DIGITAL INCLUSION PLAN

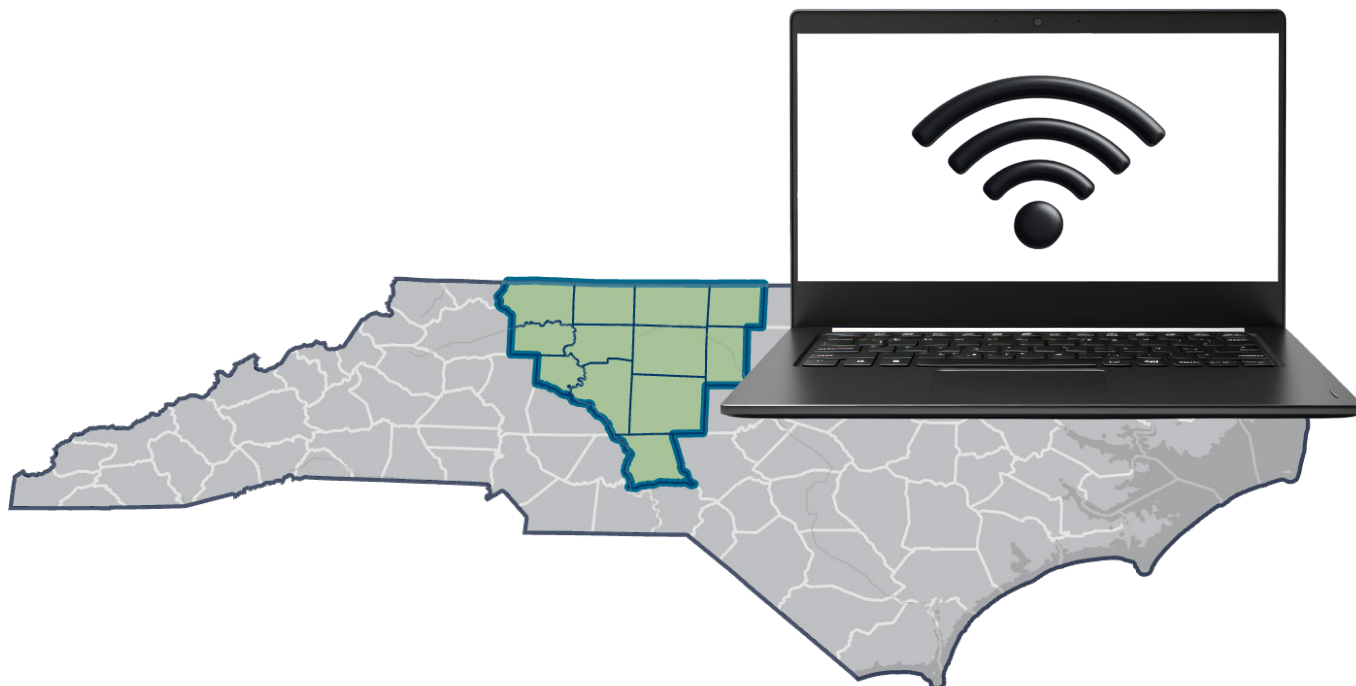**PIEDMONT TRIAD**
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Piedmont Triad Regional Digital Inclusion Plan

Final Report

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INTRODUCTION

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The Piedmont Triad Regional Digital Inclusion Plan represents a critical step toward addressing digital inequity in a 12-county region of North Carolina. Spearheaded by the Piedmont Triad Regional Council (PTRC) and developed by the University of North Carolina at Greensboro's Center for Housing and Community Studies (CHCS), this comprehensive report was funded through the BAND-NC grant program, which focuses on building a new digital economy. As technology and internet access increasingly become essential for participation in education, healthcare, workforce development, and daily life, this initiative aims to bridge the digital divide and ensure equitable access for all residents.

Defining Digital Inclusion

Digital inclusion represents the process and practice of ensuring that all individuals and communities, particularly those most disadvantaged, have equitable access to and the capability to effectively use digital technologies and the opportunities they provide. It transcends the mere availability of technology to incorporate affordability, accessibility, digital literacy, and the meaningful utilization of digital tools and services.

The National Telecommunications and Information Administration (NTIA) defines digital inclusion as individual and community-level access to robust broadband connections, Internet-enabled devices, and the necessary skills to explore, create, and collaborate in the digital world. Digital inclusion may therefore be evaluated through four key dimensions: access, digital literacy, meaningful use, and institutionalization. Access encompasses reliable high-speed Internet and relevant devices available in homes or community centers. Digital literacy refers to an individual's ability to navigate and utilize modern technologies like computers and smartphones. Meaningful use pertains to leveraging digital skills for educational and employment advancements, while institutionalization focuses on embedding digital inclusion into community and workforce strategies (NTIA, n.d.).

Similarly, the Roundtable on Digital Inclusion, says that digital inclusion involves "equitable, meaningful, and safe access to use, lead, and design digital technologies, services, and associated opportunities for everyone, everywhere" (Roundtable on Digital Inclusion, 2022). This definition emphasizes human rights, intersectionality, and societal equity, highlighting the role of digital inclusion in dismantling systemic inequalities and fostering participation across diverse social groups.

The U.S. Department of Education Digital Equity Guide (2022) emphasizes the need for intentional strategies to bridge historical and structural barriers to technology access. These strategies should encompass affordable broadband, access to internet-enabled devices, digital literacy training, and robust technical support. The focus is not only on physical connectivity but also on ensuring that technology usage empowers users towards self-sufficiency and collaboration. Furthermore, the Digital Promise - Framework for

Digital Equity (2024) underscores the necessity of integrating digital equity in education and workforce systems. It links digital inclusion to societal and economic participation, emphasizing that digital inequity perpetuates broader social and economic disparities.

The various definitions of digital inclusion converge on a shared understanding that it is a multifaceted, equity-focused endeavor aimed at ensuring that all individuals and communities can access and benefit from digital technologies. Central to all definitions is the emphasis on equitable access to robust broadband, affordable technology, and the digital literacy needed to use these resources effectively. They highlight the importance of meaningful use, enabling individuals to leverage digital skills for education, employment, civic participation, and personal empowerment. A consistent theme is the recognition of systemic barriers and the need for intentional, intersectional strategies to dismantle inequities that disproportionately affect marginalized populations based on race, gender, age, geography, and socioeconomic status. Furthermore, these definitions stress the significance of embedding digital inclusion within broader societal frameworks such as education, workforce development, and community planning, ensuring it is both sustainable and institutionalized. They advocate for community-driven, human-centric approaches, where affected populations contribute to the design of policies and programs tailored to local and cultural contexts. Finally, they recognize that digital inclusion is dynamic, requiring adaptable strategies that evolve alongside technological advancements and societal changes. Collectively, these shared principles reflect a comprehensive vision for bridging digital divides and fostering inclusive, empowered participation in the digital world.

Thus, digital inclusion is a multidimensional construct aiming to provide equitable access to and effective use of digital technologies, ensuring no one is left behind in an increasingly digital society. This concept requires systemic strategies, robust infrastructure, and community-driven approaches to foster meaningful participation and equity across all sectors of society. For the purposes of this plan we will use the following working definition of digital inclusion:

Digital inclusion is the equitable and meaningful access to affordable, high-speed Internet, digital devices, digital literacy training, and the skills and opportunities to effectively use technology for education, employment, civic engagement, and personal empowerment, achieved through intentional, community-driven, and intersectional strategies that address systemic barriers and foster sustained participation across all demographics.

Piedmont Triad Regional Digital Inclusion Plan

The primary goal of the Digital Inclusion Plan is to develop actionable strategies and recommendations that address the region's disparities in broadband access, digital literacy, affordability, and adoption. Covering both rural and urban areas, the plan seeks to identify and mitigate the barriers faced by underserved populations, such as low-income families, non-English speakers, seniors, and individuals with disabilities. The findings and strategies outlined in the plan are intended to guide regional stakeholders, including governments, educational institutions, community organizations, and businesses, in fostering greater digital equity.

The process and methods for the Digital Inclusion Plan reflects a meticulous approach, rooted in academic rigor, to address the multifaceted nature of digital inequity in the Piedmont Triad region. This process emphasizes inclusivity, data-driven decision-making, the leveraging of existing community resources and information, and alignment with broader policies. It also integrates best practices to mitigate common pitfalls, ensuring that the final plan is actionable, equitable, and sustainable.

Comprehensive Assessment and Needs Analysis

The development of the Digital Inclusion Plan commenced with a comprehensive assessment and needs analysis, which sought to illuminate the disparities in broadband access, digital literacy, and affordability across the region's 12 counties. This included both county-by-county profiles as well as a compiled regional analysis of the PTRC footprint. This phase was informed by a robust methodology that combined quantitative data analysis of demographic, geographic, and socio-economic factors with qualitative input. Sources included:

- Federal Communications Commission (FCC) Data
- Federal Reserve Economic Data (FRED) Federal Reserve Bank of St. Louis
- NC Carolina Land Area County Rankings
- NC Commerce Department Commuting & Area Profiles
- NC Department of Commerce
- NC OneMap
- NC Rural Center
- North Carolina Association of County Commissioners (NCACC) Map Book
- North Carolina Broadband Availability Index Dashboard
- North Carolina Department of Information Technology (NCDIT) Broadband Equity Survey
- North Carolina Department of Information Technology (NCDIT) County Broadband Profiles

- State Rural Development Center (SRDC) Broadband Issues Briefs
- Statewide and Local Digital Equity and Inclusion Reports
- US Census Bureau Data

The geographic analysis utilized detailed mapping to illustrate disparities in digital inclusion across the region, highlighting significant gaps in high-speed service availability, particularly in rural counties such as Montgomery, Rockingham, and Caswell, which were identified as underserved. The analysis also examined broadband adoption rates, infrastructure gaps, and demographic factors, including income levels, racial composition, and age.

These maps revealed urban-rural divides and intra-county inequities, with adoption rates and device access varying widely even within densely populated areas like Greensboro and Winston-Salem. A comprehensive regional analysis integrated county-level profiles to provide a holistic view of these patterns, showing that urban areas, while generally better connected, often had clusters of low adoption driven by affordability barriers. In contrast, rural counties struggled with infrastructure deficits, marked by limited fiber penetration and slower internet speeds, further exacerbating the digital divide. Drawing on these insights, the researchers ensured that their approach was both evidence-based and sensitive to the nuanced realities of each county and community, a hallmark of data-driven decision-making.

Community Outreach and Data Collection: Methodology and Process

The development of the Piedmont Triad Regional Digital Inclusion Plan also incorporated an extensive process of community outreach and data collection, designed to capture the voices and experiences of a diverse array of stakeholders across the 12-county region. This process included structured interviews with community leaders and digital inclusion experts as well as public listening sessions (focus groups) to ensure that the plan addressed the multifaceted barriers and opportunities surrounding digital equity. Central to the plan's methodology was an emphasis on inclusive and participatory planning. The process actively involved a diverse spectrum of stakeholders, from local governments and nonprofit organizations to educators, business leaders, and marginalized residents. By prioritizing the inclusion of underrepresented groups and communities, the research team created a space where all voices could be heard. This inclusive approach not only enhanced the equity of the plan but also fostered greater community buy-in. For example, focus groups or public listening sessions in each county provided valuable forums for residents to articulate their experiences and concerns, which were directly incorporated into the plan's strategic objectives. Community engagement, a core tenet of this project, demonstrated the researchers' commitment to centering the voices of those most affected by the digital divide.

Structured Interviews

Interviews served as a core data collection method, engaging 23 individuals from various sectors, including local government, education, nonprofit organizations, libraries, and

internet service providers. These structured conversations were conducted by the UNCG Center for Housing and Community Studies research team. Participants provided insights into key issues such as digital inclusion definitions, broadband infrastructure availability, affordability challenges, digital literacy levels, and community-based solutions. Each interview adhered to a thematic framework to guide discussions while allowing participants to elaborate on their unique experiences and perspectives. The themes included:

- **Defining Digital Inclusion:** Exploring participants' understanding of the term and identifying who is most impacted by digital disparities, particularly in rural and low-income communities.

- **Digital Asset Inventory:** Documenting existing resources such as broadband infrastructure, training programs, and public internet access points.

- **Challenges and Recommendations:** Highlighting specific barriers—such as funding limitations, insufficient broadband coverage, and gaps in digital literacy programs—and proposing actionable solutions.

To ensure the accuracy and reliability of findings, all interviews were recorded, transcribed, and subjected to thematic coding. This rigorous analysis identified recurring themes while preserving the unique context and recommendations provided by participants. The diversity of roles represented—ranging from librarians to county commissioners—added depth to the findings and reinforced the need for cross-sector collaboration to address digital inclusion. The interviews provided granular insights into the regional digital landscape, revealing disparities in access and affordability, especially in rural areas.

Public Listening Sessions

Complementing the interviews, 13 public listening sessions were conducted across the Piedmont Triad region, involving 112 participants from varied backgrounds. These sessions aimed to gather qualitative insights from community members, educators, business leaders, nonprofit representatives, and other stakeholders. The discussions focused on identifying barriers to digital inclusion, evaluating the effectiveness of existing resources, and proposing strategies for improvement.

The listening sessions followed a standardized protocol to ensure consistency and inclusivity. Each session began with an introduction to the objectives, followed by open-ended questions covering topics such as:

- Broadband accessibility and infrastructure gaps.

- Affordability of internet services and digital devices.

- Effectiveness of digital literacy programs for specific populations, including seniors and non-English speakers.

- The role of key institutions, such as libraries and schools, in promoting digital equity.

Participants highlighted critical issues, such as the lack of affordable high-speed internet in rural areas and the challenges faced by low-income families in maintaining connectiv-

ity. The sessions also revealed disparities in digital literacy, with older adults and non-English-speaking populations requiring tailored training programs. Participants called for increased funding to expand digital navigator roles and enhance outreach efforts, particularly in underserved communities.

The combined methodologies of interviews and public listening sessions ensured a comprehensive understanding of the digital inclusion challenges and opportunities within the Piedmont Triad region. By engaging stakeholders from diverse sectors and communities, the process captured a wide range of perspectives and produced actionable insights to guide the Digital Inclusion Plan. This participatory approach underscores the commitment of the PTRC and its partners to creating an inclusive digital future for all residents of the region.

Plan Development Phase

The plan development phase synthesized the findings from the needs assessment and community engagement activities to craft strategic goals and measurable outcomes. Drawing upon established best practices, the planners prioritized leveraging existing resources within the community. Public libraries, community centers, local governmental agencies, NC Cooperative Extension, and local broadband providers served as foundational assets that could be enhanced and expanded rather than duplicated. This approach optimizes resource allocation and also strengthens partnerships with organizations already engaged in digital equity work. For instance, collaborations with nonprofit entities and educational institutions may allow for the integration of digital literacy training programs and device lending initiatives into the broader strategy.

To ensure that the plan was actionable and aligned with broader policy initiatives, the methodology incorporated a deliberate focus on sustainability and scalability. This involved harmonizing the plan's objectives with federal and state-level programs such as the Broadband Equity, Access, and Deployment (BEAD) initiative. The alignment with these overarching frameworks also provided a

pathway for the plan to evolve and scale in response to future challenges and opportunities.

In summary, the methodology for the Digital Inclusion Plan exemplifies a comprehensive and thoughtful approach to bridging the digital divide. By adhering to best practices, leveraging existing assets, and addressing common pitfalls, the research team has delivered a framework that is both equitable and actionable. The emphasis on inclusivity, data-driven decision-making, and sustainability ensures that the plan is well-positioned to achieve its ultimate goal: fostering digital equity and empowering all residents of the Piedmont Triad region to participate fully in the digital economy.

Through its comprehensive approach and focus on actionable outcomes, the Digital Inclusion Plan establishes a clear roadmap for bridging the digital divide in the Piedmont Triad region and fostering an inclusive digital future for all residents. This Digital Inclusion Plan will serve as a foundational tool for the PTRC and its partners. It will be used to:

- Guide policy decisions and funding allocations aimed at improving digital equity across the region;

- Advocate for resources and investments to expand broadband infrastructure and access;

- Support local governments and community organizations in implementing tailored digital inclusion initiatives; and

- Monitor progress over time and adjust strategies to address evolving challenges and opportunities.

BACKGROUND ON DIGITAL EQUITY & INCLUSION

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Digital equity remains a pressing challenge, deeply entwined with socioeconomic disparities, geographic divides, and demographic exclusions. The increasing reliance on digital technologies for education, work, healthcare, and social interaction highlights the urgent need for digital inclusion. Despite progress, significant disparities persist in digital access and equity. This review synthesizes recent research to illuminate the multifaceted nature of digital inclusion, its impact as a social determinant of health, educational opportunity, and economic mobility. The articles cited emphasize the rural-urban divides, the relationship between poverty and access, demographic exclusions, and other barriers to digital equality. Recommendations for bridging these gaps are discussed, drawing on insights from a range of peer-reviewed studies and reports.

Rural-Urban Digital Divide

The rural-urban digital divide is one of the most persistent disparities in digital access. Approximately 36% of rural Americans lacked access to broadband at the FCC's baseline speed in 2016, compared to only 4% of urban residents (Stover et al., 2019). Geographic isolation, coupled with lower population density, renders rural broadband less profitable for private providers (Tomer et al., 2020; Bailey & Nyabola, 2021; Raihan et al., 2024). Rural areas face higher infrastructure deployment costs, often 80% greater than in urban regions, deterring investment by Internet Service Providers (Reddick et al., 2020). Libraries and other public institutions often serve as critical access points for rural communities, yet they face funding challenges (Stover et al. 2019).

Digital isolation is not solely a rural phenomenon; it is also deeply entrenched in urban environments, particularly in low-income areas. While urban centers typically enjoy robust digital infrastructure, significant disparities exist within cities, driven by socioeconomic and structural inequities. Low-income neighborhoods often face barriers such as affordability, limited provider competition, and systemic neglect, which contribute to their digital exclusion (Reddick et al., 2020). Research highlights that low-income neighborhoods experi-

ence significantly lower rates of broadband adoption compared to more affluent areas. Aguilar (2020) notes that "low-income Americans participate in a cycle of un-adoption, in which they adopt broadband connectivity at home, and then drop it for financial or other reasons" (p. 286).

In addition to affordability issues, limited competition among Internet Service Providers (ISPs) in low-income urban neighborhoods exacerbates the problem of digital isolation. Providers often prioritize high-income areas for infrastructure investments due to higher profit margins, leaving economically disadvantaged communities with fewer options and higher prices. This "profit-based discrimination" creates a self-reinforcing cycle of exclusion, as ISPs deem low-income neighborhoods less lucrative and therefore less deserving of resources (Raihan et al., 2024).

The consequences of digital isolation in urban low-income areas are far-reaching. A lack of reliable internet access impedes students' ability to participate in online learning, a challenge that became starkly evident during the COVID-19 pandemic. Aguilar (2020) highlights that "close to 50% of students in some urban neighborhoods rely on school-issued equipment to do their homework, while 20% do not have a device at all" (p. 287). These limitations disproportionately affect students of color, further entrenching educational inequities.

Poverty and Digital Access

Economic barriers are paramount in digital exclusion. Nearly 59% of households earning less than $20,000 annually lack broadband access (Early & Hernandez, 2021; Gleason & Suen, 2021; Raihan et al., 2024). Low-income households often face a "digital cost burden," struggling with the combined expenses of devices, connectivity, and skills training (Raihan et al., 2024). For instance, 40% of low-income households rely on limited data plans or public Wi-Fi, compromising their ability to access essential services like telehealth and online education (Tomer et al., 2020; Sieck et al., 2021).

The COVID-19 pandemic further exposed these vulnerabilities, as remote work and learning became unattainable for households without adequate digital tools (Reddick et al., 2020). Affordability extends beyond connectivity to encompass devices and digital literacy, which are essential for meaningful engagement (Sieck et al., 2021; Bailey & Nyabola, 2021). Digital literacy programs, such as one-on-one training for older adults, have shown promising results in bridging this gap (Gleason & Suen, 2021).

Demographics of Exclusion

The digital divide is a profound and multifaceted issue that disproportionately affects older adults, racial and ethnic minorities, and individuals with disabilities. These populations often face unique barriers that hinder their ability to access, afford, and effectively use digital technologies. Addressing these challenges requires a nuanced understanding of their specific circumstances and systemic inequities that perpetuate digital disparities.

Older adults are one of the most affected groups when it comes to digital exclusion. Many

seniors lack the digital literacy necessary to navigate online platforms or make use of essential services like telehealth, e-government, and online banking. Aguilar (2020) emphasizes that older adults often require tailored education programs to bridge their digital skills gap, stating that "effective navigation skills and the ability to use technology safely and responsibly are critical for reducing exclusion among seniors" (p. 286). Moreover, adaptive technologies that could accommodate physical or cognitive limitations in older individuals are often prohibitively expensive or unavailable in underserved areas. This digital illiteracy exacerbates social isolation, as seniors may struggle to connect with family and community resources online.

Racial and ethnic minorities are disproportionately affected by digital exclusion, a reflection of systemic inequities embedded in access to technology. Communities of color are often overrepresented among those without broadband access or necessary devices for connectivity. This disparity is rooted in broader socioeconomic inequities, as minority households are more likely to experience lower incomes and reside in underserved areas with limited broadband infrastructure. Studies highlight that "the digital divide is not merely a technological issue, but an intersectional concern tied to race, income, and geography" (Reddick et al., 2020, p. 3). For example, while many urban centers have robust digital infrastructure, low-income minority neighborhoods often lag in broadband adoption due to affordability issues and lack of competitive service providers. These systemic barriers further marginalize these groups, limiting their access to educational opportunities, healthcare, and employment resources available online.

The digital divide is particularly pronounced for individuals with disabilities, who face compounded barriers to digital inclusion. Accessible technologies such as screen readers, adaptive keyboards, and specialized software can enable equitable participation in the digital world but are often prohibitively expensive. Moreover, digital platforms are frequently designed without considering the needs of users with disabilities, resulting in poor usability and accessibility. Raihan et al. (2024) note that "the absence of inclusive design and affordable assistive technologies exacerbates digital inequities for people with disabilities" (p. 3). This exclusion limits access to vital services, including telehealth, online education, and employment opportunities, which are increasingly dependent on digital platforms.

Digital Equity as a Social Determinant of Health

Digital equity is increasingly recognized as a pivotal social determinant of health (SDOH), shaping access to healthcare, education, and economic opportunities. As society becomes more reliant on digital technologies, disparities in digital access exacerbate existing health inequities, particularly among vulnerable populations. Access to digital tools and broadband is increasingly recognized as a "super social determinant of health," underpinning access to employment, education, and healthcare (Sieck et al., 2021). Early and Hernandez (2021) highlight that "digital exclusion can create cascading effects, leading to worse health outcomes, reduced access to preventive care, and increased health disparities" (p. 607). The COVID-19 pandemic underscored the critical role of digital access, with disparities in connectivity directly affecting health outcomes (Early & Hernandez, 2021; Gleason & Suen, 2021).

Access to digital tools and broadband internet is fundamental to modern healthcare delivery. Telehealth services, online patient portals, and health information systems rely on robust digital infrastructure and digital literacy. However, these benefits are unequally distributed, leaving marginalized communities without the tools they need to manage their health effectively. Raihan et al. (2024) emphasize that "equitable access and usage of ICT has emerged as a crucial aspect in society," particularly as digital platforms increasingly mediate access to healthcare and social services (p. 3). Digital exclusion also amplifies mental health challenges. Social isolation, compounded by the inability to connect digitally with support networks, has been linked to increased rates of anxiety and depression. Gleason and Suen (2021) emphasize the need for "inclusive digital policies to mitigate the mental health impacts of digital exclusion, particularly among seniors and low-income families" (p. 77).

Recommendations for Bridging Digital Inequality

It is important to recognize that these forms of exclusion are often intersectional, with individuals facing multiple barriers simultaneously. For example, an older adult from a minority or rural community with a disability may experience compounded disadvantages that further entrench their digital marginalization. Moreover, systemic barriers such as high costs and low digital literacy exacerbate these disparities (Weaver, 2024; Reisdorf & Rhinesmith, 2020).

Addressing these systemic barriers requires targeted interventions that account for the complex, overlapping factors influencing digital inequity. Programs focused on inclusive design, affordability, and targeted training must be prioritized to ensure that marginalized groups are not left further behind in an increasingly digital world. As digital technologies become more integrated into daily life, bridging the gap for these groups is not only a matter of social equity but also a necessity for fostering an inclusive and connected society.

The persistent challenge of digital inequality demands a multifaceted approach encompassing policy, education, infrastructure, and social integration. The literature offers several evidence-based strategies to promote digital inclusion, ranging from policy reforms

and public-private collaborations to targeted digital literacy programs. Each recommendation reflects the critical need to address systemic barriers to equitable access and engagement in the digital age.

Policy Interventions

Governments play a pivotal role in ensuring equitable digital access. A central recommendation is the establishment of universal service obligations for Internet Service Providers, mandating that all citizens, regardless of geographic or socioeconomic status, have access to high-speed internet. Comprehensive policy reform is essential to bridge systemic gaps in digital equity. Federal and state-level policies should promote pricing transparency, set affordability standards, and incentivize ISPs to expand services in underserved regions. As Horrigan (2021) notes, "Addressing affordability and mandating transparency are necessary steps to ensure that digital access becomes a universal right rather than a privilege" (p. 3).

Public-Private Partnerships

Collaboration between governments, private entities, and community organizations emerges as a critical strategy for reducing costs and broadening access to digital infrastructure. Public-private partnerships not only leverage resources from multiple sectors but also address the economic and logistical challenges of rural and underserved urban areas. As highlighted in studies, these partnerships can "mitigate the digital divide especially if the strategy helps to lower or eliminate costs to the user" (Reddick et al., 2020, p. 2). Furthermore, such collaborations enable the pooling of expertise, fostering innovative solutions to structural barriers in connectivity and digital literacy (Raihan et al., 2024).

Digital Literacy Initiatives

Addressing digital exclusion requires more than physical infrastructure; it demands investments in human capacity. Community-based digital literacy programs tailored to the unique needs of vulnerable groups, such as older adults and marginalized populations, are essential. These programs help bridge knowledge gaps and foster meaningful engagement with digital technologies. Aguilar (2020) emphasizes the importance of equipping individuals with the skills to "navigate the digital space creatively, effectively, and safely" (p. 286). Similarly, Raihan et al. (2024) identify digital literacy as a critical dimension of digital equity, noting that "limited proficiencies in information navigation hinder access to essential services" (p. 3).

Infrastructure Investments

Substantial investments in infrastructure are necessary to overcome the geographic and financial challenges associated with rural connectivity. Municipal broadband initiatives and public-private collaborations offer viable pathways to expand access in underserved areas. Research underscores the importance of targeted interventions, with Tomer et al. (2020) stating that "improving broadband's physical reach will require interventions that incentivize private capital to invest in riskier geographies" (p. 5). These efforts must prioritize affordability and quality, ensuring that infrastructure development meets the diverse

needs of local communities.

Affordability Programs

Affordability remains a significant barrier to digital inclusion. Programs such as the FCC's Lifeline initiative and community-led device donation schemes are critical for reducing costs associated with broadband access and digital devices. Gleason and Suen (2021) highlight the importance of such interventions, stating, "Addressing affordability is key to reducing the digital divide and ensuring equitable access to essential online services" (p. 76). By directly addressing economic barriers, these programs empower low-income households to participate fully in the digital economy.

Addressing Inequality through Digital Inclusion Plans

Bridging the digital divide requires a holistic approach that addresses infrastructure, affordability, and education. Digital inclusion plans are essential tools for fostering equity in access to digital resources and services. Digital inclusion plans aim to bridge the digital divide by ensuring equitable access to internet services, devices, digital skills, and resources. Such plans are pivotal in fostering economic development, improving educational opportunities, enhancing healthcare delivery, and supporting civic engagement. By prioritizing inclusivity, leveraging existing assets, and employing data-driven approaches, communities can address systemic disparities and enhance opportunities for all. These plans must be actionable, sustainable, and adaptable to achieve their intended impact and contribute to broader socioeconomic development goals.

Drawing from federal and state-level guidelines, including those in North Carolina, this section outlines the essential components and processes involved in creating a digital inclusion plan. Materials reviewed include:

- Benton Institute for Broadband & Society. (2024). A Vision and a Mission for Digital Equity in North Carolina.

- Building a New Digital Economy. (2022). Digital Inclusion Planning Guide.

- National Telecommunications and Information Administration. (2022). Digital Equity Plan Guidance.

- North Carolina Department of Information Technology. (2023). Digital Inclusion Plan Template and Guide.

- National Digital Inclusion Alliance. (2023). State Digital Equity Plan Toolkit.

Establishing a Vision and Mission

The first step in creating a digital inclusion plan is defining a clear vision and mission to guide all subsequent activities. These statements articulate the overarching goals and aspirations of the initiative. For instance, North Carolina's vision for digital equity is to ensure all residents have "access to high-speed internet and the digital tools, resources, and skills to fully and equitably participate in their society" (Benton Institute for Broadband & Society, 2024). Such a vision helps unify stakeholders and provides a focused direction for planning and implementation.

Forming a Core Planning Team

Establishing a diverse planning team is crucial for the plan's development and success. The team should include representatives from government agencies, community-based organizations, educational institutions, nonprofits, and individuals with lived experience of digital inequity. This inclusivity ensures that the plan addresses the needs of all covered populations, including those most affected by the digital divide. Best practices recommend engaging 4 to 15 members to balance productivity with diversity (National Digital Inclusion Alliance, 2023). This team plays a pivotal role in providing insights, identifying resources, and ensuring broad-based community engagement throughout the process.

Conducting a Community Assessment

A comprehensive assessment of the community's digital landscape is necessary to understand existing assets and gaps. This includes conducting an asset inventory to identify resources such as broadband access points, digital literacy programs, and technology support services. Simultaneously, a needs assessment evaluates gaps in broadband availability, affordability, device access, and digital literacy. For example, over 1.1 million North Carolinians either lack broadband access or the skills to use it, underscoring the urgency of addressing these disparities (Building a New Digital Economy, 2022).

Engaging the Community

Community engagement is a cornerstone of successful digital inclusion planning. By involving stakeholders through focus groups, surveys, public forums, and listening sessions, planners can ensure the plan reflects the unique needs and priorities of the community. This approach fosters trust and collaboration while providing valuable insights into barriers and potential solutions (National Digital Inclusion Alliance, 2023).

Setting Goals and Objectives

Establishing clear goals and measurable objectives is another critical step. These should align with broader community development and economic initiatives while addressing specific digital inclusion priorities. Effective objectives follow the SMART framework—Specific, Measurable, Achievable, Relevant, and Time-bound—to ensure accountability and progress tracking (North Carolina Department of Information Technology, 2023).

Developing Strategies

The strategies outlined in a digital inclusion plan must comprehensively address key issues such as affordability, accessibility, digital literacy training, and device distribution. Leveraging programs like the Affordable Connectivity Program (ACP) can help reduce costs for low-income households while ensuring access to essential services (Benton Institute for Broadband & Society, 2024). Strategies should also emphasize partnerships with local organizations to expand reach and effectiveness.

Implementation Planning

Implementation planning involves outlining actions across short-term, mid-term, and long-term timelines. It should specify measurable milestones, assign responsibilities to stakeholders, and establish mechanisms for ongoing evaluation. Collaboration with community partners and securing sustainable funding are key factors in the successful execution of the plan (National Digital Inclusion Alliance, 2023).

Key Elements of Digital Inclusion Plans

Digital inclusion plans are grounded in several foundational elements that comprehensively address the multifaceted challenges of the digital divide. These elements are designed to create equitable opportunities for all individuals to access and utilize digital resources, ultimately fostering greater social and economic participation.

Access to High-Speed Internet

Access to reliable and affordable high-speed internet is a fundamental requirement for achieving digital equity. Without sufficient infrastructure, many individuals and communities are unable to participate fully in the digital economy. This issue is particularly pronounced in rural and underserved areas where significant gaps in broadband availability persist. For instance, in North Carolina, over 400,000 households remain unserved by broadband services, highlighting the urgent need for targeted infrastructure investments and supportive policy measures (Benton Institute for Broadband & Society, 2024). Bridging these gaps requires coordinated efforts at the federal, state, and local levels to expand connectivity and ensure that all communities have access to robust and reliable internet services.

Affordability of Services

While access to infrastructure is essential, affordability often represents a substantial barrier for many low-income households. Internet service costs can prevent families from adopting and sustaining broadband use, even when infrastructure is available. Programs such as the Affordable Connectivity Program (ACP) played a critical role in addressing this challenge by subsidizing internet services for eligible households. Such initiatives not only reduce financial barriers but also encourage greater broadband adoption, ensuring equitable access to essential online resources (National Telecommunications and Information Administration, 2022).

Digital Skills Training

The ability to access digital tools and services is of limited value without the requisite skills to use them effectively. Digital literacy is, therefore, a cornerstone of digital inclusion. Training programs, such as community workshops, online courses, and individualized support from digital navigators, are vital for addressing these skill gaps. These initiatives empower individuals to perform essential tasks, from navigating online services to enhancing employability through advanced digital competencies. In North Carolina, the emphasis on digital skills development reflects a broader commitment to ensuring that all residents can fully participate in the digital economy and society (North Carolina Department of Information Technology, 2023).

Device Access

Equitable access to functional and affordable devices is another critical component of digital inclusion. Even with reliable internet and digital skills, individuals require appropriate tools to connect and engage. Communities can address this need by implementing device lending programs, offering low-cost refurbished equipment, and collaborating with local organizations to distribute devices to those in need. These efforts help ensure that disadvantaged populations, including students and low-income families, are not excluded from the opportunities afforded by digital access (National Digital Inclusion Alliance, 2023).

Community Outreach and Awareness

Finally, effective community outreach is indispensable for the success of any digital inclusion plan. Public awareness campaigns and targeted outreach efforts are essential for informing residents about available programs and resources. By raising awareness and engaging underserved populations, communities can significantly enhance participation rates and maximize the impact of digital inclusion initiatives. For example, tailored outreach strategies can address the specific needs of rural, minority, and low-income communities, ensuring that these groups benefit equitably from digital inclusion programs (Building a New Digital Economy, 2022).

Best Practices and Common Pitfalls in Digital Inclusion Planning

Adherence to best practices and awareness of potential pitfalls are essential for the development of impactful and sustainable digital inclusion plans. Inclusive planning, evidence-based strategies, resource optimization, and policy alignment form the foundation of successful initiatives, while attention to barriers, sustainability, and stakeholder engagement safeguards against common challenges. By integrating these principles, communities can create robust frameworks for achieving digital equity and closing the digital divide.

Inclusive Planning

Effective digital inclusion plans must be developed through inclusive and participatory planning processes. This involves engaging a diverse array of stakeholders, including representatives from government, nonprofits, educational institutions, and community-based organizations. Emphasis should be placed on ensuring that marginalized and underserved groups are represented in the planning process. By incorporating the perspectives of those who are most affected by the digital divide, planners can design initiatives that address specific barriers and reflect the unique needs of all community members. Inclusive planning fosters greater community buy-in, enhances equity, and ensures that the resulting strategies are both practical and impactful.

Data-Driven Decision-Making

Data-driven approaches are critical for the success of digital inclusion plans. Robust and reliable data on broadband adoption rates, affordability, and digital literacy levels provide the foundation for informed decision-making. For example, understanding the geographic and demographic disparities in broadband access allows planners to prioritize areas with the greatest need. Evidence-based strategies ensure that interventions are targeted and effective, increasing the likelihood of meaningful outcomes. As noted in the Broadband Issues Brief (2022), data-driven planning enhances the strategic allocation of resources, enabling communities to achieve their digital equity goals more efficiently.

Leveraging Existing Resources

Communities often possess a wealth of existing resources, initiatives, and infrastructure that can be utilized to advance digital inclusion. These resources may include public libraries, community technology centers, local broadband providers, and nonprofit organizations engaged in digital equity work. By building on these assets, planners can maximize the impact of their initiatives while avoiding redundancy and unnecessary expenditures. Partnerships with established programs also facilitate the sharing of expertise and best practices, strengthening the overall effectiveness of digital inclusion efforts (National Telecommunications and Information Administration, 2022).

Alignment with Broader Policies

Digital inclusion plans should not exist in isolation but must align with broader regional and national initiatives. Programs such as the Broadband Equity, Access, and Deployment (BEAD) initiative provide valuable frameworks and resources that can amplify the effectiveness of local efforts. Alignment ensures coherence across different levels of planning and enables scalability, allowing communities to benefit from synergies between local and national strategies. For instance, leveraging federal funding and guidance from initiatives like BEAD can enhance the sustainability and reach of community-level digital inclusion programs (National Digital Inclusion Alliance, 2023).

Underestimating Barriers

One of the most significant risks in digital inclusion planning is failing to fully recognize the

range of barriers that can impede access and adoption. Challenges such as language barriers, cultural differences, and low literacy levels are often underestimated, leading to gaps in service delivery. For example, a plan that does not account for language diversity may exclude non-English-speaking populations, limiting its overall impact. Recognizing and addressing these barriers is essential to creating equitable and effective solutions (Benton Institute for Broadband & Society, 2024).

Neglecting Sustainability

A lack of focus on sustainability can undermine the long-term success of digital inclusion initiatives. Plans that rely heavily on short-term funding or fail to incorporate scalability considerations may struggle to maintain their impact over time. Sustainable financing models, such as partnerships with private sector entities or ongoing public funding mechanisms, should be integral to the planning process. These models ensure that programs remain viable and continue to benefit communities well into the future (National Digital Inclusion Alliance, 2023).

Excluding Key Stakeholders

Limited stakeholder engagement is another common pitfall that can compromise the effectiveness of digital inclusion plans. Excluding critical voices, particularly those from underserved or marginalized populations, results in strategies that fail to address the most pressing community needs. Effective plans must involve a wide range of stakeholders throughout the planning and implementation processes to ensure that all perspectives are considered and that solutions are comprehensive and inclusive. Failure to do so risks creating a plan that lacks relevance and community support (Building a New Digital Economy, 2022).

The Product – A Comprehensive Roadmap

The final digital inclusion plan should be a well-structured document that provides a comprehensive roadmap for achieving digital equity. According to the North Carolina Department of Information Technology (2023) the essential sections include:

- **Executive Summary:** A concise overview of the plan's purpose, vision, and goals.

- **Current State Analysis:** A synthesis of findings from the asset and needs assessments.

- **Goals and Objectives:** Specific outcomes the plan aims to achieve.

- **Implementation Plan:** Detailed strategies and actions for achieving objectives.

- **Evaluation Framework:** Methods for monitoring progress and adapting strategies as needed.

North Carolina's Digital Inclusion Plans & Reports

North Carolina's digital inclusion efforts represent a multifaceted approach to bridging the digital divide. This section synthesizes key findings from recent reports and plans on digital inclusion and equity in North Carolina. The reports were authored or supported by key organizations committed to digital equity in North Carolina. The Broadband Infrastructure Office (BIO), a division of the North Carolina Department of Information Technology (NCDIT), played a significant role in most reports, leveraging partnerships with entities like the Friday Institute for Educational Innovation at NC State University. Other contributors include the NCDIT's Division of Broadband and Digital Equity, which spearheads statewide initiatives, and organizations like the NC Farm Bureau Federation, reflecting a collaborative effort across government, academic, and community stakeholders to address the digital divide.

While each report addresses unique challenges, they collectively emphasize the importance of equitable access, affordability, and collaboration. The reports collectively emphasize several overlapping themes critical to advancing digital equity and broadband adoption in North Carolina. Affordability and accessibility emerge as primary barriers to broadband adoption, particularly in underserved rural and low-income communities. Programs like the Affordable Connectivity Program (ACP) are highlighted as essential tools for reducing costs and expanding access to high-speed internet. A strong focus on equity for vulnerable populations is also evident, with efforts aiming to bridge digital gaps for farmers, students, and residents of coal-impacted regions. Additionally, inclusivity is prioritized for groups such as individuals with disabilities, non-English speakers, and those who are incarcerated, reflecting the need for targeted interventions.

Another commonality is the emphasis on public-private partnerships, which are consistently recommended as a mechanism for expanding infrastructure, fostering innovation, and addressing diverse community needs. The integration of digital skills training is a recurring priority, with reports advocating for statewide initiatives to equip residents with the competencies necessary for meaningful participation in the digital economy and education systems. Finally, all reports underscore the importance of data-driven strategies, relying on comprehensive data collection to guide policy decisions and interventions. Tools such as the NC Broadband Survey and Homework Gap study play a pivotal role in identifying and addressing specific areas of need, ensuring that solutions are targeted and effective. These plans serve as a blueprint for statewide progress, ensuring that all residents can fully participate in the digital age.

2020 Internet Connectivity and Farms in North Carolina

The report Internet Connectivity and Farms in North Carolina (2020) explores the critical intersection of broadband access and agriculture, emphasizing the essential role of reliable, high-speed internet for modern farming operations. Agriculture represents an $87 billion sector in North Carolina's economy, yet many farmers face significant connectivity barriers that hinder their ability to conduct essential business functions, adopt emerging technologies, and remain competitive in global markets. As the report notes, "90 percent of respondents said that reliable high-speed internet is 'extremely important' or 'very important' to conduct business" (Broadband Infrastructure Office, 2020, p. 1). This highlights the growing urgency to bridge the digital divide in rural and agricultural communities.

The report draws on survey data collected from over 1,250 farmers in 98 counties, revealing widespread gaps in broadband availability and quality. Many respondents identified challenges such as slow speeds, high costs, and a lack of choice among service providers. Notably, "78% of farmers said they do not have another viable option to change service providers," underscoring the monopolistic conditions that exacerbate access disparities in rural areas (Broadband Infrastructure Office, 2020, p. 2). Moreover, the report emphasizes that connectivity issues often extend beyond farm offices to encompass agricultural fields, where reliable internet is increasingly necessary for real-time data collection, precision farming, and market engagement.

Recognizing the unique broadband needs of agricultural operations, the report calls for targeted strategies to address connectivity gaps. These include leveraging programs like the GREAT (Growing Rural Economies with Access to Technology) grant to prioritize broadband expansion in farming areas, supporting the development of smart farm applications, and fostering public-private partnerships. Additionally, initiatives such as the Internet Connectivity for Farmers Survey provide valuable data to inform policy and funding decisions, identifying unserved and underserved farms as critical areas for investment.

The report concludes by emphasizing the transformative potential of broadband in enabling agricultural innovation and sustainability. Reliable internet access allows farmers to engage in e-commerce, streamline operations, and adopt technologies that enhance both economic and environmental outcomes. As the report asserts, "broadband access will require focused solutions that are able to serve a variety of needs," highlighting the importance of tailored approaches to rural connectivity challenges (Broadband Infrastructure Office, 2020, p. 1). By addressing these barriers, North Carolina can ensure its agricultural sector remains a cornerstone of the state's economy while fostering equitable access to digital tools and opportunities for rural communities.
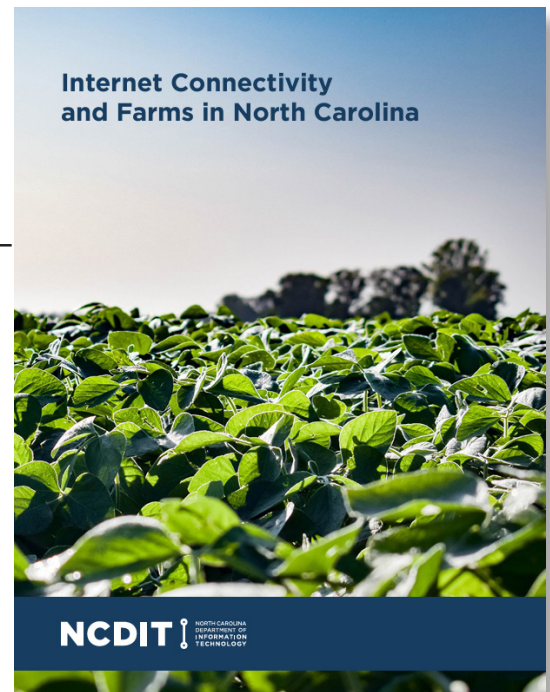
2020 Carolina Crosscut: Broadband and Telehealth in Appalachian Coal-Impacted Communities

The Carolina Crosscut: Broadband and Telehealth in Appalachian Coal-Impacted Communities (2020) report provides a detailed examination of the interrelated issues of broadband access, health disparities, and telehealth adoption in 20 coal-impacted counties in North Carolina's Appalachian region. This study underscores the socioeconomic challenges faced by these communities, which have experienced significant economic decline following the collapse of the coal industry. The report connects the lack of adequate broadband infrastructure with persistent health inequities, proposing that the region's economic and public health revitalization is contingent upon addressing these interconnected deficiencies.

The study highlights that "a stark economic, broadband, and health divide exists between those living in one of the 20 coal-impacted counties in North Carolina's Appalachian region and the average North Carolinian" (Carolina Crosscut, 2020, p. 3). Specifically, these counties face higher rates of mortality from diseases such as cardiovascular disease, diabetes, and opioid use disorder, correlating closely with their lower broadband access rates. The findings emphasize that these health disparities are not merely a reflection of the region's economic struggles but are further compounded by limited access to digital and telehealth services. The inability of residents to access specialists or utilize digital health platforms due to inadequate connectivity exacerbates the crisis.

The report also highlights the pivotal role of telehealth as a transformative tool to address health disparities and bolster workforce productivity. Telehealth has been shown to "reduce hospital admissions, improve early intervention of chronic disease exacerbations, and reduce mortality rates by up to 30 percent" (Carolina Crosscut, 2020, p. 6). However, telehealth adoption remains stymied by low broadband penetration, with over 70,000 households in these counties lacking access to reliable internet. Safety net sites in the region, such as school-based health centers, are under-resourced and ill-equipped to implement telehealth programs effectively, further limiting healthcare accessibility.

To address these challenges, the report offers seven recommendations aimed at increasing broadband access and telehealth integration. Key proposals include expanding the GREAT (Growing Rural Economies with Access to Technology) grant program, enhancing data collection on broadband coverage, and piloting telehealth initiatives in counties with high health disparities and moderate broadband availability. For example, the study identifies Burke, Caldwell, Madison, and Surry counties as "ideal sites for telehealth pilots designed to meet their largest health needs" (Carolina Crosscut, 2020, p. 5).

The report recommends a coordinated approach involving state and local leaders, healthcare providers, and broadband service providers is essential to ensure that coal-impacted communities have the resources needed to thrive. It asserts that increasing broadband adoption and telehealth utilization will not only improve public health

outcomes but also strengthen the region's economic resilience. As the report succinctly states, "Fostering an increase in broadband and telehealth adoption will improve health outcomes and create a healthier workforce, which will increase the health of the local economies and ensure the region flourishes" (Carolina Crosscut, 2020, p. 4). This comprehensive study serves as a roadmap for addressing the digital and health inequities that have plagued these Appalachian communities.
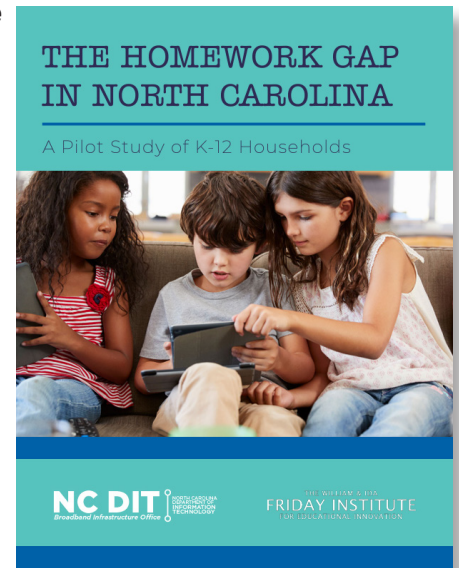
2020 The Homework Gap in North Carolina

The Homework Gap in North Carolina report, authored by the Broadband Infrastructure Office (BIO) and the Friday Institute in 2020, examines the educational inequities resulting from students lacking home broadband access needed to complete school assignments. The "Homework Gap," a subset of the broader digital divide, disproportionately affects low-income, rural, and minority households. This gap, described as "the cruelest part of the digital divide" by FCC Commissioner Jessica Rosenworcel, significantly hinders students' ability to participate in an increasingly digital education system and has long-term implications for workforce readiness and economic mobility (Broadband Infrastructure Office & Friday Institute, 2020, p. 3).

Data collected through a pilot survey revealed that 10% of K-12 households in North Carolina lack broadband access at home, with cost cited as the primary barrier. Among respondents, many also lacked access to devices such as computers or tablets, further exacerbating educational disparities. This lack of connectivity impacts not only students' ability to complete assignments but also parents' ability to assist their children with online learning. The survey also highlighted systemic inequities, noting that the Homework Gap "disproportionately impacts low-income Black and Hispanic households," emphasizing the intersection of socioeconomic and racial factors in digital inequities (Broadband Infrastructure Office & Friday Institute, 2020, p. 7).

The report outlines six key recommendations for addressing the Homework Gap. Chief among these is the establishment of a state-funded grant program to support local education agencies in deploying solutions such as Wi-Fi-enabled school buses and hotspot devices for students without home internet. The report also advocates for expanding broadband infrastructure through programs like the GREAT (Growing Rural Economies with Access to Technology) grant and fostering cross-sector collaborations to develop sustainable, multifaceted solutions. Additionally, the report emphasizes the importance of ongoing data collection to refine strategies and monitor progress. As noted, "the Homework Gap will not be closed unless it is directly addressed," underscoring the urgency of focused interventions (Broadband Infrastructure Office & Friday Institute, 2020, p. 4).

Importantly, the report presents the Homework Gap as a solvable problem, provided there is committed leadership, targeted funding, and sustained collaboration among stakeholders. It calls for a holistic approach that combines infrastructure investment, affordability programs, and digital literacy initiatives to ensure that all students in North Car-

olina have equitable access to the tools needed for academic success. As the authors assert, bridging the Homework Gap is not only critical for educational equity but also for preparing students to thrive in a digitally connected world (Broadband Infrastructure Office & Friday Institute, 2020, p. 25).
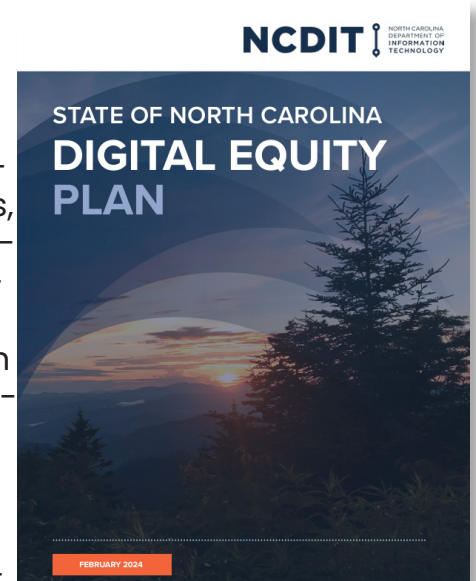
2024 NC Digital Equity Plan

The North Carolina Digital Equity Plan (2024), developed by the North Carolina Department of Information Technology (NCDIT), presents a comprehensive strategy to address the pervasive digital divide in the state. Anchored by the vision of ensuring "all North Carolinians have access to reliable, affordable high-speed internet and the digital tools, resources, and skills to fully and equitably participate in our society, democracy and economy," the plan underscores the multifaceted challenges of digital inequity while offering actionable solutions (NCDIT, 2024, p. 4). This effort is closely aligned with the objectives of the federal Digital Equity Act, with a particular focus on vulnerable and underserved populations.

The plan defines covered populations as those disproportionately affected by digital inequities, including individuals living in rural areas, low-income households, racial and ethnic minorities, veterans, older adults, and those with disabilities or language barriers. The inclusion of these groups reflects a data-driven and community-centered approach, as the planning process engaged in extensive outreach, including 23 listening sessions and eight regional convenings, to ensure that the needs of these populations were fully understood and addressed (NCDIT, 2024, p. 5). The findings highlight critical barriers such as affordability of broadband services, lack of access to devices, limited digital literacy, and cybersecurity concerns, all of which hinder meaningful participation in the digital economy.

To address these barriers, the plan outlines a series of targeted strategies, including infrastructure expansion, digital skills training, and policy initiatives to promote affordability and accessibility. One notable objective is to increase enrollment in low-cost broadband programs like the Affordable Connectivity Program (ACP), which subsidizes internet access for eligible households. The plan also prioritizes improving the accessibility and inclusivity of public digital resources, ensuring they are usable by individuals with disabilities and non-English speakers (NCDIT, 2024, p. 6). Furthermore, the plan emphasizes the importance of a sustainable ecosystem for digital equity, proposing the development of a robust network of digital equity practitioners and organizations across the state.

The plan's implementation strategy spans five years, with an emphasis on collaboration among state and local governments, nonprofit organizations, educational institutions, and private-sector partners. This collaborative approach is reinforced by the inclusion of 1,480 digital inclusion assets, such as community anchor institutions, public computer labs, and digital literacy training programs, identified during the asset mapping phase (NCDIT, 2024, p. 5). These resources serve as the foundation for locally driven solutions that address unique community needs while aligning with broader state priorities, includ-

ing workforce development, education, and healthcare access.

The North Carolina Digital Equity Plan (2024) represents a critical step toward bridging the digital divide and fostering a more inclusive digital future. Its comprehensive approach, combining infrastructure development, community engagement, and targeted interventions, reflects a commitment to ensuring that every resident, regardless of their socio-economic status or geographic location, can benefit from the opportunities afforded by digital connectivity. As the plan asserts, achieving digital equity "is not just about technology—it is about providing opportunities for better education, health, and economic outcomes for all North Carolinians" (NCDIT, 2024, p. 9). This forward-thinking document sets the stage for transformative change, guided by equity, sustainability, and collaboration.

Digital Inclusion Plans within the PTRC Footprint

Several communities in North Carolina serve as exemplary models for having developed digital inclusion plans. Guilford County conducted extensive focus groups and leveraged unique local resources to develop its digital inclusion plan. Similarly, Forsyth County partnered with consultants and community organizations to create tailored strategies for addressing regional digital equity challenges (Building a New Digital Economy, 2022). Five existing digital inclusion plans were found within the 12-county footprint of the PTRC. These include:

- **Alamance:** Alamance County Digital Inclusion Plan: Connecting for Success. 2021. Authored by the Alamance Digital Inclusion Alliance.

- **Forsyth:** Connecting Forsyth County: Forsyth County's Digital Equity Plan, Version 1.0. 2021. Authored by A/R360 Consultants and the Forsyth County Digital Equity Committee.

- **Guilford:** Guilford County Broadband Strategy. 2022. Authored by the Guilford County Digital Inclusion Task Force.

- **Randolph:** Randolph County Digital Alliance. Randolph County Digital Inclusion Plan. 2021. Authored by

- **Rockingham:** Connecting Rockingham County: Digital Inclusion Plan. 2021. Authored by the Rockingham County Digital Inclusion Coalition.

The digital inclusion plans for the counties of the Piedmont Triad share several overlapping themes and strategies that highlight their collective commitment to addressing the digital divide. A major focus across all plans is the expansion of broadband access, par-

ticularly in underserved rural and urban areas. Counties rely on tools such as mapping to identify coverage gaps and implement solutions like targeted grants, including the Growing Rural Economies with Access to Technology (GREAT) Program. For example, Randolph County aims to achieve 98% broadband availability by 2025, emphasizing the importance of infrastructure to meet residents' needs (Randolph County Digital Inclusion Plan, 2021).

Affordability and adoption also emerge as critical priorities. All counties promote federal programs such as the Affordable Connectivity Program to help residents access affordable broadband services. Additionally, many plans include device distribution initiatives and digital literacy training to encourage adoption. Alamance County, for instance, prioritizes providing equitable and affordable access to technology while supporting residents with the skills needed to benefit from digital resources (Alamance County Digital Inclusion Plan, 2021). These initiatives address the gap between having access to broadband and using it effectively, which is essential for long-term inclusion.

Collaboration is another key strategy. Each county emphasizes partnerships with local organizations, schools, and libraries, as well as regional and state-level initiatives like Building a New Digital Economy in North Carolina (BAND-NC). For example, Forsyth County relies on collaborations with public, private, and nonprofit stakeholders to implement its plan, ensuring broad-based support for its digital equity initiatives (Forsyth County Digital Inclusion Plan, 2021). These partnerships leverage collective resources and expertise to achieve comprehensive solutions.

Community engagement underpins these efforts, ensuring that plans reflect local needs. Focus groups, surveys, and community meetings are commonly used to gather input and shape initiatives. Rockingham County illustrates this with its Digital Inclusion Coalition, which held workshops and community sessions to identify priorities and set goals for broadband expansion and adoption (Connecting Rockingham County, 2021). By involving residents and stakeholders, counties ensure that their strategies address real-world challenges and opportunities.

Equity is a central theme across all plans. Counties consistently emphasize the importance of reducing barriers for underserved populations, including low-income households, communities of color, and rural residents. Guilford County's strategy, for example, explicitly targets affordability and adoption gaps in low-income urban areas, highlighting the need for inclusive policies to bridge the digital divide (Guilford County Broadband Strategy, 2022). This focus on equity ensures that digital inclusion benefits all residents, regardless of socioeconomic status.

Finally, the COVID-19 pandemic served as a catalyst for these efforts, highlighting the urgent need for digital inclusion. The pandemic revealed critical gaps in access to remote work, online education, and telehealth services, spurring counties to act decisively. As the Forsyth County plan notes, "Internet access has been hailed as the civil rights issue of the 21st century," underscoring its necessity for modern life (Forsyth County Digital Inclusion Plan, 2021, p. 2). The pandemic accelerated efforts to close these gaps and expand opportunities for all residents.

2021 Alamance County Digital Inclusion Plan

The Alamance County Digital Inclusion Plan, spearheaded by the Alamance Digital Inclusion Alliance (ADIA), takes a comprehensive approach to digital inclusion. It begins with mapping broadband availability to identify underserved areas, recognizing that Census data often overestimates coverage. Despite reports indicating that 98.8% of Alamance residents have access to broadband, surveys reveal that 28% lack wired internet at home, and 54% have speeds below 50 Mbps (Alamance County Digital Inclusion Plan, 2021).

To address these gaps, the county leverages grants such as the Rural Digital Opportunity Fund (RDOF) and the GREAT program to expand broadband in rural areas. Priority-based strategies tackle three areas: availability, such as expanding fiber infrastructure; access, like establishing free Wi-Fi hotspots; and adoption, through digital literacy programs. Partnerships with local stakeholders and ongoing monitoring ensure the sustainability of these initiatives. Alamance County strives to become "a leading example in North Carolina for providing equitable, reliable, and sustainable broadband access" (Alamance County Digital Inclusion Plan, 2021, p. 3).
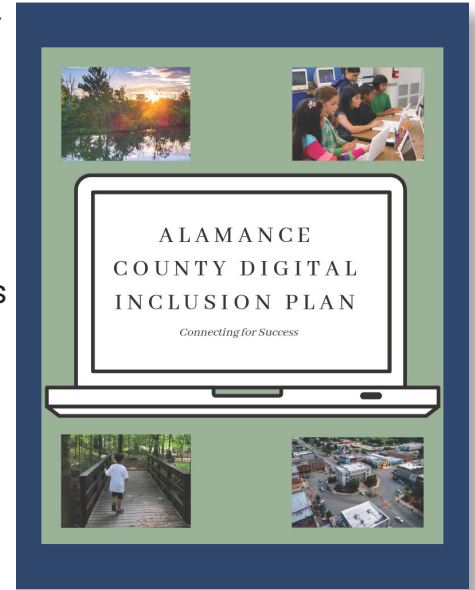
2021 Forsyth County Digital Inclusion Plan

Forsyth County's Digital Inclusion Plan offers a detailed blueprint for addressing digital inequities as a means of combating poverty, improving health outcomes, and enhancing educational attainment. The county's efforts, supported by funders like the Kate B. Reynolds Foundation, are deeply rooted in equity. Forsyth County focuses on "the most underserved communities to ensure that all communities will benefit from the interventions" (Forsyth County Digital Inclusion Plan, 2021, p. 2).

The plan incorporates a multi-step process, including surveys, focus groups, and partnerships with local organizations to understand and meet community needs. Programs like the Computer Training Bridge help residents acquire essential digital skills, while short-, medium-, and long-term strategies address infrastructure challenges, affordability, and literacy gaps. By leveraging collaborations across public, private, and nonprofit sectors, Forsyth County demonstrates a commitment to equity-driven solutions that serve as a model for other counties.
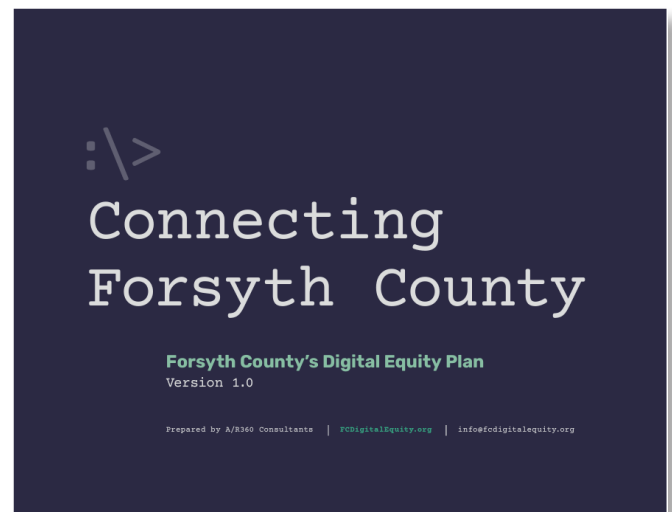
2022 Guilford County Broadband Strategy

Guilford County's Broadband Strategy employs data-driven analysis and community engagement to address digital inequities across availability, affordability, and adoption. The county's approach includes creating targeted strategies for rural and urban areas, such as expanding middle-mile fiber networks and implementing 5G technology. The plan identifies significant gaps, with 30% of residents living in areas with low broadband availability, and prioritizes scalable pilot programs to address these needs (Guilford County Broadband Strategy, 2022).

