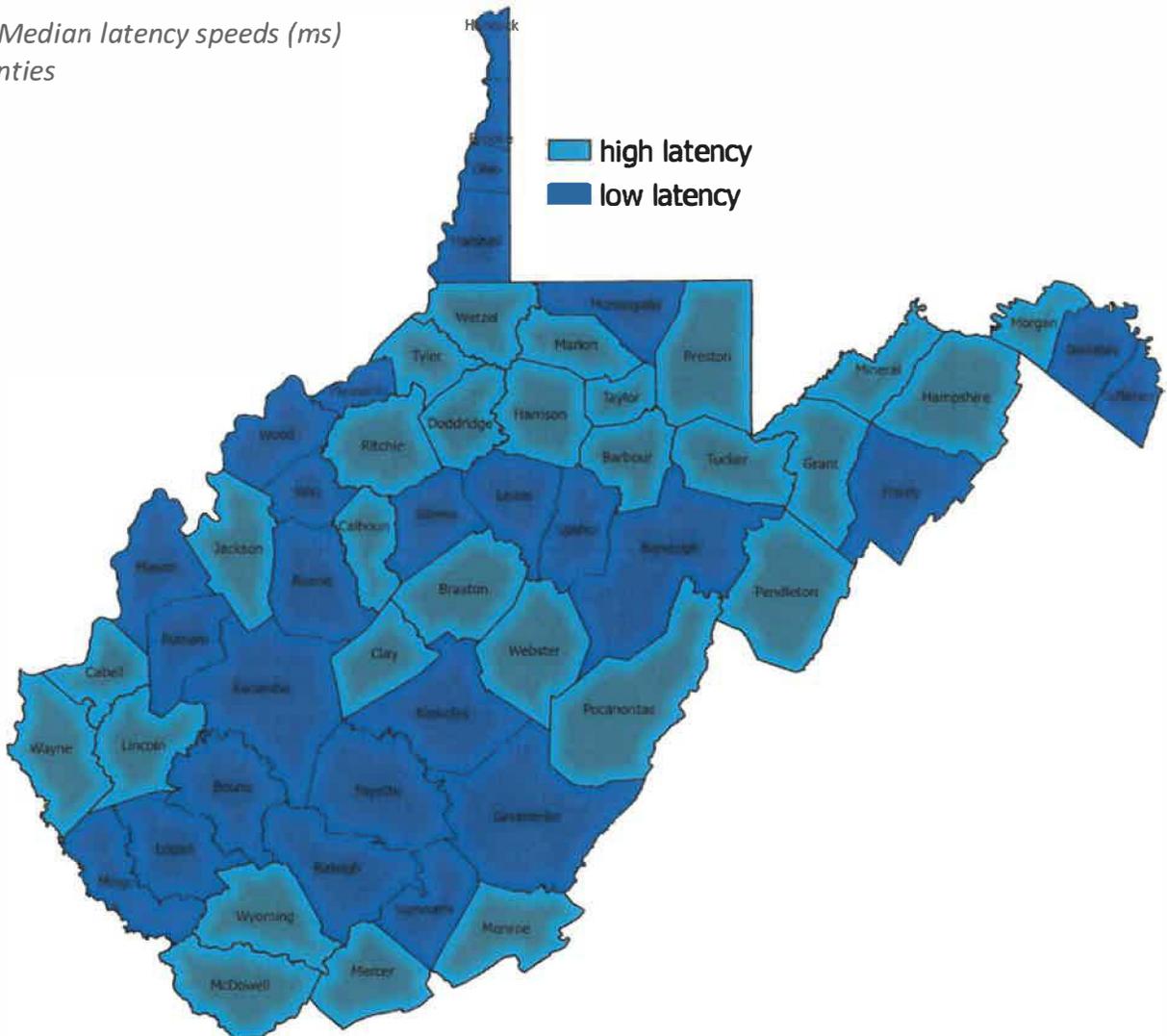


Figure 12: Median download speed tiers for postal codes

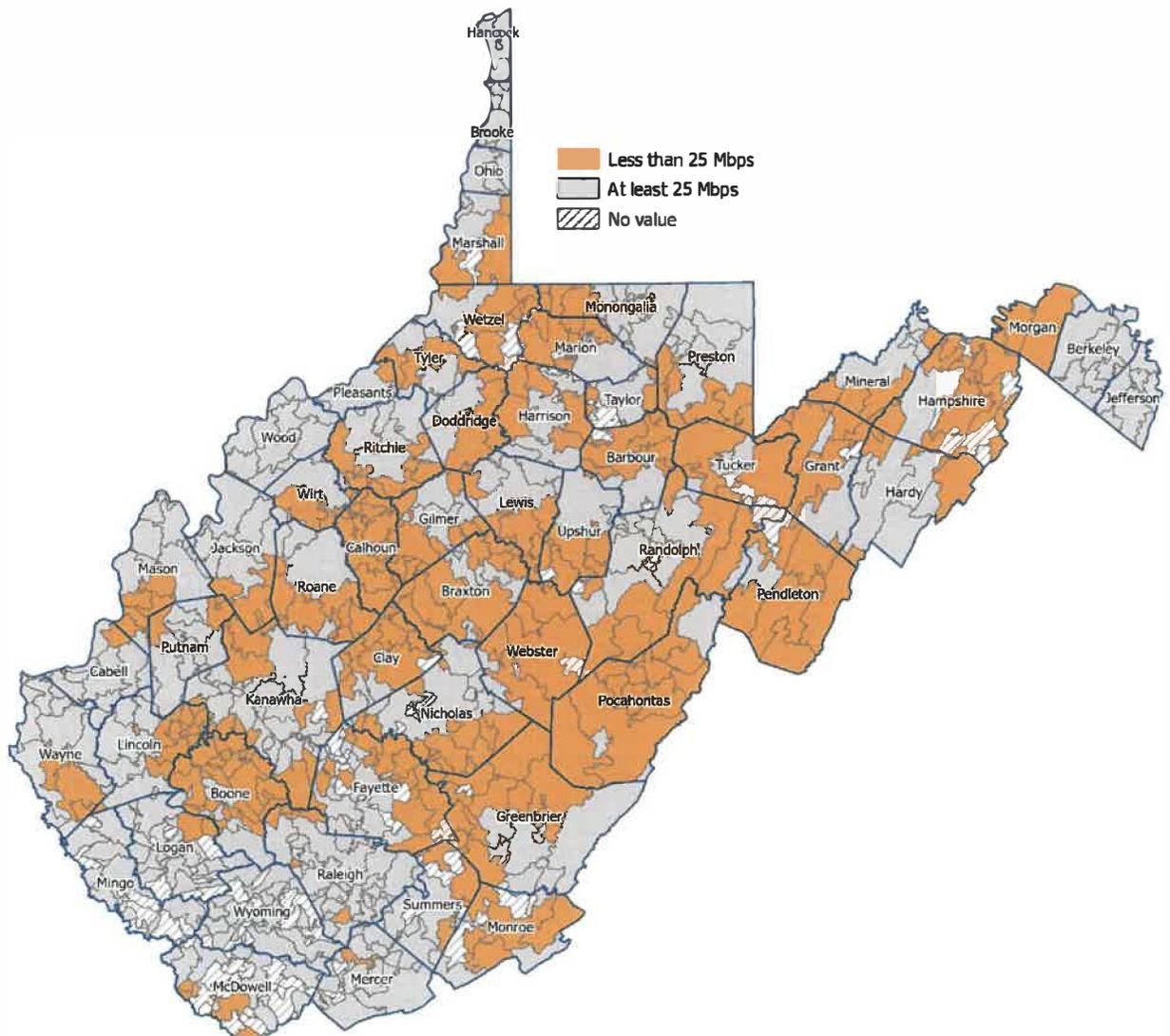


Figure 13: Median downloads speeds of at least 100 Mbps for postal codes

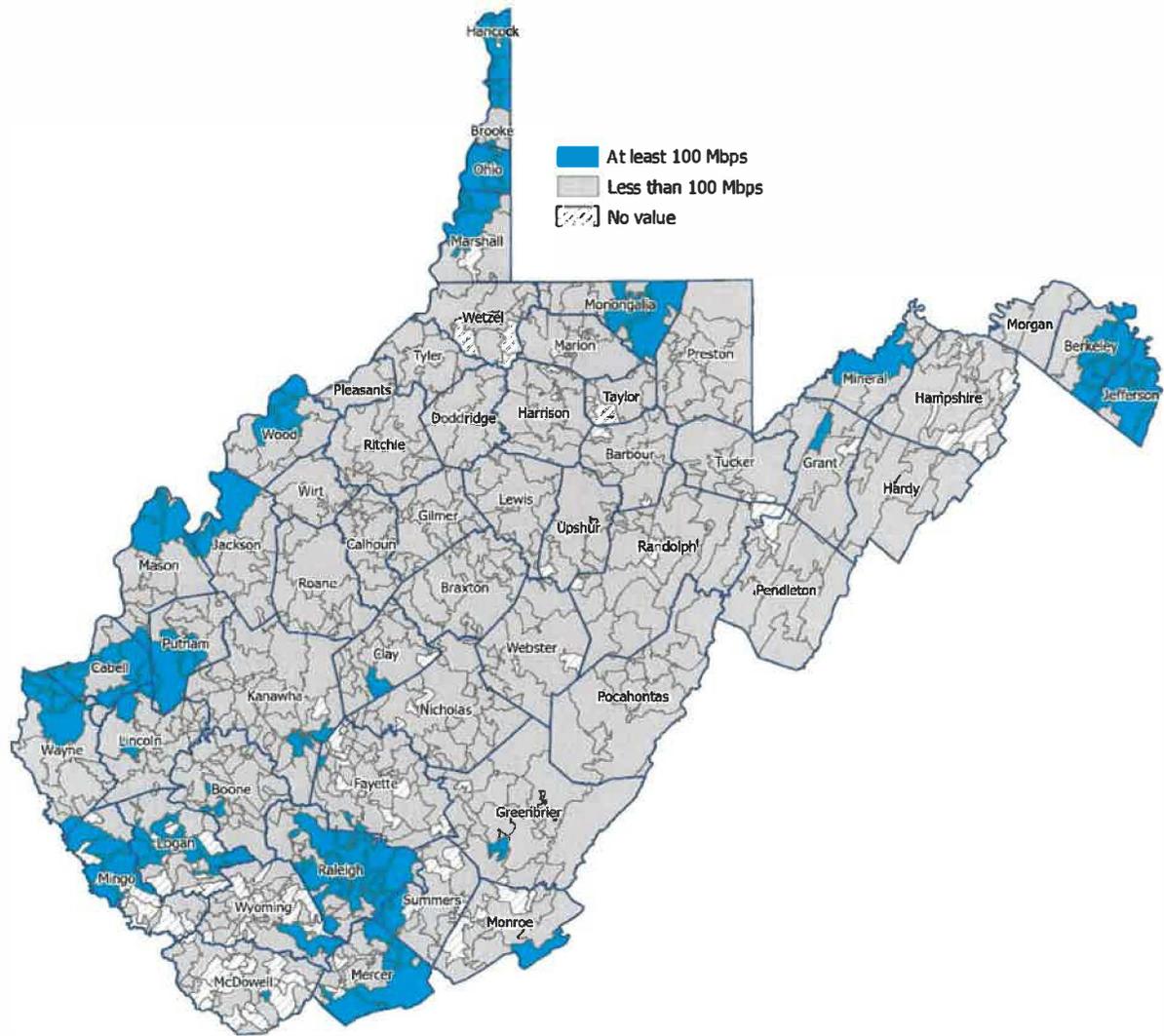
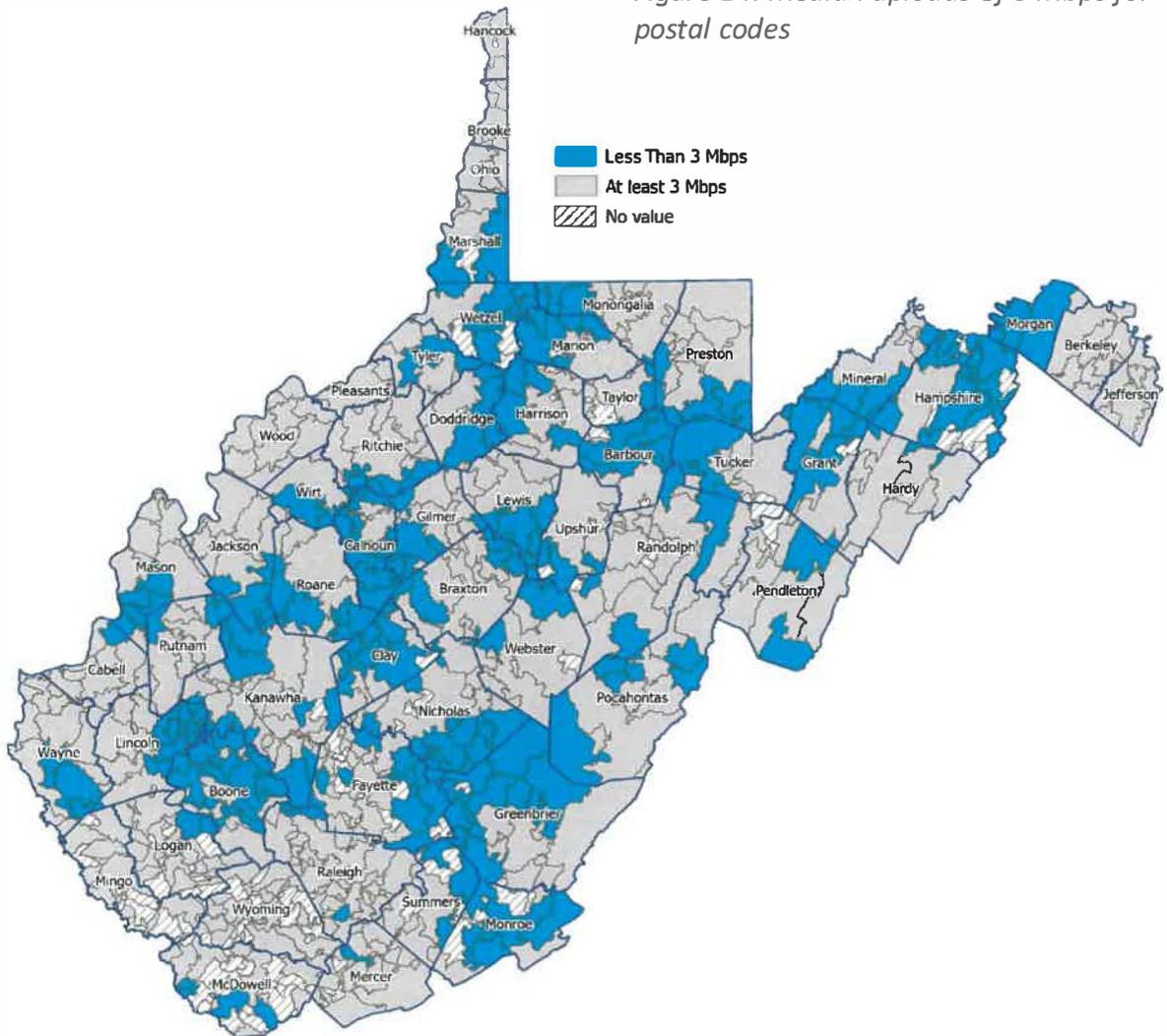
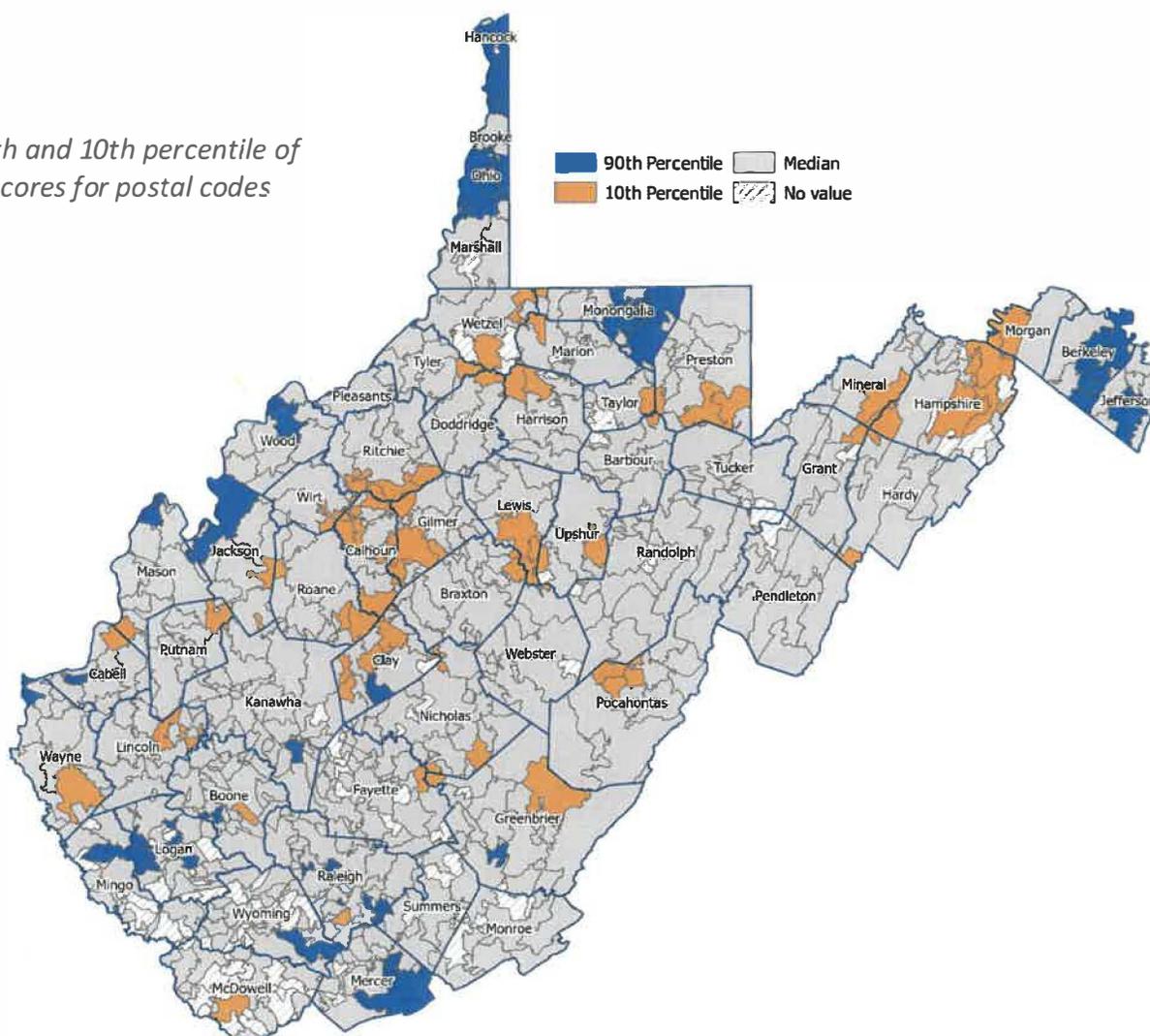


Figure 14: Median uploads of 3 Mbps for postal codes



OOKLA INTRODUCED THE CONCEPT OF MEASURING SPEED SCORES TO ACCOUNT FOR THE RANGE OF SPEEDS A PROVIDER OR GEOGRAPHIC AREA CAN OFFER IN A SINGLE METRIC. THE METHODOLOGY BEHIND MEASURING SPEED SCORES INVOLVES TESTS RESULTS FROM PROVIDERS OF THE 10TH, 50TH, AND 90TH PERCENTILE THAT IS COMBINED AND WEIGHTED USING A 1:8:1 RATIO RESPECTIVELY. THESE SCORES THEN RANK THE OVERALL PROVIDERS OR A GEOGRAPHIC AREA'S NETWORK PERFORMANCE.

Figure 16: 90th and 10th percentile of Okkla speed scores for postal codes



2021 FCC BROADBAND DEPLOYMENT DATA

Twice each year, the Federal Communications Commission (FCC) publishes data from Form 477 reports on where broadband services are available. Internet Service Providers (ISPs) are required to report to the FCC where they provide internet speeds exceeding 200 Kilobits per Second (Kbps) for upload or download. Service is reported at the census block level in its entirety based upon service at only one location within the census block.

The FCC’s reporting methodology has limited the ability to accurately identify the extent of broadband services. However, the FCC data can be utilized to identify which providers are in a particular area. The Office of Broadband does not use FCC data to define locations as either served or unserved, but to identify locations to where providers potentially deliver a particular service.

Figure 1, below, demonstrates the number of ISPs that reported data to the FCC at the census block level as of December 2020. For example, an area with the darkest shading of blue is a census block where there are five available services to at least *one location* (e.g. VDSL, Asymmetric xDSL, Cable Modem DOCSIS 3.0, Cable Modem DOCSIS 3.1, Terrestrial Fixed Wireless).

Implications of FCC Form 477 Data

The implication of FCC Form 477 data, a methodology based upon reporting at the census block level, is generalized data. This general information does not accurately demonstrate broadband availability at the address level. The data is widely known to exaggerate the extent of broadband service. Therefore, the data cannot be used to determine which locations within a census block can receive service. Instead, the Office of Broadband analyzes Form 477 to determine which companies are reporting services to the FCC within the State of West Virginia.

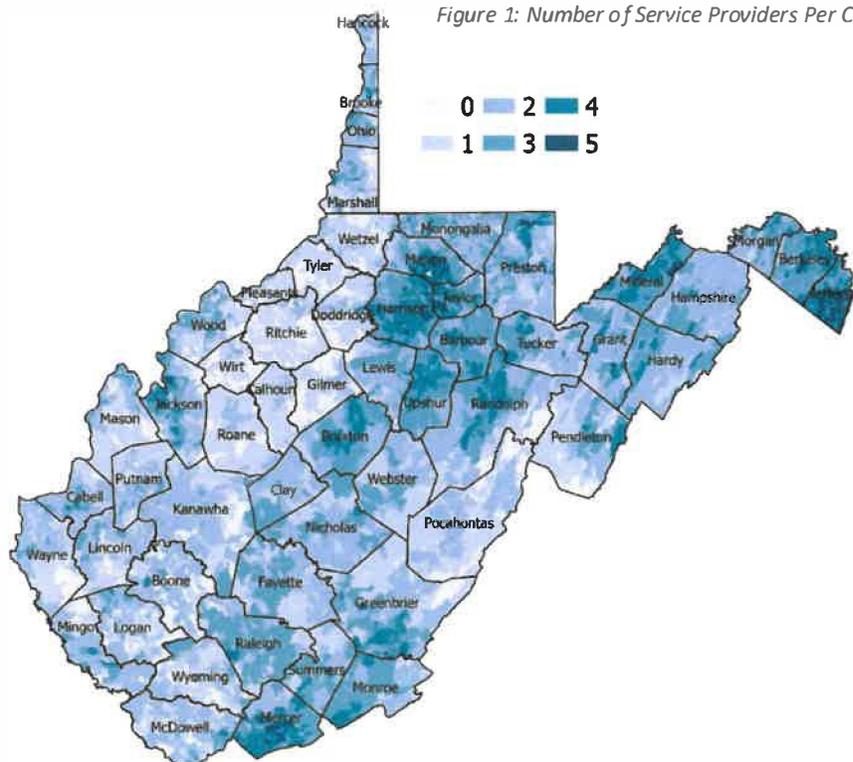


Figure 1: Number of Service Providers Per Census Block

The same fiber providing your broadband can also simultaneously deliver voice (VoIP) and video services, including video-on-demand.

Telecommunications providers sometimes offer fiber broadband in limited areas and have announced plans to expand their fiber networks and offer bundled voice, Internet access, and video services.

Variations of the technology run the fiber all the way to the customer's home or business, to the curb outside, or to a location somewhere between the provider's facilities and the customer

FTTP is the most reliable technology for speeds and scalability; however, the high cost of implementing new fiber optic lines has created a digital divide across the State. This divide limits rural communities from receiving high-speed connectivity.

FTTP is deployed in West Virginia, but in limited locations. Figure 2 demonstrates where fiber is being reported to at least one location within a census block. Discussed in the implications narrative of this section, this information does not imply fiber is available to all areas covered in the map.

According to the 2021 FCC Form 477 release, there are 14 unique fiber providers in West Virginia:

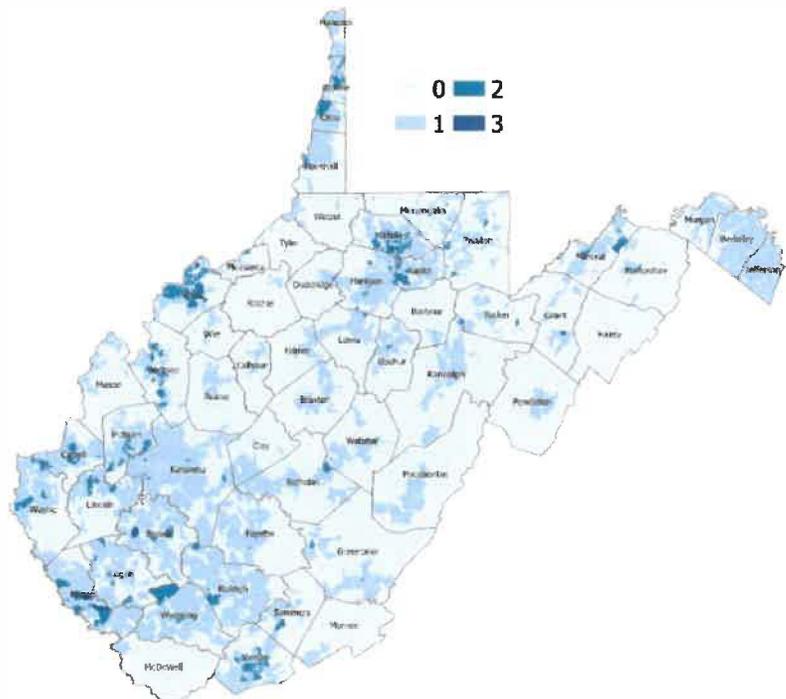
1. A&A Communications
2. Alpha Technologies
3. Armstrong
4. Citynet
5. TelAtlantic
6. Prodigy
7. Frontier
8. Shentel
9. HardyNet
10. Hotwire Communications
11. West Side Telecommunications
12. QCOL
13. RT21
14. Spruce Knob Seneca Rocks Telephone

CABLE MODEM

Cable modem service enables cable operators to provide broadband using the same coaxial cables that deliver pictures and sound to your TV set.

Most cable modems are external devices that have two connections: one to the cable wall outlet, the other to a computer. Subscribers can access their cable modem service by simply turning on their computers, without dialing-up an ISP. You can still watch cable TV while using it. Transmission speeds vary depending on the type of cable modem, cable network, and traffic load.

Figure 3: Census Blocks Where Cable Modem Services are Reported to at Least One Location



According to the most recent FCC Form 477 release, there are 12 unique cable providers in West Virginia:

1. A&A Communications
2. Suddenlink
3. Armstrong
4. Blue Devil Cable Television
5. Charter Communications
6. Comcast
7. Community Antenna Service
8. Mikrotec CATV
9. Shentel
10. Lycom
11. Massillon Cable TV
12. Zito Media

FIXED WIRELESS

Wireless broadband services are similar to wired broadband in that they connect to an internet backbone usually a fiber-optic trunk; however, they do not use cables to connect to the last mile or business/residences. Instead they use Wireless Fidelity (Wi-Fi) connections or radio waves. A computer or mobile device has a wireless adapter that translates data into a radio signal and transmits the signal using an antenna. A wireless router receives the signal, decodes it and then sends it to the Internet through a wired Ethernet connection.² There are different technologies to access wireless broadband:

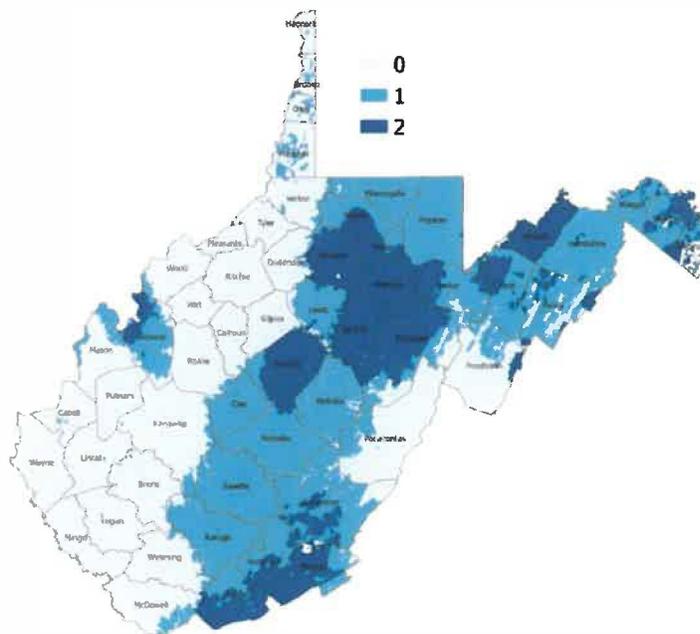
- Fixed Wireless
- Wireless Fidelity (Wi-Fi)
- Mobile Wireless (3G, 4G, 5G)

Fixed wireless is a type of high-speed Internet access where connections to service providers use radio signals rather than cables. Fixed wireless generally offers connections speeds between 1 and 10 Mbps (although speeds are increasing with advances in technology) and use transmission towers similar to cell phone towers that communicate to a resident’s transceiver equipment that, as the name implies, is fixed at the premise. The transceiver equipment communicates

with the providers’ ground stations. According to the most recent FCC Form 477 release, there are 19 unique fixed wireless providers in West Virginia:

1. All Points Broadband
2. Arx Technologies
3. CityNet
4. CountryMen Communications
5. NeuBea
6. GigaBeam
7. Hardy Telecommunications
8. Rural Broadband
9. JB-Nets
10. King Street Wireless
11. Micrologic
12. Morgan Wireless
13. New Era Broadband
14. OHS Broadband
15. RT21
16. Skypacket Networks
17. Telegia Communications
18. U.S. Cellular
19. Win Win Wireless

Figure 4: Census Blocks Where Cable Modem Services are Reported to at Least One Location



² [“What are the Wireless Broadband Technologies?”](http://www.broadbandmatters.com) Broadband Matters, broadbandmatters.com.

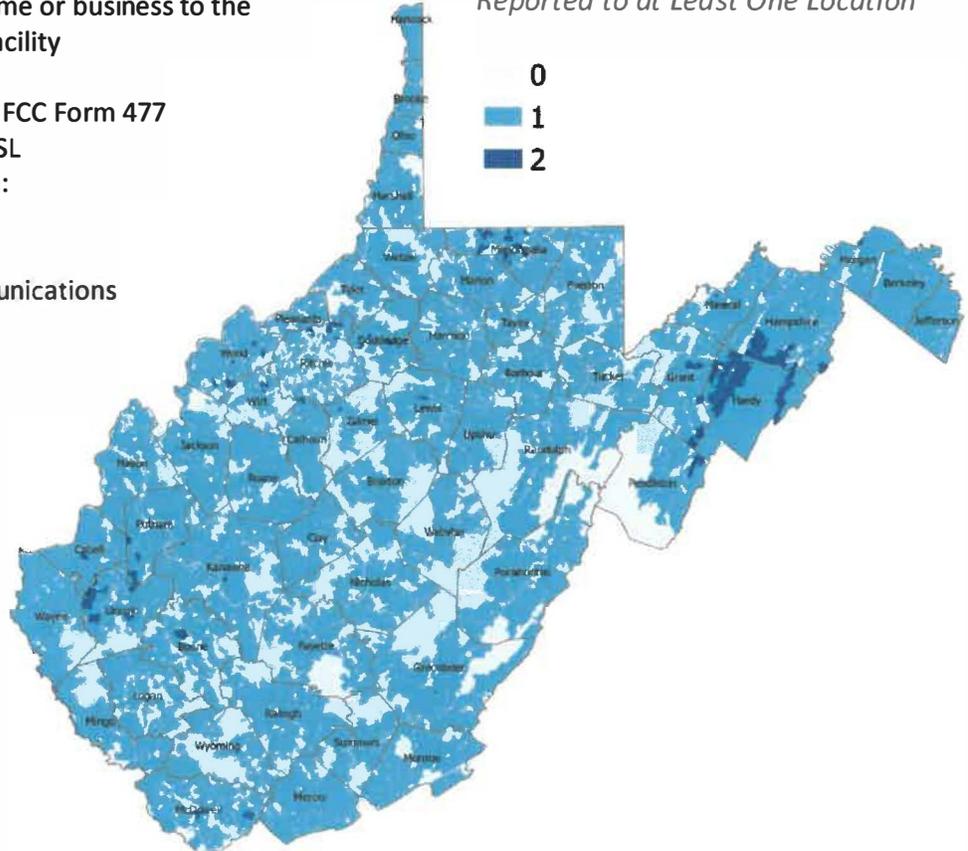
DIGITAL SUBSCRIBER LINE (DSL)

DSL is a wireline transmission technology that transmits data faster over traditional copper telephone lines already installed to homes and businesses. These may be considered legacy systems. DSL-based broadband provides transmission speeds ranging from several thousand to several million bits per second. The availability and speed of your DSL service may depend on the distance from your home or business to the closest telephone company facility

According to the most recent FCC Form 477 release, there are 6 unique DSL providers in the West Virginia:

1. HardyNet
2. West Side Telecommunications
3. Frontier
4. Lumos Networks
5. Armstrong
6. War Telephone

Figure 5: Census Blocks Where DSL Services are Reported to at Least One Location



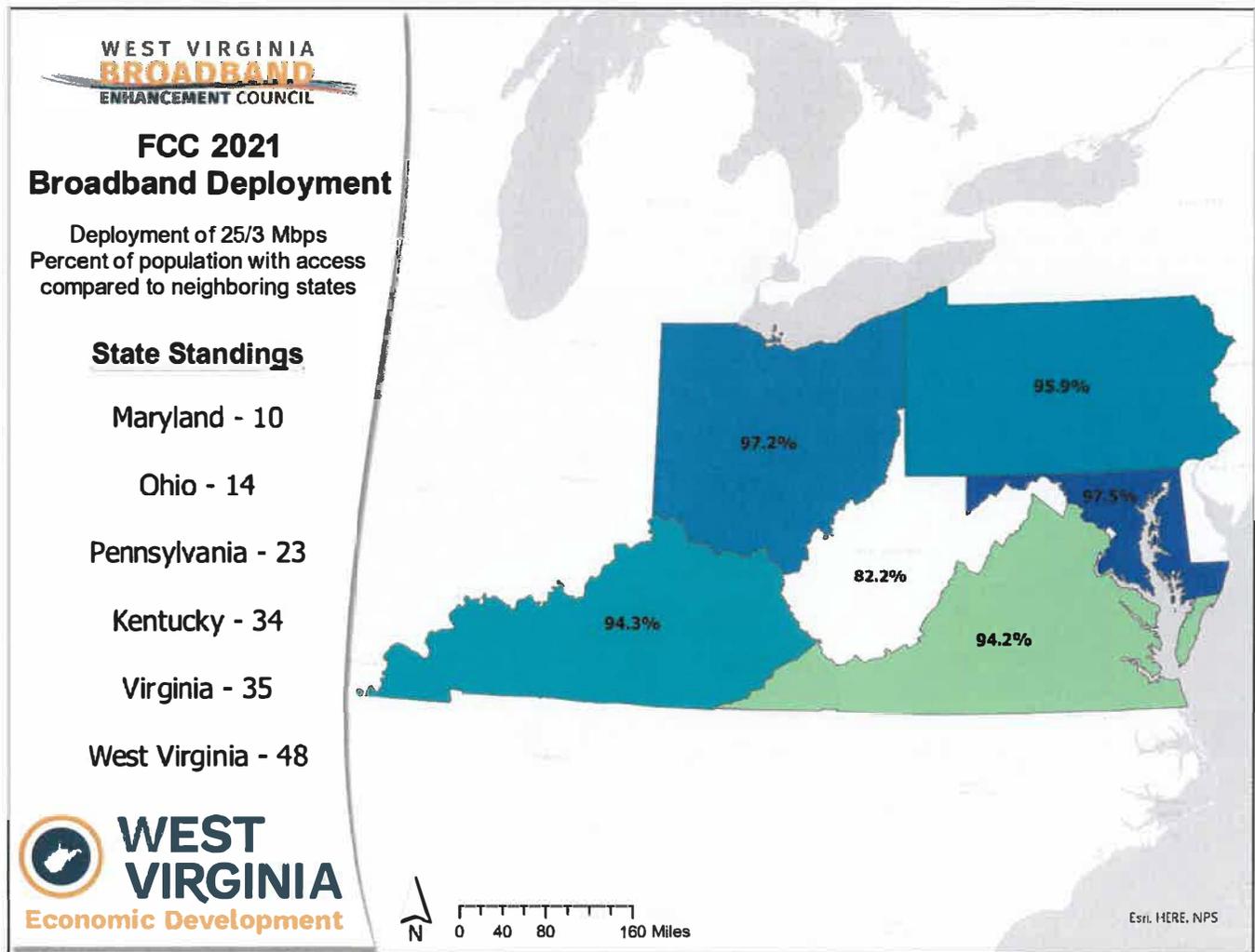
2021 FCC BROADBAND DEPLOYMENT REPORT

The FCC released its annual deployment report, [https://www.fcc.gov/document/FCC 2021 Deployment Report](https://www.fcc.gov/document/FCC%202021%20Deployment%20Report), on January 19, 2021. This report evaluates the availability of fixed and mobile services over a 5-year time period (2015-2019). The report provides consumer data in four categories:

1. Access to Fixed Services
2. Access to Mobile LTE Services;
3. Access to Fixed *and* Mobile Mobile LTE Services Combined
4. Access to Fixed *or* Mobile LTE Services

The FCC has noted that mobile services are not full substitutes for fixed services and that mobile and fixed services must be evaluated separately.

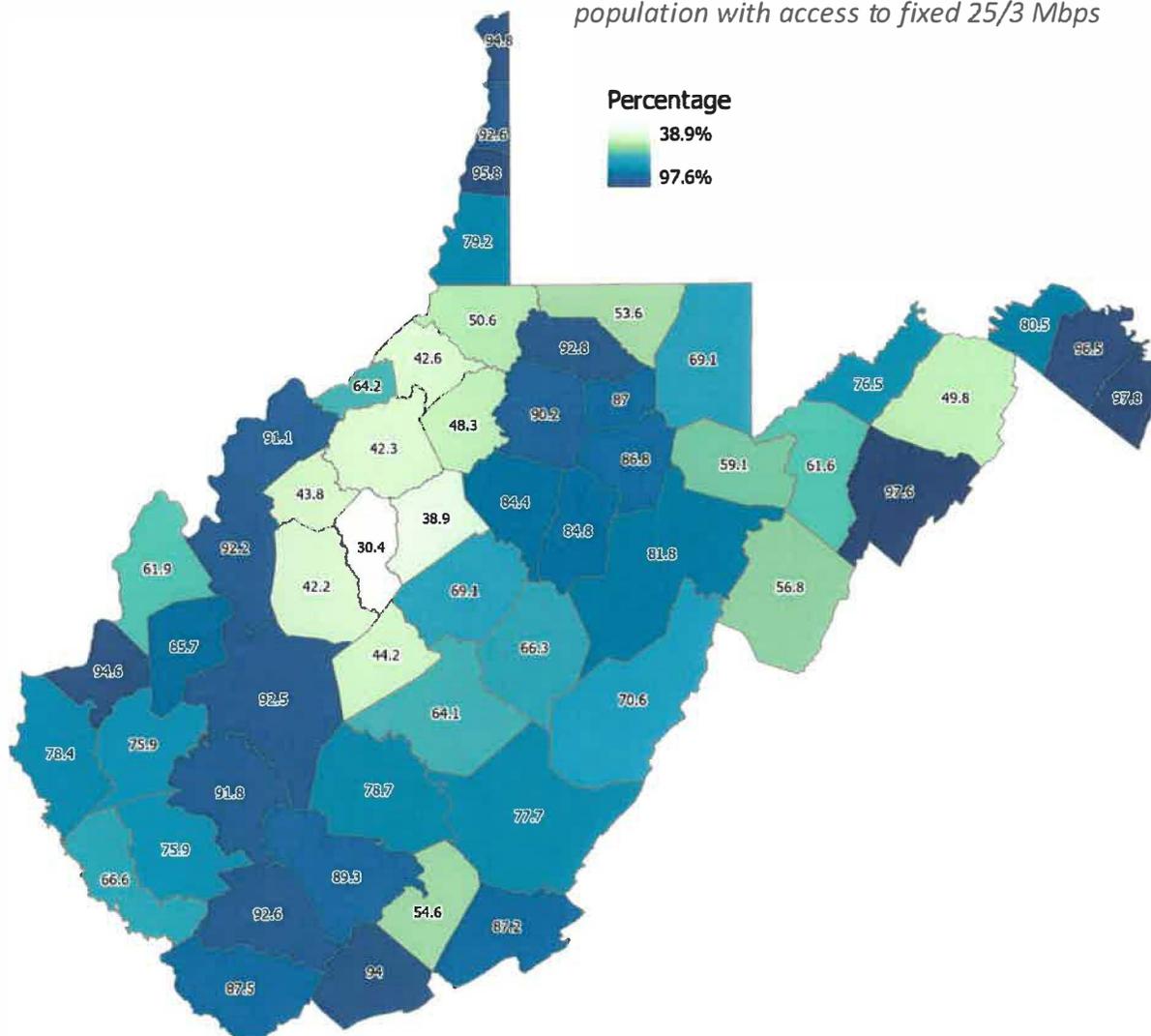
Figure 6: FCC 2021 Broadband Deployment State Rankings



FROM THE 2021 FCC BROADBAND DEPLOYMENT REPORT, FIGURE 7 SHOWS THE PERCENTAGE OF POPULATIONS THAT HAVE ACCESS TO FIXED 25/3 BROADBAND.

JEFFERSON COUNTY RANKS NUMBER ONE WITH 97.8% AND CALHOUN COUNTY RANKS NUMBER 55 WITH ONLY 30.4%.

Figure 7: County rankings of percentage of population with access to fixed 25/3 Mbps



BROADBAND AVAILABILITY AND ADOPTION

Broadband mapping is a continuously evolving endeavor in the State of West Virginia. Accurate broadband mapping provides the data needed to drive investment to the areas that need it most. The most basic, yet most elusive element of broadband planning is address level data.

It is widely known that the Federal Communications Commission's (FCC) broadband mapping exaggerates the extent of broadband availability. As states take a leading role in investment decisions, generalized data provides insufficient grounds for investment decisions.

To address this deficiency, the West Virginia Office of Broadband has implemented new protocols for mapping broadband availability at the address level. In 2021, the Office executed the critical shift of mapping broadband availability at the census block level to the address level.

West Virginia's broadband mapping system incorporates contributions of data by Internet Service Providers (ISPs), as well as community data, Ookla speed tests, field validation and verification, and ESRI services. Each data element is utilized to improve the overall accuracy of West Virginia's broadband maps.

MEASURING BROADBAND AVAILABILITY

Broadband availability is typically assessed by examining existing infrastructure in relation to a community, household or business and determining whether that infrastructure can deliver reliable internet with speeds of at least 25/3 Mbps.

The extension of this infrastructure into rural areas has been limited by available capital and overall feasibility.

With the State's success in securing financial assistance to implement grant programs, mapping broadband availability will ensure that grant funds are being efficiently allocated. The State's goal is to promote and support the expansion of reliable high-speed broadband services to locations that do not have access to at least one provider.

The identification of network route locations in proximity to households and businesses is a critical factor in broadband availability. The State also assesses the quality of technology that can truly deliver and maintain broadband services to locations.

Following the guidance of U.S. Treasury for the American Rescue Plan Act (ARPA) Capitol Projects Fund, the Office of Broadband does not recognize DSL as a broadband service. The Office also does not focus on deploying mobile or satellite services.

Types of Internet Services (Technology)

- ❖ **Fiber-to-the-Home (FTTH/FTTP)**
- ❖ **Cable Modem**
- ❖ **Fixed Wireless**
- ❖ **DSL**

The Office of Broadband recognizes the FCC established threshold of 25/3 Mbps as the minimum level of broadband service and has established a minimum threshold of 100/20 Mbps for grant programs. To identify broadband availability, the Office issued a Request for Comment to request data from ISPs regarding the extent of service territories at the address level. The focus on specific addresses has successfully shifted mapping broadband availability from census block to the address level in West Virginia. More information on the Request for Comment can be found [here](#).

THE WEST VIRGINIA BROADBAND HUB

The West Virginia Office of Broadband has established a central location for broadband GIS data and mapping at broadband.wv.gov. The West Virginia Broadband Hub includes a variety of interactive maps and features for residents, business owners, local governments, and elected leaders to learn about broadband development in West Virginia. The following portals are available on the Broadband Hub:

1. **Broadband Development Portal:** The Broadband Development Portal includes an interactive map that serves a tracker to monitor where public investments are taking place. Financial awards, fiber mileage, and beneficiaries are the three KPIs focused on this portal.
2. **Broadband Availability Map:** The Broadband Availability Map includes merged polygons of surface tax parcels where broadband service is estimated to be lacking.
3. **Provider Locator:** The provider locator serves as a tool for residents to identify existing internet service providers that may have existing services near their location. The tool is meant to provide residents with a list of potential providers from which to request service.
4. **Demographic Indicator:** The Demographic Indicator provides key information on county demographics to monitor economic growth. Sources include ESRI Services, American Community Survey, U.S. Census Bureau, FCC, and Ookla.
5. **Ookla Speed Tests:** The Office of Broadband monitors ISP performance through speed testing. This tool can be used to monitor speed performance while networks are providing service to new customers.
6. **ARPA:** The ARPA portal is the central hub for all grant programs established through the West Virginia Broadband Investment Plan.
7. **Public Wi-Fi Locator:** Interactive application that allows citizens to locate Public Wi-Fi locations near and available to them. The Public Wi-Fi Locator began as an initiative under the direction of Governor Jim Justice.
8. **Legislative Map:** This map includes boundaries of state legislative districts in relationship to broadband development.
9. **Static PDF Maps:** Printable maps available for download are hosted through this portal.

MEASURING BROADBAND ADOPTION

Measuring broadband adoption typically relies on one variable, the number of homes subscribed to an available service. Other variables can be assessed to conduct further research in communities that struggle to achieve high levels of broadband adoption. These variables include age, income, education, and household size. While data is generally available for the demographic variables, another important variable is cost of service. However, data concerning cost of service is not typically available from reliable services, making it difficult to include in analytical models.

The Office of Broadband has implemented a scoring approach of “preferred” and “non-preferred” for grant applications through the West Virginia Broadband Investment Plan. Cost of service is included as a scoring metric that maximizes adoption potential for new infrastructure builds.

Other sources of data, such as the U.S. Census Bureau, American Community Survey, and BroadbandUSA, are alternative sources to measure broadband adoption within the State.

BROADBAND DATA MANAGEMENT AND KEY PERFORMANCE INDICATORS

The Office of Broadband will provide a central point of contact for broadband development and related target industries. Accordingly, the office will continue to develop databases to manage information related to assets and resources, mapping, investments, projects and infrastructure, and performance measures.

The Office of Broadband tracks Key Performance Indicators (KPIs) related to broadband infrastructure and service to residents and businesses in West Virginia. The following metrics will be tracked:

1. Number of communities served.
2. Number of residents served.
3. Number of businesses served.
4. Number of jobs created.
5. Fiber milage
6. All known financial investment and assistance, in the form of grants, loans, and loan guarantees.
7. All known infrastructure assets, including fiber, tower, satellite, conduit, and related system components.
8. Mapping data showing progression in all areas on a year-by-year basis.
9. Any other metrics requested.

The Broadband Investment Tracker located on broadband.wv.gov is an interactive web map that displays geographic locations and information for each program funded through state, local, and federal initiatives.

FCC EMERGENCY BROADBAND BENEFIT REGISTRATIONS

The Emergency Broadband Benefit is an [FCC program](#) to help families and households pay for internet service during the pandemic. Congress has recently created the Affordable Connectivity Program, a \$14 billion long term program which will replace the EBB.

The EBB is still available to households and will continue providing benefits through a 60-day transition period. The ACP will provide a discount of up to \$30 per month toward broadband service for eligible households and up to \$75 per month for households on qualifying Tribal lands. This program is to ensure the longevity of providing broadband affordability assistance.

Eligible households can receive a one-time discount of up to \$100 to purchase a laptop, desktop computer, or tablet from participating providers if they contribute between \$10 and \$50 toward the purchase price.

As of December 27, 2021, nearly 59,000 West Virginians have registered, and 48 fixed and mobile Internet Service Providers are participating in the EBB program. For more information, visit fcc.gov/broadbandbenefit or send email to BroadbandBenefit@fcc.gov.

BROADBAND USE INCREASES

In 2021, the PEW Research Center, estimated that 93 percent of adults in America use the internet. The digital migration of society to telehealth and medicine, remote working, and remote education has increased the daily usage of internet that requires more bandwidth delivered at consistent rates.

The current FCC definition of broadband as 25 Mbps downstream and 3 Mbps upstream is considered a minimum level of service, and does not address the many business, commercial, and residential uses that demand much higher speed.

According to the National Telecommunications Information Administration (NTIA), an agency of the U.S. Department of Commerce, fast, reliable internet service is vital for communities to fully participate in the economy. NTIA provides the following guidelines for broadband speeds in certain settings:

| | | |
|--------------------------|------------------|---|
| 1. Hospital | 1 Gbps+ | Sharing health records, performing virtual consultations, connecting first responders. |
| 2. Library | 100 Mbps-1 Gbps+ | Operating public computer centers, mobile hotspot lending, enabling collaborative workspaces. |
| 3. School | 100 Mbps-1 Gbps+ | Sharing educational material, online testing, accessing databases. |
| 4. Small Business | 50 Mbps+ | Managing inventory, operating point-of-sales terminals, coordinating shipping. |
| 5. Home | 25 Mbps+ | Completing homework, streaming video, internet browsing. |

U.S. Department of Commerce, NTIA, BroadbandUSA

BANDWIDTH NEED INCREASES

With the conversion to High Definition (HD) video, and Ultra High Definition (UHD) video such as 4K, the bandwidth demands for traditional broadcast video as well as streaming video are increasing rapidly. Add to that increased bandwidth demands for telecommuting and distance learning, which also rely heavily on streaming video for teleconferencing, and their effects on bandwidth needs over time.

The need for increased bandwidth is driven by several factors, with the increase in video quality to HD and UHD as the primary driver. Telecommuting, online learning and telehealth require frequent video conferencing. Entertainment content using an Internet connection is largely replacing traditional broadcast signal. The number of Internet connected devices in use in a single residence has increased dramatically. In addition to a desktop or laptop computer, tablets, smart phones, smart TVs, web cams and other Internet enabled devices can be utilizing a home's single Internet connection at any one time, and many of those devices will be utilizing an application involving high-definition video.

Figure 1: Growth of 4k (UHD) TVs over time¹

Figure 2: Bandwidth demands of video over time¹

Figure 3: Bandwidth demand growth over time¹

BROADBAND USAGE BY ZIP CODE

In October of 2020, Microsoft released the Broadband Usage Percentages Dataset² that demonstrates the percentage of populations within a zip code that access the internet with broadband speeds of 25/3 Mbps. The anonymized data is collected and aggregated by Microsoft as part of its ongoing work to improve software and services. When a device connects to a Microsoft service, Microsoft estimates the throughput speed. Using reverse IP geolocating, the location of the device can be determined within a zip code. Microsoft then aggregates the information and calculates the percentage of a population accessing the internet at broadband speeds.

Figure 4: Broadband usage across zip codes in West Virginia

MICROSOFT'S BROADBAND USAGE DATASET CAN BE USED TO CHALLENGE FCC FORM 477 DATA THAT OVERSTATES THE EXTENT OF BROADBAND AVAILABILITY. AS SHOWN IN FIGURE 4, THE MORE RURAL POPULATIONS BECOME, END-USERS ACCESSING THE INTERNET WITH SPEEDS OF 25/3 MBPS BECOME LESS COMMON.

AMERICAN COMMUNITY SURVEY (ACS)

BROADBAND METRICS

The following maps show the most recent American Community Survey (ACS)¹ data from the 5-year estimates. The survey information is from 2015-2019 that demonstrates broadband availability and adoption across census tracts. ACS data is intended to be used to identify areas of investigation at the census tract level for broadband planning and development. Measurements for most of the following maps are on a scale of 25% of the total sample size (e.g. yellow depicted in figure 5 indicate areas above 25% of the metric).

Figure 5: Percent of households with no internet access across census tracts

²<https://github.com/microsoft/USBroadbandUsagePercentages>

FIGURE 6 DEMONSTRATES THE NUMBER OF HOUSEHOLDS WITHIN A CENSUS TRACT THAT HAVE ACCESS TO AN EXISTING NETWORK BUT DO NOT HAVE A SUBSCRIPTION. DATA REPRESENTED IN THE LEGEND IS ON A SCALE OF 3-25% OF THE MAXIMUM POPULATION SIZE WITHIN A TRACT. THIS INFORMATION CAN BE USED TO IDENTIFY AREAS THAT NEED ADOPTION IMPLEMENTATION EFFORTS.

Figure 6: Households with internet access without a subscription

¹<https://data.census.gov>

FIGURE 7 DEMONSTRATES THE NUMBER OF HOUSEHOLDS WITHIN A CENSUS TRACT THAT HAVE SATELLITE INTERNET AND OTHER TYPE OF SUBSCRIPTION. THIS COULD IMPLY THAT FIXED SERVICES ARE NOT AVAILABLE FOR SOME HOUSEHOLDS.

Figure 7: Households with satellite internet service with no other type of internet subscription

FIGURE 8 DEMONSTRATES THE NUMBER OF HOUSEHOLDS WITHIN A CENSUS TRACT THAT HAVE A CELLULAR PLAN NO AND OTHER TYPE OF SUBSCRIPTION. THIS COULD IMPLY THAT FIXED SERVICES ARE NOT AVAILABLE FOR SOME HOUSEHOLDS. HOUSEHOLDS MAY BE ACCESSING THE INTERNET THROUGH THEIR CELLULAR SERVICE OR MOBILE HOTSPOT. THE OFFICE OF BROADBAND FOCUSES ON BUILDING FIXED INFRASTRUCTURE TO REACH RESIDENTS THAT HAVE LIMITED SERVICES AVAILABLE.

Figure 8: Households with a cellular data plan but no other type of internet subscription

ACCORDING TO THE ACS 5-YEAR ESTIMATES (2015-2019), 3,058 HOUSEHOLDS IN WEST VIRGINIA HAVE DIAL-UP WITH NO OTHER TYPE OF INTERNET SUBSCRIPTION.

Figure 9: Households with Dial-up with no other type of internet subscription

ADOPTION OF BROADBAND DOES NOT JUST FOCUS ON INTERNET SUBSCRIPTIONS, BUT ACCESS TO A DEVICE FOR INTERNET USAGE. PROGRAMS SUCH AS THE EMERGENCY CONNECTIVITY FUND¹ HELP SCHOOLS AND LIBRARIES PROVIDE DEVICES TO COMMUNITIES TO HELP ACCESS THE INTERNET.

Figure 10: Percent of households that have no computer, smartphone, or tablet.

¹<https://www.fcc.gov/emergency-connectivity-fund>

Figure 11: Percent of households whose income is less than \$35,000 without a broadband internet subscription

Figure 12: Percent of households whose income is \$35,000 or more without a broadband internet subscription

STATE, LOCAL, AND FEDERAL BROADBAND INITIATIVES

**\$420,066,567 Awarded
2017-2021**



FCC Rural Digital Opportunity Fund

8 Winning Bidders | \$362,066,660 | 143,050 addresses*



USDA ReConnect

4 Winning Projects | \$40 Million Investment | 10,101 addresses*



USDA Community Connect

4 Winning Projects | \$11 Million Investment | 6,756 addresses*



USDA Distance Learning and Telemedicine

\$5.8 Million | 14 Projects in West Virginia



FCC CAFII

3 Winning Bidders | \$11.9 Million Investment | 900 addresses*



ARC/ARC POWER

5 Winning Projects | \$11,076,503 Investment | 2,663 addresses*



ARC Central Appalachian Broadband

3 Winning Projects | \$2,171,515 Investment | 3,042*

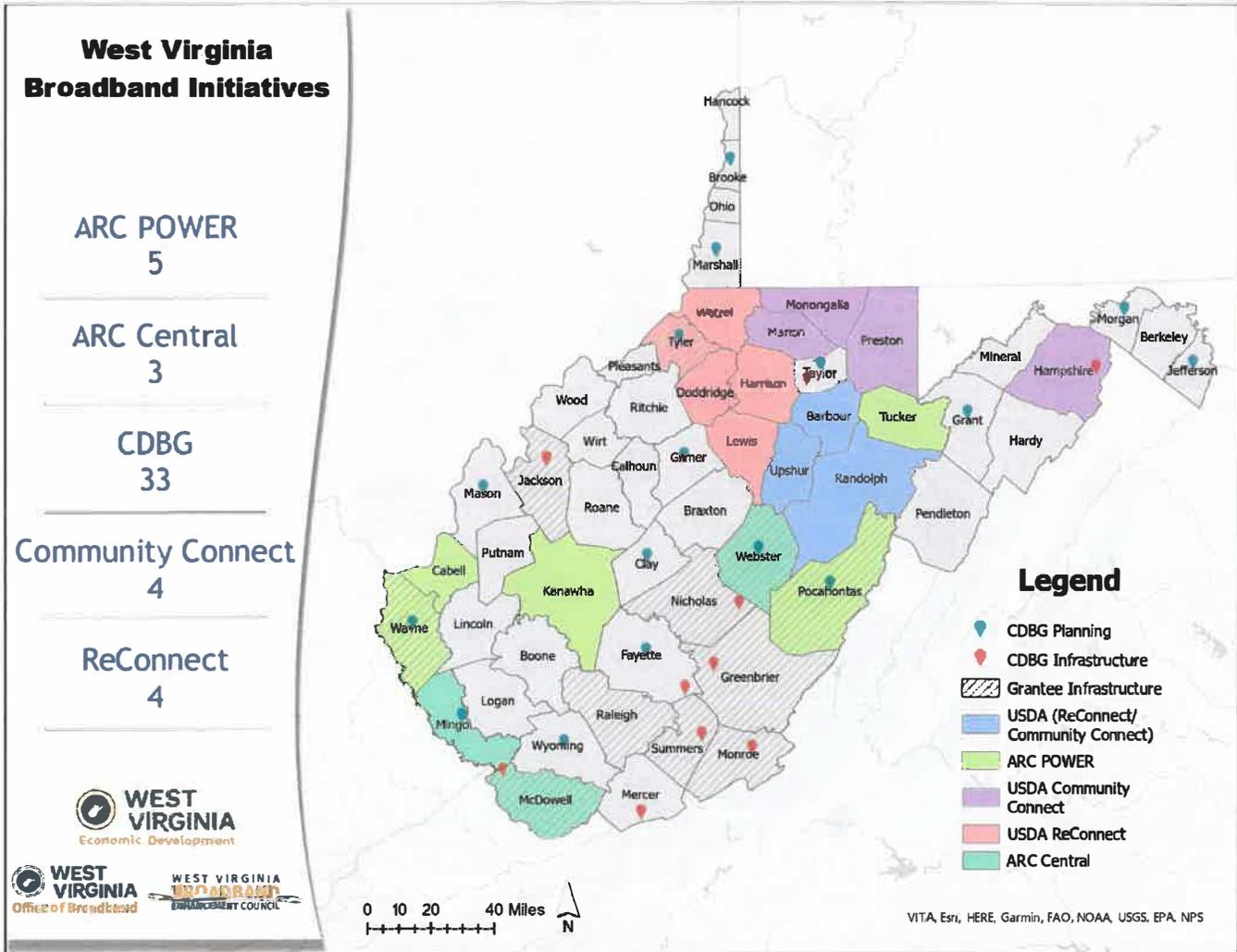


HUD CDBG

8 Winning Infrastructure Projects | \$7,500,000 | 3,500 addresses*

* Estimated Addresses

ARC, CDBG AND USDA PROJECT LOCATIONS



FCC Emergency Connectivity Fund \$33.2 Million Awarded



FCC Emergency Connectivity Fund (ECF)

Coordinated by the West Virginia Department of Education

The FCC's Emergency Connectivity Fund (ECF) provides financial support to schools and libraries to support remote learning. ECF provides reasonable costs for devices and connectivity services for staff and students with unmet needs or insufficient access. There were two application windows in 2021 for which West Virginia requested a total of \$52,822,671.02. As of December 14, 2021, the FCC has committed five rounds of funding to West Virginia for the total of \$33,263,714.83.

ECF Applications by Funding Window:

August 2021 Funding Window Request: \$48.1 Million

- \$21.2 Million Requested by the West Virginia Department of Education
- \$25.5 Million Requested by 24 West Virginia Counties

October 2021 Funding Window Request: \$6.1 Million

ECF Funds Committed to West Virginia by Funding Round:

- Phase 1: \$3,858,989.24
- Phase 2: \$13,488,481.57
- Phase 3: \$9,097,860.44
- Phase 4: \$6,302,063.92
- Phase 5: \$516,319.65

ECF Committed Funds by Category:

K-12 District Applications:

- Requested: \$29,288,977.80
- Funded: \$11,985,975.90

K12 School-Library Partnership Consortia Application (Pendleton County):

- Requested: \$2,338,706.00 (Pending)

West Virginia Department of Education Application:

- Requested and Funded: \$21,194,987.22

NTIA Broadband Infrastructure Program \$46 Million Pending



NTIA Broadband Infrastructure Program

Four Applications Pending

\$46 Million Requested

WV Ranked 16th in the Nation for the Amount of Funds Requested by States

Four West Virginia applications are currently pending with the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA) Broadband Infrastructure Grant Program.

NTIA received more than 230 applications with requests totaling more than \$2.5 billion for the \$288 million program. Applications were submitted from 49 states and U.S. territories. Notably, West Virginia ranked 16th in the nation for the amount of funds requested by state. For more information about the NTIA program, view the [press release](#) summarizing the nationwide response.

NTIA has issued request for comment on proposed funded service areas in November 2021, found here: <https://broadbandusa.ntia.doc.gov/announcement-proposed-service-areas>. The Office of Broadband has assisted West Virginia applicants in the data submission process related to the NTIA grant program.

WEST VIRGINIA'S SUCCESSFUL UTILITY FEASIBILITY STUDY MODEL

Under legislation adopted in 2019, West Virginia electric utilities began reviewing the feasibility of constructing and operating a middle-mile infrastructure project within the electric utility distribution system. The West Virginia Broadband Enhancement Council and the West Virginia Public Service Commission (WVPSC) assisted the electric utilities in the preparation of the feasibility studies, which will address:

- ❖ The route of the middle-mile infrastructure proposed for the project,
- ❖ The number of fiber strands that would be utilized in connection with the proposed project and dedicated to serve as the middle mile,
- ❖ The location of the electric utility's distribution infrastructure that will be utilized in connection with the proposed project, and
- ❖ The capacity of the middle-mile broadband infrastructure that will be available to lease to last-mile broadband Internet providers upon completion of the proposed project;
- ❖ The estimated cost of the proposed project, including but not limited to engineering costs, construction costs, permitting costs, materials and labor, right-of-way costs, and a reasonable rate of return to the electric utility;
- ❖ The proposed schedule of construction of the proposed project; and
- ❖ The method of attachment and connection of the middle-mile broadband fiber assets to the electric utility's distribution infrastructure.

MIDDLE-MILE FIBER BROADBAND EXPANSION PROGRAM

In 2020, the West Virginia Legislature passed HB 4619, which amended §24-2-1 of the W. Va Code and added a new section, §24-2-10, both of which concern the powers and duties of the West Virginia Public Service Commission (PSC). HB 4619 allows electric utilities to install "middle-mile" broadband fiber on their existing infrastructure to facilitate the expansion of broadband service into unserved and underserved areas of the State.

**APPALACHIAN POWER COMPANY
AND WHEELING POWER COMPANY
(AEP)**

**2 Counties
430 Fiber Miles
\$46 Million Investment**

LOGAN-MINGO BROADBAND EXPANSION

Pursuant to legislation passed by the West Virginia Legislature in 2019, Appalachian Power Company and Wheeling Power Company (AEP) prepared a Broadband Feasibility Study for the construction of a middle-mile fiber optic network in Logan and Mingo Counties, known as the Logan-Mingo Broadband Project.

The proposed network would provide utility communications and contain fiber optic strands that AEP could lease to Internet Service Providers (ISPs) who would provide broadband internet service to end-user, “last-mile” customers through the construction of more than 400 new fiber miles and the utilization of approximately 200 existing fiber miles.

AEP submitted its study to the Council on October 22, 2019. The Council unanimously approved the study in December 2019, concluding that the proposed project was feasible and in the interests of both AEP and the citizens of West Virginia. In considering the proposed project’s feasibility, the Council identified one or more last-mile broadband Internet providers that may lease the middle-mile broadband internet capacity created by the proposed project pursuant to lease terms and conditions set by the Council. AEP conducted a Request for Proposal process and selected GigaBeam Networks as an ISP partner.

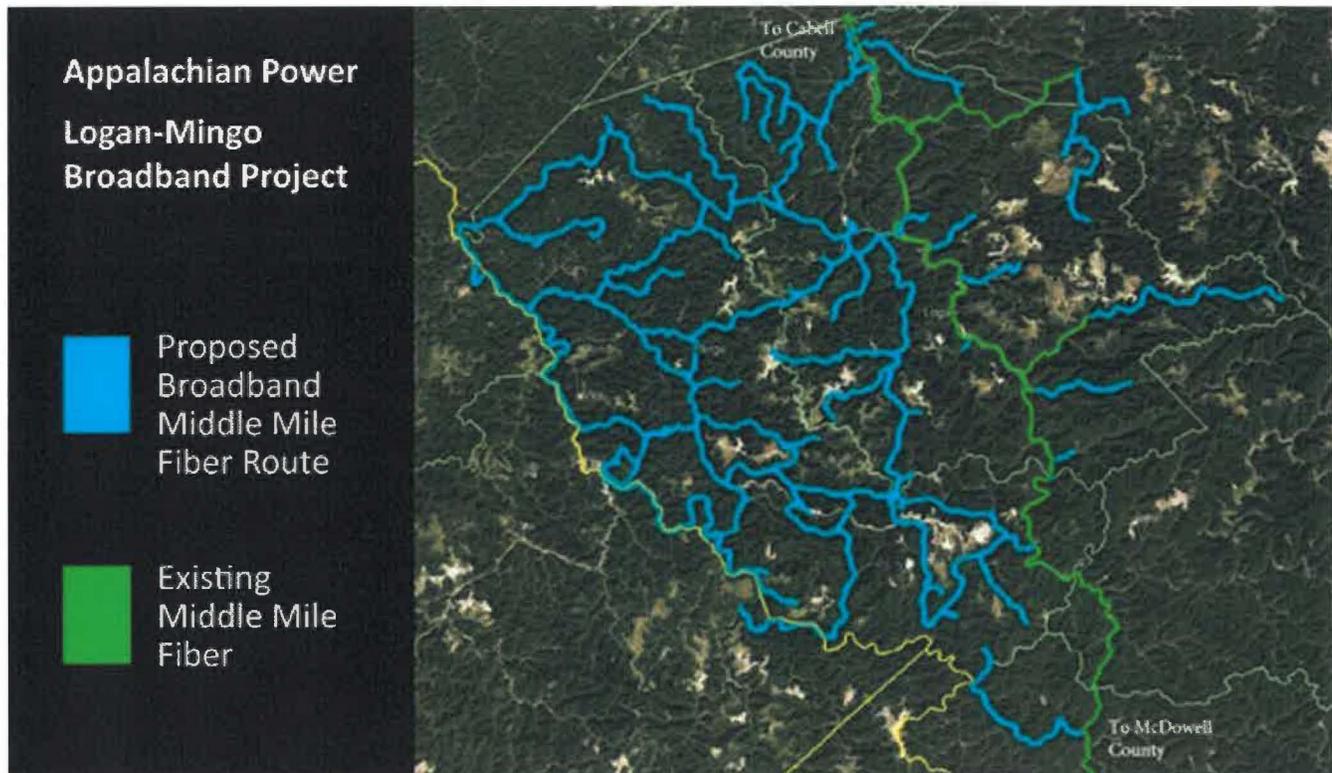


Figure 2: AEP Logan-Mingo Project

LOGAN-MINGO BROADBAND EXPANSION MOVES FORWARD IN 2021

On January 20, 2021, Appalachian Power (APCo), along with Wheeling Power, submitted an application to the West Virginia Public Service Commission (WVPSC) for approval of a broadband infrastructure expansion project that will facilitate broadband access in unserved areas of Logan and Mingo counties. The company requested approval of the project plan and cost recovery for the estimated \$61.3 million investment, which includes installing 430 miles of middle-mile fiber optic cable infrastructure needed to expand high-speed broadband access.

On June 16, 2021, the WVPSC approved APCo's application of a written plan for a middle-mile broadband infrastructure expansion project and associated cost recovery.

The 430 fiber miles specified in the project will include the construction and installation of 361 miles of 96-strand fiber and the addition of 48 strands to 69 miles of transmission lines in Logan and Mingo counties. Thirty-six of the strands will be offered for lease to last-mile Internet Service Providers (ISPs). APCo has entered into a lease with GigaBeam Networks, LLC (GigaBeam) under which GigaBeam will lease fiber strands.

GigaBeam estimates a take-rate of 60 percent of unserved residents of the counties and 90 percent unserved businesses in the counties. Because the project will be built in phases, GigaBeam will be able to connect as APCo completes each phase.

In 2021, GigaBeam partnered with the Logan County Commission and the Mingo County Commission to seek funding through the National Telecommunications and Information Administration (NTIA) Broadband Infrastructure Program grant program. If awarded, GigaBeam would utilize funds to construct a Fiber to the Premise (FTTP) network that utilizes APCo's middle mile fiber and an additional 83 miles in fiber extensions.

Current work includes the development of a construction schedule and prioritization of fiber routes in Logan and Mingo counties. Work also involves identifying the necessary requirements for make readiness and permitting.

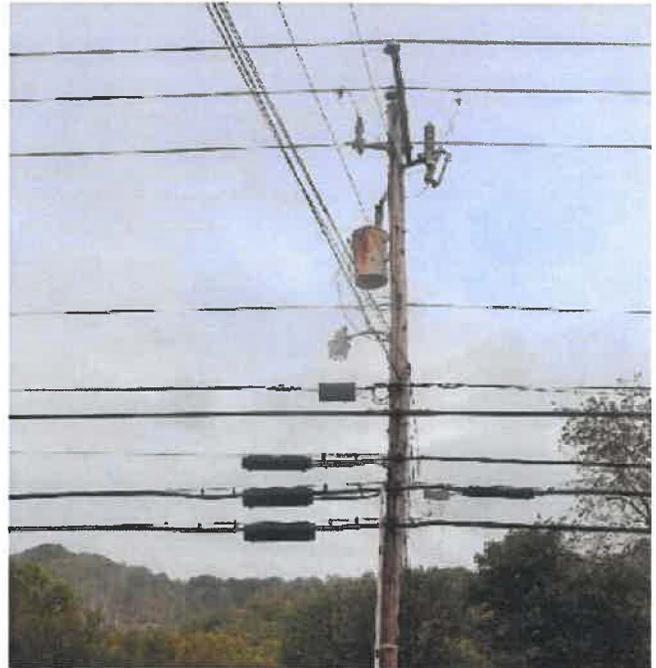


Photo courtesy of APCo.

FUTURE PROJECTS

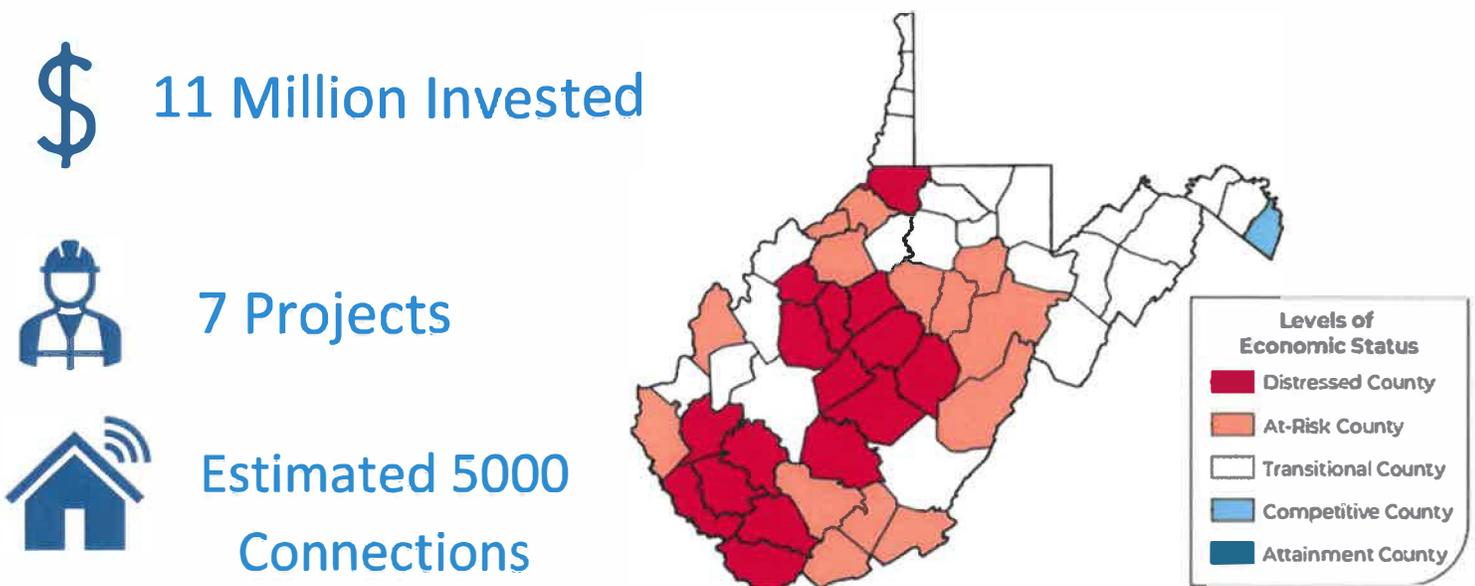
This project provides a successful model for future projects in other areas of West Virginia. The model builds upon existing expertise within the State of West Virginia and provides opportunities for innovative partnership.

The West Virginia Broadband Enhancement Council and the Office of Broadband will continue to support this initiative to build critical broadband infrastructure in West Virginia communities.

APPALACHIAN REGIONAL COMMISSION

The Appalachian Regional Commission (ARC) serves to grow economically distressed communities in Appalachia by investing in critical infrastructure and entrepreneurial initiatives. ARC provides the foundational resources for communities to have financially sustaining growth and prosperity. West Virginia's partnership with ARC has resulted in \$7.8 million for economic initiatives and \$3.4 million for infrastructure during fiscal year 2020. To date, ARC has invested in eight broadband projects in West Virginia, including three ARC POWER projects that were funded in 2021.

In 2020, the West Virginia Department of Economic Development (WVDED) obtained approval from ARC to administer broadband projects through designation as a Responsible State Basic Agency (RSBA). The RSBA designation authorized the WVDED to administer ARC funding for broadband in West Virginia.



https://www.arc.gov/wp-content/uploads/2021/01/WEST_VIRGINIA_FY2020.pdf

Appalachian Regional Commission: Partnerships for Opportunity and Workforce and Economic Revitalization (ARC POWER)

The Appalachian Regional Commission (ARC) launched the POWER (Partnerships for Opportunity and Workforce and Economic Revitalization) program to help communities and regions that have been affected by job losses in coal mining, coal power plant operations, and coal-related supply chain industries due to the changing economics of America's energy production. In 2021 ARC POWER awarded funds to three broadband infrastructure projects: Pocahontas County Commission, Wayne County Commission; and Woodlands Development Group. The WVDED, Office of Broadband is the administrative agency for these projects, along with the 2020 ARC POWER project awarded in 2020 for a 25-mile fiber loop in downtown Huntington to be completed by Thundercloud.

- ❖ **Pocahontas County Commission:** Received a \$2,500,000 ARC POWER grant in 2021 to build FTTH to over 1,000 households in Pocahontas County.
- ❖ **Wayne County Commission:** Received a \$1,551,000 ARC POWER grant in 2021 to build a 16-mile middle-mile route down WV-152 connecting households and businesses along the route with fiber. The project also targets last-mile FTTH in Lavallette, Beech Fork, and Arden. The future potential of this middle-mile route can expand FTTH to rural areas of Wayne County.
- ❖ **Woodlands Development Group:** Received a \$2,500,000 ARC POWER grant in 2021 to construct a 33-mile middle-mile fiber route along Route 33, from Elkins to Davis.

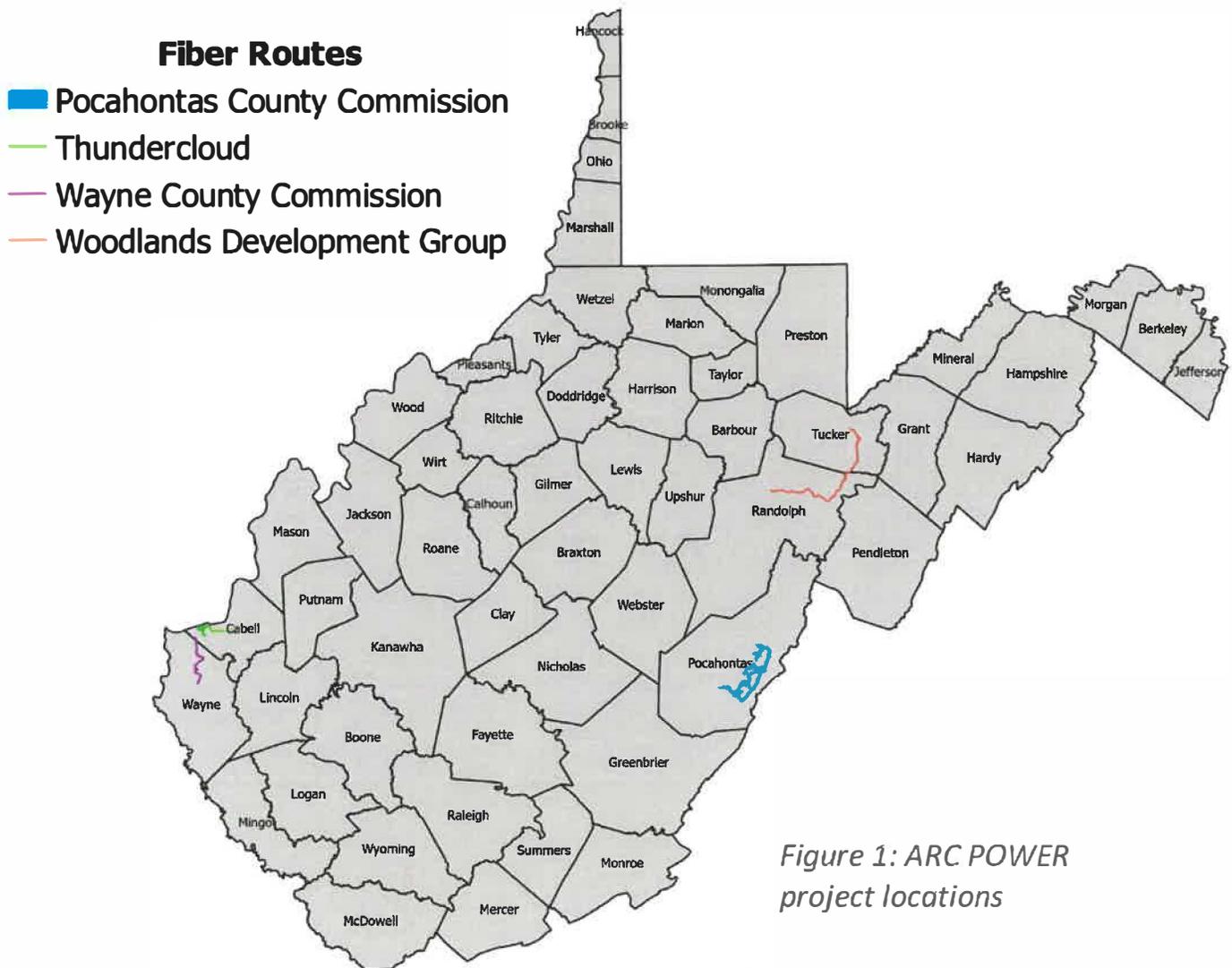
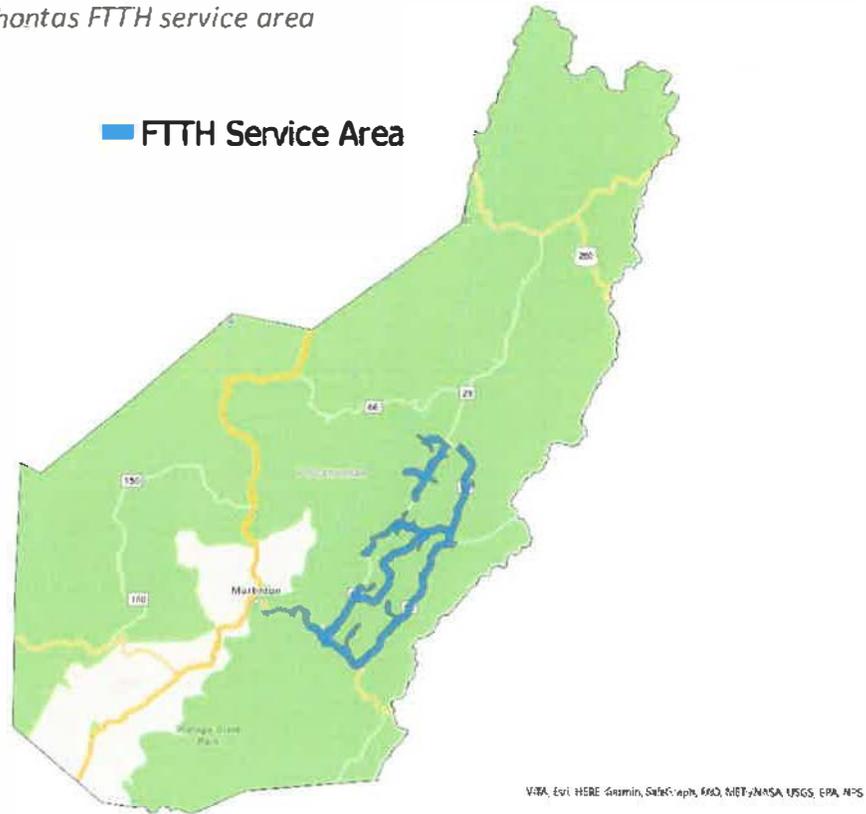


Figure 1: ARC POWER project locations

Figure 2: Pocahontas FTTH service area



Appalachian Regional Commission: Central Appalachian Broadband

In 2018, the Council and the West Virginia Development Office (WVDO) coordinated a request for proposals for projects to be funded by an available \$3.2 million in Appalachian Regional Commission (ARC) funding as part of the agency's broadband initiative.

The goal of the initiative is to provide funding for the deployment of broadband that will increase economic and business development or provide service to unserved customers. Funding is limited to ARC-designated distressed counties in West Virginia that have been most negatively impacted by the downturn in the coal industry. Eligible counties are Boone, Clay, Logan, Lincoln, McDowell, Mingo, Webster, and Wyoming.