Digital inclusion initiatives are central to the strategy, with programs like device refurbishment, digital navigators, and free or discounted internet for public housing. The county also advocates for policy changes to increase broadband competition and reduce barriers to infrastructure expansion. As the strategy notes, these efforts aim to provide "context-aware investments" that address the unique challenges of Guilford County's diverse communities (Guilford County Broadband Strategy, 2022, p. 5).

2021 Randolph County Digital Inclusion Plan

The Randolph County Digital Inclusion Plan adopts the Broadband Spectrum of Engagement framework to address digital inequities through benchmarks of awareness, availability, adoption, and advancement. A critical component of this plan is the establishment of the Randolph County Digital Alliance (RCDA), which brings together stakeholders from schools, libraries, and community organizations to address the county's digital needs. As the plan states, the RCDA aims to ensure that "every household and business will have the opportunity to earn, learn, and be well by accessing needed digital resources" (Randolph County Digital Inclusion Plan, 2021, p. 3). To achieve these goals, Randolph County launched a Digital Ambassador program to increase awareness of broadband resources, encourage participation in the Affordable Connectivity Program, and gather data through broadband surveys.

Building Connections, Starting at Home
Randolph County Digital Inclusion Plan

Created by the Randolph County Digital Alliance

The plan sets ambitious targets, including 98% broadband availability and 80% adoption across all racial groups by 2025, with a special focus on connecting 100% of households with school-aged children. Initiatives to address access include expanding public Wi-Fi locations, distributing devices, and promoting affordability programs such as Spectrum Internet Assist. The COVID-19 pandemic amplified the urgency of these efforts, highlighting gaps in access and the necessity of prioritizing underserved communities (Randolph County Digital Inclusion Plan, 2021).

2021 Rockingham County Digital Inclusion Plan

Rockingham County's Digital Inclusion Plan, developed by the Rockingham County Digital Inclusion Coalition, focuses on addressing digital inequities through partnerships, targeted workgroups, and regional collaboration. The county emphasizes expanding broadband access through programs like the Growing Rural Economies with Access to Technology (GREAT) grant. Collaborative efforts between organizations, such as the Reidsville Area Foundation and the Piedmont Triad Regional Council (PTRC), have played a pivotal role in advancing these initiatives.

CONNECTING ROCKINGHAM COUNTY

Digital Inclusion Plan

Rockingham County Digital Inclusion Coalition
October 2021
Version 1.0

The plan organizes its work into three main areas: availability, access, and adoption. Digital literacy programs are central to its strategy, with digital navigators providing training to help residents utilize broadband effectively. The mission of the plan is to "expand reliable, affordable high-speed internet access to all residents" and ensure they have "the hardware, tools, and skills needed to use that access to improve their lives and livelihoods" (Connecting Rockingham County, 2021, p. 6). By aligning with state-level initiatives like BAND-NC, the plan integrates local needs with broader digital equity goals.
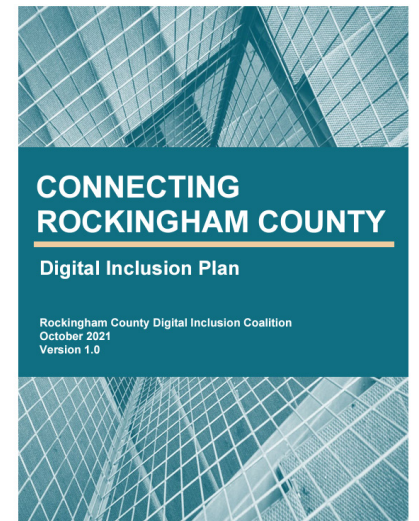
Recent and Current Funding for Digital Equity Projects

Digital equity has emerged as a pivotal focus of both federal and state governments, catalyzing investments to ensure all communities, particularly underserved populations, gain access to reliable, high-speed internet and the requisite skills to thrive in a digital economy. This section examines recent and current funding initiatives, offering an overview of their objectives, mechanisms, and targeted outcomes.

Federal and State Investments in Digital Equity

The federal government has spearheaded several programs underpinned by substantial legislative frameworks, such as the Bipartisan Infrastructure Law and the American Rescue Plan Act (ARPA). North Carolina likewise exemplifies a robust state-level response to the digital divide. The state employs a suite of funding mechanisms to extend broadband infrastructure and foster digital inclusion. These initiatives aim to address the pervasive digital divide by targeting infrastructure, accessibility, and literacy.

- **Broadband Equity, Access, and Deployment (BEAD) Program:** Allocating $42.45 billion, the BEAD Program represents a cornerstone of federal efforts to expand high-speed internet access nationwide. It supports planning, infrastructure deployment, and adoption programs, thus addressing the multifaceted barriers to digital connectivity. The program's comprehensive approach underscores the federal commitment to achieving universal broadband access.

- **Digital Equity Act Programs:** With a $2.75 billion allocation, the Digital Equity Act em-

phasizes inclusivity through three grant streams: State Planning, State Capacity, and Competitive Programs. These grants fund activities ranging from digital equity planning to implementing inclusion initiatives. Notably, the State Capacity Program alone offers $1.44 billion over five years to support comprehensive digital inclusion projects.

- **Capital Projects Fund (CPF):** Designed to address critical connectivity needs, the CPF dedicates $10 billion for high-speed internet infrastructure. For instance, North Carolina received $259.9 million to provide broadband to an estimated 78,100 unserved locations, illustrating how state-level allocations are tailored to regional needs.

- **Enabling Middle Mile Broadband Infrastructure Program:** Middle mile infrastructure, critical for connecting local networks to broader internet backbones, received $1 billion through this program. Such investments reduce connectivity costs for underserved areas, thereby enhancing access.

- **ReConnect Loan and Grant Program:** Administered by the USDA, this program targets rural areas with limited broadband access. It offers flexible financial packages, including grants and loans, to construct or improve facilities essential for broadband deployment.

- **BIP Satellite Program:** This initiative incentivizes satellite broadband for remote areas lacking terrestrial options. It highlights a recognition of geographic challenges in connectivity efforts, addressing the needs of isolated communities.

- **Completing Access to Broadband (CAB) Program:** Backed by $400 million in ARPA funds, the CAB program leverages partnerships among counties, the state, and internet providers. It ensures deployment in underserved and unserved areas, with stringent speed requirements (100 Mbps symmetrical) to future-proof infrastructure.

- **Growing Rural Economies with Access to Technology (GREAT) Grant:** With an annual budget of $350 million, this competitive grant program prioritizes economically distressed counties, requiring grantees to provide matching investments. It has effectively channeled federal ARPA funds into North Carolina's most rural regions, enhancing connectivity for households and businesses.

- **State Digital Equity Capacity Grant Program:** As part of its broader digital inclusion strategy, North Carolina received $1.25 billion through this program. Funds support the implementation of the State Digital Equity Plan, which targets critical barriers such as affordability, skills training, and device accessibility.

Programmatic Impacts and Challenges

Significant strides are being made toward closing the digital divide. Programs like BEAD, GREAT, and CAB exemplify a strategic approach to leveraging federal funding while tailoring interventions to local needs. Federal and state initiatives have underscored the importance of stakeholder collaboration, innovative funding models, and localized implementation. For example, North Carolina's use of both CPF and SFRF funds in the CAB program showcases financial agility in meeting diverse needs. Additionally, initiatives like the BEAD program integrate planning and deployment phases, ensuring sustainability and scalability. However, challenges remain. Many programs grapple with ensuring equitable allocation to historically marginalized communities, while others face hurdles in meeting aggressive deployment timelines due to logistical and supply chain constraints. Continued investment and adaptive strategies will be essential to realizing the vision of digital equity.

Source	Funding Name	Total Amount	Date	Description	URL
State	Growing Rural Economies with Access to Technology (GREAT) Grant	$350 million	2018	Provides grants to private providers for broadband infrastructure in North Carolina's rural areas.	https://www.ncbroadband.gov/funding-programs/great-grant-federal
Federal	Broadband Infrastructure Program	$288 million	2021	Supports partnerships to expand internet access to unserved areas, prioritizing rural regions.	https://www.internetforall.gov/program/broadband-infrastructure-programs
Federal	Capital Projects Fund	$10 billion	2021	Provides funds for high-speed internet infrastructure supporting vital services like telehealth and education.	https://www.internetforall.gov/program/capital-projects-fund
Federal	Connecting Minority Communities Pilot Program	$268 million	2021	Supports colleges and minority-serving institutions in tribal communities with connectivity funding.	https://www.internetforall.gov/program/connecting-minority-communities-pilot-program
Federal	BIP Satellite Program	N/A	2021	Incentivizes satellite broadband for remote users without terrestrial broadband options.	https://eligibility.sc.egov.usda.gov/eligibility/welcomeAction.do?pageAction=GetSatRules&N#farmbillcommunities
Federal	ReConnect Loan and Grant Program	Varies	2021	Funds construction and improvement of broadband infrastructure in rural areas.	https://www.usda.gov/reconnect
Federal	Broadband Equity, Access, and Deployment (BEAD)	$42.45 billion	2022	Expands high-speed internet access through planning, infrastructure deployment, and adoption programs.	https://www.internetforall.gov/program/broadband-equity-access-and-deployment-bead-program
Federal	Digital Equity Act	$2.75 billion	2022	Promotes digital equity and inclusion through planning and implementation grants.	https://www.internetforall.gov/program/digital-equity-act-programs
Federal	Enabling Middle Mile Broadband Infrastructure Program	$1 billion	2022	Reduces costs of extending high-speed internet to unserved communities via middle mile networks.	https://www.internetforall.gov/program/enabling-middle-mile-broadband-infrastructure-program
Federal	State Digital Equity Capacity Grant Program	$1.25 billion	2022	Supports state-led efforts to expand broadband access and digital literacy.	https://www.internetforall.gov/program/state-digital-equity-capacity-grant-program
State	Completing Access to Broadband (CAB)	$400 million	2024	Deploys last-mile broadband infrastructure to unserved and underserved areas of North Carolina.	https://www.ncbroadband.gov/funding-programs/cab-program

Table 1 - Current and Recent Digital Inclusion Funding Opportunities

INTERVIEWS

The PTRC Digital Inclusion Study utilized a comprehensive interview-based methodology to gather insights from 23 community leaders and digital inclusion experts across twelve counties in North Carolina. The goal of this study is to assess the state of broadband services, identify obstacles to access, and explore solutions to bridge the digital divide in the region.

To achieve these objectives, interviews were structured around key themes and were conducted with representatives from various sectors, including local government, education, public libraries, nonprofit organizations, and internet service providers. Each interview began with an overview of the respondent's organization and their perspective on digital inclusion. This approach ensured that participants provided both general and detailed accounts of the digital challenges and opportunities within their communities. Interview questions covered several areas:

- **Defining Digital Inclusion:** Participants shared what digital inclusion meant to them, highlighting factors such as who is being left out due to racial, economic, or geographic disparities and whether digital inclusion is perceived primarily as an equity or workforce development issue.

- **Digital Asset Inventory:** Questions examined the existing broadband infrastructure, including service providers, public access points, and affordability of services. Respondents were also asked about digital skill levels within their communities, availability of training, and resources for those without access to digital devices.

- **Challenges and Opportunities:** Interviews delved into specific barriers to digital access, such as funding limitations, infrastructure gaps, and insufficient data to support policymaking. Additionally, participants provided recommendations for overcoming these barriers, ranging from enhancing public Wi-Fi networks to increasing training for community-wide technology adoption.

The interviewees span a diverse array of roles, each contributing unique perspectives on digital equity and inclusion across various sectors (see Table 1). Representing educational institutions, library systems, government, and technology-focused organizations, these professionals highlight digital access and literacy as crucial needs for their communities. Community college directors, school technology officers, and economic development coordinators focus on enhancing digital infrastructure and access in both educational and rural settings, often pointing out the difficulties faced by underserved populations. They advocate for improved broadband infrastructure, especially in rural areas, and emphasize the need for affordable options to support students and residents who lack reliable internet connectivity.

Library directors and program managers play pivotal roles in bridging the digital divide by offering public internet access, training sessions, and device lending programs, par-

Interviews

Title	Location	Key Themes of Interview	Recommendations
City Council Member	Alamance County	Broadband and regional economic development	Implement community Wi-Fi network
Executive Director, Technology Alamance-Burlington Schools	Alamance County	Broadband access for students and schools	Support digital learning infrastructure
Executive Director, WinstonNet	Alamance County	Digital access through public Wi-Fi; Training for inclusion	Increase training for broader community tech use
Chief Technology Officer Caswell County Schools	Caswell County	School connectivity challenges; Rural infrastructure needs	Improve broadband infrastructure through local partnerships
Economic Development Coordinator	Caswell County	Rural broadband funding needs; Remote work support	Increase funding for broadband expansion in underserved areas
Director, Career Development Davidson-Davie CC	Davidson County	Digital access issues; Mobile device compatibility	More mobile-friendly applications
Director, Davidson County Public Library System	Davidson County	Community engagement; Digital literacy	Community library presentations
County Extension Director, Family & Consumer Sciences	Davie County	Digital literacy for seniors	Tailor training to immediate, specific needs of users
Chief Information Officer, City of Winston-Salem	Forsyth County	Digital plan contributions	Enhance engagement with local stakeholders
Library Director, Forsyth County Public Library	Forsyth County	Public access to digital resources; Community-led training	Identify community leaders to enhance local training efforts
City Council Member	Guilford County	Digital inclusion policy needs	Increase data availability for informed policy decisions
Digital Literacy Agent, NC Cooperative Extension	Guilford County	AI's impact on digital literacy and workforce skills	Engage workforce in AI readiness initiatives

Interviews

Title	Location	Key Themes of Interview	Recommendations
Help Desk Analyst at Greensboro Public Library	Guilford County	Library services for vulnerable populations	Integrate social services into digital resource programs
Technology Director, Greensboro Public Library	Guilford County	Homeless population's access to digital services	Increase free internet access locations
Chief Executive Officer at Hospice of the Piedmont	Guilford, Alamance, Randolph, Montgomery, Chatham, Moore, Davidson, Forsyth	Expanding community digital initiatives	Collaborate with local community groups
Technology Director Montgomery County Schools	Montgomery County	Countywide connectivity issues	Enhance rural broadband
Town Commissioner	Montgomery County	Economic impacts of digital access; Public awareness	Increase awareness campaigns
County Extension Director in Randolph County	Randolph County	Telehealth for aging populations; Device accessibility	Simplify tech for seniors and expand telehealth options
Extension Agent, Digital Skills, NC Cooperative Extension	Randolph County	Broadband affordability and device distribution	Increase low-cost broadband options and device programs
President, Randolph County Economic Development Corporation	Randolph County	Job accessibility; Barriers in digital resource allocation	Foster partnerships to reduce digital divides
Director of Media and Technology and Public Information Officer	Stokes County	Educational needs; Infrastructure for new businesses	Support infrastructure in under-developed areas
Stokes County Broadband	Stokes County	Broadband access challenges in rural areas	Use ARPA funds for local broadband improvements
Director, Customer Support Zirrus	Yadkin County	Grant management; Rural fiber expansion	Streamline grant processes to remove local match barriers

Table 2 - Interview Participant Roles, Locations, Key Themes, and Recommendations

ticularly for vulnerable populations such as seniors and those experiencing homelessness. Digital inclusion advocates and consultants from regional councils bring a broader, policy-driven approach, pushing for more effective community engagement and equitable resource distribution. They often suggest expanding public-private partnerships to increase local funding and involvement from tech companies. In roles like customer support and economic development, several interviewees discuss grant management and the economic benefits of digital access, noting how improved connectivity can attract businesses and support remote work opportunities. Collectively, these professionals underscore the need for community-based solutions that leverage local leaders, public libraries, schools, and regional councils to create a more inclusive digital landscape.

Each interview was recorded and transcribed for accuracy, then reviewed and coded to identify common themes and unique insights. This methodology not only facilitated a detailed understanding of the digital landscape in the PTRC region but also allowed for a structured analysis of participants' recommendations for moving digital inclusion forward.

What is Digital Inclusion?

According to participants, "digital inclusion" is characterized as universal and equitable access to digital resources, connectivity, and the skills to navigate the internet for various purposes, from education to employment and health. As one participant said, "Digital inclusion means, to me, everybody has access to the online resources that they need to have access to, to live their daily lives." Interviewees emphasize that digital inclusion extends beyond just having an internet connection; it encompasses the capability to effectively use digital tools and access resources essential for modern life. For instance, many see digital inclusion as essential for community participation, especially for underserved populations in both urban and rural settings who otherwise struggle to access digital resources, often exacerbated by socioeconomic and geographic barriers. An interviewee explained:

> "To me, it means that we want everybody to be part of the new age in terms of ways to communicate and access information. And to be part of that, that means that you have to have devices and connectivity and training, somehow know how to use it and how to be safe in that process."

The primary issues related to addressing disparities in digital inclusion include the high costs of internet subscriptions, lack of infrastructure in rural areas, affordability of digital devices, and limited digital literacy skills. Participants from rural counties expressed particular challenges, with many areas underserved by providers who are reluctant to extend services due to low population density: "It's gonna come down to funding... to build out infrastructure in rural areas or to subsidize people's broadband... it's going to be the same question for local policymakers." The cost of connectivity and devices, coupled with a lack of technical knowledge, further limits individuals' ability to engage in the digital world effectively. Additionally, language barriers in some communities make it difficult for residents to utilize available resources.

Key concerns expressed by interviewees include the accessibility of affordable and reliable high-speed internet in rural areas and high poverty urban neighborhoods, limited outreach and knowledge of digital literacy programs, and the ongoing stigma associated with seeking help for digital skill-building. Interviewees highlight that even where resources are available, such as libraries offering Wi-Fi or computer access, these solutions are often insufficient without consistent access to high-speed internet at home. Concerns are also raised regarding the need for local leaders and trusted community figures to communicate the benefits of digital inclusion to hesitant or unaware populations.

Challenges with Digital Inclusion

Those who are most affected by the digital divide include low-income families, people in rural communities, and individuals facing language barriers. For example, there are significant pockets in urban centers like Greensboro, where language barriers prevent immigrant and refugee communities from accessing digital services effectively. Similarly, low-income families, particularly those in areas identified as "digital deserts," struggle to afford devices and broadband subscriptions, which affects their access to education, healthcare, and job opportunities.

Interviewees commonly highlight the lack of adequate internet services in rural parts of the region, where infrastructure is sparse or outdated. As one County Extension Director noted:

> "If you look at the broadband mapping tools for Randolph County, there are still some holes out there. We have some great... We have a great provider in the county, Randolph Communications. They're doing some fiber work and they cover a large part of the county already. But yeah, there are still some holes."

Even where broadband is available, the cost can be prohibitively high, making it inaccessible for lower-income households. This is particularly problematic in areas like Stokes County, where geography and low population density increase the cost and complexity of expanding digital infrastructure. One respondent described situations where rural residents were quoted thousands of dollars to extend services to their homes, illustrating the impracticality of current pricing models for many residents:

> "In some instances, we heard of some cases where there were, you know, especially in Stokes County being rural, some households are so far off the road they were gonna have to pay for it to come down their driveway and all this stuff, and it was gonna be like thousands of dollars. So, I mean, just, I guess technically they do have coverage, but it's not affordable coverage."

Many interviewees observed inequities across the region, particularly affecting low-income families, non-English speaking communities, and small business owners. For instance, in Greensboro, areas in the "Crescent" are underserved, not only in broadband but in various essential services. One council member explained, "This area struggles with socioeconomic disadvantages that extend beyond digital connectivity, impacting access to education and other resources"

The Affordable Connectivity Program (ACP) was a topic of concern among the interviewees, especially as its funding status has impacted low-income households' ability to maintain affordable internet access. Some interviewees note that the ACP provided essential subsidies, typically around $30 per month, which helped make broadband more affordable for lower-income subscribers. However, the program has not been renewed by Congress, creating uncertainty and anxiety about who will step in to support the residents who relied on this subsidy. With the expiration of the ACP, there is worry that many families will struggle to afford monthly broadband costs, leading to a potential increase in digital exclusion, particularly among low-income and rural residents. In some rural areas, even when the infrastructure is available, the affordability of internet services remains a barrier without programs like the ACP:

> "The other barriers is just the affordability with the ACP program ending. Who knows, after this month, if they had a price support for broadband connectivity from ISP through that Affordable Connectivity Program, how many people are not going to be able to afford it now that that program's ending?"

Interviewees frequently emphasize the need for increased funding and support from federal and state levels. They note that current funding models and policies often do not align with the actual digital needs on the ground. For instance, the mismatch between state maps and real-world internet availability limits funding eligibility for communities that are deemed "covered" but, in practice, lack adequate speeds or access. Some interviewees advocate for policy adjustments to ensure that funding reaches underserved areas and suggest that community partnerships with local leaders and organizations could improve outreach and engagement, especially among vulnerable populations.

Digital Champions and Community Resources

The interviewees were asked about digital assets in their community. They reveal that digital inclusion in the Piedmont Triad area is primarily supported by local libraries, community organizations, and specific county initiatives targeting broadband and device access, as well as digital literacy efforts. Specific actions being taken to address disparities include public libraries providing free Wi-Fi and device loans, workforce development programs incorporating digital skills training, and school systems issuing devices to students. Additionally, some areas have established committees or task forces to address broadband gaps, conduct outreach campaigns, promote partnerships with various ISPs, and gather data on internet access and speed to accurately assess community needs and advocate for state funding.

Organizations playing a key role in these initiatives include public libraries, such as Forsyth County Library, which has introduced mobile Wi-Fi and community-based digital literacy classes. The PTRC and various school systems also actively contrib-

ute by partnering in broadband access initiatives. In Greensboro outreach efforts include Casa Azul, a Hispanic community organization that collaborates to inform residents about digital access services at libraries and recreation centers. Additionally, WinstonNet offers ongoing programs to improve connectivity in areas like East Winston.

Local government departments, such as economic development offices, are integral in organizing broadband committees and applying for state and federal grants to fund infrastructure expansion. These organizations collectively work to bridge the digital divide, particularly for low-income families, seniors, and rural residents, although gaps in resources and outreach remain a persistent challenge. Examples mentioned in interviews include:

- **Stokes County Broadband Committee:** This committee, driven by the local government and community leaders, actively works to improve broadband accessibility in the county's rural areas. With ARPA funding, Stokes County has prioritized broadband development by issuing RFPs and collaborating with internet providers. They also initiated a significant outreach campaign with the NC OneMap broadband survey, resulting in the highest response rate in North Carolina, demonstrating strong community interest in improving local broadband infrastructure.

- **Alamance Digital Inclusion Alliance:** This coalition, convened by Impact Alamance and PTRC, comprises nonprofit leaders, small business owners, government officials, and school board leaders. The alliance focuses on improving broadband access and ensuring internet availability for all residents in Alamance County.

- **Rockingham County Digital Inclusion Coalition:** Formed through a partnership between PTRC and local agencies, this coalition developed a strategic plan to expand reliable, affordable high-speed internet access to all residents. Their comprehensive approach addresses availability, access, and adoption of broadband services.

Some of these digital champions have helped to improve data accuracy, integral to infrastructure development. The Stokes County Broadband Committee, for instance, launched a campaign to increase resident participation in broadband mapping through the NC OneMaps platform. Their efforts resulted in Stokes County having the highest percentage of household responses in the state, which helped correct previously inaccurate coverage maps. One interviewee noted, "Some members from the NCDIT came and said Stokes County has the highest percentage of responses for households registering on that NC OneMap," indicating that effective outreach can help direct infrastructure investments to genuinely underserved areas. By building a more precise understanding of existing gaps, local broadband committees aim to channel resources effectively and advocate for ongoing infrastructure support where it's needed most.

County	Backbone Organizations Promoting Digital Inclusion
Alamance	Alamance County Libraries, NCWorks (providing job search support and digital skills workshops)
Caswell	Caswell County Public Library (digital literacy programs and public computer access), Caswell Senior Center (offering tech support for older adults)
Davidson	DavidsonWorks (workforce development and digital literacy training), Davidson County Public Libraries (providing computer access and digital learning sessions)
Davie	Davie County Libraries, Davie County Senior Services (technology support and internet access for older adults)
Forsyth	Forsyth County Public Library (digital literacy and Web on Wheels mobile unit), WinstonNet (connectivity programs in underserved areas), NCWorks (collaborates with libraries for digital skills training)
Guilford	Greensboro Public Library (Wi-Fi and digital literacy programs), Casa Azul (digital outreach for the Hispanic community), Guilford Works (digital training as part of job readiness)
Montgomery	Montgomery County Public Library (providing computer access and digital skills), Montgomery Community College (offering digital literacy workshops)
Randolph	Randolph County Libraries, Randolph Community College (collaborates for computer literacy programs), NCWorks Randolph (providing workforce-focused digital skills training)
Rockingham	Rockingham County Library (provides public computers and digital training), Rockingham Community College (digital literacy and community tech support)
Stokes	Stokes County Broadband Committee (promotes broadband access and digital inclusion efforts), Stokes County Public Library (offering tech access and workshops), Duke Energy (community broadband supporter)
Surry	Surry County Libraries, Surry Community College (provides digital literacy classes and tech support), YVEDDI (regional community action agency supporting digital access initiatives)
Yadkin	Yadkin County Library (public computer access and digital learning sessions), Yadkin Senior Center (providing digital literacy for seniors)

Table 3 - Backbone Organizations Promoting Digital Inclusion as Indentified by Interviewees

Broadband Infrastructure

There is a clear commitment to improving broadband access through comprehensive planning, data-driven decisions, and continued collaboration with state partners, reflecting a robust approach to digital inclusion for the entire region. Certain areas in the most populated areas of the Piedmont benefit from established providers with adequate broadband infrastructure. One City Councilperson noted, "We've seen decent broadband availability around A&T State University, especially in the student housing zones, due to high demand and urban investment." Another non-profit director noted similar access in Winston-Salem, "Forsyth County, especially near the urban centers, has a network that allows students and professionals easier access to high-speed internet, unlike more remote counties," illustrating an urban-rural divide in ISP priorities. Yet, as noted, broadband infrastructure is not equally accessible throughout the region.

High installation costs were cited as a barrier, especially in sparsely populated areas where extending lines to individual homes can cost thousands of dollars. One rural leader mentioned, "Broadband maps often show areas as 'covered,' but residents can't realistically access affordable, usable service," highlighting discrepancies in coverage reporting and actual connectivity. "Some areas do have fiber lines passing through, but unless a resident can pay the installation fees, the lines are useless to them," indicating the disconnect between infrastructure presence and actual access. Many rural communities remain without affordable and reliable high-speed internet options.

> "Some areas do have fiber lines passing through, but unless a resident can pay the installation fees, the lines are useless to them."

The interviews highlight a patchwork of Internet Service Providers (ISPs) serving different counties in the Piedmont Triad area, with significant disparities in broadband access and affordability. For example, in Forsyth County, AT&T services primarily urban areas but often falls short on affordability, especially for low-income residents. One interviewee noted frustrations with the ISP, describing concerns over "rising costs without subsidies," which can make broadband access difficult for economically disadvantaged households.

Spectrum and Zitel have expanded in rural areas like Caswell County, though with mixed results. Spectrum's efforts are bolstered by grant support, with contracts expanding coverage into sparse areas. However, in one instance, Zitel's planned broadband expansion fell through. This failure to fulfill obligations left residents in limbo, highlighting the challenges rural communities face in securing reliable service providers. An interviewee expressed frustration, noting that Zitel "backed out of grant-supported expansion," leading to delays

in much-needed connectivity improvements.

In Stokes County, RiverStreet Communications exemplifies a more proactive approach to bridging the digital divide, using multiple grants to set up connectivity hubs at local institutions like schools and churches. This model of community-based access has garnered positive feedback as residents see tangible infrastructure changes, though some isolated areas remain underserved. In Montgomery and Randolph counties, Randolph Telephone Cooperative works to bring fiber to rural homes, though as a cooperative, it faces funding challenges. Its limited access to state funding is a hurdle, yet the cooperative's commitment to rural coverage makes it a valuable resource for these communities.

Meanwhile, larger providers like NorthState and Brightspeed, active in Davidson and Montgomery counties, concentrate on higher-density urban or suburban areas, which restricts expansion into remote zones. This urban focus leaves many in more isolated areas without high-speed options. One interviewee pointed out that Brightspeed's reach extends primarily along Highway 109 and other well-trafficked areas, leaving "isolated rural homes underserved," an issue echoed repeatedly by others across the region.

Interviewees from across the Piedmont Triad region reported varied experiences with internet download and upload speeds, often depending on their location and provider. In some counties, urban areas enjoy relatively high speeds, while rural regions struggle with either low speeds or limited options. For instance, in Montgomery County's towns, residents can achieve "gigabit speeds" through providers like Spectrum and Brightspeed, which serve several urban locations. However, outside these towns, connectivity options and speeds dwindle, and residents often rely on cell phone connections or alternative services like Starlink, which are both costly and may not provide reliable speeds.

Ongoing infrastructure development for broadband access in the Piedmont Triad region is actively supported by a combination of local initiatives and federal funding, though progress varies based on geographic and socioeconomic factors. Counties are leveraging federal funds from the American Rescue Plan Act (ARPA) and partnering with the North Carolina Department of Information Technology (NCDIT) to address connectivity issues in underserved areas. Programs like the NCDIT's GREAT Grant were frequently referenced as major contributors to broadband expansion, especially in rural areas. These grants aim to build fiber infrastructure in areas where private investment alone would not be viable due to low population density. The Bipartisan Infrastructure Law, part of broader infrastructure initiatives by the Biden administration, was mentioned as well as a potential source of substantial future funding specifically earmarked for broadband infrastructure projects. Local officials expect this funding to create more "big rivers of dollars" to help meet digital inclusion goals.

In some counties, local government funds were allocated to incentivize private broadband providers, such as Spectrum, to expand their networks. Public-private partnerships have also played a role, with counties sometimes funding part of the infrastructure cost to encourage private providers to serve less profitable rural area. A representative from Stokes County explained, "The Stokes Coun-

"The Stokes County Broadband Committee is using ARPA funds and partnering with state grants to make progress in broadband acess."

ty Broadband Committee is using ARPA funds and partnering with state grants to make progress in broadband access," highlighting the use of multiple funding sources to tackle local connectivity gaps. This strategic approach, which includes working with community leaders, is helping prioritize infrastructure expansion in regions that have historically faced broadband deficits due to their rural nature.

Some areas have used more community-oriented approaches to address broadband gaps, like Stop-Gap funding, which focuses on bridging service gaps where traditional broadband may not reach. This funding helps subsidize alternative connectivity solutions, such as mobile hotspots, especially in rural pockets. Similarly, nearly all the school districts leveraged Elementary and Secondary School Emergency Relief (ESSER funds) during the pandemic to provide Wi-Fi hotspots to students, ensuring they could access digital resources for remote learning even if they lacked home internet. These resources are still being utilized in many districts.

Where possible, local governments and broadband committees are working to streamline infrastructure projects by issuing Requests for Proposals (RFPs) to Internet Service Providers (ISPs) and collaborating on the development of realistic timelines. As one official described, "We're putting out RFPs and assessing proposals from ISPs to expand coverage, but the process takes time and cooperation from multiple stakeholders," underscoring the importance of multi-level collaboration between public and private sectors. However, despite these efforts, local leaders acknowledge that rolling out broadband in rural areas is complex, as it requires not only funding but also detailed planning to ensure alignment with local needs.

> "We're putting out RFPs and assessing proposals from ISPs to expand coverage, but the process takes time and cooperation from multiple stakeholders."

Smaller telecommunications cooperatives, such as Randolph Telephone, have expanded fiber infrastructure using their funds when excluded from certain grant programs. Their investment in rural broadband access often complements public funding efforts and demonstrates local providers' commitment to serving hard-to-reach communities In addition to Randolph Telephone, Zirrus (formerly Yadkin Valley Telephone Membership Corporation or Yadtel) is another local cooperative actively working to expand broadband coverage in the Piedmont Triad region. The Director of Customer Support at Zirrus, described their focus on transitioning remaining DSL customers to high-speed fiber, with only about 5% left to upgrade.

Zirrus is actively leveraging multiple government grants to fund their expansion, specifically targeting unserved and underserved rural areas in North Carolina. They noted this period as a "big fiber land grab of 2024-2025," as extensive government funds are available to support equitable high-speed internet access. Zirrus is managing several grants, including the CAB and GREAT grants through NCDIT. While they are progressing in expanding to four counties under the GREAT grant, they face challenges with the CAB program, primarily due to a required county financial match. Many counties struggle to provide these funds, impacting Zirrus's ability to participate fully. They expressed optimism that legislative changes might soon reduce or eliminate these county match requirements, which would enable Zirrus to expand further into additional counties.

ISP	County	Location / Coverage Details	Resources / Limitations
AT&T	Forsyth	Urban areas, some coverage within city limits	Provides standard broadband but lacks affordable options for low-income residents. Concerns about accountability and rising costs without subsidies.
Spectrum	Caswell	Yanceyville and some rural areas	Coverage is improving with grants. Some contracts recently expanded to cover sparse areas, though rural zones remain challenging due to costs.
Brightspeed	Montgomery	Major towns and along Highway 109	Limited high-speed availability in remote areas. Focus on more populated locations, leaving isolated rural homes underserved.
RiverStreet	Stokes	Westfield, Aarons Corner Church Rd, and Sandy Ridge	Active expansion funded by multiple grants, including hubs at local schools and churches.
NorthState	Davidson	Initial coverage, now expanding into Guilford, High Point	Previously provided limited service but expanding through partnerships. Focus on urban areas, which restricts rural access.
Randolph Telephone	Randolph, Montgomery	North end of Randolph and parts of Montgomery	Cooperative ISP offering fiber to homes, prioritizing rural connectivity despite funding challenges. Cooperative status prevents access to some state funds.
Zitel	Caswell	Contracted but backed out of grant-supported expansion	Failed to fulfill contract obligations for rural broadband expansion, leading to delays.
Comcast	Caswell	Yanceyville and surrounding towns	Primarily serves industrial and government buildings with limited residential access.
Windstream	General area	Some presence across counties, specific locations not noted	Mentioned as an option but not heavily relied on; may not provide consistent high-speed service.
Zirrus (formerly Yadtel)	Davie	Broad coverage in central areas, fewer gaps	Established a significant broadband infrastructure, though some northern and southern zones have gaps.

Table 4 - Internet Service Providers in the PTRC

Digital Literacy and Skills Development

The interviewees characterize Digital Literacy and Skills Development as essential for enabling economic and workforce readiness. The interviews reveal several focused initiatives addressing digital literacy and training within the community. Programs often emphasize teaching foundational digital skills, particularly for vulnerable groups, including seniors and individuals in workforce readiness programs. For instance, NC Cooperative Extension staff across multiple counties focus on "internet safety, workforce empowerment, and helping people to become workforce ready" with classes like "internet safety, social media in politics, and basic computer use," particularly aimed at seniors re-entering the workforce.

Digital Ambassadors and Navigators are notably provided by Cooperative Extension and some community organizations like Forsyth Tech and Digital Bridges Forsyth. These roles involve guiding community members through device usage and online safety. Several organizations are implementing tailored training programs. North Carolina Cooperative Extension, for instance, has a needs-assessment-based approach, delivering digital literacy classes across demographics in rural and urban settings. The emphasis is also on adaptive teaching to meet participants' specific needs, such as introducing email, basic device operation, and internet navigation. Similarly, Digital Bridges Forsyth in Forsyth County provides internet, device access, and training, supported by partnerships with the United Way and Forsyth Tech. Goodwill Workforce Readiness Programs support digital skill-building for seniors and unemployed individuals, helping bridge skills gaps for job market reintegration. For youth the Cooperative Extension agents focus on teaching pre-coding skills and general STEM principles through community outreach and STEM activities while working with seniors on digital safety and cybersecurity, often targeting issues like online scams. Forsyth's Digital Bridges initiative emphasizes listening sessions with seniors, who voiced preferences for shorter, more patient instruction formats and requested options for reduced time commitments

Libraries have become central resources for digital literacy, offering a range of programs accessible to all residents, including those from underserved and marginalized backgrounds. Northstar Online Learning at the Greensboro Public Library and elsewhere offers courses on basic computer use, job readiness, and assessments, available in English and Spanish. Librarians also provide computer training on topics from setting up email accounts to creating resumes and navigating online job applications. Forsyth County Library operate a "WOW Mobile" (Web On Wheels), a mobile unit equipped with Wi-Fi and laptops, to reach neighborhoods with limited connectivity. This mobile service is especially valuable in lower-income areas, extending access to those who may struggle to visit the library's physical locations and providing digital literacy opportunities.

Digital training programs are also tailored to the specific needs of different community segments, particularly in addressing the urban-rural digital divide. For example, training sessions cover a variety of digital competencies, including Microsoft Office skills, basic internet use, and even e-commerce management skills like learning to sell on eBay. These community-driven classes respond to local needs, such as a high demand among seniors for e-commerce skills. One library director explained:

> "So, we have what we call library information specialists in each of the branch locations who are equipped to do one-on-one sessions with anybody. So if you were to walk in today and said I'm just not sure how to set an email up, one of the staff members could help you do that right away. But now we were fortunate to get some funding from ARPA, and so now we have purchased about 80 laptop computers, Chromebooks that are distributed throughout the system. So, each of the branches will get anywhere from six to 10 of those. And now we've got the computer bridge coordinator going out to actually do some training with staff, sort of like train the trainer of how to conduct ongoing learning sessions with individuals. So, there would be anything from real basic, how do you get into your email as to how do you become a seller on eBay, those are pretty popular."

Outreach initiatives are a key part of expanding digital literacy, particularly for isolated or vulnerable populations, including low-income households and non-native English speakers. Libraries and community centers work to minimize barriers by recruiting and training local leaders who can advocate for and inform residents about available services. These local leaders play a crucial role in fostering trust within communities, ensuring that more residents are aware of and comfortable utilizing digital resources.

Partnerships with educational institutions, especially local schools, are another important facet of the digital literacy initiative. Programs like the "CLASS card" partnership between public libraries and schools allow students to use their school IDs as library cards, providing seamless access to library databases and resources for research and coursework. This integration ensures that students from all backgrounds have access to the digital tools they need to succeed academically.

These digital literacy initiatives face ongoing challenges, such as limited funding for sustained digital literacy programs and difficulty reaching individuals with minimal technology exposure. Another obstacle is preparing individuals for an increasingly digital workforce. Many program participants require training beyond basic digital literacy, including competencies in newer technologies and software relevant to job markets, but the scope of such training often exceeds available resources. The digital divide between urban and rural areas persists, with rural areas often receiving fewer resources for digital literacy and facing transportation barrier in accessing those that exist. Addressing these barriers will require continued advocacy for funding, innovative partnerships, and tailored approaches to meet the diverse needs of different community groups.

Device Access and Affordability

Many participants noted that low-income residents struggle to afford devices and broadband subscriptions, making consistent internet access a challenge. Access to devices, particularly for those on fixed incomes or facing economic hardships, is a recurring barrier. Even when devices are provided, maintaining them over time poses challenges. As technology evolves, devices quickly become outdated, and there are limited resources to repair or replace them. Without sustainable funding for device maintenance, communities risk facing technology shortages, which could erode the initial gains made in digital inclusion.

One interviewee observed that "50% or more of the residents within this county may not have a personal computer at home," underscoring the widespread issue of digital inequity. Others noted that, for some households, a smartphone is often seen as an adequate substitute due to affordability, even though it may not meet all the digital needs of family members. For instance, while a smartphone might suffice for communication or occasional browsing, it falls short for educational or work purposes, particularly for students needing to complete assignments. Another respondent highlighted how people without home internet or computers turn to their cell phones as a default, though it isn't always adequate. They described how many in the community rely on "a government-funded cheap smartphone… with unlimited data, but it's usually very slow and doesn't actually operate super well.". This reflects a broader reliance on mobile devices for basic tasks, although they lack the functionality required for more complex needs such as job applications and school assignments.

For individuals without computers, community spaces such as libraries, schools, and recreational centers play a crucial role in providing access. In Randolph County, one interviewee mentioned, "Our libraries are fabulous access points," with several community organizations promoting library resources to ensure broader community awareness. Libraries, however, often restrict computer use to on-site access, as one respondent pointed out: "I know they have a few computers people can use in the library, but I'm not sure they can go outside the library." In Guilford County, recreational centers and mobile access points also provide some digital inclusion support, especially in underserved areas. This interviewee explained, "Recreation centers have access and… several are in neighborhoods that… do not have [home] service." This availability of shared access points, while helpful, underscores the need for more permanent solutions to bridge the digital divide for those without personal devices.

Refurbished device programs, though limited, are recognized as crucial resources for bridging the digital divide. Locally, organizations such as WinstonNet have attempted to distribute refurbished devices, relying on corporate donations of retired employee devices. These devices are then refurbished and redistributed to community members in need. However, the scale of

these initiatives remains small, leaving gaps in coverage and availability for low-income families. Organizations like the Kramden Institute and E2D (Eliminate the Digital Divide) in other parts of North Carolina are known for providing refurbished computers, but their reach does not extend widely within the Piedmont Triad area. One tech support interviewee explained, "E2D, I think. Yeah, E2D in Charlotte, they do some refurbishing. We haven't tapped into it, but there are several people that do computer repair in the county, and they might have some refurbished ones that could be bought out of their shop, but not on a large scale here in the county."

School districts in the region have made strides in providing students with devices, especially since the onset of the COVID-19 pandemic. Most middle and high school students now receive Chromebooks that they can take home, while elementary school students often use these devices in school settings. However, as one school administrator noted, the district's ability to maintain a one-to-one device-to-student ratio is precarious, sustained primarily through temporary pandemic funding. The lack of a long-term sustainability plan poses a risk to continued access. He explains:

> "I guess for the purposes of the information here, now, it's expected, everybody expects students and staff to have access to digital resources. So, it's a care and feeding thing. It's like if you have an automobile, you've got to change the oil, change the tires, put gas in it. That's the challenge right now is that upkeep. It's no longer, we're not going back to a time where you didn't have access to digital resources. So, it's the management of that expectation and meeting that expectation over time, that is the thing that we're faced with a challenge with right now....
>
> So, the major issue with that is the battery life. That's the key determinant. We're finding that five years is probably the limit. There may be a handful that may go beyond that, but five years is about the physical limit supporting the device. Usually because of the battery, technically from the other aspects of the device, if the battery was able to be replaced and managed, generally we could probably run another year or so, but it's better just to replace the device because you're upgrading the speed of the device at the same time and resources now have become more needy, for lack of a better term, with access to the technical capability of the computer. So yeah, about five years."

Beyond schools, access to affordable or free devices for low-income families is limited. While some community centers and libraries offer access to public computers, few extend these services to loaner programs that allow devices to be taken home. Library systems in the region have implemented hotspot loan programs to improve internet accessibility. For example, one library has a program with 50 hotspots available for checkout, primarily used by high school students for remote learning. A library administrator stated that while these hotspots are "almost all checked out most of the time," the program has been well-received, and demand remains high. Efforts to expand loan programs to include laptops or tablets are in exploratory stages. As one library staff member expressed, providing laptops for home use remains "a big project" that would require additional grants and safety measures to implement. One library representative noted that while a laptop loan program would be valuable, it would require considerable planning around "safety measures" and additional resources to ensure its sustainability and effectiveness for

tracking borrowed devices and managing repairs. Some libraries have considered setting up a kiosk for laptop lending, but such programs are not yet operational, with funding and logistical challenges acting as barriers.

Economic Development and Workforce Readiness

Interviewees discussed at length the relationship between digital inclusion and its relationship to economic development and opportunities. Topics discussed included: Job Access and Skills, Workforce Training, Corporate and Educational Partnerships, Attracting New Businesses, and the Needs of Local Employers. Participants underscore the critical need for expanded digital literacy initiatives, improved broadband infrastructure, and strengthened partnerships between educational institutions and corporations to enhance workforce readiness in the Piedmont Triad. These efforts are essential for meeting the expectations of new and existing businesses and ensuring that all residents have equitable access to job opportunities in the region's increasingly digital economy.

> "I've met seniors who are not retired yet... and they say, 'I don't even know how to use a computer. How am I gonna even submit a job application?'"

Attracting new businesses to the area is seen as closely linked to the region's digital infrastructure. Economic development professionals expressed the need for reliable broadband access across industrial and commercial sites to ensure that businesses can operate effectively. According to one official, "for us, most of the instances related to broadband access are industrial business access related...to ensure that they can do business online." Local government initiatives are underway to improve connectivity in underserved areas, but interviewees noted that continued investments in broadband are crucial to positioning the Piedmont Triad as a competitive business location. "Our main jobs," explained one economic development professional, "is to see if we can bring utilities to certain areas" to make them more attractive for business development.

Interviewees emphasized the importance of digital literacy for accessing job opportunities, with the ability to use technology now seen as a prerequisite for many positions. This is especially relevant for those who may be re-entering the workforce later in life or switching careers. One interviewee pointed out the specific needs of middle-aged and older workers who

may not possess the digital skills necessary for today's job applications: "I've met seniors who are not retired yet. Maybe they've been laid off…and they say, I don't even know how to use a computer. How am I gonna even like submit a job application?"

Many interviewees also discussed the challenges of building a workforce that meets the digital literacy demands of local employers. There is a "continuum" of skills required, as "some people may have some basic skills but aren't qualified for certain of these jobs…or couldn't be eligible for remote work." Addressing these gaps in digital literacy is seen as essential for both job seekers and employers in the region. The region's workforce training initiatives are adapting to meet the rising demand for these digital skills. As one interviewee noted, many local Workforce Development Centers now incorporate computer labs, providing the necessary tools for job seekers to apply online and improve their digital competencies. This "device, connection, and training" triad is critical for ensuring that residents are equipped to navigate digital platforms required by employers.

However, while the infrastructure for training is available, interviewees highlighted ongoing needs for targeted skills development. Community colleges, such as Alamance and Randolph Community Colleges, play a key role in offering training programs tailored to local industries, including the growing biomedical and digital fields. Corporate and educational partnerships are increasingly pivotal in addressing the region's workforce needs. Toyota's recent hiring trends exemplify this, as they are actively recruiting from within the local community while also bringing in out-of-state workers for more specialized roles. Partnerships with educational institutions are essential to develop the workforce pipeline. One participant elaborates:

> "Also, the digital inclusion will facilitate folks learning skills that they then they can go and apply for you know employment given what is going on in and around Alamance County. You got the Toyota facility being built. You've got the, the digital plant being built you know, south of us. You've got the supersonic transport out there in Greensboro. You know, you got some high-tech firms coming, and we've gotta be able to provide a workforce to support them. And thankfully, Alamance Community College has been doing a great job and tailoring the curriculum there at the, at ACC to fit the demands of the companies who are considering relocating in the area….
>
> …I have a friend, his wife got her web design associate's degree from ACC depending upon your age, if you want to get into biomedical, ACC has an up to date. We've just that… I'm trying to, how to describe it. For the biomedical field, they have all the instruments that someone needs to know how to use if they go into the biomedical community." This tailored approach is expected to help bridge the skills gap between available jobs and the qualifications of local job seekers."

Such partnerships are seen as mutually beneficial, with educational institutions providing a steady flow of skilled workers while companies offer career pathways for graduates. However, the need for high-speed internet and other technological infrastructure remains a primary concern for attracting and retaining such partnerships in the region.

Finally, local employers' needs for digitally skilled workers are broad and evolving. Inter-

viewees highlighted that many of the incoming industries, especially those in advanced manufacturing and automotive sectors, require a workforce capable of operating in highly automated and data-driven environments. One interviewee shared that for manufacturing jobs involving automation, "it does take a minimum amount of competency...to navigate any number of systems...so they do have to have a minimum skillset to actively engage." As a result, there is strong support for the idea that workforce development programs should include resources for retraining and upskilling, particularly in digital competencies. Such efforts are seen as "not only filling an economic need and proving the workforce skills of an existing incumbent workforce but also promoting their own...self-sufficiency to participate in a digital economy."

Interviewee Recommendations

Interviewees were asked to suggest recommendations for addressing digital inclusion in their communities. These recommendations reflect a comprehensive approach to bridging digital inequality, emphasizing the need for both immediate solutions and long-term structural change. The suggestions reflect diverse perspectives on overcoming digital inequity, focusing on themes such as infrastructure expansion, affordability, and community involvement.

Expand Broadband Infrastructure in Rural Areas

A recurring recommendation is the expansion of broadband infrastructure in rural regions. Many advocate for building comprehensive infrastructure to enable every household in their counties to access high-quality internet, preferably fiber. They stress that this infrastructure is essential not only for educational access but also as a foundation for economic development, especially in rural and underserved areas. Government-supported initiatives are seen as critical due to the reluctance of private providers to invest in less densely populated areas. One interviewee expressed the challenge: "You have these hubs and they want to embrace the technology and everything, but the first thing that always comes up is, man, our network is horrible...we just can't get the service out here or to people." The need for continuous support and long-term planning is underscored by another participant who noted, "There's still areas that have no service at all. We hope that expanding fiber and additional providers will help, but it's a huge issue that needs continuous support and planning."

> "Libraries provide access when people have nowhere else to go."

Improve Affordability through Subsidies and Grants

Affordability is a major barrier to digital inclusion, with several interviewees advocating for subsidies to reduce costs for households. Some suggest a sliding scale based on income or similar structures to make access financially feasible for all. Others suggest that communities provide "free access to every household in the community of high-speed

internet" at 300 gigabytes or more for households that cannot afford it. This, they believe, would ensure a reliable and fast connection, alleviating the burden of cost and allowing all families equitable access. They also highlighted the importance of accessible grants for infrastructure expansion, particularly for smaller counties that may struggle with matching fund requirements. One participant pointed out, "The Spectrum plans are more affordable now, but even so, there's families out there who just can't pay for it consistently. Some subsidy or reduced pricing would make a huge difference." Another added, "There are grants, but without the county match, some areas just can't take advantage of the funding."

Utilize Libraries and Community Hubs as Digital Access Points

Utilizing libraries and community hubs as digital access points is a central recommendation from interview participants, who see these institutions as crucial for bridging digital divides, particularly in underserved areas. They serve as "digital lifelines," particularly for low-income individuals, students, seniors, individuals experiencing homelessness, and rural residents. Libraries and community centers offer not only physical spaces for internet and computer access but also trusted environments where residents can receive digital literacy training and support for using technology effectively. Increased funding for these facilities is seen as essential to enhance digital access and training programs. A librarian shared, "Libraries provide access when people have nowhere else to go. We have people coming in to use desktops, hotspots, and get help, so continued support and resources are critical for us." Another noted, "Our WiFi and device lending programs get a lot of use, and even though numbers went down since COVID, it's still a need. More funding would help us expand what we offer."

Beyond libraries, other community hubs such as recreation centers, nonprofit organizations, and mobile outreach units serve as critical access points. These facilities are embedded within neighborhoods and are often more approachable for residents who may feel uncomfortable in more formal settings. One rural community leader explained, "The recreation centers are a place where people feel welcome. They're part of the neighborhood, so residents trust them and use their resources, whether that's WiFi or computers." This point highlights how community hubs can provide an inclusive environment that encourages digital engagement among those who might otherwise hesitate to seek out resources.

While libraries and community hubs play a pivotal role in advancing digital inclusion, they face significant challenges in sustaining and expanding their services. The demand for digital resources, combined with limited budgets, places considerable strain on these institutions. Interviewees consistently called for increased funding to enhance digital access and literacy programs. As one librarian put it, "Our libraries are doing everything we can, but to meet the demand, we need more funding, more devices, and more training resources." This plea for support reflects the broader need for government and private sector investment to ensure these community hubs can continue serving as digital access points for all residents.

Expand Device Access and Ownership Programs

Beyond infrastructure, affordable access to devices was frequently cited as essential. Several interviewees suggested moving from short-term loans to programs that allow device ownership. One Cooperative Extension Agent said: "I'd probably give everyone high speed broadband and a decent little computer. But then they don't need to know how to use it too, but that would be a good start anyway." Rather than temporary lending programs, they suggested enabling device ownership for low-income individuals. As one person noted, "People check out hotspots regularly, but for many, it's a constant cycle of returning and rechecking. Maybe we need to explore programs that let them own these devices so they have permanent access." Another example involved a community college, which, "realized the same students were borrowing laptops repeatedly, so they looked at just giving them a laptop. That could be a sustainable model here."

Increase Digital Literacy Training Programs

Interviewees stressed the importance of expanding digital literacy, particularly for seniors, non-English speakers, and economically disadvantaged residents. Programs should address basic digital skills, internet safety, and job-related technology training. One County Extension Director explained, "We've hired digital skills educators in 12 counties, and they're really making a difference teaching people the basics like how to use a phone or laptop. This needs more support and reach." Foundational digital skills remain a significant hurdle underscoring the need for programs that start with the basics, such as setting up an email account and navigating the internet.

Interviewees emphasized the importance of targeting digital literacy programs to specific demographics, including seniors and non-English speakers, who may have unique challenges and needs when it comes to learning digital skills. Seniors, for example, often express a strong desire to learn but may need a slower-paced, more hands-on approach. As one librarian described, "Seniors have been very consistent. They are, they want to learn… I've never seen in the last couple of years, they want to learn everything they can in terms of databases and software packages." In one class, 51 seniors gathered to learn how to sell items on eBay, illustrating the high demand for training that addresses both practical skills and personal interests. Another suggested a culturally responsive approach, stating, "Digital literacy training, especially in multiple languages, is critical. It's about meeting people where they are and helping them gain confidence with technology." Offering training in various languages and with culturally relevant examples can make digital skills more accessible and help bridge the gap for non-English speaking communities, especially immigrant families who may rely on their children as interpreters.

"ISPs play a key role, and we need to involve them more to extend service in underserved areas."

In addition to basic digital skills, interviewees highlighted the importance of training on internet safety and digital security. With increasing concerns over privacy and the risks of online scams, particularly for vulnerable populations, educating individuals about safe

internet practices is crucial. One interviewee explained, "We can't just teach people to use the internet; we also need to teach them how to stay safe online. A lot of our seniors, for example, are worried about getting scammed." By including internet safety as a core part of digital literacy programs, communities can empower individuals to use digital tools with greater confidence and security.

Digital literacy programs also play a critical role in improving individuals' economic opportunities. Several interviewees stressed the need for training that focuses on job-related skills, such as creating resumes, applying for jobs online, and using productivity software like Microsoft Office and Google Workspace. As one community leader pointed out, "We get questions that go beyond basic digital literacy to 'How do I put together a resume?' or 'How do I apply for jobs online?'" For economically disadvantaged individuals, digital skills are increasingly essential for accessing job opportunities, participating in remote work, and building long-term career resilience.

"The differential between what the maps say and what people experience is reported pretty much universally by every county."

Foster More Partnerships

To sustain and scale digital inclusion, interviewees recommended fostering partnerships between public institutions and private entities. One interviewee shared, "We're working with schools, businesses, and local government to get things like internet and training. Partnerships make a huge impact, but they need more resources to do this long-term." Engaging private-sector partners not only provides additional funding but also aligns digital literacy efforts with local economic needs, ensuring that training is relevant to current job markets. Another highlighted the role of ISPs, suggesting, "ISPs play a key role, and we need to involve them more to extend service in underserved areas…they've got the resources, but need incentive." To enhance the reach and impact of digital literacy programs, interviewees recommended partnerships with local organizations and schools. Collaborating with schools, for example, allows libraries and community hubs to connect with students and families who may need digital skills for homework or remote learning. One librarian shared their experience working with the local school system: "We meet with the school media folks pretty regularly to share any updates of any online resources that we have, and hopefully they share that with the students that they come in contact with." Such partnerships enable communities to integrate digital literacy into other aspects of life, making it a shared responsibility across institutions.

"State regulations limit what we can do in terms of expanding city internet, so we need the flexibility to tackle this issue creatively, especially with local providers."

Advocate for Policy Changes at State and Federal Levels

The recommendation to advocate for policy changes at the state and federal levels

emerged strongly from the interviews, as interviewees highlighted specific policy challenges and regulatory barriers that hinder digital inclusion efforts. Several participants emphasized the need for policy advocacy to address structural barriers, such as inaccurate broadband mapping and restrictive state regulations.

One of the primary policy concerns raised by interviewees is the inaccuracy of current broadband maps, which are used to determine areas eligible for funding and support. These maps often overstate coverage in rural areas, where service may be technically available but is often inadequate or unaffordable. One participant noted, "The FCC maps are notoriously inaccurate, so we're working with the state to address this because we need a clear picture of where broadband gaps are." An interviewee noted, "Our maps were really skewed... While a lot of [the county's] systems technically have offers of coverage, it's companies that don't provide the level of broadband service that is basically worth anything." Another participant elaborated, "The differential between what the maps say and what people experience is reported pretty much universally by every county... It's a big issue." Interviewees recommended policy changes that would require more granular data collection and verification, allowing for a more accurate representation of service gaps. Such changes would enable communities to receive funding and resources that are currently allocated based on misleading data.

Several interviewees discussed the limitations imposed by state regulations, particularly those that restrict municipal broadband initiatives. In some states, local governments face legal obstacles that prevent them from establishing or expanding publicly funded broadband networks. An interviewee stated, "State regulations limit what we can do in terms of expanding city internet, so we need the flexibility to tackle this issue creatively, especially with local providers." Interviewees advocated for policy changes that would give municipalities more freedom to implement their own broadband solutions. For instance, they suggested revising laws to allow cities and counties to operate broadband services or partner with private providers to expand coverage. Such changes would empower local governments to take proactive steps in addressing digital inequity in their communities.

Another key area of focus is the need for more flexible grant funding, particularly for rural counties that struggle with matching fund requirements. Many interviewees noted that even when grants are available, local governments in economically disadvantaged areas often cannot provide the required financial match. As one interviewee explained, "There are grants, but without the county match, some areas just can't take advantage of the funding." To address this barrier, interviewees recommended advocating for policy adjustments that would either reduce or eliminate matching requirements for small or rural counties. Additionally, they suggested that grants should be structured to cover long-term service costs, not just initial infrastructure investments, to ensure sustainable access for low-income communities.

Interviewees emphasized the need for policies that specifically support broadband infrastructure expansion in rural areas, where private companies are often unwilling to invest due to low population density. One rural advocate pointed out, "We're not number one on the list to get people served... so the state needs to prioritize us with targeted support for infrastructure." Another interviewee suggested, "If we're talking about infrastructure, we're

going to need federal and state funds earmarked specifically for rural areas, with less bureaucracy around accessing those funds." The recommendation here is for advocacy efforts to focus on ensuring that state and federal infrastructure funds are distributed equitably, with particular attention to rural and underserved areas. This could involve setting aside dedicated funding for rural broadband projects and simplifying application processes to make it easier for rural communities to access these resources.

Adapt Educational Models to Reflect Digital Realities

Recognizing the digital divide in educational settings, interviewees suggested adapting curricula and homework expectations to reflect students' varying access to digital resources. Key themes from the interviews emphasize the importance of addressing screen time

"For students in rural areas, even hotspots aren't enough if there's no signal. We need to plan for these realities and create flexible learning models."

management, critical thinking in digital spaces, equitable device access, and flexible, adaptive educational approaches that take into account students' varied home internet situations. Educators stressed the need for curriculum changes to prepare students for a technology-driven workforce, which now includes artificial intelligence (AI) and other rapidly advancing digital tools.

Several interviewees noted that, although digital learning tools are essential, there needs to be a balance to prevent excessive screen time, particularly in elementary education. One educator shared that in their district, they decided to limit younger students' take-home devices: "About two years ago, we decided to say, okay, elementary schools, no Chromebooks going home... we still have it that way. So they don't take Chromebooks home." This helps ensure that younger students are not over-reliant on screens and encourages more traditional learning methods, allowing them to develop face-to-face social and communication skills. The experience of other countries, such as Norway and Sweden, where devices were removed in favor of books, was mentioned as an inspiration for rebalancing digital and traditional approaches in U.S. schools. According to another participant, "they realized there was a lot of... they were missing a lot for being in front of the computer or relying on the computer all the time."

Digital natives may be savvy with technology, but they often lack critical thinking and discernment skills in online environments. An interviewee highlighted this need, explaining, "The generation coming up reacts to everything they see... They're very savvy to navigate that space, but they are not savvy enough to have the experience to have discernment. Is what I'm seeing true or false?" Teachers should therefore help distinguish between reliable and unreliable online information, and to think critically about digital content, is essential for fostering responsible digital citizens. Another participant emphasized the need for balance, advocating for teaching students "healthy practices, like knowing what amount of screen time is enough and knowing how to take time to be bored... to be able to think critically and not just react."

Interviewees called for policies that support universal internet access so that all students, regardless of their home environment, can participate fully in digital learning. One educator commented, "During COVID, we saw a big demand for hotspots, but now that schools

are back in person, many of our students don't have homework that requires internet access. It's a change in how we think about connectivity." Another added, "For students in rural areas, even hotspots aren't enough if there's no signal. We need to plan for these realities and create flexible learning models."

In conclusion, the recommendations provided by interviewees reflect a comprehensive strategy for bridging the digital divide, addressing both immediate needs and advocating for long-term systemic changes. From expanding broadband infrastructure in rural areas and improving affordability through subsidies, to utilizing libraries and community hubs as essential digital access points, these suggestions highlight the diverse and layered challenges of digital inclusion. The repeated call for sustained support underscores the urgency for government and private sector investment in these efforts. By implementing these recommendations, we can work toward a future where digital access, literacy, and equity are accessible to all residents of the Piedmont Triad, fostering greater educational, economic, and social opportunities.

FOCUS GROUPS

PIEDMONT TRIAD
REGIONAL COUNCIL

UNC
GREENSBORO
Center *for* Housing
& Community Studies

The methodology employed for the public listening sessions (or focus groups) ensured broad community engagement and comprehensive data collection to inform the Piedmont Triad Regional Council Digital Inclusion Plan. These sessions were designed to gather qualitative insights from diverse community stakeholders across all twelve counties of the PTRC. A total of 112 individuals participated in 13 separate meetings representing a wide array of perspectives and organizations. The sessions aimed to uncover barriers, needs, and opportunities related to digital inclusion and broadband access.

Participants represented a mix of community members, government officials, nonprofit leaders, educators, and industry stakeholders. Many participants were actively engaged in roles that directly impact digital inclusion, such as:

- **Local Government Representatives:** Addressing regional broadband initiatives and infrastructure challenges.

- **Nonprofit Leaders:** Working on community programs to improve digital literacy and provide device access.

- **Educators and School Officials:** Offering insights on digital access and technology use in education.

- **Business Leaders:** Sharing the digital needs of small businesses and the workforce.

- **Library directors and staff:** Providing digital resources such as Wi-Fi and device lending.

- **Community College Staff:** Managing distance learning and workforce development.

- **Community Advocates:** Highlighting the lived experiences of underserved populations, including rural residents, low-income families, and immigrant communities.

This diverse representation ensured that the focus groups captured a wide range of perspectives and provided a solid foundation for developing actionable recommendations for the region's digital inclusion efforts.

The focus groups followed a standardized protocol, beginning with introductions and an explanation of the session's objectives. Participants were prompted with open-ended questions spanning various topics, such as barriers to broadband access, digital literacy programs, infrastructure deficits, device accessibility, and the role of community organizations in addressing digital inclusion challenges. Each session was recorded with participant consent, transcribed, and subsequently analyzed using thematic coding to identify recurring themes and actionable recommendations.

The listening sessions explored several core areas critical to advancing digital inclusion. Participants were asked to identify barriers to broadband access, including issues of affordability, infrastructure gaps, and other obstacles faced by their communities. Dis-

cussions delved into infrastructure and service issues, focusing on deficits in broadband infrastructure, the adequacy of current internet speeds, and strategies for prioritizing underserved areas. Digital literacy and skills training emerged as key themes, with participants assessing the availability and effectiveness of local programs and highlighting gaps in training for specific populations, such as older adults, non-English speakers, and low-income families. The sessions also addressed device access and public facilities, examining the sufficiency of public initiatives to provide devices and public Wi-Fi access and identifying areas where additional resources or expanded services might be needed. Additionally, participants evaluated the roles of key institutions such as schools, libraries, and community centers, discussing how these organizations could enhance their support for digital inclusion efforts. Finally, the focus groups gave special attention to children's access and education, reflecting on lessons learned during the pandemic's shift to remote learning and considering strategies to ensure equitable access to devices and reliable internet for students.

Themes of the Discussions

The listening sessions highlighted several overarching themes: the critical nature of digital literacy for both daily life and employment, challenges related to broadband infrastructure and accessibility, the importance of public Wi-Fi and device availability, and the need

> "The Internet is used for everything – communication, connectivity, work, and learning."

for increased digital literacy training. The series of discussions on digital inclusion revealed a complex and interconnected set of challenges related to affordability, accessibility, digital literacy, and infrastructure limitations. Everyone agreed though that it is indispensable to have access to broadband, the technologies to access the internet, and the skills to effectively navigate the online world. Speaking from experience, a focus group member mentioned, "it's amazing how reliant on [the internet] you are, and you don't realize until it's out." Another participant elaborated, the "Internet is used for everything—communication, connectivity, work, and learning."

The themes that emerged from these discussions paint a comprehensive picture of the digital divide, revealing deep-seated inequities. These themes highlight systemic barriers that disproportionately affect rural communities, low-income households, and marginalized populations, underscoring the urgent need for coordinated and sustained efforts to bridge the digital divide. Participants acknowledged that addressing these challenges will require a multifaceted approach that combines policy reform, community partnerships, and sustained investment in digital infrastructure and education. As the digital landscape continues to evolve, ensuring equitable access to internet services and digital resources will remain a cornerstone of efforts to foster economic development, educational opportunity, and social inclusion.

Focus Groups

County	Digital Assets Mentioned	Key Barriers or Limitations	Unique or County-Specific Issues Discussed	Recommendations
Alamance	Public libraries, school systems, community colleges, loaner hotspots, digital navigators, community organizations	Rural "dead zones", affordability, digital literacy gaps, high demand on resources	Reliance on grants for hotspot programs, high demand for library resources, diverse ethnic communities needing tailored approaches	Increase funding for hotspots, expand device distribution, provide targeted training, enhance communication about resources
Caswell	Limited public facilities, schools, Cooperative Extension programs, and libraries	Rural isolation, limited infrastructure, affordability issues	Economic challenges, reliance on neighboring counties for resources	Expand broadband infrastructure, increase public Wi-Fi access points, develop digital literacy programs
Davidson	Libraries, loaner hotspots, digital navigators, refurbished devices (E2D initiative), NC Cardinal library network	Rural coverage gaps, lack of suitable devices for students, reluctance to participate in formal training	Large rural area with significant dead zones, upcoming housing developments, challenges with advanced student needs	Expand broadband infrastructure, provide suitable devices for students, support digital literacy through personalized assistance, address affordability barriers
Davie	Libraries, hotspots, Chromebooks, senior centers, public Wi-Fi in parks	Limited device availability, affordability, rural connectivity gaps, limited transportation to access resources	Limited transportation options, residents seeking resources in neighboring counties, trust and accessibility issues in rural areas	Invest in rural broadband, enhance transportation options to digital hubs, improve public Wi-Fi availability, expand education about affordable internet programs
Forsyth	Libraries, loaner hotspots, public computers, digital literacy programs, Winston-Net, Digital Bridges Forsyth, partnerships with nonprofits	Infrastructure gaps in rural areas, affordability, digital literacy gaps among seniors and non-English speakers, limited competition among ISPs	Urban vs. rural disparities, advanced digital inclusion plan serving as a model statewide, rapid technological changes challenging ongoing efforts	Expand digital literacy programs, improve broadband infrastructure, secure funding for hotspots, enhance cross-sector collaboration, develop digital navigator programs
Guilford	Libraries, Eduroam networks through schools and universities, Piedmont Triad Technology & Data Institute (TDI), Cooperative Extension programs, partnerships with educational institutions	Cost barriers, mistrust of free or subsidized services, statutory limits on municipal broadband efforts, affordability challenges, lack of centralized coordination	Statutory limitations on municipal broadband efforts, lack of dedicated "digital equity champion", climate change concerns affecting infrastructure, mistrust affecting adoption	Create digital champions or centralized oversight, improve resource accessibility, simplify enrollment processes, foster partnerships with trusted institutions, explore cooperative broadband models
Montgomery	Libraries, public Wi-Fi in select locations, community colleges, Cooperative Extension programs	Geographic isolation, limited device availability, affordability, limited digital literacy programs, slow broadband expansion	Youth migration due to lack of opportunities, federal lands complicating infrastructure expansion, high outflow of young residents, population "churn"	Improve broadband expansion efforts, increase Spanish-language outreach, provide low-cost devices through partnerships, enhance digital literacy programs, engage local community leaders

Focus Groups

County	Digital Assets Mentioned	Key Barriers or Limitations	Unique or County-Specific Issues Discussed	Recommendations
Randolph	Libraries, digital navigators, school-provided devices, partnerships with nonprofits, community centers	Rural coverage issues, limited training availability, affordability barriers, limited trust in technology among certain populations, transportation issues	Reliance on nonprofit partnerships, language accessibility issues, need for stronger communication networks to disseminate resource information	Prioritize broadband expansion, establish sustainable funding for digital resources, train more digital navigators, expand digital literacy programs, improve communication strategies
Rockingham	Libraries, school-provided devices, limited public Wi-Fi, collaboration with local ISPs	Rural areas with limited or no access, affordability challenges, digital literacy gaps among seniors and non-English speakers	Economic challenges impacting digital inclusion efforts, reliance on neighboring counties for resources, statutory limitations on municipal broadband expansion	Expand broadband infrastructure to underserved areas, increase device availability through loan programs, enhance digital literacy efforts targeting vulnerable populations, develop partnerships for funding
Stokes	Limited public facilities, some hotspots available for checkout, investment partnerships with ISPs like RiverStreet Networks	Dead zones due to terrain, language barriers for non-English speakers, low funding, infrastructure constraints (e.g., restrictions on building towers in state parks)	Population growth straining limited infrastructure, challenges in expanding broadband due to geographic and regulatory constraints, reliance on inconsistent grant funding	Strengthen partnerships for funding and infrastructure development, enhance outreach and communication about existing programs, deploy digital navigators, address affordability through subsidies
Surry	Libraries, school-issued iPads and Chromebooks, community programs, extended Wi-Fi signals into parking lots	Infrastructure dead zones, affordability issues, funding instability, limited awareness of programs, transportation challenges for accessing resources	Seven identified food deserts indicating broader socioeconomic challenges, reliance on schools and libraries as primary digital access points, language barriers among Hispanic residents	Extend broadband to underserved areas, increase public Wi-Fi access points especially in rural areas, promote digital literacy programs, develop stable funding models, improve communication about resources
Yadkin	Limited county buildings offering Wi-Fi, sporadic hotspots, library computer access	Sparse public Wi-Fi, limited device availability, funding dependency, economic challenges impacting infrastructure development	Reliance on neighboring counties for resources, limited public Wi-Fi availability, small population with widespread rural areas, challenges in engaging community due to trust and resource awareness issues	Expand hotspot programs through libraries and schools, focus on improving rural access, create digital literacy workshops especially for seniors and non-English speakers, seek sustainable funding sources

Table 5 - Summary of Assets, Barriers, Issues, and Recommendations by County

Populations with Most Pressing Digital Inclusion Needs

The public listening session underscored that certain demographic groups face heightened challenges due to systemic barriers in accessing technology, the internet, and digital literacy resources. These groups—rural residents, low-income families, seniors, non-English-speaking communities, justice-involved individuals, and unhoused populations—represent the most pressing areas of concern in addressing the digital divide.

Rural Residents

Geographic isolation remains a significant obstacle for rural communities, where broadband infrastructure is often lacking or entirely absent. Residents in areas such as Caswell, Randolph, and Montgomery Counties experience limited connectivity due to insufficient internet service provider (ISP) coverage. This disparity leaves rural populations reliant on outdated, slow, or unreliable forms of internet, exacerbating exclusion from essential digital services. Farmers and agricultural workers in these regions are particularly affected, as they often depend on non-digital communication methods like phone calls or word of mouth. Additionally, these areas frequently lack public Wi-Fi access points, further isolating residents from digital resources.

Low-Income Families

Low-income households are disproportionately impacted by affordability barriers, which prevent access to internet services and devices. For many, basic needs such as food, medication, and housing take precedence over the costs of broadband, which can exceed $100 per month. This financial limitation forces reliance on public libraries or community centers to access digital resources. Single-device households are another common scenario, limiting family members' simultaneous access to online education, telemedicine, or job-seeking activities. Many parents in these households also lack digital literacy themselves, creating further challenges in supporting children's digital learning.

Seniors

Older adults consistently emerged as a demographic with substantial digital inclusion needs. Many seniors are hesitant or distrustful of technology, stemming from unfamiliarity, a lack of training, or fears of falling victim to cyber scams. "Many older adults are hesitant to use technology because they don't trust it or feel it's not necessary for their lifestyle." Reflecting on this topic, one person remarked, "Some seniors are particularly vulnerable, struggling with cyber security issues due to literacy." Educational gaps in digital literacy prevent them from engaging with critical online services, such as telemedicine, social security portals, or banking systems. Seniors living in multigenerational households also face challenges in bridging intergenerational digital skills gaps, often relying on younger family members for assistance. Participants emphasized the need for tailored, accessible training programs for older adults to address these unique barriers. In discussing the issue, a respondent noted, "Seniors often struggle with

> "Many older adults are hesitant to use technology because they don't trust it or feel it's not necessary for their lifestyle."

basic online tasks, and targeted workshops have proven transformative."

Recognizing the specific challenges faced by older adults, many counties have implemented senior-focused digital literacy initiatives. Libraries, senior centers, and Cooperative Extension programs across the region offer tailored classes to address basic technology needs. For example, Cooperative Extension in Montgomery County provides digital skills courses for adult learners and inmates nearing release, while similar programs in Forsyth and Surry counties offer hands-on assistance through home visits and informal learning opportunities. Despite these efforts, digital literacy among seniors remains an ongoing challenge, often hindered by pride, discomfort, or mistrust of technology. One participant explained, "Digital literacy classes don't tend to do as well... It's just having someone there who is tech-savvy and who is good at explaining these devices that's a little more effective than the classes."

Non-English-Speaking and Immigrant Communities

Non-English-speaking populations, particularly Hispanic and Montagnard residents, face compounded barriers due to language limitations and a lack of culturally relevant digital resources. In counties such as Surry and Stokes, Hispanic residents are further disadvantaged by insufficient outreach in Spanish and limited translation services for digital platforms. These barriers hinder access to educational tools for children, telehealth services, and financial applications, such as digital banking. Additionally, newcomers to the U.S. must simultaneously navigate learning English and developing digital skills, making the transition even more difficult. Compounded barriers, such as language limitations and transportation challenges, were also discussed, particularly in counties like Surry and Stokes, where non-English speakers and residents without reliable transportation face additional hurdles to accessing digital services. Participants emphasized the need for targeted resources that address both linguistic and digital literacy challenges.

Justice-Involved and Unhoused Individuals

Justice-involved individuals, particularly those in pre-release programs, are another population with critical digital inclusion needs. These individuals often lack access to devices, internet, or digital skills training, limiting their ability to reintegrate successfully into society. Access to technology is essential for applying to jobs, securing housing, and participating in rehabilitation programs. Similarly, unhoused individuals face logistical challenges, including the lack of stable power sources for charging devices and secure locations to access Wi-Fi. Libraries and other public spaces are often their primary points of contact with digital resources, but limited funding and capacity in these institutions constrain their ability to serve this vulnerable group.

Students and Youth

Students, particularly those from low-income households or rural areas, experience significant digital exclusion due to inadequate home connectivity and device access. Many rely on school-provided devices or library hotspots to participate in online learning. However, these resources are often insufficient to meet demand, leaving gaps in access. Participants highlighted that students in underserved areas struggle to keep pace with digital learning expectations, increasing their risk of falling behind academically. Additionally, basic devices such as Chromebooks, while useful for entry-level tasks, are often inadequate for more advanced coursework or technical applications.

Residents with Disabilities

Individuals with intellectual or developmental disabilities (IDD) face unique barriers to digital inclusion, including the need for specialized devices and tailored training programs. Limited outreach and accessibility-focused resources further compound the challenges for this population, restricting their ability to engage with digital platforms for education, healthcare, and employment. Participants noted the importance of providing adaptive technologies and inclusive digital literacy programs to address these needs.

Digital Infrastructure & Broadband Access

Broadband access remains a critical and complex challenge across the region, with disparities between urban and rural areas, affordability concerns, and inconsistent infrastructure development. These gaps, compounded by issues of affordability and limited competition among internet service providers (ISPs), pose substantial barriers to equitable connectivity. While some progress has been made in expanding fiber-optic networks and improving connectivity, significant gaps persist, leaving many communities underserved. The discussions highlighted how geographic isolation, limited competition among service providers, and high costs create systemic barriers to digital inclusion, disproportionately affecting rural and low-income populations.

Geographic and Infrastructure Barriers

Rural and geographically isolated areas often lack comprehensive broadband coverage, leaving residents with unreliable or nonexistent connectivity. Low population density create substantial challenges to broadband expansion. Counties such as Davidson, Montgomery, and Caswell suffer from significant "dead zones" where residents lack reliable internet access. In Davidson County, for instance, the southern regions near the Yadkin River and Uwharrie Mountains experience poor or non-existent connectivity due to terrain and limited infrastructure. Participants noted that the geography of these regions often hinders the installation of new broadband networks, leaving underserved areas reliant on inadequate alternatives. Satellite internet is sometimes used as a last resort, but its high cost and unreliable performance make it an unsustainable solution.

Similarly, Caswell County is fragmented in its broadband coverage, with much of its infrastructure outdated or inaccessible. While fiber-optic lines run through parts of the county,

these connections are often reserved for business-level services, leaving residential users without access unless they pay exorbitant fees. One participant observed, "The fiber network runs through the county, but there's no access for residents unless they pay a premium for business-level service." Dead zones remain a significant issue in Stokes County, where geographic and economic factors hinder broadband expansion. Riverstreet Networks has worked to improve service, yet inconsistencies persist, leaving many residents reliant on inadequate connections.

> "The fiber network runs through the county, but there's no access for residents unless they pay a premium for business-level service."

Even in more urbanized areas, such as Guilford, Alamance, and parts of Forsyth County, gaps in broadband coverage persist. Attendees highlighted that some neighborhoods, particularly in southern Alamance and norther Forsyth, still rely on older DSL connections, which cannot meet modern demands. This limited infrastructure fails to support households with multiple users, particularly for activities such as remote work, education, and telemedicine, which require high-speed and stable connections. In Forsyth County, while urban neighborhoods enjoy relatively robust service, rapidly growing areas such as Kernersville are plagued by inconsistent and unreliable connectivity due to aging infrastructure and lagging upgrades.

In all counties, participants described some persistent connectivity gaps that create significant inequities. As one participant explained, "Even with connectivity on paper, some areas can't establish a reliable connection." In some regions, geographic isolation compounds these challenges, with residents in remote or mountainous areas unable to access reliable service. One attendee noted, "When you get out far into the haulers, so to speak, it's very difficult [to access the internet]." Limited infrastructure, including inadequate broadband speeds and dead zones, further exacerbates these issues, creating logistical challenges for residents, businesses, and schools. Moreover, a participant explained, "the lack of competition in broadband providers locks residents into high prices and limited service." Attendees consistently emphasized the vital role of broadband access as a public utility necessary for

> "Even with connectivity on paper, some areas can't establish a reliable connection."

education, economic development, and healthcare. Nonetheless, participants also indicated that policy restrictions are imposed on local governments that exacerbate the issues, "Statutory limitations mean counties can't address certain infrastructure issues directly, leaving barriers unresolved."

Limited Provider Options and Competition

A recurring issue across all regions is the lack of competition among ISPs, which drives up costs and limits service quality. North Forsyth, for example, is a single-provider area dominated by Spectrum. This monopoly results in higher costs for residents, with one participant noting that broadband service in the area costs "$100 without fiber." Similar concerns were raised in Alamance County, where Spectrum and AT&T dominate the market but have only recently begun rolling out fiber in select neighborhoods, leaving many areas underserved. In Caswell County, residents reported that Brightspeed, one of the few providers available, offers outdated and slow internet speeds that fail to meet modern needs.

Efforts to improve digital access must also address the underlying infrastructure challenges that limit connectivity in many areas. Federal and state grants, such as the Great Grant program, have funded broadband expansion projects, with providers like Spectrum and Brightspeed working to extend fiber networks to rural and underserved areas. However, deployment has been slow, and significant gaps remain. In Davie County, for example, underserved northern and southeastern regions continue to struggle with inconsistent or nonexistent internet service.

Technological and Data Limitations

The limitations of current technology and data collection methods also hinder efforts to address broadband gaps. Attendees discussed the inaccuracy of speed tests, which can reflect only what a customer pays for rather than the actual availability of higher-speed services. For example, older devices used to run these tests may not capture the true potential of available connections, leading to biased or incomplete data on broadband speeds. Moreover, climate change and natural disasters were identified as emerging threats to the sustainability of digital infrastructure, with participants calling for more resilient systems to withstand these challenges.

Emerging Technologies and Future Challenges

While the expansion of 5G networks has shown promise in filling some connectivity gaps, attendees emphasized that much work remains to ensure affordable and equitable access. Climate change and extreme weather events were also highlighted as potential threats to the sustainability of digital infrastructure, with participants calling for investments in more resilient systems. Larger employers have contributed to infrastructure development by supporting fiber installation in key areas. However, such initiatives are often limited in scope and fail to address the broader needs of low-income neighborhoods.

Affordability Challenges

The lack of competition impacts affordability. Without alternative providers, ISPs face little

pressure to offer competitive pricing, making high-speed internet prohibitively expensive for many low-income households. This affordability barrier, with high costs for internet plans, devices, and hotspots prevents many low-income households from achieving digital inclusion. High costs of broadband services and devices remain a universal obstacle, forcing low-income families and marginalized groups to prioritize other basic needs over digital access. Service providers such as Spectrum and Zirrus offer tiered plans, but affordability remains a barrier. An attendee shared that, in some areas, "you have one option, or maybe another option, and most of the time they're just not affordable".

An attendee noted, "Affordability remains a critical issue; even discounted devices are beyond reach for many families." Participants highlighted the disproportionate impact of these financial constraints on seniors, unemployed individuals, and families with limited resources. One attendee observed, "Affordability challenges and limited access to internet services" are central obstacles to achieving equity. The resulting equity divide means "families lack affordable internet options, which limits their children's educational opportunities." Libraries and schools often serve as critical access points for free digital services for these families, but demand frequently outstrips supply, leaving gaps in accessibility.

> "Affordability remains a critical issue; even discounted devices are beyond reach for many families."

Programs such as the Affordable Connectivity Program (ACP) and Lifeline were designed to subsidize internet costs for eligible residents. However, attendees noted that these programs are underutilized due to limited community awareness. One provider explained, "We still offer internet at like 20 bucks, but only if you qualify for those programs." With the ACP ending in April 2024, the financial strain on low-income families has only increased, leaving many without affordable internet options.

The lack of affordable broadband options is further exacerbated by limited competition among internet service providers (ISPs) in underserved areas. Single-provider regions, such as parts of North Forsyth, often experience higher costs and reduced service quality, creating additional barriers for residents. As one participant noted, "Grassroots organizations are where trust is built… nobody's going to trust us walking in this room or walking into their neighborhood," emphasizing the need for community-based outreach to connect residents with available resources. Yet, public mistrust of free or subsidized internet services presents another significant barrier to adoption. Concerns over data privacy and government intentions were frequently cited as reasons why some residents are hesitant to engage with available programs. This mistrust, coupled

> "Grassroots organizations are where trust is built."

with poor communication about existing resources, limits the effectiveness of digital inclusion initiatives. Participants called for greater transparency and outreach to build trust and ensure that residents are aware of the opportunities available to them.

The discussions also pointed to systemic affordability issues stemming from state regulations, which restrict local governments from directly competing with telecom providers, limiting municipalities' ability to offer cost-effective (or free) solutions. As previously noted, "residents often face exorbitant fees for internet services due to monopolies in certain areas." The idea that access to the internet is a public utility emerged frequently. A com-

munity member explained, "affordability should be part of broader municipal initiatives, akin to water and electricity."

Progress and Limitations in Infrastructure Expansion

Efforts to expand broadband infrastructure are underway in many counties, driven by a combination of public and private initiatives. Grant-funded programs are facilitating the rollout of fiber-optic networks in some regions, with ISPs like Zirrus (formerly Yadtel) and T-Mobile making strides to improve connectivity. For example, new cell towers installed in southern Davidson County have had a transformative impact on connectivity in previously underserved areas. However, these advancements are uneven and often progress too slowly to meet the growing demand.

In Montgomery County, broadband expansion initiatives have improved access in certain areas, but attendees noted that "a few...are still going to miss out," particularly in northern and southeastern parts of the county. Similarly, while Rockingham County claims to have nearly 100% broadband availability, high installation costs and affordability barriers continue to leave many residents disconnected.

Infrastructure constraints also hinder long-term solutions. For example, in Stokes County, restrictions on building cell towers in state parks limit the expansion of wireless services, while in Forsyth County, older infrastructure struggles to keep pace with rapid population growth. Participants emphasized the need for faster progress in infrastructure development, as current efforts remain insufficient to address widespread connectivity gaps. This lack of investment in rural infrastructure perpetuates disparities in digital access and inhibits economic growth.

Public Wi-Fi Access

Access to public Wi-Fi has become a critical lifeline for individuals without home broadband, particularly in the context of increasing reliance on digital resources for education, employment, and personal finance management. Across Forsyth County and surrounding regions, libraries, schools, and community centers serve as primary access points for internet connectivity. For example, libraries often act as de facto offices where residents conduct job interviews, complete online coursework, and manage financial matters. A library staff member noted, "Libraries are now where people go to conduct work and interviews because they lack internet at home." Similarly, schools have adapted by extending Wi-Fi coverage to parking lots, enabling families to connect to the internet from their vehicles during the pandemic. Despite these innovative measures, public spaces remain insufficient to meet the broader need for equitable internet access.

> "Libraries are now where people go to conduct work and interviews because they lack internet at home."

Public Wi-Fi Availability and Limitations

While public Wi-Fi is offered in a variety of community locations, such as libraries, city parks, and select businesses, its availability is unevenly distributed, particularly in rural

areas. For instance, Forsyth County libraries provide Wi-Fi that extends into parking lots, allowing 24/7 access to residents. A library staff member shared, "The library provides free Wi-Fi 24/7, and people even come to our parking lots to use it when the library is closed." However, these services are constrained by limited operating hours and geographic distribution, leaving many rural residents underserved. In counties such as Stokes and Surry, public Wi-Fi is predominantly available at libraries and schools, with efforts to extend access, such as installing boosters to expand parking lot coverage. Yet, the lack of comprehensive, county-wide or regional initiatives means that many residents remain disconnected.

Schools and housing authorities have collaborated to expand digital access, leveraging partnerships to create innovative solutions. For instance, Guilford County's Eduroam program extends internet access to public housing residents, while libraries and schools in other counties distribute hotspots to mitigate connectivity issues. As a participant explained, "hotspots on school buses provided temporary relief during COVID but are not a sustainable solution." However, these efforts are often constrained by limited budgets and fail to provide long-term solutions to infrastructure challenges.

Transportation barriers further exacerbate the issue. One participant observed, "Transportation is an issue...we have families who, because of their limited resources and limited transportation, need more resources available online." Even in urban areas, such as downtown High Point and Greensboro, municipal wireless networks are often confined to central locations, excluding residents in outlying regions. While some cities, such as Lexington and Troy, have made strides in providing Wi-Fi access at public buildings and downtown areas, these initiatives fail to address the persistent gaps in rural and lower-income communities.

Community-Based Efforts and Private Sector Contributions

Community centers, local businesses, and faith-based organizations have emerged as supplementary providers of public Wi-Fi. Churches in many areas offer guest Wi-Fi networks for their congregations and the wider community, while businesses like Starbucks and McDonald's provide hotspots that residents frequently rely on for connectivity. Despite these contributions, attendees noted that the reliability of such connections is inconsistent. For example, public Wi-Fi initiatives in some downtown areas, such as Burlington, have been scaled back due to challenges like loitering, leaving fewer options for residents who depend on these services.

Expanding Public Wi-Fi

Although public Wi-Fi networks have been established in several public facilities and community hubs, significant challenges remain in ensuring widespread digital inclusion. Rural areas, in particular, face acute shortages of access points. In Davie County, public Wi-Fi is largely restricted to county buildings and a few businesses, with plans to extend

access to school parking lots still in early stages. Similarly, Stokes County lacks comprehensive efforts to expand connectivity, relying instead on small-scale solutions like hotspots available for checkout. To address these disparities, stakeholders have proposed leveraging county-owned towers to facilitate broader Wi-Fi coverage through partnerships with internet service providers. While this strategy holds promise, no formal agreements have yet been established. The pandemic underscored the importance of public Wi-Fi as a stopgap solution, but its limitations—such as insufficient geographic coverage, inconsistent reliability, and security concerns—highlight the need for systemic improvements.

Public Device Access

Public device access remains a critical component of digital inclusion efforts, providing essential tools for individuals without personal devices to engage in education, employment, and basic online services. Efforts to improve digital access within the region have centered on device distribution, public internet access, and collaborative initiatives involving schools, libraries, nonprofits, and government agencies. While these initiatives have successfully increased access for many underserved communities, barriers related to affordability, infrastructure limitations, and insufficient program awareness persist. These limitations disproportionately affect rural residents, low-income families, and individuals with limited access to transportation or digital literacy support. These challenges highlight the need for expanded and sustainable efforts to bridge the digital divide.

A cornerstone of digital access efforts is the distribution of devices to students, low-income families, and other underserved populations. During the COVID-19 pandemic, schools across Forsyth, Davie, and other counties prioritized device distribution to facilitate remote learning. Forsyth County schools, for example, provided managed devices to students, significantly improving access for many families. However, not all students received devices, and many were left to rely on public Wi-Fi hotspots or printed learning packets. One participant highlighted this disparity: "During the pandemic, it was super hard for a lot of our students to do basic work, because even the hotspots wouldn't work because they just didn't have access."

Libraries as Key Access Points for Public Devices

Public libraries, schools, and community centers have become critical hubs for internet access, particularly for residents without home broadband. Libraries in Forsyth County, for example, serve as substitutes for home offices, where residents conduct job interviews, complete online coursework, and manage personal finances. One library staff member remarked, "Libraries are now where people go to conduct work and interviews because they lack internet at home."

Public libraries play a central role in providing device access, offering a range of resources from desktop computers to loanable Chromebooks and Wi-Fi hotspots. Device-lending programs support students, job seekers, and residents managing personal or educational tasks. Libraries also serve as educational hubs, offering tablets for children's learning activities and hosting computer skills courses for adults. In Davidson county, a librarian explained , "through the library and its tech-savvy staff, we have a kind of 'free Geek Squad' for the community... people come in with their devices and we help them." However, these programs face sustainability challenges and cannot fully meet the community's growing needs.

In Forsyth County, libraries provide vital support for residents lacking personal devices, enabling them to complete tasks such as job applications, bill payments, and research. The library system allows patrons to check out Chromebooks and hotspots for up to 30 days, with in-person renewal required, though demand often exceeds availability. Similarly, in Davidson County, hotspots and Chromebooks are available for loan, but the number of devices is limited to about 50 hotspots countywide, leading to waiting lists in high-demand areas. One library staff member noted, "There's generally a little bit of a waitlist depending on location, but it's a lot of the same people," reflecting the recurring reliance of specific demographics on these services. However, the short-term nature of hotspot loans and the requirement for regular renewals pose challenges for patrons who need continuous access.

In rural areas, libraries remain a primary access point for public devices, but their geographic distribution and operating hours limit accessibility for residents without reliable transportation. For example, Montgomery County libraries do not provide device loans, leaving residents with few alternatives. Caswell County faces similar issues, where funding cuts have reduced the availability of Chromebooks and hotspots previously provided by schools, creating significant barriers for students and families.

School-Based Device Programs

Schools have been instrumental in expanding device access through one-to-one device programs, particularly during the COVID-19 pandemic.

A cornerstone of digital access efforts is the distribution of devices to students, low-income families, and other underserved populations. During the COVID-19 pandemic, schools across Forsyth, Davie, and other counties prioritized device distribution to facilitate remote learning. Forsyth County schools, for example, provided managed devices to students, significantly improving access for many families. However, not all students received devices, and many were left to rely on public Wi-Fi hotspots or printed learning packets. One participant highlighted this disparity: "During the pandemic, it was super hard for a lot of our students to do basic work, because even the hotspots wouldn't work because they just didn't have access."

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Many school systems are rolling back on these resources, "laptops and devices distributed during

COVID are no longer available, limiting student access." The cessation of funding for educational hotspots and devices has increased the digital divide, affecting students' ability to learn remotely. Reflecting on this topic, one person suggested that "partnerships between schools and libraries can help sustain access to educational technology. Libraries provide spaces for students to access technology they don't have at home."

In Forsyth County, every student from fifth grade through high school still receives a Chromebook, addressing significant gaps in digital access for younger generations. However, students in households without home internet rely on public spaces such as libraries for connectivity. As one librarian noted, "The school system has provided every student fifth grade through high school with a Chromebook... but kids get off the bus and come here for internet access."

Similarly, schools in Davidson and Alamance counties distribute Chromebooks to students, but these devices often fall short for advanced educational needs. High school students working on upper-level projects frequently encounter compatibility issues with software, as Chromebooks are not equipped to handle certain applications. Participants emphasized the need for more advanced devices to support students' academic and professional development.

In Montgomery County, schools provide Chromebooks or Windows devices to students, but community resources for adult residents are virtually nonexistent. Without libraries or nonprofits offering device loans, low-income adults and seniors face significant barriers to accessing essential digital tools.

Community colleges complement library and school efforts by providing additional device access. Alamance Community College, for instance, maintains a fleet of approximately 300 laptops available for student checkout, though demand often outstrips supply by the third week of the semester. Rockingham Community College also lends Chromebooks to enrolled students, with service costs covered by grants. However, participants noted that these devices sometimes lack compatibility with specific applications required for coursework or professional tasks.

Nonprofits Supporting Device Access

Nonprofits and community organizations have further contributed to device access through innovative programs. WinstonNet (Forsyth) and Right Here Right Now (Alamance and Rockingham) partner with grassroots organizations and churches to distribute laptops, tablets, and other devices, emphasizing the importance of community trust in reaching underserved populations. The Kramden Institute and E2D refurbish corporate-donated laptops and provides them to low-income communities at subsidized rates, though these efforts have not yet been fully implemented in some areas. These initiatives aim to bridge device access gaps, but their reach is limited by funding constraints and the high demand for affordable devices. Additionally, refurbished devices may not always meet the technological requirements of users engaged in complex activities such as job applications or remote learning.

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through innovative programs. WinstonNet partners with grassroots organizations and churches to distribute laptops, tablets, and other devices, emphasizing the importance of community trust in reaching underserved populations. The organization E2D refurbishes corporate-donated laptops and provides them to low-income communities, though these efforts have not yet been fully implemented in some areas, such as Davidson County. Similarly, organizations like Kramden Institute and DE2 refurbish computers and offer them at subsidized rates, aiming to close the device gap for families without adequate digital infrastructure.

Device-lending programs also play a significant role in expanding access. Public libraries across the region lend out hotspots and laptops, providing critical support for students, job seekers, and residents managing personal or educational tasks. For instance, Alamance County's library system maintains a hotspot lending program and provides in-library device usage, though demand often exceeds supply. Rockingham Community College extends similar services, offering hotspots and laptops to students through grant funding. However, these programs face sustainability challenges and cannot fully meet the community's growing needs.

Barriers to Equitable Device Access

A recurring theme across counties is that demand for public devices far exceeds supply. Libraries, schools, and community organizations consistently face resource shortages, leading to waiting lists and unmet needs. For example, Alamance Community College's laptop program is quickly oversubscribed, while Davidson County libraries report recurring patrons dependent on their hotspot lending services. Limited budgets and high repair costs further strain the capacity of these programs to scale.

While Chromebooks and basic tablets address many users' needs, they often fall short for more advanced tasks. High school students, professionals, and job seekers frequently encounter compatibility issues with software or applications that require more powerful devices. Public housing residents and other low-income groups, who primarily rely on mobile devices, face additional limitations. Mobile devices are often insufficient for complex activities such as completing job applications, creating resumes, or submitting documents for public benefits.

Rural residents face unique challenges in accessing public devices due to the limited distribution of libraries and community centers. In counties like Caswell and Montgomery, where library systems do not provide loanable devices, residents are left with few options. Additionally, transportation barriers prevent some individuals from traveling to public access points, further exacerbating digital inequities. Many device access initiatives rely on temporary funding, such as grants secured during the pandemic. With the expiration of funding, sustaining public device access has become increasingly difficult. Schools and libraries face ongoing budget constraints, and nonprofits depend on limited donations to refurbish and distribute devices.

Digital Literacy

Digital literacy remains a cornerstone of digital inclusion, empowering individuals to utilize technology for education, employment, healthcare, and civic engagement. Across multiple counties there was a pervasive lack of digital literacy, particularly among older adults, low-income families, formerly incarcerated, and non-English-speaking populations. Some counties noted challenges related to their past industrial or agricultural economies, with many residents historically employed in tobacco and textiles. This legacy has contributed to a digital skills gap in their middle-aged and older populations who never learned to use technology in the jobs.

Participants described challenges in using devices and navigating online applications, with some residents avoiding digital resources due to discomfort or pride. Digital literacy is an essential component of equitable access to technology, yet significant gaps remain in the availability and effectiveness of training programs. While libraries, community colleges, and nonprofits have made commendable strides in addressing these needs, persistent barriers such as transportation, language, economic inequities, and cultural resistance hinder progress.

Educational gaps, particularly among seniors and non-English speakers, limit the ability of many residents to utilize online services for healthcare, employment, and education. For many, the inability to utilize digital tools effectively limits their access to essential services such as telemedicine, job applications, and educational resources. Participants explained that this deficit only became clear to them recently, "COVID exposed the gap between access and actual ability to use the internet effectively." COVID also exposed how prevalent the digital literacy deficit had become when schools moved to online-only formats: "Educators themselves often lack adequate training to teach effectively in digital formats." This underscores the need for targeted digital literacy training and support networks to empower individuals to engage with digital services meaningfully. Yet, as a community member noted, "Digital literacy courses are available, but many are unaware of them or lack transportation to attend."

> "COVID exposed the gap between access and actual ability to use the internet effectively."

Digital literacy is an essential component of equitable access to technology, yet significant gaps remain in the availability and effectiveness of training programs. Robust efforts are underway to address the digital literacy needs of diverse populations. While libraries, community colleges, and nonprofits have made commendable strides in addressing these needs, persistent barriers such as transportation, language, economic inequities, and cultural resistance hinder progress.

Libraries as Digital Literacy Hubs

Public libraries play a pivotal role in providing free and accessible digital literacy training. Libraries are seen as, "trusted spaces where people seek help for everything from job applications to digital literacy." However, these institutions face challenges in meeting the growing demand for digital access and support. The evolving role of libraries highlights the importance of community resources in bridging digital inequities.

Libraries across counties, including Forsyth, Randolph, Alamance, and Rockingham, offer structured classes and one-on-one sessions tailored to the needs of their communities. As one participant noted, "Libraries serve not only as digital hubs but also as community spaces and informal social service providers." Another explained, "Libraries serve as hubs for job search assistance, resume creation, and basic skill training."

> "Libraries serve not only as digital hubs but also as community spaces and informal social service providers."

Training topics range from setting up email accounts to navigating online job applications and identifying cybersecurity threats. For example, library staff in Forsyth County focus on assisting seniors with fundamental skills, such as accessing online services and understanding digital scams, which are particularly critical for navigating health and financial services. As one librarian noted, "Our digital services librarian specializes in sitting down one-on-one sessions, but the problem is, can you get to a class when it's taking place?" Similarly, Alamance County Public Library has shifted its staffing to meet growing demand for individualized technology appointments. According to the library director, "One-on-one appointments are what people want when they want it," underscoring the effectiveness of personalized training over group classes.

Community Colleges Role in Digital Literacy

Community colleges are also central to digital literacy efforts, offering structured courses and drop-in sessions to address foundational and advanced digital skills. "Community colleges are stepping up to provide digital literacy training, especially for job seekers," explained a participant. Forsyth Tech provides multi-language courses, ensuring accessibility for non-English-speaking populations. Alamance Community College attendees explained that, "Our digital navigators at the community college offer open-door time slots...they assist people with everything from printing a document to setting up email."

> "Community colleges are stepping up to provide digital literacy training, especially for job seekers."

In Montgomery, a participant noted, "our Community College has done some work in the past...continuing education classes that they go out to the community and offer these digital literacy classes." In Randolph and Rockingham counties, community colleges partner with nonprofits and local churches to extend their reach, particularly to underserved populations. However, attendance challenges and resource limitations hinder these programs' ability to achieve their full potential.

Nonprofit Organizations

The importance of digital literacy coaches, digital navigators, and digital support networks was emphasized as a means of assisting residents in navigating the digital landscape effectively. Many institutions were noted as providing these resources. One attendee pointed out that, "Churches and local organizations

> "Churches and local organizations provide informal training and support for digital skills."

provide informal training and support for digital skills" while "nonprofits like Goodwill are leading digital literacy workshops in multiple languages to meet diverse needs." Many digital literacy programs were discussed including WinstonNet, programs with the NC Cooperative Extension, various Senior Services programs, cyber security lasses through local sheriff's departments, and the NAACP's Silver Tech program which helps "seniors gain confidence in navigating digital tools." Yet, while nonprofits play a vital role, they may "struggle with sustainability due to grant dependencies."

Nonprofit organizations further enhance digital literacy initiatives through innovative partnerships. In Forsyth County, WinstonNet collaborates with Forsyth Tech, Habitat for Humanity, and Goodwill to deliver hands-on training in computer skills, device navigation, and internet use. In Rockingham and Alamance, the Right Here Right Now Project focuses on empowering residents by providing them with devices and training. In Caswell, the Co-operative Extension representative noted, "I've been doing classes with the senior centers and going to people's houses to help with tech." Similarly, the community organization Valores in Burlington pairs high school students with adults in intergenerational learning programs, enabling younger generations to teach digital skills while bridging gaps be-tween age groups. As one participant noted, "Our high schoolers teach adults computer skills... bridging the digital divide between generations."

Barriers to Participation

Although digital literacy initiatives are widely available, many residents face barriers to participation. Transportation challenges and a lack of convenient class schedules pre-vent some community members from attending training sessions. In Rockingham County, for example, limited instructional resources and logistical issues hinder efforts to reach intended participants, particularly those in rural areas. Furthermore, attendees observed that some county employees themselves lack basic computer skills, reflecting the broad-er need for digital literacy training across all demographics.

Likewise, language barriers remain a significant obstacle for non-English-speaking com-munities, particularly in counties with large Hispanic populations like Surry, Randolph, and Alamance. These challenges affect adults and children, limiting access to essential ser-vices such as online banking and educational platforms. Additionally, many families rely solely on mobile devices for internet access, which complicates tasks such as filling out forms or accessing detailed information. One participant noted, "A lot of our families have access only to mobile devices, and accessing important information and filling out forms on mobile is a major challenge."

Economic barriers also exacerbate inequities in digital literacy. Low-income families, es-pecially those without reliable internet or devices, struggle to access training opportuni-ties. Libraries and community colleges, while providing critical services, are often underfunded and unable to meet the growing demand for individualized support.

"There's still a big equity chal-lenge. There are people who have a connection but don't know how to use it effectively."

Attendees also highlighted the role of pride and dis-comfort in deterring some individuals from seeking digital literacy training. Seniors, in particular, may feel embarrassed about their lack of digital skills or

mistrust technology due to concerns about privacy and security. As one participant observed, "There's still a big equity challenge…there are people who have a connection but don't know how to use it effectively." These cultural and psychological barriers underscore the need for more approachable and empathetic training methods.

Higher Education and Regional Digital Inclusion

Institutions of higher education in Guilford and Forsyth Counties play a pivotal role in fostering community trust and driving regional initiatives, particularly in the realm of digital inclusion. Participants highlighted the presence of esteemed universities such as North Carolina A&T State University, the University of North Carolina at Greensboro (UNCG), Winston-Salem State University, Wake Forest University, and High Point University. These institutions are viewed as reliable partners in addressing community challenges, particularly those related to education and technological equity. One participant remarked, "From an advantage standpoint, we have some great educational institutions in this immediate area that people do trust… A&T, UNCG, even Winston Salem State, Wake Forest, High Point University."

Central to discussions on regional digital access is the Piedmont Triad Technology & Data Institute (TDI), a public service entity linking k-12 public education, local governments, and higher education and dedicated to fostering a smart, connected region. TDI aims to enhance the Piedmont Triad's infrastructure, competitiveness, and resilience through the strategic use of shared technology and data. While its mission encompasses broad goals, its specific initiatives in digital inclusion have garnered attention for their potential to bridge disparities in access and education.

One of TDI's most impactful collaborations has been with the Eduroam network, a secure global Wi-Fi initiative designed for academic and research institutions. In partnership with TDI, Guilford County Schools extended Eduroam access, allowing students to connect to Wi-Fi within walking or driving distance of public facilities. A similar effort in Greensboro utilized public buildings to further expand Eduroam coverage. These initiatives were recognized as critical in providing students, particularly those from under-resourced communities, with the connectivity necessary for academic success.

Despite its ambitious goals, TDI faces challenges in maintaining the momentum and effectiveness of its digital inclusion efforts. Participants noted the need to hire a dedicated director and build a foundational team to ensure continuity and growth. Currently, TDI's broad portfolio of initiatives dilutes its focus on digital inclusion, raising concerns about its ability to address deeply rooted issues such as digital literacy and long-term broadband access.

Broader Implications

The digital divide presents a profound challenge, cutting across various aspects of modern life, from education and healthcare to workforce development and economic mobility. Internet access and digital literacy have become foundational requirements for participating in the modern economy and society, yet systemic barriers leave many communi-

ties, particularly in rural and low-income areas, at a significant disadvantage. Discussions among stakeholders highlighted the cascading effects of digital exclusion, emphasizing how inadequate

broadband infrastructure, limited device access, and insufficient digital literacy exacerbate existing inequities. By framing digital access as a fundamental human right, the discussions underscore the urgency of achieving digital equity as a pathway to economic and social justice.

Educational Impacts of Digital Exclusion

The discussions highlighted the critical role of internet access in education, emphasizing its importance for students' academic success. The gap in digital access is especially problematic for students, who struggle to complete assignments or access online resources when connectivity is poor or nonexistent. A participant explained, "schools with limited resources can't provide equal opportunities in digital education, creating disparities." Inadequate digital infrastructure and unreliable connectivity were described as significant barriers to completing homework, accessing online resources, and participating in remote learning. Moreover, "parents struggle to help children with digital homework due to their own skill gaps." Similarly, one person remarked, "grandparents raising children face challenges in supporting their digital education due to their own limitations." A Superintendent explained that students without reliable internet "are at risk of falling behind." The ongoing shift toward digital education necessitates robust broadband infrastructure and equitable access to devices to ensure that students in rural and low-income areas are not left behind.

> "Schools with limited resources can't provide equal opportunities in digital education, creating disparities."

Lack of Digital Healthcare Opportunity

Digital literacy and broadband access were also identified as essential components for accessing healthcare. Participants noted that broadband is now a "whole-home requirement" for essential activities such as telemedicine, remote education, and job-seeking. The lack of robust infrastructure, particularly in rural households, leaves residents at a disadvantage in accessing these critical services, perpetuating economic and social inequities. Seniors, in particular, face barriers to utilizing telemedicine services, which require both digital skills and reliable internet connectivity. Highlighting a critical barrier, a participant stated, "Virtual healthcare access is limited by the digital divide, especially in rural areas." Again, this became especially acute during the pandemic, "Telehealth adoption during COVID showed the importance of reliable digital access for healthcare."

> "Virtual healthcare access is limited by the digital divide, especially in rural areas."

Impact on Workforce and Economic Development

The lack of comprehensive broadband access has far-reaching economic implications, particularly in rural and low-income urban areas. Participants highlighted that limited digital infrastructure and lack of digital literacy undermines the region's ability to attract businesses and support economic growth. With few high-tech job prospects, young people often leave for urban centers, reducing the potential for digital skill retention within the community. In discussing the issue, a respondent noted, "Economic growth depends on digital infrastructure that supports telecommuting and e-commerce." A participant expanded upon the challenge by saying, "The lack of digital literacy is limiting the types of manufacturers and industries that are coming and impacting economic opportunities for the broader community."

> "The lack of digital literacy is limiting the types of manufacturers and industries that are coming and impacting economic opportunities for the broader community."

In Caswell County, for instance, inadequate broadband was cited as a deterrent for potential investors. One attendee remarked, "Our infrastructure is so weak… it's hard to attract people like that." Similar concerns were raised in Alamance and Davidson counties, where the absence of reliable high-speed internet limits opportunities for remote work, entrepreneurship, and digital-based industries. An urban planner in Randolph County explained that "Access to broadband is as critical as traditional utilities for economic development. "Investors expect turnkey-ready sites with robust infrastructure, and limited internet accessibility hampers the region's economic potential. Furthermore, the discussions underscored the psychological and logistical stress associated with internet outages, which disrupt both personal and professional activities.

Lack of access and/or digital literacy may also hamper economic mobility and opportunities, "There's a lot of people that don't have email addresses or know how to apply for jobs online, which limits their ability to access the job market." As one participant noted, "When the Great Recession hit… the county's largest employers and service employers like Walmart, went to online applications only. And people who didn't have the concept of the username and password." Another respondent emphasized, "employers expect applicants to navigate complex online portals, which discourages many." While digital skills are essential for job applications and virtual interviews, many lack training. There are attempts to prepare prison reentry populations as well as those who have worked for decades in factory or labor occupations for the digital workplace stating. One focus group participant explained, "workforce reentry programs are integrating digital literacy to prepare participants for modern jobs."

Systemic and Structural Challenges

The discussions consistently demonstrated the need for cross-sector collaboration to address these challenges. Participants called for partnerships between community organizations, local governments, and private providers to promote digital equity. They noted that, "coordination between public and private entities is insufficient to address systemic barriers," implying that policy change and significant funding were needed for real changes to the disparities.

Recognizing internet access as a fundamental human right was identified as a critical step toward achieving economic and social equity. Legal reforms to allow greater municipal involvement in broadband provision were also highlighted as necessary to overcome systemic constraints. More than one participant noted the need for enabling laws as "statutory restrictions hinder creative approaches to infrastructure development."

The discussions also highlighted funding challenges, including the reliance on inconsistent grant funding to support digital inclusion initiatives. A participant illustrated the challenge by saying, "grant funding cycles create distrust and limit long-term digital equity solutions." This funding instability limits long-term planning, and the sustainability of programs designed to close the digital divide. Participants further emphasized the need for better communication and community awareness about existing programs and initiatives, noting that many residents remain unaware of available resources.

> "Grant funding cycles create distrust and limit long-term equity solutions."

Recommendations and Priorities for Enhancing Digital Inclusion

The insights gathered from stakeholders highlight the urgent need for comprehensive and multi-faceted strategies to address digital inclusion challenges. Attendees emphasized the importance of expanding broadband infrastructure, fostering cross-sector collaboration, improving digital literacy, and creating sustainable funding mechanisms to support long-term solutions. These recommendations aim to bridge the persistent digital divide, particularly in rural and underserved areas, while addressing the specific needs of vulnerable populations, such as seniors, low-income families, and non-English speakers.

Expanding Infrastructure and Access

A recurring theme among attendees was the critical need to expand broadband infrastructure, especially in rural areas where connectivity remains inadequate. Repeatedly participants emphasized that "broadband expansion must include rural areas, where cell towers are limited and internet speeds are insufficient for daily needs." Attendees advocated for incentivizing internet service providers (ISPs) to extend high-speed internet to underserved regions and suggested exploring alternative solutions, such as cooperative models or municipal networks, to enhance accessibility and affordability. Stakeholders also highlighted the importance of redundancy and reliability in network infrastructure to mitigate disruptions that currently hinder access to essential services.

Public Wi-Fi access was another priority, with recommendations to increase the number of hotspots in libraries, schools, community centers, and other high-traffic locations. Initiatives such as "park and learn" zones and mobile Wi-Fi units were proposed to address connectivity challenges in geographically isolated areas. Participant explained, "We need mobile hotspots and outreach vehicles equipped with internet access to reach disconnected communities." Attendees also emphasized the need for expanded device loan programs through libraries and community centers to ensure equitable access to digital

tools.

Enhancing Digital Literacy

Digital literacy training emerged as a cornerstone of the recommendations, with a focus on tailored programs to meet the needs of diverse populations. Attendees suggested developing targeted workshops for seniors, non-English speakers, and justice-involved individuals, incorporating foundational skills such as basic computer use, cybersecurity awareness, and navigating online platforms: "Providing workshops on basic computing skills and online safety is essential for building confidence and trust." Programs offering devices upon course completion were highlighted as effective incentives to boost participation and digital competency. In addition, intergenerational models of instruction were promoted: "Digital literacy training is crucial for bridging generational gaps; high schoolers teaching older adults is a promising model."

> "Providing workshops on basic computing skills and online safety is essential for building confidence and trust."

Intergenerational learning models, where tech-savvy youth assist older adults with digital skills, were identified as valuable approaches to fostering community cohesion and knowledge sharing. Attendees also recommended establishing a "digital navigator" program to provide one-on-one assistance to residents, addressing specific barriers to digital engagement in a personalized and accessible manner. A library explained, "one-on-one appointments for technology training are in high demand and more effective than group sessions for many users."

Addressing Affordability and Funding Sustainability

Ensuring affordability for internet services and devices was a central concern. Attendees advocated for expanding subsidy programs, such as the Affordable Connectivity Program (ACP), to offset costs for low-income households. "Affordable internet service plans must be prioritized, especially for low-income families." Additionally, they called for sustainable funding models to support device distribution, hotspot lending, and digital literacy initiatives. Reliance on inconsistent grant funding was identified as a major limitation, prompting recommendations for long-term investments from public, private, and philanthropic sources. An attended elaborated, "programs should focus on long-term sustainability rather than short-term grants to ensure continued impact."

Stakeholders emphasized the need for stronger partnerships between government agencies, nonprofits, ISPs, and local businesses to pool resources and address funding gaps. These collaborations could facilitate the refurbishment and distribution of affordable devices, establish low-cost broadband programs, and support the expansion of public Wi-Fi networks. An attendee noted, "partnerships with ISPs to offer discounted rates and device refurbishing programs can mitigate cost barriers."

Improving Community Engagement and Outreach

Effective communication and outreach were deemed essential for maximizing the impact of digital inclusion programs. Attendees stressed the importance of raising awareness about existing resources, such as library services, digital literacy classes, and subsidy programs. Strategies included targeted advertising, multilingual outreach, and partnerships with trusted community institutions, such as churches and YMCAs, to reach diverse populations. "Partnering with trusted local organizations increases awareness and participation in digital inclusion initiatives." Participants also highlighted the value of community engagement in the planning and implementation of digital inclusion initiatives, ensuring that solutions align with local needs and priorities. Mobile programming was also key as a participant explained, "Outreach programs need to focus on meeting people where they are, including mobile solutions for remote communities."

Strengthening Collaboration and Coordination

Recognizing the complexity of digital inclusion challenges, attendees advocated for enhanced cross-sector collaboration and the establishment of a centralized entity to coordinate efforts. For example, a participant explained, "regional coordination is necessary to close gaps in digital equity comprehensively." This "digital equity champion" or dedicated team would oversee resource allocation, facilitate partnerships, and ensure accountability across initiatives. Stakeholders also called for greater alignment between public and private sectors to address systemic barriers, such as statutory restrictions on municipal broadband and limited ISP competition.

Prioritizing Equity and Sustainability

A central theme in the discussions was the need to embed equity and sustainability into all digital inclusion efforts. Attendees recommended focusing on vulnerable populations, such as seniors, immigrants, and the unhoused, with tailored programs that address their unique barriers to access. They said, "Equity must be at the forefront, addressing systemic barriers that disproportionately affect marginalized groups." Often overlooked were the needs of individuals with a disability, "Digital inclusion initiatives must consider accessibility for people with disabilities and tailor solutions accordingly." Sustainable solutions that empower residents to independently afford digital services were also prioritized, alongside advocacy for recognizing broadband as a utility essential to modern life.

> "Equity must be at the forefront, addressing systemic barriers that disproportionately affect marginalized groups."

The recommendations underscore the critical need for holistic, community-driven approaches to digital inclusion. By expanding infrastructure, enhancing digital literacy, addressing affordability, and fostering collaboration, stakeholders aim to create a digitally inclusive society that supports education, healthcare, and economic development for all. These efforts require sustained commitment and investment to ensure that the benefits of digital connectivity are equitably shared across all communities, particularly those most at risk of being left behind.

PIEDMONT TRIAD REGION PROFILE

PIEDMONT TRIAD
REGIONAL COUNCIL

UNC
GREENSBORO
Center *for* Housing
& Community Studies

PIEDMONT TRIAD REGION
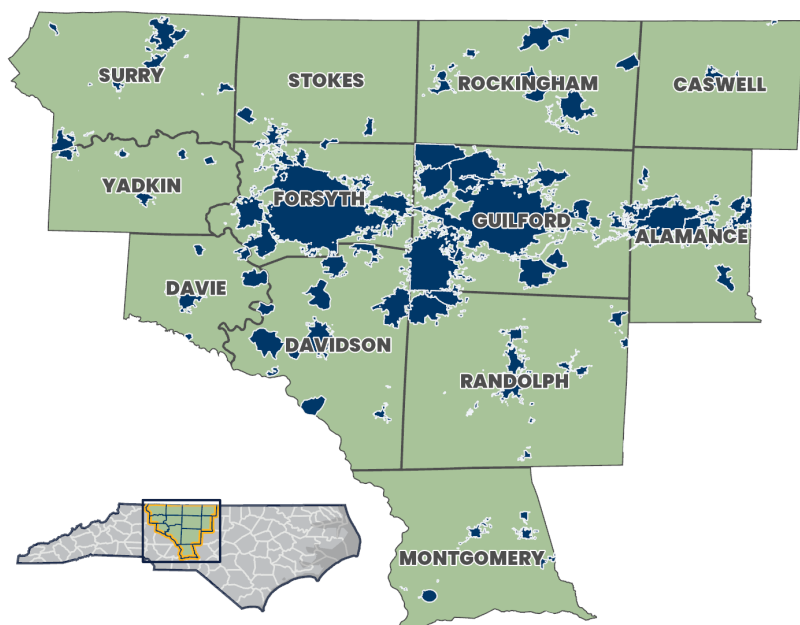
The Piedmont Triad Regional Council area covers twelve counties in the midwestern region of North Carolina, with a total population of over 1.7 million people. The largest cities are Greensboro and Winston-Salem in Guilford and Forsyth counties, respectively.

The PTRC includes a broad range of rural and urban areas, wealth and poverty, and a diverse population. This combination of factors creates a range of obstacles to decreasing the digital divide in the region. Building infrastructure in sparsely-populated areas can be costly, and internet subscription fees can be out of reach for families struggling in the middle of the cities. There is no single solution to addressing the problems of digital inequity in the PTRC.

DEMOGRAPHICS	PTRC	NORTH CAROLINA
Population	1,745,206	10,470,214
White	1,081,094 (61.9%)	6,455,988 (61.7%)
Black	371,529 (21.3%)	2,161,841 (20.6%)
Hispanic	181,589 (10.4%)	1,051,008 (10.0%)
Other	110,994 (6.4%)	801,377 (7.7%)
Median Age	–	39.1
% Under 18	*21.8%*	*21.8%*
% 65 and Over	*17.4%*	*16.7%*
Median Income	–	$66,186
% Household Poverty	14.5%	13.1%
% College Degree	28.7%	33.9%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

The graph to the right shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The PTRC has higher rates of availability at all speeds when compared to the rest of the state and is particularly exceeding the state in the availability of fiber services. Almost 60% of the population of the PTRC has access to high-speed fiber.
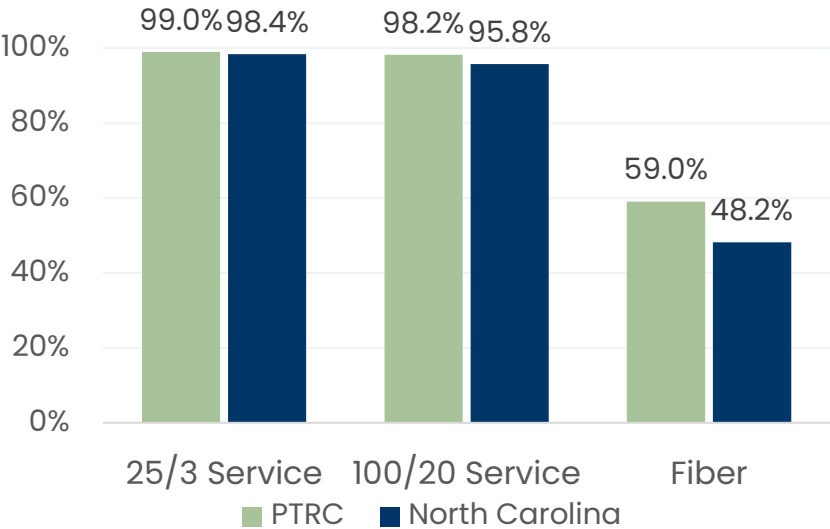
NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

PTRC Findings. Approximately 9,038 or 2.1% of PTRC households have responded to the survey. Some of the responses vary from the official data. For example, 55% of respondents reported download and upload speeds or less than 25/3 Mbps, and 42% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results
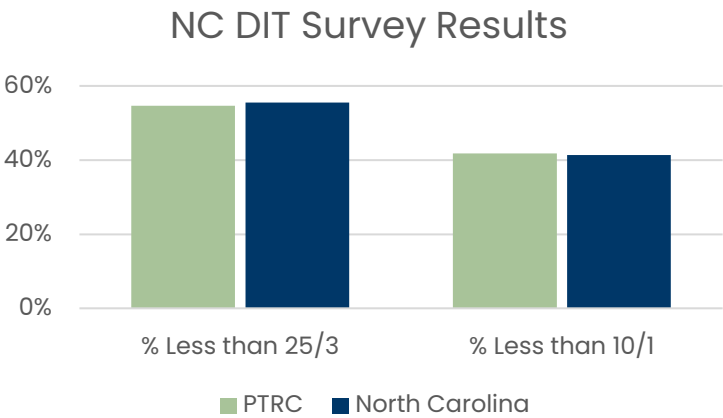
SURVEY RESPONSE	PTRC	NORTH CAROLINA
Extremely or somewhat satisfied with service	29%	31%
Extremely or somewhat dissatisfied with service	44%	45%
Monthly cost over $125	20%	19%
Median download speed	22 Mbps	22 Mbps
Median upload speed	5 Mbps	5 Mbps

AVAILABILITY – A CLOSER LOOK

High Speed Service: The map on this page show in greater detail the geography of broadband service in Alamance County, including areas that have fiber, cable, or copper services available to them. While fiber services (shown in green on the map) are widespread through the PTRC, there are still many areas where cable service (shown in blue) is the fastest option available for residents.