-  Infrastructure: Fiber and Wireless
-  Infrastructure: Fiber
-  Planning

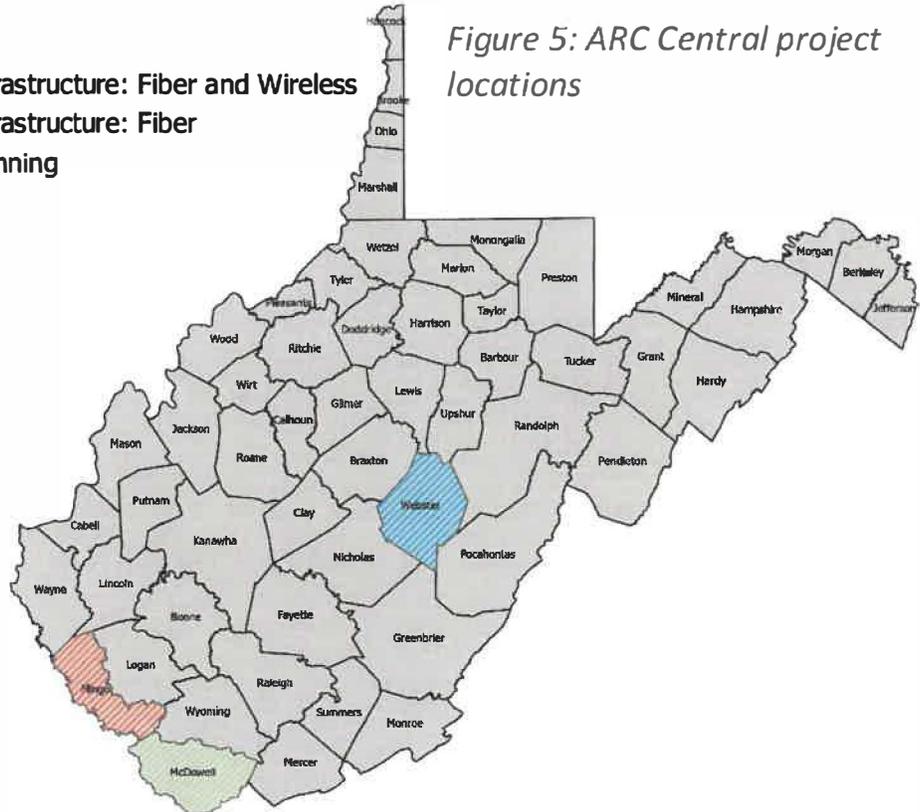


Figure 5: ARC Central project locations

In 2021, the West Virginia Department of Economic Development, Office of Broadband, is managing the construction of the Southern Western West Virginia Broadband Expansion project awarded to the Webster County Economic Development Authority.

- ❖ **Webster County EDA:** Received a \$1,936,080 ARC grant to build a hybrid FTTH-wireless network with their partner CityNet in Webster Springs.
- ❖ **Williamson Health and Wellness:** Received \$194,787 for engineering related to fiber development in downtown Williamson of Mingo County that will serve WVCTC and Williamson Hospital.
- ❖ **WVU Land Use and Sustainable Development Law Clinic via West Virginia University Research Corporation:** Received \$140,648 to develop a legal toolkit for broadband development.

COMMUNITY DEVELOPMENT BLOCK GRANT

Governor Justice announced the first broadband projects funded by Community Development Block Grant (CDBG) funding for broadband development projects in West Virginia in 2018. Through 2020, approximately \$7.5 million in CDBG funding has been dedicated to broadband planning and infrastructure projects, with more than half of West Virginia’s 55 counties actively pursuing broadband development as follows:

1. Broadband Planning: 20 projects including 41 counties, and
2. Broadband Infrastructure: 11 projects that will provide broadband connectivity to more than 3,500 residential and business customers upon completion.

The CDBG program is one of the longest running programs of the U.S. Department of Housing and Urban Development (HUD). The CDBG broadband program has a primary emphasis on the extension of broadband to unserved and underserved communities. These areas often align with CDBG priorities for low- to moderate-income residents. The following chart summarizes CDBG infrastructure projects.

Table 1: CDBG broadband infrastructure projects in West Virginia

| CDBG Broadband Infrastructure In West Virginia | | | | | |
|---|--|---------------------|--------------|----------------------|------------|
| Applicant | Project | Amount | FY | Date Awarded | Completion |
| 1. Taylor County | Taylor County Broadband Expansion Project | \$ 131,382 | 2020 | 7/1/2021 | 2024 |
| 2. Greenbrier County | Quinwood Fiber Extension – 2 Awards | \$ 1,251,227 | 2020 2019 | 7/1/2021 6/3/2020 | 2024 |
| 3. Meadow Bridge | Fiber Development Project | \$ 906,600 | 2019 | 6/3/2020 | 2023 |
| 4. Monroe County | Keenan-Doss-Shaver Road Fiber | \$ 50,059 | 2019 | 6/3/2020 | 2023 |
| 5. Raleigh County | Airport Industrial Park | \$ 643,999 | 2019 | 6/3/2020 | 2023 |
| 6. Summers County | Talcott Area Fiber Project | \$ 220,500 | 2019 | 6/3/2020 | 2023 |
| 7. Lewis County | Southern Lewis -Walkersville Towers | \$ 500,000 | 2018 | 4/1/2019 | 2022 |
| 8. McDowell County | Bull Creek – Isaban Area Fiber Expansion | \$ 630,000 | 2018 | 4/1/2019 | 2022 |
| 9. Mercer County | Cumberland Industrial Park Fiber Project | \$ 155,000 | 2018 | 4/1/2019 | 2022 |
| 10. Hampshire County | Capon Bridge Industrial Park Fiber | \$ 434,137 | 2017 | 2/1/2018 | 2021 |
| 11. Jackson County | Sandyville Tower Wireless Project | \$ 137,500 | 2017 | 2/1/2018 | 2021 |
| 12. Nicholas County-Richwood | Richwood-Hinkle Mountain Hybrid Fiber-Tower Project – 2 Awards | \$ 800,000 | 2017 2018 | 2/1/2018 4/1/2019 | 2023 |
| Total CDBG Infrastructure Awards 2017-2021 | | \$ 5,860,404 | | | |

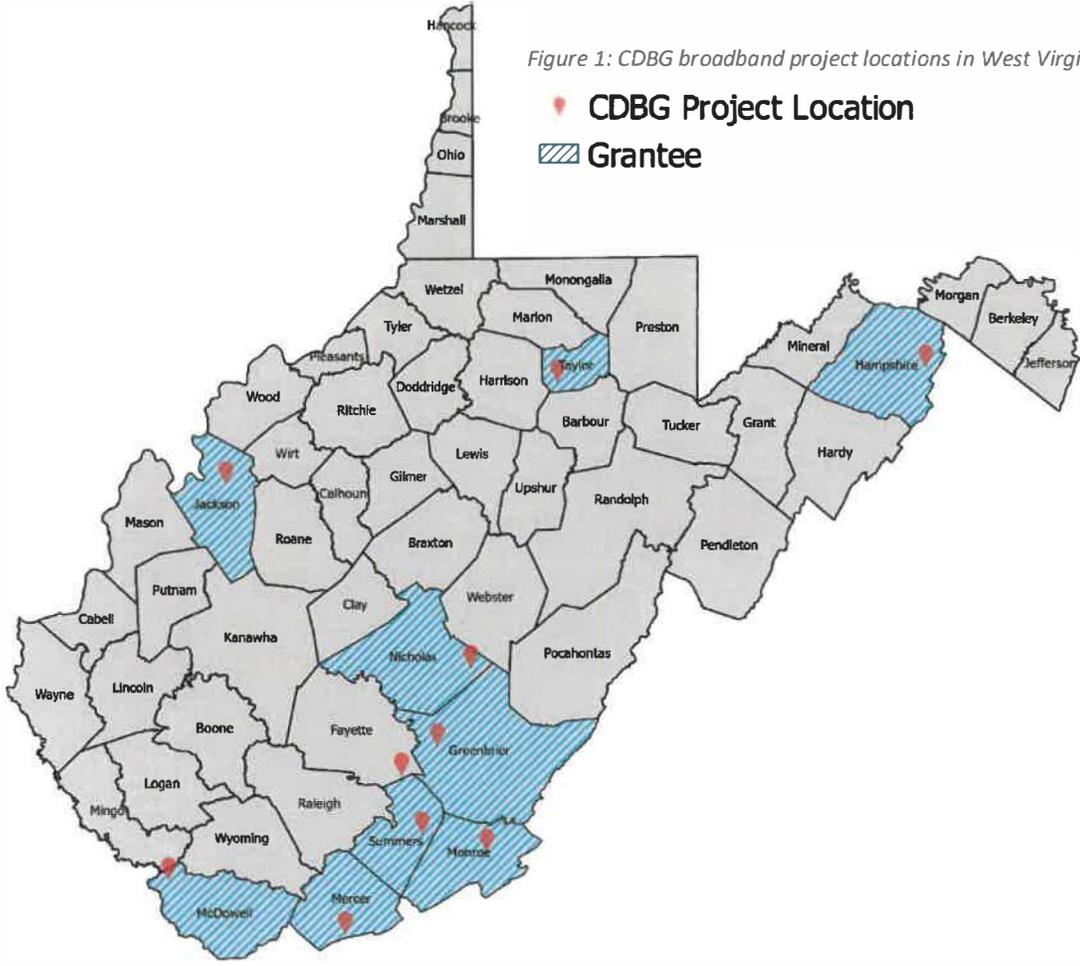


Figure 1: CDBG broadband project locations in West Virginia

CDBG BROADBAND INFRASTRUCTURE PROJECTS IN RURAL WEST VIRGINIA

Hampshire County Commission: Capon Bridge Industrial Park Fiber Extension

The Hampshire County Commission partnered with HardyNet to complete the Capon Bridge Industrial Park Fiber Extension. The project reached substantial completion in October 2021. This fiber infrastructure will provide new and improved broadband performance throughout the Capon Bridge community. To date, 44 customers have been connected, including 12 households, 32 businesses, and 7 anchor institutions.

Upon completion, project proposed to connect at least 65 customers including 60 households, 46 businesses, and 10 anchor institutions such as the Capon Bridge Town Hall, Banks, Fire Department, and Emergency Medical Services. Connection of the Hampshire County Satellite Treasurers Office/Assessors Office provides access to a WVNET server which greatly increases access speed and available services to local residents.

Connection of local banks to the fiber network provides the reliable bandwidth needed to complete required financial systems backups. The project impact has also allowed 10 jobs to be retained or created to date out of the 16 jobs proposed in the original plan.



Photo courtesy of HardyNet

Jackson County Commission: Sandyville Tower Wireless Project

The Jackson County Commission has utilized Community Development Block Grant funds to contract with locally-based Internet Service Provider [RT21.NET](https://www.rt21.net) to bring affordable, broadband speed wireless internet to the Sandyville area of Jackson County.

This project leveraged the use of a county-owned communications tower, which is located in a Low-Moderate Income service area of households that were identified as both unserved and underserved. The project was initially funded in 2017, with Thompson and Litton serving as project engineer, plans to finalize connections to 20 households by the end of the 2021 calendar year. Total project expenditures are estimated at approximately \$100,000. The bid contract included provision and installation of 6 base station radios, networking equipment, climbing costs, point to point links, receiver equipment, bandwidth costs and build out to provide 25 Mbps download and 3 Mbps upload speeds to up to 100 customers. [RT21.NET](https://www.rt21.net) will be able to continue to add unsubsidized customers in the Sandyville area.

More than one-third of the customers who signed up for service at \$55 per month for unlimited data internet primarily work from their home. With the pandemic still affecting the connectivity needs of residents for both work and school, this has been a fortunate time to bring reliable and affordable service to Sandyville.

Customer satisfaction among new customers has been high, reliability and customer service and speeds are key factors. Customer speed tests have shown examples of 236 Mbps download and 48 Mbps upload.

FCC RURAL DIGITAL OPPORTUNITY FUND

9
Bidders

Gigabit
Tier

119,267
Locations

\$362
Million

Historic
Broadband
Investment

FCC RURAL DIGITAL OPPORTUNITY FUND

The FCC conducted Phase 1 of the Rural Digital Opportunity Fund (RDOF) multi-round, reverse auction in October and November 2020. Through the entire RDOF program, the FCC outlined plans to award up to \$20.4 billion to support fixed broadband development nationwide. Phase 1 of the RDOF auction program included \$16 billion in potential funding. Of the \$16 billion, \$9.2 billion, or 57.5 percent, was awarded through a competitive, reverse auction framework designed to reduce costs through repetitive rounds of bidding by location(s). Winning bidders were announced on December 7, 2020.

West Virginia's initial auction eligibility profile, as determined by the FCC, included 120,506 locations. The maximum statewide award possible was slightly more than \$766 million, or \$76 million per year, for ten years. This figure was the maximum potential subsidy to be awarded by the FCC to carriers that competed in the auction process. However, through the reverse auction process, the ultimate subsidy amount awarded in West Virginia was \$362 million, approximately 47.2 percent of the maximum amount. Additionally, of the 120,506 initially eligible locations, 119,267, 98.9 percent, were 'won' by auction participants.

2021 RDOF SUPPORT AUTHORIZATIONS

As of December 2021, the FCC has issued its third RDOF Support Authorization Public Notice which includes support for CityNet. The FCC has also published a public notice for Ready to Authorize Long Form Application and Winning Bids which includes the West Virginia internet service provider, PRODIGI. "Ready to Authorize" public notification opens a 10-day business period for provider to submit a letter of credit to the FCC.

DEPLOYMENT MILESTONES

As shown in Figure 8.1, of the approximately \$362 million (total amount of subsidy over ten years) in RDOF Phase 1 subsidy awarded in West Virginia, approximately \$247 million was assigned to Frontier. This was the largest award in West Virginia and the third largest award nationally.

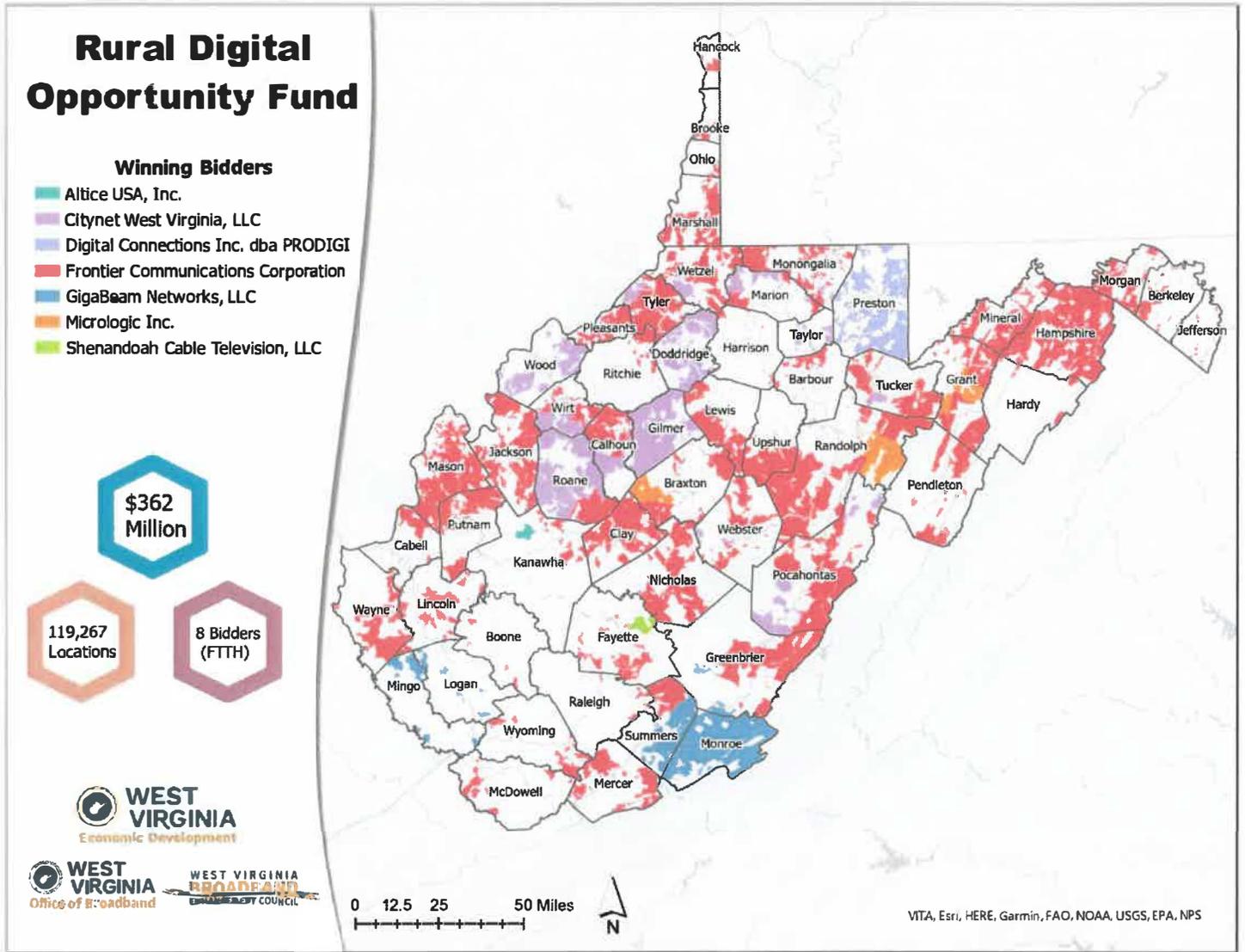
Of the 119,267 West Virginia locations assigned to bidders at the auction, approximately 80,000 of those were assigned Frontier. Notably, Frontier bid and won in the auction's Gigabit Performance Tier, specifying the use of "Optical Carrier – Fiber to the End-User" as the technology to be utilized to satisfy deployment obligations.

All auction winners must fulfill deployment obligations to serve 40 percent of the total locations won in a state by the end of year 3 (starting when the FCC announces final approval of auction winners to receive Universal Service Funds) and an additional 20 percent of auction subsidized locations per year until 100 percent completion by the end of year 6.

The specification of "Optical Carrier – Fiber to the End User" as a technology is presumed to necessitate the deployment of a Gigabit Passive Optical Network (GPON) as a fiber-to-the-home (FTTH) network that is able to provide service to each of the estimated 80,000 subsidized locations in West Virginia. To remain compliant with FCC RDOF auction rules, this GPON FTTH network must reach approximately 32,000 locations within three years after final FCC award approval. The network must then reach an additional 16,000 locations per year for each of the three years after the initial deployment.

These deployment milestones apply to all auction participants and represent a significant investment in broadband infrastructure in West Virginia. See Figure 1 for FCC RDOF awards by winning bidder in West Virginia.

FCC RDOF WINNING BIDDERS MAP



Note: SpaceX locations are not depicted in this map.

WEST VIRGINIA FCC RDOF AWARDS BY BIDDER

| Winning Bidders | WV Locations Assigned | Announced Annual Subsidy | Announced 10-Year Subsidy | Auction Speed Tier |
|---|-----------------------|--------------------------|---------------------------|--------------------|
| Altice USA, Inc. | 536 | 12,552.80 | 125,528 | 100/20 Mbps |
| Citynet West Virginia, LLC | 13,460 | 5,351,685.83 | 53,516,858.3 | 1000/500 Mbps |
| CommNet Wireless, LLC | 206 | 19,695.20 | 196,952 | 50/5 Mbps |
| Digital Connections, Inc. dba Prodigy | 4,771 | 858,300.14 | 8,583,001.4 | 1000/500 Mbps |
| Frontier Communications Corporation, DIP | 79,391 | 24,762,639.53 | 247,626,395.3 | 1000/500 Mbps |
| GigaBeam Networks, LLC | 9,071 | 2,806,778.92 | 28,067,789.2 | 1000/500 Mbps |
| MicroLogic, Inc. | 2,076 | 1,003,604.77 | 10,036,047.7 | 1000/500 Mbps |
| Shenandoah Cable Television, LLC | 419 | 9,186.70 | 91,867 | 50/5 Mbps |
| Space Exploration Technologies Corp. | 9,337 | 1,382,222.13 | 13,822,221.3 | 100/20 Mbps |
| TOTAL | 119,267 | 36,206,666.02 | 362,066,660.2 | NA |

STATE BROADBAND POLICY

WEST VIRGINIA ATTORNEY GENERAL CONSUMER COMPLAINT PROCEDURE

As directed by House Bill 2002, and in compliance with *W. Va. Code §31G-1A-2(b)(9)*, the West Virginia Office of Broadband has coordinated with the West Virginia Attorney General Consumer Complaint Division to establish procedures for consumer complaints related to broadband service.

Consumers who believe that they have been the victim of unlawful practices in the purchases of goods and services are first encouraged to fill out the appropriate form and return it to the West Virginia Attorney General's (WVAGO's) Consumer Protection Division. The office provides three options for submitting complaints:

- **Option 1:** Download and print the forms, complete and mail (with any copies of documents related to the complaint) to: Office of the Attorney General, Consumer Protection Division, P.O. Box 1789, Charleston, WV 25326-1789.
- **Option 2:** Download and fill out the appropriate PDF form and email the form and any additional documents related to the complaint in PDF format to complaint@wvago.gov. (25MB limit on attachments)
- **Option 3:** Complete an online version of the General Consumer Complaint form.

Individuals who need assistance may call the WVAGO Consumer Protection Hotline at 1-800-368-8808. Clicking the links below will download a PDF of the form in a separate tab.

- [Instructions for Filing a Consumer Complaint Form](#)
- [Documents Needed for Filing a General Consumer Complaint Form](#)
- [Broadband Complaint Form](#)

WEST VIRGINIA ECONOMIC DEVELOPMENT AUTHORITY BROADBAND LOAN INSURANCE FUND

Since 2018, West Virginia has provided incentives for investors to support deployment of broadband infrastructure, through a non-lapsing fund administered by the West Virginia Economic Development Authority (WVEDA).

The Broadband Loan Insurance Program (BLINS) was initially established to insure bank loans made to internet service providers to support the repayment of debt on capital costs related to providing broadband service to unserved or underserved areas of the State, or to link a segment of a network operator's core network to a local network plant that serves an unserved area or an area with no more than two wireline providers. The initial program did not contemplate BLINS working in conjunction with a state or federal grant program to promote the extension of broadband service.

In January 2020, the most significant federal program undertaken to that time for the expansion of broadband service was announced, the Federal Communication Commission's Rural Digital Opportunity Fund ("RDOF") program. The RDOF program rules were announced by a January 2020 FCC order. The \$16 billion phase I RDOF auction concluded on November 24, 2020.

The FCC announced that it would award over \$362 million to nine winning bidders to extend broadband service in West Virginia. One of the requirements of the RDOF process is for winning bidders to post a letter of credit with the FCC for up to 30% of the award amount to secure performance.

Governor Justice issued Executive Order 66-20 on September 3, 2020, pursuant to his authority to suspend statutory regulations during the COVID state of emergency. That Executive Order mentioned the RDOF program, suspended the per recipient and program dollar limits in the BLINS program and directed the WVEDA to make modifications to the BLINS program consistent with the Executive Order.

2021 Annual Report

The WVEDA, in consultation with the Council, undertook modifications to its guidelines for the BLINS program. The revised guidelines allow the BLINS program to be used to provide insurance to the banks that will be providing letters of credit to winning RDOF bidders.

Under the BLINS program prior to the Governor’s Executive Order, the WVEDA could insure up to 80 percent of a bank loan for a broadband infrastructure or development project. The insured portion could not exceed \$10 million and could be for a maximum term of 20 years. The WVEDA’s revised guidelines issued November 2020 permitted the BLINS program to insure up to 100% of a letter of credit and eliminated the cap of \$10 million per recipient.

In anticipation of the state of emergency being lifted, the Broadband Enhancement Council worked with the WVEDA, the Governor’s Office, and the Legislature to develop Senate Bill 295 which was adopted in the 2021 Legislative Session. Senate Bill 295 places the BLINS program in its own sections of the West Virginia Code (previously it had been coupled with an EDA industrial development loan program) and clarified that the BLINS program could be used for both loan insurance and letter of credit insurance. It set the BLINS program cap at \$80 million and limits any individual internet service provider to \$20 million of insurance through the program.

In 2021, the BLINS program provided \$6.27 million of letter of credit insurance to two RDOF winning bidders in the State. The WVEDA has insured a Letter of Credit issued by MVB Bank, Inc. for the benefit of Citynet West Virginia, LLC in the initial maximum amount of \$5,351,685.90 and a Letter of Credit issued by Clear Mountain Bank, Inc. for the benefit of Digital Connections, Inc., d/b/a Prodigy in the initial maximum amount of \$913,153.34. At the end of 2021, the WVEDA was in the process of insuring a Letter of Credit issued by Citizens Bank of West Virginia, Inc. for the benefit of MicroLogic Inc., in the initial maximum amount of \$1,003,605.00.

ACCESS TO HIGHWAY RIGHTS-OF-WAY AND DIG ONCE POLICY

In 2018, the West Virginia Legislature enacted a Dig Once Policy, passing legislation that will create incentives over the long term to create spare conduit or opportunities to lay fiber in a joint trench. HB 4447 created a new article of code, §17-2E-1 et seq., that established the “Dig Once” policy. It directed the West Virginia Division of Highways (WVDOH) to install vacant broadband conduit during highway construction projects. Interested ISPs apply to the Council for approval to use the conduit. Conduit is leased at cost-based rates.

The Council is also charged with creating a strategy to facilitate the timely and efficient deployment of broadband infrastructure on state-owned lands and buildings, and to assist local governments with development of similar Dig Once and deployment policies.

The West Virginia Division of Highways (WVDOH) has updated guidance to implementing the State’s Dig Once Policy Act. The Dig Once Application Submission Checklist is now available online.

In 2019, Senate Bill 270 amended the Dig Once Policy, W. Va. Code § 17-2E-1 et seq., in addition to W. Va. Code § 17-2A-17a, which governs utility accommodation leases. Section 17-2A-17a provides that the Commissioner (Commissioner) of the WVDOH may lease real property held by the Division to accommodate any utility providing telecommunications or broadband services if the Commissioner finds that entering said lease is in the public interest.

The utility is required to pay fair market value for the real property interest under the lease. Senate Bill 270 amends this section to provide that the fair market value of such property interest shall be \$0 in monetary compensation. However, the legislation does not prohibit in-kind compensation if the lease concerns multiple districts within the Division.

Senate Bill 270 amended § 17-2E-3 of the Dig Once Policy to provide that the fair market value of the Division’s spare conduit or related facilities shall be \$0 in monetary compensation. It also amends the Dig Once

Policy by eliminating the newspaper notice requirements, and by reducing the notice period from thirty (30) days to fifteen (15) days.

This legislation also provided new exemptions from the Dig Once Policy's requirements, including:

- ❖ Projects that are less than 1,000 feet in length,
- ❖ Projects that use the direct bury of cable or wire,
- ❖ Projects where the carrier installs an amount of spare conduit or innerduct equal to what is being installed for its own use and which is made available for lease to competing carriers on a nondiscriminatory basis at rates established by the FCC.

Finally, the legislation permits the WVDOH, with the Governor's written approval, to transfer or assign ownership, control, or any rights related to any in-kind compensation received by the Division to any other state agency.

In House Bill No. 2002 adopted in 2021, the Legislature amended *W.Va. Code* §17-2E-5 to provide that broadband or telecommunication providers that wish to construct a trench in the WV Department of Highways right of way are to apply to the DOH for a permit. An applicant for a DOH permit is obligated to simultaneously notify the Office of Broadband and all telecommunication carriers of record with the Office of Broadband of the application.

A carrier receiving notice of the application for a permit has 15 days in which to issue a notice of interest with the original applicant to share the trench. Once such a notice is issued, the original applicant and the carrier filing the notice of interest have 30 days within which to execute a trench sharing agreement which sets out responsibilities and cost sharing. The Legislation specifies that cost sharing is to be allocated based upon amount of conduit space or excess conduit space. If the two parties cannot reach an agreement on a trench sharing agreement, the two are to take the dispute to the West Virginia Public Service Commission (WVPSC), which must adjudicate the dispute within 45 days.

In 2021, the WVPSC opened a general investigation, PSC Case No. 21-0532-T-E-CTV-GI, which has as one of its purposes to develop formal complaint procedures for trench sharing disputes consistent with HB 2002. The Office of Broadband and the Broadband Enhancement Council participated in the WVPSC Staff lead Task Force in that general investigation. The Task Force unanimously recommended to the WVPSC on November 15, 2021 that it adopt trench sharing dispute resolution rules drafted by the Broadband Enhancement Council. The WVPSC's general investigation remained open at the end of 2021.

SMALL WIRELESS FACILITIES DEPLOYMENT ACT

Senate Bill 3 also creates a new chapter of the West Virginia Code, designated as § 31H-1-1 *et seq.* and known as the **Small Wireless Facilities Deployment Act**. The Legislature found that small wireless facilities, also known as small cells and distributed antenna systems, are often deployed most effectively in public rights-of-way. Therefore, this chapter allows wireless providers to collocate small wireless facilities and install, modify, or replace utility poles for such facilities in public rights-of-way.

This chapter also sets rates for the occupancy and use of the rights-of-way and provides some zoning and permitting guidelines.

WIRELESS TECHNOLOGY BUSINESS PROPERTY VALUATION ACT

This act of the Legislature creates a new article of the West Virginia Code, designated as § 11-6L-1 *et seq.* and known as the **Wireless Technology Business Property Valuation Act**. It provides for the valuation of towers constructed or erected between July 1, 2019, and July 1, 2024, that host antenna or other equipment used for transmitting cellular or wireless communications signals.

Under this new article, for the five years immediately following the tower's erection, the value of the tower is its "salvage value," or five percent of its original cost. Thereafter, the value of the tower is determined in accordance with existing West Virginia Code § 11-6-1 *et seq.*

VERTICAL REAL ESTATE MANAGEMENT AND AVAILABILITY ACT

In 2020, HB 4015 created a new article of the W. Va Code, § 31G-1-3; §§ 31G-5-1 – 4, known as the **Vertical Real Estate Management and Availability Act**, which requires the West Virginia Department of Administration to request proposals to manage state-owned Vertical Real Estate. “Vertical Real Estate” is defined as towers or other structures mounted on rooftops or other prominent places, and any facilities associated with that structure, including ground facilities.

All funds in excess of management fees will be deposited by the West Virginia Office of Technology (WVOT) as follows: 50 percent to the Technology Infrastructure Reinvestment Fund for reinvestment in Vertical Real Estate or other infrastructure supporting broadband on state-owned property, and 50 percent to the Broadband Expansion Fund established in § 31G-1-5 and under the control of the Council.

The West Virginia Office of Technology (WVOT) is currently researching opportunities and potential relationship links of the vertical real estate initiative with other state technology initiatives, such as modernization of the State Interoperable Radio Network (SIRN) and the state's Wide Area Network (WAN). A professional services solicitation to assist the state in drafting a Request for Proposal that addresses the full range of requirements will soon be completed.

MAKE-READY POLE ACCESS ACT, LEGISLATIVE CHANGES AND WV PUBLIC SERVICE COMMISSION POLE ATTACHMENT RULE REVISIONS

In 2019, Senate Bill 3 provided for the implementation of One-Touch Make-Ready rules for utility pole attachments, premised primarily on the Federal Communications Commission's (FCC's) rules around this process. One-Touch Make-Ready requires the pole owners to allow a single crew to make changes to multiple wires, rather than having the owner of each wire or strand send its own crew to move it separately.

The Broadband Enhancement Council filed comments in support of the new rules and urged that the WVPSOC adopt the FCC rules largely as is, taking the position: *Improving the reach and quality of broadband is absolutely vital to West Virginia's efforts to attract and retain businesses and residents.*

Senate Bill 3 is appealing to broadband providers because it adopts a known framework. Many broadband providers operate on an interstate basis, and distinctive State rules are a deterrent to entry and expansion. Initial Comments of West Virginia Broadband Enhancement Council, Case No. 19-0551-T-G, July 9, 2019

The WVPSOC adopted new rules implementing One-Touch Make-Ready based on the FCC's rules on December 5, 2019.

In 2021, House Bill 2002 amended the Make Ready Pole Access Act. House Bill 2002 directed the WVPSOC to promulgate rules regarding amendments to *W. Va. Code* § 31G-4-4 which concern abandoned cable and related facilities attached to utility poles. When a utility pole is used to transmit both electricity and communication, the higher portion of the pole carries the electricity, and the lower portion of the pole is the communication space for telecommunications, cable television, and broadband. A great majority of the poles are owned by electric utilities or the incumbent local exchange carrier, or jointly owned between the two, but some competitive local exchange carriers and some cable television providers do install and own some poles.

When pole owners determine that pole replacement is required, users of the old poles may not want to migrate their facilities to the new poles. This leads to redundant poles on the landscape. House Bill 2002 authorizes the pole owner, once it takes reasonable efforts to require the attachment owner to migrate or remove its facilities, to recover its costs of removing and disposing of attachment owner facilities from the old pole from the attachment owner.

A pole owner is also relieved of liability for removing or disposing of attachment owner facilities once it gives the attachment owner reasonable notice of its intent to migrate or remove, and the attachment owner fails to respond. To the extent a pole owner is unsuccessful in

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recovering its costs of removing or disposing of attachment owner facilities from attachment owners, House Bill 2002 authorizes the utility to recover such expenses through a surcharge to be approved by the WVPSC on the utility's customers. The Legislature directed the WVPSC to adopt rules which specify the timing and process for the transfer of facilities from an old pole to a new pole, including actions to be taken by the pole owner when an attachment owner is non-responsive.

In 2021, the WVPSC opened a general investigation, PSC Case No. 21-0532-T-E-CTV-GI, which has as one of its purposes to address the timing and process for the transfer of facilities from an old pole to a new pole consistent with HB 2002. The Office of Broadband and the Broadband Enhancement Council participated in the WVPSC Staff led task force in that general investigation. The parties to the Task Force were able to jointly recommend to the WVPSC proposed rules governing the timing and process for the transfer of facilities on poles. The Staff of the WVPSC recommended that the proposed rules require pole owners to implement transfers where an attacher is non-responsive or uncooperative, whereas the other members of the task force recommended that when an attacher is responsive the pole owner would have the authority, but not the obligation, to move the attacher's facilities. The WVPSC's general investigation remained open at the end of 2021.

WEST VIRGINIA POLICY ON BRIDGE ATTACHMENTS

Bridge Attachments are governed by the WVDOH Utility Manual, available at the following link:

https://transportation.wv.gov/highways/engineering/files/ACCOMMODATION_OF_UTILITIES.pdf

BROADBAND COOPERATIVES

West Virginia also provides a statutory mechanism for residents, businesses, and political subdivisions in West Virginia who have no good options for service providers to create a cooperative association to address connectivity problems. These coops are authorized to establish a provider focused on their communities, bond or finance the building of infrastructure, and

engage in other related activities. W. Va. Code § 31G-2-1 *et seq.*

MICROTRENCHING

West Virginia Code § 31G-3-1 *et seq.* establishes the ability of fiber network builders to utilize microtrenching in the State of West Virginia, an innovative lower-cost, lower-impact option for installing underground fiber facilities. It also requires the installation of vacant conduit when a provider is performing microtrenching operations.

NONREGULATION OF VOIP SERVICES

West Virginia also has legislation clarifying that the Public Service Commission does not have jurisdiction over companies that offer Voice over Internet Protocol (VoIP) telephony services. W. Va. Code § 24-2-1(e).

OVERSIGHT OF CABLE FRANCHISING

Under W. Va. Code § 24D-1-1 *et seq.*, cable television service in West Virginia is subject to the authority of counties and municipalities to grant franchises and enter into franchise agreements. Many cable television providers also offer internet and VOIP ((voice over internet protocol) telephone service on a bundled basis and through a single cable.

If a county commission declines to serve as a franchising authority, the West Virginia Public Service Commission (WVPSC) can serve as the franchising authority for that county. The WVPSC has quality of service jurisdiction over cable television providers to receive complaints from consumers. The WVPSC does not have jurisdiction over the internet and VOIP services provided by cable television providers.

Due to a large volume of complaints concerning one of the largest cable television providers, in 2021 the WVPSC opened a general investigation into its quality of service, PSC Case No. 21-0515-CTV-SC-GI. Consumers experiencing poor cable television service were also likely experiencing poor internet and VOIP service as well. While the Broadband Enhancement Council did not seek to intervene in the general investigation, it did monitor the proceeding. The general investigation remained open at the end of 2021.

FEDERAL BROADBAND POLICY

FCC DODC AND MODERNIZING THE FCC FORM 477 DATA PROGRAM

The Council strongly supports the establishment of the DODC because the success of broadband expansion initiatives including the RDOF, depends heavily upon the accuracy of the data used to determine which areas are “unserved” and therefore eligible for funds. To this end, the Council supports sunsetting Form 477 and implementing a new, more accurate polygon-based system of reporting with a public challenge process, which will represent service at a greater granularity than census blocks. However, the Council continues to advocate for the use of address-level data, as it provides the most granular and therefore accurate depiction of broadband availability.

a. CREATION OF ONLINE PORTAL

- i. The Council also supports the creation of an online portal for local, state, and Tribal governmental entities, as well as members of the public, to review and dispute the broadband coverage polygons filed by internet service providers.
- ii. As the Council has mentioned in previous comments submitted to the FCC, the geographic areas in West Virginia eligible for funding in the Connect America Fund Phase II auction were drastically reduced by inaccurate representations made during that application process. Allowing interested parties to submit data to contest representations will ensure that polygons are not mislabeled and wrongfully excluded from broadband expansion initiatives. This will also help the FCC more precisely target universal service dollars to areas lacking broadband service.

b. CROWDSOURCING AND USAC DATA VERIFICATION

- i. The Council also supports the FCC’s proposal to collect and use crowdsourced data, meaning data collected by the Universal Service Administrative Company (USAC) from state governments, including state public utility commissions, and local and Tribal governmental entities, as well as members of the public, about the accuracy of the coverage polygons gathered from fixed providers and to make such data publicly available.[1]
- ii. The Council encourages the FCC and USAC to structure the interface of this online data collection portal to support the submission of both 1) bulk data submissions by state and local entities, and 2) individual data submissions by members of the public. In order to standardize crowdsourced data collected by state, local, and Tribal entities, the Council encourages the FCC and USAC to create a common set of criteria for submitting crowdsourced data and has suggested key categories for this data.

[1] [Establishing the Digital Opportunity Data Collection and Modernizing the FCC Form 477 Data Program](#), 84 Fed. Reg. 43764, ¶ 88 (August 22, 2019).