There is also a great deal of variability between counties. Montgomery County stands out as having the least number of options available, while Caswell, Rockingham, and Stokes also have large gaps in fiber availability. Forsyth and Guilford, with the most built, urban environments, have high amounts of coverage throughout their counties, but smaller counties such as Davie do as well.
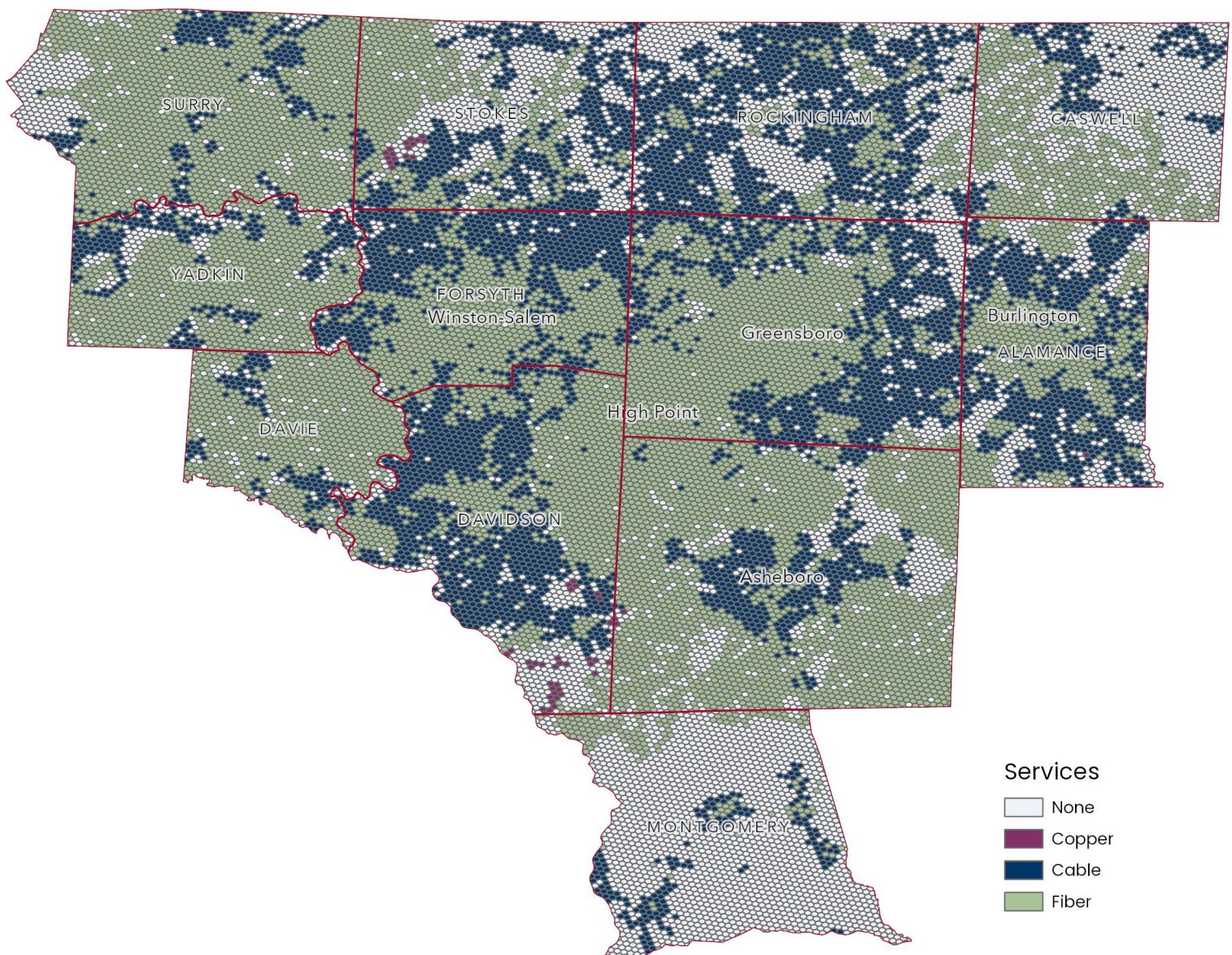
AVAILABILITY – A CLOSER LOOK

Locations with No High-Speed Service: The map below shows the number of locations (home or business) that have no high-speed coverage. Approximately 93% of all locations in PTRC have high-speed service options available to them. Some counties have a greater number of unserved locations. Counties such as Davie or Yadkin have locations throughout their areas that lack service, while in much of Forsyth County, every location has service available.

Locations
- 0
- 1 – 10
- 11 – 22
- 23 – 51
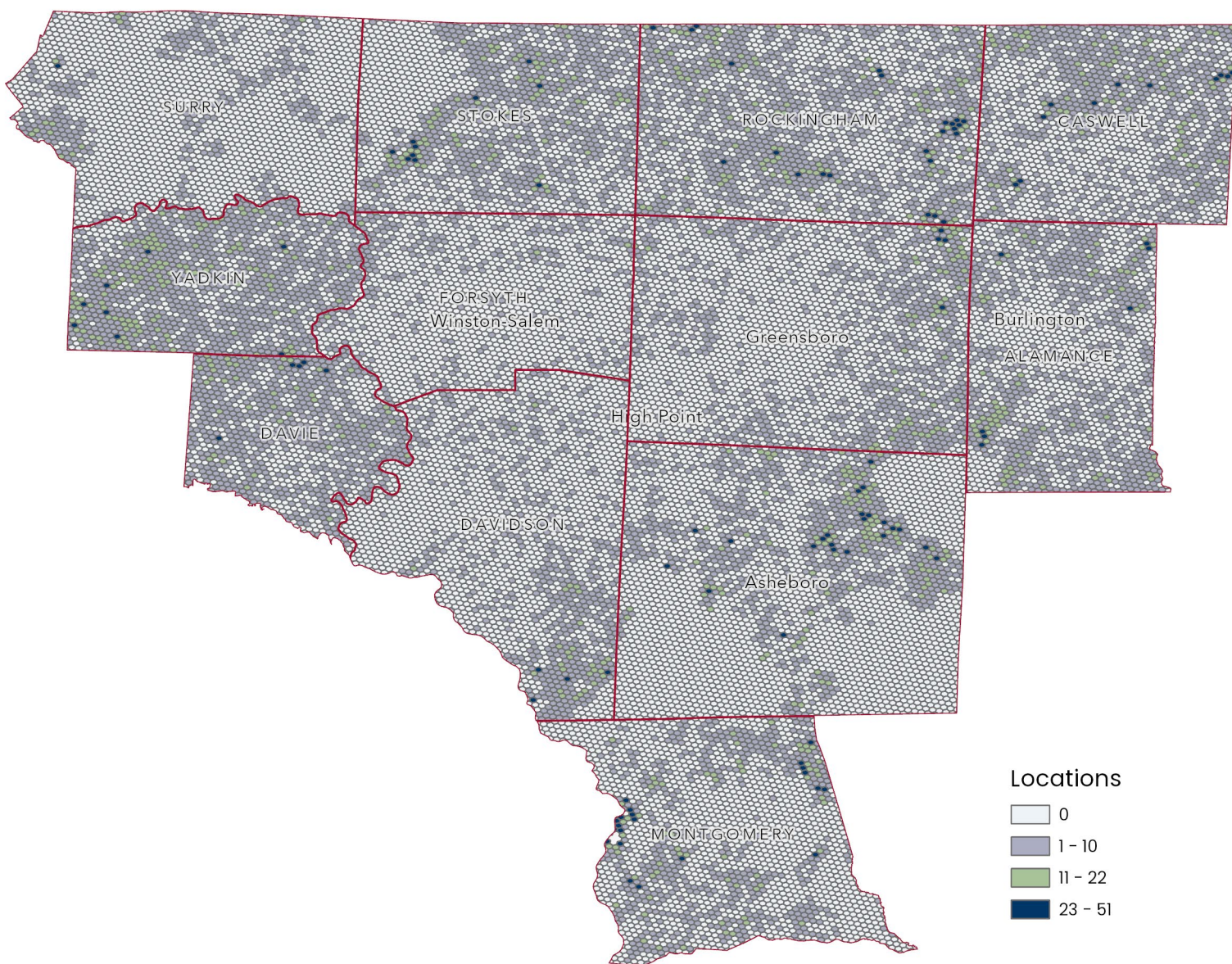
AVAILABILITY – A CLOSER LOOK

Mobile Broadband Service. Mobile broadband is frequently used when people do not have access to fiber or cable services. These services can provide high-speed access under optimal conditions, but are affected by cell towers, topography, and peer usage. However, 5G service (shown in green on the map below) is available across much of the PTRC. 4G service fills in much of the gaps, with mobile voice coverage being the only option in a few pockets on the edges of the PTRC.
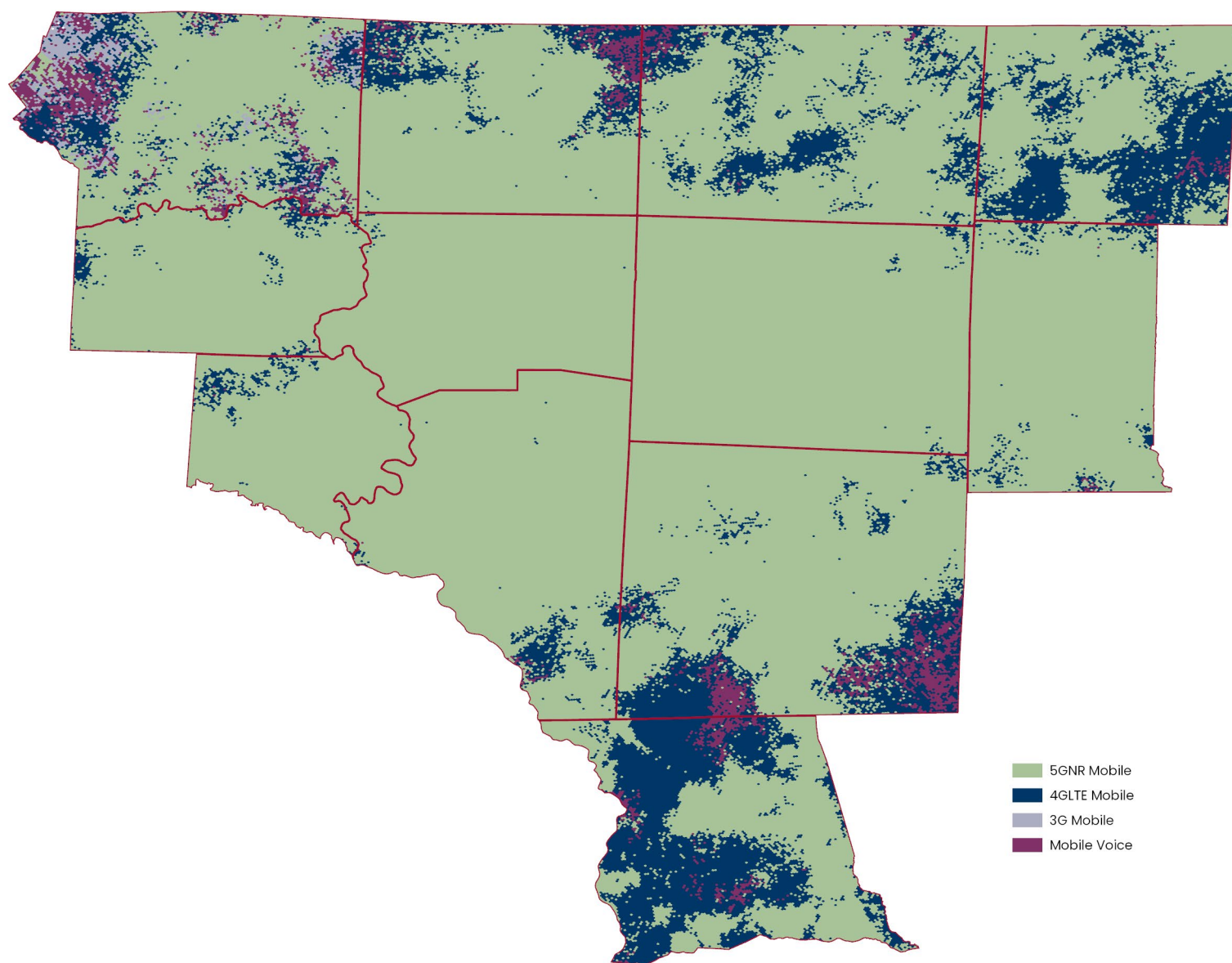
Legend:
- 5GNR Mobile
- 4GLTE Mobile
- 3G Mobile
- Mobile Voice

BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.

Adoption by Service Type

Legend: ■ PTRC   ■ North Carolina

Service Type	PTRC	North Carolina
Fixed Broadband	85.2%	87.0%
Cellular Only	10.4%	10.2%
Satallite Only	0.4%	0.5%
Dialup Only	0.1%	0.1%
No Broadband Subscription	2.8%	2.4%
No Internet	11.8%	10.4%
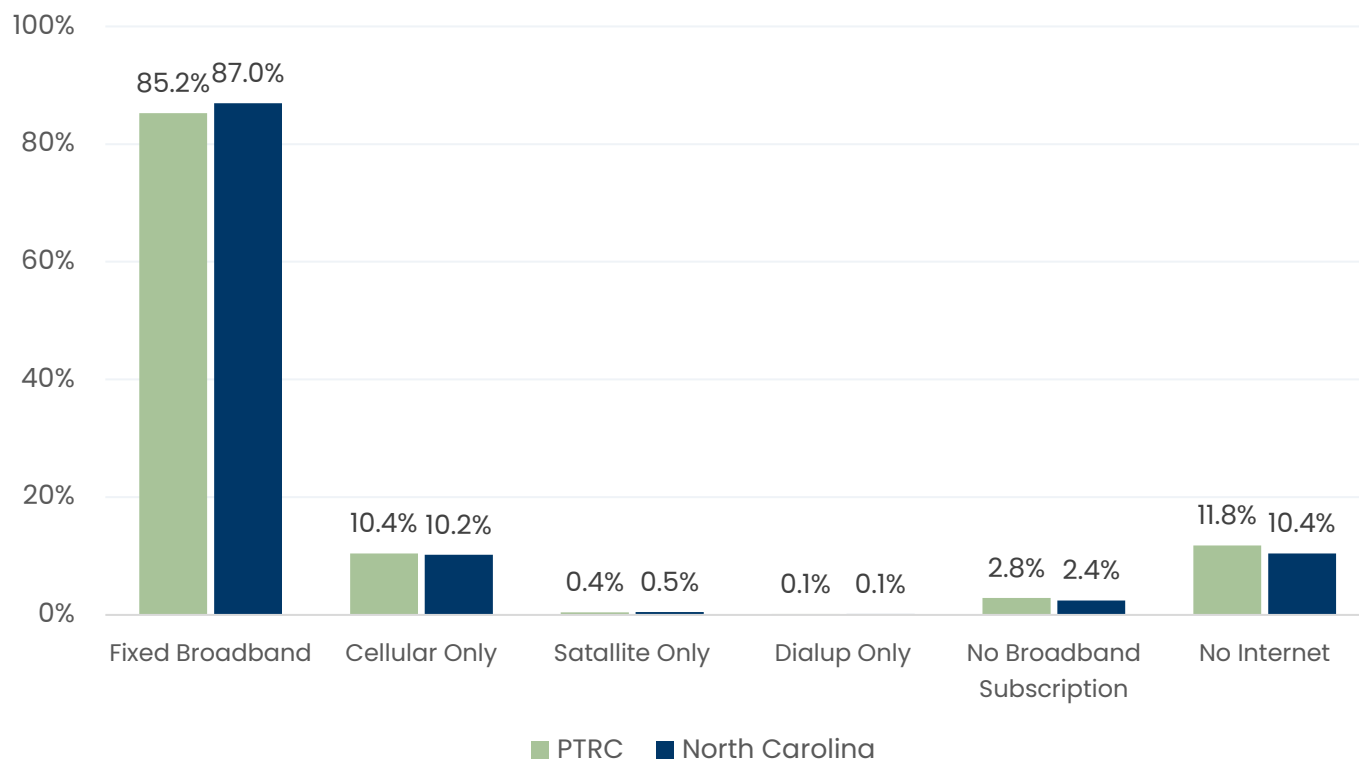
The chart above shows adoption by service type. As expected, fixed broadband is by far the most common. The PTRC region lags behind North Carolina as a whole slightly in the fixed broadband category at 85% compared to 87%. Over 10% still use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all. Almost 12% of households in the PTRC have no internet compared to just over 10% for North Carolina.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.
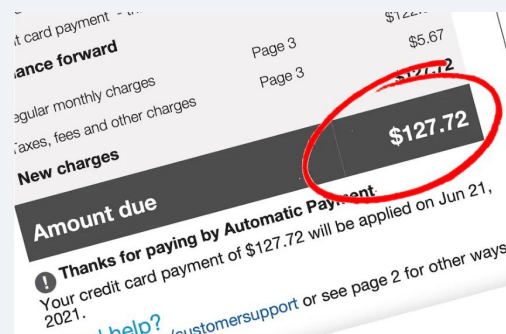
BROADBAND ADOPTION

Geography of Adoption. The map of the PTRC below shows Census block groups where households with no internet service are concentrated. The majority of block groups contain high to medium levels of adoption, with only a few block groups having very low adoption. However, block groups with 35-75% of households not having internet exist in ten of the twelve PTRC counties. These low rates of adoption often occur within the most built environments in the PTRC – Greensboro, Winston-Salem, and High Point.

% No Internet

- 0% – 8.7%
- 8.8% – 19.7%
- 19.8% – 35.3%
- 35.4% – 75.4%
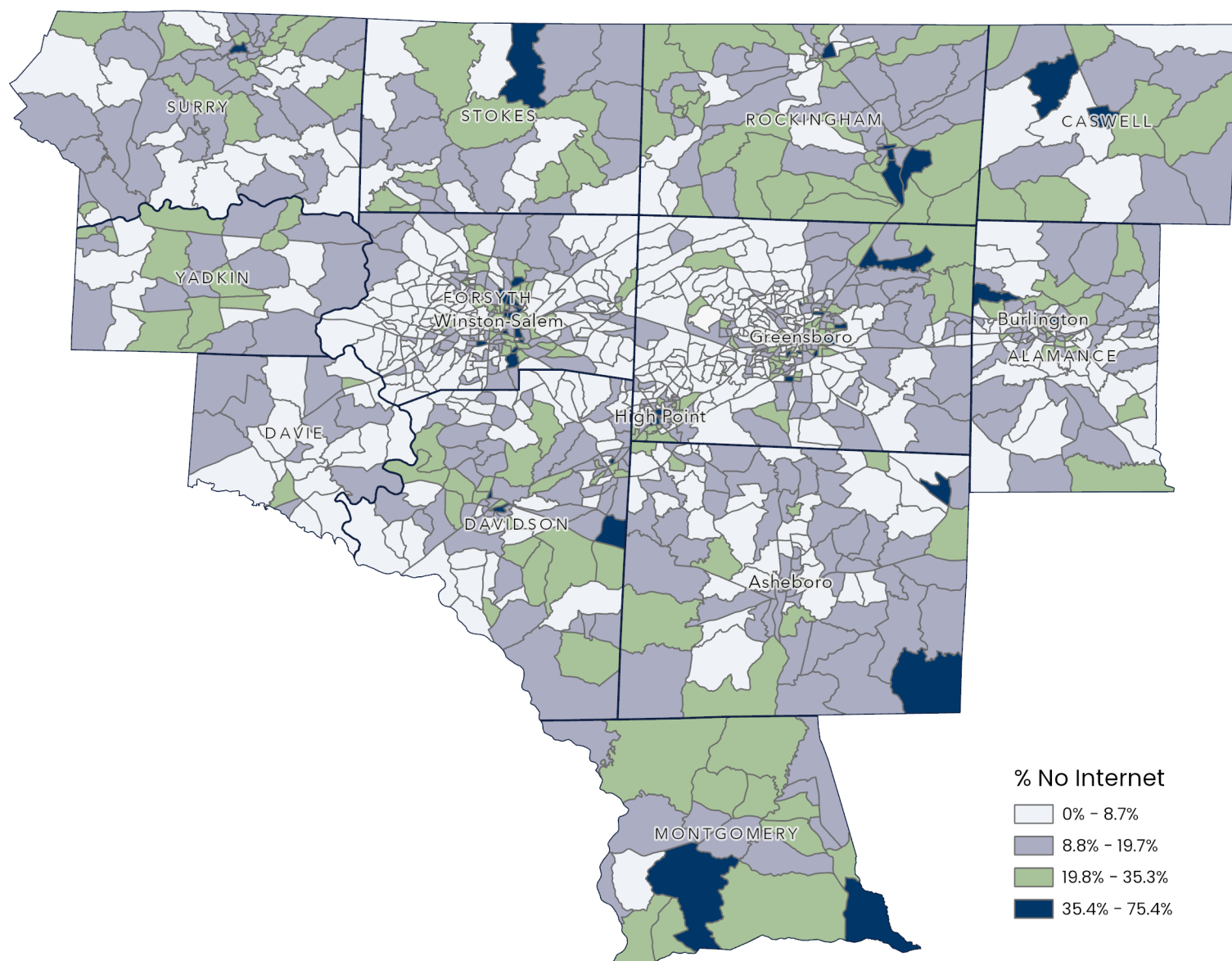
BROADBAND ADOPTION

Geography of Adoption. The previous map showed the percentage of households that did not have internet in the home. The map on this page shows a representation of every household in the PTRC that does not have internet. Concentrations of households with no internet cluster in the urban areas (shown highlighted in red) with high population density. These households are typically in areas that have access to at least one internet service provider but may be impacted by high costs and lack of digital literacy.
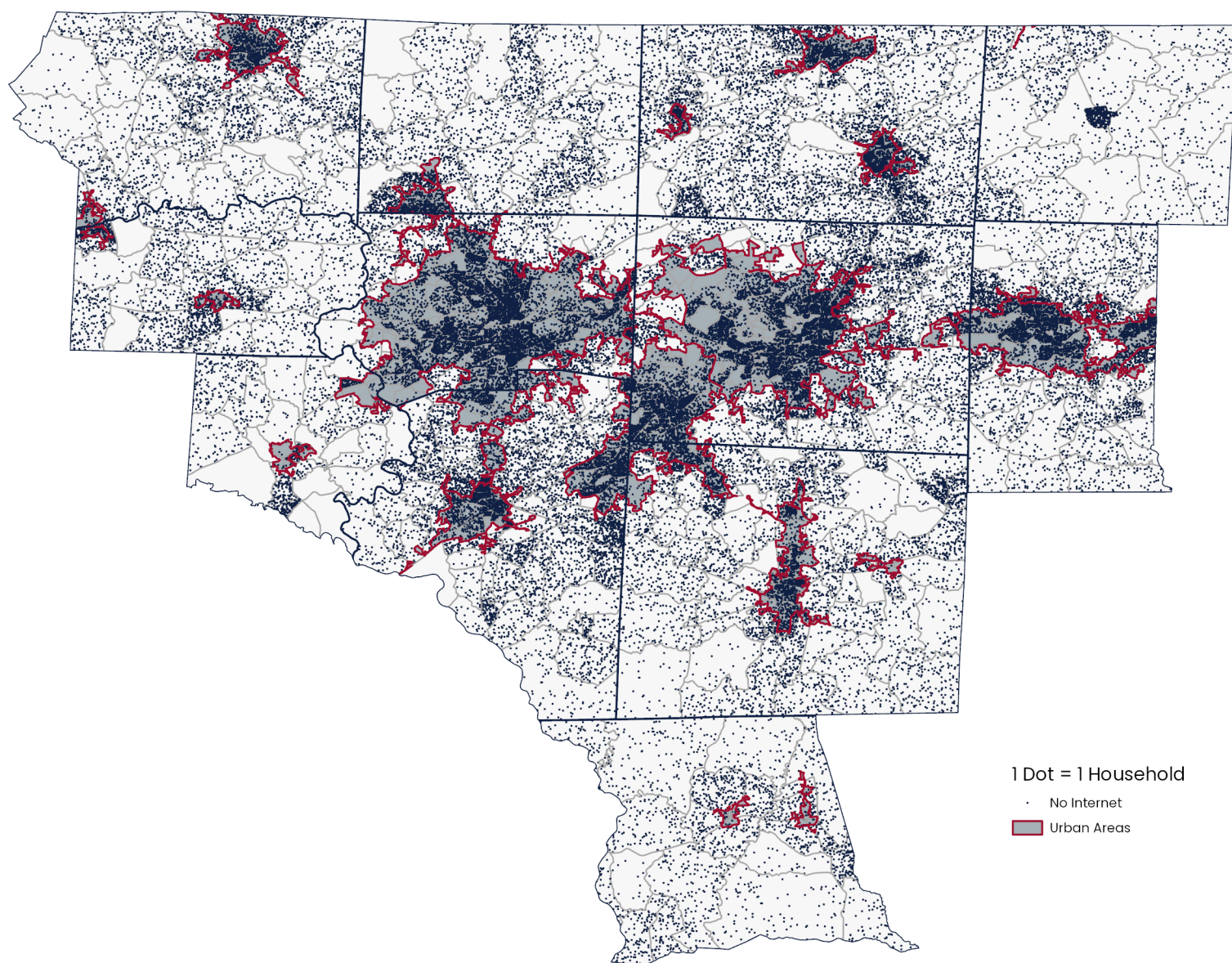
1 Dot = 1 Household
· No Internet
Urban Areas

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities are most often available at libraries, community colleges, or senior centers in neighborhoods throughout the PTRC.

Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad
High	29.7	28.9	26.6
Moderate	41.6	42.7	43.6
Low	28.7	28.4	29.7

■ Low ■ Moderate ■ High
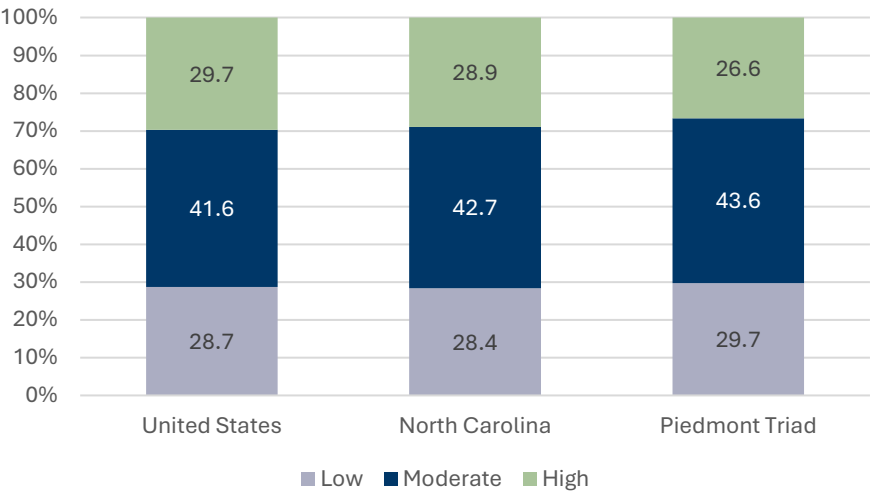
We can measure digital literacy in a variety of different ways. The graph to the left shows the PTRC has a larger share of occupations requiring high digital literacy. The one below presents PTRC residents' responses to the NC Broadband Equity Survey, indicating they have comparable levels of digital literacy to the state, but are less confident with protecting data.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Apply for government services
- Protect the privacy of your data
- Search or apply for jobs
- Know how to keep yourself safe online
- Use Zoom or FaceTime
- Find educational content
- Do word processing
- Install apps on a device
- Access online banking
- Send an email
- Turn on a digital device

■ NORTH CAROLINA ■ PTRC
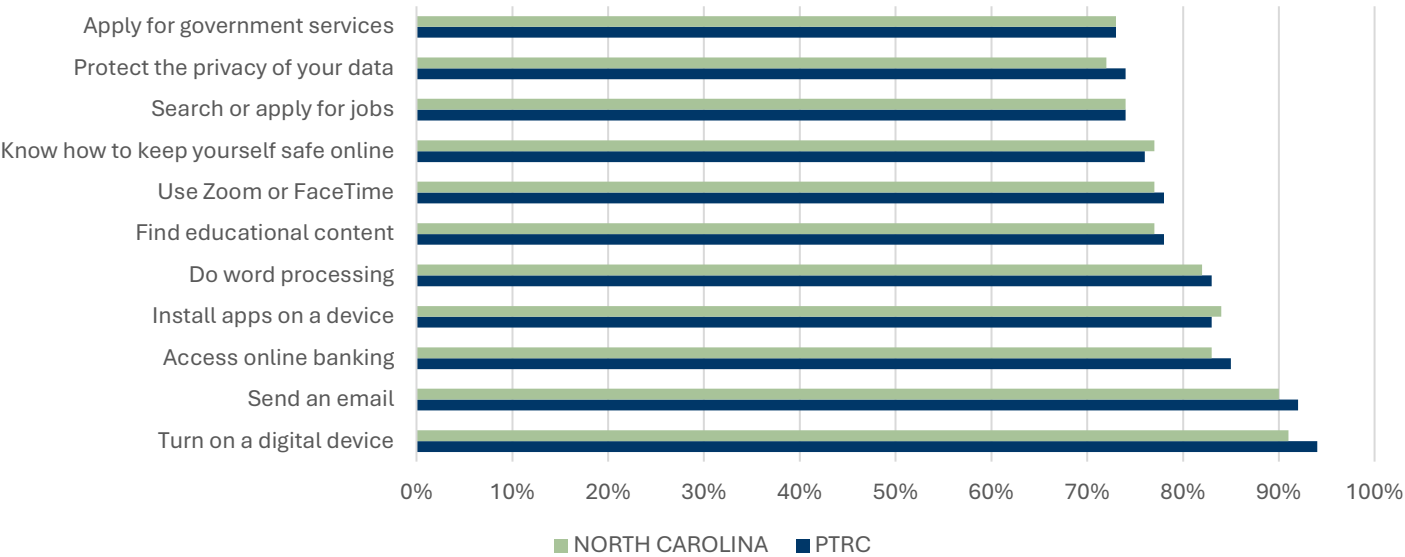
DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph in the lower left, in the PTRC, almost 8% of households lack any kind of computer (54,298 households), and an additional 10.6% have only a smart phone to connect to the internet (73,665 households).

Geography of Device Access. Device access is not evenly distributed geographically. The map below shows households with no computer by census block group. Similar to internet adoption, many of the block groups with the highest levels of no computers are in the densely populated urban areas.

Device Access

Chart data — No Computer: PTRC 7.8%, North Carolina 6.9%; Smartphone Only: PTRC 10.6%, North Carolina 9.8%; Tablet Only: PTRC 0.9%, North Carolina 0.8%.

Legend — % No Computer:
- 0% – 4.2%
- 4.3% – 11.1%
- 11.2% – 24.6%
- 24.7% – 60.1%
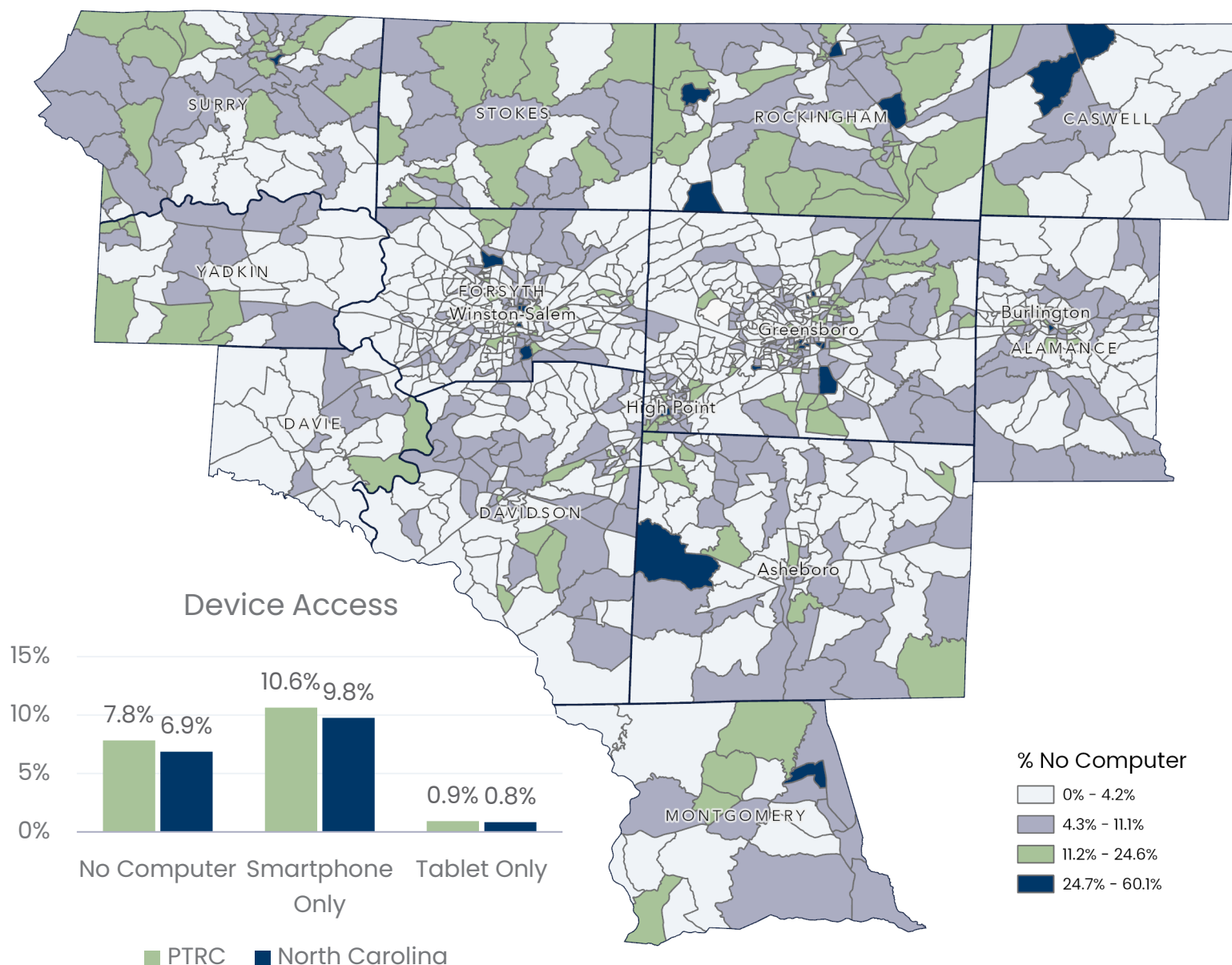
DEVICE ACCESS

Geography of Device Access. The map below shows a representation of the total number of households in the PTRC that do not have a computer in the home. Similarly to the distribution of households with no internet, there are clusters of homes with no computer in the urban areas of the PTRC. Again, factors such as cost, perceived need, and digital literacy play a key role in access to internet-capable devices.
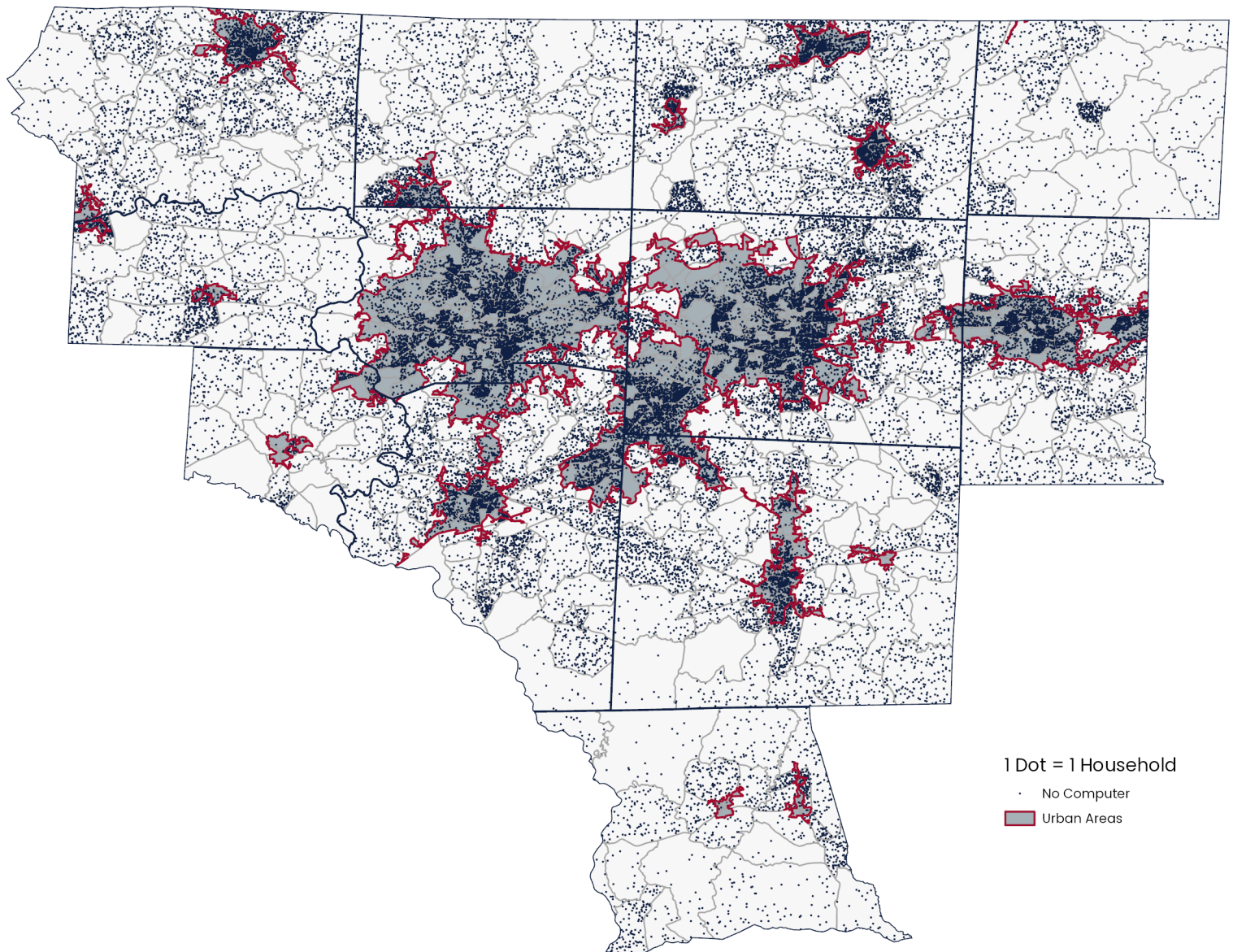
1 Dot = 1 Household
· No Computer
▨ Urban Areas

DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Over 6% of Alamance County's Black population live in a household with no computer. In Alamance, seniors also suffer a similar disparity of device access to the rest of the PTRC, with around 15% in households with no computer in Alamance County.

No Computer by Race/Ethnicity

	White	Black	Hispanic	Other
PTRC	4.9%	6.4%	3.8%	2.9%
North Carolina	3.9%	6.1%	3.3%	1.9%

■ PTRC ■ North Carolina

No Computer by Age

	Population	Under 18	18 to 64	65 and Up
PTRC	4.9%	2.1%	3.0%	14.7%
North Carolina	4.1%	1.5%	2.5%	13.6%

■ PTRC ■ North Carolina
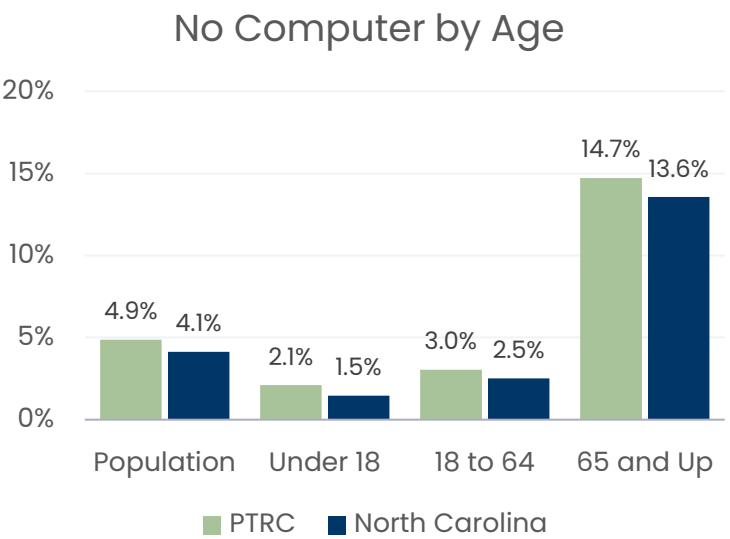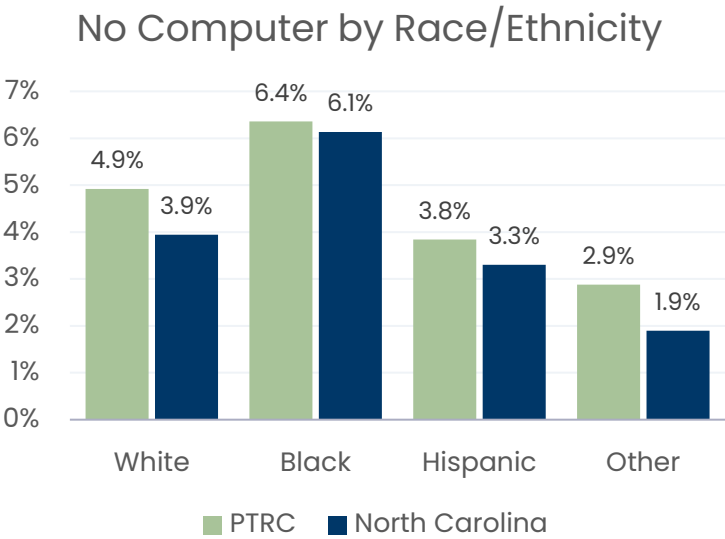
Children's Access. As the graph above right shows, persons under 18 are most likely of all age groups to have access to a computer. We attribute this to widespread one-to-one policies of making sure all students in an educational setting have a computer or other electronic device for learning. These programs exist throughout the counties of the PTRC, but are at risk of continuing due to a lack of funding.

Public Device Access. For those having no computer, access to public use computers is vital. Public libraries provide both computers and wireless hotspots for people in the community to check out. However, these resources are limited and there are often long wait times to access these devices.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices.

PTRC County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. In the following county sections, we will highlight programs and policies that are in place currently or in the process of starting. In speaking with community members working in this area, we heard of the necessity for sharing information between organizations so that work is not duplicated. Collaboration will be essential in closing the digital divide.
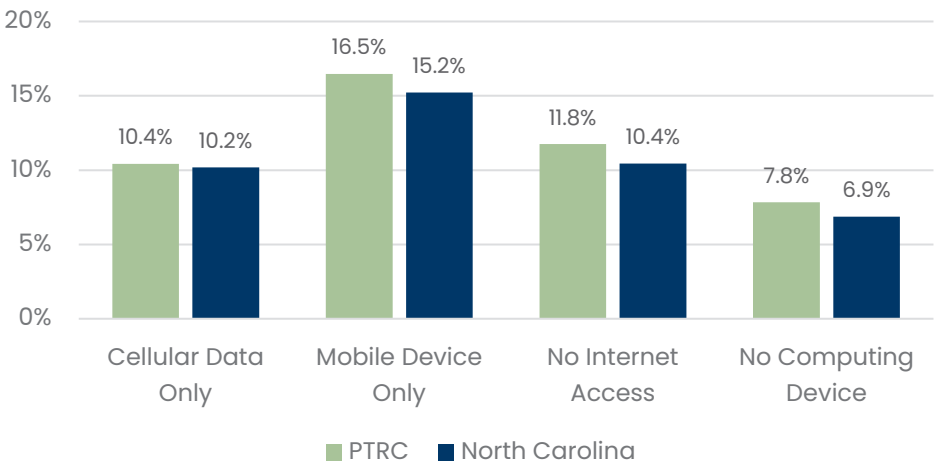
Households by Digital Distress

Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Alamance County experiences a slightly higher rate of households relying on mobile devices only compared to the PTRC or the state as a whole.

No Internet Access by Household Income

Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Alamance County as elsewhere, that's true, with Alamance having a slightly higher than expected rate in the $20k to $34.9k income group.

SUMMARY & CONCLUSIONS

The Piedmont Triad Regional Council Digital Inclusion Plan represents an initiative to address digital inequities across a 12-county region of North Carolina. Developed collaboratively by the Piedmont Triad Regional Council (PTRC) and the Center for Housing and Community Studies (CHCS) at the University of North Carolina at Greensboro. As digital access increasingly underpins education, healthcare, employment, and daily life, this initiative seeks to bridge the digital divide and ensure equitable access to technology for all residents, prioritizing marginalized and underserved communities. The plan's scope encompasses actionable strategies addressing disparities in broadband infrastructure, adoption, affordability, and digital literacy.

Digital inclusion is a multidimensional concept rooted in equitable access to and effective utilization of digital technologies. It encompasses access to reliable broadband, internet-enabled devices, digital literacy training, and meaningful use for personal and economic empowerment. Central to the plan is the recognition of systemic barriers to digital equity, including race, income, geography, and age. Various frameworks—such as those by the NTIA, the Roundtable on Digital Inclusion, and the U.S. Department of Education—stress the importance of community-driven and intersectional strategies. These approaches aim to dismantle systemic inequities, foster participation across social groups, and embed digital inclusion within broader societal frameworks.

PTRC Regional Digital Inclusion Data

The PTRC region encompasses 12 counties in central North Carolina, characterized by a population of over 1.7 million. The region includes major urban centers like Greensboro and Winston-Salem and spans a mix of urban and rural areas, presenting a complex digital inclusion landscape. Socioeconomic diversity significantly influences disparities in internet access, digital adoption, and device availability. These issues are compounded by the high cost of infrastructure in rural areas and affordability challenges within urban centers, highlighting the multifaceted nature of digital inequity in the PTRC.

Broadband availability in the PTRC exceeds North Carolina's overall rates, with nearly 60% of residents having access to high-speed fiber services. However, significant variability persists among counties. While urbanized areas like Guilford and Forsyth boast extensive coverage, less developed counties such as Montgomery and Caswell face substantial gaps. Additionally, approximately 93% of locations in the PTRC have high-speed service,

though areas remain unserved, particularly in less urbanized counties. Mobile broadband, including 4G and 5G, supplements fixed services, but its efficacy varies with geography and demand.

Broadband adoption remains a critical challenge, with affordability and perceived relevance as the primary barriers. Fixed broadband adoption in the PTRC slightly lags behind the state average, with nearly 12% of households lacking internet access entirely. Non-adopters are disproportionately concentrated in urban block groups with high population density, often due to economic constraints or low digital literacy. Similarly, disparities in device access are evident, with approximately 8% of households lacking a computer and an additional 10.6% relying solely on smartphones. Public libraries and schools play a pivotal role in bridging these gaps, although funding constraints threaten the sustainability of these programs.

Digital literacy and inclusion are vital components of PTRC's strategy to address the digital divide. While the region has a relatively high concentration of jobs requiring advanced digital skills, residents report varying levels of confidence, particularly in areas like data protection. Programs to enhance digital literacy are largely based in community institutions, though accessibility remains uneven. Addressing these challenges requires a comprehensive approach that integrates infrastructure expansion, affordability initiatives, and collaboration among stakeholders. Existing county-level initiatives and increased inter-organizational coordination offer a pathway toward achieving digital equity across the PTRC.

Background Literature on Digital Equity and Inclusion

The background literature on digital equity and inclusion underscores the persistent challenges associated with ensuring equitable access to digital resources and opportunities. Socioeconomic, geographic, and demographic inequities underpin digital exclusion, necessitating multifaceted strategies to address barriers and promote inclusion. The review examines key dimensions of the digital divide, such as the rural-urban disparity, the role of poverty, and the intersectional impacts on marginalized communities, emphasizing their implications for education, health, and economic mobility.

The rural-urban digital divide is a pervasive issue, with rural communities often struggling to access broadband due to high infrastructure costs and low provider profitability (Stover et al., 2019; Tomer et al., 2020). Approximately 36% of rural Americans lacked access to broadband at baseline speeds as of 2016, compared to just 4% in urban areas (Stover et al., 2019). Urban areas, while better served overall, still experience significant disparities in low-income neighborhoods, where affordability issues and limited competition exacerbate digital exclusion (Reddick et al., 2020; Raihan et al.,

2024). This divide has tangible consequences, such as reduced online learning opportunities and inadequate access to essential digital tools during the COVID-19 pandemic (Aguilar, 2020).

Economic barriers remain a central obstacle to digital inclusion. Households earning less than $20,000 annually are disproportionately affected, with 59% lacking broadband access and many relying on public Wi-Fi or limited data plans (Early & Hernandez, 2021; Gleason & Suen, 2021). These barriers extend to the cost of devices and digital literacy training, creating a "digital cost burden" that hinders meaningful engagement (Raihan et al., 2024). The pandemic further exposed these vulnerabilities, as remote work and education became inaccessible for many low-income families (Tomer et al., 2020).

Marginalized groups, including racial and ethnic minorities, older adults, and individuals with disabilities, face compounded barriers to digital access. Systemic inequities leave communities of color overrepresented among those without broadband, a reflection of broader income disparities and infrastructural neglect (Reddick et al., 2020). Older adults often lack digital literacy and access to adaptive technologies, exacerbating social isolation (Aguilar, 2020). For individuals with disabilities, the absence of inclusive design and costly assistive technologies limit their participation in digital spaces, further entrenching exclusion (Raihan et al., 2024).

Digital equity is increasingly recognized as a critical social determinant of health, influencing access to healthcare, education, and economic opportunities. Disparities in connectivity hinder telehealth adoption, exacerbate health inequities, and negatively impact mental health outcomes, particularly among vulnerable populations (Sieck et al., 2021). The COVID-19 pandemic demonstrated the vital role of digital access in maintaining public health and social connectivity (Early & Hernandez, 2021; Gleason & Suen, 2021).

Addressing digital inequity requires comprehensive strategies. Policy reforms, such as mandating universal service obligations for internet providers, are essential for ensuring equitable access (Horrigan, 2021). Public-private partnerships can reduce costs and enhance infrastructure development, particularly in underserved areas (Reddick et al., 2020). Digital literacy initiatives tailored to vulnerable groups, such as older adults and non-English speakers, are critical for building capacity and fostering meaningful digital engagement (Aguilar, 2020). Investments in broadband infrastructure, affordability programs like the Affordable Connectivity Program, and community-based initiatives remain key to closing the digital divide (National Telecommunications and Information Administration, 2022).

Methodology

Holistic digital inclusion plans, grounded in participatory processes and data-driven decision-making, are pivotal for fostering equity. These plans prioritize community engagement, leveraging existing resources, and aligning with broader policy frameworks, such as the Broadband Equity, Access, and Deployment (BEAD) initiative (Benton Institute for Broadband & Society, 2024). By addressing systemic and intersecting barriers, these strategies aim to empower all communities to thrive in a digitally connected society.

The development of this Digital Inclusion Plan involved an assessment and needs analy-

sis to identify disparities in broadband availability and adoption. By integrating quantitative data with qualitative insights, researchers conducted a regional analysis and county-specific profiles, revealing significant urban-rural divides and intra-county inequities. While urban areas like Greensboro and Winston-Salem face affordability and adoption challenges, rural counties such as Montgomery and Caswell grapple with infrastructure deficits and limited fiber penetration. This comprehensive analysis laid the foundation for crafting tailored strategies addressing the region's unique challenges.

A participatory methodology was central to the plan's development, incorporating structured interviews and public listening sessions to gather diverse stakeholder perspectives. These sessions engaged representatives from local governments, nonprofits, educational institutions, businesses, and marginalized communities to identify barriers and propose actionable solutions. Focus areas included broadband accessibility, affordability, digital literacy, and device access. The process emphasized community engagement, fostering ownership and aligning strategies with the lived realities of residents.

The final phase of the plan focused on synthesizing findings to establish strategic goals, leveraging existing resources such as public libraries, community centers, and broadband providers to optimize impact. The plan aligns with federal and state initiatives, ensuring scalability and sustainability. It aims to guide policy decisions, advocate for resource allocation, and support tailored digital inclusion programs. The plan provides a framework for monitoring progress and adapting to evolving challenges, setting a clear roadmap for fostering digital equity in the Piedmont Triad region. Through its comprehensive and inclusive approach, the plan underscores a commitment to bridging the digital divide and empowering residents to thrive in a digital society.

Interviews and Public Listening Sessions

The interviews and public listening sessions conducted for the Piedmont Triad Regional Digital Inclusion Plan collectively offered rich qualitative insights into the digital divide across the region. These efforts involved extensive engagement with a broad spectrum of stakeholders, including government officials, educators, nonprofit leaders, and community advocates. The key focus was identifying barriers, assets, and actionable strategies to foster digital equity in the region.

Insights from Interviews

The interviews, conducted with 23 professionals across diverse sectors, revealed systemic barriers to digital inclusion, emphasizing affordability, infrastructure gaps, and limited digital literacy. Respondents characterized digital inclusion as encompassing equitable access to broadband, devices, and skills necessary for meaningful participation in a digitally connected society. They highlighted the compounded challenges faced by rural communities, low-income families, and marginalized groups, such as non-English speakers and seniors. Affordability remains a critical concern, with the high costs of broadband and devices excluding significant portions of the population. Rural respondents particularly emphasized geographic isolation and sparse infrastructure, while urban respondents pointed to high costs and limited service options as persistent obstacles.

Interviewees also discussed the critical role of public libraries, schools, and nonprofits in addressing digital inequities, citing device loan programs, digital literacy workshops, and broadband initiatives as valuable interventions. Despite these efforts, respondents noted a lack of coordination, sustained funding, and community awareness about existing resources. Many advocated for strengthening public-private partnerships and leveraging state and federal funding to expand broadband infrastructure, subsidize costs, and sustain educational programs.

Findings from Public Listening Sessions

The public listening sessions, attended by 112 participants across 13 meetings, further underscored the multi-dimensional nature of the digital divide. These sessions provided a platform for residents to voice their challenges, ranging from inadequate broadband speeds to the absence of culturally relevant digital literacy resources. Participants repeatedly emphasized the necessity of reliable internet access, particularly for education, healthcare, and employment.

Recurring themes included the inadequacy of broadband infrastructure in rural areas, high costs of connectivity, and the need for targeted digital literacy programs. Marginalized groups—such as low-income households, seniors, non-English speakers, and individuals with disabilities—were identified as having the most urgent digital inclusion needs. For instance, rural residents faced dead zones and outdated infrastructure, while seniors struggled with cybersecurity concerns and lack of digital skills. Immigrant communities highlighted language barriers and cultural disconnects in digital resource offerings.

The sessions also shed light on the critical role of schools and libraries in bridging the digital divide. Schools were commended for distributing devices during the COVID-19 pandemic, though participants expressed concern about the sustainability of these initiatives. Libraries were recognized as essential access points for public Wi-Fi and digital literacy training, though they often lacked the resources to meet demand. Participants called for expanded hotspot programs, targeted digital training, and increased funding to maintain and enhance community-based solutions.

Synthesis of Findings

This comprehensive assessment illustrates a persistent digital divide driven by overlapping factors such as infrastructure limitations, economic disparities, and insufficient digital literacy, with compounded challenges evident across rural and urban contexts. These inequities are not merely technological but are deeply intertwined with socioeconomic and demographic vulnerabilities, emphasizing the critical role of digital inclusion as a determinant of social and economic wellbeing.

Broadband infrastructure in the Piedmont Triad region demonstrates uneven distribution, with significant progress in urban centers contrasting sharply with deficits in rural areas. While coverage metrics suggest widespread access to high-speed services, these figures mask substantial variability in adoption rates and service reliability. Rural communities, burdened by sparse infrastructure and geographic isolation, encounter systemic barriers to connectivity, which not only hinder individual and collective access but also exacerbate

regional economic disparities. Conversely, urban populations, despite ostensibly higher infrastructure penetration, face affordability constraints and service gaps that disproportionately affect low-income households and marginalized groups.

Affordability emerges as a recurring theme across the qualitative analyses, highlighting its pervasive influence on digital exclusion. High subscription costs for broadband and devices, coupled with limited availability or awareness of subsidy programs, pose formidable barriers to adoption for economically disadvantaged households. The compounded burden of digital costs not only excludes significant portions of the population from essential online services but also perpetuates a cycle of economic and social marginalization. This affordability gap underscores the need for a more nuanced understanding of economic constraints as a primary driver of digital inequity.

Digital literacy, as both an enabler and a barrier, plays a pivotal role in determining the meaningful utilization of digital resources. The findings indicate that while the region possesses a burgeoning need for advanced digital skills, significant portions of the population lack confidence and competence in navigating online environments. Older adults, immigrant populations, and individuals with disabilities are particularly vulnerable, facing challenges that extend beyond access to encompass usability, security, and adaptability to evolving digital landscapes. Community institutions such as schools and libraries have emerged as critical mitigators of these challenges, providing devices, training, and public access, yet they remain constrained by funding limitations and inconsistent resource allocation.

The participatory methodology underpinning this initiative reveals the deeply felt and multidimensional impacts of digital inequity on education, healthcare, and economic opportunities. Stakeholder engagement highlights the interconnectedness of infrastructure deficits, affordability barriers, and digital literacy challenges, emphasizing that addressing one dimension in isolation is insufficient. This systemic perspective not only aligns with broader frameworks of digital equity but also reinforces the necessity of integrated, community-driven approaches that reflect the lived realities of those most affected.

In sum, the findings from the Piedmont Triad Regional Council Digital Inclusion Plan emphasize the critical urgency and complexity of bridging the digital divide. They reflect a region at a crossroads, with opportunities to leverage existing resources and innovative strategies to foster equity yet constrained by persistent barriers that require systemic and sustained efforts to overcome. The implications of these findings extend beyond technology access, highlighting the broader social and economic consequences of digital exclusion and underscoring the fundamental role of digital equity in fostering a just and inclusive society. Addressing these challenges will require sustained investment, innovative partnerships, and adaptive policies to meet the evolving needs of the Piedmont Triad region's diverse communities. By integrating these insights into actionable strategies, the region can make meaningful progress toward inclusive and equitable digital access.

RECOMMENDATIONS & IMPLEMENTATION PLAN

PIEDMONT TRIAD
REGIONAL COUNCIL

UNC
GREENSBORO
Center *for* Housing
& Community Studies

This section introduces actionable solutions aimed at addressing the complex and persistent barriers to digital equity across the Piedmont Triad Regional Council's 12-county region. Grounded in insights from stakeholder interviews, public listening sessions, and community profiles, the recommendations and implementation plan provides a roadmap for fostering inclusive access to broadband, devices, and digital literacy training. Recognizing the multidimensional nature of digital inequity—spanning affordability, infrastructure, and literacy—these strategies prioritize community engagement, sustainable partnerships, and tailored approaches to meet the diverse needs of rural and urban populations. The recommendations outlined here aim to bridge the digital divide, empower underserved communities, and create pathways for equitable participation in an increasingly connected society.

Digital Equity Barriers and Needs

The Piedmont Triad Regional Digital Inclusion Plan has identified several key barriers to digital equity within its 12-county area, as derived from the community profiles, focus groups, and interviews conducted. These barriers include:

- **Broadband Access and Infrastructure:** Inadequate or non-existent high-speed internet in rural and underserved urban areas.

- **Affordability:** High costs for broadband services and digital devices, particularly for low-income households.

- **Digital Literacy:** Insufficient skills among residents to effectively use digital tools for personal, educational, or professional purposes.

- **Device Availability:** Lack of access to affordable and reliable, internet-enabled devices among disadvantaged populations.

- **Technical Support:** Limited availability of affordable technical support for device repair and internet troubleshooting.

- **Community Awareness:** Limited awareness of existing digital inclusion programs, subsidies, or initiatives.

- **Trust in Digital Systems:** Skepticism towards online technology, public access programs, and data privacy concerns.

- **Cultural and Language Barriers:** Challenges faced by non-English speakers in accessing online resources and services.

- **Geographic and Economic Disparities:** Persistent inequities between urban and rural communities in digital inclusion opportunities.

Strategies for Addressing Digital Equity

The data point to an urgent need for comprehensive, multi-level strategies to achieve digital equity. Key recommendations include expanding broadband infrastructure through targeted state and federal funding, addressing affordability through subsidies and cooperative broadband models, and enhancing digital literacy through tailored, culturally sensitive programs. Stakeholders also emphasized the importance of leveraging local partnerships, engaging trusted community leaders, and fostering greater transparency and trust in public digital inclusion efforts. The following strategies are proposed to bridge the digital divide across the PTRC region. The detailed action plans provide a comprehensive framework for implementing the Piedmont Triad Regional Digital Inclusion Plan, addressing the identified barriers and promoting equitable access across the region.

Strategy 1: Identify Local Digital Champions in Each County

Action 1.1: Leverage libraries to act as central hubs for digital literacy, access, and technical support.

- **Description:** Libraries serve as trusted, accessible community institutions capable of providing digital resources, training, and technical support to underserved populations.

- **Justification:** Libraries are well-positioned within communities and have a history of supporting educational initiatives. Expanding their role in digital inclusion aligns with their mission and capacity.

- **Intended Impact:** Increased digital literacy, access to resources, and technical support for marginalized communities.

- **Timeline:** Near-to-midterm (3-12 months).

- **Considerations:** Libraries may require additional funding, staffing, and training to expand their capacity for digital inclusion.

- **Stakeholders:** Public libraries, local County government, NC Digital Equity Office.

- **Next Action Steps:** Conduct needs assessments in libraries to identify resource gaps and initiate training for library staff.

Action 1.2: Partner with NC Cooperative Extension Community Resource Development Digital Skills Agents.

- **Description:** Utilize existing networks within NC Cooperative Extension to provide targeted digital skills training to rural communities.

- **Justification:** The NC Cooperative Extension has established relationships, agents, and funding in rural areas, making it an effective partner for digital skills outreach.

- **Intended Impact:** Enhanced digital skills in rural populations, reducing barriers to em-

ployment and education.

- **Timeline:** Midterm (6-18 months).
- **Considerations:** Requires coordination and alignment with ongoing Cooperative Extension initiatives.
- **Stakeholders:** NC Cooperative Extension, community development organizations, local governments.
- **Next Action Steps:** Expand to counties without Digital Skills agents. Develop training modules and identify funding sources for program implementation.

Action 1.3: Employ local digital navigators at non-profit organizations and churches to provide one-on-one assistance with technology use, internet setup, and troubleshooting.

- **Description:** Digital navigators are trusted guides who offer personalized support for individuals navigating technology. They assist with tasks such as setting up internet service, troubleshooting devices, and developing basic digital skills.
- **Justification:** Many residents, particularly seniors and low-income families, need tailored support to bridge the digital divide. Non-profits and churches are trusted institutions that can extend these services effectively.
- **Intended Impact:** Improved confidence and capability in using digital tools, increased internet adoption, and enhanced access to online resources.
- **Timeline:** Midterm (6-18 months).
- **Considerations:** Training programs and funding are required to equip navigators with the necessary skills.
- **Stakeholders:** Non-profit organizations, faith-based institutions, community colleges, and digital literacy training providers.
- **Next Action Steps:** Support a regional coordinator to oversee local digital navigators, then identify and recruit potential part-time paid and volunteer digital navigators, secure funding, and develop training modules.

Action 1.4: Engage local grassroots organizations and leaders to build trust and ensure programs are culturally sensitive.

- **Description:** Partner with grassroots organizations and community leaders to design and deliver digital inclusion programs that reflect cultural and linguistic diversity and local spatial equity needs.
- **Justification:** Community trust is essential for program adoption. Grassroots organizations have the local knowledge and relationships needed to engage marginalized populations effectively.
- **Intended Impact:** Increased program participation and trust in digital inclusion initia-

tives.

- **Timeline:** Midterm (6-18 months).
- **Considerations:** Collaboration requires careful planning and respect for local contexts and leadership structures.
- **Stakeholders:** Local grassroots organizations, cultural organizations, community leaders.
- **Next Action Steps:** Host community meetings to identify key partners and co-develop culturally tailored strategies.

Strategy 2: Expand Broadband Infrastructure and Access

Action 2.1: Leverage state and federal funding to expand high-speed internet access, focusing on rural and underserved areas.

- **Description:** Secure and allocate funds to expand broadband infrastructure in underserved regions, prioritizing rural and economically disadvantaged areas.
- **Justification:** Broadband access is critical for education, work, and healthcare. Infrastructure improvements directly address access disparities.
- **Intended Impact:** Reduced broadband deserts, increased connectivity for rural residents.
- **Timeline:** Long term (18 months to 3 years).
- **Considerations:** Infrastructure projects require significant investment and time, and coordination with ISPs is crucial.
- **Stakeholders:** State and federal agencies, ISPs, local governments, NC Broadband Office.
- **Next Action Steps:** Apply for additional federal funding and engage stakeholders in identifying priority areas.

Action 2.2: Incentivize ISPs to improve rural service quality and expand their footprint.

- **Description:** Provide financial and policy incentives to encourage ISPs, especially cooperatives and providers that have a track record of providing fiber and high-speed options in low density areas, to expand broadband access in rural areas.
- **Justification:** ISPs are hesitant to invest in low-density areas due to lower profit margins. Incentives can offset costs and drive infrastructure expansion.
- **Intended Impact:** Reduced broadband deserts in rural communities and improved internet quality.

- **Timeline:** Long term (18 months to 3 years).

- **Considerations:** Requires coordination with regulatory agencies and funding sources.

- **Stakeholders:** ISPs, state and federal funding agencies, local governments.

- **Next Action Steps:** Identify potential funding sources and negotiate agreements with ISPs.

Action 2.3: Increase the number of public access points in community centers, libraries, parks, and other public spaces.

- **Description:** Establish additional free Wi-Fi access points in public areas to ensure equitable internet access.

- **Justification:** Public Wi-Fi bridges the gap for individuals without home internet access, particularly in low-income and rural communities.

- **Intended Impact:** Enhanced public connectivity and reduced reliance on expensive mobile data plans.

- **Timeline:** Near-to-midterm (3-12 months).

- **Considerations:** Requires investment in equipment and ongoing maintenance.

- **Stakeholders:** Local governments, community organizations, public libraries.

- **Next Action Steps:** Conduct site assessments and procure funding for hardware installation.

Strategy 3: Affordable Internet Programs

Action 3.1: Partner with ISPs to provide affordable broadband options and subsidized plans for low-income families.

- **Description:** Collaborate with ISPs to create subsidized plans that lower the cost of broadband for eligible households.

- **Justification:** High costs are a primary barrier to broadband adoption among low-income families. Subsidized plans address affordability directly.

- **Intended Impact:** Increased broadband adoption rates among low-income households.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Negotiations with ISPs and program outreach will require significant effort.

- **Stakeholders:** ISPs, local governments, NC Broadband Office.

- **Next Action Steps:** Identify participating ISPs and finalize program agreements.

Action 3.2: Promote programs modeled after the Affordable Connectivity Program (ACP) and work with grassroots intermediaries to increase enrollment.

- **Description:** Expand the reach of ACP-style subsidies through targeted outreach campaigns and collaboration with trusted community organizations.

- **Justification:** Increasing enrollment in affordability programs directly addresses one of the key barriers to digital access for low-income households.

- **Intended Impact:** Higher enrollment in subsidy programs and reduced financial barriers to internet access.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Effective outreach requires collaboration with grassroots organizations to engage hard-to-reach populations.

- **Stakeholders:** Grassroots organizations, ISPs, government agencies, local leaders.

- **Next Action Steps:** Support a regional coordinator to develop marketing materials and host community workshops to increase program awareness.

Action 3.3: Broadly disseminate information about low-cost broadband options.

- **Description:** Implement a multi-channel marketing campaign to raise awareness of affordable broadband plans, including flyers, social media, and local media.

- **Justification:** Many eligible residents remain unaware of low-cost options, which limits program effectiveness.

- **Intended Impact:** Increased broadband adoption through higher enrollment in affordable plans.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Messaging must be clear and accessible, with translations for non-English speaking communities.

- **Stakeholders:** ISPs, community organizations, media outlets.

- **Next Action Steps:** Develop and distribute outreach materials through identified channels.

Strategy 4: Device Access Initiatives

Action 4.1: Expand on existing device lending programs through area libraries.

- **Description:** Scale up existing device lending programs at libraries to increase access to reliable digital devices for underserved populations. This includes expanding inventories of laptops, tablets, and hotspots available for short-term and long-term loans.

- **Justification:** Libraries already serve as access points for digital resources, and lending programs help bridge the gap for individuals who cannot afford their own devices. These programs ensure equitable access to technology for education, job searches, and personal development.

- **Intended Impact:** Increased access to devices for low-income and underserved community members, enabling participation in online activities.

- **Timeline:** Near term (3-6 months).

- **Considerations:** Libraries will require additional funding and staff training to manage expanded inventories and ensure proper usage.

- **Stakeholders:** Public libraries, local governments, community organizations, state broadband offices.

- **Next Action Steps:** Conduct an inventory assessment of current library resources, secure funding for program expansion, and train staff on device lending procedures.

Action 4.2: Collaborate with schools to ensure all students have home internet access and devices for remote learning.

- **Description:** Partner with schools to provide students with the necessary tools and connectivity to succeed in a digital learning environment.

- **Justification:** Access to reliable devices and internet is essential for educational equity, particularly in underserved communities.

- **Intended Impact:** Bridged digital divide in education, ensuring all students can participate in remote and hybrid learning.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Coordination with schools and funding for devices and connectivity.

- **Stakeholders:** School districts, local governments, non-profits.

- **Next Action Steps:** Conduct a needs assessment and develop funding proposals.

Action 4.3: Expand on existing programs to distribute affordable or refurbished devices and establish device loan programs.

- **Description:** Scale successful programs like Digital Bridges Forsyth and Right Here Right Now to provide more low-cost or refurbished devices to underserved populations. Fund these programs directly to provide device training as well as to purchase refurbished, affordable devices (see Action 4.4).

- **Justification:** Device availability is a critical component of digital inclusion, enabling access to online resources and services.

- **Intended Impact:** Increased ownership of reliable devices among low-income households.

- **Timeline:** Near term (3-6 months).

- **Considerations:** Programs require sustainable funding and partnerships with technology refurbishers.

- **Stakeholders:** Local nonprofits, technology refurbishers, community organizations.

- **Next Action Steps:** Secure additional funding and expand partnerships with organizations like Right Here Right Now.

Action 4.4: Partner with technology refurbishers to distribute low-cost devices in low-income communities.

- **Description:** Collaborate with organizations like Kramden Institute and E2D to provide refurbished, affordable devices.

- **Justification:** Affordable devices are a crucial component of digital equity for low-income households.

- **Intended Impact:** Increased ownership of functional devices in underserved communities.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Requires partnerships and sustainable funding for refurbishment programs.

- **Stakeholders:** Technology refurbishers, non-profits, schools.

- **Next Action Steps:** Formalize agreements with refurbishers and identify distribution channels. Fund acquisitions of refurbished, affordable devices through intermediary organizations (see Action 4.3).

Strategy 5: Digital Literacy and Education Campaigns

Action 5.1: Offer free, community-based digital literacy training tailored to different populations.

- **Description:** Implement training programs to enhance digital skills, focusing on under-served groups such as seniors and individuals with disabilities.

- **Justification:** Digital literacy is a key barrier to fully leveraging online resources for education, work, and personal needs.

- **Intended Impact:** Improved digital literacy rates, reducing barriers to online participation.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Tailoring programs to specific community needs requires detailed planning.

- **Stakeholders:** Local libraries, community colleges, nonprofit organizations.

- **Next Action Steps:** Develop curriculum and identify instructors for pilot programs.

Action 5.2: Offer programs in multiple languages to cater to non-English speaking communities.

- **Description:** Provide digital literacy resources and training in commonly spoken languages to engage non-English speaking residents.

- **Justification:** Language barriers hinder access to digital tools and resources, leaving many communities underserved.

- **Intended Impact:** Increased participation from diverse linguistic groups in digital programs.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Requires partnerships with cultural organizations and translation services.

- **Stakeholders:** Language service providers, cultural groups, community organizations.

- **Next Action Steps:** Translate existing materials and identify trainers fluent in target languages.

Action 5.3: Provide training in digital skills to prepare residents for employment in the digital economy.

- **Description:** Offer targeted training programs designed to build digital skills aligned with the needs of the local job market. This includes basic computer skills, internet navigation, and specialized training in software commonly used in high-demand indus-

tries.

- **Justification:** Digital skills are increasingly critical for employment. Many residents lack these skills, which creates barriers to entering or advancing in the workforce. Tailored training programs help bridge this gap and support economic mobility.

- **Intended Impact:** Increased employment opportunities for residents through enhanced digital literacy and job readiness.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Program design must align with local economic needs and include partnerships with employers to ensure relevancy.

- **Stakeholders:** Workforce development agencies, local businesses, community colleges, non-profits.

- **Next Action Steps:** Identify high-demand digital skills in the region, develop curriculum in collaboration with employers, and recruit participants through outreach programs.

Action 5.4: Offer resources and training to help small businesses leverage digital tools for growth and competitiveness.

- **Description:** Provide training sessions and resources for small businesses to adopt digital tools, including website development, e-commerce platforms, digital marketing, and financial management software. Additionally, establish mentorship programs to guide small business owners through technology adoption.

- **Justification:** Many small businesses, especially in underserved areas, lack the knowledge or resources to utilize digital tools effectively. Supporting digital adoption enhances their competitiveness and resilience, contributing to local economic development.

- **Intended Impact:** Enhanced business operations, increased customer engagement, and improved economic sustainability for small businesses.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Program success relies on identifying businesses' specific needs and providing tailored support. Partnerships with local business associations and tech providers are essential.

- **Stakeholders:** Small business owners, chambers of commerce, economic development agencies, technology companies.

- **Next Action Steps:** Conduct a needs assessment of small businesses, develop training modules, and collaborate with local business organizations to promote participation.

Strategy 6: Address Emerging Areas in Digital Equity

Action 6.1: Investigate the Impact of Emerging AI Technologies on Digital Inequalities

- **Description:** Conduct further research to understand how emerging AI technologies, such as machine learning algorithms, ChatGPT, and other AI tools, might exacerbate or reduce digital inequalities. Identify opportunities to leverage AI for promoting digital inclusion and equity.

- **Justification:** AI technologies are increasingly embedded in digital tools and platforms, potentially widening gaps for underserved communities while also presenting opportunities to enhance access and equity. Proactive research ensures these technologies serve as tools for inclusion rather than division.

- **Intended Impact:** Improved understanding of AI's role in digital inclusion efforts, enabling targeted strategies to mitigate risks and harness benefits.

- **Timeline:** Mid-to-long term (12-24 months).

- **Considerations:** Requires partnerships with academic institutions, tech companies, and policy researchers to ensure comprehensive analysis.

- **Stakeholders:** Universities, think tanks, technology firms, NC Digital Equity Office.

- **Next Action Steps:** Convene a working group to scope research priorities and identify funding opportunities for in-depth studies.

Action 6.2: Enhance Emergency Preparedness in Digital Infrastructure

- **Description:** Develop strategies to ensure resilience in digital infrastructure during emergencies, such as utilizing satellite redundancy to support municipal and county services and enhance connectivity for emergency response.

- **Justification:** Natural disasters and other emergencies often disrupt digital access, leaving communities vulnerable. Building resilient digital infrastructure is essential for emergency preparedness and equitable access during crises.

- **Intended Impact:** Improved continuity of digital services in emergencies, safeguarding access to critical resources for all populations.

- **Timeline:** Long term (18-36 months).

- **Considerations:** Requires collaboration between local governments, emergency management agencies, and technology providers.

- **Stakeholders:** Emergency management agencies, technology providers, municipal governments, state broadband offices.

- **Next Action Steps:** Conduct a risk assessment of current infrastructure vulnerabilities and explore partnerships with satellite service providers to develop redundancy plans.

Strategy 7: Develop and Track Performance Metrics

Action 7.1: Set measurable goals and evaluate progress in digital inclusion efforts.

- **Description:** Establish key performance indicators (KPIs) for tracking broadband adoption, digital literacy participation, and device distribution.

- **Justification:** Metrics provide a clear framework for evaluating the success of initiatives and identifying areas for improvement.

- **Intended Impact:** Data-driven adjustments to programs, ensuring greater effectiveness.

- **Timeline:** Near term (3-6 months).

- **Considerations:** Requires a robust data collection and analysis infrastructure.

- **Stakeholders:** NC Digital Equity Office, local governments, academic institutions.

- **Next Action Steps:** Finalize KPIs and develop a reporting framework.

Action 7.2: Incorporate community feedback into ongoing evaluations of digital inclusion programs.

- **Description:** Establish mechanisms for soliciting and incorporating feedback from program participants into digital inclusion initiatives.

- **Justification:** Community input ensures that programs remain responsive and effective in addressing evolving needs.

- **Intended Impact:** Improved program relevance and community engagement.

- **Timeline:** Midterm (6-18 months).

- **Considerations:** Requires consistent outreach and robust data collection systems.

- **Stakeholders:** Community members, local governments, non-profits.

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REGIONAL COUNCIL

UNC GREENSBORO
Center *for* Housing
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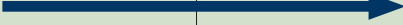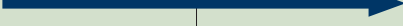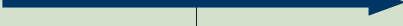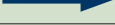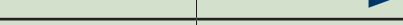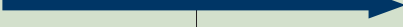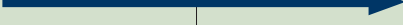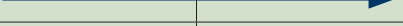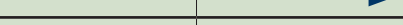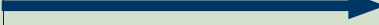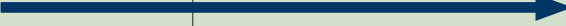
TIMELINE

	Year One	Year Two	Year Three
Strategy 1: Identify Local Digital Champions in Each County			
Action 1.1: Leverage libraries	→————→		
Action 1.2: Partner with NC Cooperative Extension	————————→		
Action 1.3: Employ digital navigators at non-profits	————————→		
Action 1.4: Engage local grassroots organizations	————————→		
Strategy 2: Expand Broadband Infrastructure and Access			
Action 2.1: Leverage state and federal funding		————————————→	
Action 2.2: Incentive ISPs to improve rural service		————————————→	
Action 2.3: Increase public access points	→————→		
Strategy 3: Affordable Internet Programs			
Action 3.1: Partner with ISPs for affordable broadband	————————→		
Action 3.2: Promote programs modeled after ACP	————————→		
Action 3.3: Disseminate information on low-cost options	————————→		
Strategy 4: Device Access Initiatives			
Action 4.1: Expand device-lending programs	→——→		
Action 4.2: Collaborate with schools	————————→		
Action 4.3: Expand affordable device programs	→——→		
Action 4.4: Partner with refurbishers	————————→		
Strategy 5: Digital Literacy and Education Campaigns			
Action 5.1: Community-based literacy training	————————→		
Action 5.2: Training for ESL populations	————————→		
Action 5.3: Training in digital skills for employment	————————→		
Action 5.4: Resources and training for small businesses	————————→		
Strategy 6: Address Emerging Areas in Digital Equity			
Action 6.1: Investigate AI technologies		————————→	
Action 6.2: Enhance emergency preparedness		————————————→	
Strategy 7: Develop and Track Performance Metrics			
Action 7.1: Set measurable goals and evaluate progress	→——→		
Action 7.2: Incorporate community feedback	————————→		

APPENDIX A:
COUNTY PROFILES

PIEDMONT TRIAD
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ALAMANCE
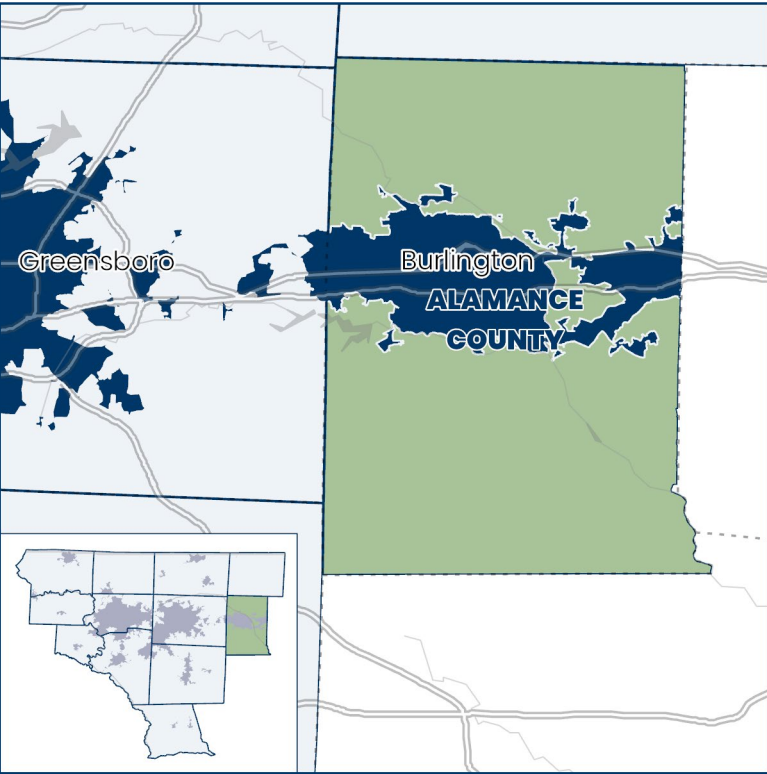
Alamance County is high in population size, ranking 15th in North Carolina, and moderate in land area, ranking 59th. It's located in the eastern section of the PTRC's 12-county service area. Burlington is the largest population center, with 57,303. Graham, with a population of 17,157, is the county seat.

Alamance County is designated a Tier Two county in the NC Commerce distress rankings, a designation it has held since rankings began in 2007. It is currently ranked 62nd (1 is the most distressed) in the state. Compared to other counties in North Carolina, it has seen a considerable population increase, almost 5% from 2019 to 2022.

Alamance County is more urban and younger than the PTRC average and has a slightly higher median household income.

DEMOGRAPHICS	ALAMANCE	PTRC
Population	171,779	1,745,206
White	105,172 (61.2%)	1,081,094 (61.9%)
Black	33,408 (19.4%)	371,529 (21.3%)
Hispanic	23,200 (13.5%)	181,589 (10.4%)
Other	9,999 (5.8%)	110,994 (6.4%)
Median Age	39.1	42.9 (Counties Average)
Median Income	$60,866	$58,333 (Counties Average)
% Household Poverty	13.7%	14.5%
% College Degree	27.3%	28.7%
% Under 18	22.0%	21.8%
% 65 and Over	16.9%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	ALAMANCE	NORTH CAROLINA
Percent Population with Available 25/3 Service	98.8%	98.4%
Percent Population with Available 100/20 Service	98.5%	95.8%
Percent Population with Available Fiber Service	43.4%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
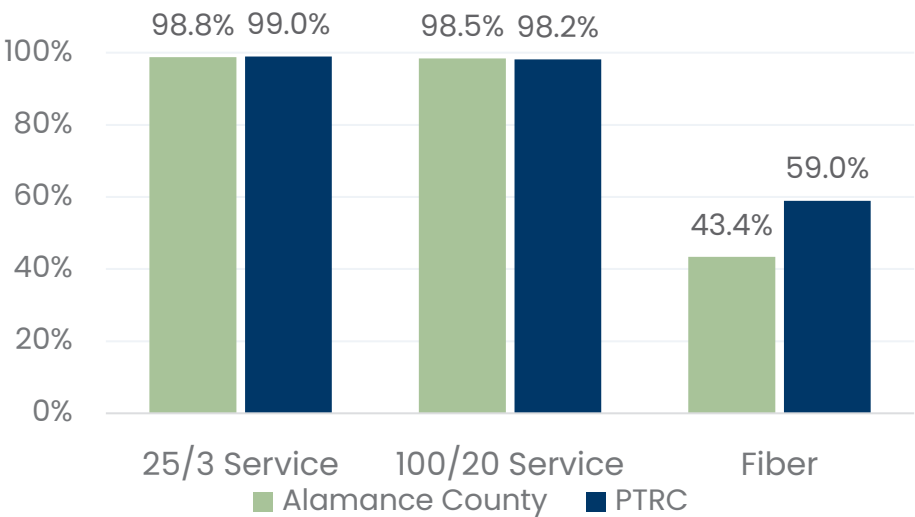
BROADBAND AVAILABILITY SCORE: 71.8

The NC Broadband Availability index awards Alamance County a score of 71.8, ranking Alamance in the top quarter of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Alamance's variables are shown in the table to the right:

% with 25/3 access	98.8
% with 100/20 access	98.5
% with fiber access	43.4
Upload / Download Ratio	0.12
Household density	161.2
% homes built 2010 or later	10.8
% with no providers	0
% with DSL only	0.4

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**43.4%**
NCDIT Alamance Profile	**34.1%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**98.5%**
Alamance Digital Inclusion Profile	**49.9%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Alamance County Findings. Approximately 1,443, or 2.1% of Alamance County households have responded to the survey. Some of the responses vary from the official data. For example, 44% of respondents reported download and upload speeds or less than 25/3 Mbps, and 33% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results
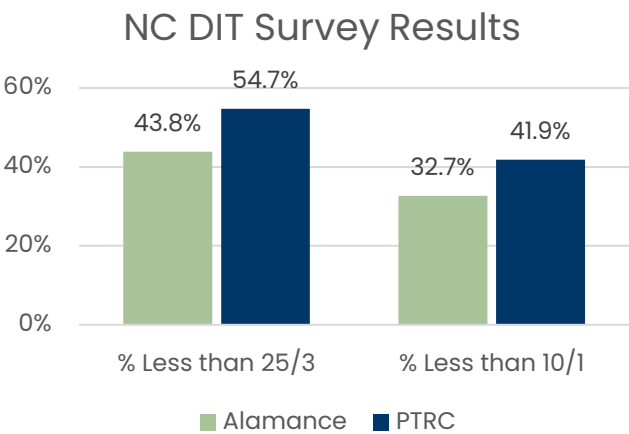
SURVEY RESPONSE	ALAMANCE	NORTH CAROLINA
Extremely or somewhat satisfied with service	31%	31%
Extremely or somewhat dissatisfied with service	43%	45%
Monthly cost over $125	23%	19%
Median download speed	38 Mbps	22 Mbps
Median upload speed	11 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. While the NC Broadband Availability Index Dashboard assigns high service ratings to Alamance County, local leaders say some areas still experience limited connectivity due to distance from cell towers or the topography of the county. A school official said that while a home may have the bandwidth for one or two students, it might not be enough for three to four students.

Symmetry Deficits. These problems with bandwidth can be symptomatic of a low ratio of upload to download speeds. The NC Broadband Availability Index rates Alamance's ratio at 0.12 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio.

Upload to Download Ratio

0.12

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Alamance County has been included in several grants totaling $6 million, including $3.5 million specifically for Alamance – with 954 households and 25 businesses served.
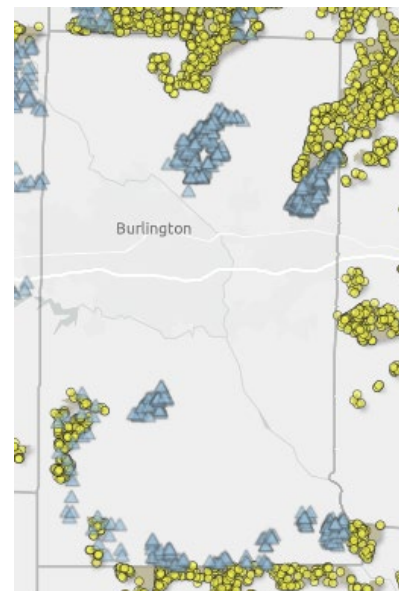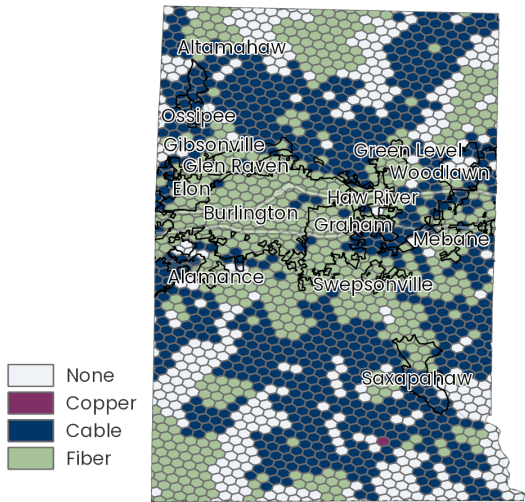
AVAILABILITY – A CLOSER LOOK

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Alamance County. The first map shows that most of Alamance County has either fiber or cable internet options available. There are significant gaps in coverage throughout the rural areas of Alamance County.

Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 95% of locations in Alamance County have high-speed service.
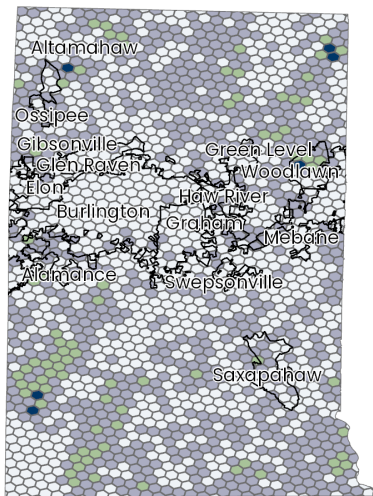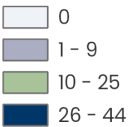
Mobile Broadband Service. Mobile broadband is available in much of the county as well. There are only a few areas relying on mobile voice data in the southern area of the county, as shown in the map to the left.
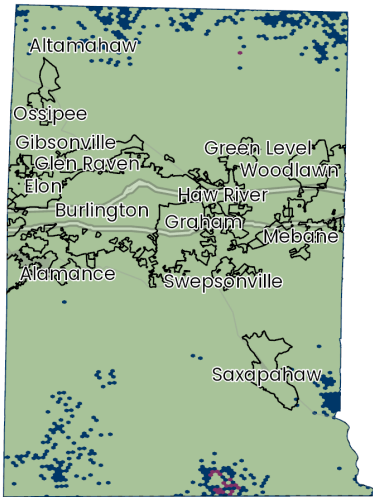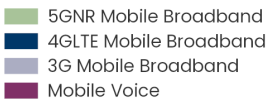
BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.

Adoption by Service Type

Legend: ■ Alamance County ■ PTRC

Data values:
- Fixed Broadband: 86.0% / 85.2%
- Cellular Only: 9.7% / 10.4%
- Satallite Only: 0.4% / 0.4%
- Dialup Only: 0.1% / 0.1%
- No Broadband Subscription: 2.2% / 2.8%
- No Internet: 11.7% / 11.8%

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, and at 86% in Alamance County, it is slightly higher than the overall PTRC coverage. Close to 10% still use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet
- 0% – 8.6%
- 8.7% – 17.2%
- 17.3% – 33.2%
- 33.3% – 52.3%

Geography of Adoption. The map of Alamance County to the left above shows Census block groups where households with no internet service are concentrated. The majority of block groups contain high to medium levels of adoption, with only a few block groups having very low adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Burlington. It show the low adoption areas are within or close-to the urban areas of the county.

BROADBAND ADOPTION SCORE: 66.2

The NC Broadband Adoption Potential index awards Alamance County a score of 66.2, ranking Alamance in the top quarter of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Alamance County variables are shown in the table to the right:

% with broadband subscription	**71.2**
% households no internet	**13.8**
% households no computer	**8.2**
% population ages 18–34	**22.9**
% population ages 65 and over	**16.7**
% households in poverty	**14.4**
% households with children	**30.9**
% limited English	**7.2**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Alamance County include the Right Here, Right Now Project, the Digital Navigators Program at Alamance Community College, and free classes offered by the United Way of Alamance County.

Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Alamance County
High	29.7	28.9	26.6	24.2
Moderate	41.6	42.7	43.6	47
Low	28.7	28.4	29.7	28.6

■ Low ■ Moderate ■ High
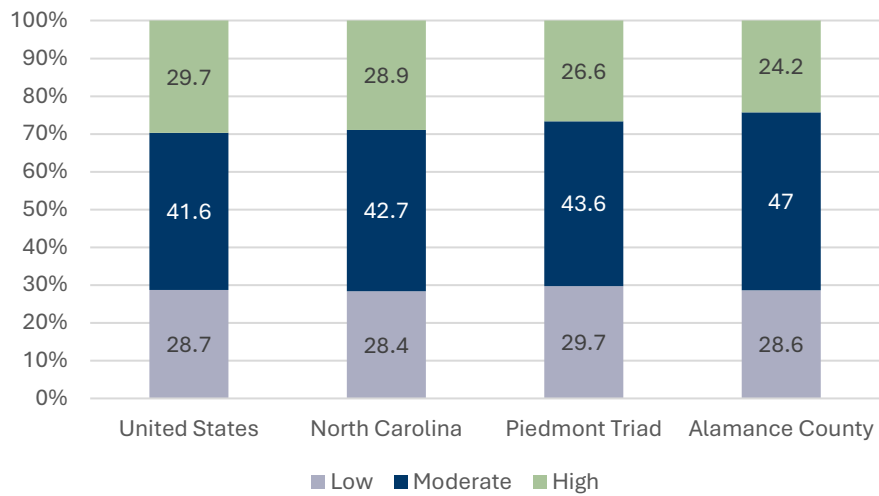
We can measure digital literacy in a variety of different ways. The graph to the left shows Alamance County has a smaller share of occupations requiring high digital literacy. The one below presents Alamance County residents' responses to the NC Broadband Equity Survey, indicating they have comparable levels of digital literacy to the state, but are less confident with protecting data.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Protect the privacy of your data
- Know how to keep yourself safe online
- Use Zoom or FaceTime
- Search or apply for jobs
- Apply for government services
- Find educational content
- Do word processing
- Install apps on a device
- Access online banking
- Send an email
- Turn on a digital device

■ NORTH CAROLINA ■ ALAMANCE
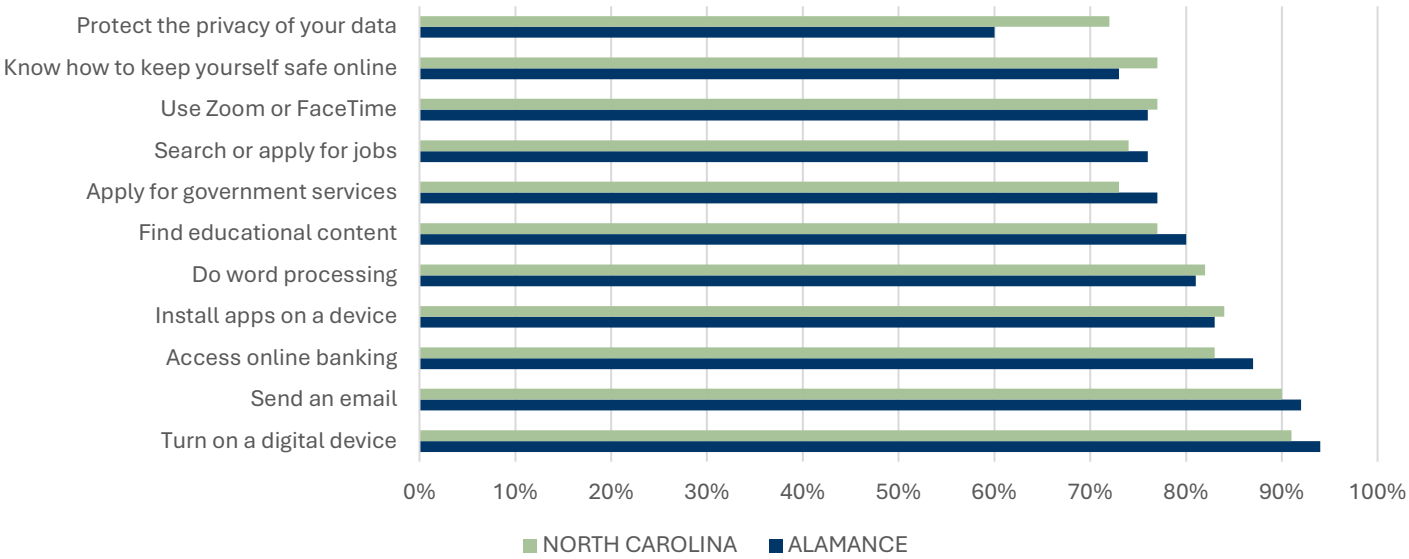
DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Alamance County, 7% of households lack any kind of computer (4,736 households), and an additional 10.7% have only a smart phone to connect to the internet (7,190 households).
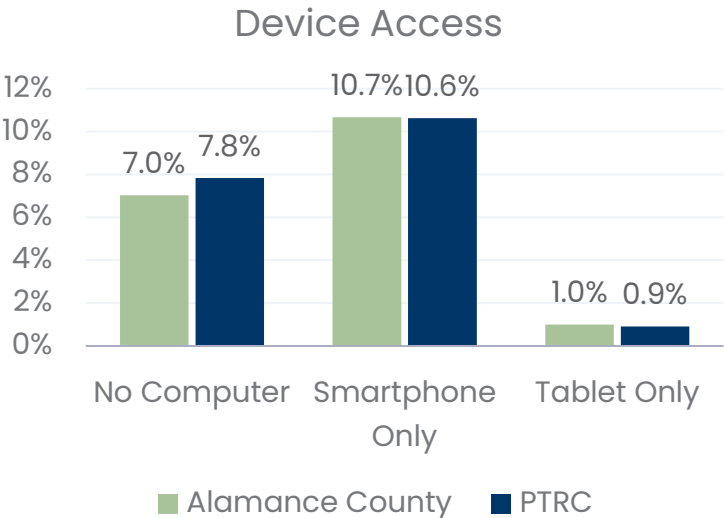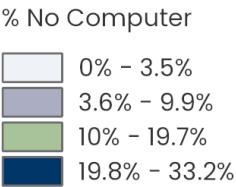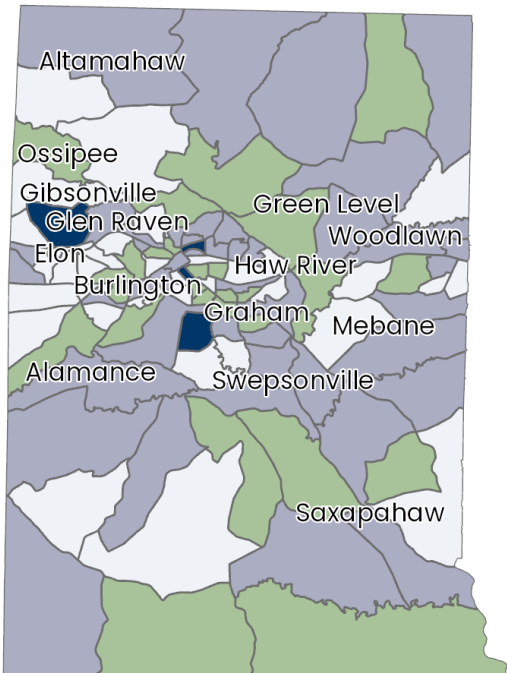
Device Access

Legend: ■ Alamance County ■ PTRC

Values: No Computer — 7.0% (Alamance County), 7.8% (PTRC); Smartphone Only — 10.7% (Alamance County), 10.6% (PTRC); Tablet Only — 1.0% (Alamance County), 0.9% (PTRC)

Households with No Computer

% No Computer
- 0% – 3.5%
- 3.6% – 9.9%
- 10% – 19.7%
- 19.8% – 33.2%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the urban areas around Burlington. At the same time, several census block groups where households are *most* likely to have a computer are also in and around Burlington – a visible digital divide.

DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Over 6% of Alamance County's Black population live in a household with no computer. In Alamance, seniors also suffer a similar disparity of device access to the rest of the PTRC, with around 15% in households with no computer in Alamance County.

No Computer by Race/Ethnicity

	White	Black	Hispanic	Other
Alamance County	4.5%	5.1%	1.2%	1.3%
PTRC	4.9%	6.4%	3.8%	2.9%

No Computer by Age

	Population	Under 18	18 to 64	65 and Up
Alamance County	3.8%	1.0%	1.8%	14.6%
PTRC	4.9%	2.1%	3.0%	14.7%

Children's Access. As the graph above right shows, persons under 18 are most likely of all age groups. To have access to a computer We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. The Alamance-Burlington School System provides computers and hotspots to be loaned out for students to take home.

Public Device Access. For those having no computer, access to public use computers is vital. Alamance County has four public libraries in Burlington, Graham, Mebane, and North Park, as well as a mobile library. Residents can use computers, check out hotspots, or access free Wi-Fi from the mobile library.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Alamance County, and areas where we see particularly underserved communities.

Alamance County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. In Alamance County, public libraries have 50 mobile hotspots available for checkout, and it distributes devices to students for virtual learning. Alamance Community College also provides several hundred laptops to students for checkout, but the demand quickly exceeds availability. Additional resources are required to maintain and update these programs.

Households by Digital Distress
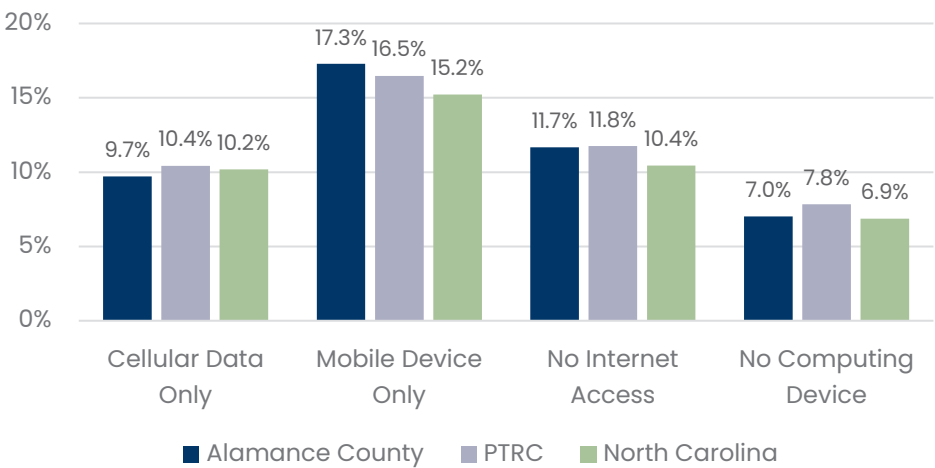
Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Alamance County experiences a slightly higher rate of households relying on mobile devices only compared to the PTRC or the state as a whole.

No Internet Access by Household Income

Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Alamance County as elsewhere, that's true, with Alamance having a slightly higher than expected rate in the $20k to $34.9k income group.

CASWELL
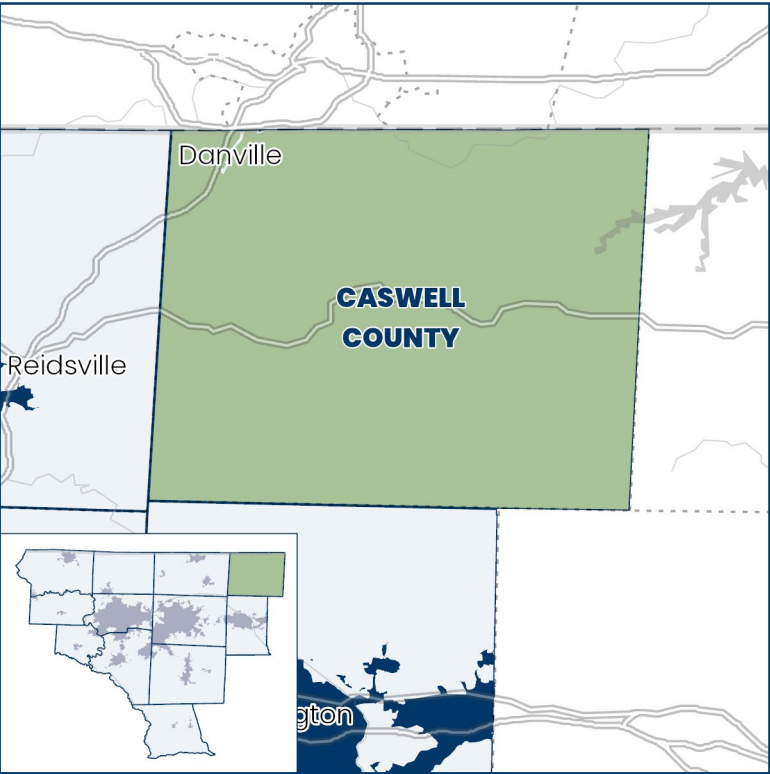
Caswell County is small in population size, ranking 75th in North Carolina, and moderate in land area, ranking 58th. It's located in the northeastern section of the PTRC's 12-county service area. Yanceyville is the largest population center and county seat, with a population of 1,937.

Caswell County is designated a Tier One county (most distressed), a designation it has held since rankings began in 2007. Caswell's relatively low household income and population decline (almost 2% from 2019 to 2022) contribute to its lower ranking.

Caswell County is more rural, poorer, and less well-educated than North Carolina as a whole and has a larger Black population.

DEMOGRAPHICS	CASWELL	PTRC
Population	22,747	1,745,206
White	13,567 (59.6%)	1,081,094 (61.9%)
Black	7,274 (32.0%)	371,529 (21.3%)
Hispanic	1,089 (4.8%)	181,589 (10.4%)
Other	817 (3.6%)	110,994 (6.4%)
Median Age	46.4	42.9 (Counties Average)
Median Income	$56,999	$58,333 (Counties Average)
% Household Poverty	15.1%	14.5%
% College Degree	15.4%	28.7%
% Under 18	18.1%	21.8%
% 65 and Over	22.0%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	CASWELL	NORTH CAROLINA
Percent Population with Available 25/3 Service	79.3%	98.4%
Percent Population with Available 100/20 Service	72.2%	95.8%
Percent Population with Available Fiber Service	0.1%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
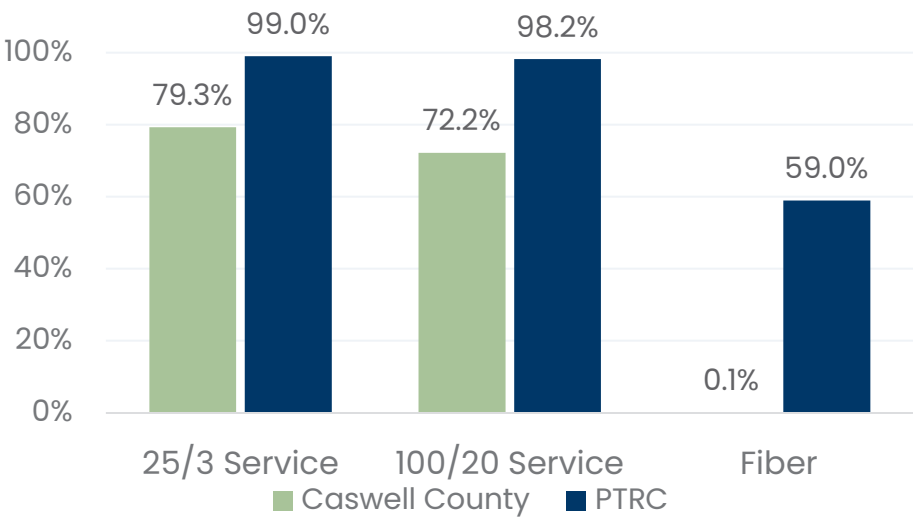
BROADBAND AVAILABILITY SCORE: 43.1

The NC Broadband Availability index awards Caswell County a score of 43.1, ranking Caswell in the bottom 10% of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Caswell's variables are shown in the table to the right:

% with 25/3 access	79.3
% with 100/20 access	72.2
% with fiber access	0.1
Upload / Download Ratio	0.10
Household density	20.6
% homes built 2010 or later	3.8
% with no providers	0
% with DSL only	0.1

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**0.1%**
NCDIT Caswell Profile	**38.6%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**72.2%**
Caswell Digital Inclusion Profile	**3.1%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Caswell County Findings.
Approximately 737, or 8.7% of Caswell County households have responded to the survey. Some of the responses vary from the official data. For example, 86% of respondents reported download and upload speeds or less than 25/3 Mbps, and 73% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results

	% Less than 25/3	% Less than 10/1
Caswell	85.9%	73.2%
PTRC	54.7%	41.9%
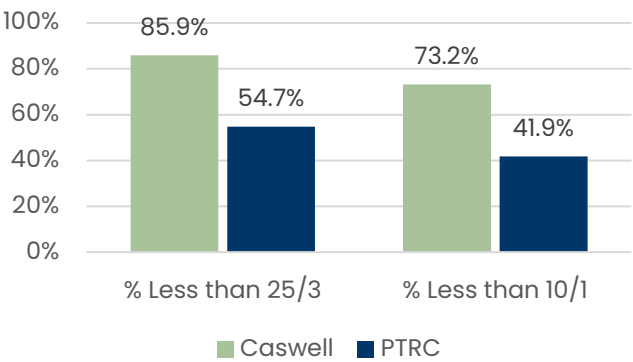
SURVEY RESPONSE	CASWELL	NORTH CAROLINA
Extremely or somewhat satisfied with service	10%	31%
Extremely or somewhat dissatisfied with service	61%	45%
Monthly cost over $125	18%	19%
Median download speed	6 Mbps	22 Mbps
Median upload speed	1 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. Caswell County has a low rating in the NC Broadband Availability Index Dashboard, which means there are significant deficits across the county for connectivity. However, increased fiber service across the county has provided improved access to residents. A local official also stated that public schools offer hotspots for students to take home, but with limited funding, these programs are at risk.

Symmetry Deficits. The NC Broadband Availability Index rates Caswell's ratio at 0.10 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio.

Upload to Download Ratio

0.10

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Caswell County has been included in several grants totaling $4 million, including almost $3 million specifically for Caswell – with 844 households and 11 businesses served.
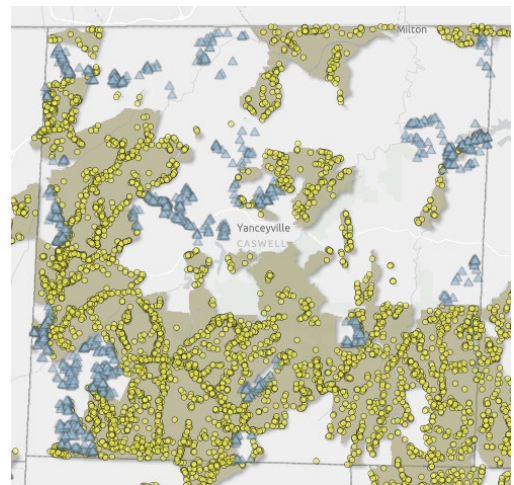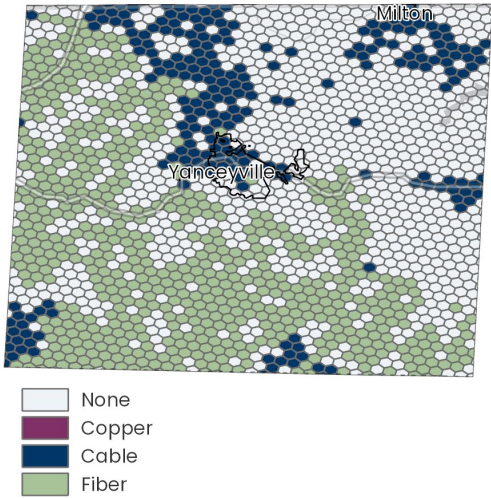
AVAILABILITY – A CLOSER LOOK

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Caswell County. The first map shows that Caswell County has significant gaps in fiber and cable internet options available. Fiber and cable have not reached large sections of the County, particularly in the eastern half of Caswell County.
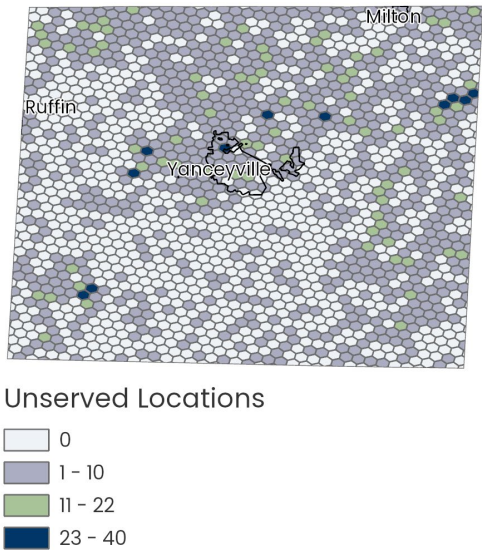
Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 69% of locations in Caswell County have high-speed service.
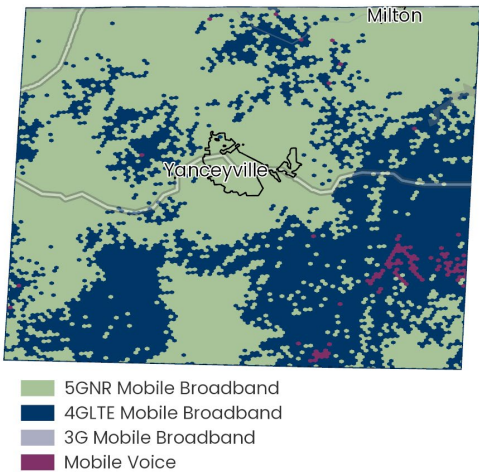
Mobile Broadband Service. 5G and 4G mobile broadband is available in much of the county as well. There are areas of mobile voice only coverage in the southeastern part of the county, as shown in the map to the left.

BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.

Adoption by Service Type

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, but at 77% in Caswell County, that leaves a lot of room for less desirable pathways. Many use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet
- 2.9% – 8.9%
- 9% – 17.6%
- 17.7% – 29.5%
- 29.6% – 36.3%

Geography of Adoption. The map of Caswell County to the left above shows Census block groups where households with no internet service are concentrated. It appears areas of high, medium, and low adoption are mixed together: no one area of the county has the highest concentration of internet adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Yanceyville. It is primarily a low-adoption area.

BROADBAND ADOPTION SCORE: 29.8

The NC Broadband Adoption Potential index awards Caswell County a score of 29.8, ranking Caswell in the bottom quarter of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Caswell County variables are shown in the table to the right:

% with broadband subscription	**50.2**
% households no internet	**21.2**
% households no computer	**15.2**
% population ages 18–34	**18.1**
% population ages 65 and over	**21.7**
% households in poverty	**17.1**
% households with children	**25.8**
% limited English	**4.2**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Caswell are limited, but the Caswell County Public Library offers computer classes for adults.

Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Caswell County
High	29.7	28.9	26.6	22.2
Moderate	41.6	42.7	43.6	46.5
Low	28.7	28.4	29.7	31.4

Legend: Low, Moderate, High
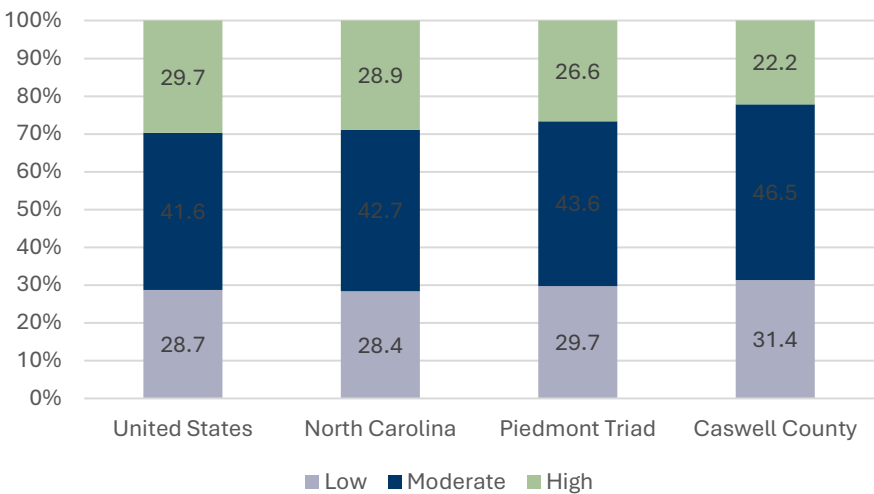
We can measure digital literacy in a variety of different ways. The graph to the left shows Caswell County has a smaller share of occupations requiring high digital literacy. The one below presents Caswell County residents' responses to the NC Broadband Equity Survey, indicating they a great deal of confidence in their digital literacy skills.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:
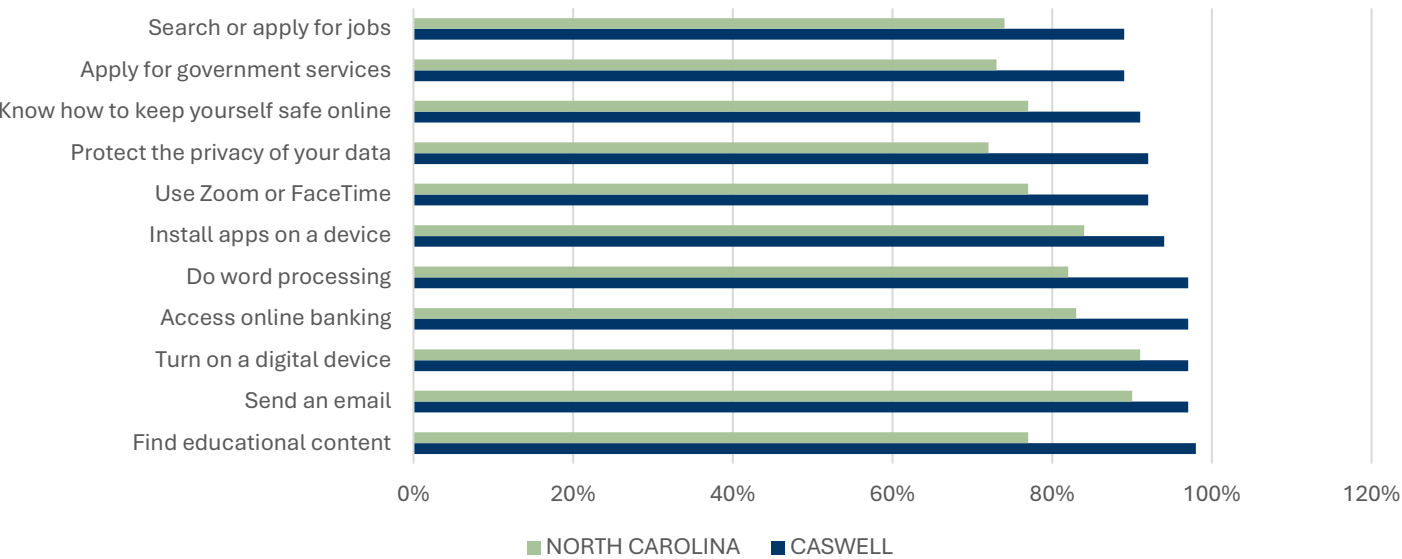
- Search or apply for jobs
- Apply for government services
- Know how to keep yourself safe online
- Protect the privacy of your data
- Use Zoom or FaceTime
- Install apps on a device
- Do word processing
- Access online banking
- Turn on a digital device
- Send an email
- Find educational content

Legend: NORTH CAROLINA, CASWELL

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Caswell County, 11.5% of households lack any kind of computer (978 households), and an additional 11% have only a smart phone to connect to the internet (936 households).

Device Access

Households with No Computer

% No Computer

- 0.6% - 2.7%
- 2.8% - 10.9%
- 11% - 20.2%
- 20.3% - 39.9%
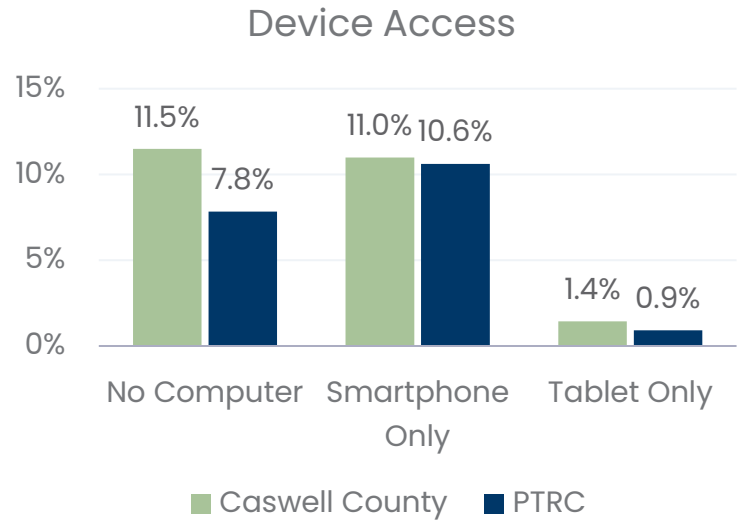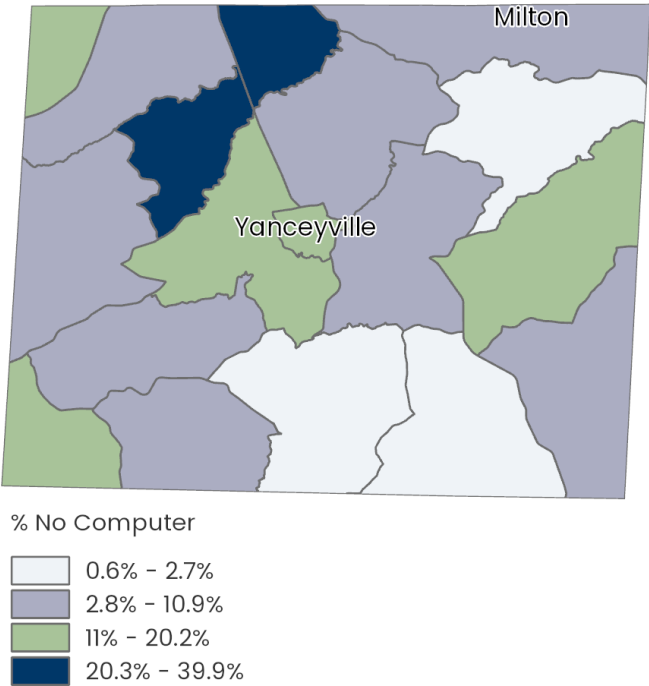
The highest concentration of homes with no computer are in the northwestern area of the county. Up to 40% of the households in these two Census block groups do not have access to a computer, one of the highest rates of a lack of access in the PTRC

DEVICE ACCESS

Dimensions of Race and Age. Unlike most counties in the PTRC, the White population of Caswell is most likely to not have access to a computer at home. 7% of Caswell County's White population live in a household with no computer. Seniors also suffer a disparity of device access, with over 20% in households with no computer in Caswell County.