2020-2025 Five-Year Broadband Plan Goals and Strategies

| Goal | Strategy | Key Sector Partners | Plan Section | Priority/Timeline | Additional Resources Needed |
|--|---|--|--------------|-------------------|-----------------------------|
| Reduce or eliminate barriers for broadband projects | Implement policies that provide efficient access to public rights-of-way | Public Service Commission; Department of Highways, Legislature | 9.1.1.1 | | |
| | Encourage “Dig Once” opportunities for projects in public rights-of way | Public Service Commission; Department of Highways, Legislature | 9.1.1.1 | | |
| | Reduce or eliminate fees, especially for projects that directly serve WV consumers | Public Service Commission; Department of Highways; Legislature; Municipal Officials and Local Boards | 9.1.1.1 | | |
| | Adopt best practices to facility access to utility poles for broadband projects, including one-touch make-ready | Public Service Commission; Legislature; Utility Pole Owners, including Electric Utilities and Municipalities | 9.1.1.2 | | |
| | Inventory and document publicly controlled assets available for broadband deployment | State Agencies; DHSEM, SIRN Network, Municipalities, Counties; Regional Planning & Development Councils | 9.1.1.3 | | |
| | Collect GIS data that broadband providers can use to plan networks | Public Service Commission; Department of Commerce, Development Office, Partner Agencies, Colleges and Universities, Contracted Technical Services; Legislature; ISPs, Utility Pole Owners, including Electric Utilities and Municipalities; Municipalities: Regional Planning & Development Councils | 9.1.1.3 | | |

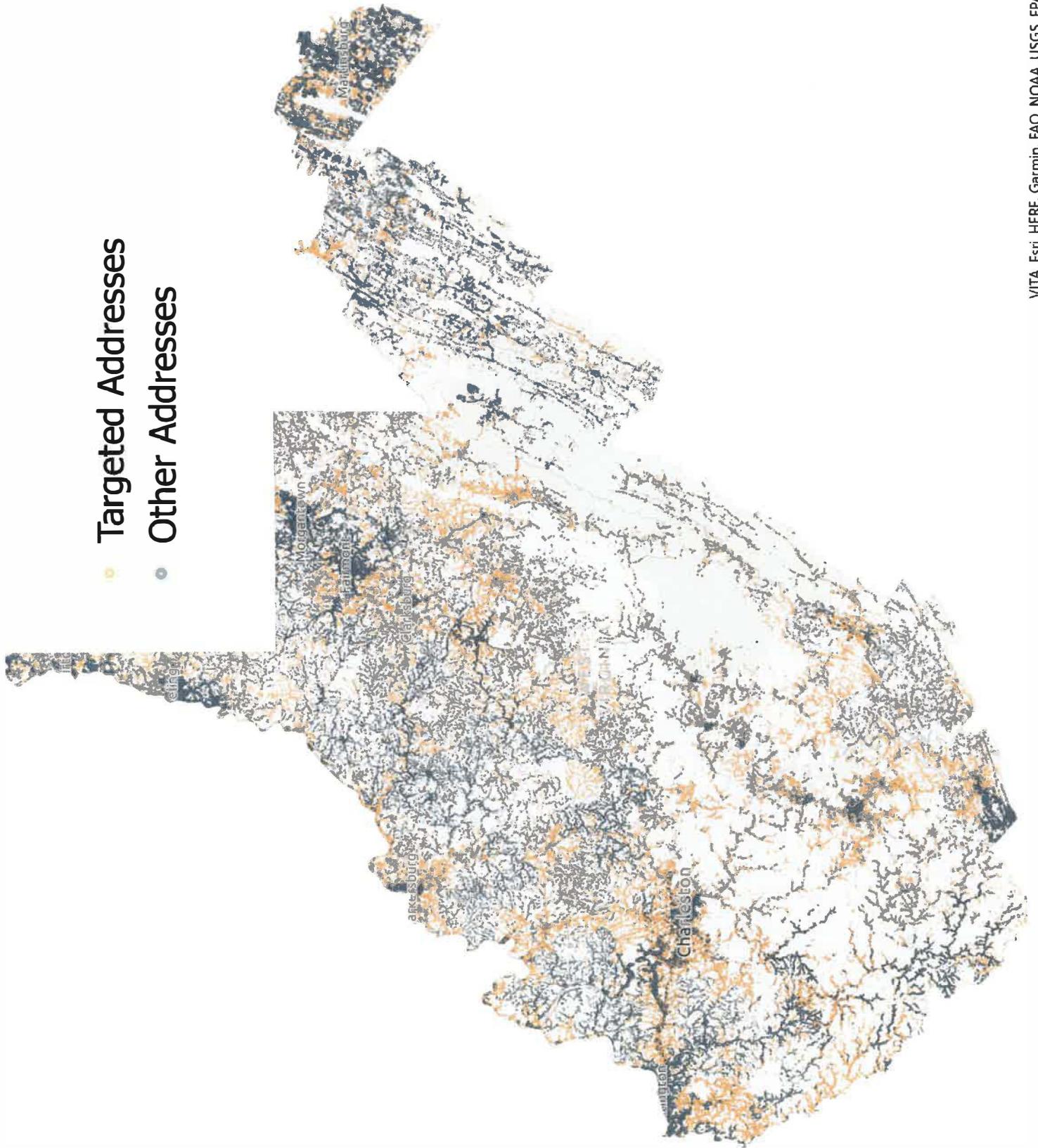
| Goal | Strategy | Key Sector Partners | Plan Section | Priority/Timeline | Additional Resources Needed |
|--|---|---|--------------|-------------------|-----------------------------|
| Secure financial assistance for broadband investments in unserved and unserved areas | Use targeted State funding to maximize availability of federal, State and private funding | Economic Development Authority; Department of Commerce, Development Office and Partner Agencies; Legislature; FCC | 9.1.2 | | |
| | Continue loan guarantee program through Economic Development Authority | Economic Development Authority; Legislature; Banking Community; Federal Funding Agencies | 9.1.2 | | |
| Ensure robust middle-mile services to support last-mile broadband projects | Support electric utility investment in middle-mile fiber to support last-mile broadband service | Public Service Commission; Legislature, Electric Utilities, ISPs and Private Sector Partners | 9.1.3 | | |
| | Continue to promote development of middle-mile infrastructure to support last-mile projects in partnership with private companies | Legislature; Private Sector Partners | 9.1.3 | | |
| Support locally-supported organizations for developing service where private ISPs cannot | Develop resources for local or regional coops to provide broadband service | State, Regional, and Local Officials and Stakeholders, ISPs and Private Sector Partners; Regional Planning & Development Councils | 9.1.4 | | |
| Have multiple "Gigabit ready" cities and counties | Provide a roadmap for cities and counties to demonstrate that they are ready for private investments in gigabit infrastructure. | Economic Development Authority; Department of Commerce, Development Office; City and County Officials and Boards; Local Economic Development, Regional Planning & Development Councils; Authorities; Chambers of Commerce | 9.1.5 | | |

| Goal | Strategy | Key Sector Partners | Plan Section | Priority/ Timeline | Additional Resources Needed |
|---|---|--|--------------|--------------------|-----------------------------|
| Have granular data on broadband availability and speed to target assistance to areas w greatest need | Create an enhanced broadband mapping initiative under the direction of the Broadband Enhancement Council | Public Service Commission; Department of Commerce, Development Office, Partner Agencies, Colleges and Universities, Contracted Technical Services; Legislature; ISPs, Utility Pole Owners, including Electric Utilities and Municipalities; Municipalities | 9.2 | | |
| Schools and health-care institutions will deliver and students and patients will have broad access to broadband-delivered online education opportunities and telehealth services | Support local use and deployment of broadband applications for education and health care institutions and users through Statewide organizations or consortia. | Department of Education; Higher Education Policy Commission; Schools; Libraries, Hospitals and Health Care System, WVNet | 9.3.1 | | |
| | Maximize federal support for broadband services to schools, libraries, and health care institutions through use of coordinated Statewide bids for supported services under the FCC's E-rate and Rural Health Care Programs. | Department of Education; Schools; Libraries, Hospitals and Health Care System, WVNet | 9.3.1 | | |
| West Virginia's workforce will have and utilize broadband-delivered opportunities for | Designate lead organization(s) to act as a clearinghouse of information on online training and continuing education best practices for local organizations who support workforce development efforts in their communities. | Department of Commerce, Workforce West Virginia; Library Commission; Department of Education; Higher Education Policy Commission; WV Community and Technical College System | 9.3.2 | | |

| Goal | Strategy | Key Sector Partners | Plan Section | Priority/ Timeline | Additional Resources Needed |
|--|--|--|--------------|--------------------|-----------------------------|
| <p>training, and continuing education that support the needs of the State’s businesses and employers</p> | | | | | |
| <p>Public safety agencies will utilize a nationwide interoperable broadband network.</p> | <p>Continue to support and inform public safety users of opportunities to use the nationwide interoperable FirstNet Public Safety Broadband Network.</p> | <p>State Police; Dept of Military Affairs and Public Safety; SORN; local law enforcement agencies and emergency response organizations</p> | <p>9.3.3</p> | | |
| <p>Support the ability of State and local government to deliver citizens access to a range of government services online</p> | <p>Designate lead organization(s) to support the deployment of broadband applications for State and local government agencies to deliver high-quality online services.</p> | <p>WV Office of Technology; State Agencies; Municipal and County Agencies</p> | <p>9.3.4</p> | | |

APPENDIX A

TARGET AREA MAP: WEST VIRGINIA



Targeted Addresses

Other Addresses

APPENDIX B

TARGET AREA MAPS: WEST VIRGINIA COUNTIES

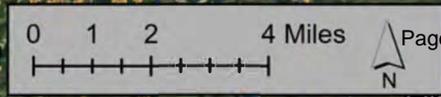
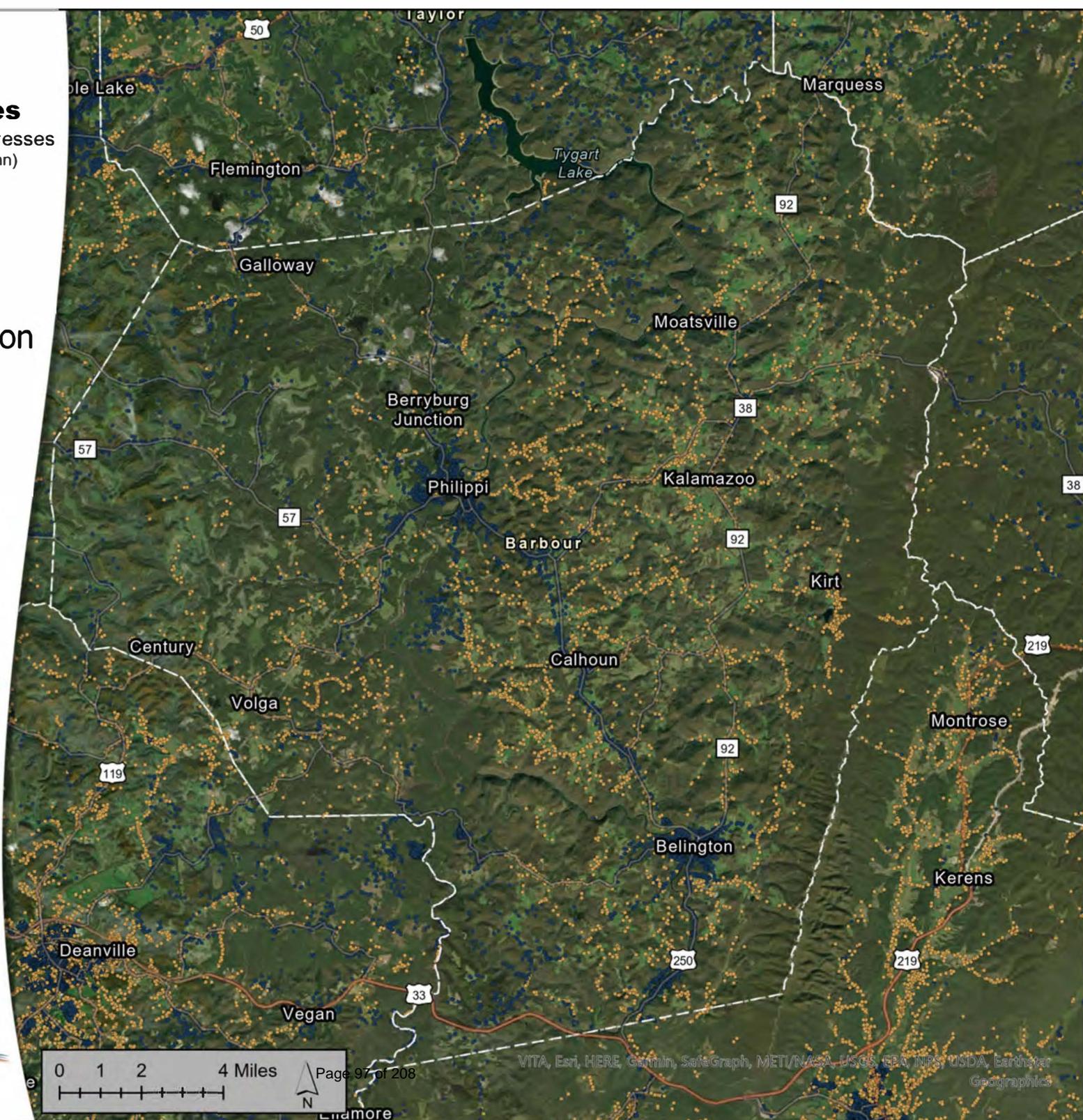
West Virginia

Target Area Addresses

Estimated Served and Unserved Addresses
(West Virginia Broadband Investment Plan)

Target Area Classification

- Targeted Addresses
- Other Addresses



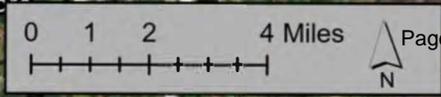
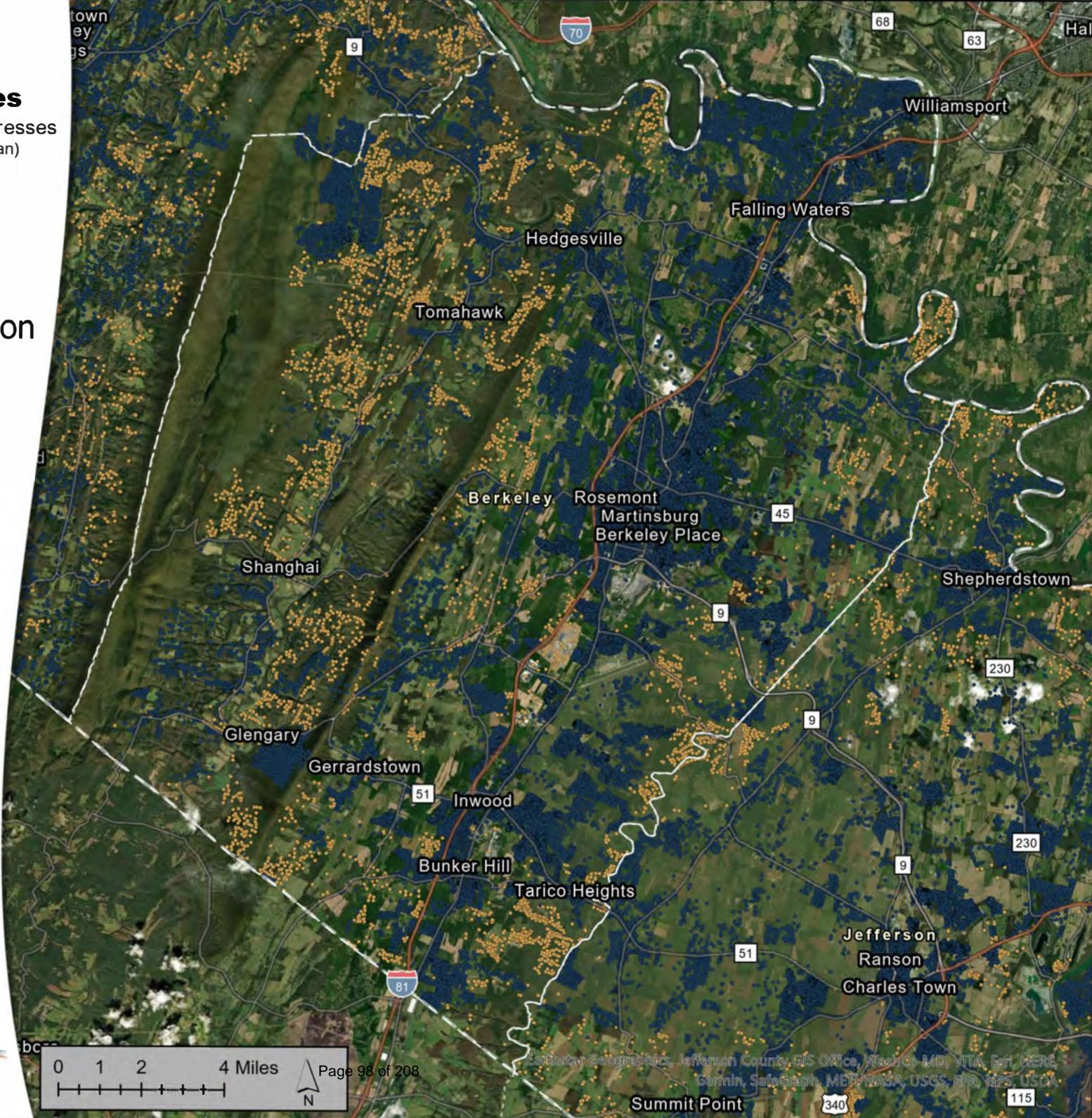
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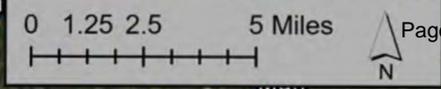
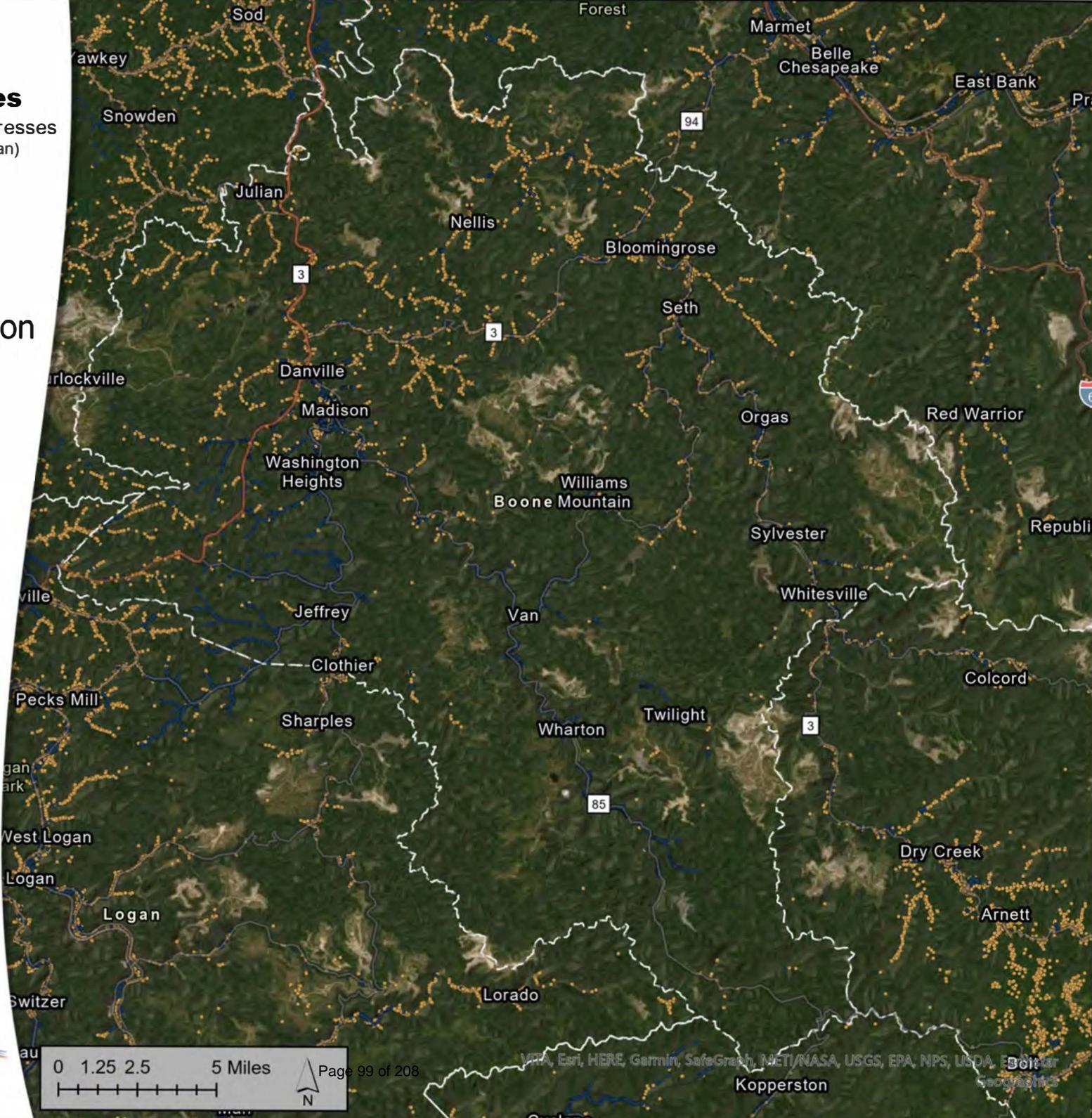
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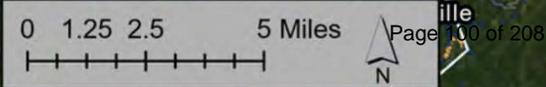
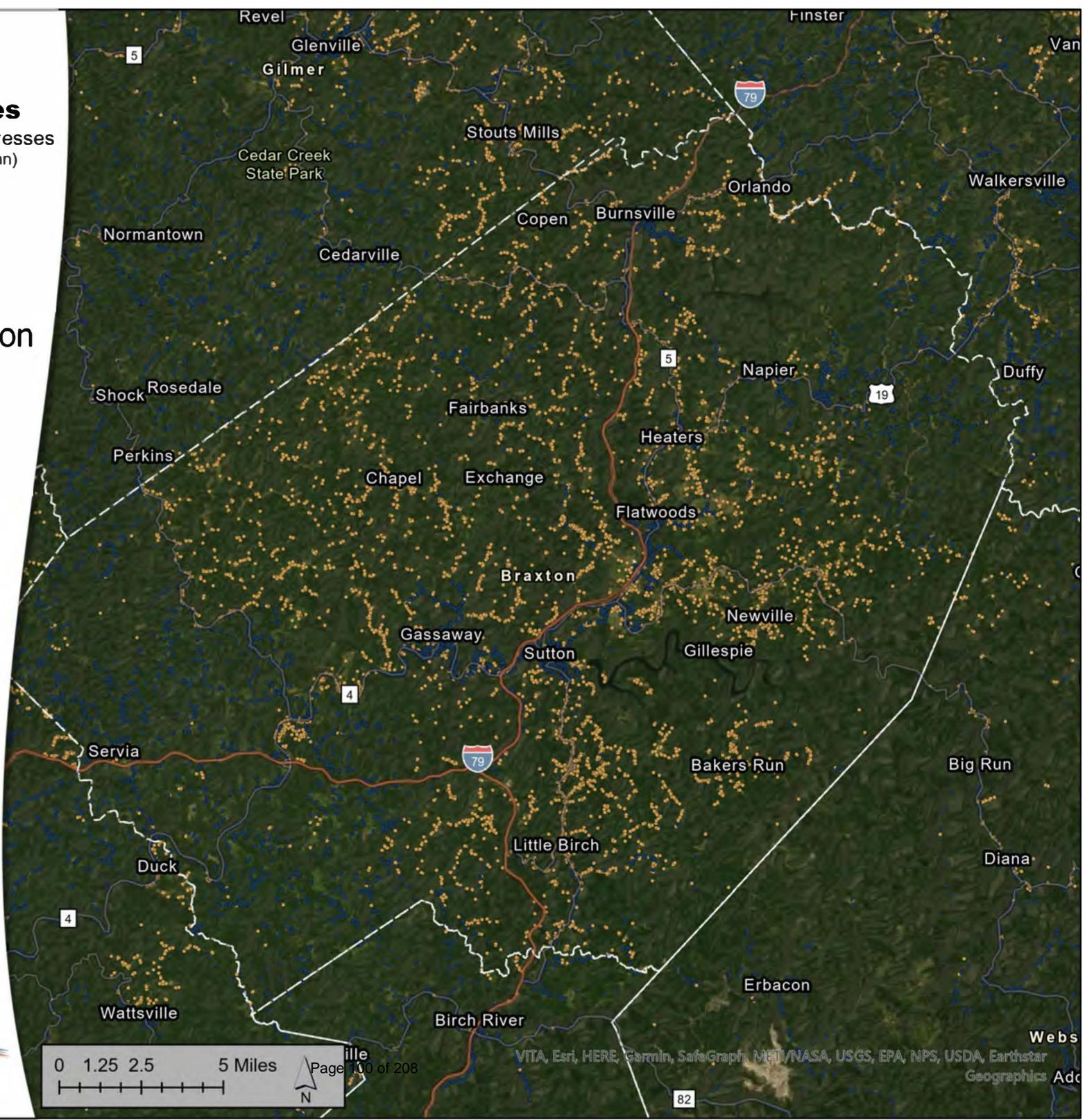
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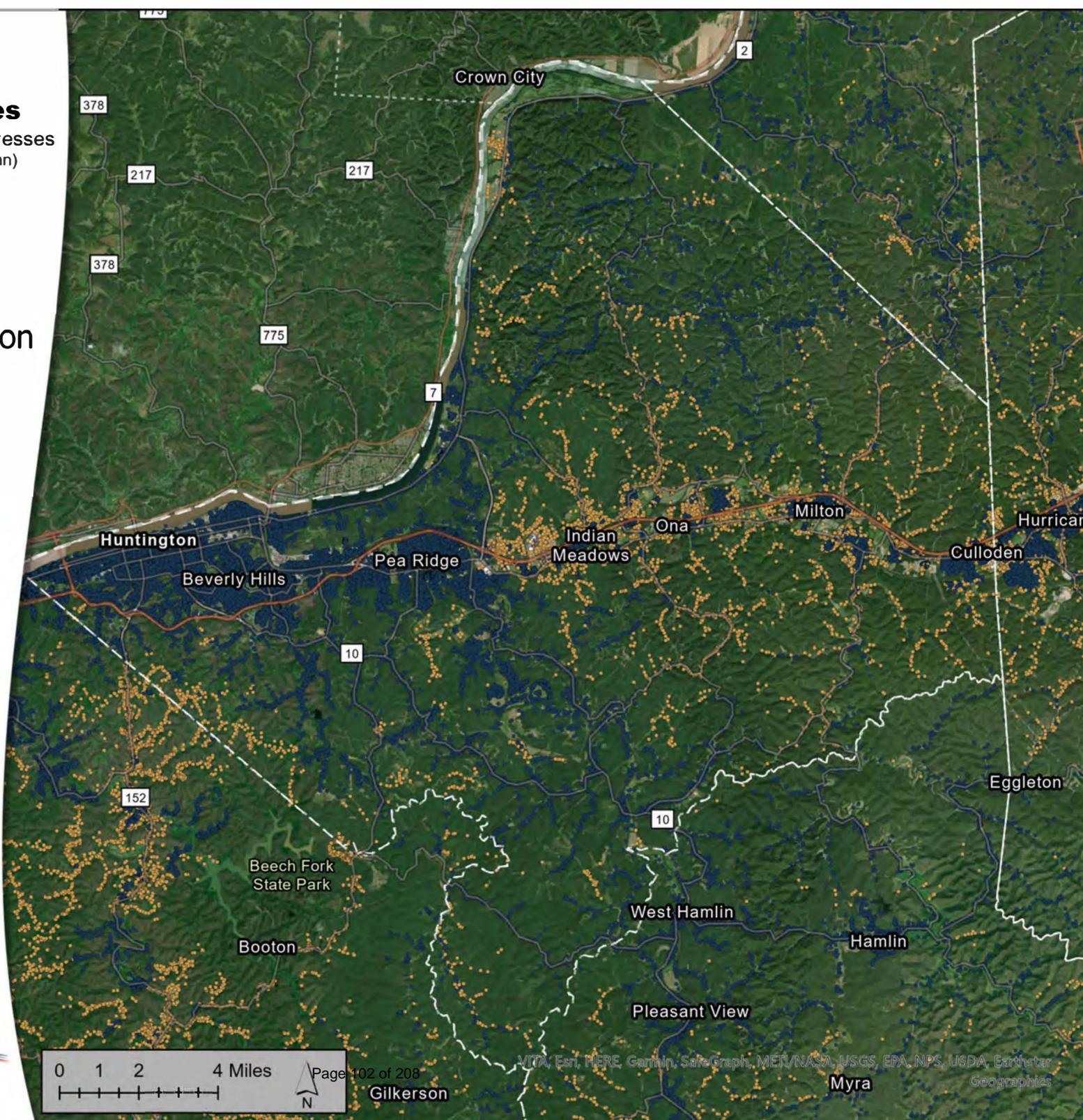
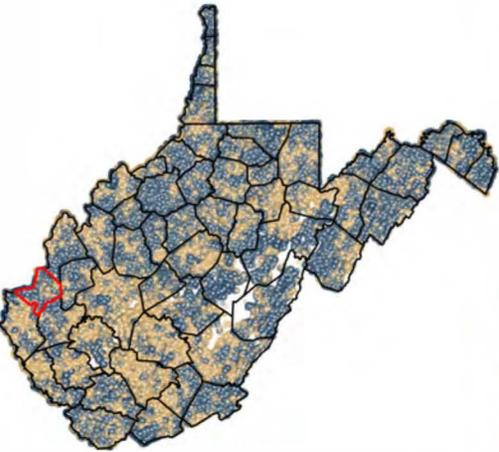
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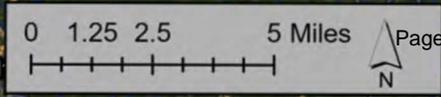
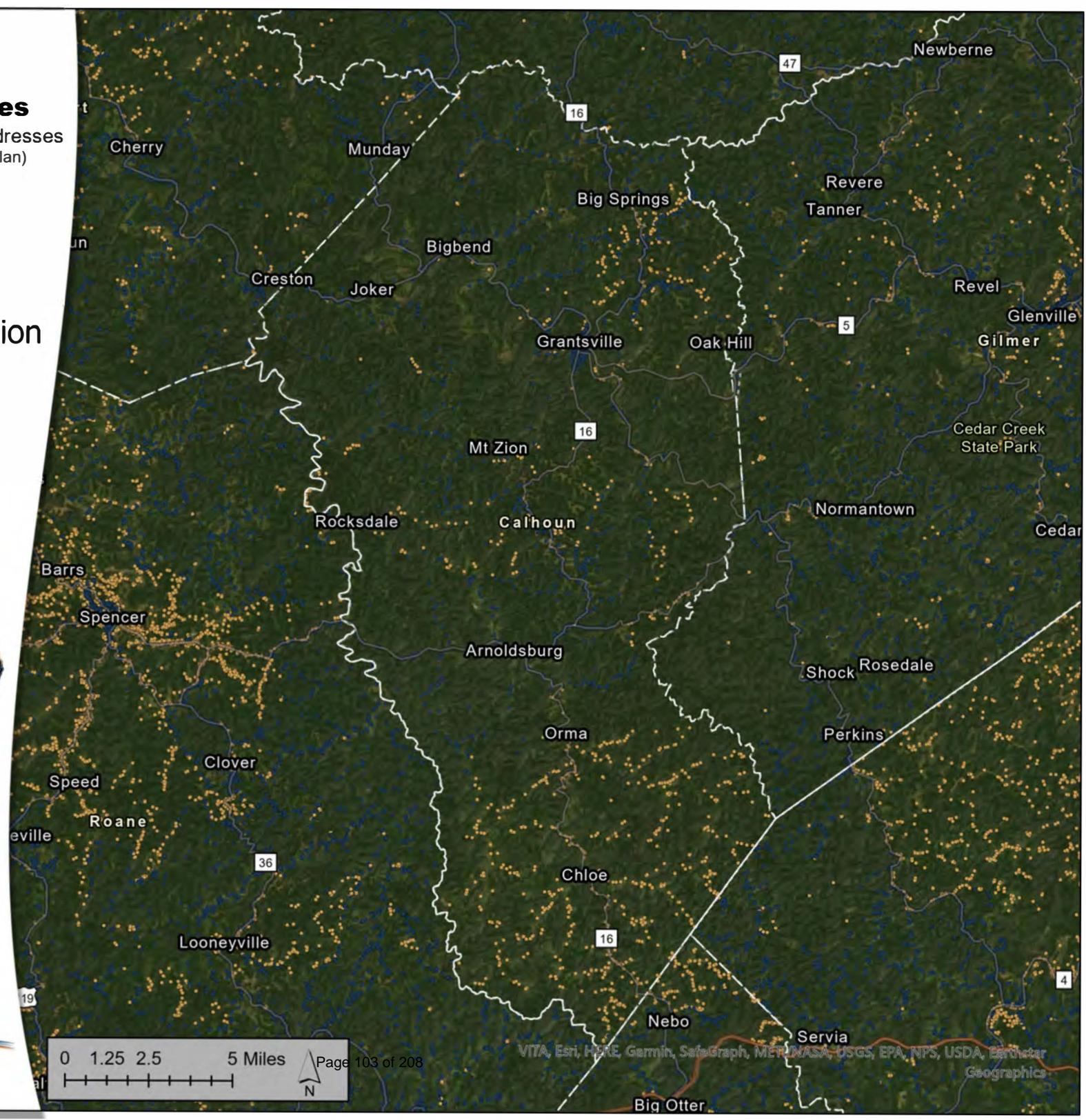
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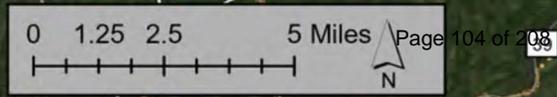
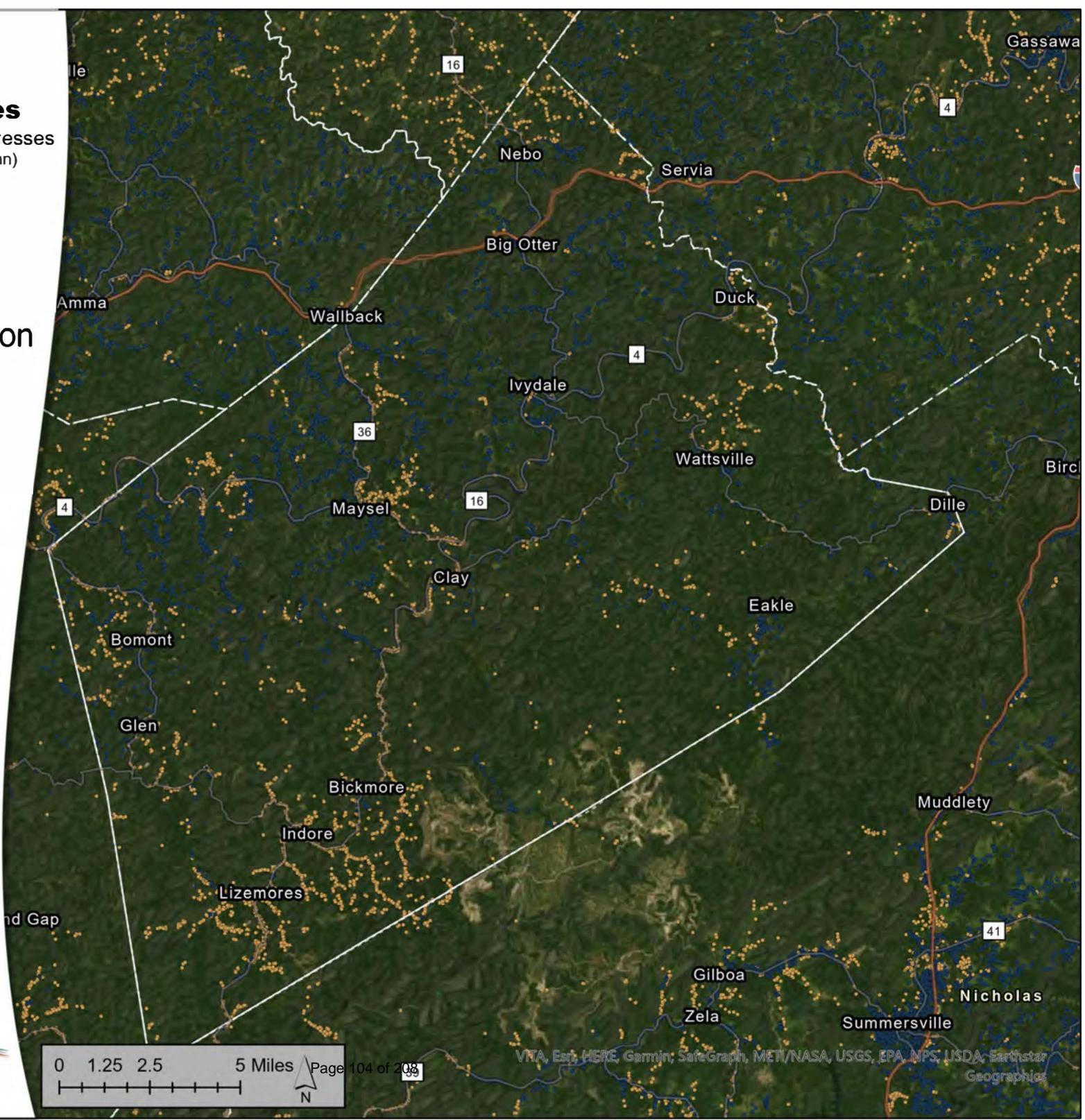
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VTA, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, Earthstar Geographics