No Computer by Race/Ethnicity
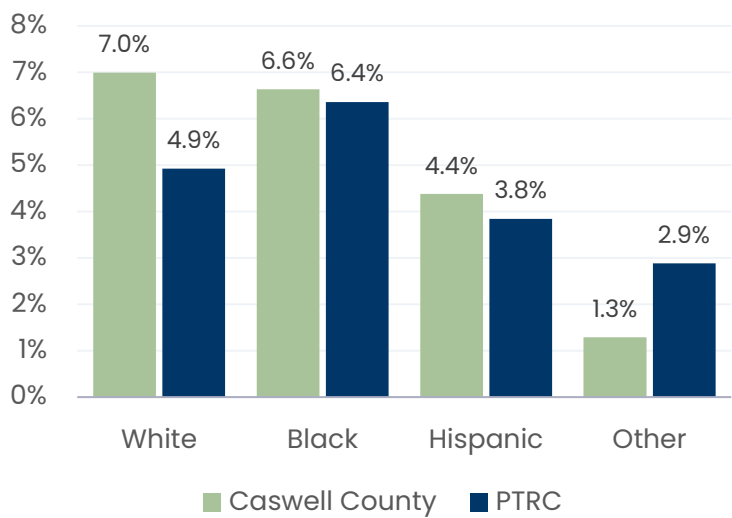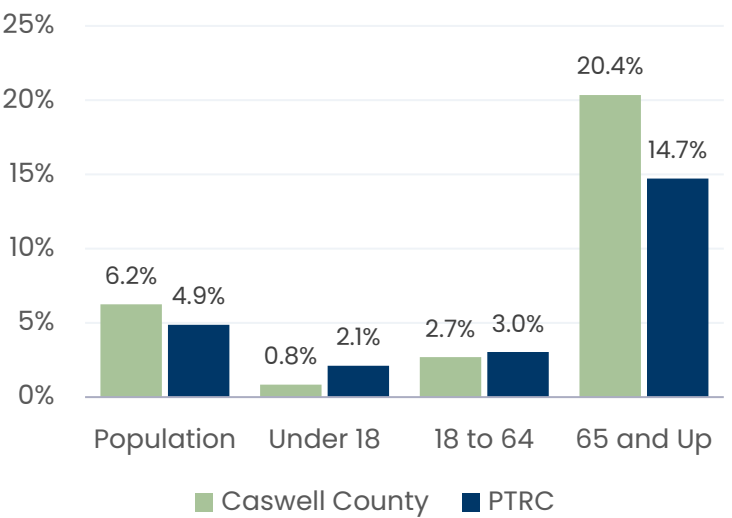
Bar chart showing "No Computer by Race/Ethnicity":
- White: Caswell County 7.0%, PTRC 4.9%
- Black: Caswell County 6.6%, PTRC 6.4%
- Hispanic: Caswell County 4.4%, PTRC 3.8%
- Other: Caswell County 1.3%, PTRC 2.9%

Legend: Caswell County, PTRC

No Computer by Age

Bar chart showing "No Computer by Age":
- Population: Caswell County 6.2%, PTRC 4.9%
- Under 18: Caswell County 0.8%, PTRC 2.1%
- 18 to 64: Caswell County 2.7%, PTRC 3.0%
- 65 and Up: Caswell County 20.4%, PTRC 14.7%

Legend: Caswell County, PTRC

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. The Caswell County School system provides Chromebooks for every student in the 6-12 grades.

Public Device Access. For those having no computer, access to public use computers is vital. The Caswell County public library in Yanceyville has computers and mobile hotspots for library customers to use, as well as free Wi-Fi.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Caswell County, and areas where we see particularly underserved communities.

Caswell County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. Caswell County has received and is continuing to apply for grant funding through the GREAT and CAB programs. These funds have allowed for expanded service through Caswell, which would not have been possible due to the rural nature of the county and the low household density.

Households by Digital Distress
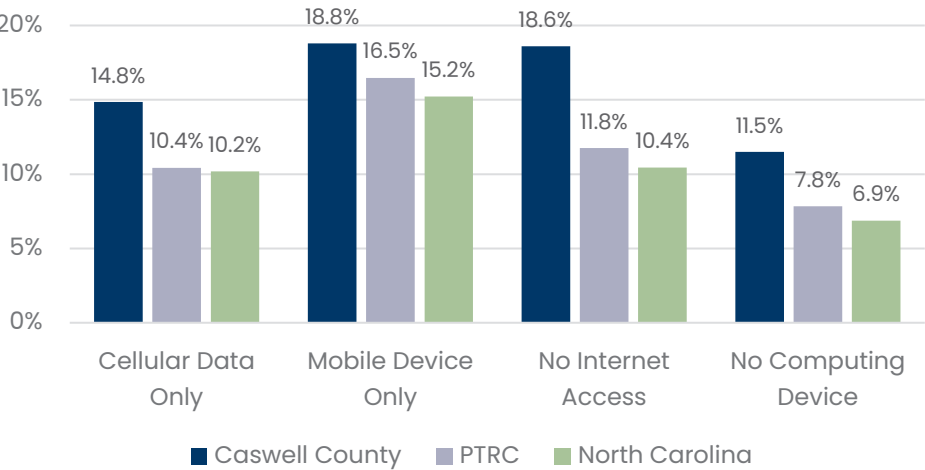
Caswell County | PTRC | North Carolina

	Caswell County	PTRC	North Carolina
Cellular Data Only	14.8%	10.4%	10.2%
Mobile Device Only	18.8%	16.5%	15.2%
No Internet Access	18.6%	11.8%	10.4%
No Computing Device	11.5%	7.8%	6.9%

Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Caswell County experiences higher distress levels in all four categories than the PTRC or the state as a whole.

No Internet Access by Household Income

Caswell County | PTRC | North Carolina
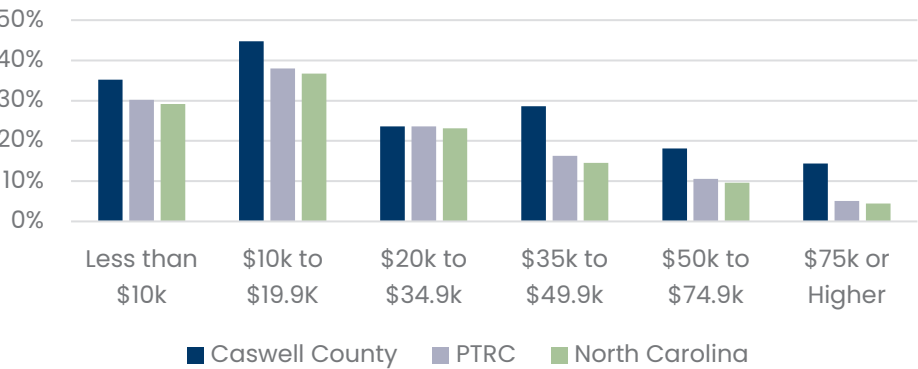
Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Caswell County as elsewhere, that's true, but in Caswell, lack of adoption and access are significantly greater in almost every income group.

DAVIDSON
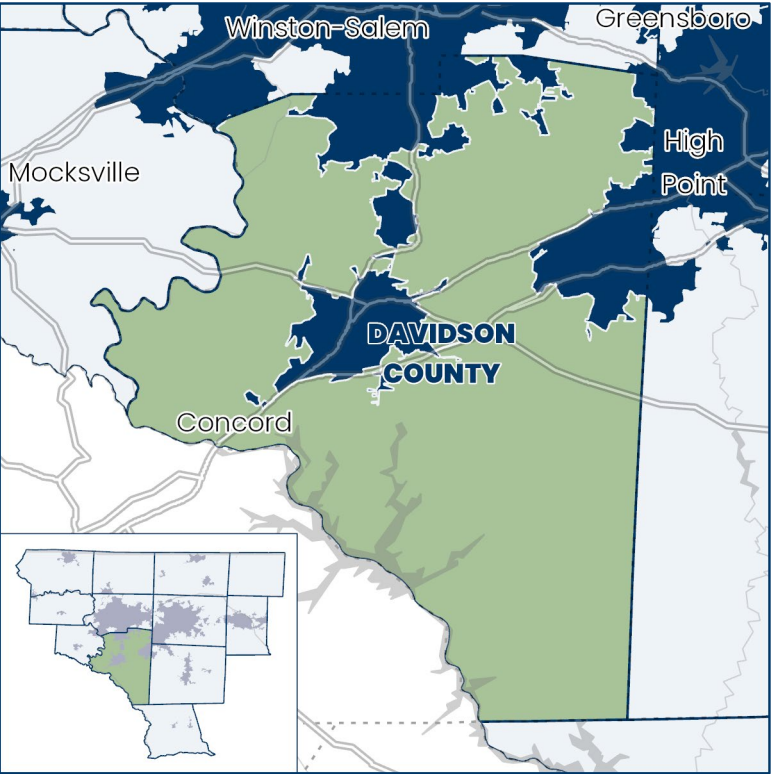
Davidson County is high in population size, ranking 17th in North Carolina, and moderate in land area, ranking 31st. It's located in the southwestern section of the PTRC's 12-county service area. Thomasville is the largest population center, with 27,183. Lexington, with a population of 19,632, is the county seat.

Davidson County is designated a Tier Two county, a designation it has held since rankings began in 2007. It is currently ranked 63rd (1 is the most distressed) in the state. Compared to other counties in North Carolina, it has seen a minor population increase, just over 2% from 2019 to 2022.

Davidson County is more urban, less well-educated, and less diverse than the PTRC as a whole.

DEMOGRAPHICS	DAVIDSON	PTRC
Population	169,498	1,745,206
White	132,403 (78.1%)	1,081,094 (61.9%)
Black	16,107 (9.5%)	371,529 (21.3%)
Hispanic	13,291 (7.8%)	181,589 (10.4%)
Other	7,697 (4.5%)	110,994 (6.4%)
Median Age	42.6	42.9 (Counties Average)
Median Income	$58,473	$58,333 (Counties Average)
% Household Poverty	13.4%	14.5%
% College Degree	20.5%	28.7%
% Under 18	21.7%	21.8%
% 65 and Over	18.5%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	DAVIDSON	NORTH CAROLINA
Percent Population with Available 25/3 Service	99.9%	98.4%
Percent Population with Available 100/20 Service	99.7%	95.8%
Percent Population with Available Fiber Service	78.2%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
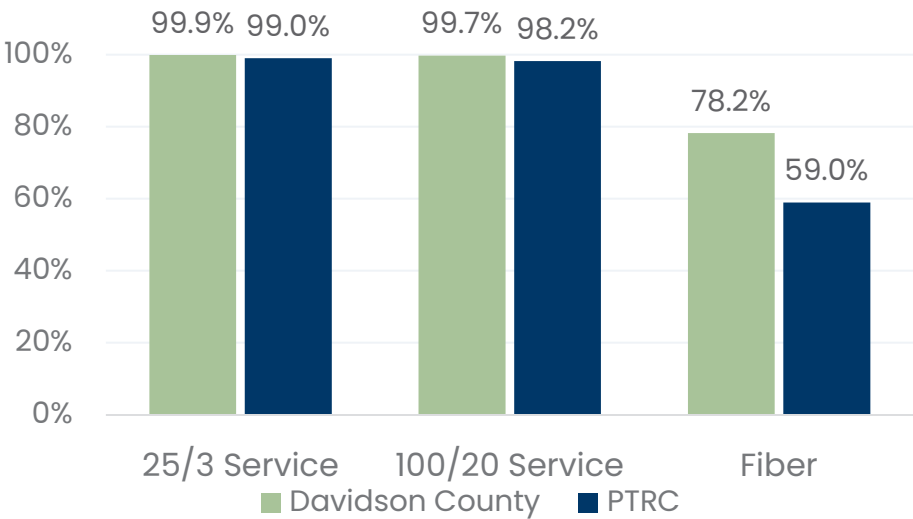
BROADBAND AVAILABILITY SCORE: 73.7

The NC Broadband Availability index awards Davidson County a score of 73.7, ranking Davidson in the top quarter of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Davidson's variables are shown in the table to the right:

% with 25/3 access	99.9
% with 100/20 access	99.7
% with fiber access	78.2
Upload / Download Ratio	0.08
Household density	125.6
% homes built 2010 or later	6.6
% with no providers	0
% with DSL only	0.5

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**78.2%**
NCDIT Davidson Profile	**42.2%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**99.7%**
Davidson Digital Inclusion Profile	**58.3%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Davidson County Findings.
Approximately 181, or 0.3% of Davidson County households have responded to the survey. Some of the responses vary from the official data. For example, 34% of respondents reported download and upload speeds or less than 25/3 Mbps, and 24% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results
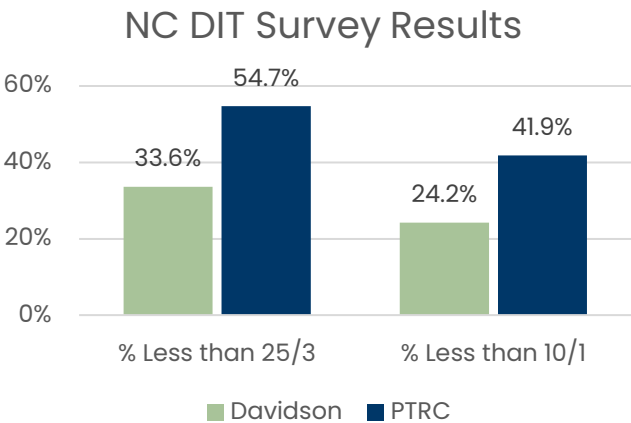
SURVEY RESPONSE	DAVIDSON	NORTH CAROLINA
Extremely or somewhat satisfied with service	46%	31%
Extremely or somewhat dissatisfied with service	35%	45%
Monthly cost over $125	23%	19%
Median download speed	55 Mbps	22 Mbps
Median upload speed	12 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. While the NC Broadband Availability Index Dashboard assigns high service ratings to Davidson County, local leaders say some areas have yet to see improvement. One Davidson-Davie Community College official says that the southern half of the county has not seem the same increase in infrastructure and residents don't have access to the same high-speed options that exist elsewhere in the county.

Symmetry Deficits. The NC Broadband Availability Index rates Davidson's ratio at 0.08 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio.

Upload to Download Ratio

0.08

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Davidson County has been included in several grants totaling $2 million, including $1.5 million specifically for Davidson – with 328 households and 5 businesses served.
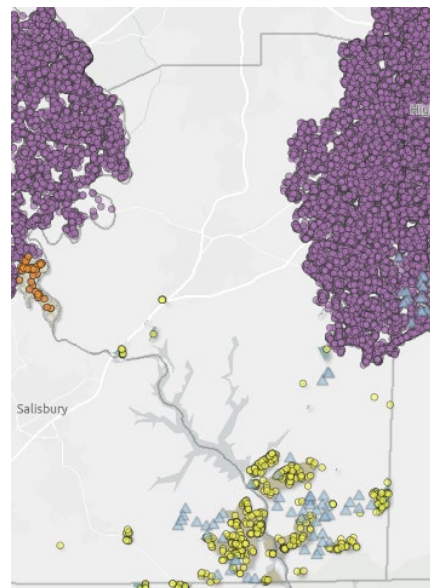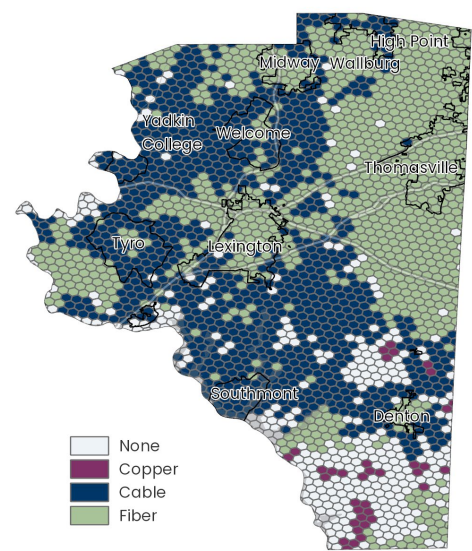
AVAILABILITY – A CLOSER LOOK

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Davidson County. The first map shows that most of Davidson County has fiber or cable internet options available. The largest gaps in coverage are in the southern area of the county, with some small pockets of no coverage throughout the rest of Davidson.
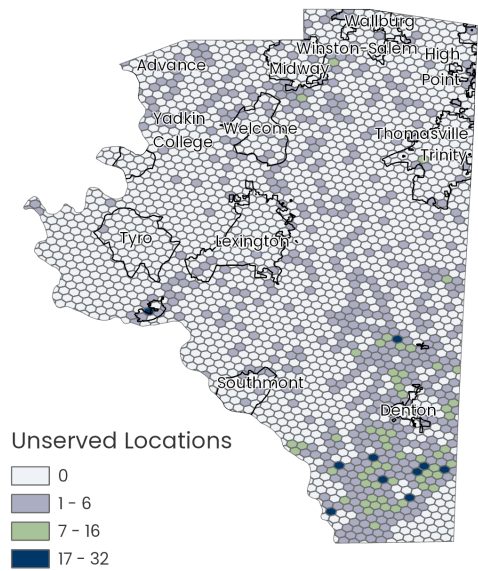
Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 98% of locations in Davidson County have high-speed service.
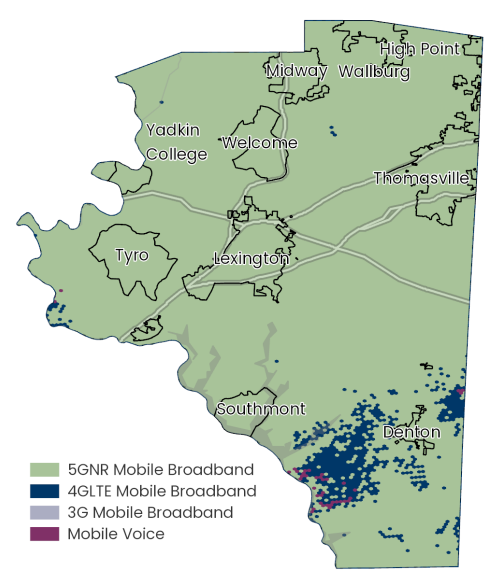
Mobile Broadband Service. 5G mobile broadband is available in much of the county as well. There are some small areas with only access to mobile voice coverage in the south of the county, as shown in the map to the left.

BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.

Adoption by Service Type

Legend: ■ Davidson County ■ PTRC

Service Type	Davidson County	PTRC
Fixed Broadband	85.0%	85.2%
Cellular Only	9.6%	10.4%
Satallite Only	0.5%	0.4%
Dialup Only	0.2%	0.1%
No Broadband Subscription	2.1%	2.8%
No Internet	12.7%	11.8%

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, and at 85% in Davidson County, it is virtually even with the overall PTRC coverage. Close to 10% still use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

Geography of Adoption. The map of Davidson County to the left above shows Census block groups where households with no internet service are concentrated. The majority of block groups contain high to medium levels of adoption, with only a few block groups having very low adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Lexington. It show the low adoption areas within the urban area of the town.

BROADBAND ADOPTION SCORE: 58.4

The NC Broadband Adoption Potential index awards Davidson County a score of 58.4, ranking Davidson in the top half of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Davidson County variables are shown in the table to the right:

% with broadband subscription	**71.6**
% households no internet	**13.8**
% households no computer	**8.4**
% population ages 18-34	**19.2**
% population ages 65 and over	**18.1**
% households in poverty	**14.5**
% households with children	**30.8**
% limited English	**7.0**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Davidson include classes in the Davidson County Schools as well as the Davidson County Public Library.
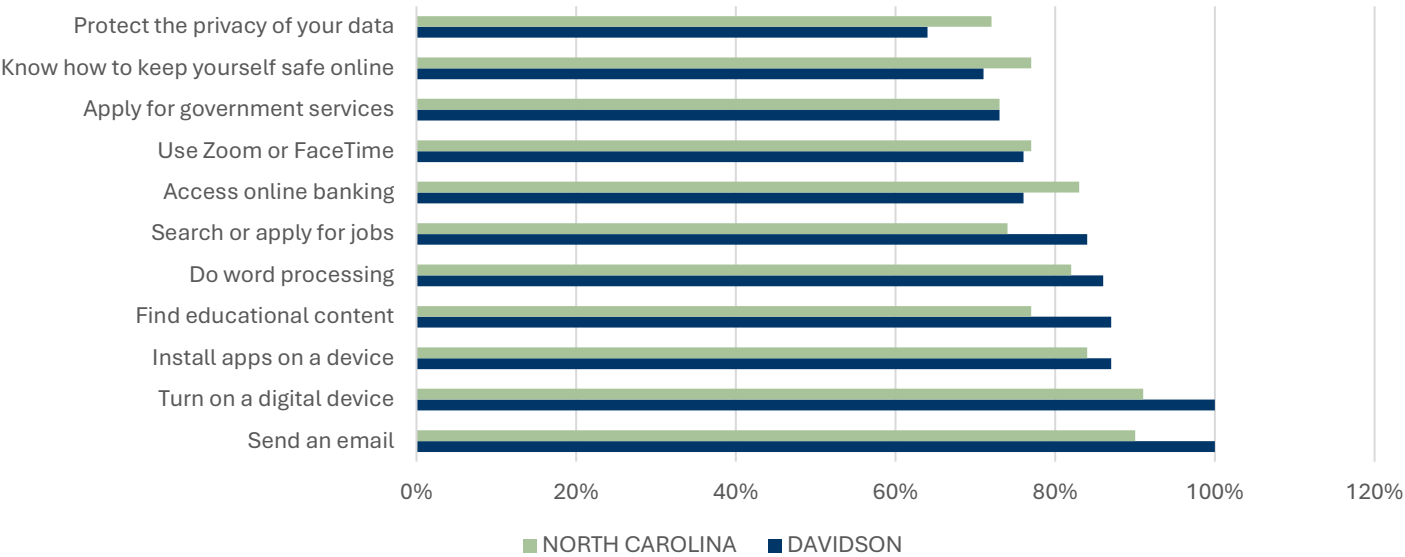
Share of Occupations by Skill Level
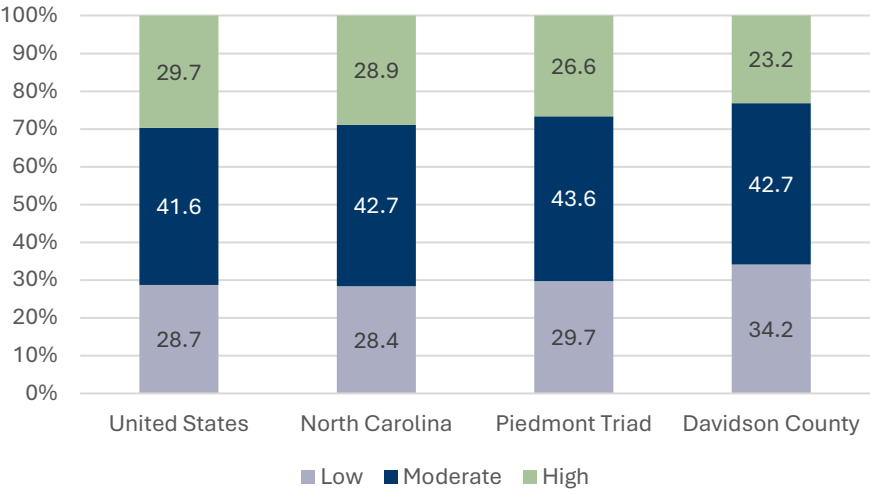
	United States	North Carolina	Piedmont Triad	Davidson County
High	29.7	28.9	26.6	23.2
Moderate	41.6	42.7	43.6	42.7
Low	28.7	28.4	29.7	34.2

■ Low ■ Moderate ■ High

We can measure digital literacy in a variety of different ways. The graph to the left shows Davidson County has a smaller share of occupations requiring high digital literacy. The one below presents Surry County residents' responses to the NC Broadband Equity Survey, indicating they have generally more confidence in their digital literacy skills than the rest of the state, but are concerned about digital privacy.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Protect the privacy of your data
- Know how to keep yourself safe online
- Apply for government services
- Use Zoom or FaceTime
- Access online banking
- Search or apply for jobs
- Do word processing
- Find educational content
- Install apps on a device
- Turn on a digital device
- Send an email

■ NORTH CAROLINA ■ DAVIDSON

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Davidson County, 7.4% of households lack any kind of computer (4,984 households), and an additional 12.1% have only a smart phone to connect to the internet (8,194 households).

Device Access
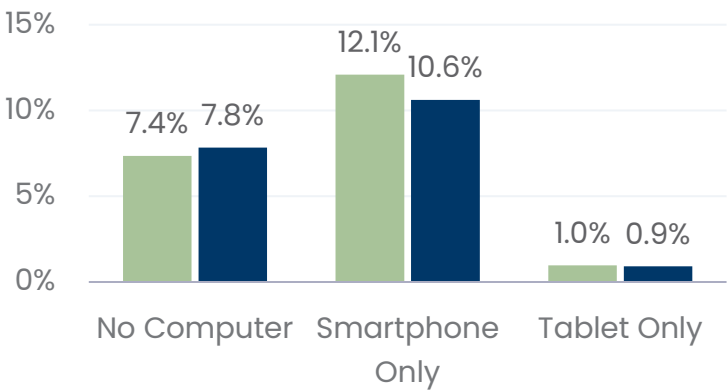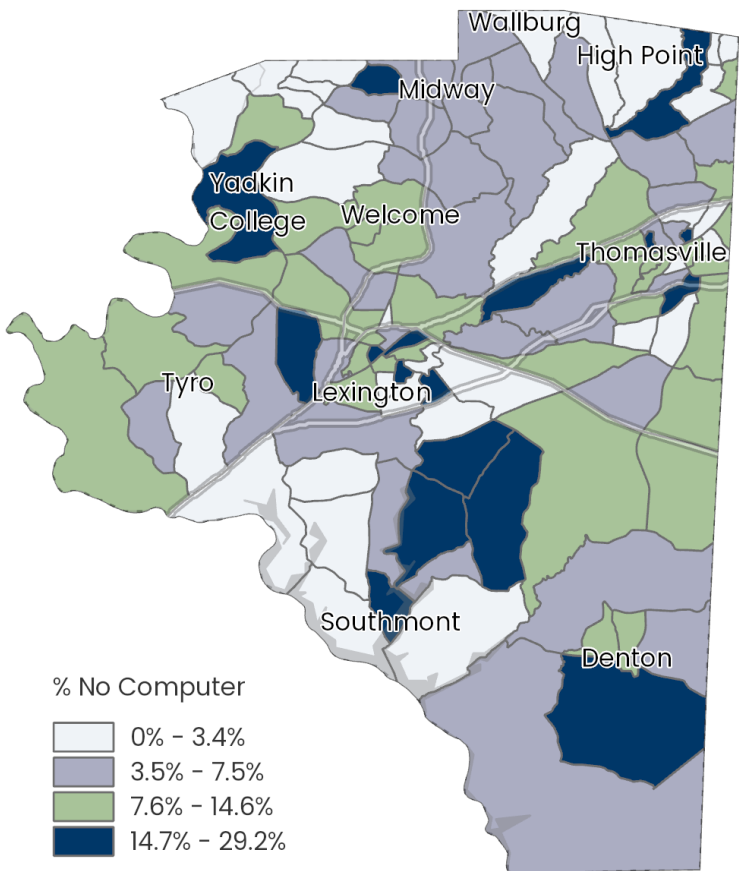
Bar chart showing Device Access with categories No Computer, Smartphone Only, Tablet Only for Davidson County and PTRC.

- No Computer: 7.4% (Davidson County), 7.8% (PTRC)
- Smartphone Only: 12.1% (Davidson County), 10.6% (PTRC)
- Tablet Only: 1.0% (Davidson County), 0.9% (PTRC)

Davidson County | PTRC

Households with No Computer

% No Computer
- 0% – 3.4%
- 3.5% – 7.5%
- 7.6% – 14.6%
- 14.7% – 29.2%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the vicinity of population centers like Thomasville and Lexington. At the same time, several census block groups where households are *most* likely to have a computer are also in and around these population centers – a visible digital divide.

DEVICE ACCESS

Dimensions of Race and Age. There is less of a racial divide for computer access in Davidson County compared to other areas in the PTRC; however, the Black population still has the least access to computers at home, with 4.8%. Seniors also suffer a disparity of device access, with over 15% in households with no computer in Davidson County.

No Computer by Race/Ethnicity
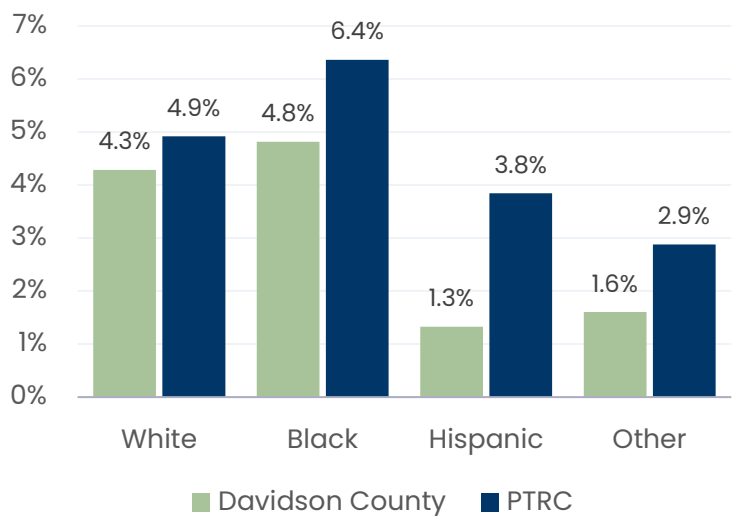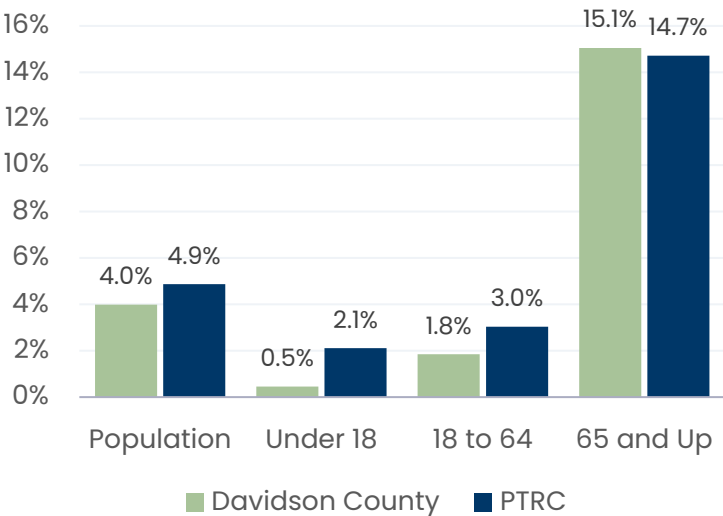
Race/Ethnicity	Davidson County	PTRC
White	4.3%	4.9%
Black	4.8%	6.4%
Hispanic	1.3%	3.8%
Other	1.6%	2.9%

■ Davidson County ■ PTRC

No Computer by Age

Age	Davidson County	PTRC
Population	4.0%	4.9%
Under 18	0.5%	2.1%
18 to 64	1.8%	3.0%
65 and Up	15.1%	14.7%

■ Davidson County ■ PTRC

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. The three school systems in Davidson County - Lexington City, Thomasville City, and Davidson County Schools - are no exception, with students being issued a computer and hot spot if needed.

Public Device Access. For those having no computer, access to public use computers is vital. The Davidson County public libraries in Lexington, Thomasville, Denton, North Davidson, and West Davidson have computers for library customers to use, hotspots to check out, and also have free WiFi in all branches.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Davdison County, and areas where we see particularly underserved communities.

Davie County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. Like many counties in the PTRC, Davie has benefitted from state and federal grants that have allowed for new infrastructure to be built to provide access, particularly to rural areas. However, the county is lacking a consistent applied plan to close the digital divide.

Households by Digital Distress
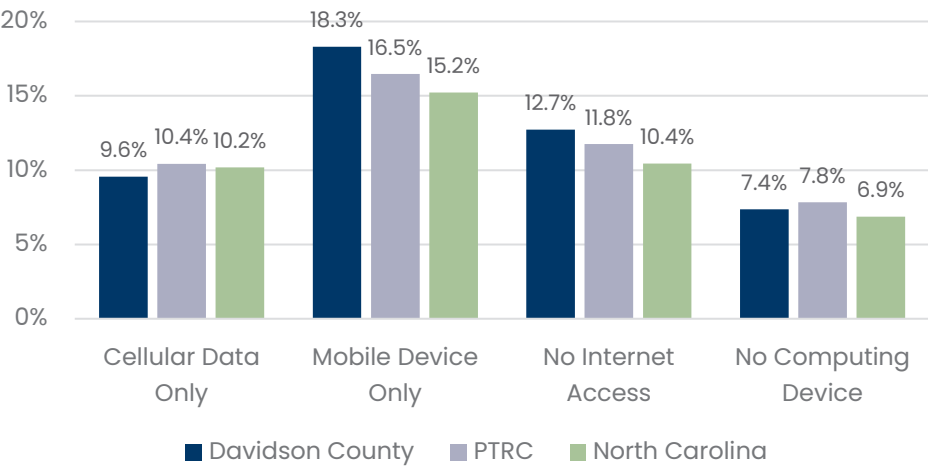
Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Davidson County experiences higher distress levels in two categories than the PTRC or the state as a whole.
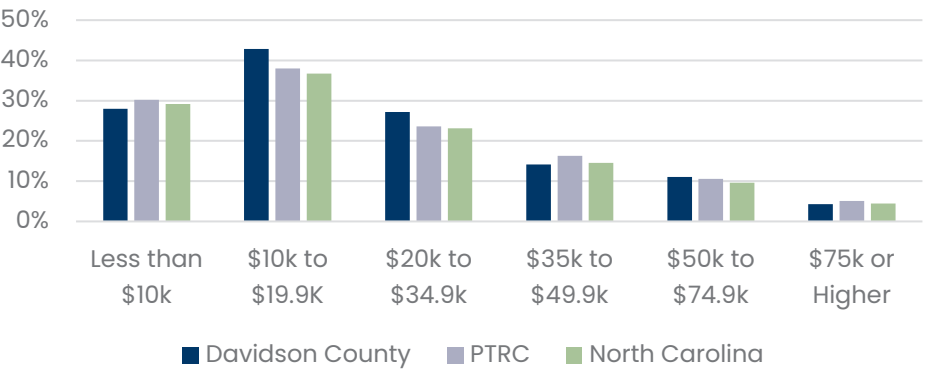
No Internet Access by Household Income

Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Davidson County as elsewhere, that's true, with Davidson having the highest rate of households with no internet in the $10k to $19.9k income group.

DAVIE
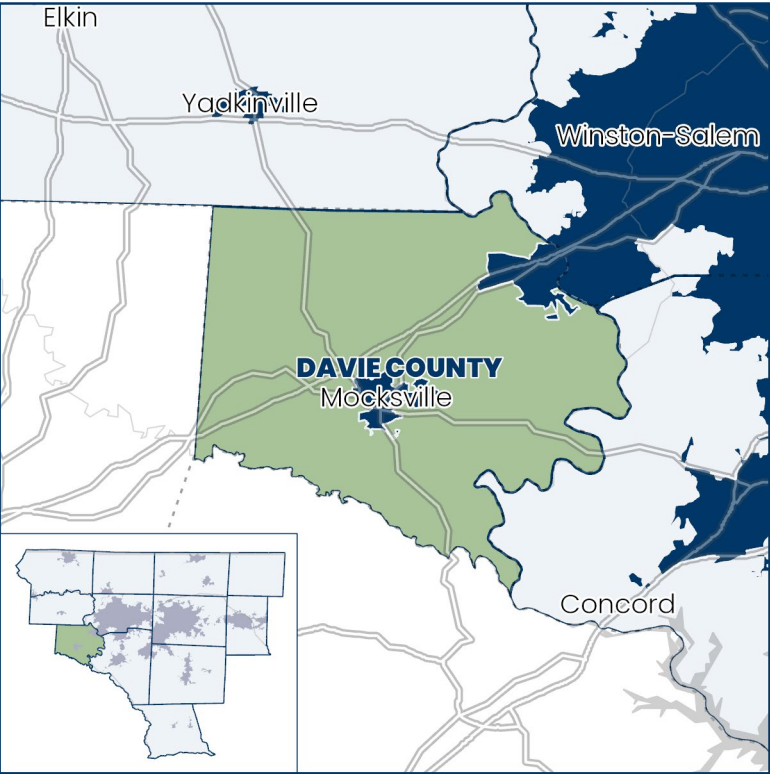
Davie County is moderate in population size, ranking 57th in North Carolina, and low in land area, ranking 86th. It's located in the western section of the PTRC's 12-county service area. Mocksville is the largest population center and county seat, with a population of 5,900.

Davie County is designated a Tier Three county (least distressed), a 2024 shift from Tier Two, attributed to an improvement in its unemployment rate rank. It has also seen a population increase of over 3% from 2019 to 2022.

Davie County is richer and less diverse than the PTRC as a whole. It has the highest median household income and the lowest poverty rate of any county in the PTRC

DEMOGRAPHICS	DAVIE	PTRC
Population	43,030	1,745,206
White	35,844 (83.3%)	1,081,094 (61.9%)
Black	1,782 (4.1%)	371,529 (21.3%)
Hispanic	3,157 (7.3%)	181,589 (10.4%)
Other	2,247 (5.2%)	110,994 (6.4%)
Median Age	45.2	42.9 (Counties Average)
Median Income	$69,105	$58,333 (Counties Average)
% Household Poverty	9.7%	14.5%
% College Degree	26.2%	28.7%
% Under 18	20.9%	21.8%
% 65 and Over	21.4%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	DAVIE	NORTH CAROLINA
Percent Population with Available 25/3 Service	100%	98.4%
Percent Population with Available 100/20 Service	100%	95.8%
Percent Population with Available Fiber Service	100%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
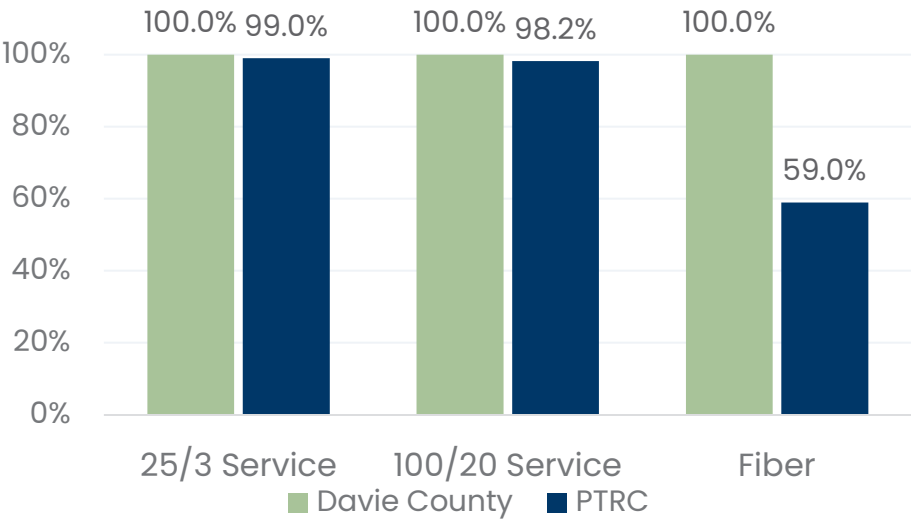
BROADBAND AVAILABILITY SCORE: 75.1

The NC Broadband Availability index awards Davie County a score of 75.1, ranking Davie in the top quarter of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Davie's variables are shown in the table to the right:

% with 25/3 access	100
% with 100/20 access	100
% with fiber access	100
Upload / Download Ratio	0.04
Household density	64.1
% homes built 2010 or later	4.8
% with no providers	0
% with DSL only	0

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**100%**
NCDIT Surry Profile	**84.4%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**100%**
Surry Digital Inclusion Profile	**71.1%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Davie County Findings.
Approximately 87, or 0.5% of Davie County households have responded to the survey. Some of the responses vary from the official data. For example, 30% of respondents reported download and upload speeds or less than 25/3 Mbps, and 26% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results

	% Less than 25/3	% Less than 10/1
Davie	29.5%	26.2%
PTRC	54.7%	41.9%
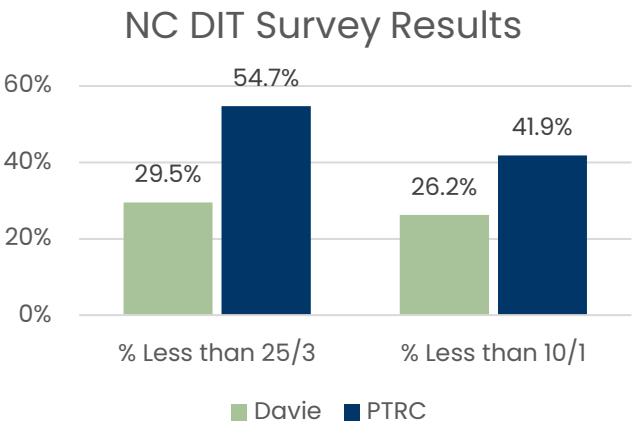
SURVEY RESPONSE	DAVIE	NORTH CAROLINA
Extremely or somewhat satisfied with service	46%	31%
Extremely or somewhat dissatisfied with service	34%	45%
Monthly cost over $125	15%	19%
Median download speed	48 Mbps	22 Mbps
Median upload speed	12 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. While the NC Broadband Availability Index Dashboard assigns high service ratings to Davie County, there are still areas for improvement. An employee at a non-profit identified gaps in the southern and western areas of the county that don't have the same level of availability as other parts of Davie.

Symmetry Deficits. The NC Broadband Availability Index rates Davie's ratio at 0.04 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio. Davie's ratio of 0.04 is tied for the lowest in the PTRC.
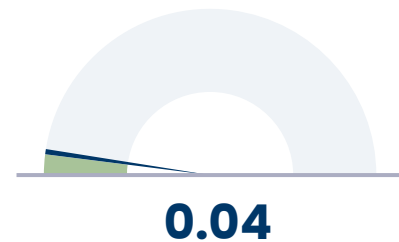
Upload to Download Ratio

0.04

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Davie County has been included in several grants totaling $1 million, including $600,00 specifically for Davie – with 128 households and 14 businesses served.
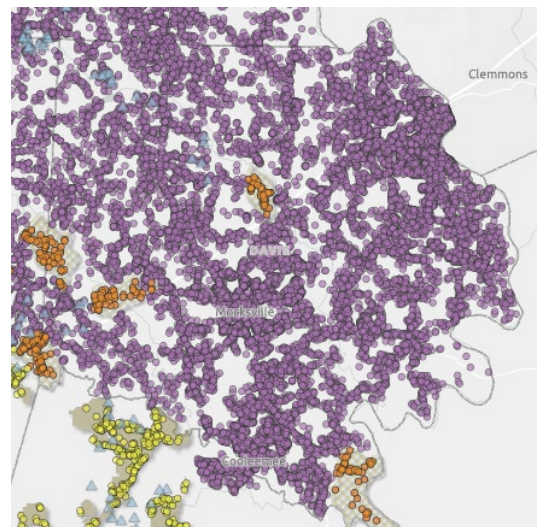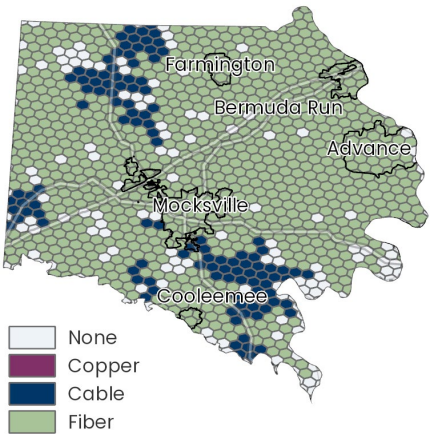
AVAILABILITY – A CLOSER LOOK

None
Copper
Cable
Fiber

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Davie County. The first map shows that most of Davie County has fiber internet options available, with other areas covered by cable service. There are a few regions of no coverage scattered throughout the county.
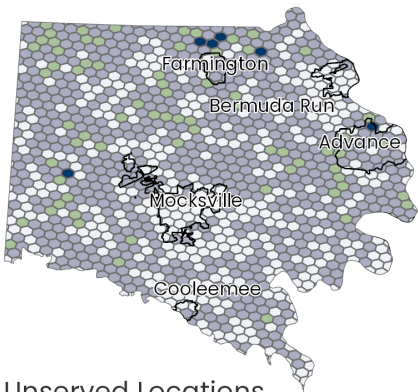
Unserved Locations

0
1 – 8
9 – 20
21 – 41

Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 86% of locations in Davie County have high-speed service.
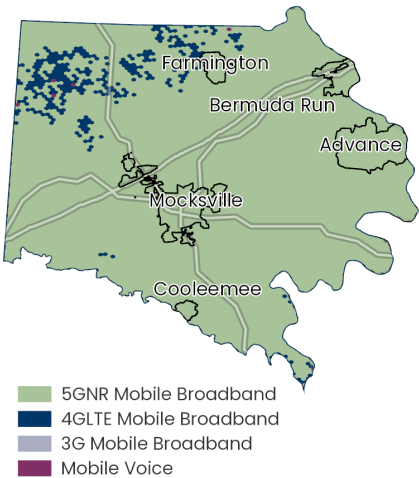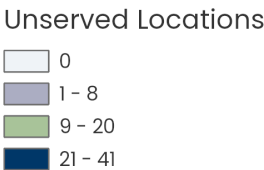
5GNR Mobile Broadband
4GLTE Mobile Broadband
3G Mobile Broadband
Mobile Voice

Mobile Broadband Service. 5G mobile broadband is available in much of the county as well. There are a few gaps in the northeastern areas of the county, but these are covered by 4G mobile broadband service.

BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.
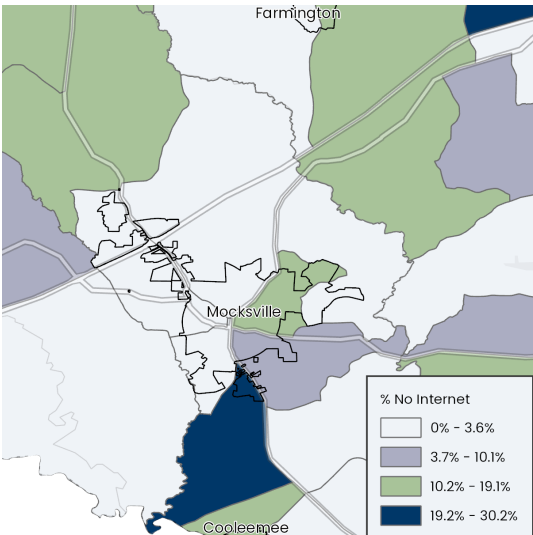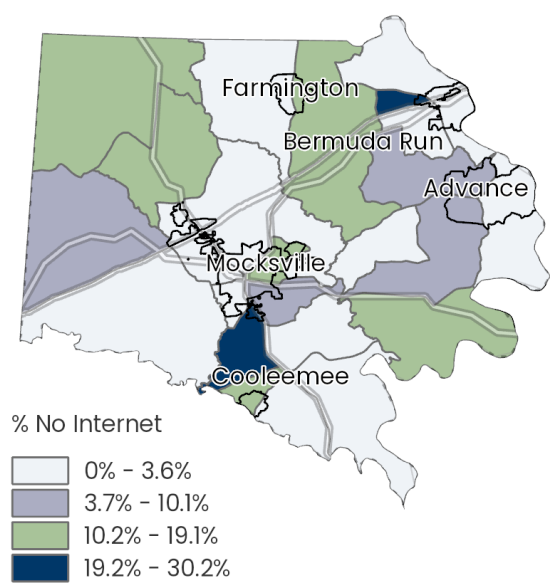
Adoption by Service Type
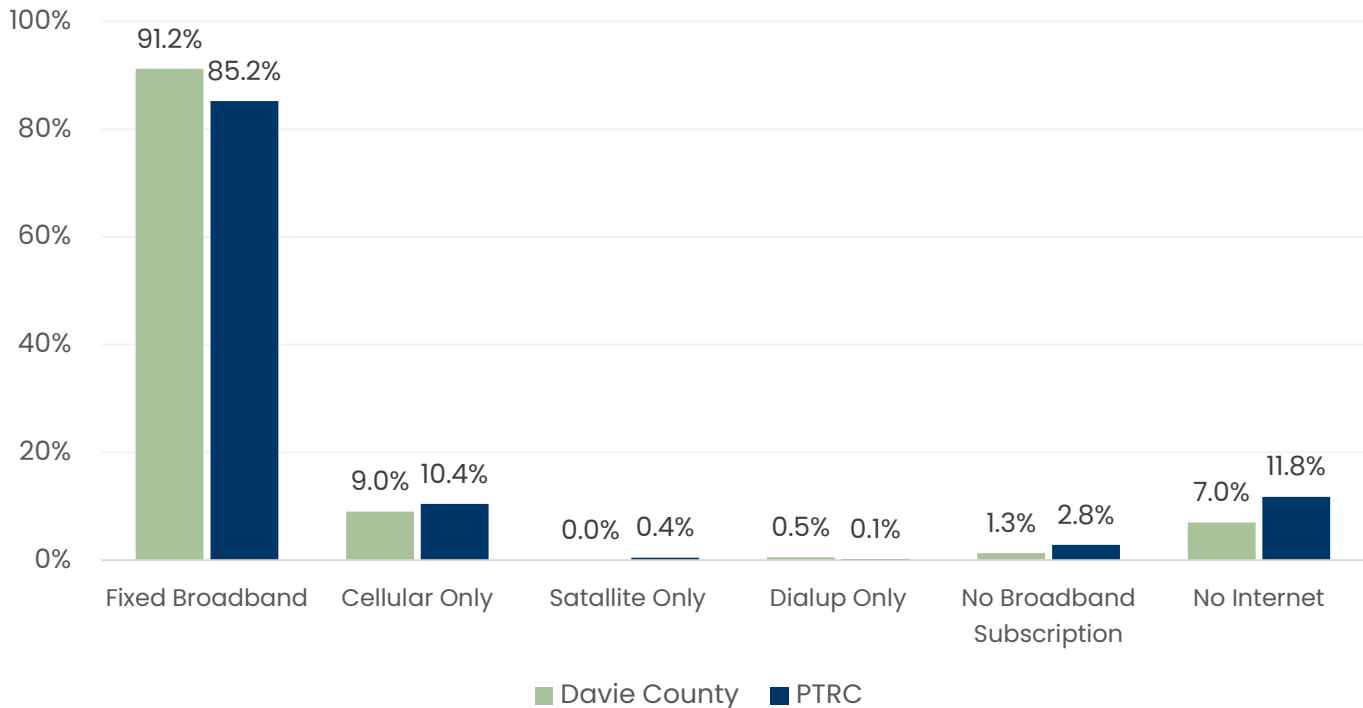
The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, and at over 91% in Davie County, it is the highest adoption in the PTRC. 9% still use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet
- 0% – 3.6%
- 3.7% – 10.1%
- 10.2% – 19.1%
- 19.2% – 30.2%

Geography of Adoption. The map of Davie County to the left above shows Census block groups where households with no internet service are concentrated. The majority of block groups contain high to medium levels of adoption, with only a few block groups having very low adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Mocksville. It show the low adoption area around the town.

BROADBAND ADOPTION SCORE: 61.2

The NC Broadband Adoption Potential index awards Davie County a score of 61.2, ranking Davie in the top third of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Davie County variables are shown in the table to the right:

% with broadband subscription	77.6
% households no internet	8.4
% households no computer	6.7
% population ages 18–34	17.4
% population ages 65 and over	20.8
% households in poverty	12.6
% households with children	28.2
% limited English	7.7

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Davie County include one-on-one sessions with public library staff, and courses through the NC Cooperative Extension – Davie County Center.
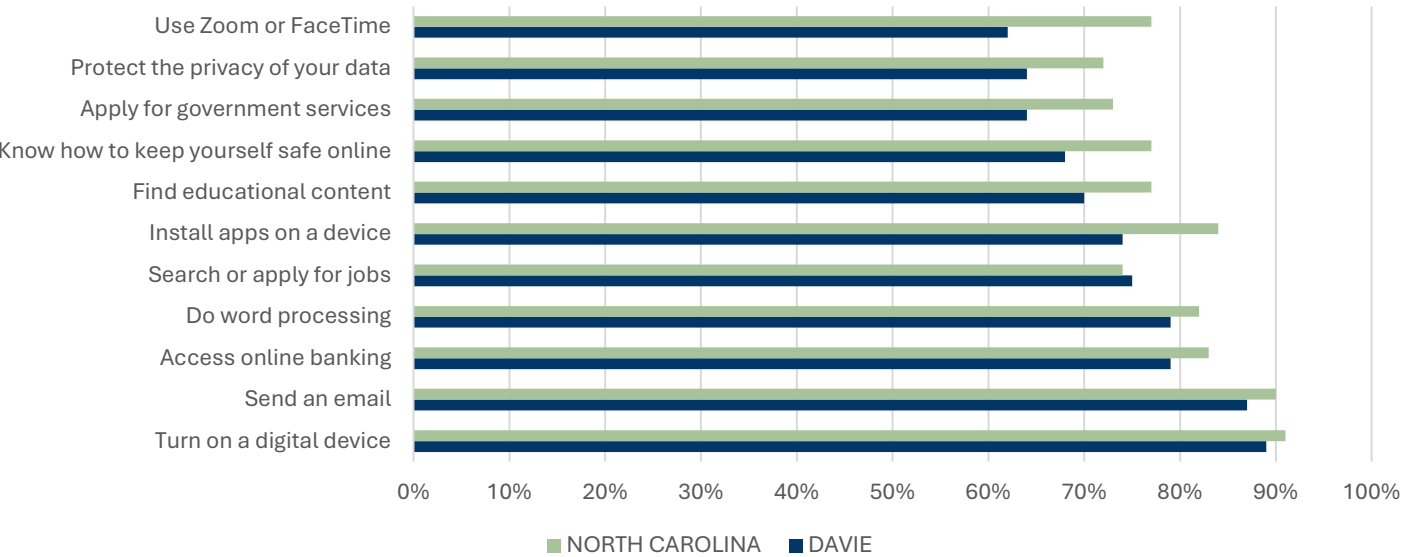
Share of Occupations by Skill Level
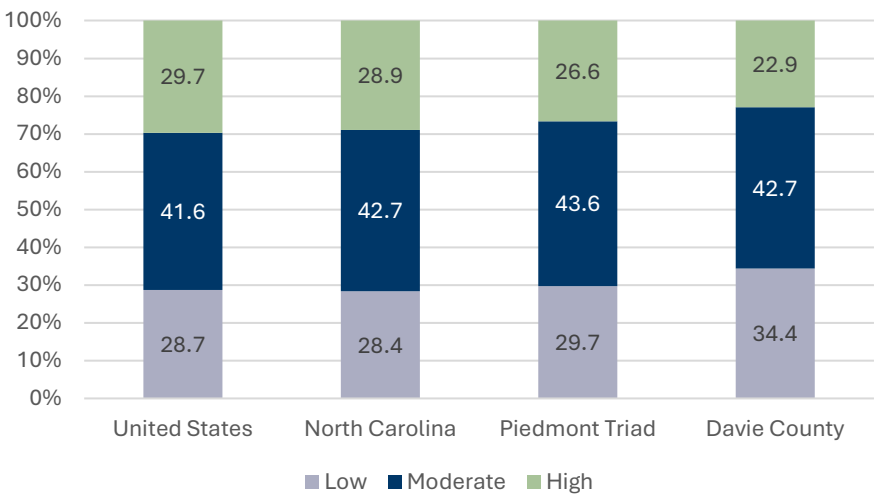
	United States	North Carolina	Piedmont Triad	Davie County
High	29.7	28.9	26.6	22.9
Moderate	41.6	42.7	43.6	42.7
Low	28.7	28.4	29.7	34.4

■ Low ■ Moderate ■ High

We can measure digital literacy in a variety of different ways. The graph to the left shows Davie County has a smaller share of occupations requiring high digital literacy. The one below presents Davie County residents' responses to the NC Broadband Equity Survey, indicating they have notably less literacy than people in the state as a whole.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Use Zoom or FaceTime
- Protect the privacy of your data
- Apply for government services
- Know how to keep yourself safe online
- Find educational content
- Install apps on a device
- Search or apply for jobs
- Do word processing
- Access online banking
- Send an email
- Turn on a digital device

■ NORTH CAROLINA ■ DAVIE

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Davie County, over 5% of households lack any kind of computer (849 households), and an additional 7.5% have only a smart phone to connect to the internet (1,229 households).
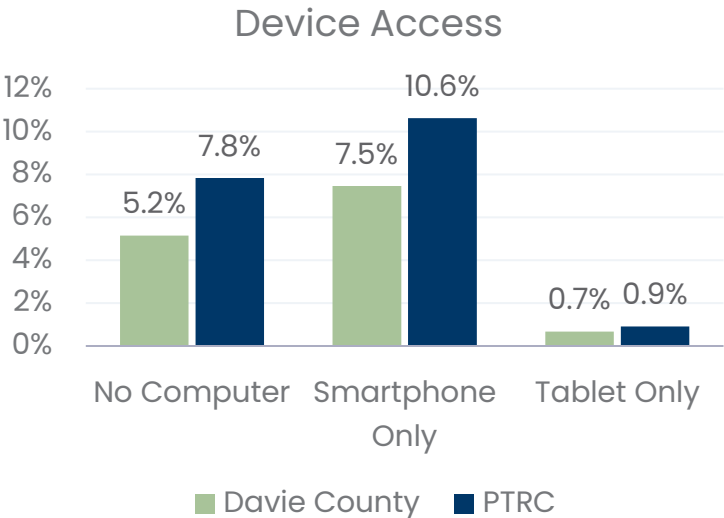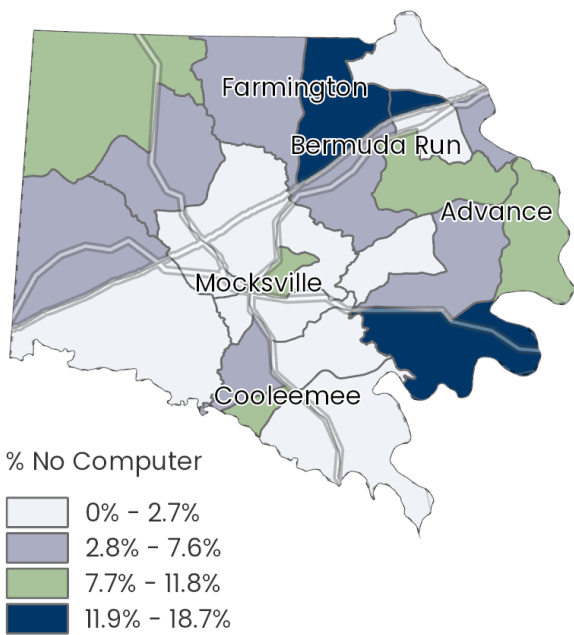
Device Access

Davie County   PTRC

Households with No Computer

% No Computer
- 0% – 2.7%
- 2.8% – 7.6%
- 7.7% – 11.8%
- 11.9% – 18.7%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the north and east areas of the county. At the same time, several census block groups where households are *most* likely to have a computer are also in these areas – a visible digital divide.

DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Over 8% of Davie County's Black population live in a household with no computer. Seniors also suffer a disparity of device access, but much lower compared to the rest of the PTRC with over 7% in households with no computer.
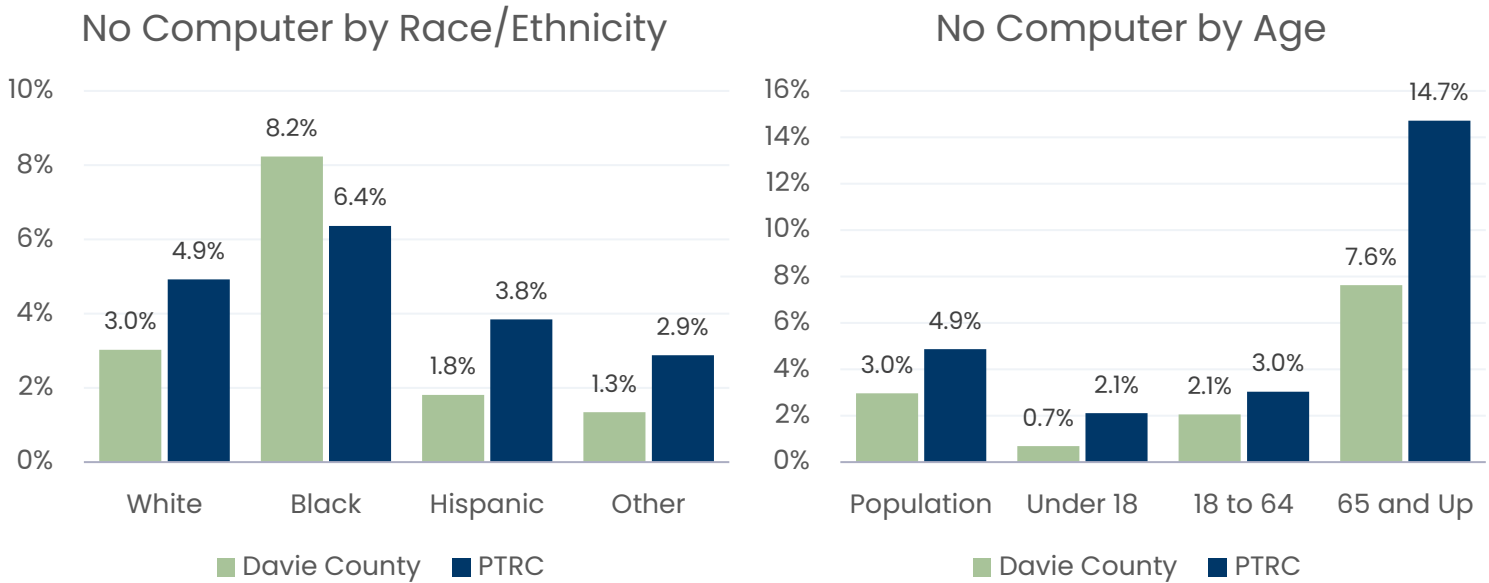
No Computer by Race/Ethnicity

	White	Black	Hispanic	Other
Davie County	3.0%	8.2%	1.8%	1.3%
PTRC	4.9%	6.4%	3.8%	2.9%

Davie County | PTRC

No Computer by Age

	Population	Under 18	18 to 64	65 and Up
Davie County	3.0%	0.7%	2.1%	7.6%
PTRC	4.9%	2.1%	3.0%	14.7%

Davie County | PTRC

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. Davie is no exception, with all the Davie County Public Schools providing Chromebooks to students in elementary and upper grades.