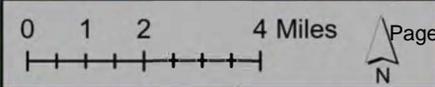
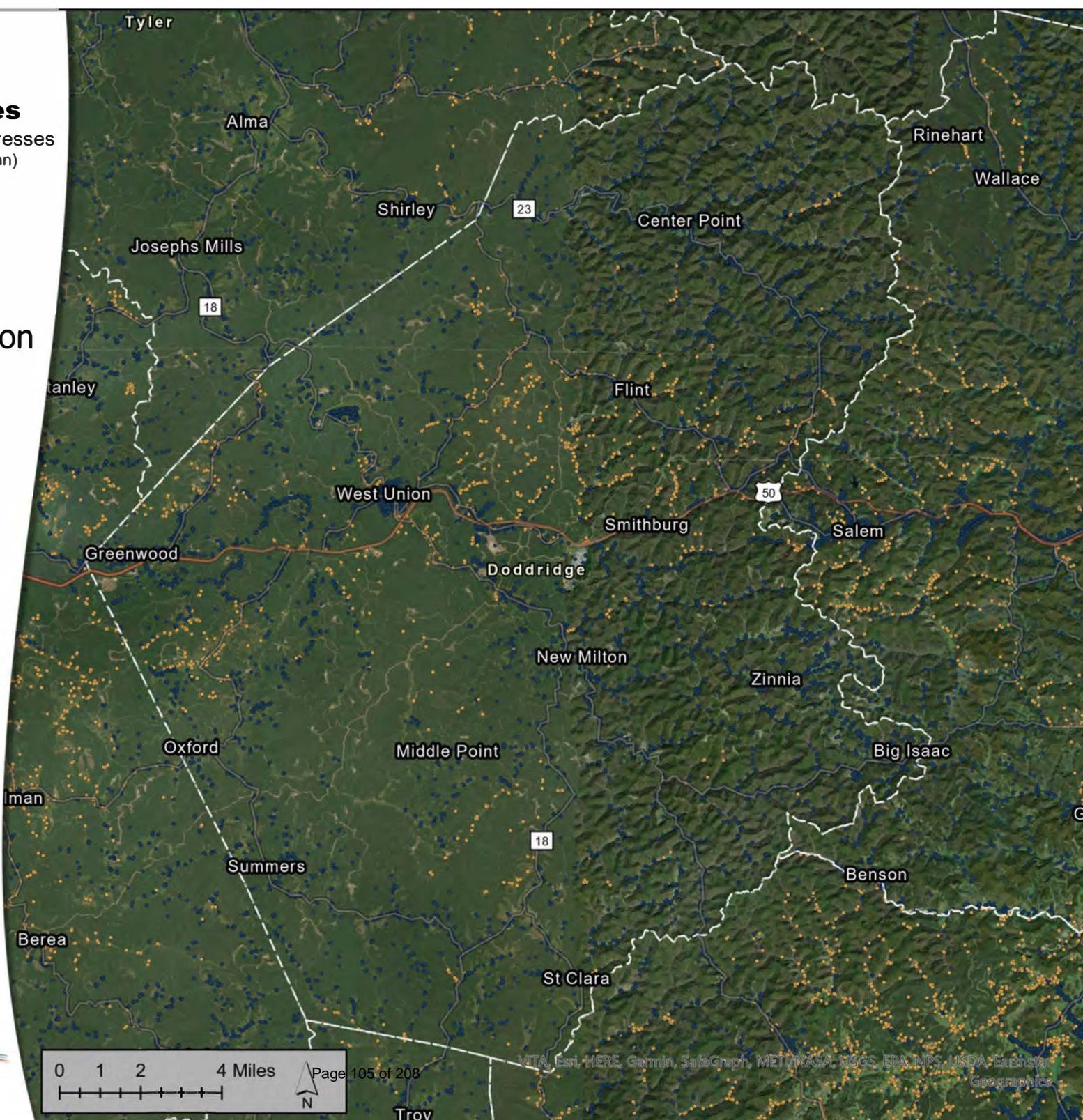
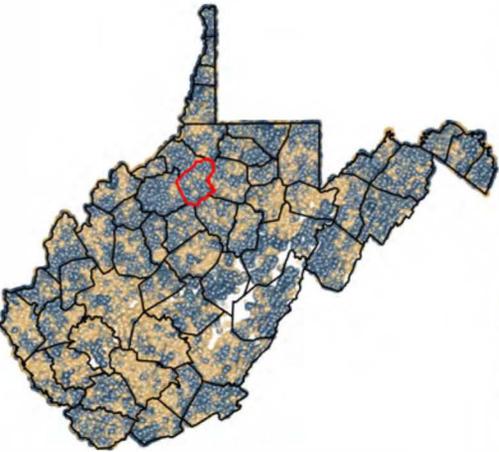
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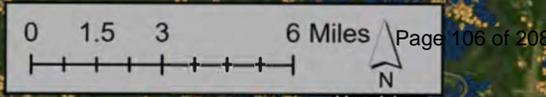
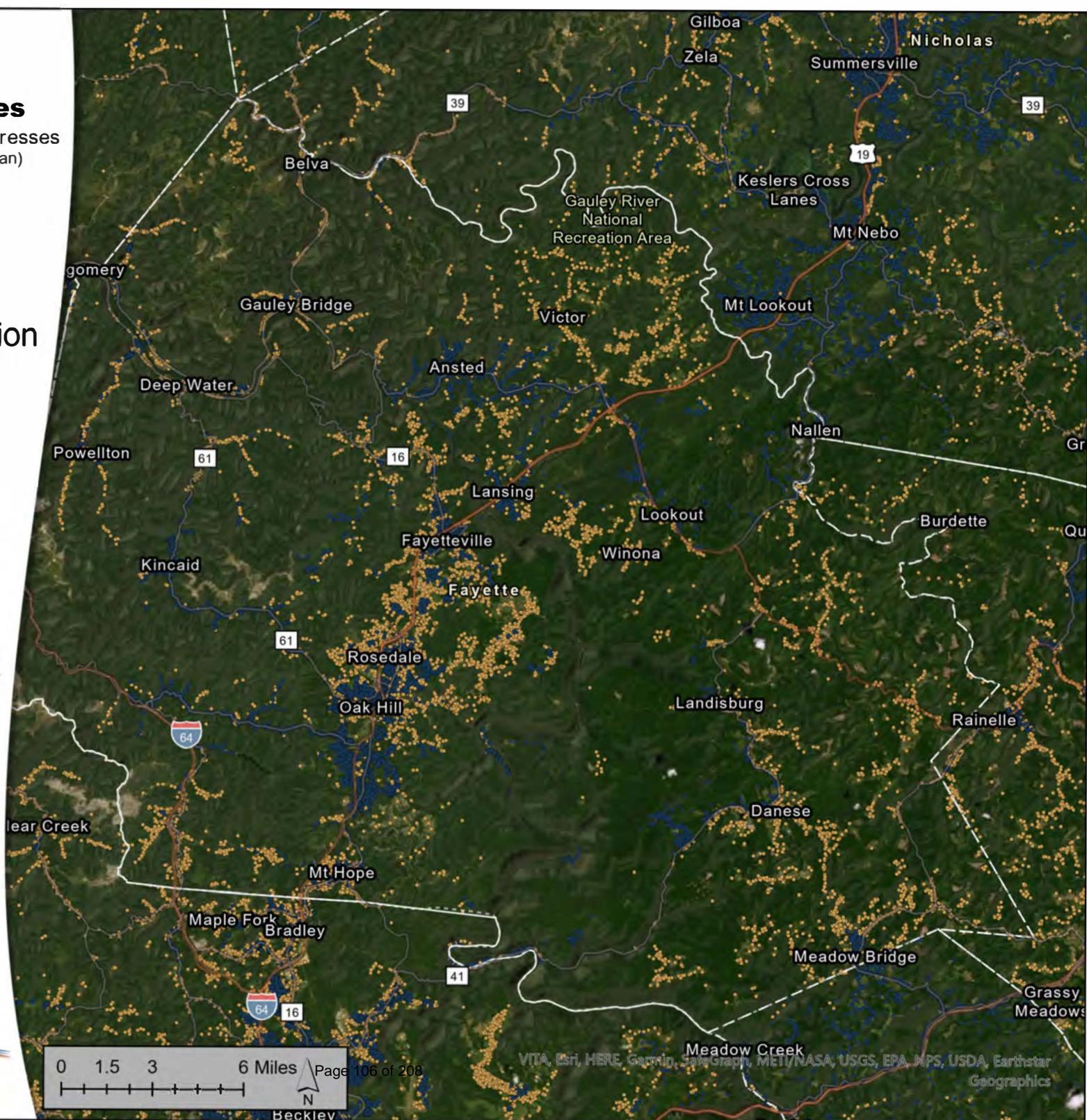
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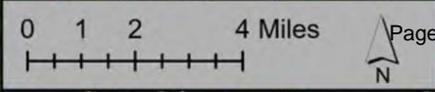
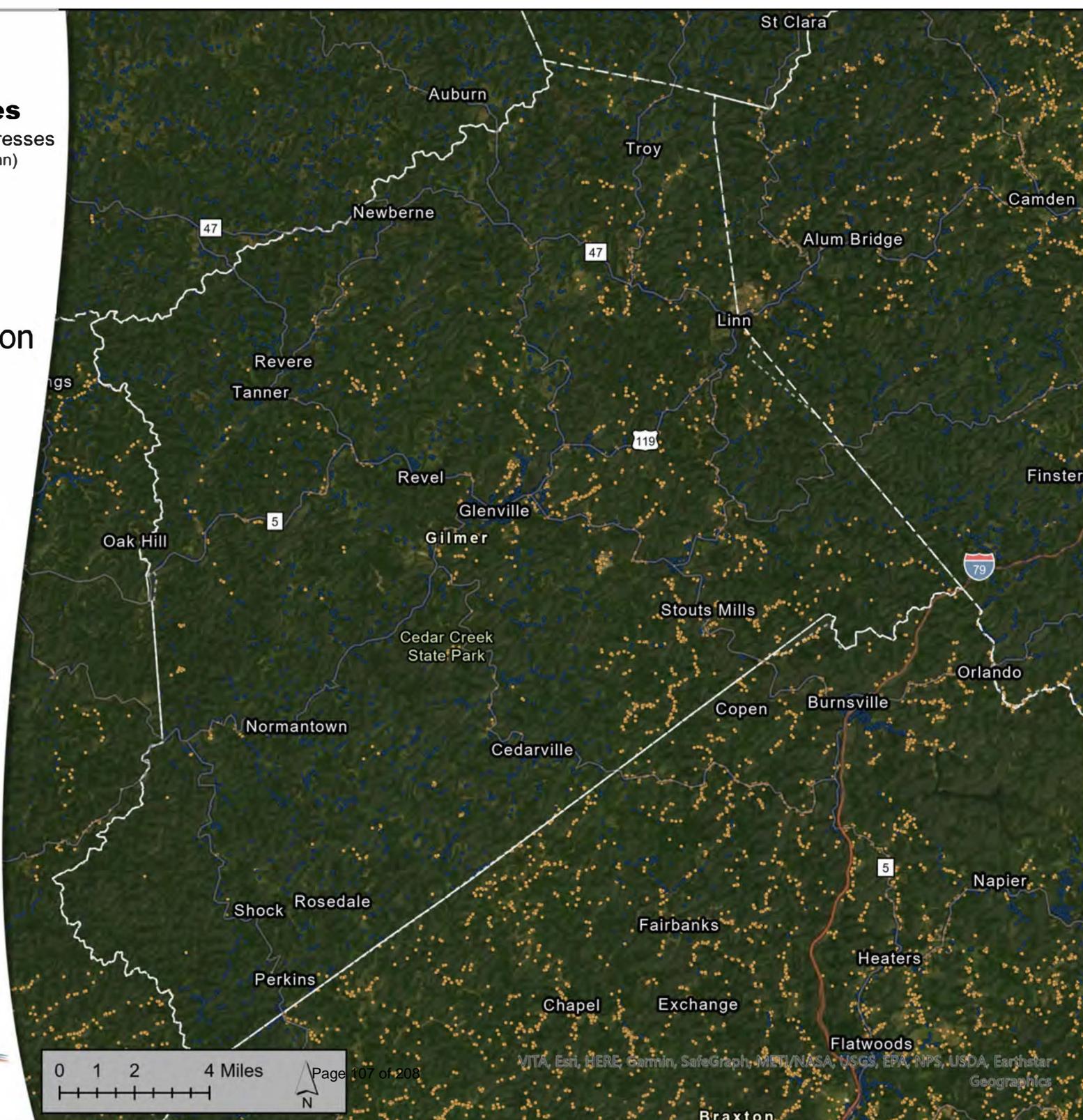
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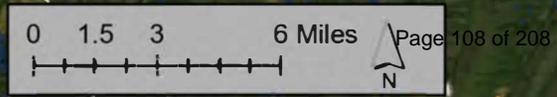
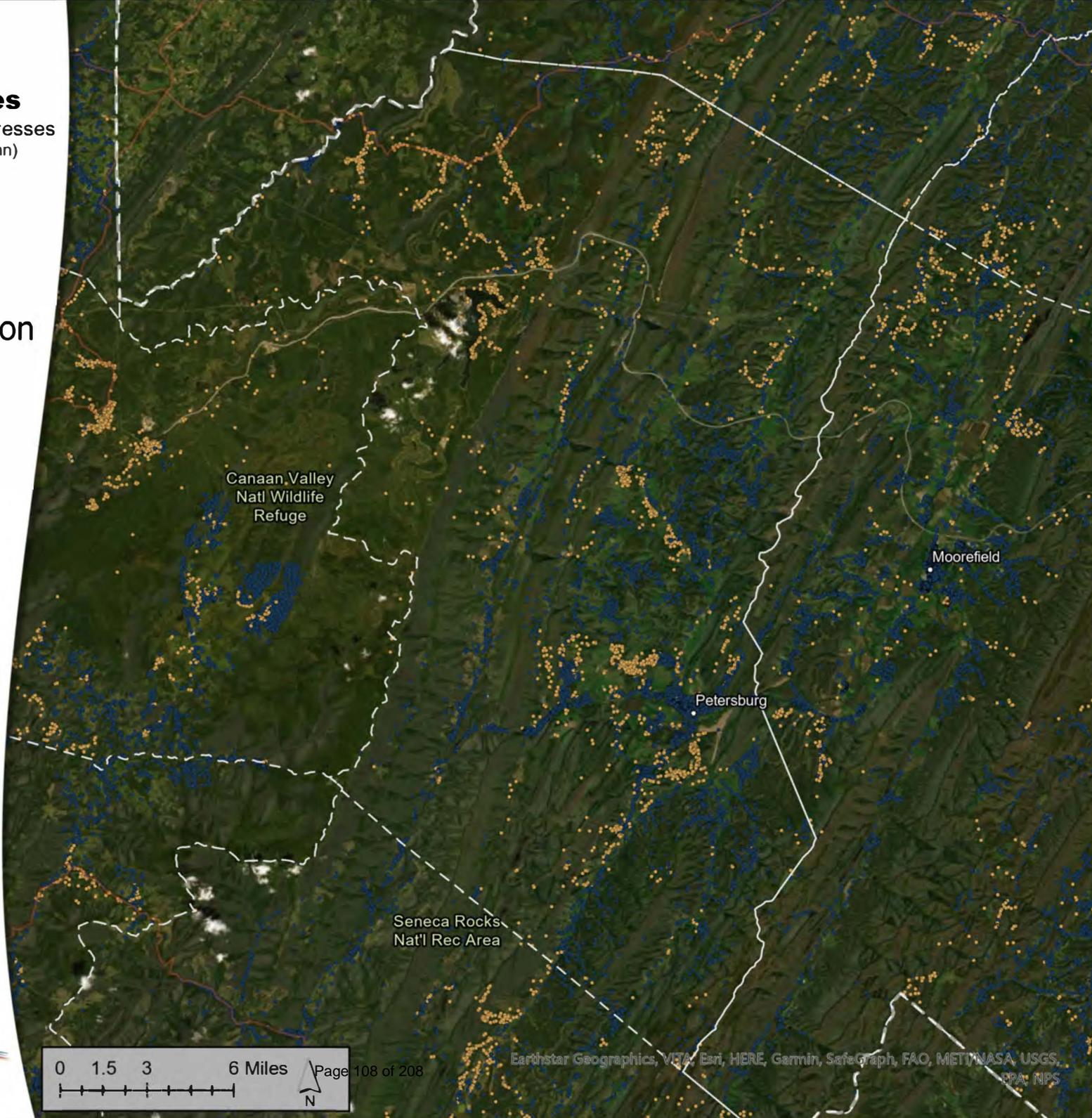
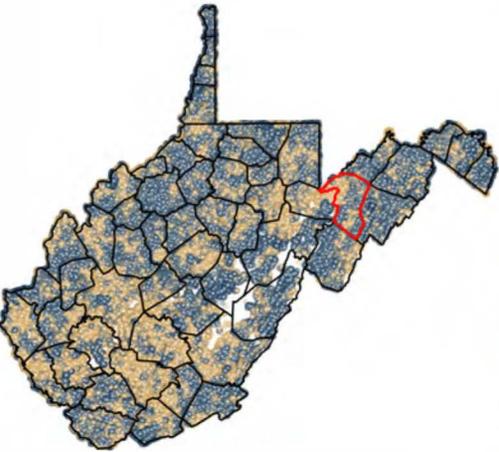
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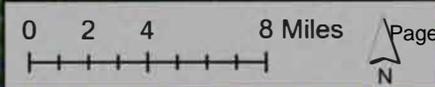
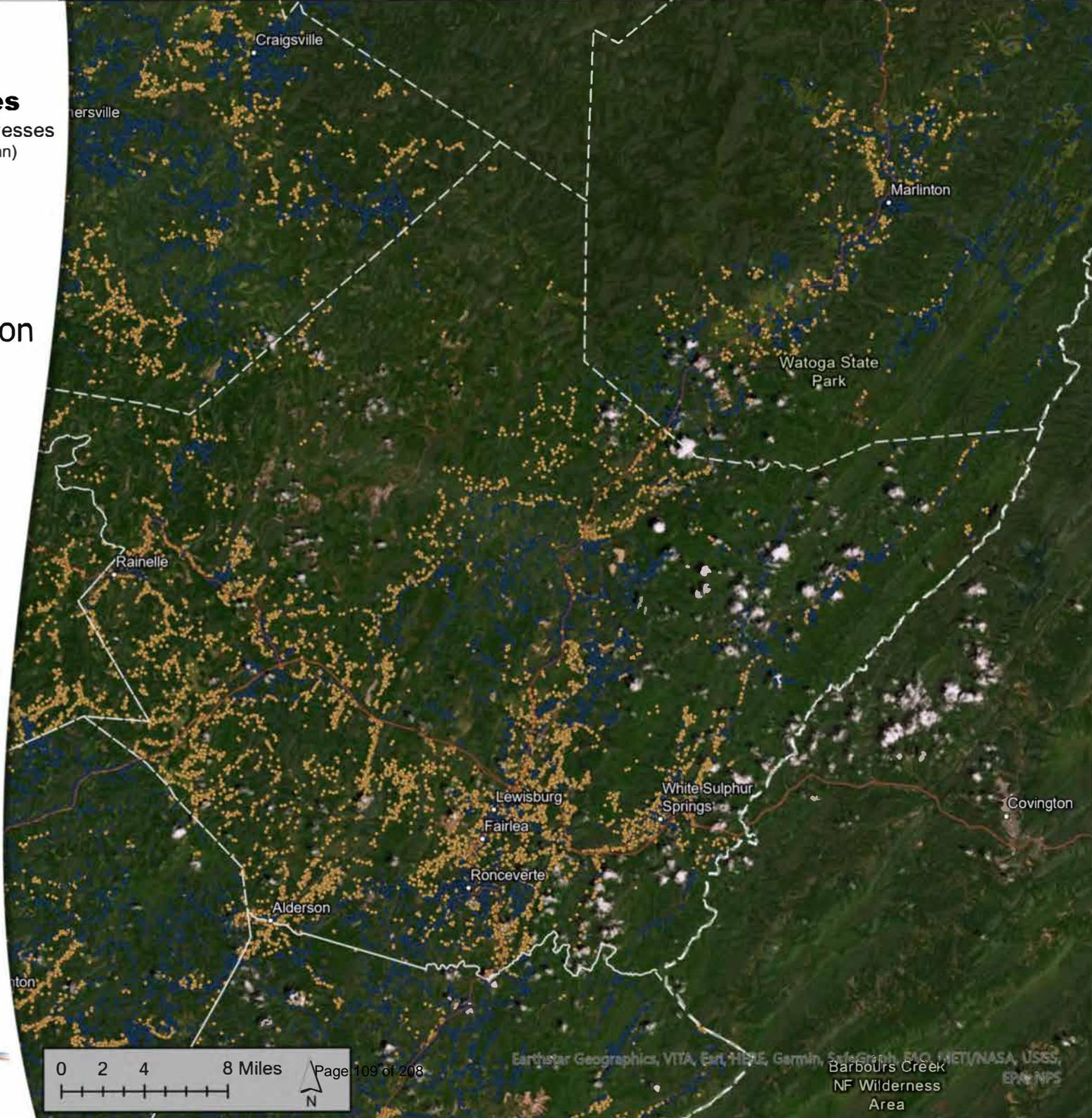
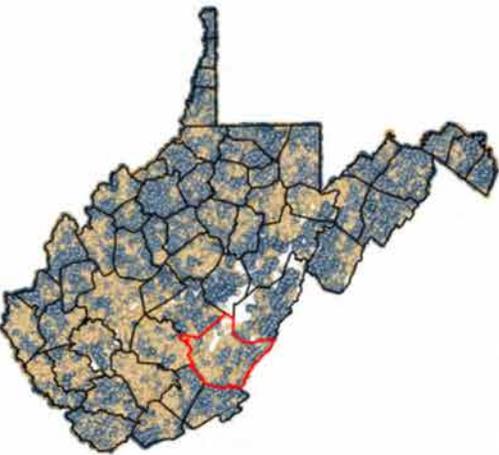
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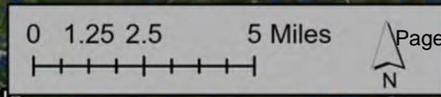
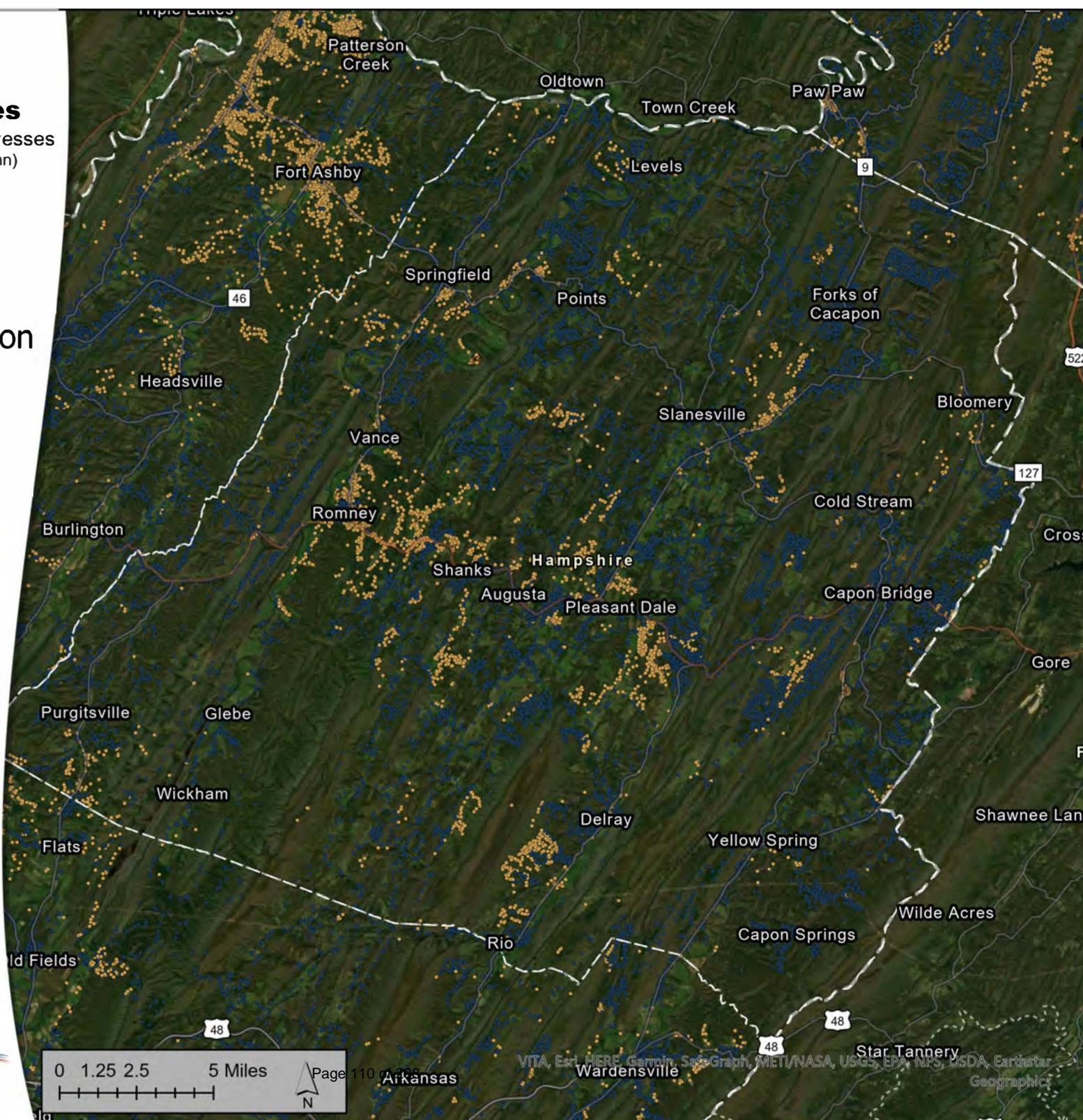
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VITA, Esri, HERE, Garmin, Swg, Graph, METI/NASA, USGS, EPA, NPS, USDA, Earthstar, Geographic

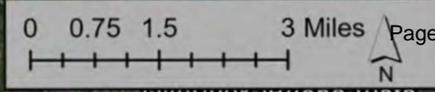
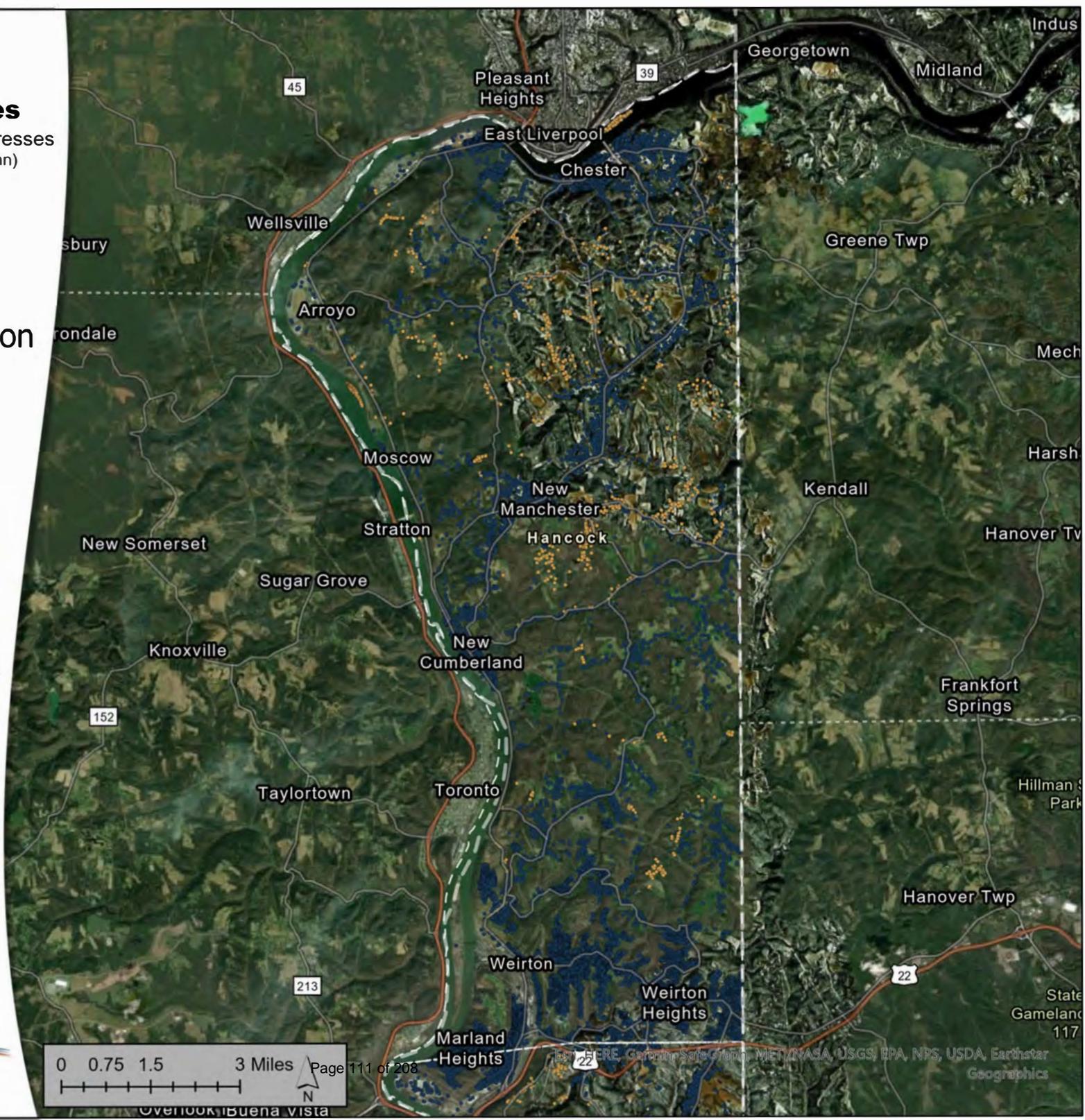
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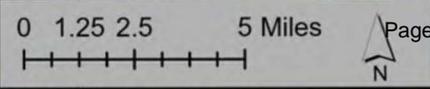
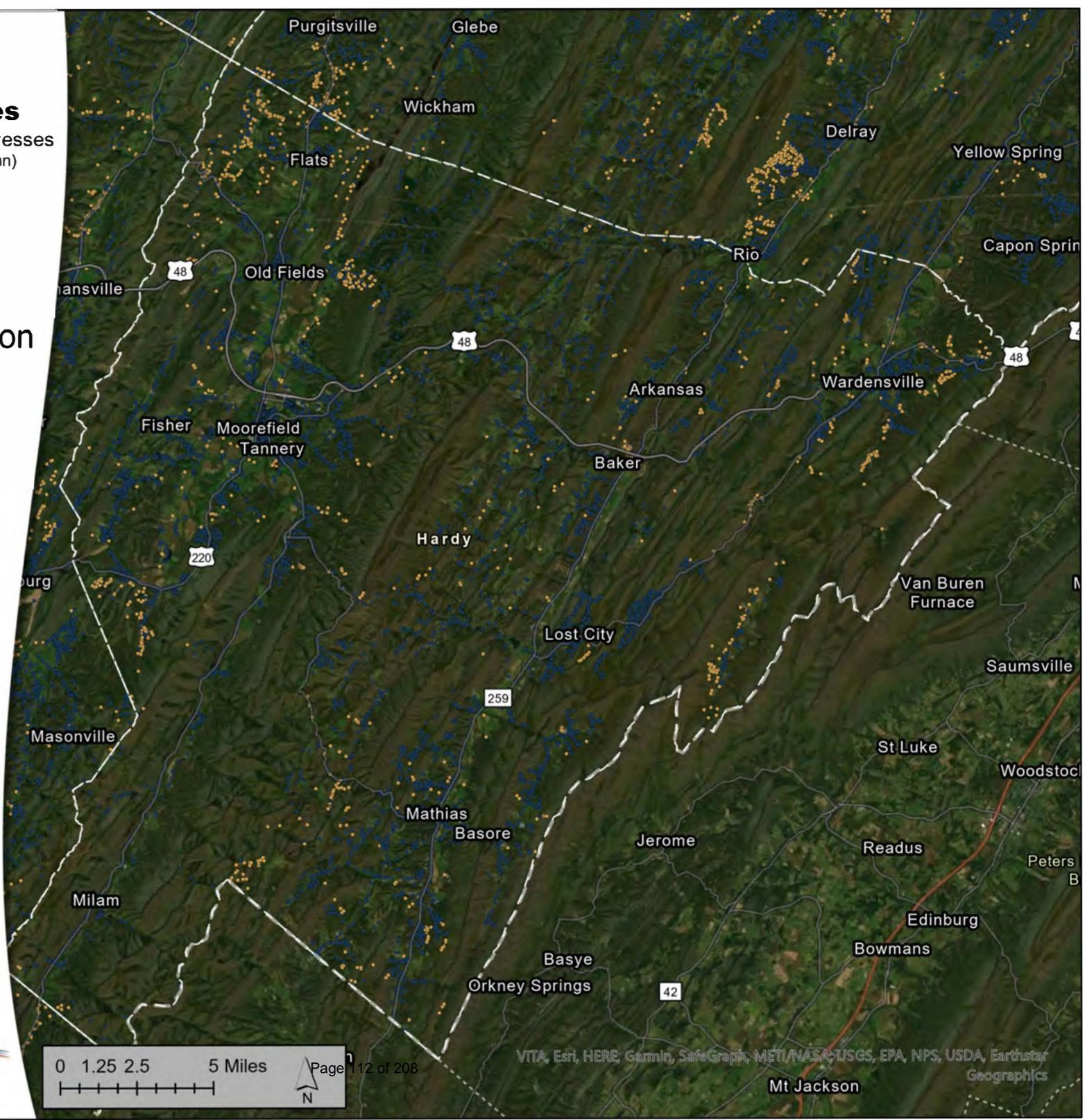
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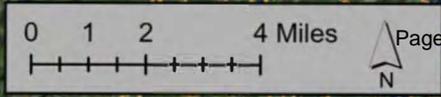
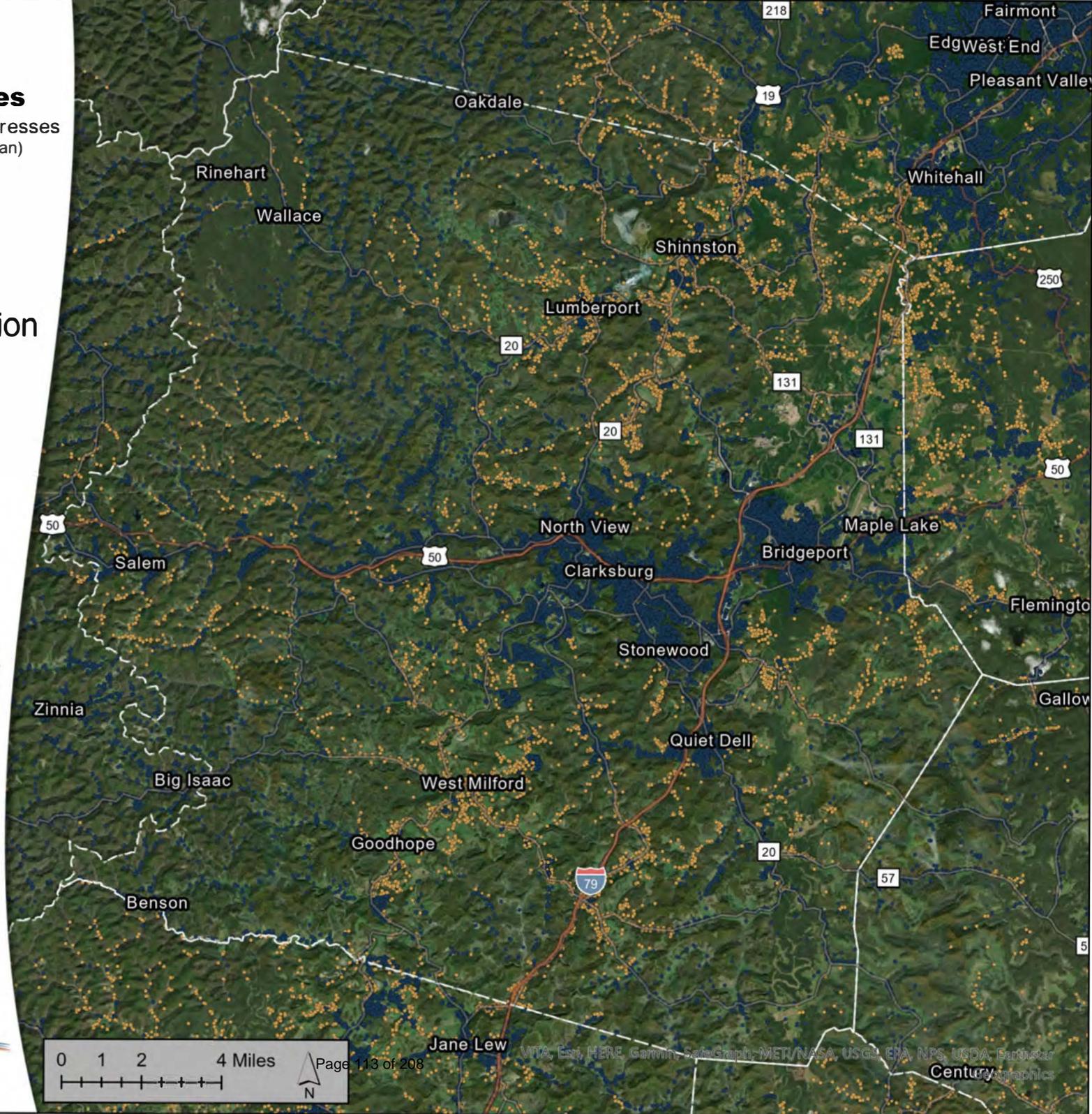
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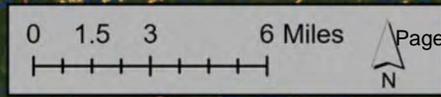
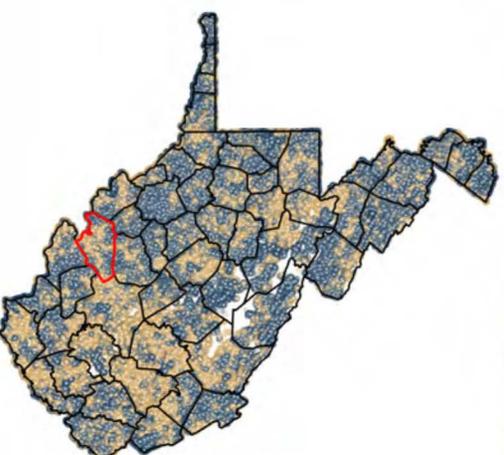
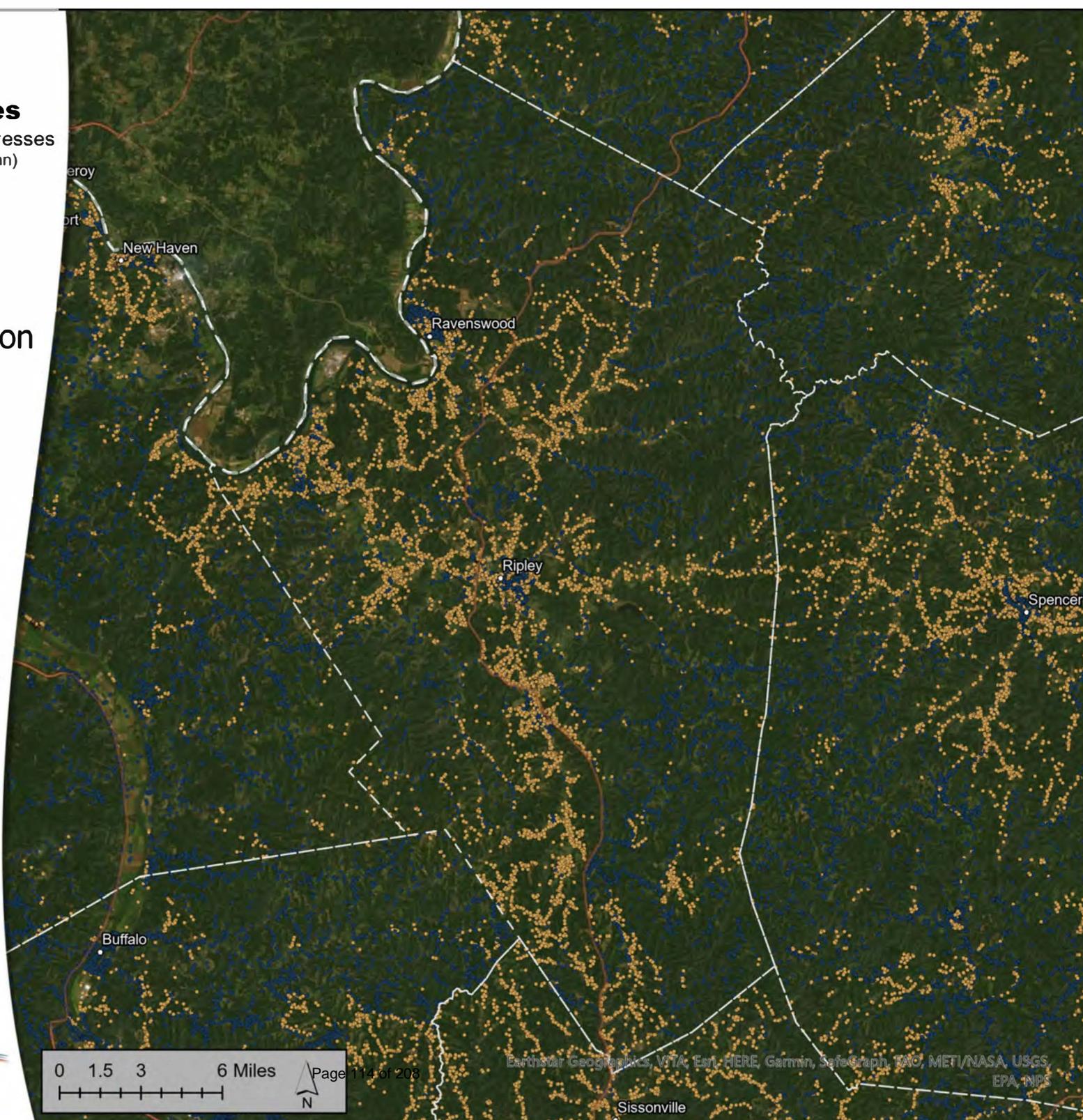
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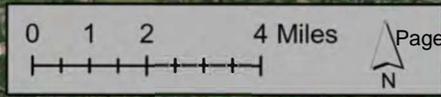
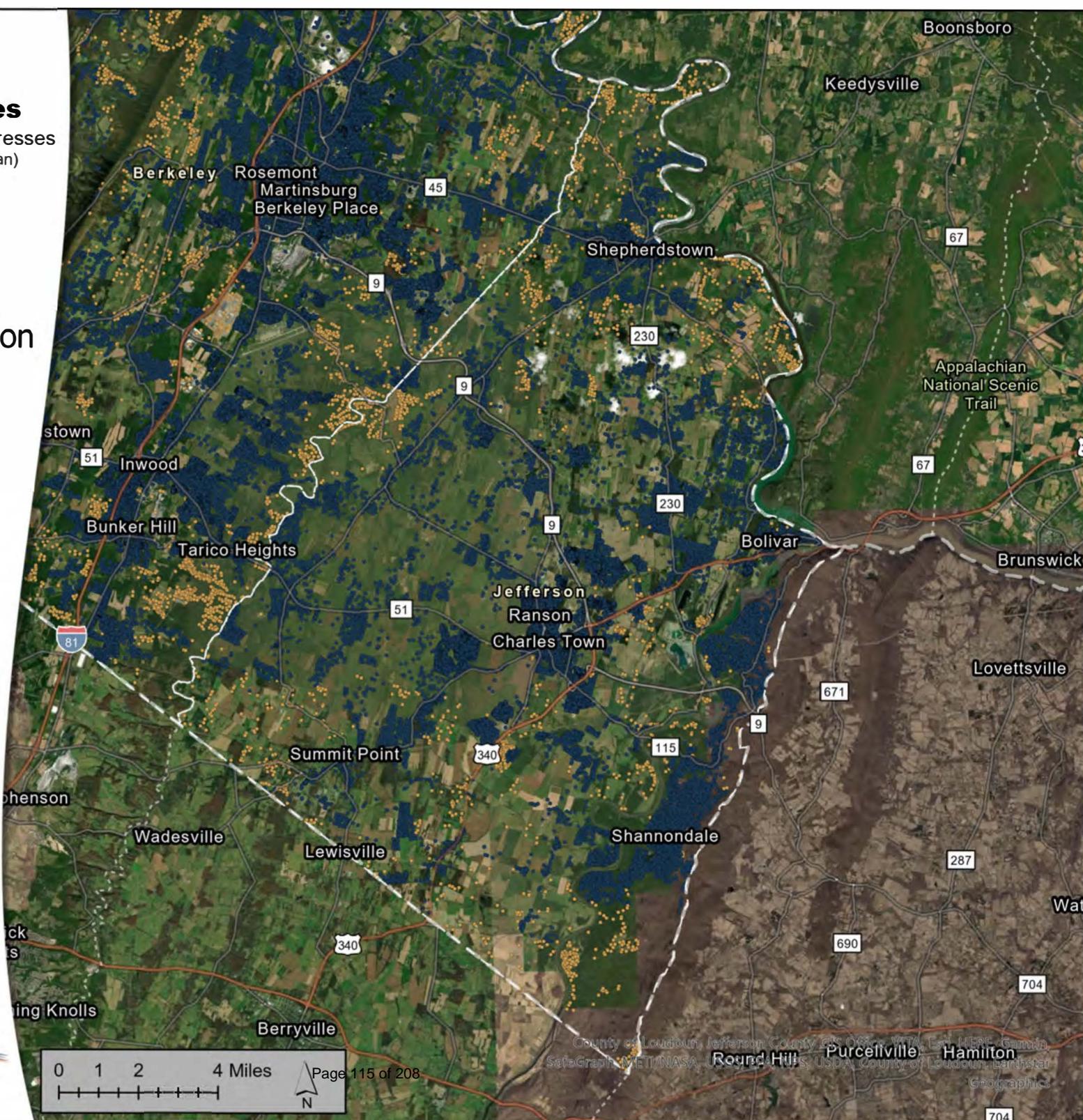
West Virginia

Target Area Addresses

Estimated Served and Unserved Addresses
(West Virginia Broadband Investment Plan)

Target Area Classification

- Targeted Addresses
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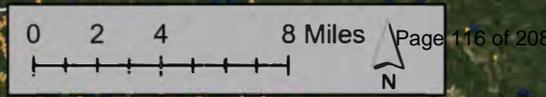
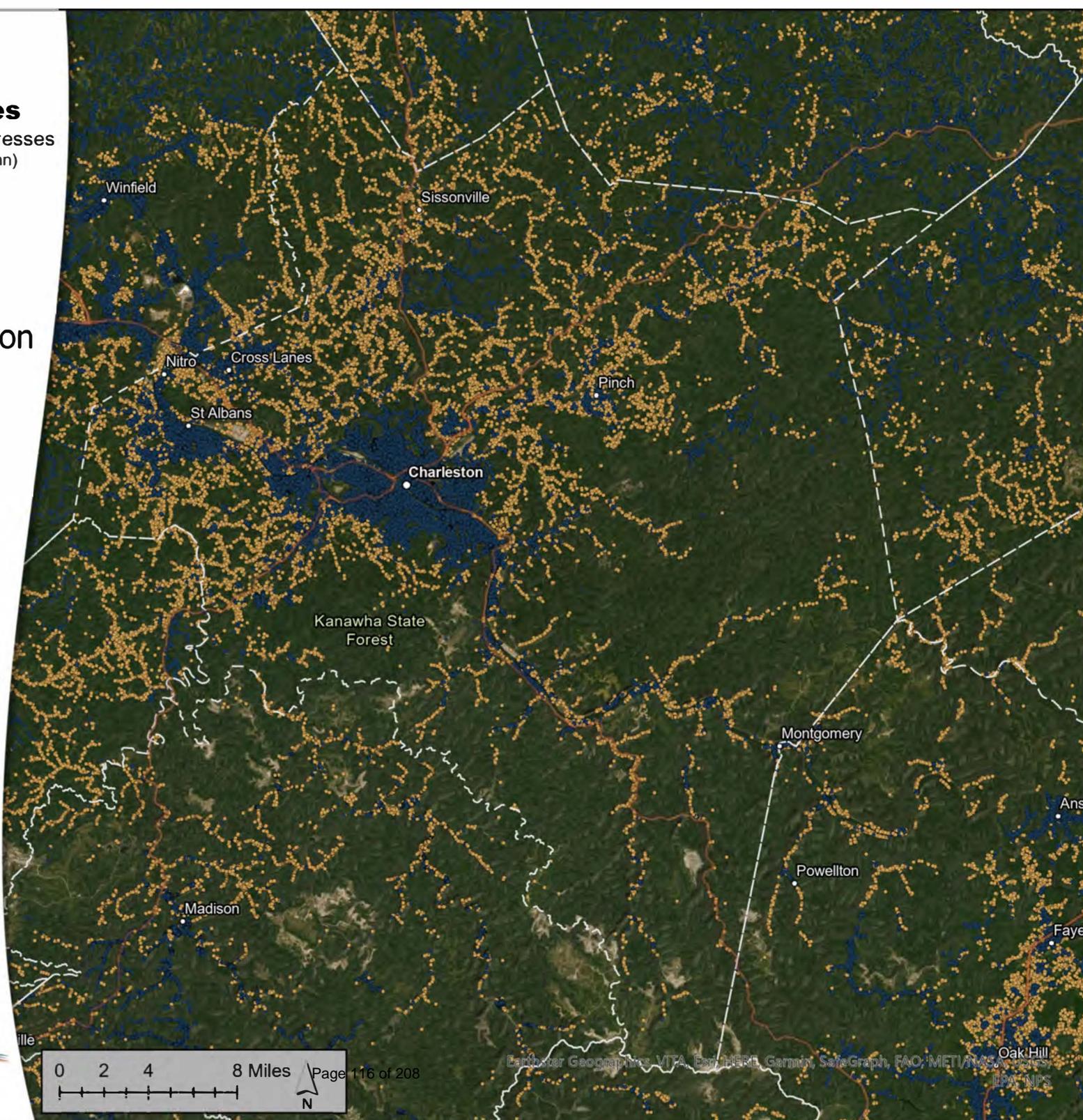
West Virginia

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(West Virginia Broadband Investment Plan)