Public Device Access. For those having no computer, access to public use computers is vital. The Davie County public libraries in Mocksville, Cooleemee, and Bermuda Run have computers for library customers to use, and also have free WiFi in all branches.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Davie County, and areas where we see particularly underserved communities.

Davie County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. In Davie County, the Cooperative Extension has begun offering digital literacy classes for seniors who have little experience with technology. However, collaboration and communication between organizations providing services was identified as a concern during the community interviews.

Households by Digital Distress
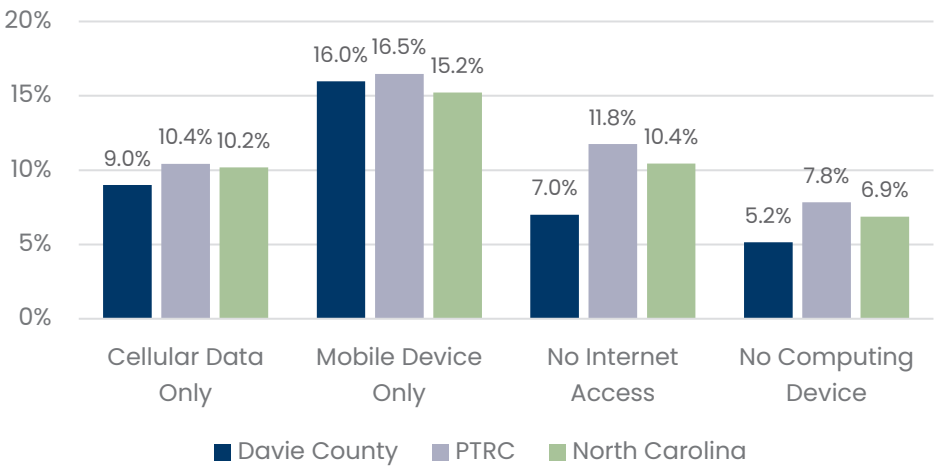
Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Davie County experiences lower distress levels in three categories than the PTRC or the state as a whole.

No Internet Access by Household Income
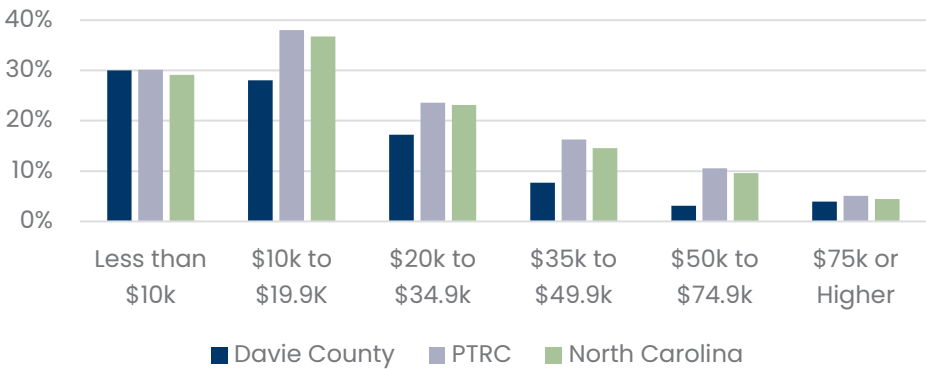
Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Davie County as elsewhere, that's true, but in Davie, lack of adoption and access are significantly lower across the board, regardless of income.

FORSYTH
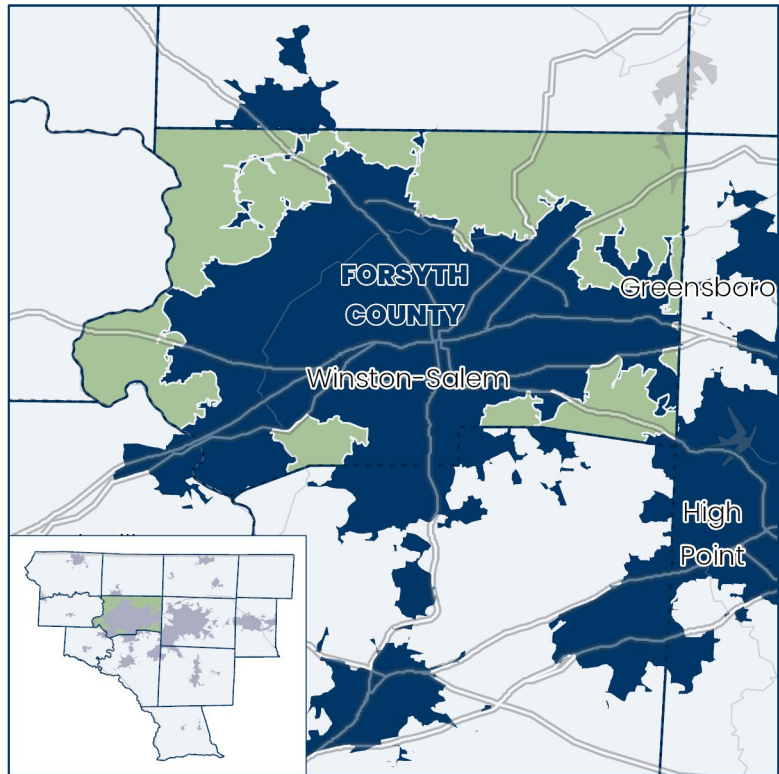
Forsyth County is high in population size, ranking 4th in North Carolina, and moderate in land area, ranking 60th. It's located in the northwestern section of the PTRC's 12-county service area. Winston-Salem is the largest population center and the county seat, with a population of 249,545.

Forsyth County is designated a Tier Two county in the NC Department of Commerce distress rankings; it was classified as Tier Three in 2017. It is currently ranked 67th in the state, its ranking being lowered by its unemployment rate and tax base per capita.

Forsyth County is more diverse, more well-educated, and has a slightly higher median income than the PTRC as a whole.

DEMOGRAPHICS	FORSYTH	PTRC
Population	383,739	1,745,206
White	211,774 (55.2%)	1,081,094 (61.9%)
Black	96,528 (25.2%)	371,529 (21.3%)
Hispanic	52,425 (13.7%)	181,589 (10.4%)
Other	23,012 (6.0%)	110,994 (6.4%)
Median Age	38.4	42.9 (Counties Average)
Median Income	$61,229	$58,333 (Counties Average)
% Household Poverty	14.3%	14.5%
% College Degree	35.3%	28.7%
% Under 18	22.7%	21.8%
% 65 and Over	16.4%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	FORSYTH	NORTH CAROLINA
Percent Population with Available 25/3 Service	100%	98.4%
Percent Population with Available 100/20 Service	100%	95.8%
Percent Population with Available Fiber Service	54.4%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
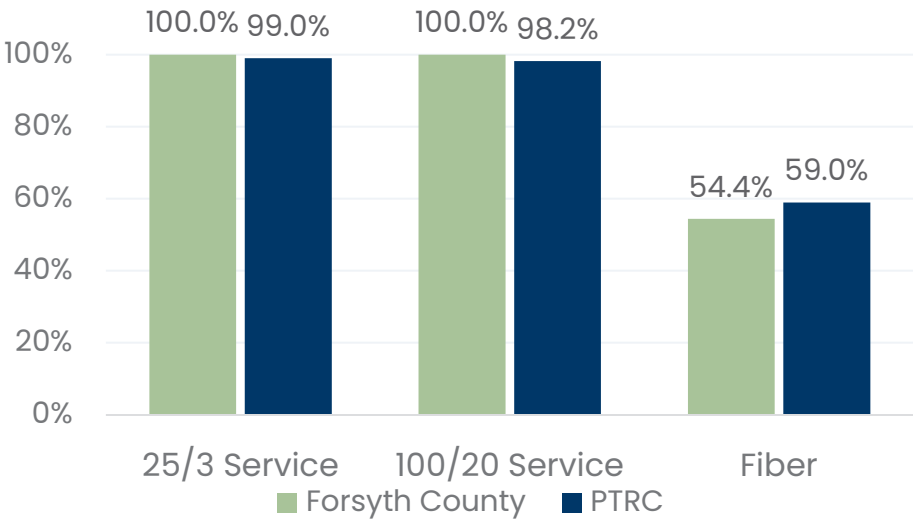
BROADBAND AVAILABILITY SCORE: 86.6

The NC Broadband Availability index awards Forsyth County a score of 86.6 ranking Forsyth in the top 5% of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Forsyth's variables are shown in the table to the right:

% with 25/3 access	100
% with 100/20 access	100
% with fiber access	54.4
Upload / Download Ratio	0.35
Household density	395
% homes built 2010 or later	7.9
% with no providers	0
% with DSL only	0

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**54.4%**
NCDIT Surry Profile	**46.0%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**99.9%**
Surry Digital Inclusion Profile	**64.8%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Forsyth County Findings.
Approximately 479, or 0.3% of Forsyth County households have responded to the survey. Some of the responses vary from the official data. For example, 24% of respondents reported download and upload speeds or less than 25/3 Mbps, and 11% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results
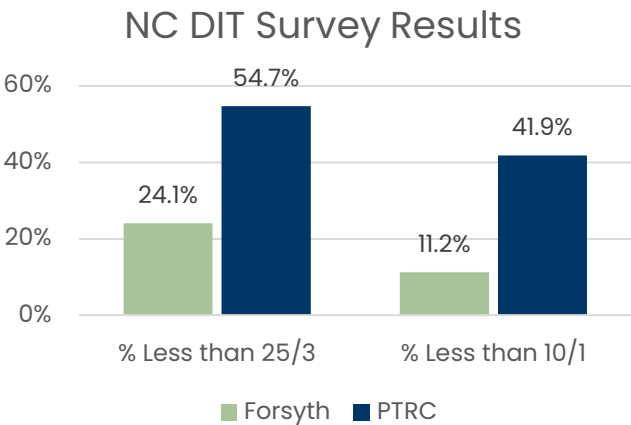
| SURVEY RESPONSE	FORSYTH	NORTH CAROLINA
Extremely or somewhat satisfied with service	49%	31%
Extremely or somewhat dissatisfied with service	29%	45%
Monthly cost over $125	23%	19%
Median download speed	75 Mbps	22 Mbps
Median upload speed	12 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. The NC Broadband Availability Index Dashboard assigns very high service ratings to Forsyth County. In a dense, urban county like Forsyth, the deficits that result in unequal internet access are more due to literacy and cost than differences in infrastructure.

Symmetry Deficits. The NC Broadband Availability Index rates Forsyth's ratio at 0.35 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio. Forsyth's ratio of 0.35 makes it the highest in the PTRC region.

Upload to Download Ratio
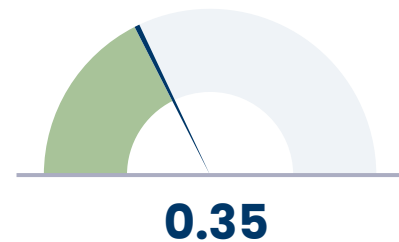
0.35

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Forsyth County has been included in several grants totaling $4 million, however only $200,000 specifically for Forsyth – with 20 households and 0 businesses served.
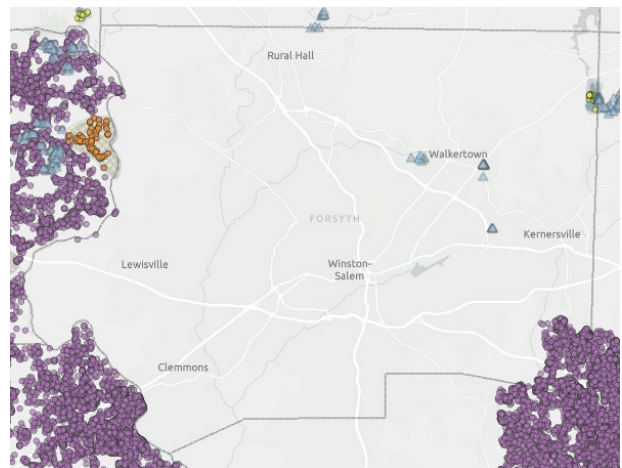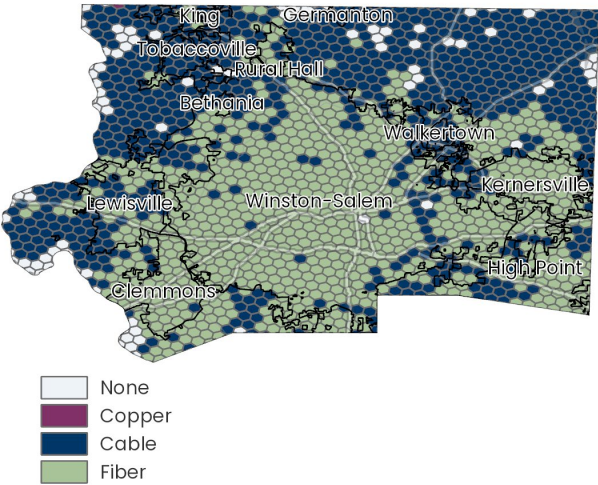
AVAILABILITY – A CLOSER LOOK

None
Copper
Cable
Fiber

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Forsyth County. The first map shows that most of Forsyth County has fiber internet options available, with other areas covered by cable service. There are a few pockets around the perimeter of the county that are lacking in fiber or cable coverage.
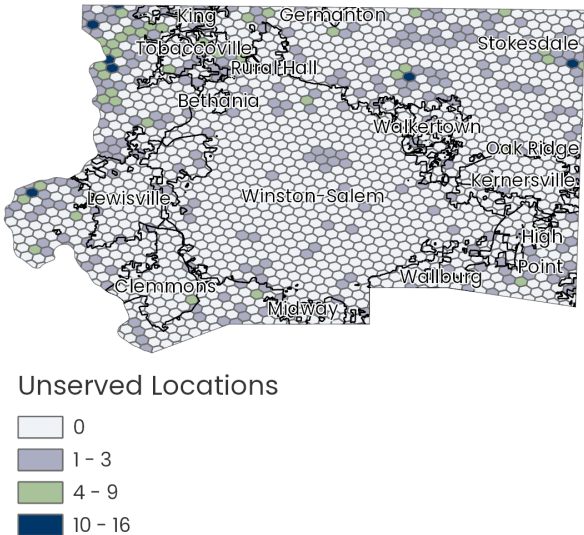
Unserved Locations

0
1 - 3
4 - 9
10 - 16

Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 99% of locations in Forsyth County have high-speed service.

5GNR Mobile Broadband
4GLTE Mobile Broadband
3G Mobile Broadband
Mobile Voice
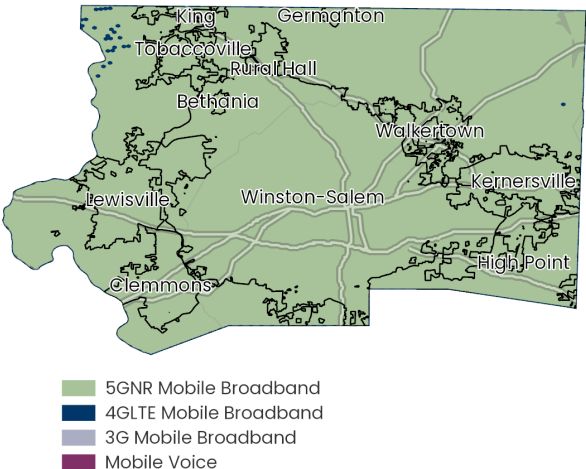
Mobile Broadband Service. 5G coverage is available across Forsyth County with only a few isolated areas relying on 4G coverage.
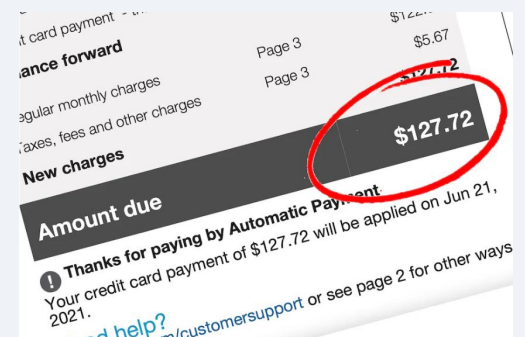
BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.
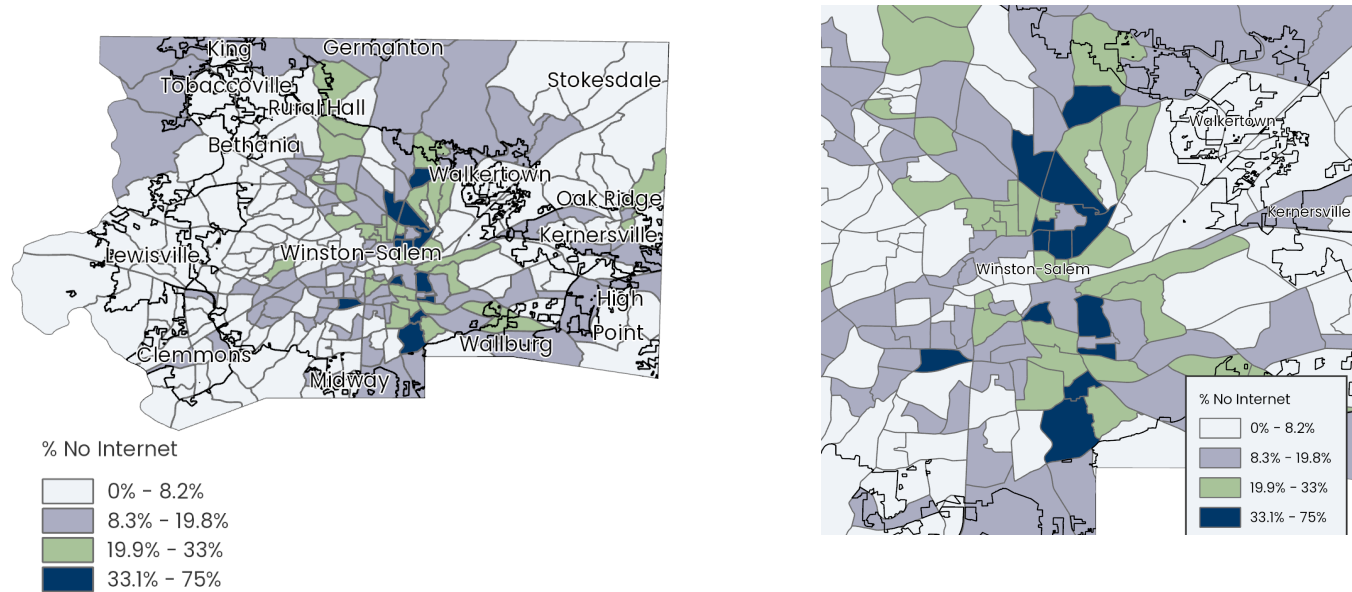
Adoption by Service Type

Legend: Forsyth County, PTRC

- Fixed Broadband: 86.8% (Forsyth County), 85.2% (PTRC)
- Cellular Only: 11.9% (Forsyth County), 10.4% (PTRC)
- Satallite Only: 0.3% (Forsyth County), 0.4% (PTRC)
- Dialup Only: 0.1% (Forsyth County), 0.1% (PTRC)
- No Broadband Subscription: 2.6% (Forsyth County), 2.8% (PTRC)
- No Internet: 10.4% (Forsyth County), 11.8% (PTRC)

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, and at almost 87% in Forsyth County, it is slightly higher than the overall PTRC coverage. Close to 12% still use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet

- 0% – 8.2%
- 8.3% – 19.8%
- 19.9% – 33%
- 33.1% – 75%

Geography of Adoption. The map of Forsyth County to the left above shows Census block groups where households with no internet service are concentrated. There is a vertical band east of the downtown area of Winston-Salem with clusters of low adoption areas. This area is highlighted in the map to the right, showing the high rates of low adoption, even within the densely populated and built environment of a major city.

BROADBAND ADOPTION SCORE: 70.3

The NC Broadband Adoption Potential index awards Forsyth County a score of 70.3, ranking Forsyth in the top quarter of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Forsyth County variables are shown in the table to the right:
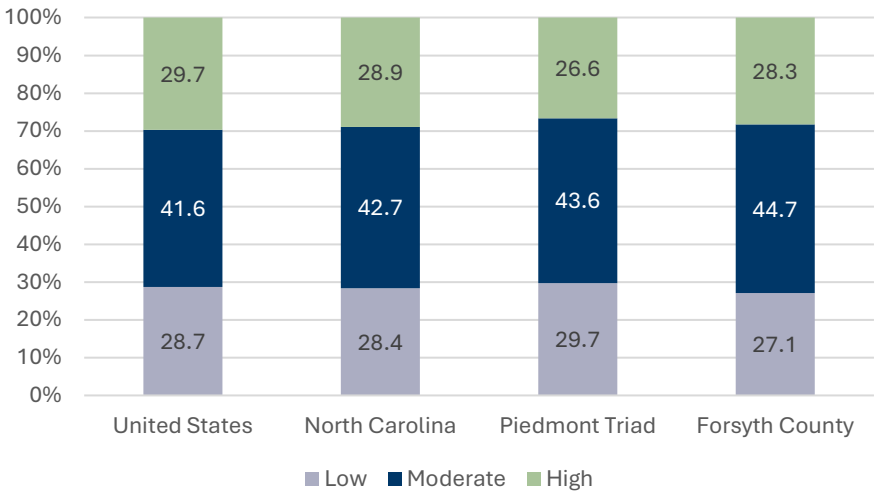
% with broadband subscription	**70.2**
% households no internet	**11.6**
% households no computer	**6.8**
% population ages 18–34	**22.8**
% population ages 65 and over	**16.0**
% households in poverty	**15.6**
% households with children	**28.7**
% limited English	**10.2**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Forsyth County include free courses and programs offered at the Forsyth County Public Library and Forsyth Tech.
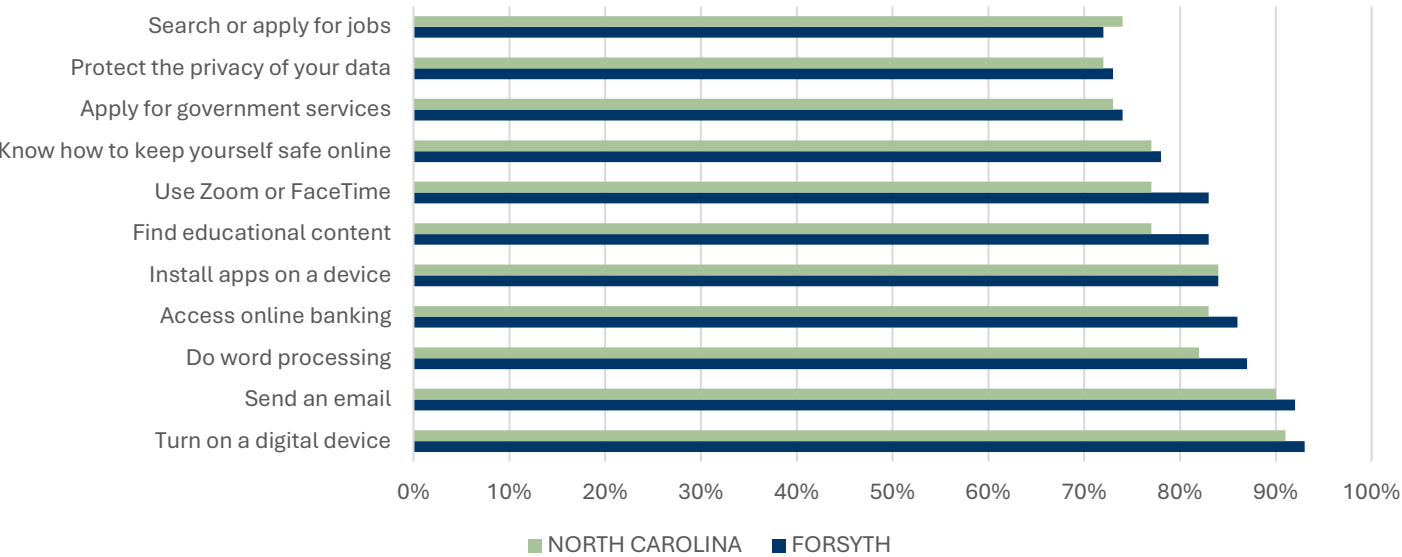
Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Forsyth County
High	29.7	28.9	26.6	28.3
Moderate	41.6	42.7	43.6	44.7
Low	28.7	28.4	29.7	27.1

■ Low ■ Moderate ■ High

We can measure digital literacy in a variety of different ways. The graph to the left shows Forsyth County has a smaller share of occupations not requiring moderate or high digital literacy. The one below presents Forsyth County residents' responses to the NC Broadband Equity Survey, indicating they have more literacy than people in the state as a whole.
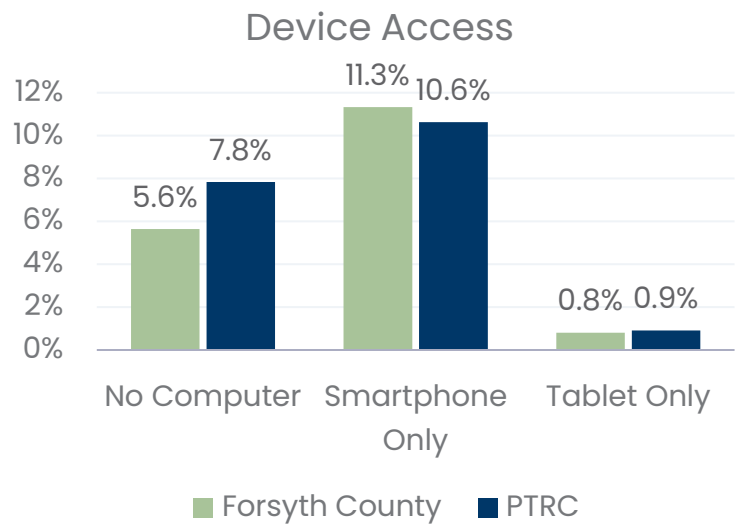
I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Search or apply for jobs
- Protect the privacy of your data
- Apply for government services
- Know how to keep yourself safe online
- Use Zoom or FaceTime
- Find educational content
- Install apps on a device
- Access online banking
- Do word processing
- Send an email
- Turn on a digital device

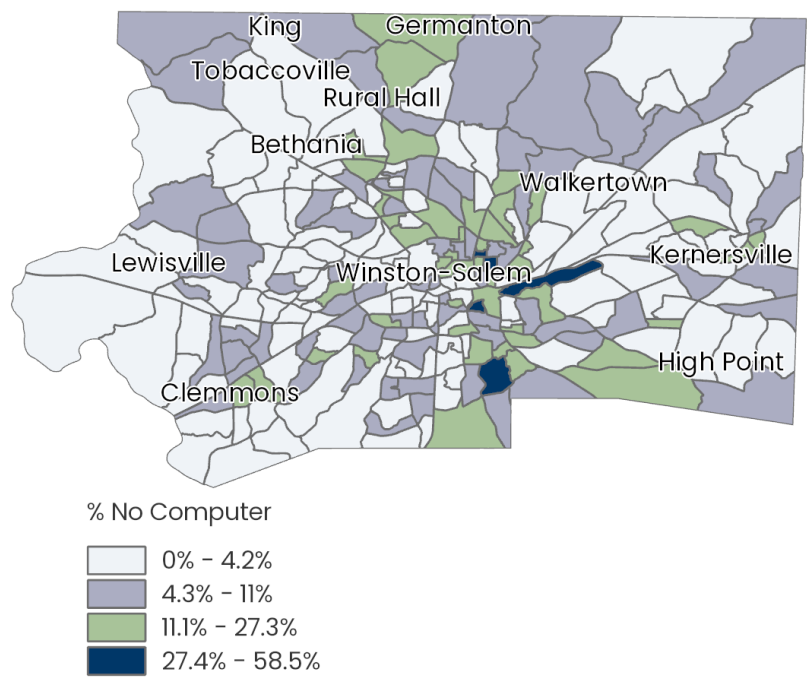■ NORTH CAROLINA ■ FORSYTH

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Forsyth County, 5.6% of households lack any kind of computer (8,640 households), and an additional 11.3% have only a smart phone to connect to the internet (17,357 households).

Device Access

Bar chart showing Device Access percentages for Forsyth County and PTRC:
- No Computer: 5.6% (Forsyth County), 7.8% (PTRC)
- Smartphone Only: 11.3% (Forsyth County), 10.6% (PTRC)
- Tablet Only: 0.8% (Forsyth County), 0.9% (PTRC)

Legend: Forsyth County, PTRC

Households with No Computer

Map labels: King, Germanton, Tobaccoville, Rural Hall, Bethania, Walkertown, Lewisville, Winston-Salem, Kernersville, Clemmons, High Point

% No Computer
- 0% – 4.2%
- 4.3% – 11%
- 11.1% – 27.3%
- 27.4% – 58.5%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are within Winston-Salem. At the same time, several census block groups where households are *most* likely to have a computer are also in Winston-Salem – a visible digital divide.
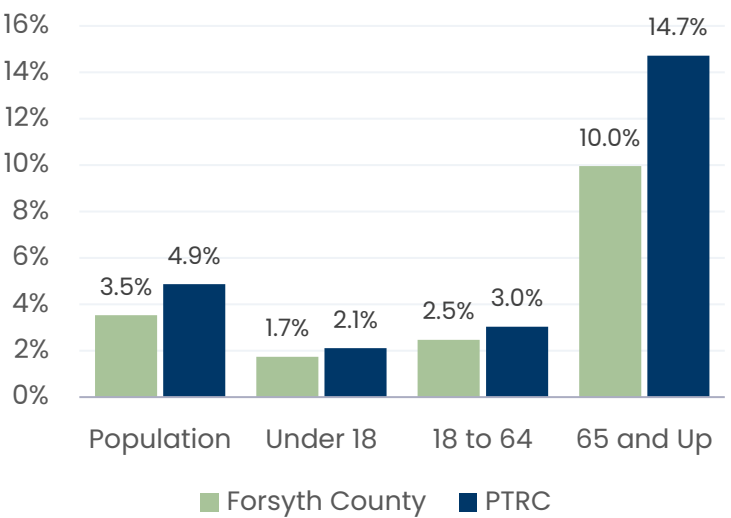
DEVICE ACCESS

Dimensions of Race and Age. There is a racial divide in access to devices in Forsyth County, but not as severe as other counties in the PTRC. 4.5% of the Black population live in a household with no computer. Seniors also suffer a disparity of device access, with 10% in households with no computer in Forsyth County.

No Computer by Race/Ethnicity
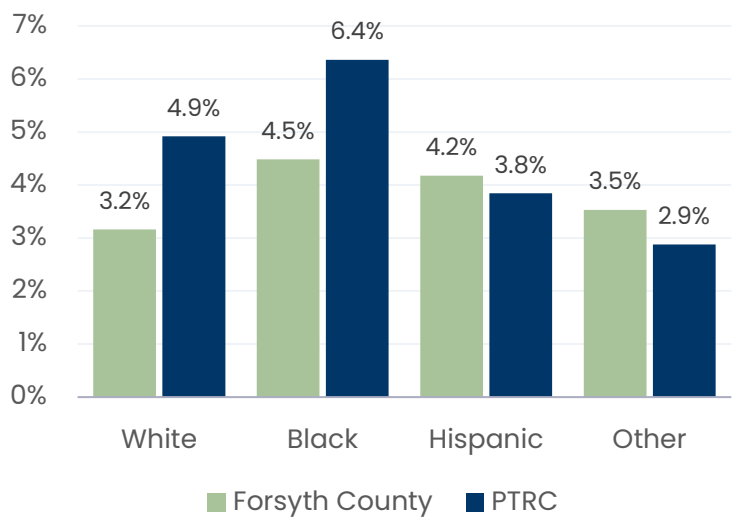
	White	Black	Hispanic	Other
Forsyth County	3.2%	4.5%	4.2%	3.5%
PTRC	4.9%	6.4%	3.8%	2.9%

■ Forsyth County ■ PTRC

No Computer by Age

	Population	Under 18	18 to 64	65 and Up
Forsyth County	3.5%	1.7%	2.5%	10.0%
PTRC	4.9%	2.1%	3.0%	14.7%

■ Forsyth County ■ PTRC

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. The Winston-Salem/Forsyth County School system provides all students in grades 3-12 with a Chromebook as an instructional resource.

Public Device Access. For those having no computer, access to public use computers is vital. Forsyth County Public Library has ten locations throughout the country where residents can access public computers and free Wi-Fi service.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Forsyth County, and areas where we see particularly underserved communities.

Forsyth County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. Forsyth County has already been taking an active role on this issue for several years. In 2021, the county released its digital equity plan that outlined a number of policies and programs focused on closing the digital divide. These include the Computer Training Bridge, a free library outreach program providing digital training; Digital Bridges Forsyth, a program providing training and laptops to residents; and WinstonNet, a nonprofit that coordinates resources across the county.
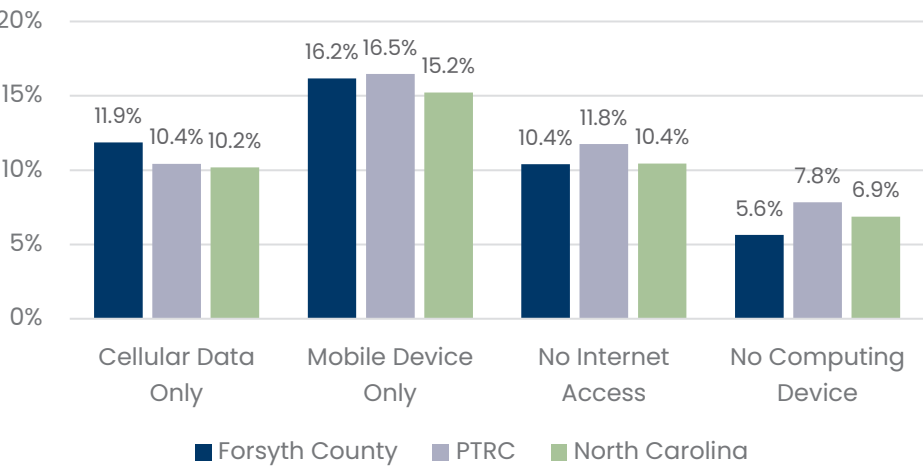
Households by Digital Distress

Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Forsyth County experiences a higher rate of individuals relying on cellular data only than the PTRC or the state as a whole.
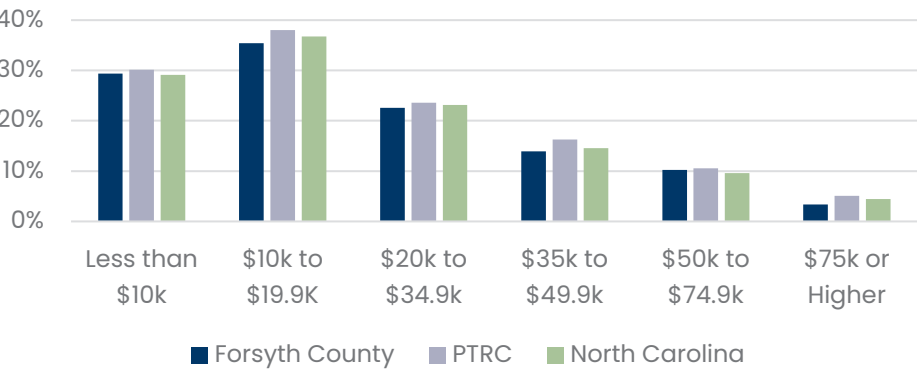
No Internet Access by Household Income

Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Forsyth County as elsewhere, that's true, with Forsyth having similar rates of no internet access to the PTRC and North Carolina at each income group.

GUILFORD
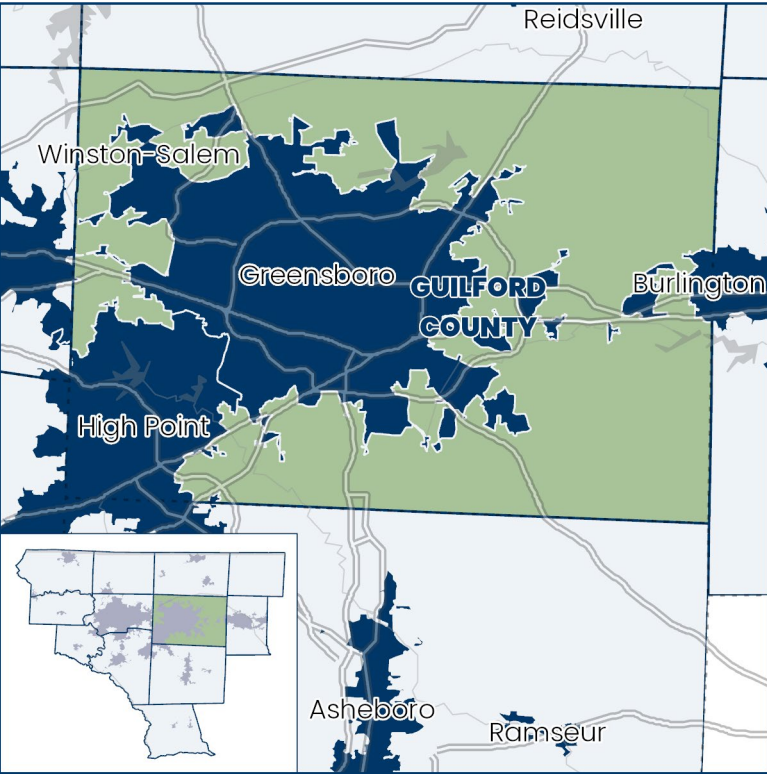
Guilford County is high in population size, ranking 3rd in North Carolina, and moderate in land area, ranking 22nd. It's located in the northwestern section of the PTRC's 12-county service area. Greensboro is the largest population center and county seat, with a population of 301,115.

Guilford County is designated a Tier Two county in the NC Department of Commerce distress rankings; it was classified as Tier Three in 2016. It is currently ranked 56th in the state, its ranking being lowered by its unemployment rate and tax base per capita.

Guilford County is more urban, diverse, and well-educated than the PTRC as a whole.

DEMOGRAPHICS	GUILFORD	PTRC
Population	539,557	1,745,206
White	259,445 (48.1%)	1,081,094 (61.9%)
Black	182,645 (33.9%)	371,529 (21.3%)
Hispanic	46,429 (8.6%)	181,589 (10.4%)
Other	51,038 (9.5%)	110,994 (6.4%)
Median Age	37.2	42.9 (Counties Average)
Median Income	$62,880	$58,333 (Counties Average)
% Household Poverty	14.7%	14.5%
% College Degree	37.9%	28.7%
% Under 18	21.9%	21.8%
% 65 and Over	15.5%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	GUILFORD	NORTH CAROLINA
Percent Population with Available 25/3 Service	99.5%	98.4%
Percent Population with Available 100/20 Service	99.3%	95.8%
Percent Population with Available Fiber Service	68.4%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
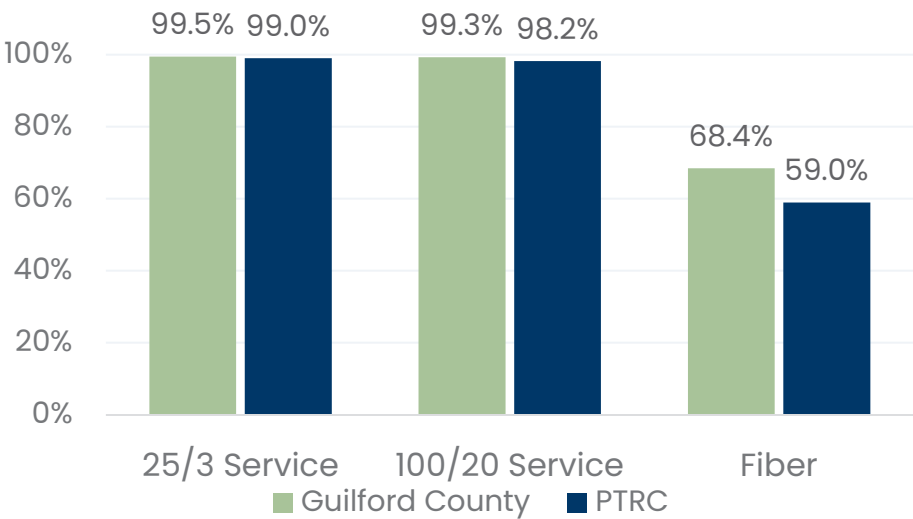
BROADBAND AVAILABILITY SCORE: 80.9

The NC Broadband Availability index awards Guilford County a score of 80.9, ranking Guilford in the top 10% of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Guilford's variables are shown in the table to the right:

% with 25/3 access	99.5
% with 100/20 access	99.3
% with fiber access	68.4
Upload / Download Ratio	0.20
Household density	357.6
% homes built 2010 or later	8.4
% with no providers	0
% with DSL only	0.6

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**68.4%**
NCDIT Guilford Profile	**64.8%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**99.3%**
Guilford Digital Inclusion Profile	**78.0%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Guilford County Findings. Approximately 1,137, or 0.5% of Guilford County households have responded to the survey. Some of the responses vary from the official data. For example, 40% of respondents reported download and upload speeds or less than 25/3 Mbps, and 28% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results
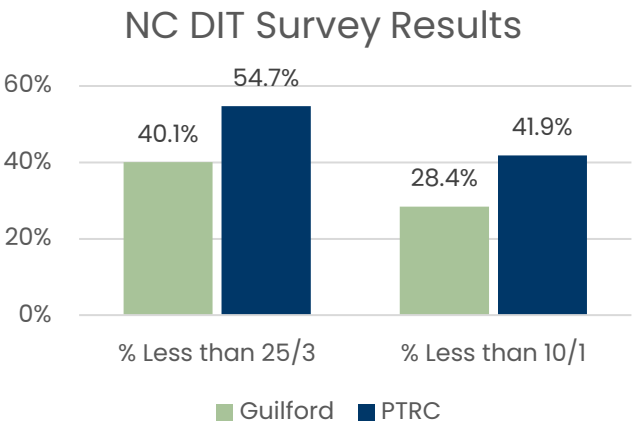
| SURVEY RESPONSE	GUILFORD	NORTH CAROLINA
Extremely or somewhat satisfied with service	38%	31%
Extremely or somewhat dissatisfied with service	30%	45%
Monthly cost over $125	22%	19%
Median download speed	45 Mbps	22 Mbps
Median upload speed	12 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. The NC Broadband Availability Index Dashboard assigns very high service ratings to Guilford County. However, in a recent report on broadband, the county reported 30% of residents living in Census tracts with low availability, due to limited consumer options.

Symmetry Deficits. The NC Broadband Availability Index rates Guilford's ratio at 0.20 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio. With a ratio of 0.2, Guilford County is the second highest in the PTRC.

Upload to Download Ratio
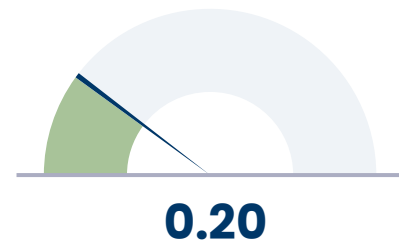
0.20

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Guilford County has been included in several grants totaling $4 million, including $2 million specifically for Guilford – with 523 households and 16 businesses served.
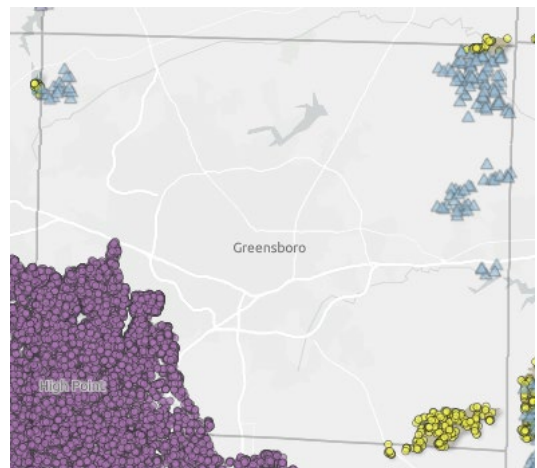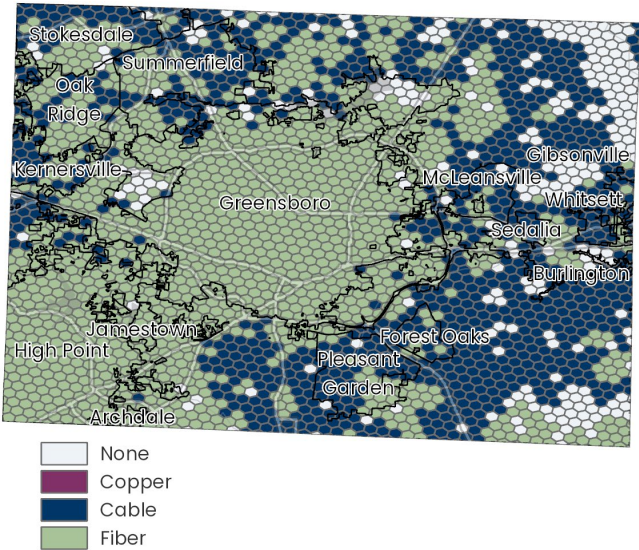
AVAILABILITY – A CLOSER LOOK

Unserved Locations

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Guilford County. The first map shows that most of Guilford County has fiber internet options available, with other areas covered by cable service. Fiber service has not reached the areas of the county outside of Greensboro and High Point, and there are pockets of no coverage of fiber or cable in these areas.
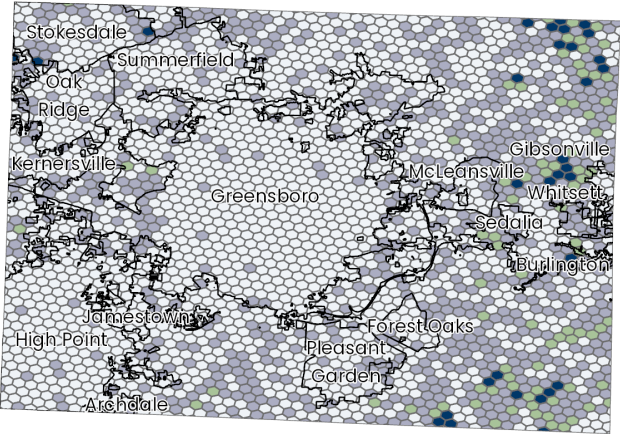
Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 98% of locations in Guilford County have high-speed service.
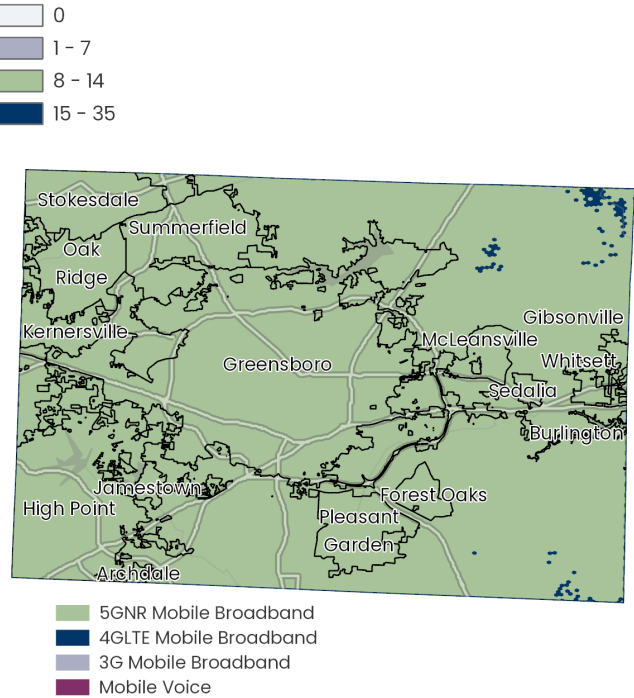
Mobile Broadband Service. 5G coverage is available across Guilford County with only a few isolated areas relying on 4G coverage.
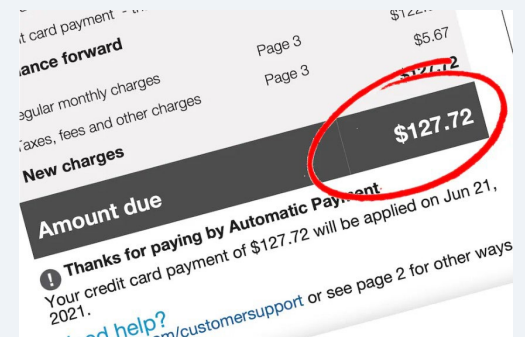
BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.
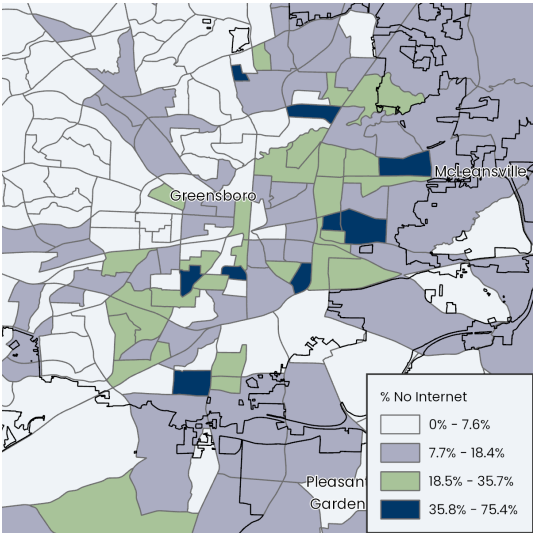
Adoption by Service Type

Legend: ▇ Guilford County ▇ PTRC

Data points:
- Fixed Broadband: Guilford County 87.3%, PTRC 85.2%
- Cellular Only: Guilford County 9.4%, PTRC 10.4%
- Satallite Only: Guilford County 0.3%, PTRC 0.4%
- Dialup Only: Guilford County 0.1%, PTRC 0.1%
- No Broadband Subscription: Guilford County 3.0%, PTRC 2.8%
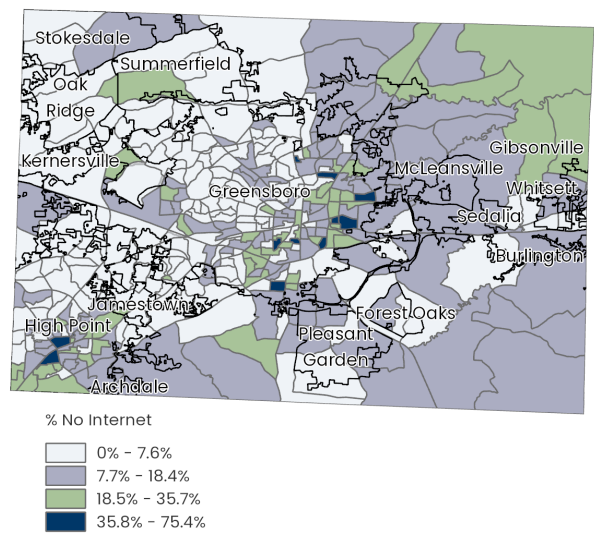- No Internet: Guilford County 9.6%, PTRC 11.8%

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, and at over 87% in Guilford County, it is slightly higher than the overall PTRC coverage. Over 9% still use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

Geography of Adoption. The map of Guilford County to the left above shows Census block groups where households with no internet service are concentrated. There are pockets on the eastern half of Greensboro, as well as in High Point of low internet adoption. The areas in Greensboro are highlighted in the map to the right, showing the high rates of low adoption, even within the densely populated and built environment of a major city.

BROADBAND ADOPTION SCORE: 74.6

The NC Broadband Adoption Potential index awards Guilford County a score of 74.6, ranking Guilford in the top quarter of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Guilford County variables are shown in the table to the right:
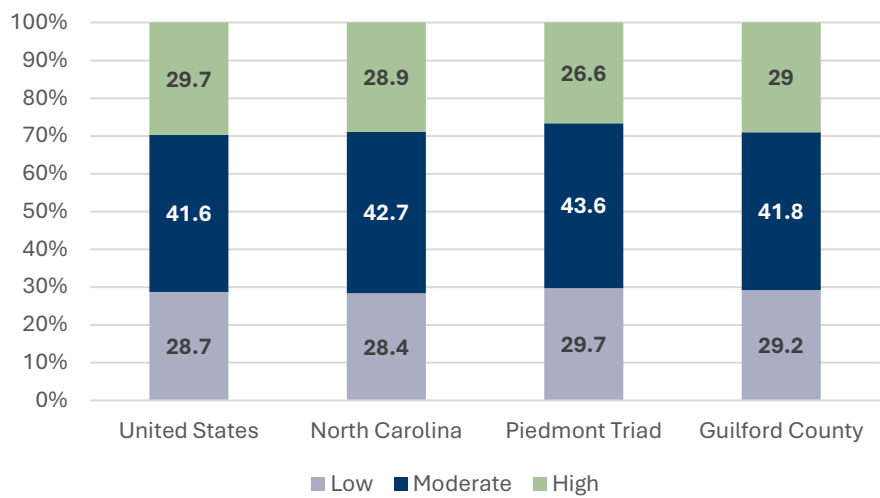
% with broadband subscription	**72.9**
% households no internet	**11.2**
% households no computer	**8.6**
% population ages 18–34	**24.4**
% population ages 65 and over	**15.2**
% households in poverty	**14.5**
% households with children	**31.0**
% limited English	**10.6**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Guilford County include online sessions taught by the NC Cooperative Extension – Guilford County Center.
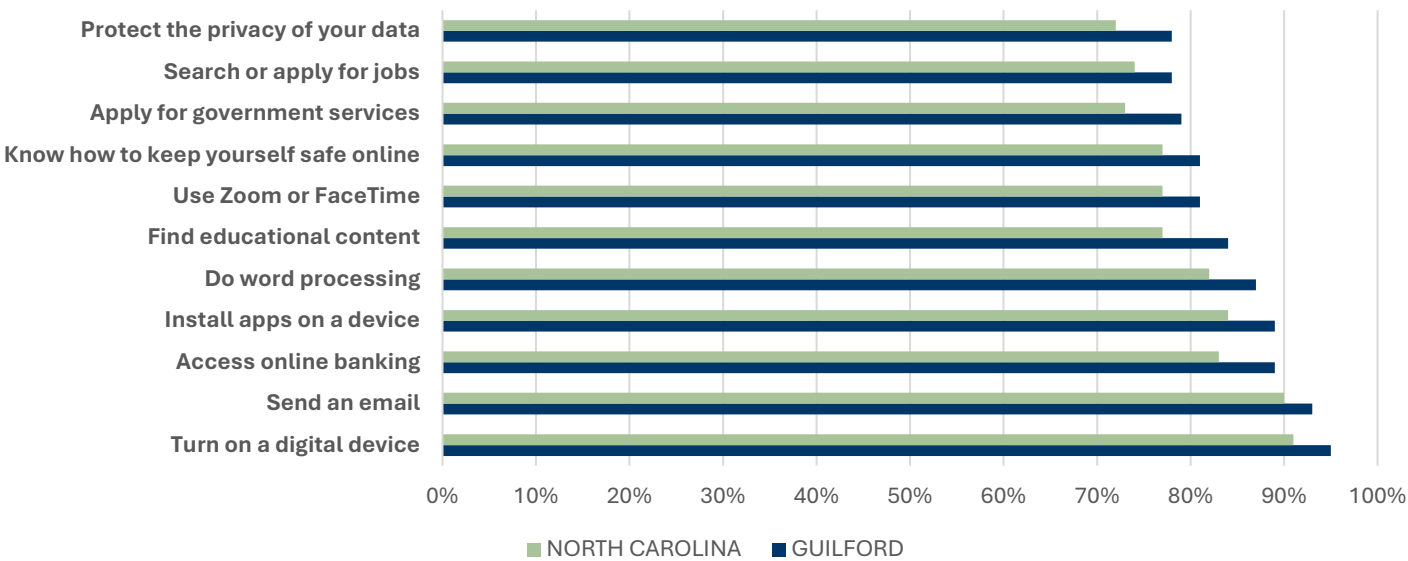
Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Guilford County
High	29.7	28.9	26.6	29
Moderate	41.6	42.7	43.6	41.8
Low	28.7	28.4	29.7	29.2

■ Low ■ Moderate ■ High

We can measure digital literacy in a variety of different ways. The graph to the left shows Guilford County has a similar share of occupations requiring high digital literacy. The one below presents Guilford County residents' responses to the NC Broadband Equity Survey, indicating they have notably more literacy than people in the state as a whole.
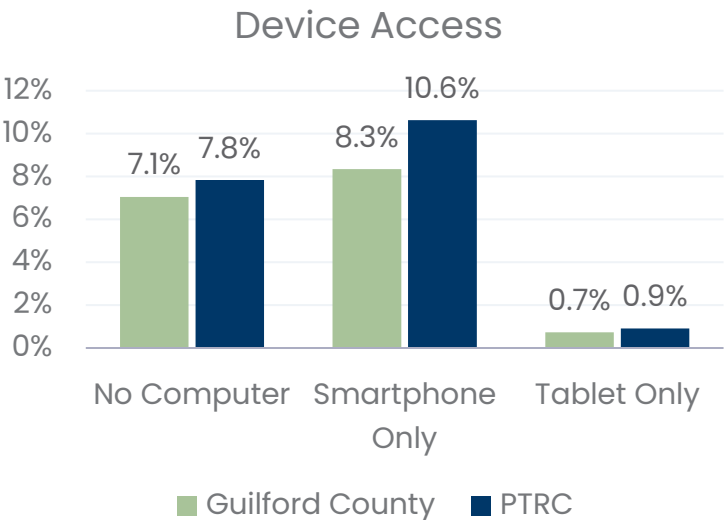
I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Protect the privacy of your data
- Search or apply for jobs
- Apply for government services
- Know how to keep yourself safe online
- Use Zoom or FaceTime
- Find educational content
- Do word processing
- Install apps on a device
- Access online banking
- Send an email
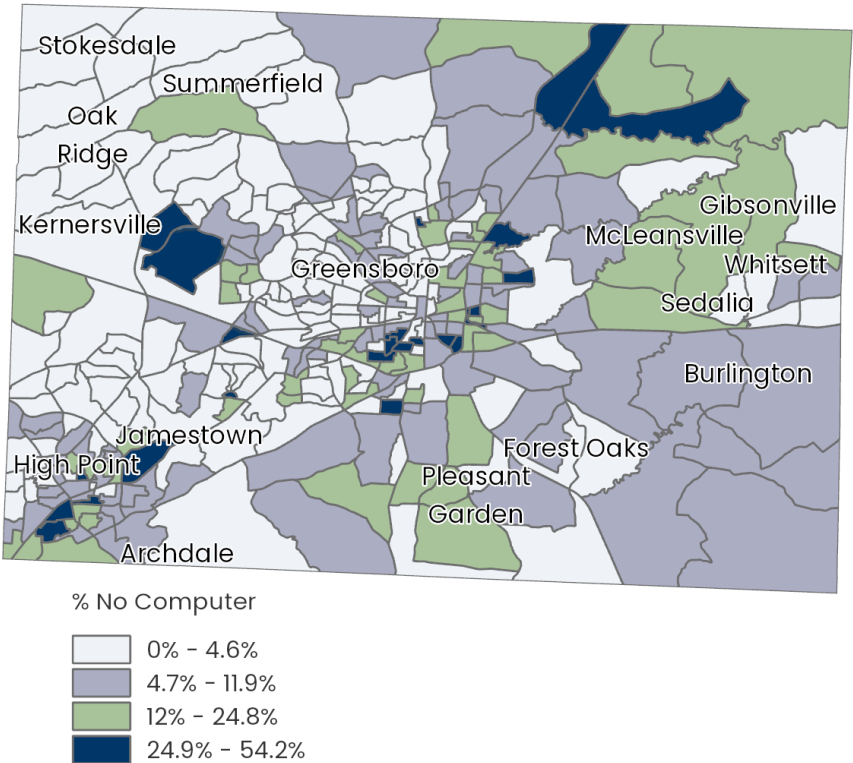- Turn on a digital device

■ NORTH CAROLINA ■ GUILFORD

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Guilford County, over 7% of households lack any kind of computer (15,013 households), and an additional 8.3% have only a smart phone to connect to the internet (17,770 households).

Device Access

Bar chart showing Device Access. No Computer: Guilford County 7.1%, PTRC 7.8%. Smartphone Only: Guilford County 8.3%, PTRC 10.6%. Tablet Only: Guilford County 0.7%, PTRC 0.9%.

Legend: ■ Guilford County ■ PTRC

Households with No Computer

Map of Guilford County showing households with no computer by census block group. Labeled places: Stokesdale, Summerfield, Oak Ridge, Kernersville, Greensboro, Gibsonville, McLeansville, Whitsett, Sedalia, Burlington, Jamestown, High Point, Forest Oaks, Pleasant Garden, Archdale.

% No Computer
- 0% - 4.6%
- 4.7% - 11.9%
- 12% - 24.8%
- 24.9% - 54.2%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are within the City of Greensboro. At the same time, several census block groups where households are *most* likely to have a computer are also in Greensboro – a visible digital divide.
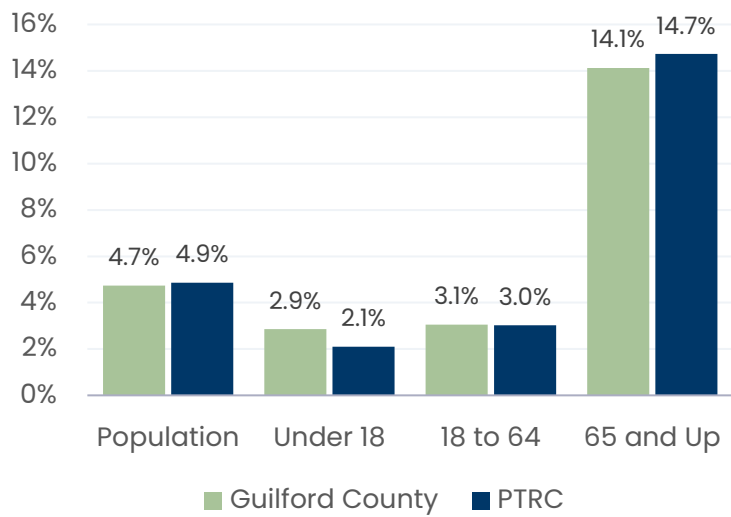
DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Over 6% of Guilford County's Black population live in a household with no computer. Seniors also suffer a disparity of device access, with over 14% in households with no computer in Guilford County.