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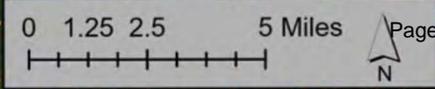
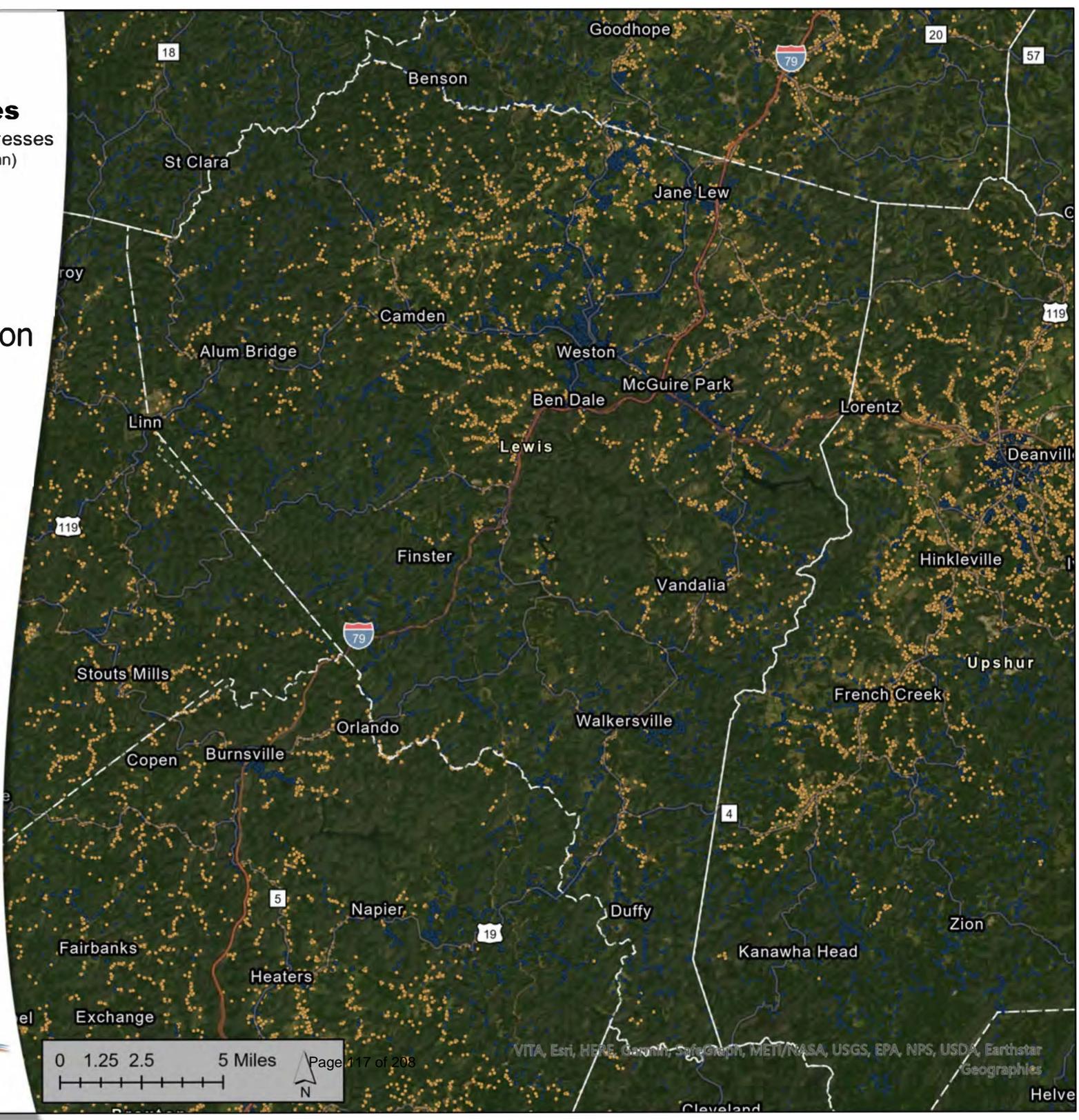
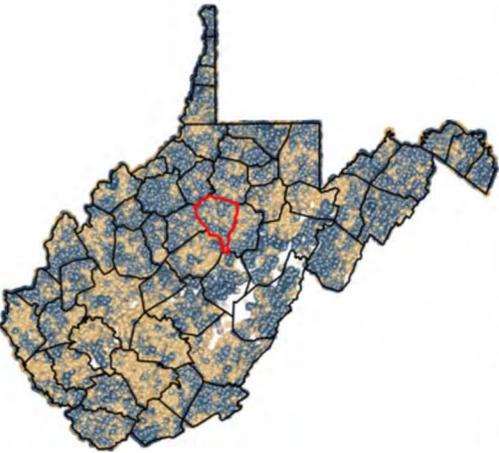
West Virginia

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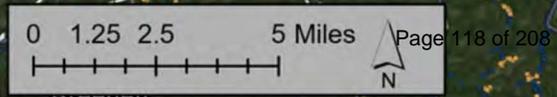
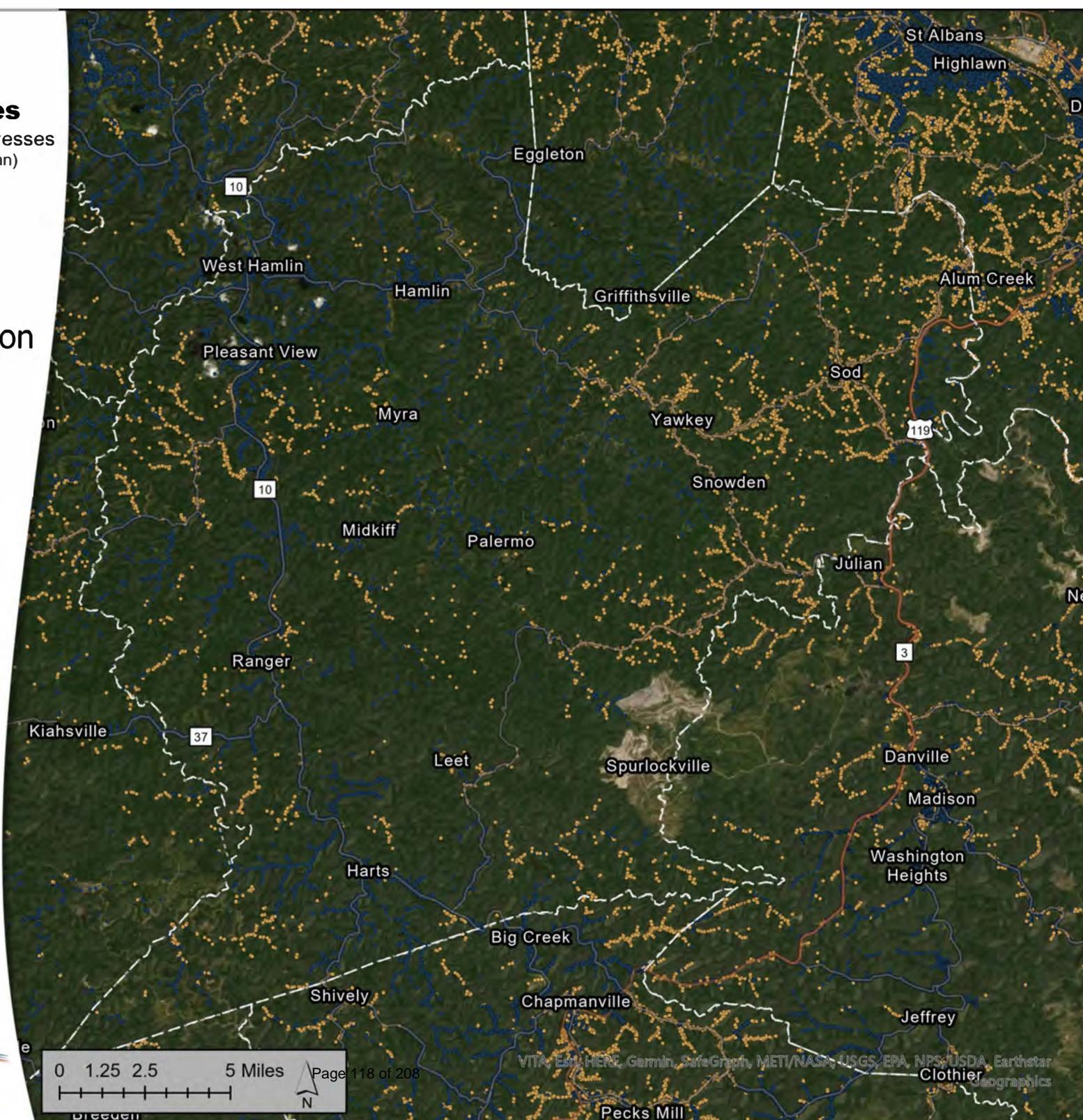
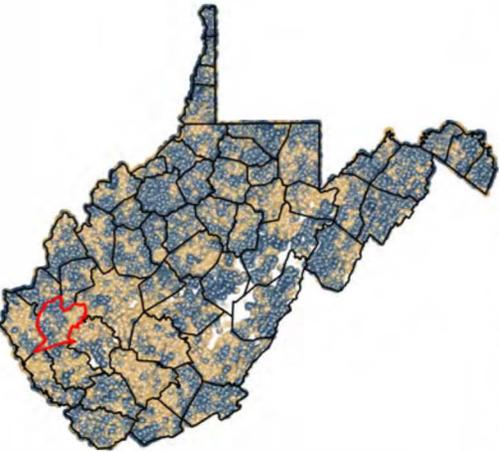
West Virginia

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VITA, Esri, HERE, Garmin, Safe-Graph, METI/NASA, USGS, EPA, NPS, USDA, Earthstar, GeoGraphics

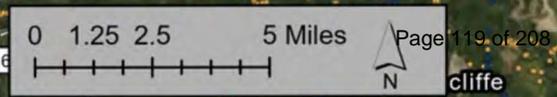
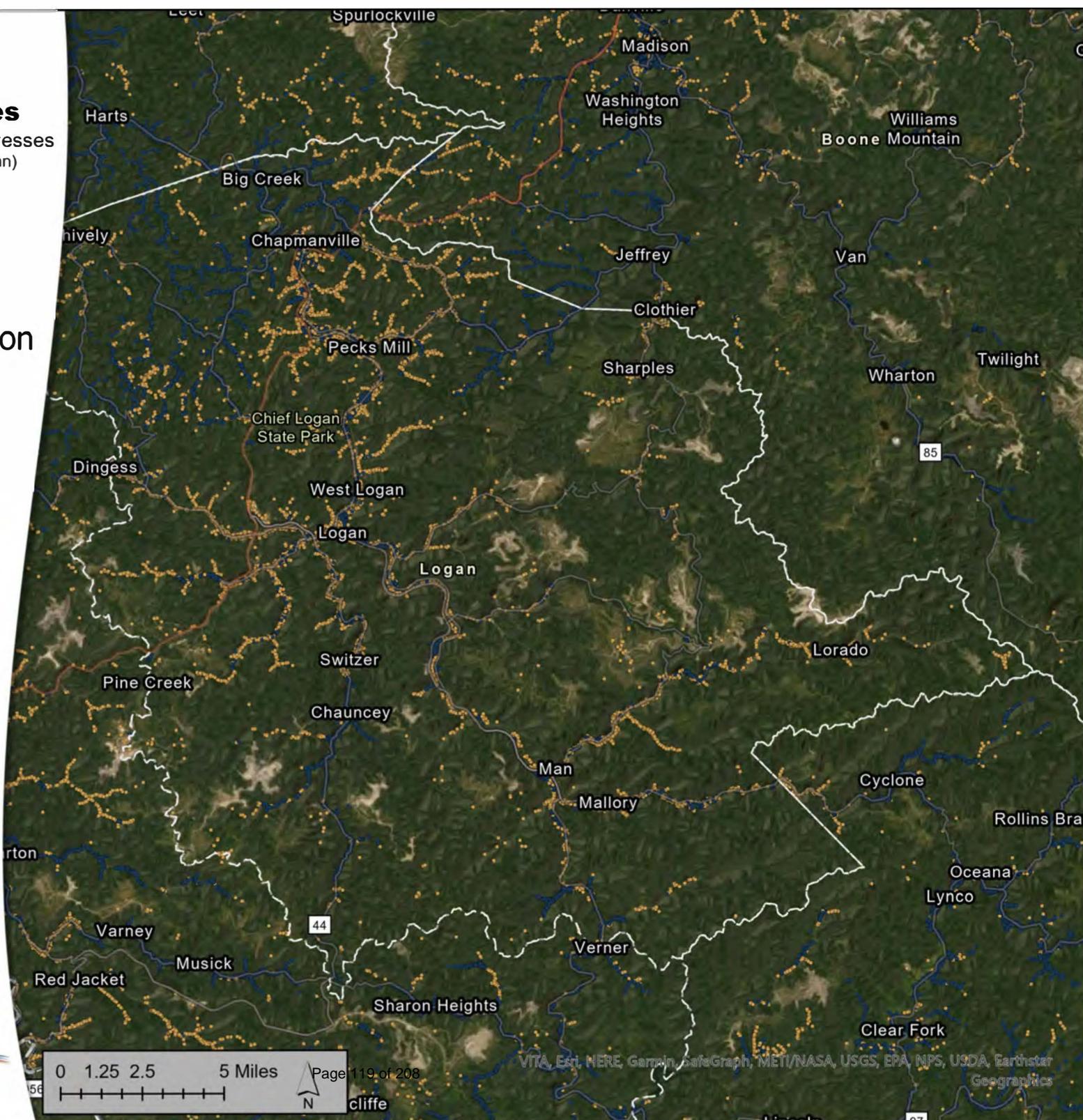
West Virginia

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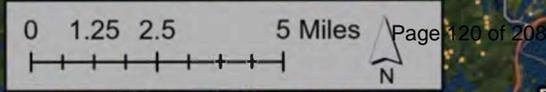
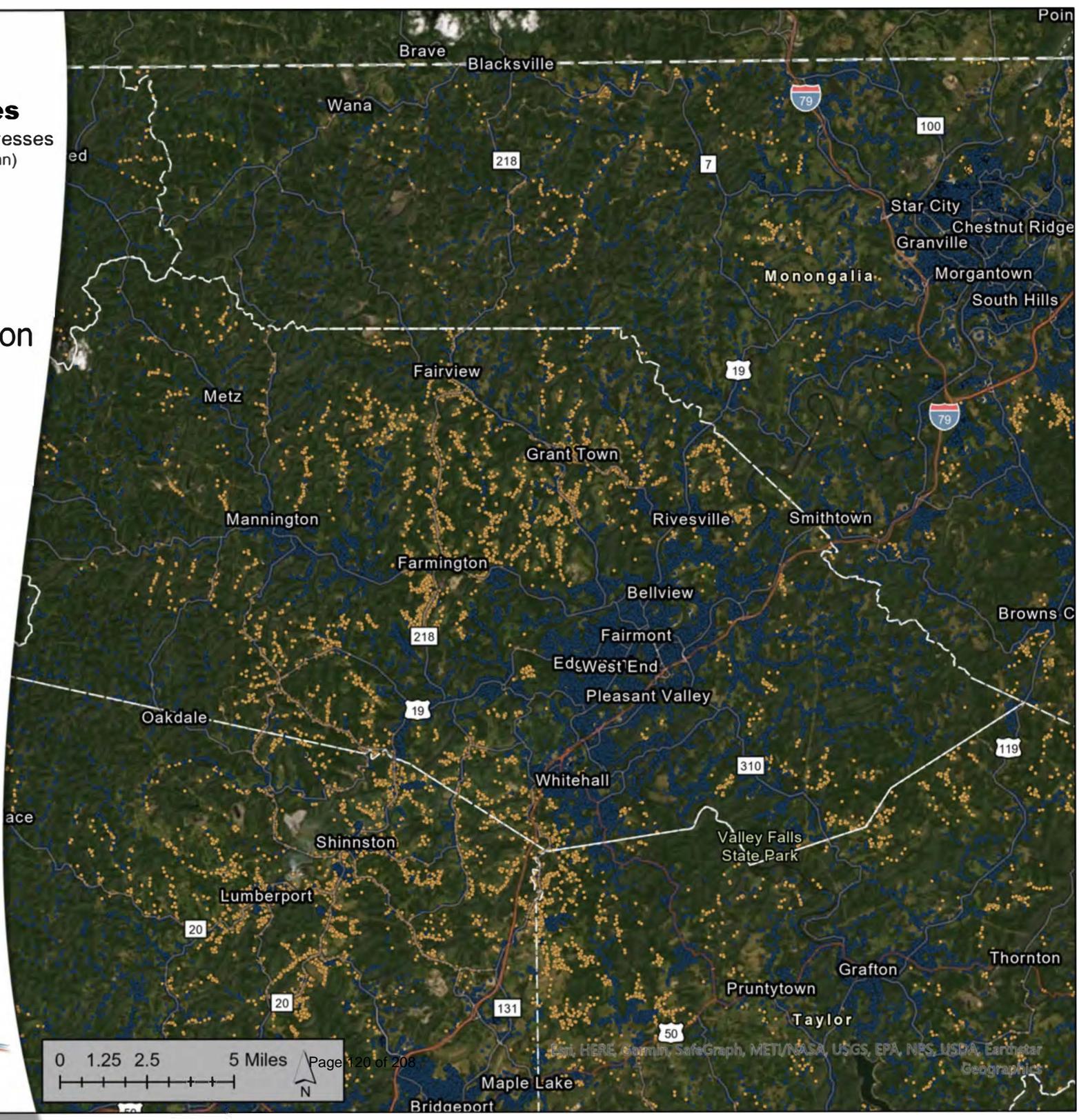
West Virginia

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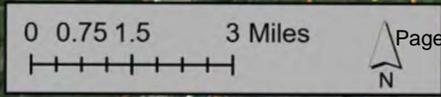
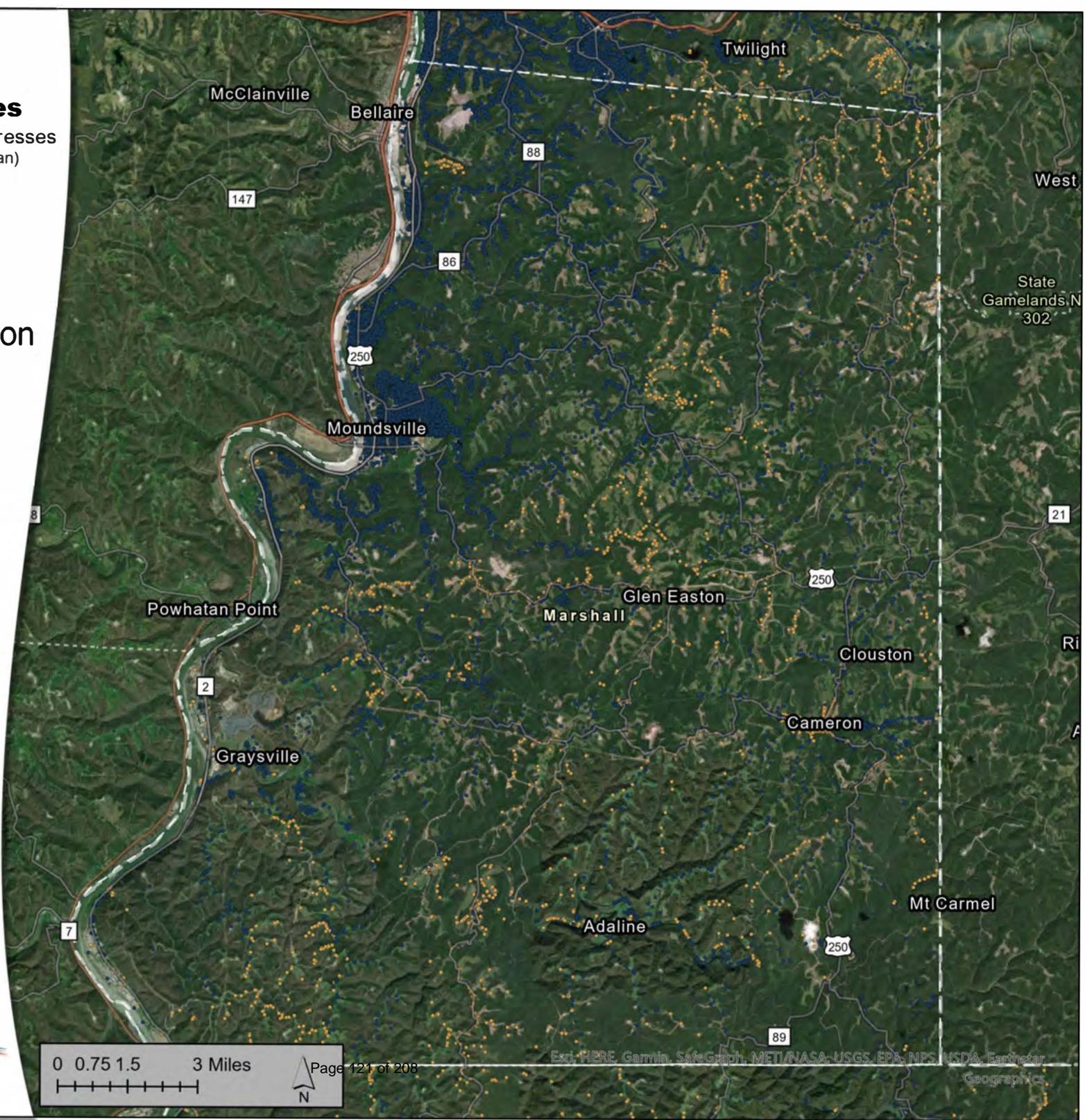
West Virginia

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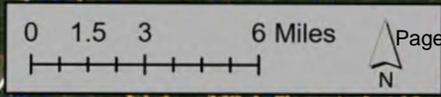
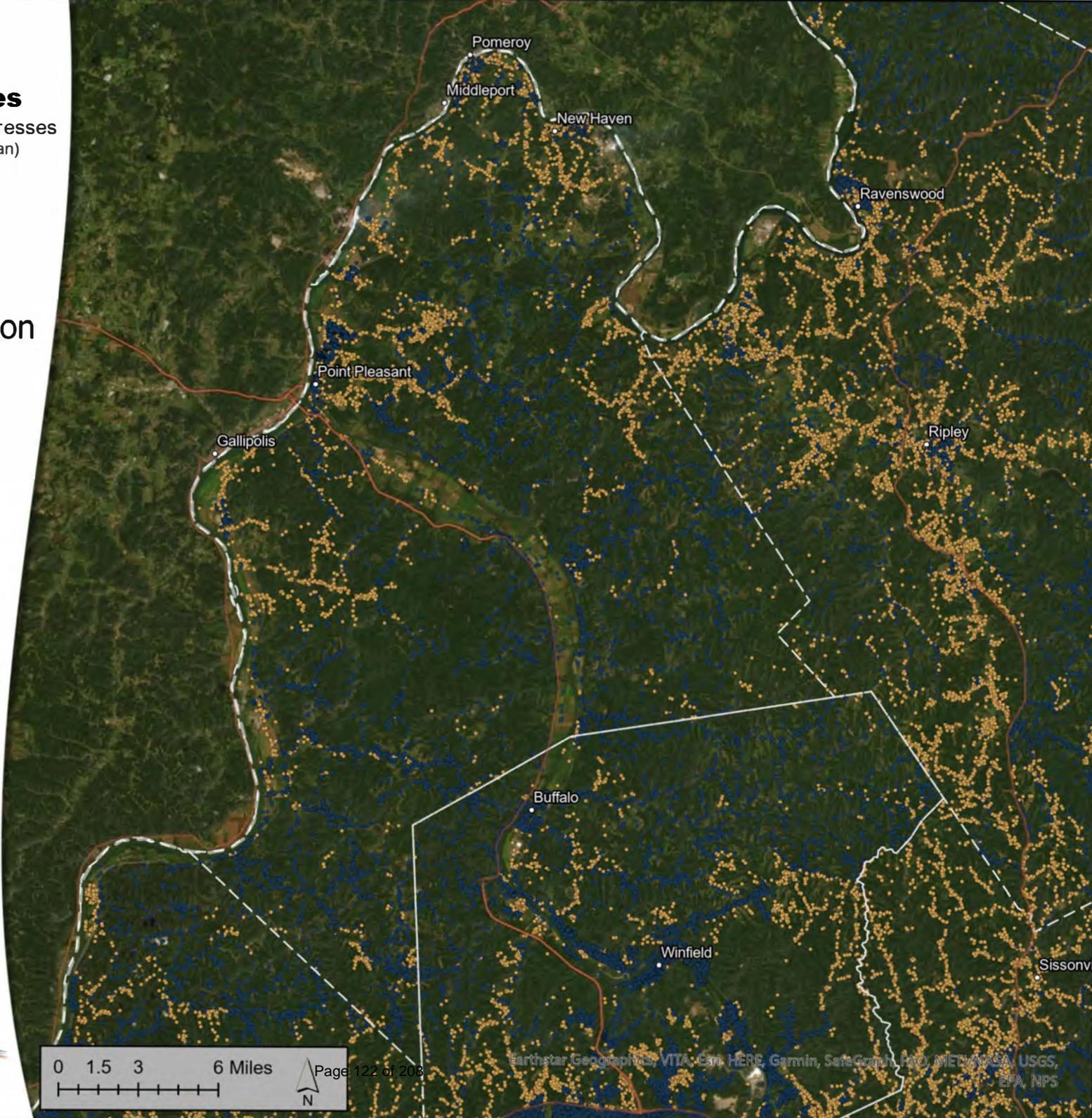
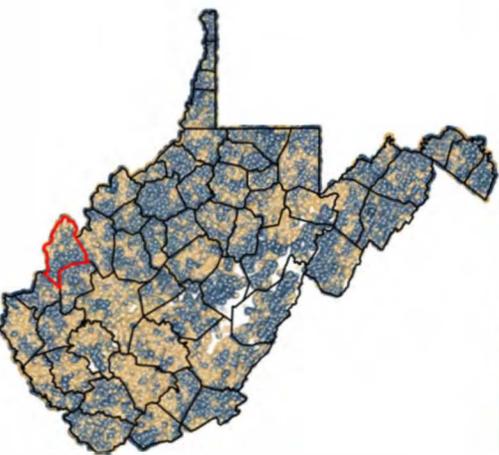
West Virginia

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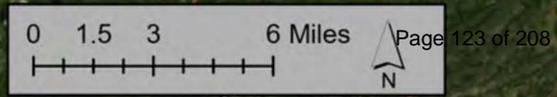
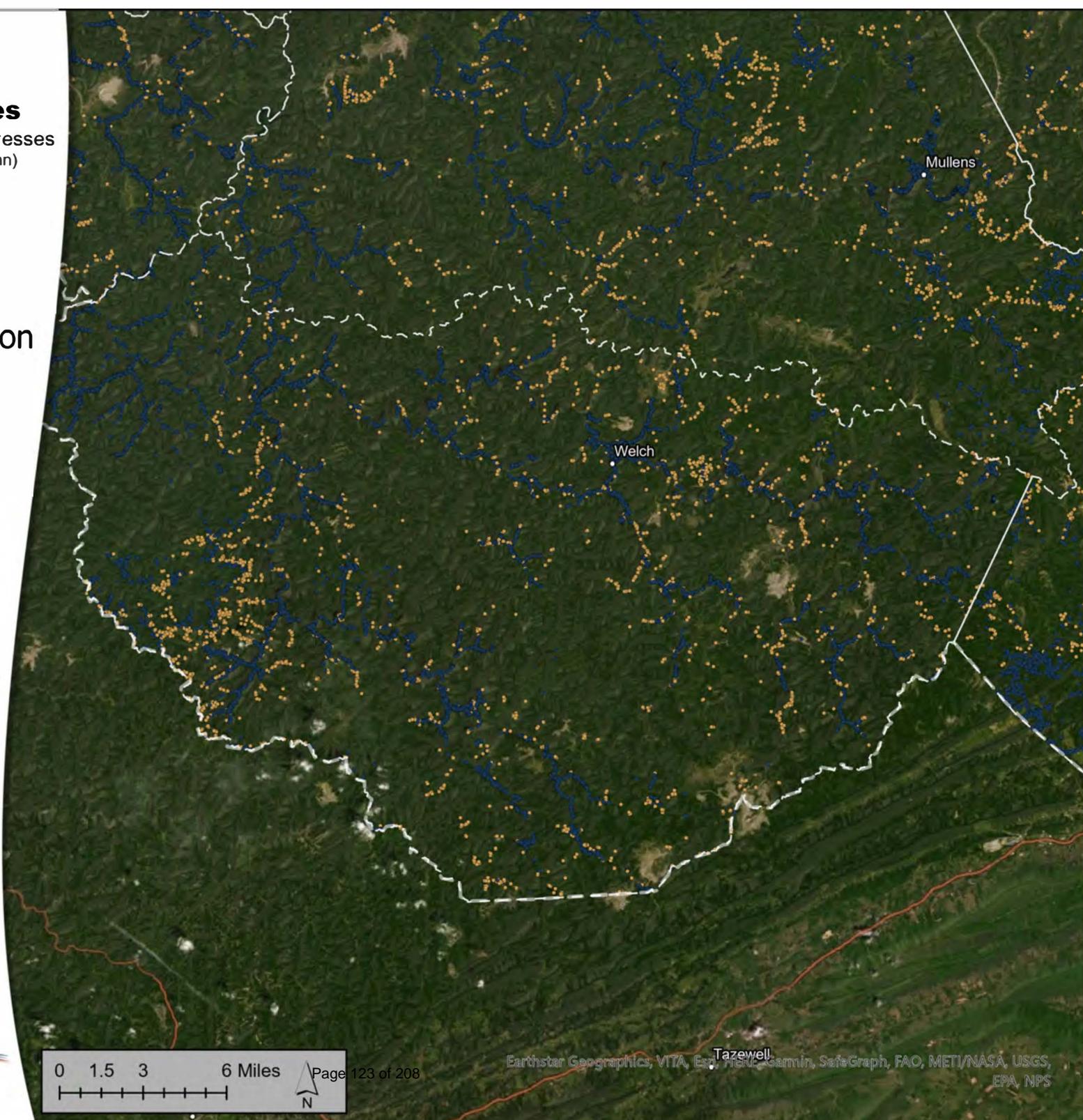
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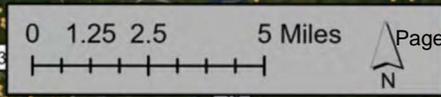
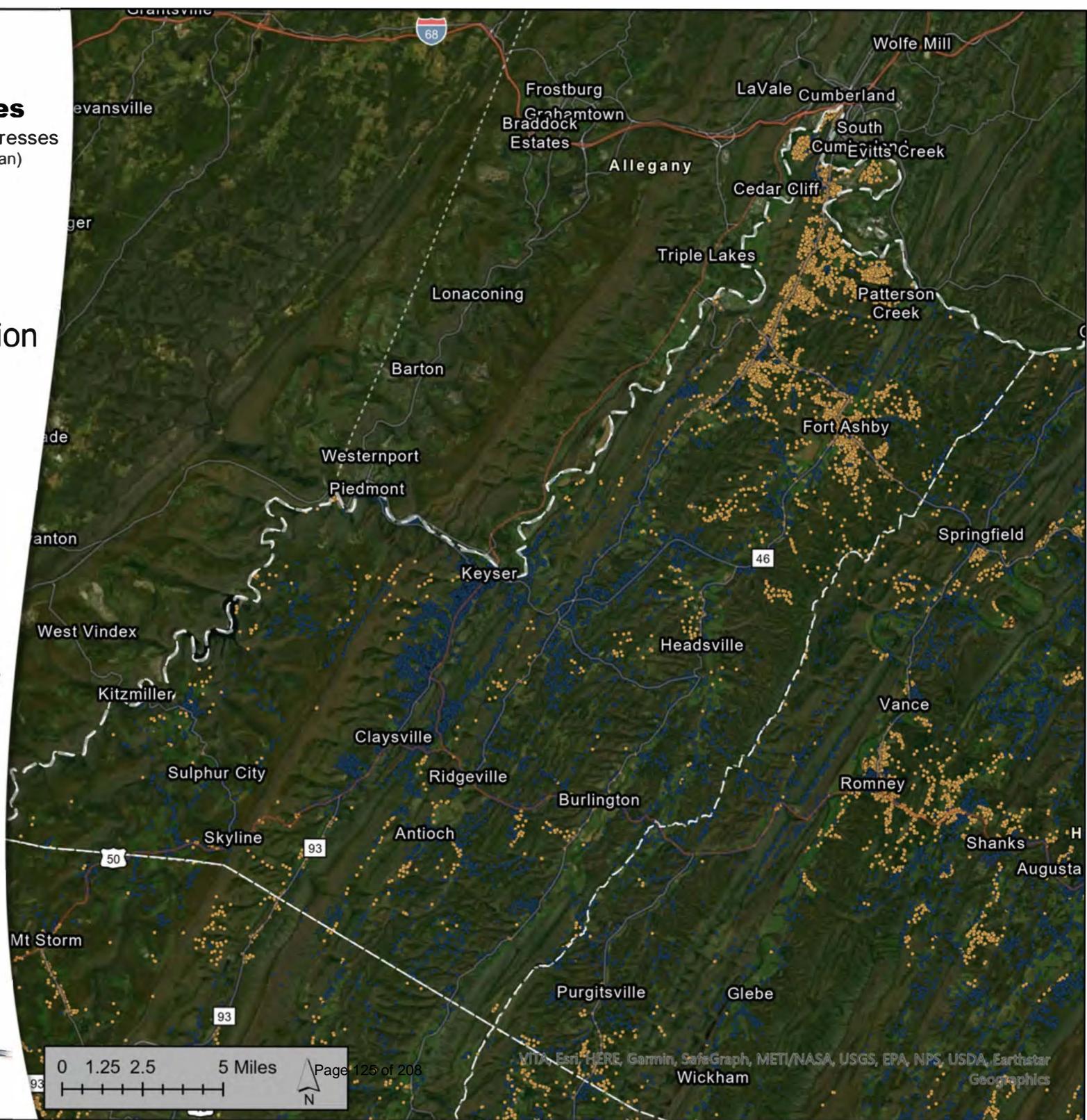
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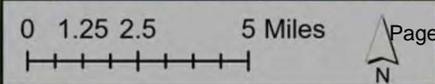
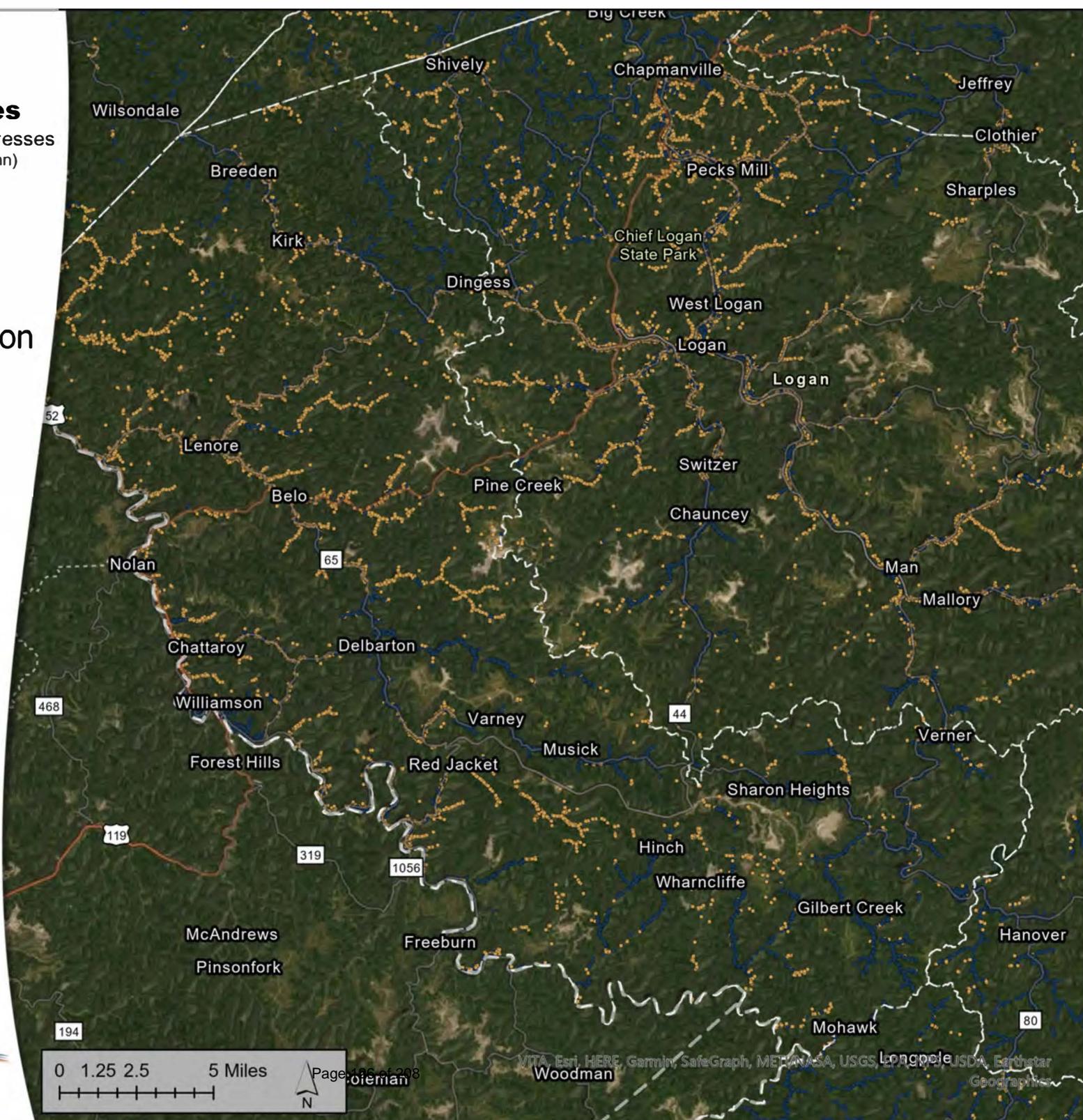
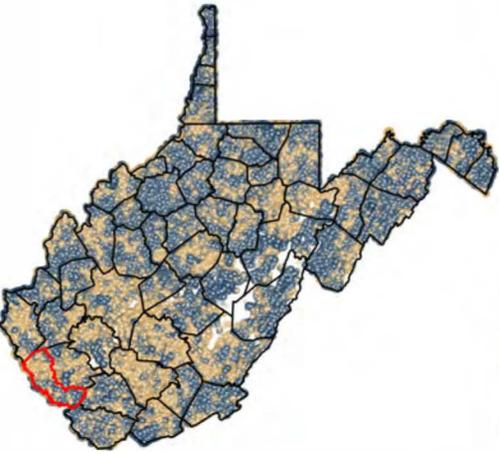
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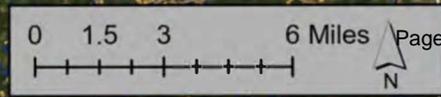
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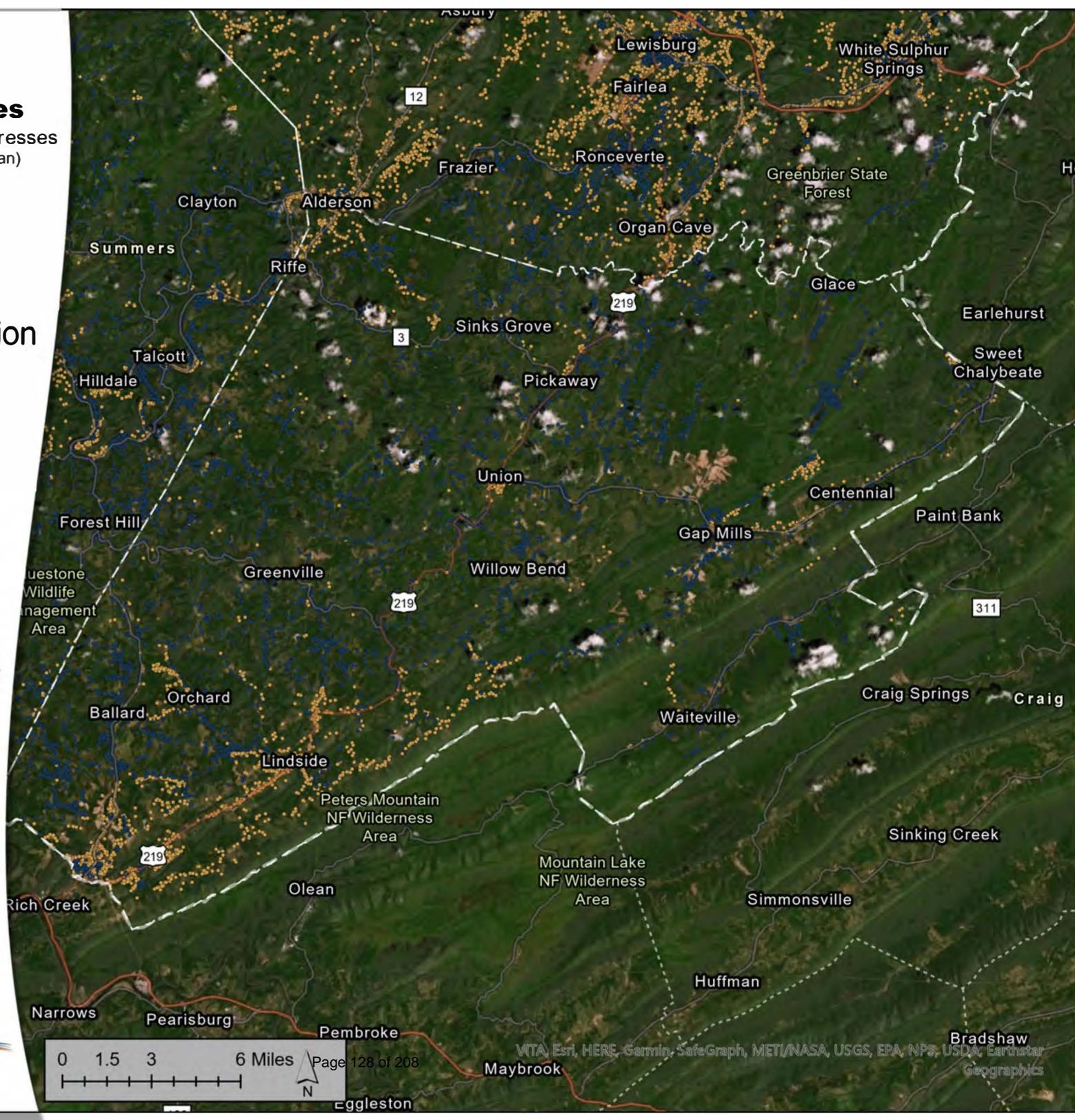
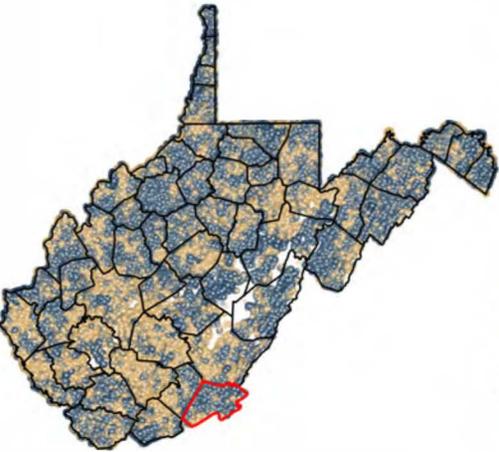
West Virginia

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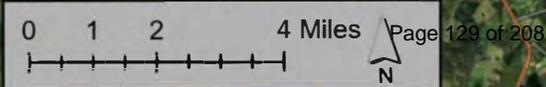
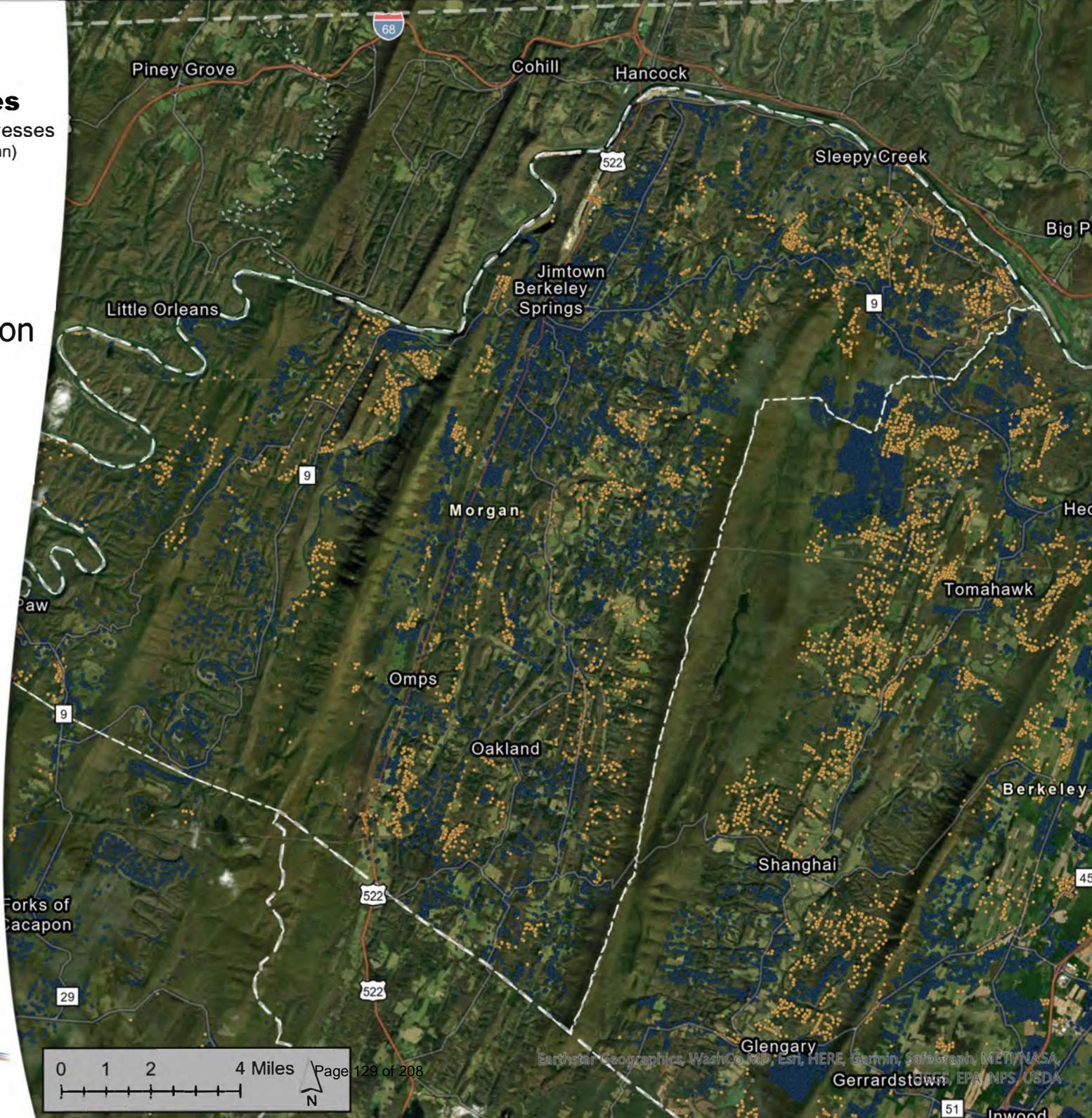
West Virginia

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Earthstar Geographics, WashCo IAD, Esri, HERE, Garmin, SafeGraph, METI/NASA, GERRARDSTOWN, EPA, NPS, USDA

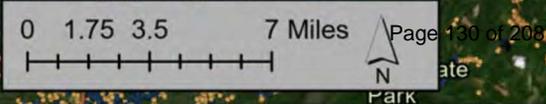
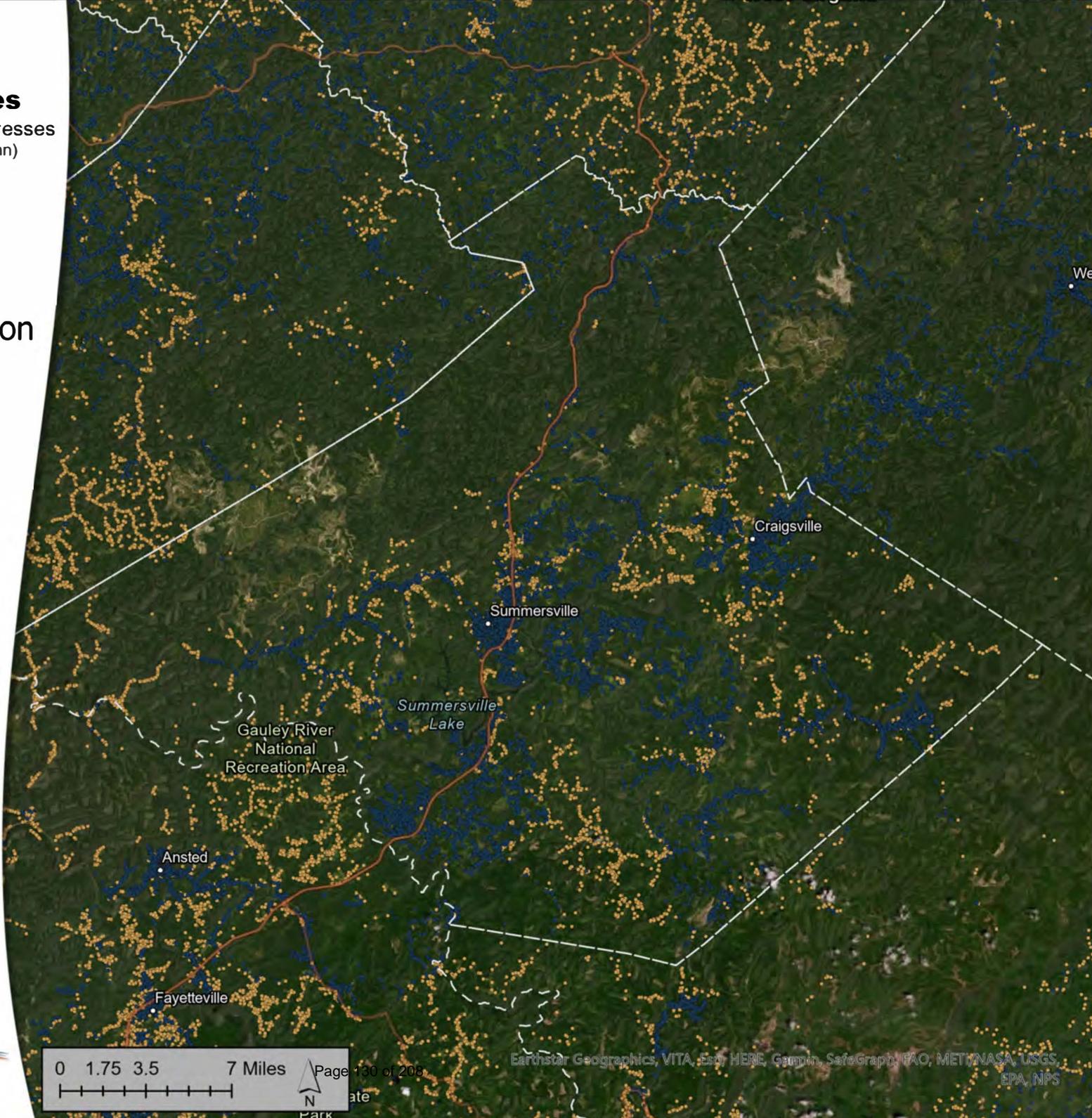
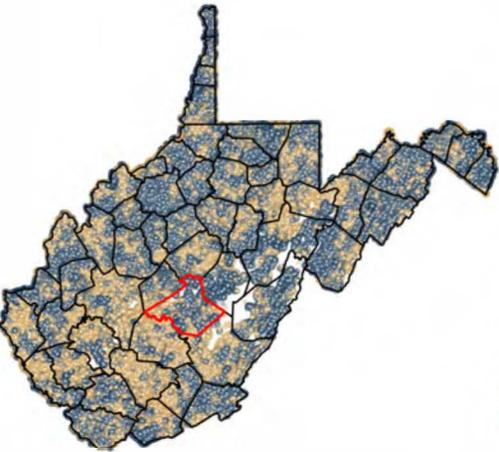
West Virginia

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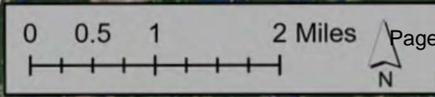
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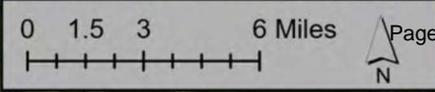
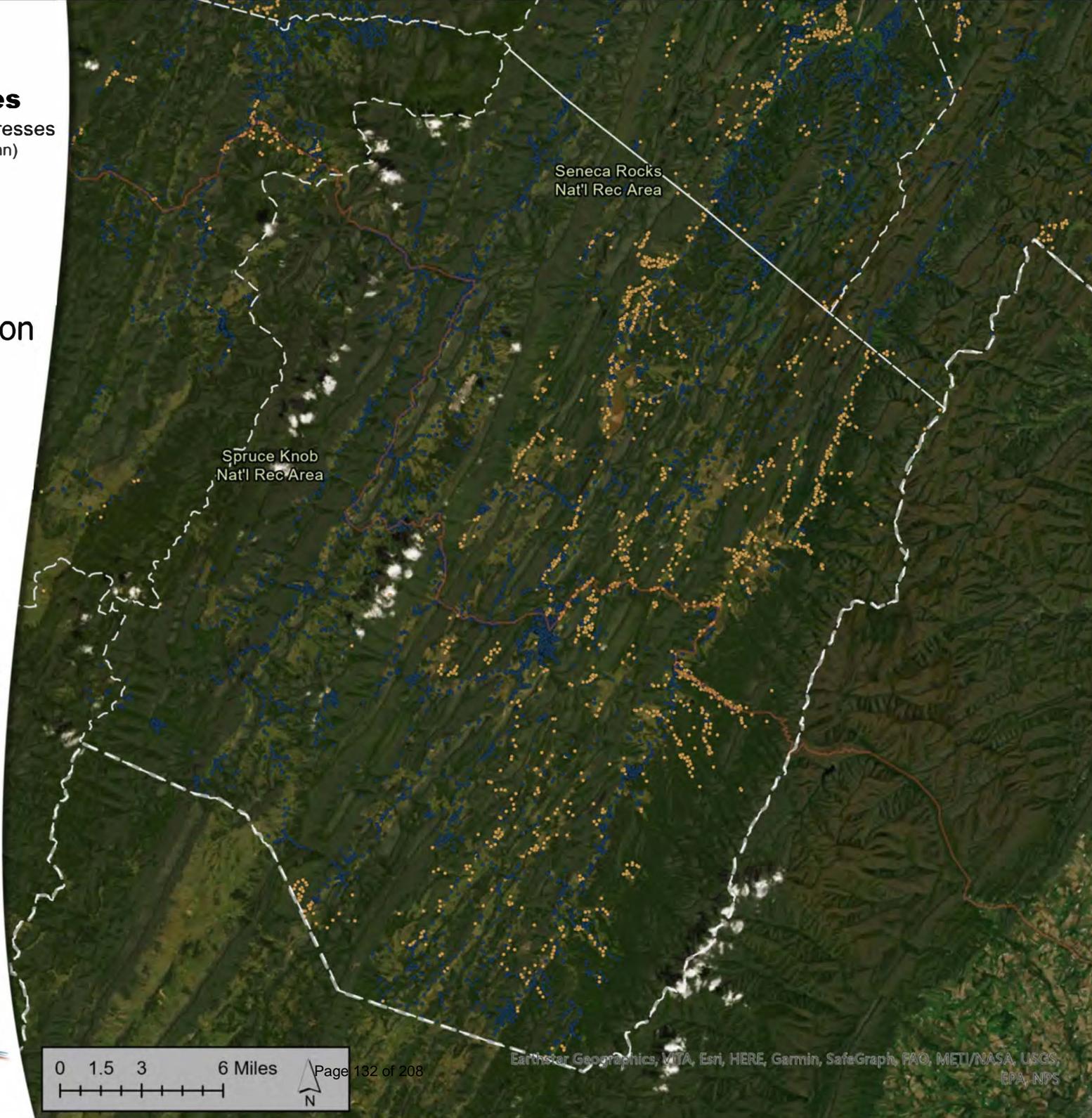
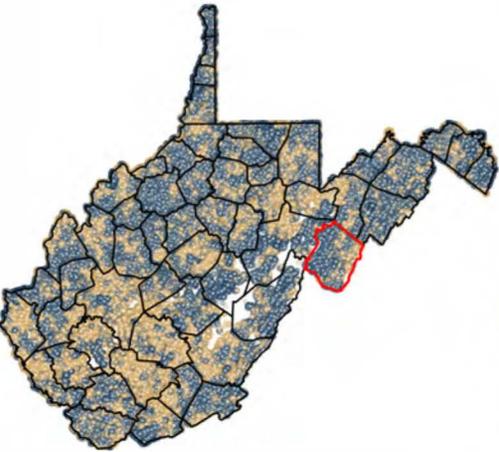
West Virginia

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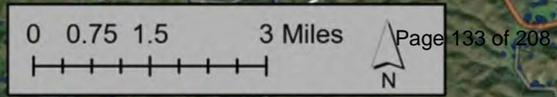
West Virginia

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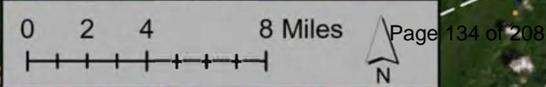
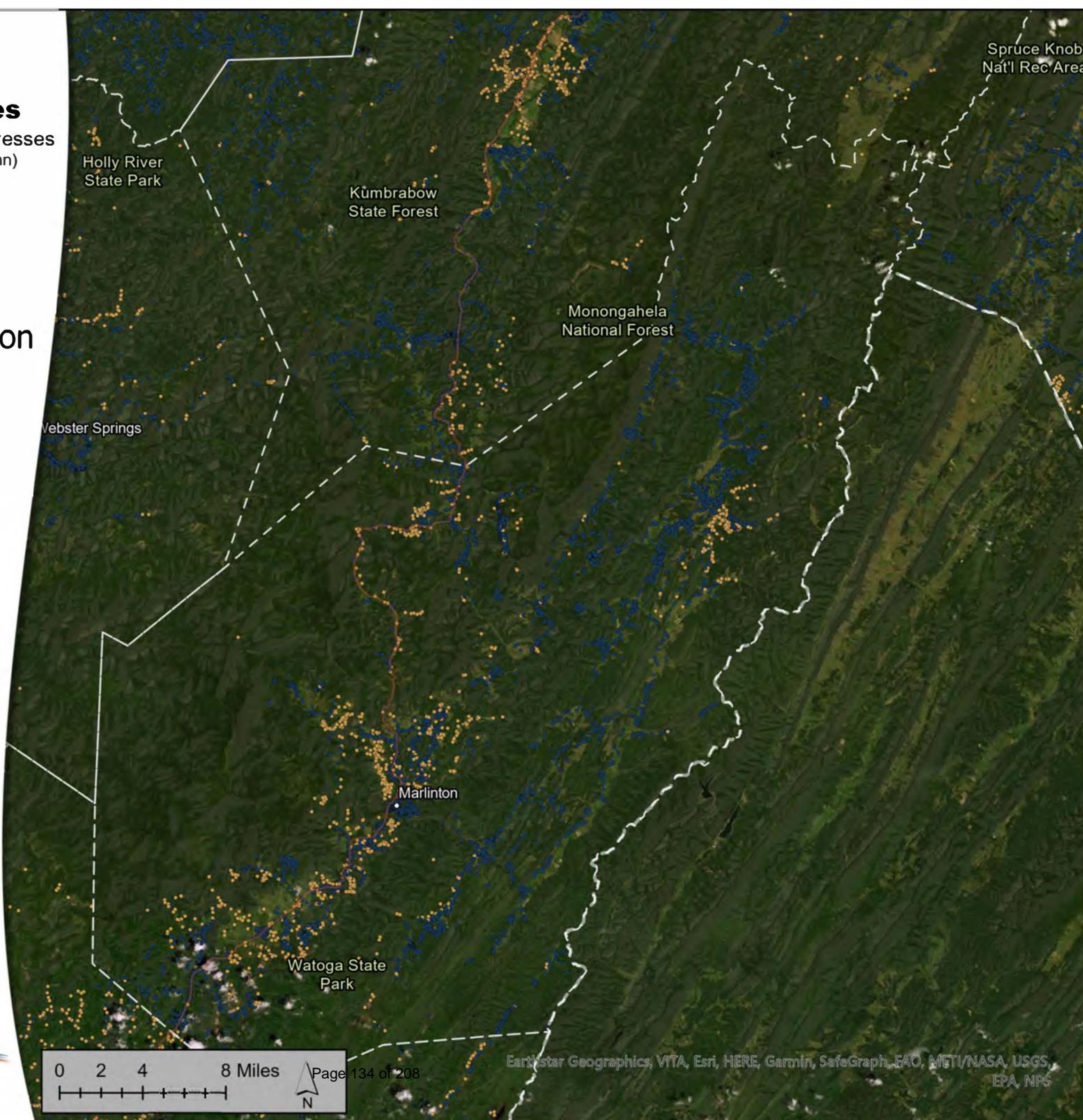
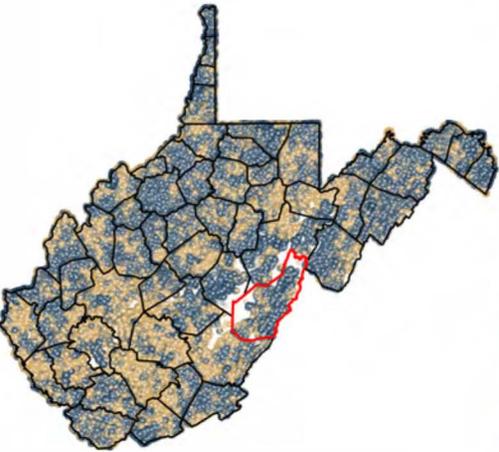
West Virginia

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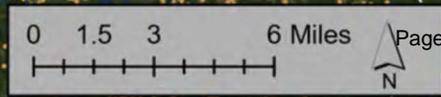
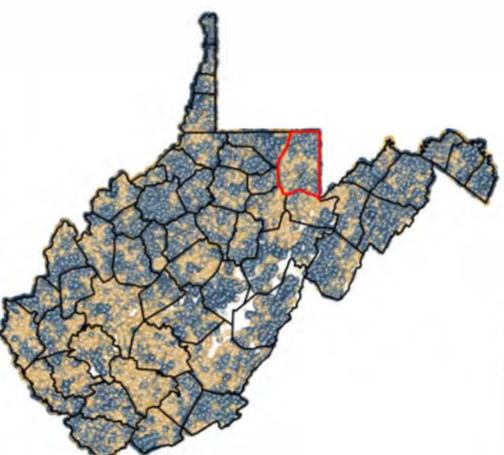
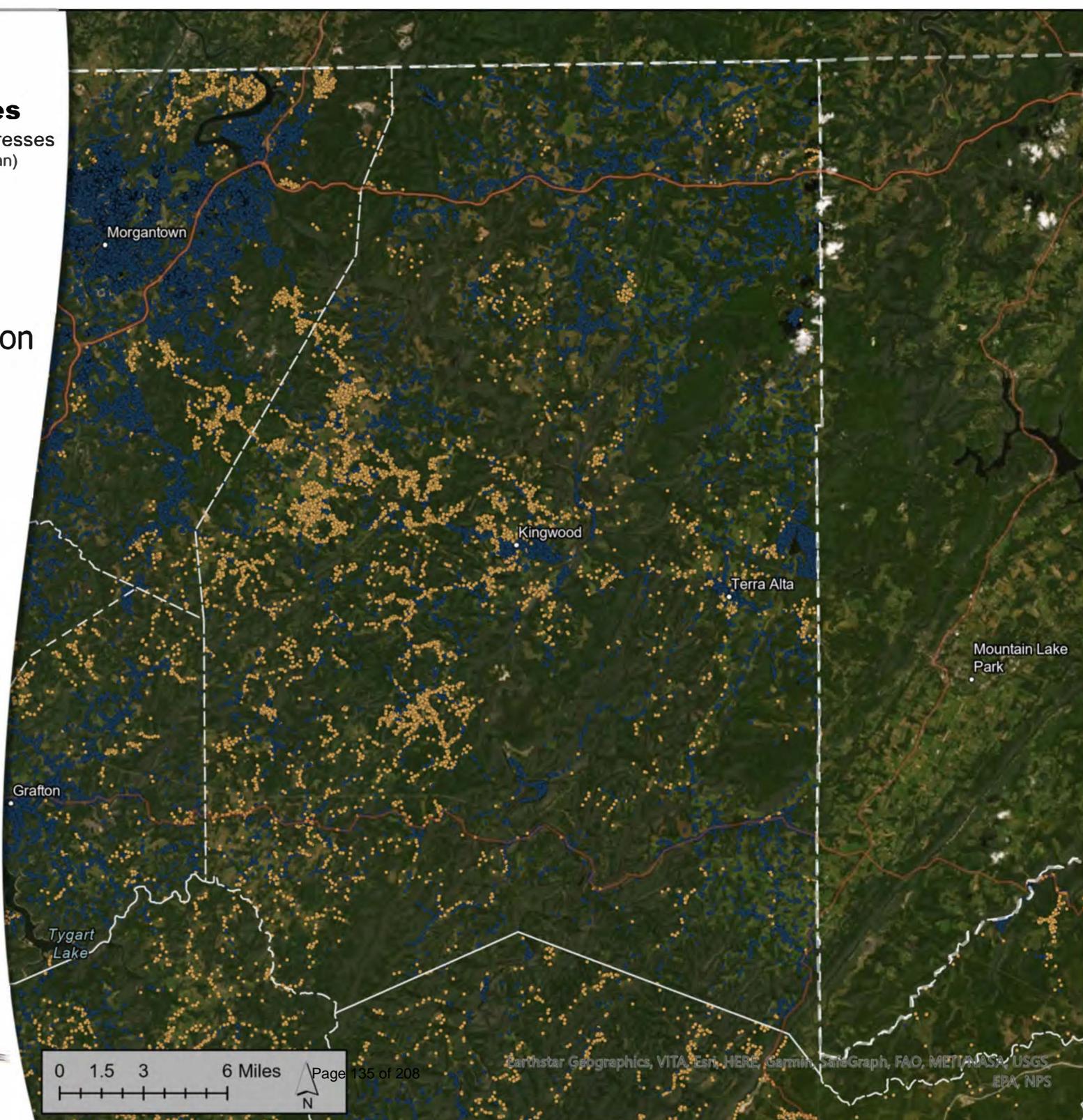
West Virginia

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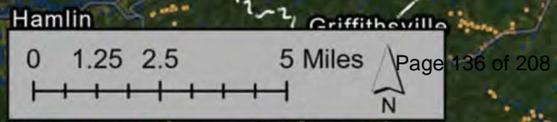
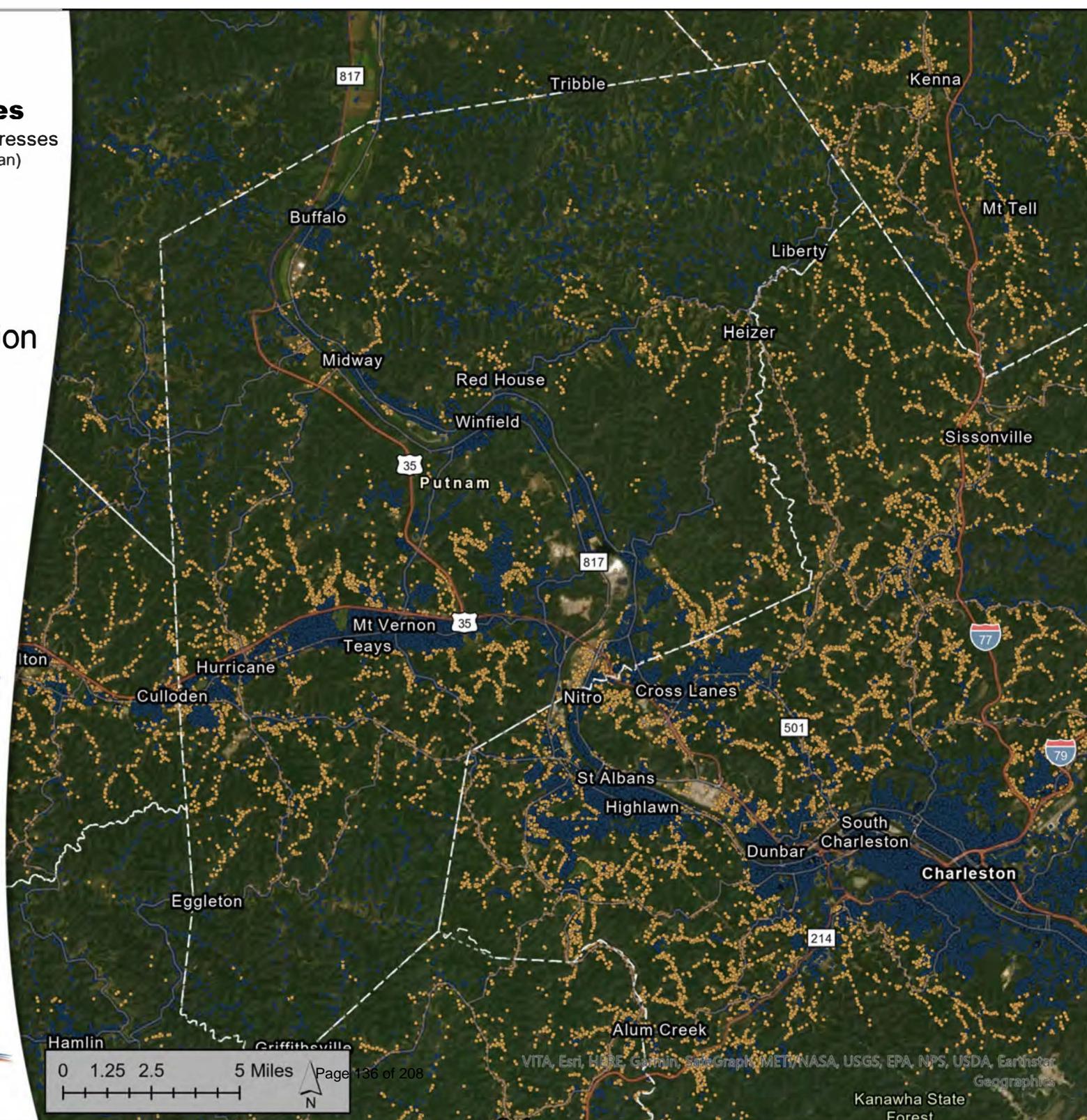
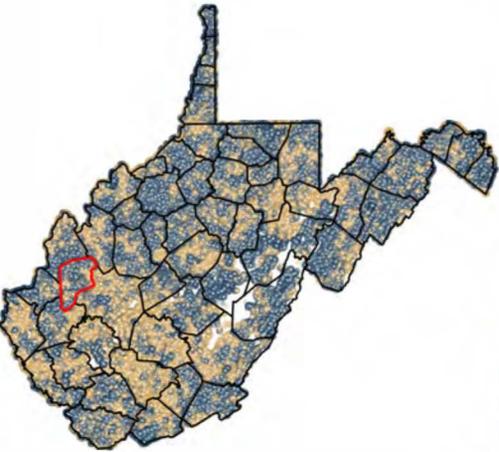
West Virginia

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VITA, Esri, HERE, Garmin, GeoGraph, METI, NASA, USGS, EPA, NPS, USDA, Earthstar Geographics

Kanawha State Forest

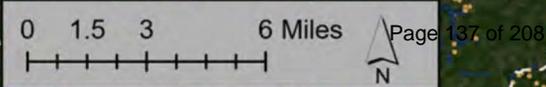
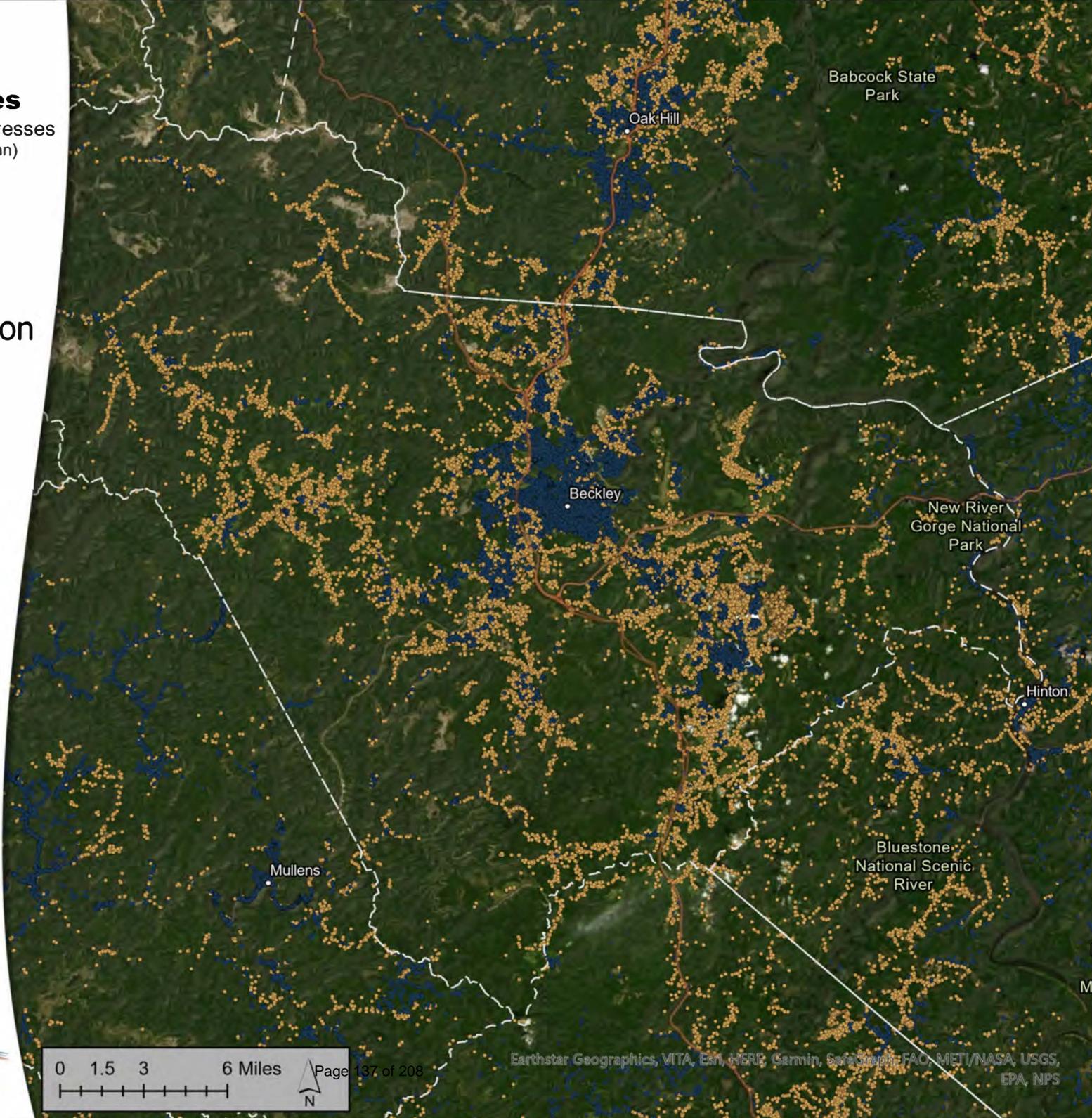
West Virginia

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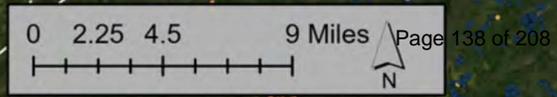
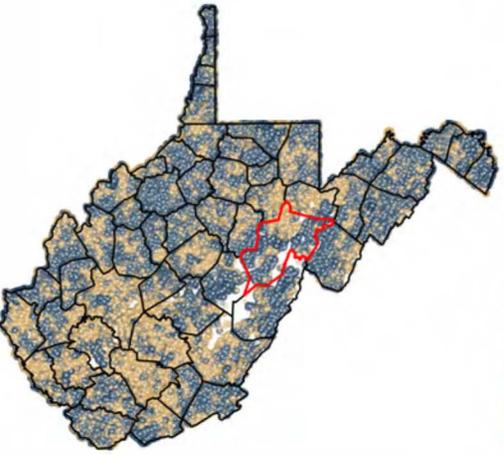
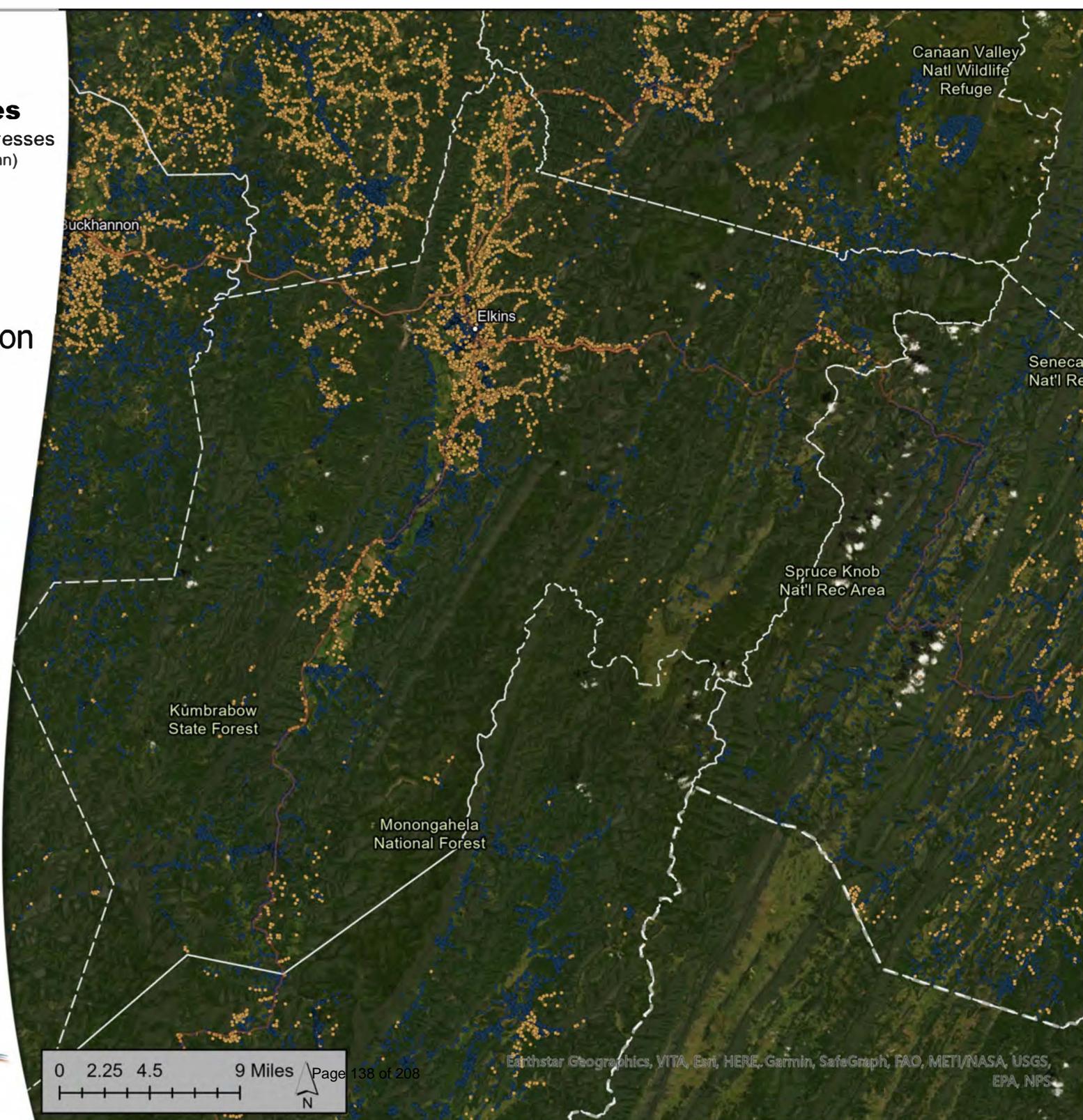
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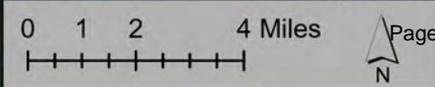
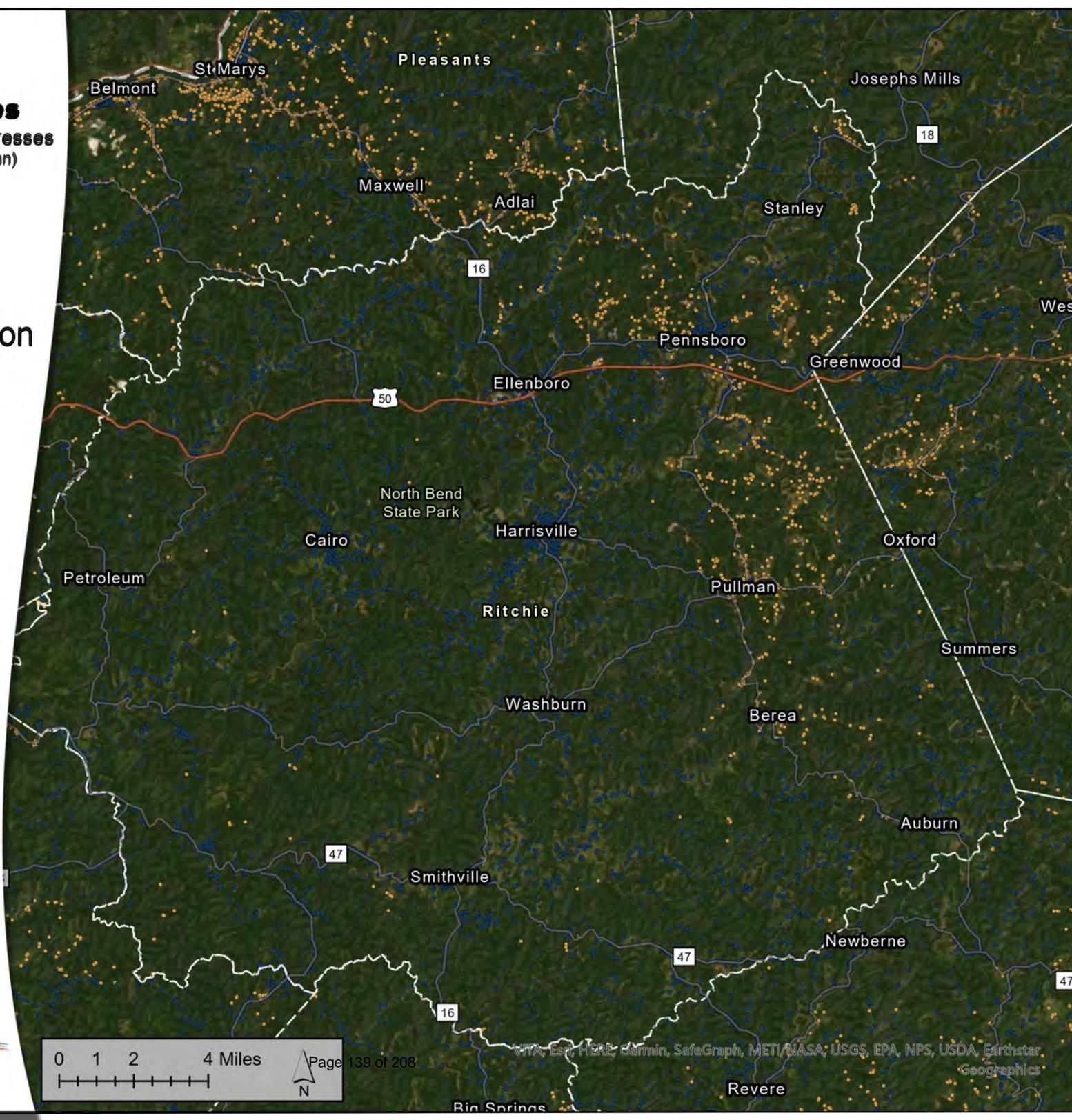
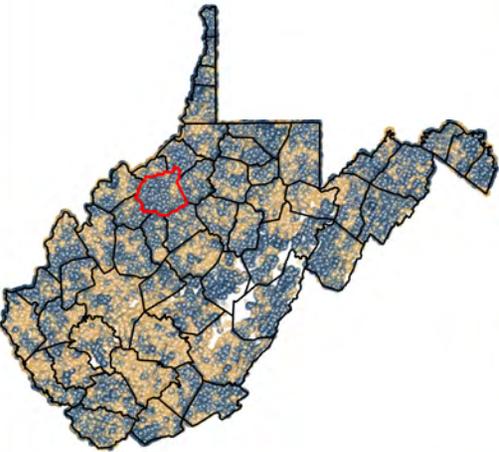
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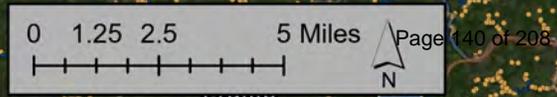
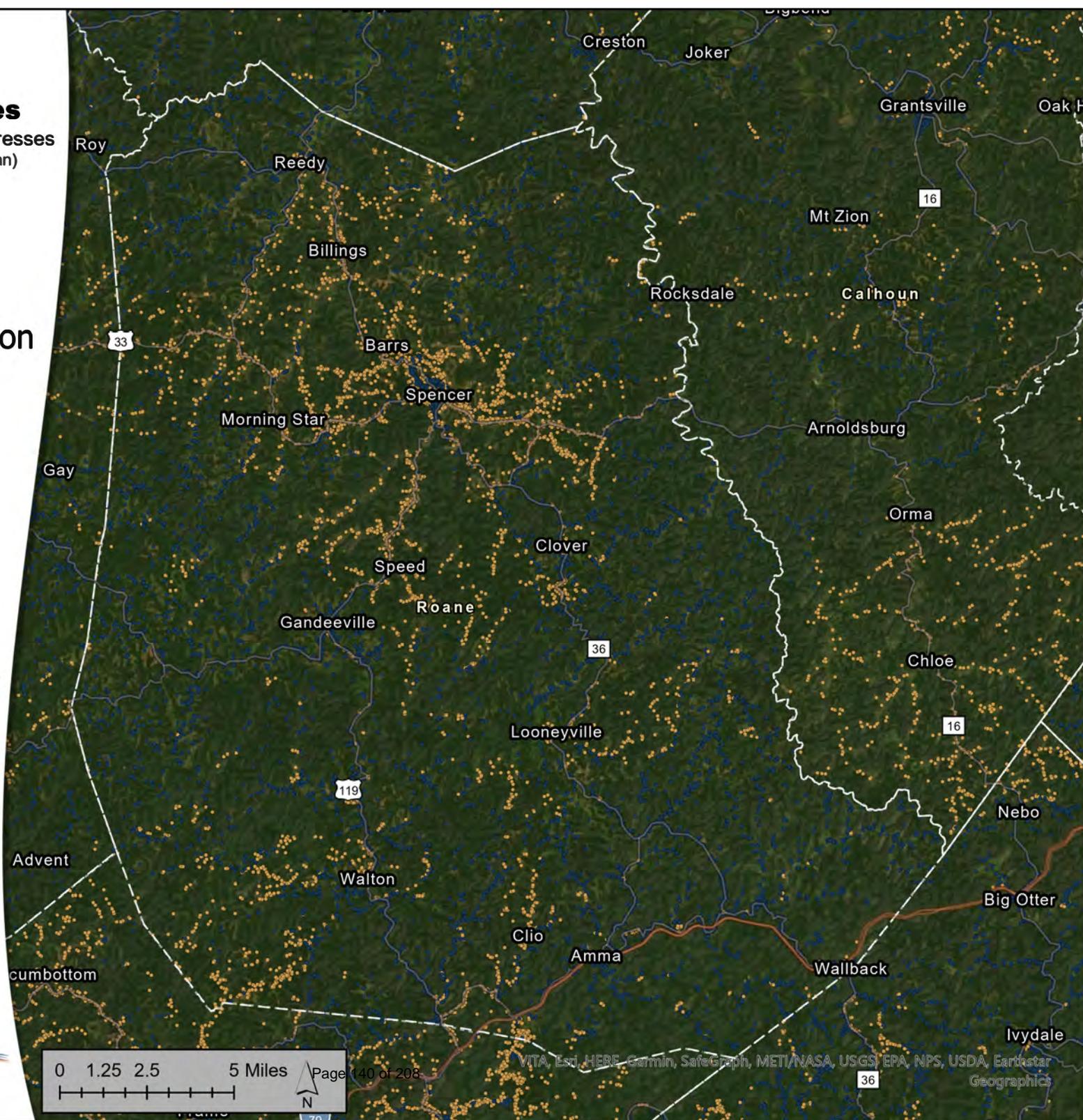
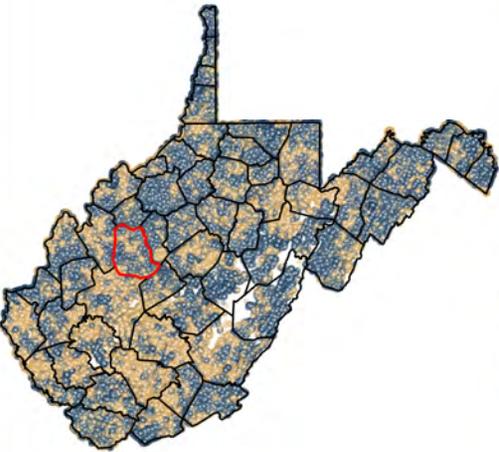
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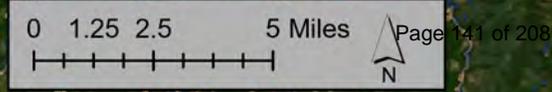
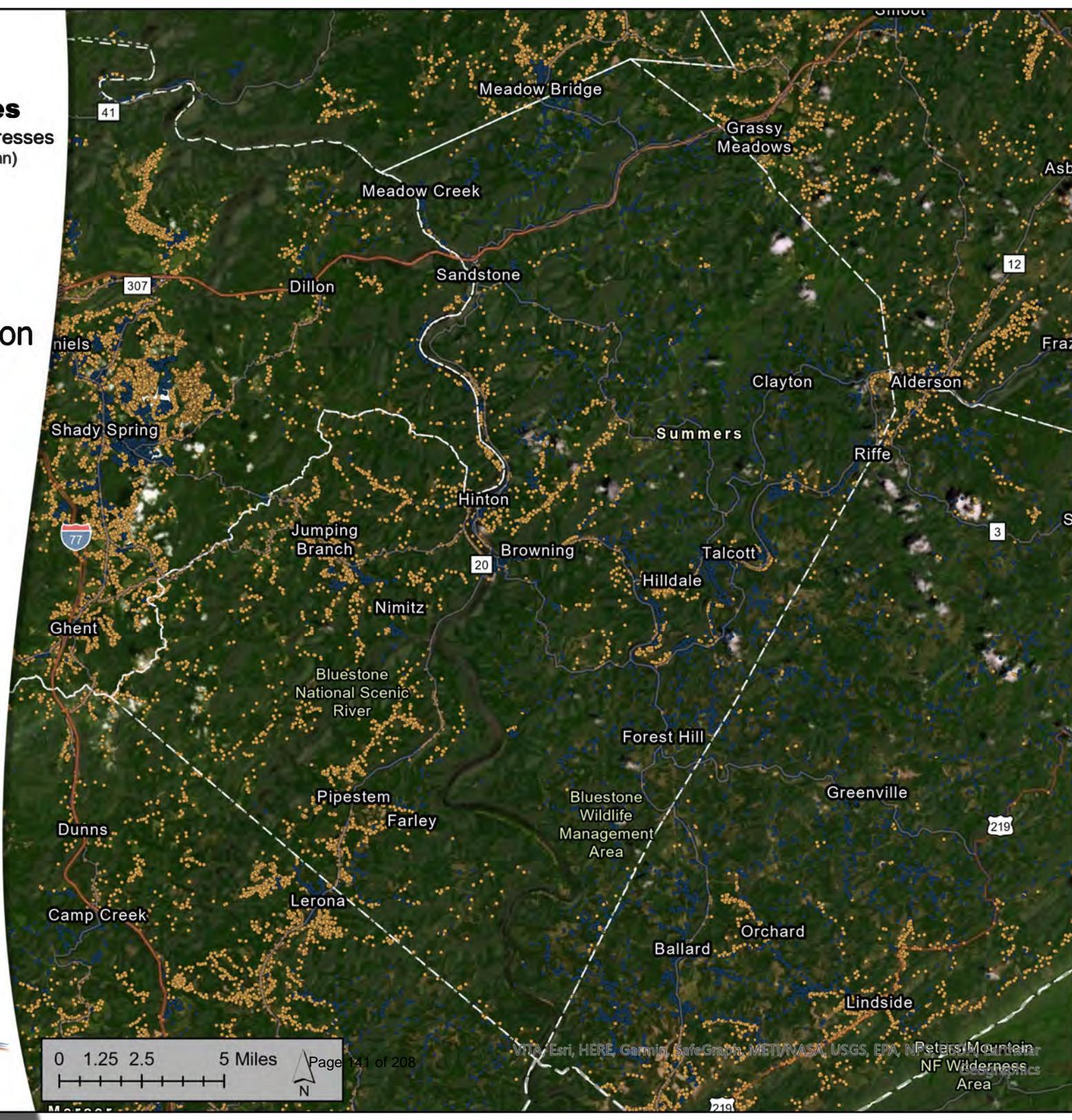
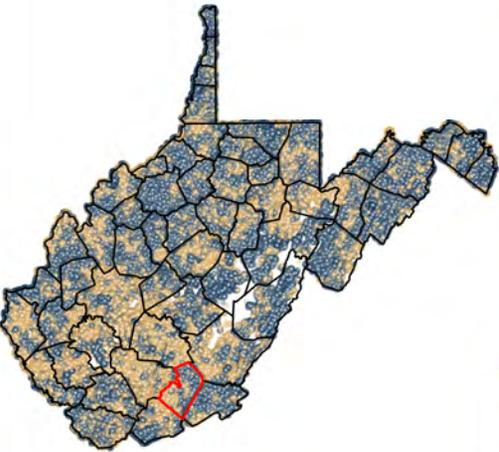
West Virginia

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Map data by Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, Peters Mountain NF Wilderness Area

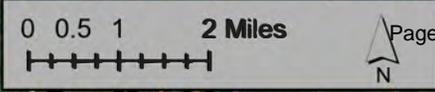
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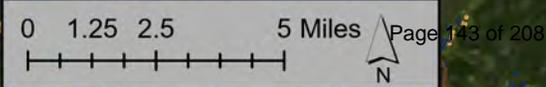
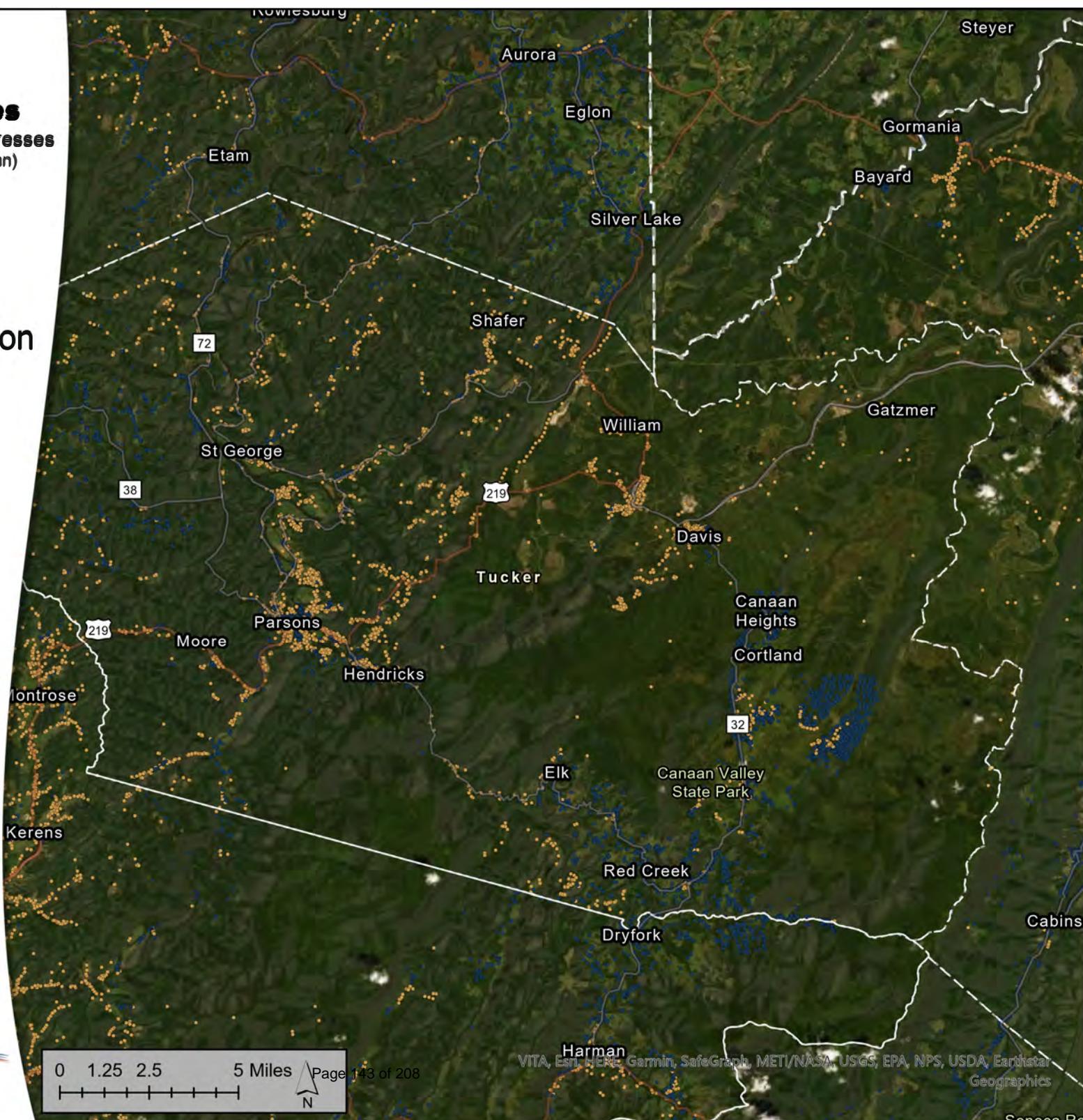
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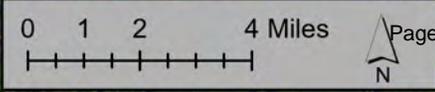
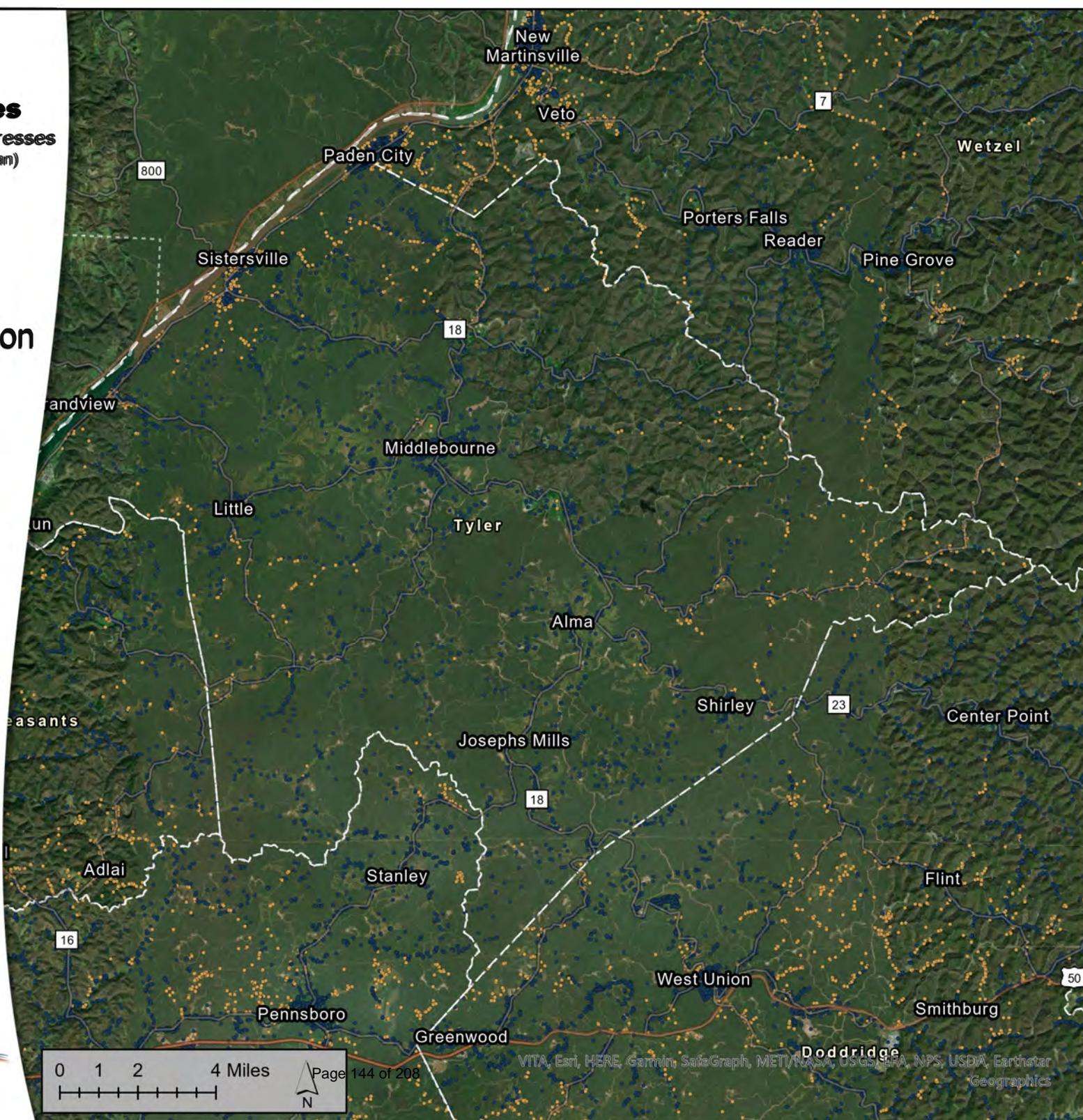
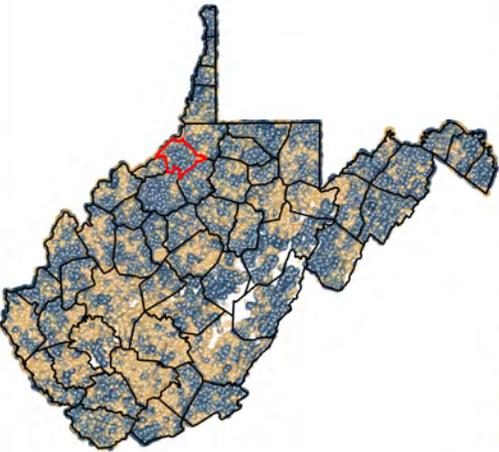
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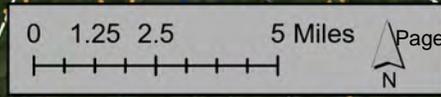
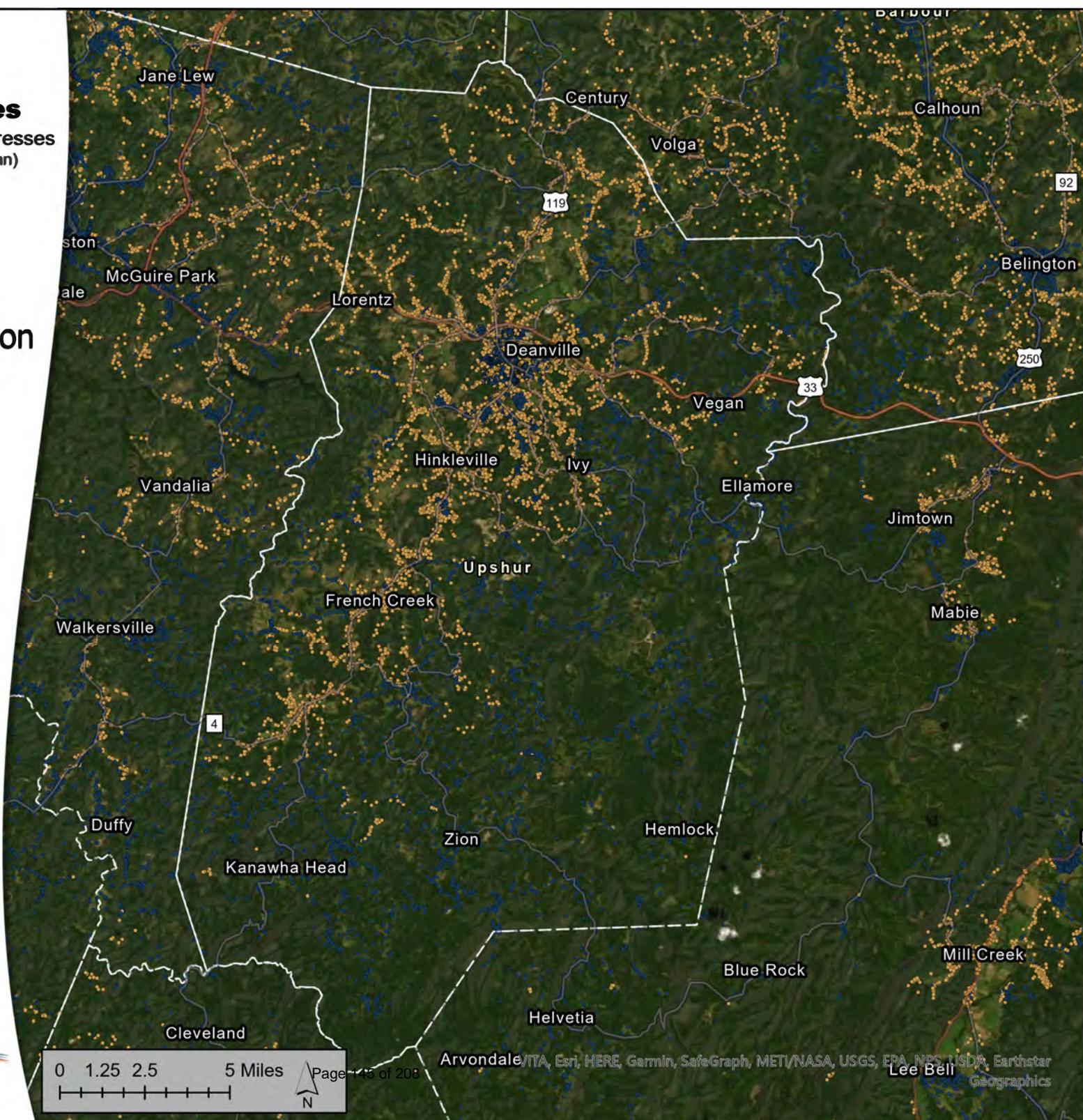
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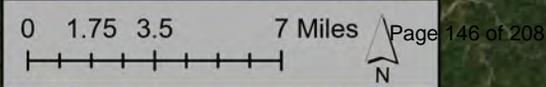
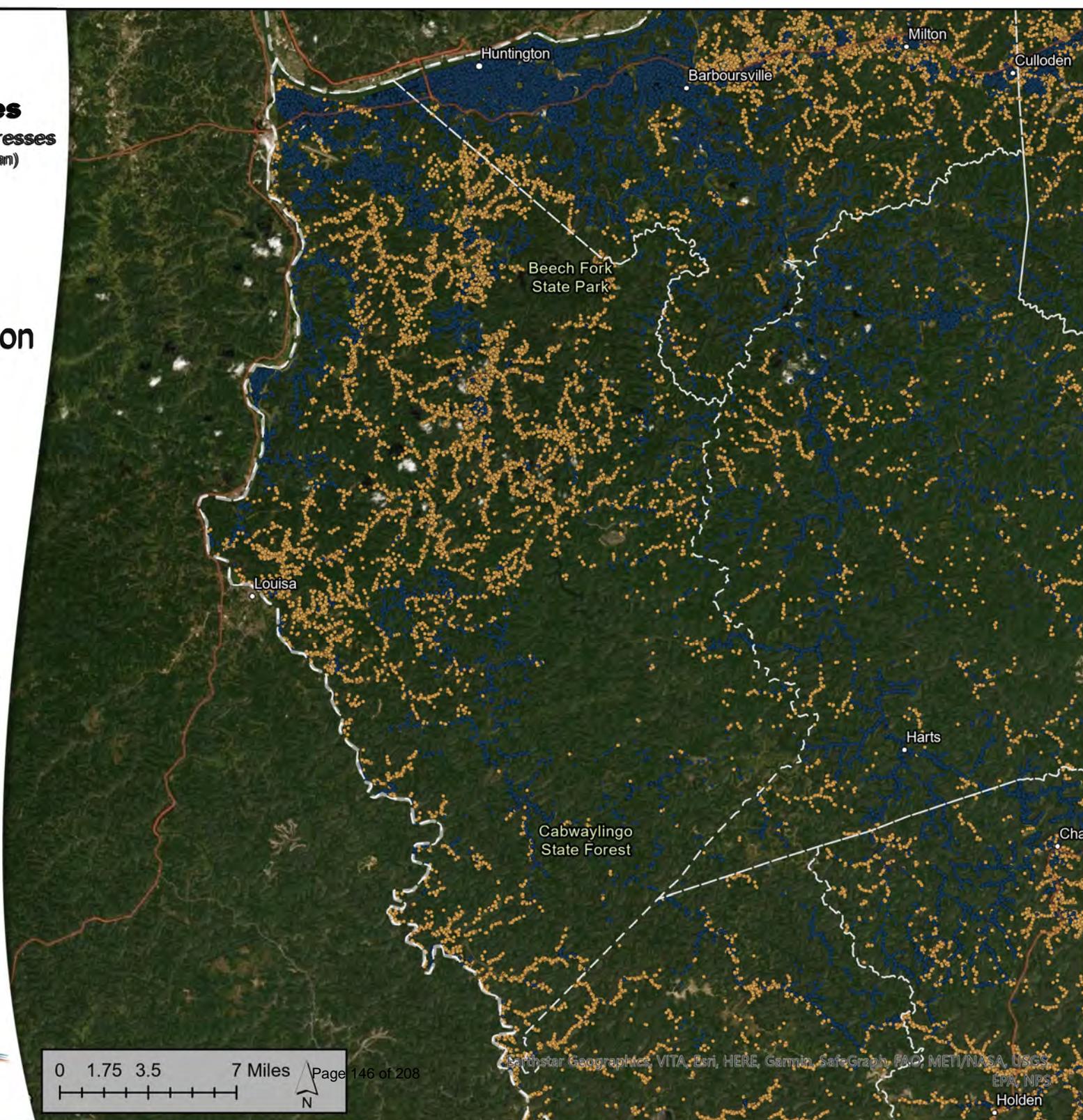
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Earthstar Geographics, VITA, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, Holden

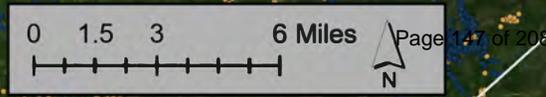
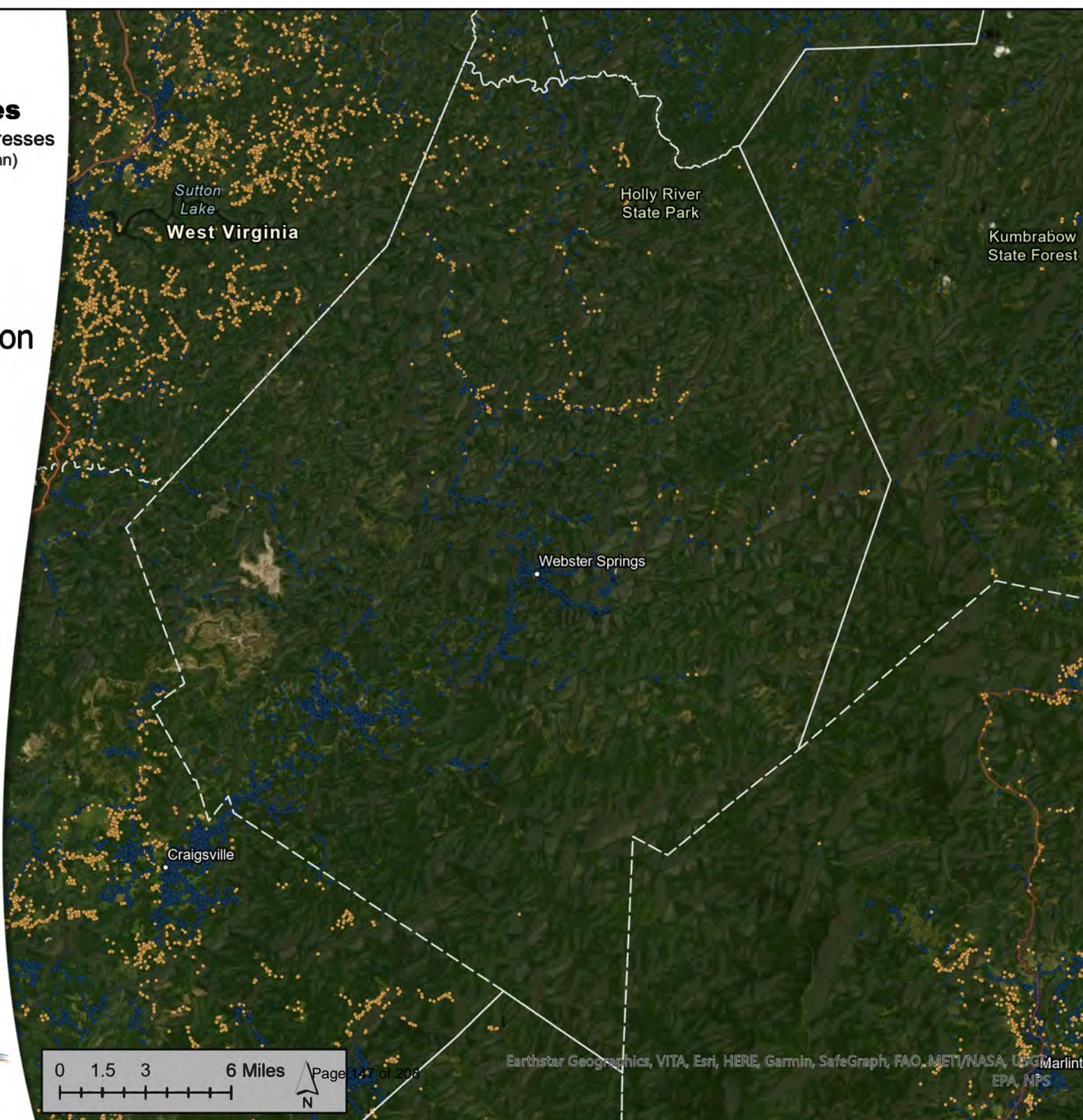
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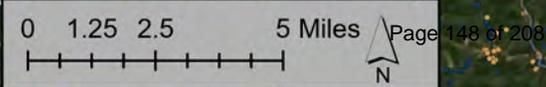
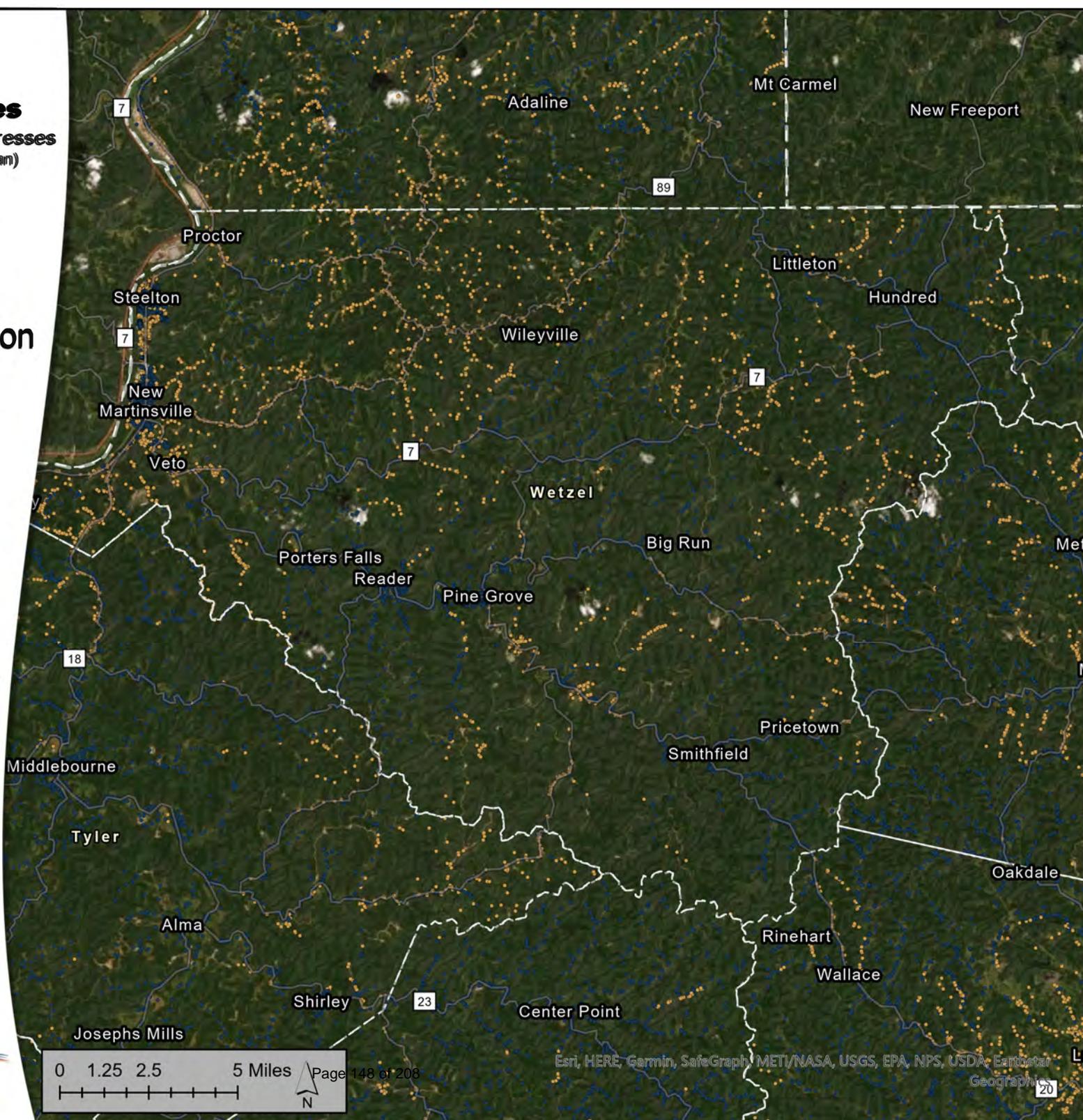
West Virginia

Target Area Addresses

Estimated Served and Unserved Addresses
(West Virginia Broadband Investment Plan)

Target Area Classification

- Targeted Addresses
- Other Addresses



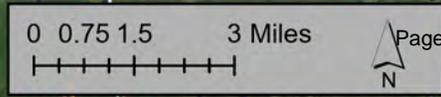
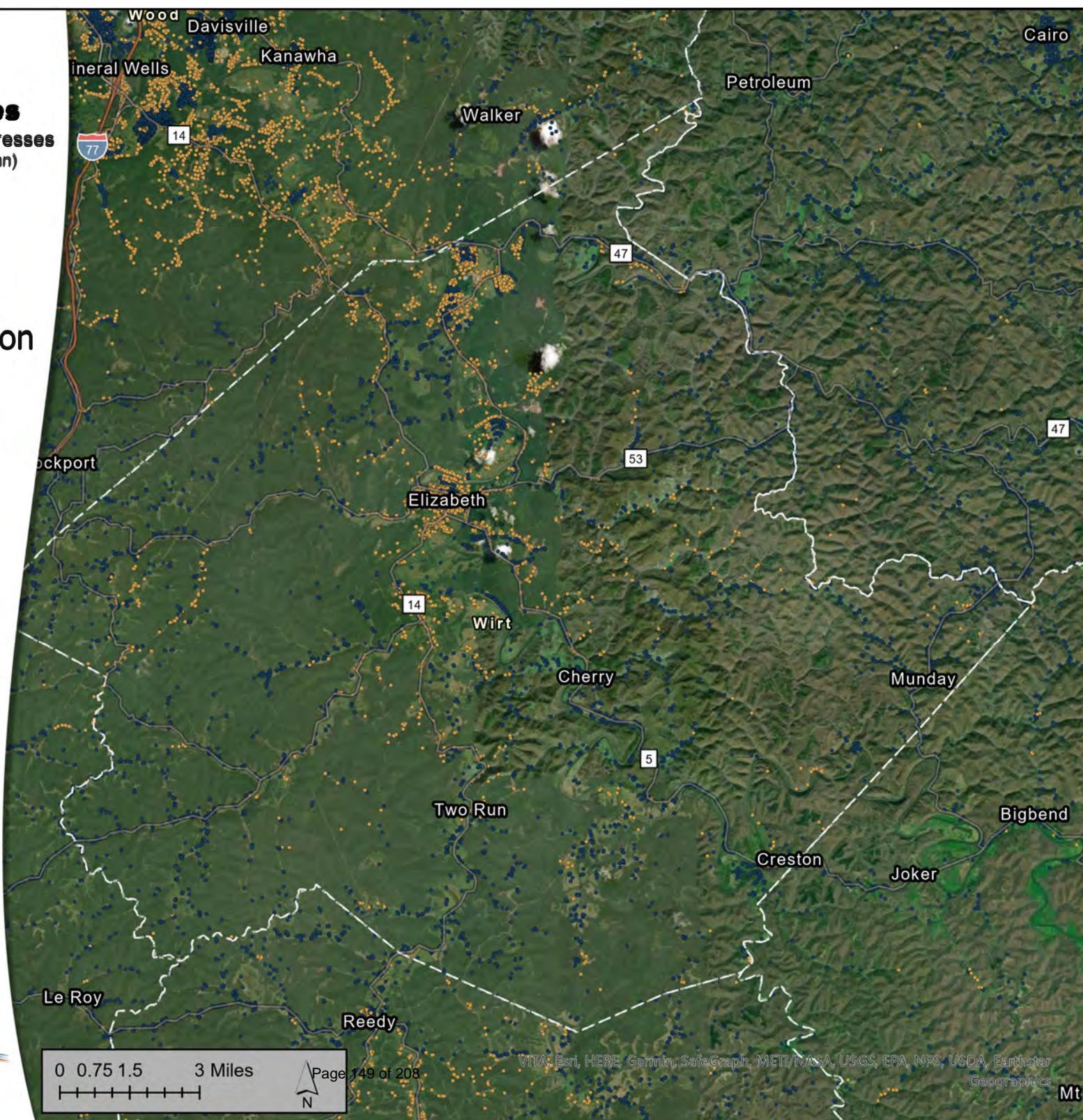
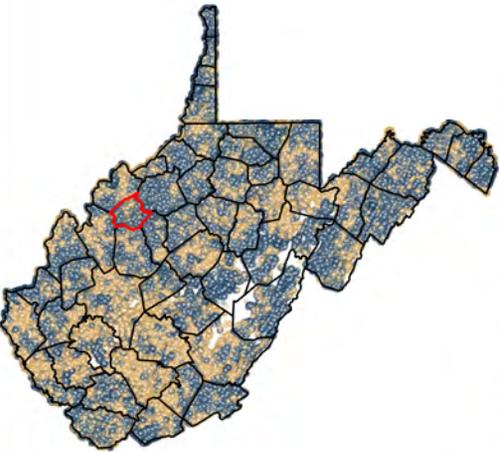
West Virginia

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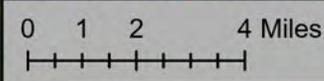
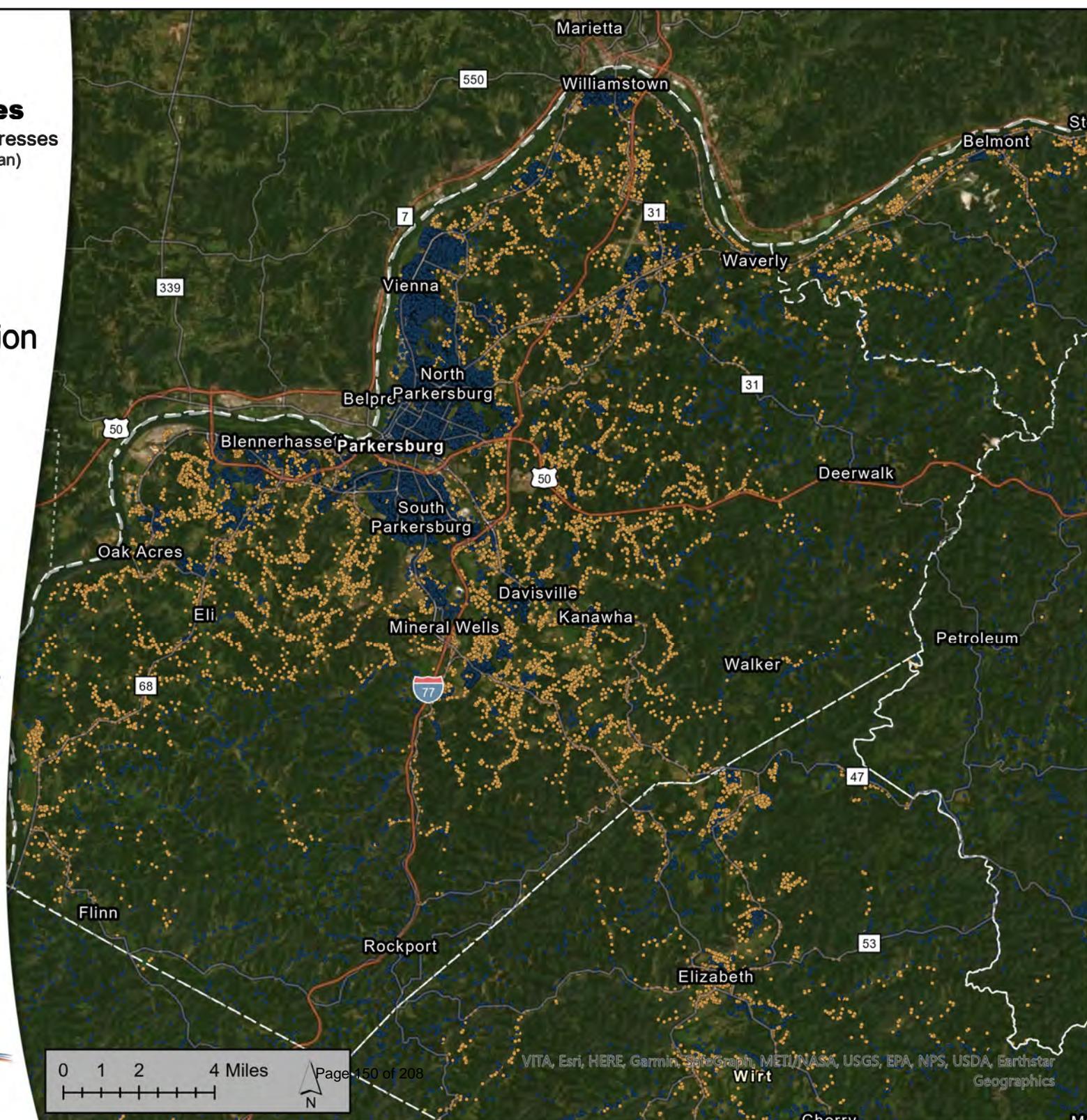
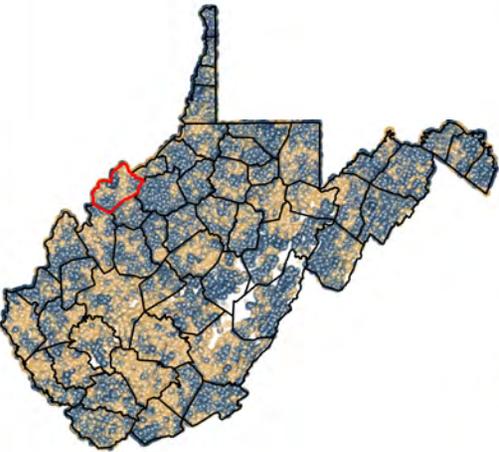
West Virginia

Target Area Addresses

Estimated Served and Unserved Addresses
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For more information, visit: broadband.wv.gov.
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