No Computer by Race/Ethnicity
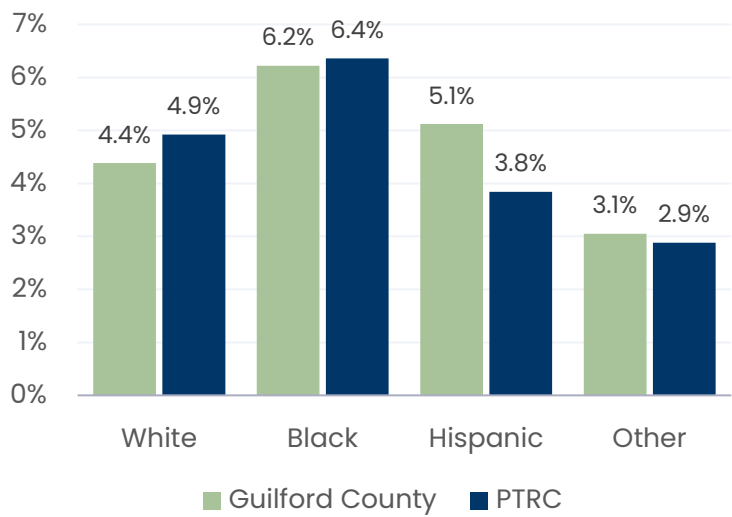
	White	Black	Hispanic	Other
Guilford County	4.4%	6.2%	5.1%	3.1%
PTRC	4.9%	6.4%	3.8%	2.9%

No Computer by Age

	Population	Under 18	18 to 64	65 and Up
Guilford County	4.7%	2.9%	3.1%	14.1%
PTRC	4.9%	2.1%	3.0%	14.7%

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. Guilford County Public Schools provide Chromebooks for students in grades 5-12, with computers or tablets available in every classroom K-12.

Public Device Access. For those having no computer, access to public use computers is vital. Guilford County Public Library has eight locations throughout the country where residents can access public computers and free Wi-Fi service.
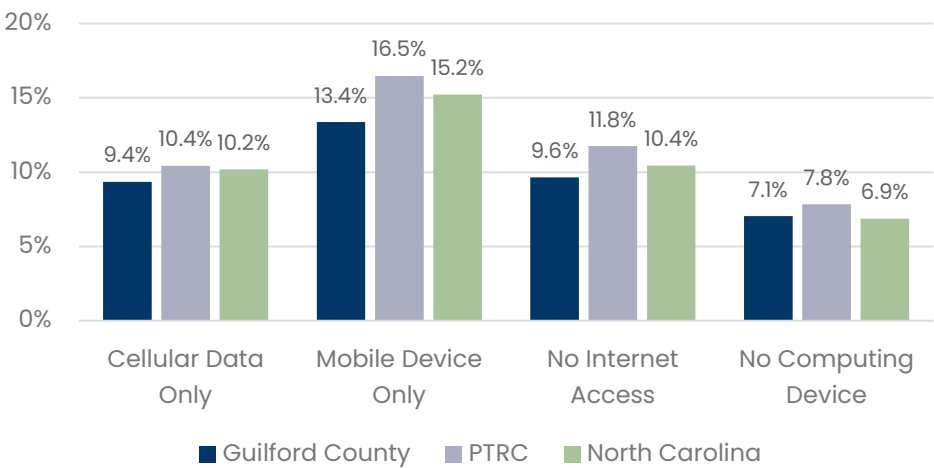
DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Guilford County, and areas where we see particularly underserved communities.
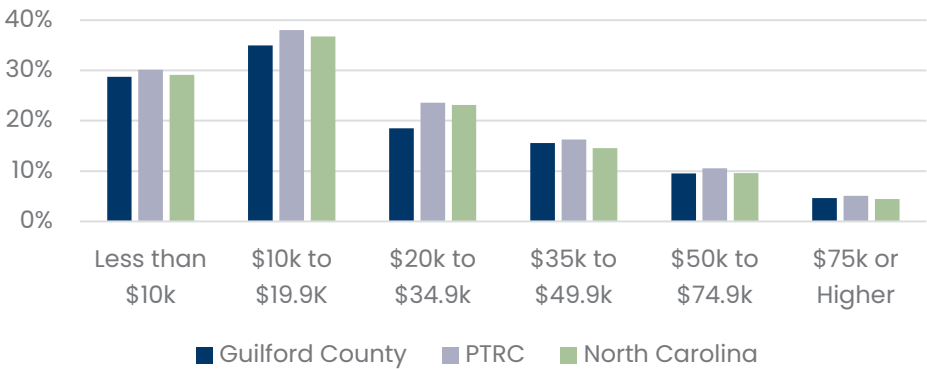
Guilford County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. Guilford County has been taking action to address the digital divide and released a broadband strategy in 2024. This strategy includes examining strategies already underway in Guilford County, such as the Greensboro Smart Connected City and Technology and Data Institute Pervasive Digital Access Project.

Households by Digital Distress

Cellular Data Only: Guilford County 9.4%, PTRC 10.4%, North Carolina 10.2%
Mobile Device Only: Guilford County 13.4%, PTRC 16.5%, North Carolina 15.2%
No Internet Access: Guilford County 9.6%, PTRC 11.8%, North Carolina 10.4%
No Computing Device: Guilford County 7.1%, PTRC 7.8%, North Carolina 6.9%

Legend: Guilford County, PTRC, North Carolina

Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Guilford County experiences lower distress levels in three categories than the PTRC or the state as a whole.

No Internet Access by Household Income

Less than $10k, $10k to $19.9K, $20k to $34.9k, $35k to $49.9k, $50k to $74.9k, $75k or Higher

Legend: Guilford County, PTRC, North Carolina

Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Guilford County as elsewhere, that's true, but in Guilford, lack of adoption and access are typically lower across the board, regardless of income.

MONTGOMERY
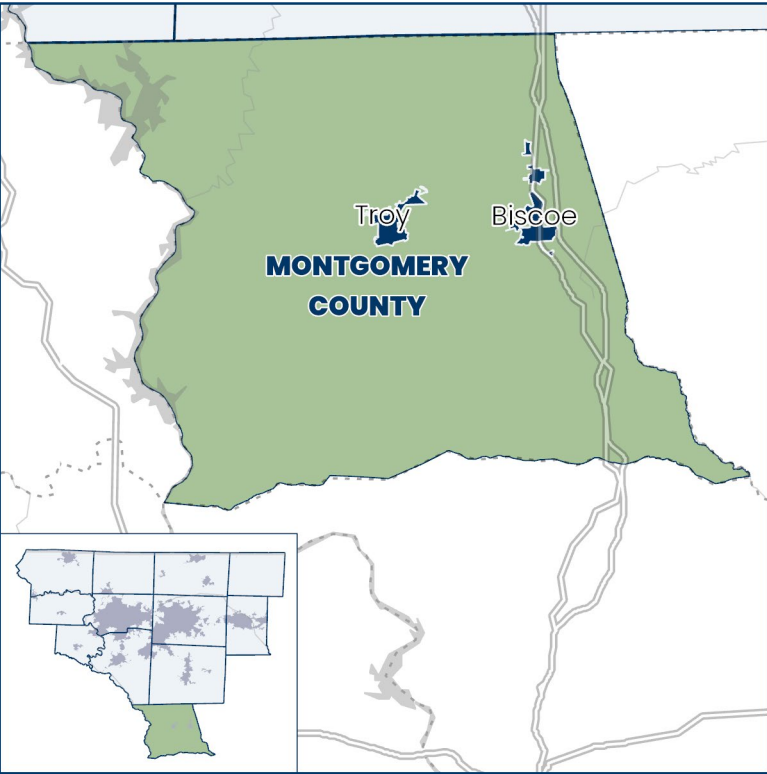
Montgomery County is low in population size, ranking 74th in North Carolina, and moderate in land area, ranking 44th. It's located in the southern section of the PTRC's 12-county service area. Troy is the largest population center and county seat, with a population of 2,850.

Montgomery County is designated a Tier Two county in the NC Department of Commerce distress rankings; it was ranked Tier One (most distressed in 2018. While it has a relatively high tax base per capita, Montgomery has seen a population decline of over 1% from 2019 to 2022.

Montgomery County is more rural, poorer, and less well-educated than the PTRC as a whole, and has a higher Hispanic population.

DEMOGRAPHICS	MONTGOMERY	PTRC
Population	25,839	1,745,206
White	16,161 (62.5%)	1,081,094 (61.9%)
Black	4,412 (17.1%)	371,529 (21.3%)
Hispanic	4,112 (15.9%)	181,589 (10.4%)
Other	1,154 (4.5%)	110,994 (6.4%)
Median Age	43.7	42.9 (Counties Average)
Median Income	$55,523	$58,333 (Counties Average)
% Household Poverty	16.0%	14.5%
% College Degree	19.7%	28.7%
% Under 18	21.2%	21.8%
% 65 and Over	21.2%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	MONTGOMERY	NORTH CAROLINA
Percent Population with Available 25/3 Service	84.0%	98.4%
Percent Population with Available 100/20 Service	64.2%	95.8%
Percent Population with Available Fiber Service	11.9%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
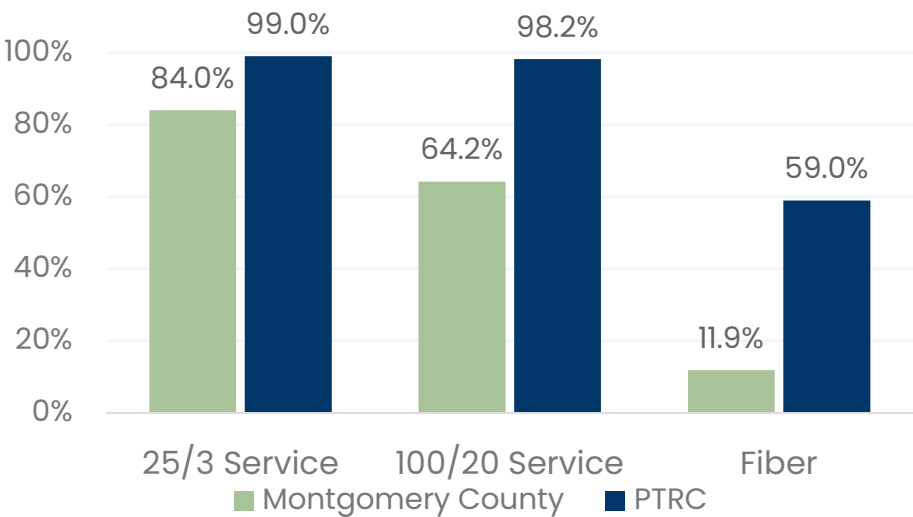
BROADBAND AVAILABILITY SCORE: 19.6

The NC Broadband Availability index awards Montgomery County a score of 19.6, ranking Montgomery as second lowest of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Montgomery's variables are shown in the table to the right:

% with 25/3 access	84.0
% with 100/20 access	64.2
% with fiber access	11.9
Upload / Download Ratio	0.13
Household density	19.8
% homes built 2010 or later	5.6
% with no providers	0
% with DSL only	10.8

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**11.9%**
NCDIT Montgomery Profile	**20.8%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**64.2%**
Montgomery Digital Inclusion Profile	**3.1%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Montgomery County Findings. Approximately 830, or 8.7% of Montgomery County households have responded to the survey. Some of the responses vary from the official data. For example, 87% of respondents reported download and upload speeds or less than 25/3 Mbps, and 73% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results

	% Less than 25/3	% Less than 10/1
Montgomery	86.6%	73.0%
PTRC	54.7%	41.9%
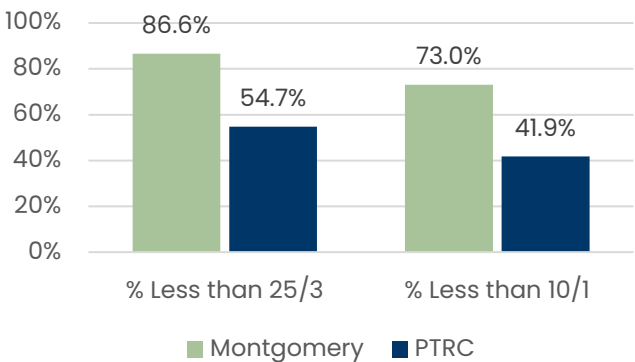
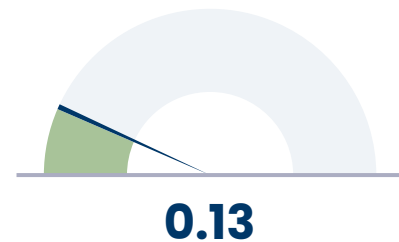| SURVEY RESPONSE	MONTGOMERY	NORTH CAROLINA
Extremely or somewhat satisfied with service	14%	31%
Extremely or somewhat dissatisfied with service	65%	45%
Monthly cost over $125	14%	19%
Median download speed	7 Mbps	22 Mbps
Median upload speed	1 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. The NC Broadband Availability Index Dashboard assigns low service ratings to Montgomery County, which means there are significant deficits in connectivity across the county. Fiber and cable services are being built across the county, and local officials say this is improving service for many residents, but gaps remain.

Symmetry Deficits. The NC Broadband Availability Index rates Montgomery's ratio at 0.13 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio.

Upload to Download Ratio

0.13

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Montgomery County has been included in several grants totaling $6 million, including over $5 million specifically for Montgomery – with 3,595 households and 44 businesses served.
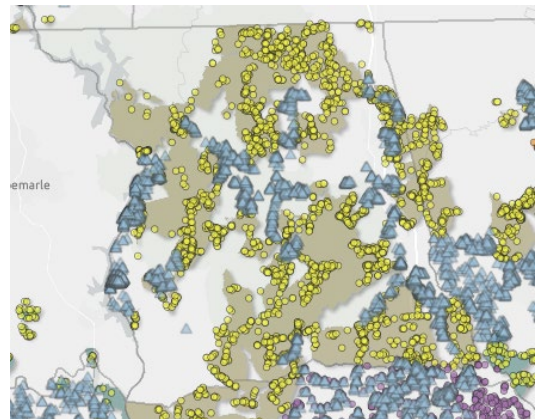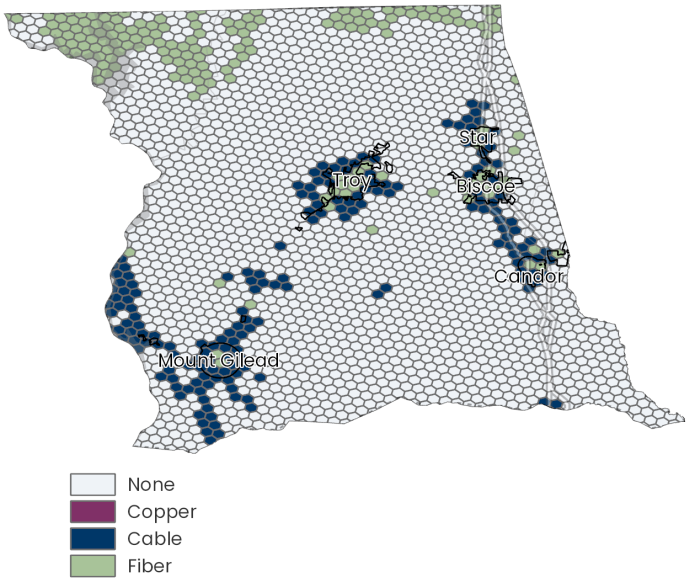
AVAILABILITY – A CLOSER LOOK

Legend:
- None
- Copper
- Cable
- Fiber

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Montgomery County. The first map shows that most of Montgomery County is lacking in fiber, cable, or copper service. Much of the county lacks access to high-speed internet services; however, much of this area has little to no population.
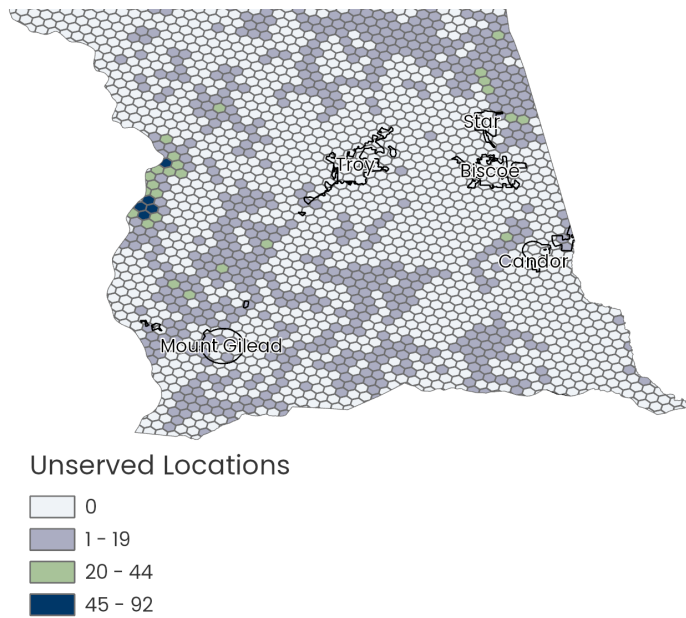
Unserved Locations:
- 0
- 1 - 19
- 20 - 44
- 45 - 92

Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 78% of locations in Montgomery County have high-speed service.
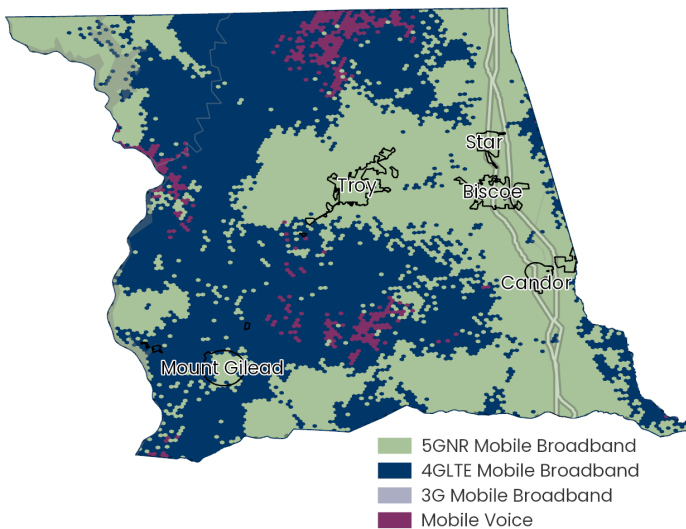
Legend:
- 5GNR Mobile Broadband
- 4GLTE Mobile Broadband
- 3G Mobile Broadband
- Mobile Voice

Mobile Broadband Service. Mobile broadband is available in much of the county as well. There are pockets where only mobile voice data is available, but 5G and 4G coverage is available across Montgomery.

BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.
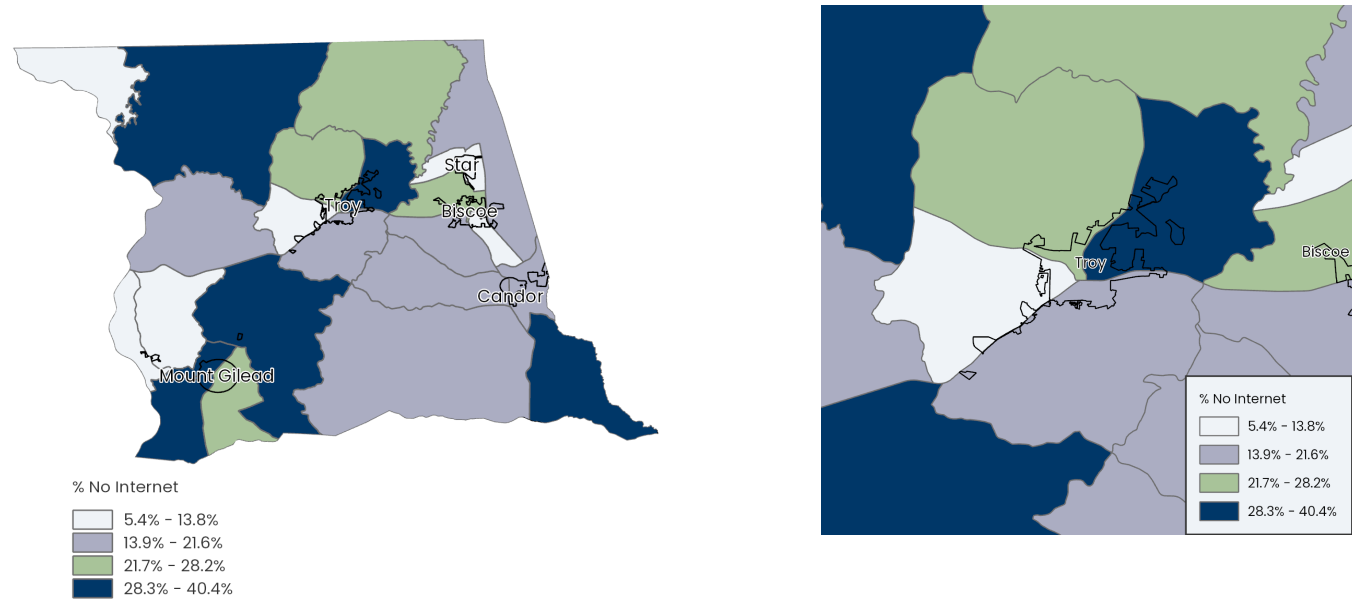
Adoption by Service Type

Legend: Montgomery County, PTRC

Data by service type:
- Fixed Broadband: 75.9% (Montgomery County), 85.2% (PTRC)
- Cellular Only: 13.4% (Montgomery County), 10.4% (PTRC)
- Satallite Only: 3.8% (Montgomery County), 0.4% (PTRC)
- Dialup Only: 0.3% (Montgomery County), 0.1% (PTRC)
- No Broadband Subscription: 2.8% (Montgomery County), 2.8% (PTRC)
- No Internet: 20.9% (Montgomery County), 11.8% (PTRC)
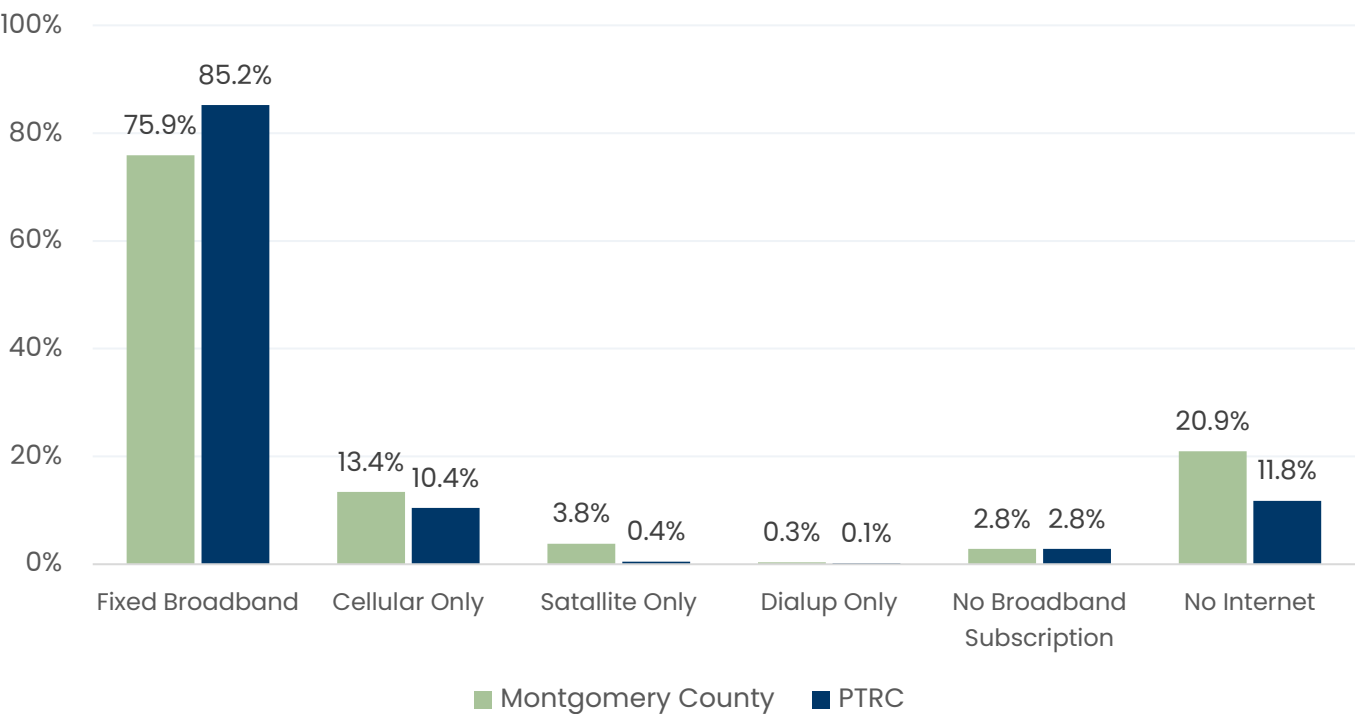
The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, but at 76% in Montgomery County, that leaves a lot of room for less desirable pathways. Many use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet
- 5.4% – 13.8%
- 13.9% – 21.6%
- 21.7% – 28.2%
- 28.3% – 40.4%

Geography of Adoption. The map of Montgomery County to the left above shows Census block groups where households with no internet service are concentrated. It appears areas of high, medium, and low adoption are mixed together: no one area of the county has the highest concentration of internet adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Troy. It, too, has a mixture of high, medium, and low-adoption areas.

BROADBAND ADOPTION SCORE: 30.4

The NC Broadband Adoption Potential index awards Montgomery County a score of 30.4, ranking Montgomery in the bottom quarter of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Montgomery County variables are shown in the table to the right:

% with broadband subscription	**49.7**
% households no internet	**24.3**
% households no computer	**14.9**
% population ages 18–34	**19.0**
% population ages 65 and over	**20.3**
% households in poverty	**15.6**
% households with children	**23.6**
% limited English	**2.5**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Montgomery County are limited, but residents are always able to ask librarians for assistance.
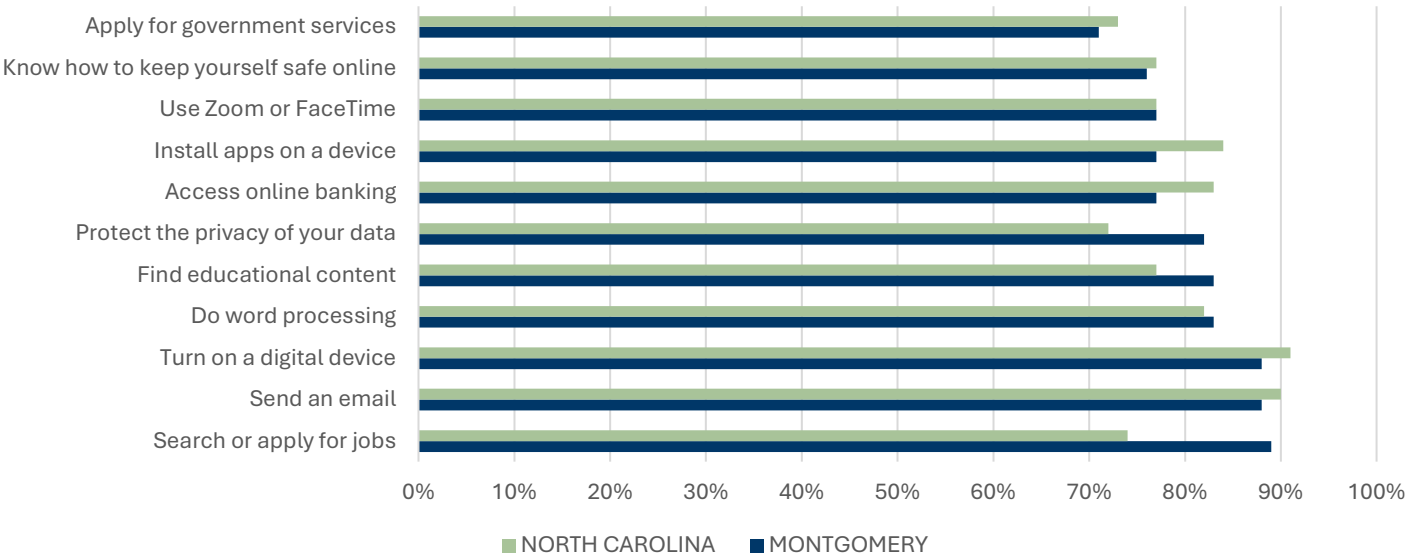
Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Montgomery County
High	29.7	28.9	26.6	19.4
Moderate	41.6	42.7	43.6	45.1
Low	28.7	28.4	29.7	35.5

■ Low ■ Moderate ■ High
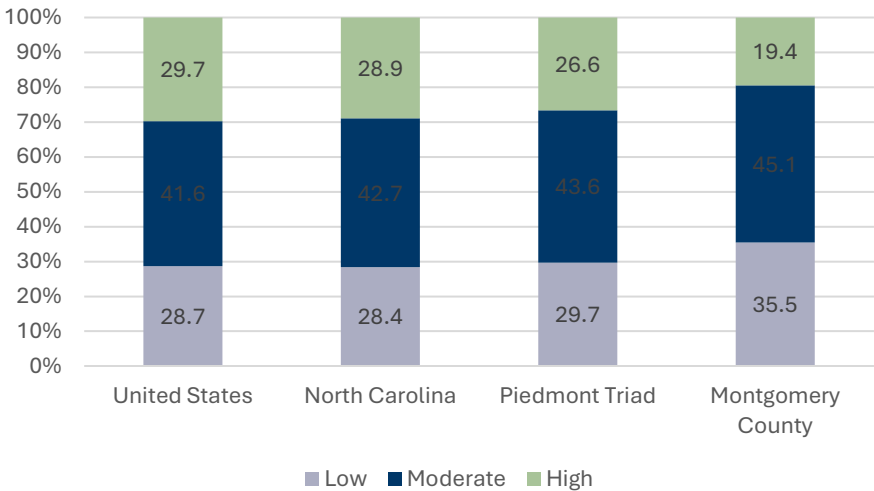
We can measure digital literacy in a variety of different ways. The graph to the left shows Montgomery County has a smaller share of occupations requiring high digital literacy. The one below presents Montgomery County residents' responses to the NC Broadband Equity Survey, indicating they have somewhat higher literacy than people in the state as a whole.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Apply for government services
- Know how to keep yourself safe online
- Use Zoom or FaceTime
- Install apps on a device
- Access online banking
- Protect the privacy of your data
- Find educational content
- Do word processing
- Turn on a digital device
- Send an email
- Search or apply for jobs

■ NORTH CAROLINA ■ MONTGOMERY

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Montgomery County, over 12% of households lack any kind of computer (1,175 households), and an additional 16.8% have only a smart phone to connect to the internet (1,595 households).
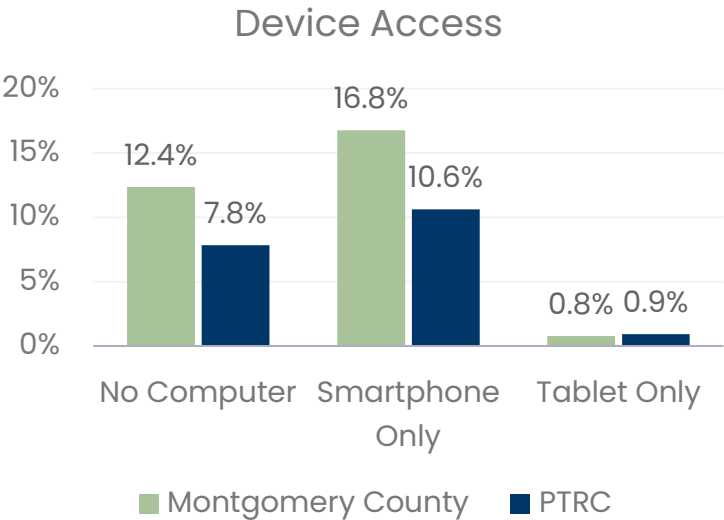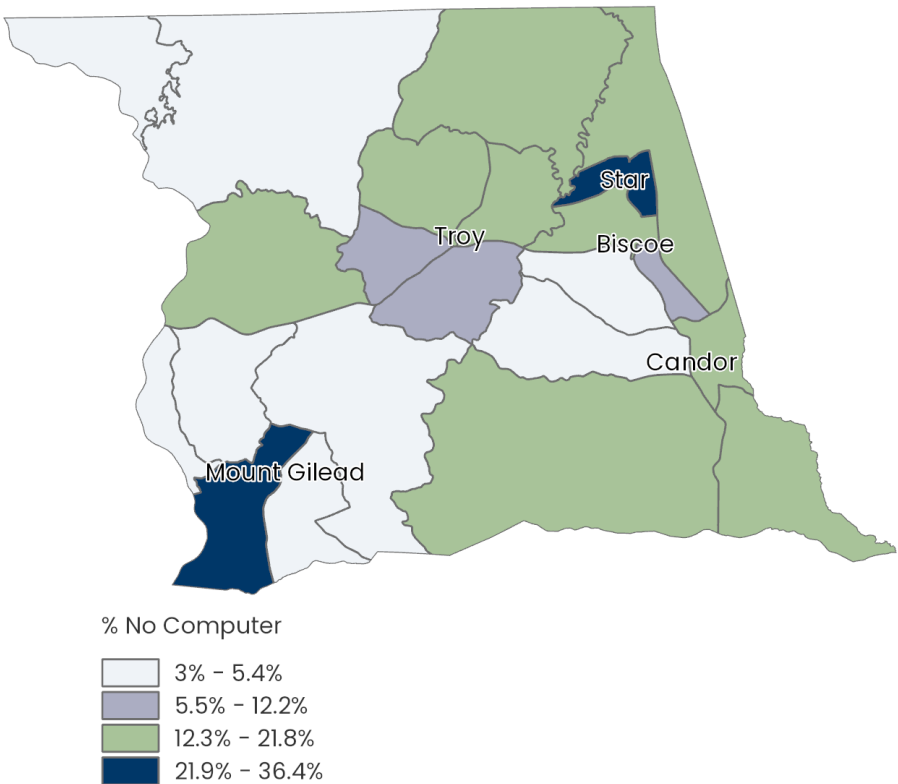
Device Access

Legend: ▉ Montgomery County ▉ PTRC

No Computer: 12.4% / 7.8%
Smartphone Only: 16.8% / 10.6%
Tablet Only: 0.8% / 0.9%

Households with No Computer

% No Computer
- 3% – 5.4%
- 5.5% – 12.2%
- 12.3% – 21.8%
- 21.9% – 36.4%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the vicinity of Gilead. At the same time, several census block groups where households are *most* likely to have a computer are also in and around Gilead – a visible digital divide.

DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Over 19% of Surry County's Black population live in a household with no computer. Seniors also suffer a disparity of device access, with over 17% in households with no computer in Surry County.
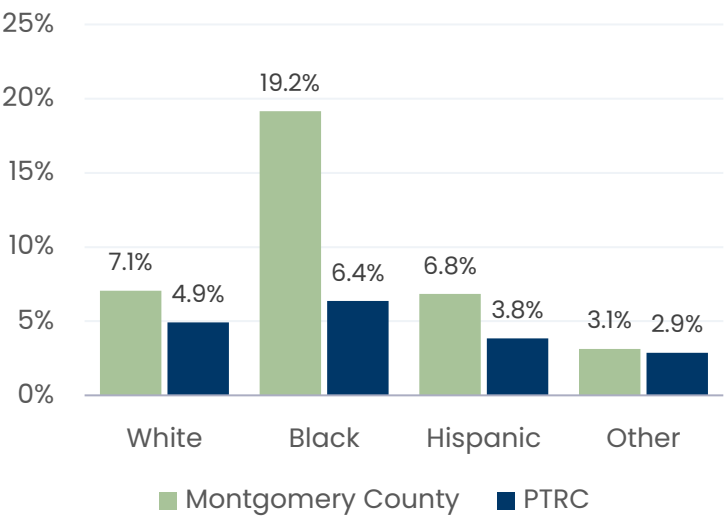
No Computer by Race/Ethnicity

	Montgomery County	PTRC
White	7.1%	4.9%
Black	19.2%	6.4%
Hispanic	6.8%	3.8%
Other	3.1%	2.9%

No Computer by Age

	Montgomery County	PTRC
Population	8.6%	4.9%
Under 18	4.9%	2.1%
18 to 64	6.8%	3.0%
65 and Up	17.2%	14.7%
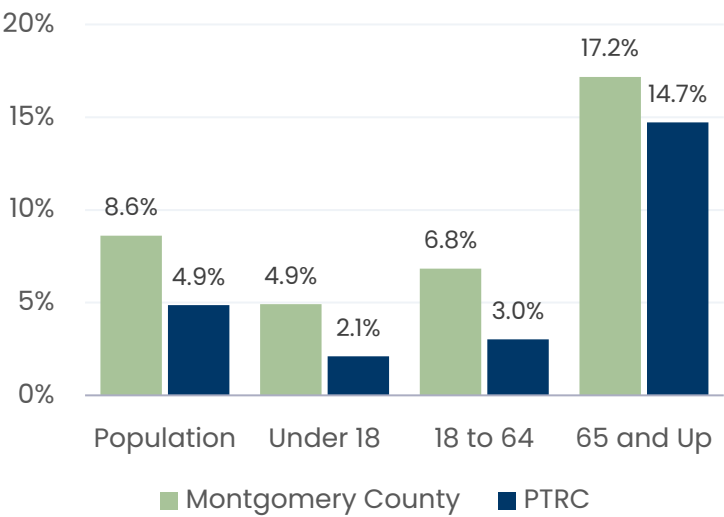
Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. Montgomery County Public Schools offers laptops to every student and offers mobile hotspots to students who need them.

Public Device Access. For those having no computer, access to public use computers is vital. The Montgomery County public libraries in Troy, Biscoe, Candor, Mt. Gilead, and Star have computers for library customers to use, and also have free Wi-Fi in all branches.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Montgomery County, and areas where we see particularly underserved communities.

Montgomery County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. In Montgomery County, state and federal grants have been used to install new infrastructure and provide laptops to students. However, the county is lacking a consistent applied plan to close the digital divide. Montgomery County faces challenges with the rural nature of the area, combined with a relatively low median income. Without planned action, many households will continue without access to the internet.

Households by Digital Distress
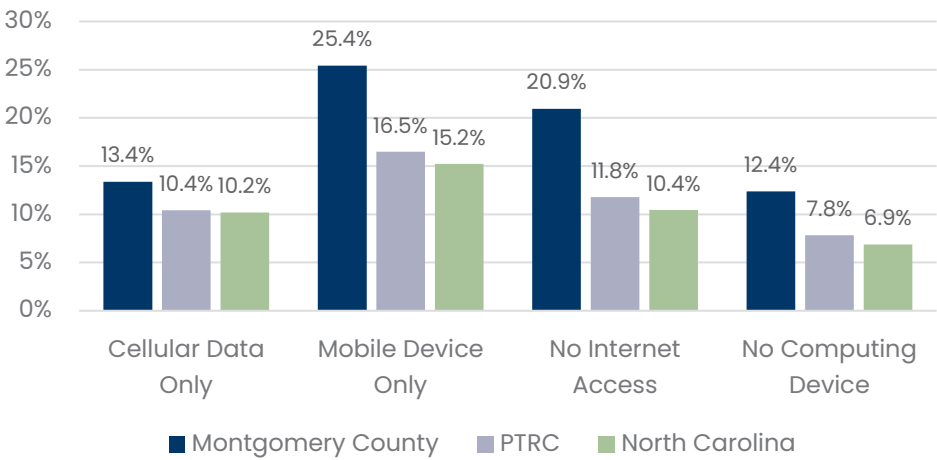
Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Montgomery County experiences higher distress levels in all four categories than the PTRC or the state as a whole.

No Internet Access by Household Income
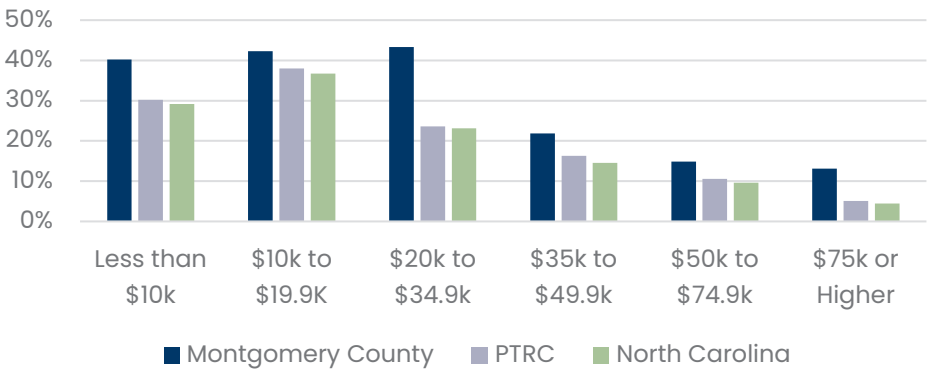
Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Montgomery County as elsewhere, that's true, but in Montgomery, lack of adoption and access are significantly greater across the board, regardless of income.

RANDOLPH
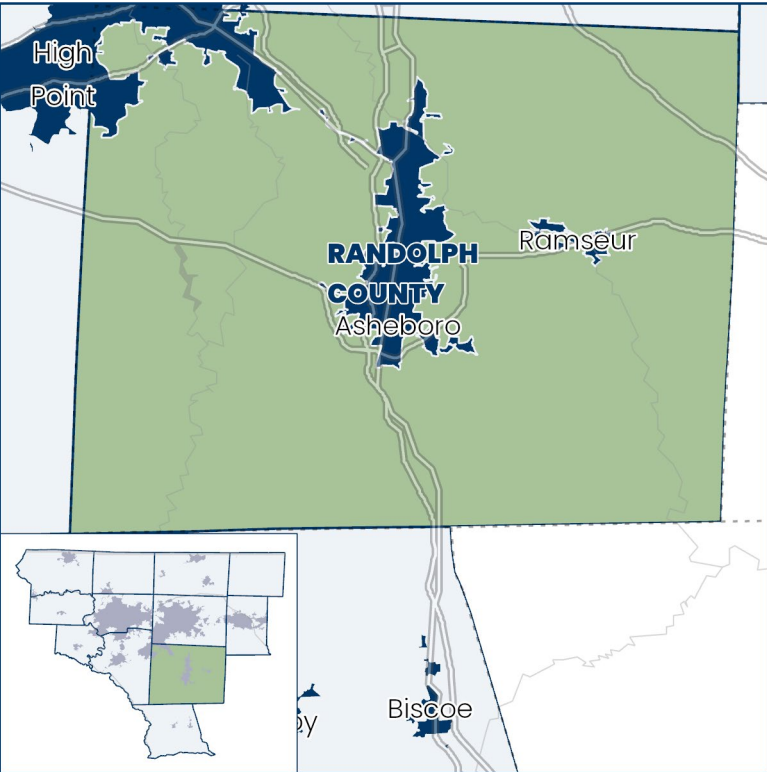
Randolph County is moderate in population size, ranking 22nd in North Carolina, and high in land area, ranking 11th. It's located in the southeastern section of the PTRC's 12-county service area. Asheboro is the largest population center and the county seat with a population of 27,156.

Randolph County is designated a Tier Two county in the NC Department of Commerce distress rankings, a 2024 shift from Tier One (most distressed), attributed to a rise in median income. Overall, Randolph is ranked 44th in the state (1 is the most distressed).

Randolph County is less diverse and well-educated than the PTRC as a whole; however, the household poverty rate is slightly lower than the PTRC average.

DEMOGRAPHICS	RANDOLPH	PTRC
Population	144,403	1,745,206
White	111,829 (77.4%)	1,081,094 (61.9%)
Black	7,976 (5.5%)	371,529 (21.3%)
Hispanic	17,837 (12.4%)	181,589 (10.4%)
Other	6,761 (4.7%)	110,994 (6.4%)
Median Age	41.4	42.9 (Counties Average)
Median Income	$56,423	$58,333 (Counties Average)
% Household Poverty	13.9%	14.5%
% College Degree	16.8%	28.7%
% Under 18	22.2%	21.8%
% 65 and Over	18.0%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	RANDOLPH	NORTH CAROLINA
Percent Population with Available 25/3 Service	99.2%	98.4%
Percent Population with Available 100/20 Service	97.5%	95.8%
Percent Population with Available Fiber Service	46.3%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
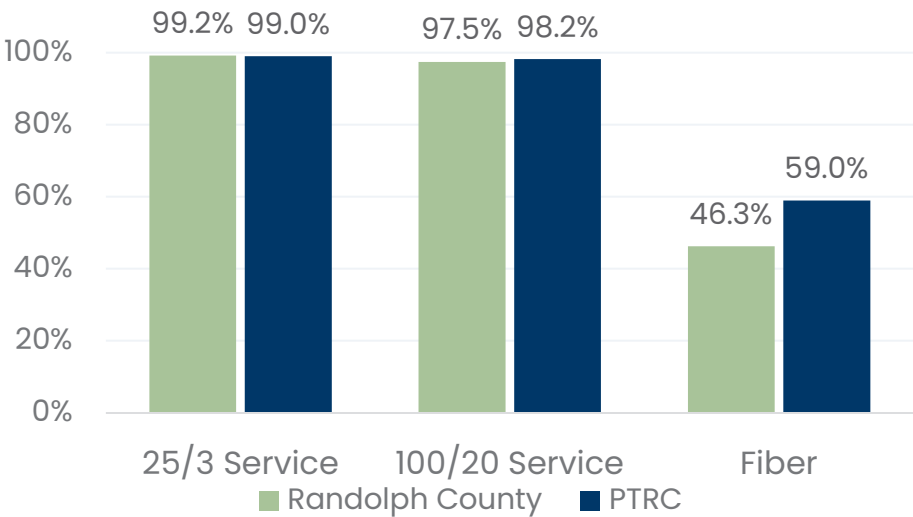
BROADBAND AVAILABILITY SCORE: 70.2

The NC Broadband Availability index awards Randolph County a score of 70.2, ranking Randolph in the top third of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Randolph's variables are shown in the table to the right:

% with 25/3 access	99.2
% with 100/20 access	97.5
% with fiber access	46.3
Upload / Download Ratio	0.20
Household density	72.8
% homes built 2010 or later	6.1
% with no providers	0
% with DSL only	0.9

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**46.3%**
NCDIT Randolph Profile	**57.2%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**97.5%**
Randolph Digital Inclusion Profile	**29.2%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Randolph County Findings. Approximately 723, or 1.3% of Randolph County households have responded to the survey. Some of the responses vary from the official data. For example, 58% of respondents reported download and upload speeds or less than 25/3 Mbps, and 46% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results
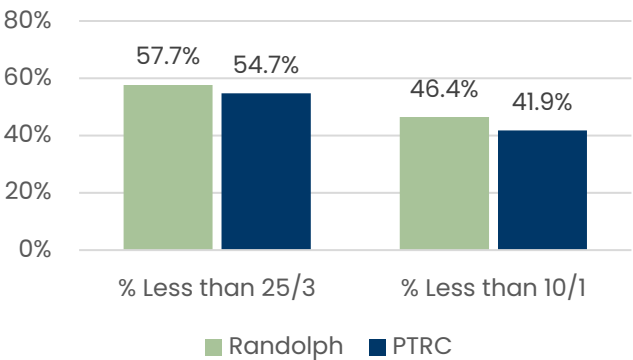
| SURVEY RESPONSE	RANDOLPH	NORTH CAROLINA
Extremely or somewhat satisfied with service	34%	31%
Extremely or somewhat dissatisfied with service	48%	45%
Monthly cost over $125	13%	19%
Median download speed	17 Mbps	22 Mbps
Median upload speed	4 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. While the NC Broadband Availability Index Dashboard assigns high service ratings to Randolph County, local leaders say some areas have yet to see improvement. One Randolph County official highlighted the rural areas in the southern half of the county as lacking in the same level of growth in other parts of the county.


Symmetry Deficits. The NC Broadband Availability Index rates Randolph's ratio at 0.20 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio. Randolph's ratio of 0.2 is one of the fastest in the PTRC.

Upload to Download Ratio
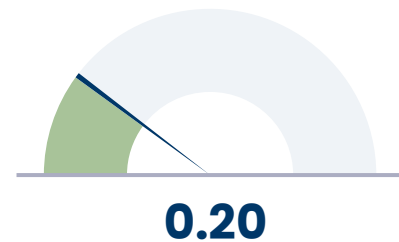
0.20

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Randolph County has been included in several grants totaling $6 million, including over $4 million specifically for Randolph – with 1,864 households and 14 businesses served.
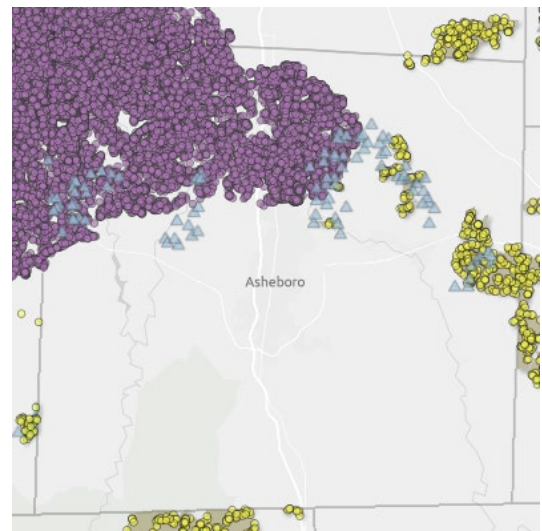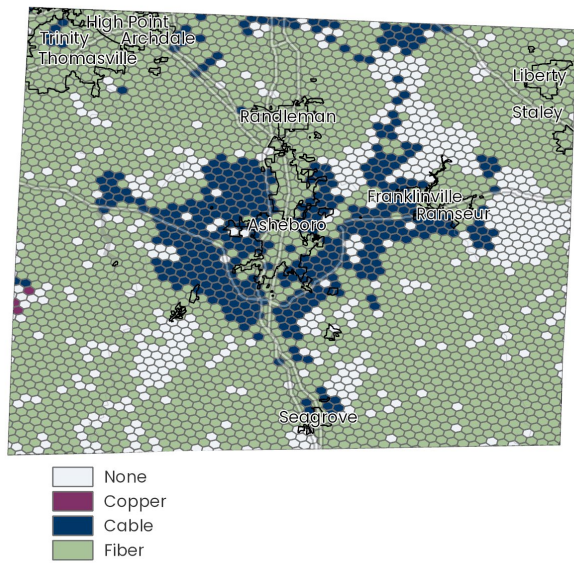
AVAILABILITY – A CLOSER LOOK

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Randolph County. The first map shows that most of Randolph County has fiber internet options available, with other areas covered by cable service. Fiber service is not as available in the areas immediately surrounding Asheboro. There are also pockets of no fiber or cable in the eastern section of Randolph.
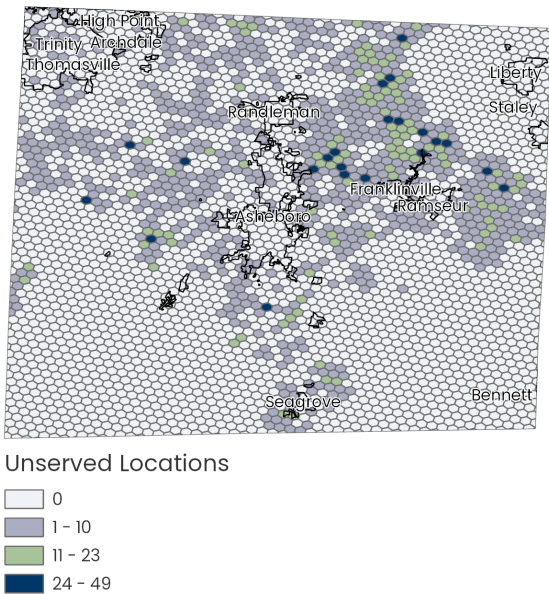
Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 93% of locations in Randolph County have high-speed service.
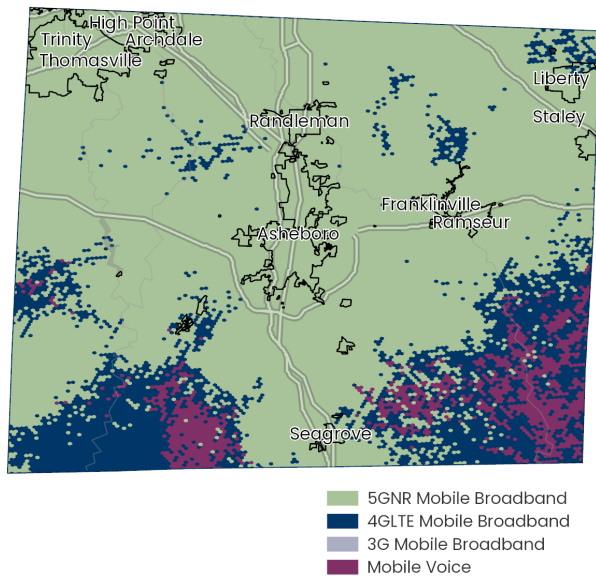
Mobile Broadband Service. Mobile broadband is available in much of the county as well. However, there are large pockets where mobile voice is the only service available in the southern and southeastern areas of the county.
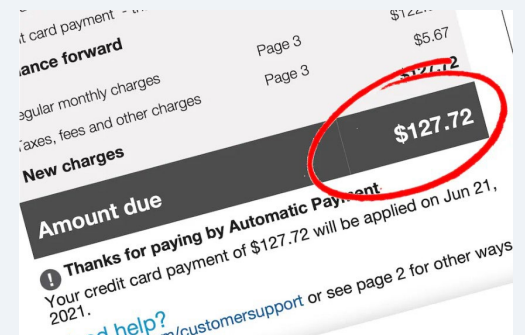
BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.
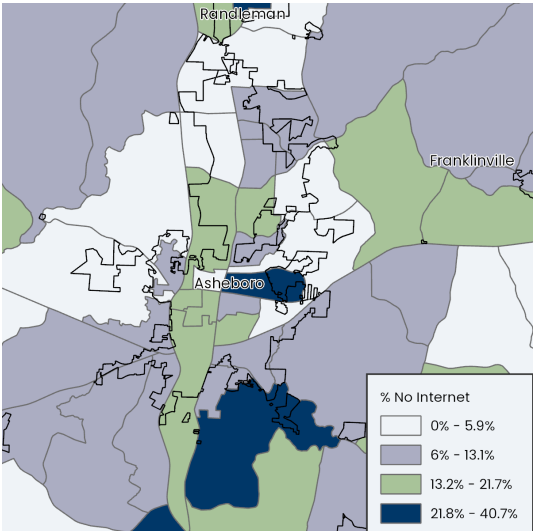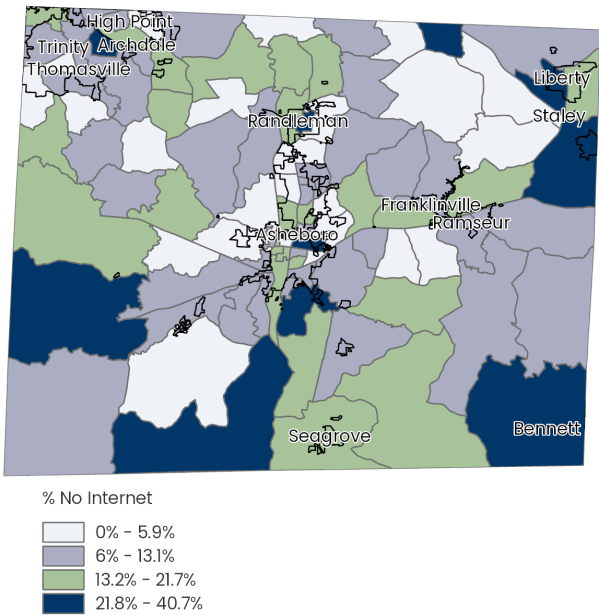
Adoption by Service Type

Legend: Randolph County (green), PTRC (dark blue)

- Fixed Broadband: 85.5% / 85.2%
- Cellular Only: 11.7% / 10.4%
- Satallite Only: 0.3% / 0.4%
- Dialup Only: 0.1% / 0.1%
- No Broadband Subscription: 2.3% / 2.8%
- No Internet: 12.1% / 11.8%

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, and at almost 86% in Randolph County, it is virtually even with the overall PTRC coverage. Close to 12% still use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dial-up, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet
- 0% – 5.9%
- 6% – 13.1%
- 13.2% – 21.7%
- 21.8% – 40.7%

Geography of Adoption. The map of Randolph County to the left above shows Census block groups where households with no internet service are concentrated. It appears areas of high, medium, and low adoption are mixed together: no one area of the county has the highest concentration of internet adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Asheboro. It, too, has a mixture of high, medium, and low-adoption areas.

BROADBAND ADOPTION SCORE: 53.2

The NC Broadband Adoption Potential index awards Randolph County a score of 53.2, ranking Randolph in the bottom half of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Randolph County variables are shown in the table to the right:
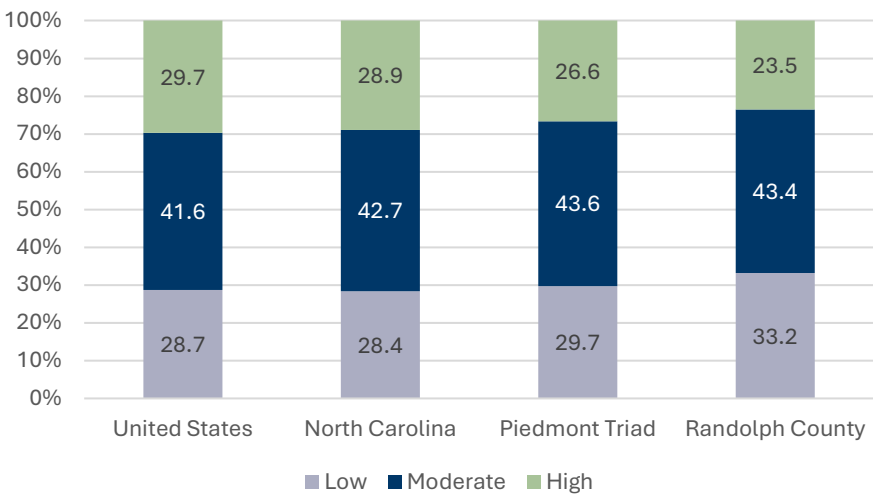
% with broadband subscription	68.5
% households no internet	14.4
% households no computer	9.5
% population ages 18–34	19.7
% population ages 65 and over	17.7
% households in poverty	15.1
% households with children	31.0
% limited English	5.9

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. The Randolph County Library offers courses in digital literacy for residents.
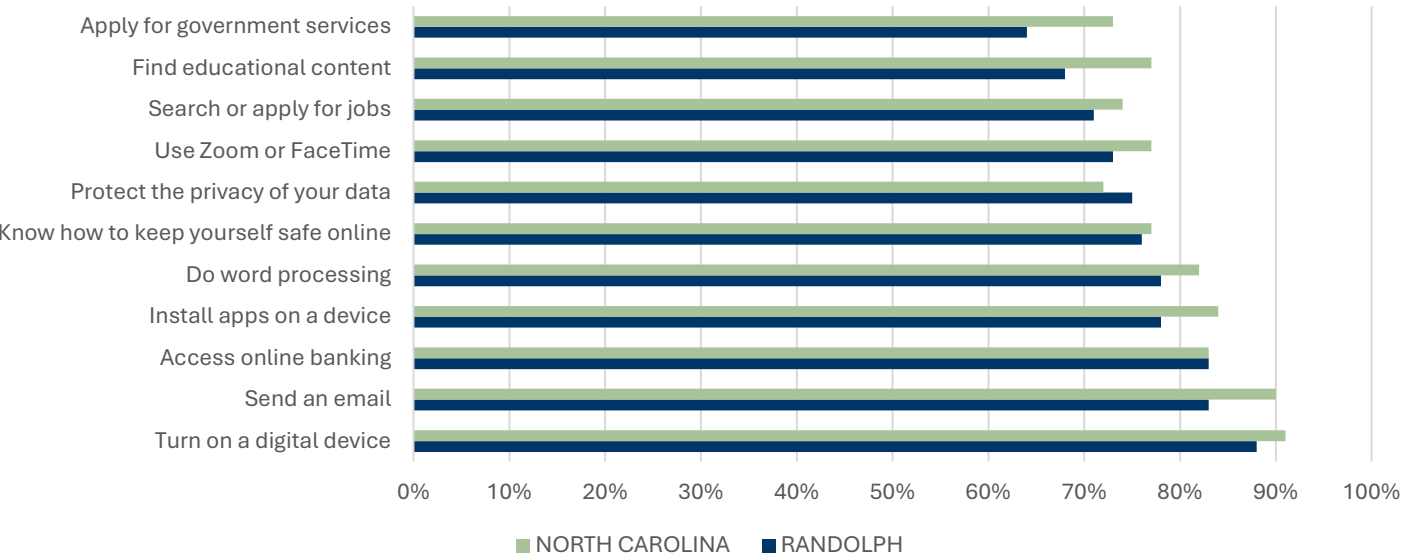
Share of Occupations by Skill Level

	Low	Moderate	High
United States	28.7	41.6	29.7
North Carolina	28.4	42.7	28.9
Piedmont Triad	29.7	43.6	26.6
Randolph County	33.2	43.4	23.5

We can measure digital literacy in a variety of different ways. The graph to the left shows Randolph County has a smaller share of occupations requiring high digital literacy. The one below presents Randolph County residents' responses to the NC Broadband Equity Survey, indicating they have notably less literacy than people in the state as a whole.
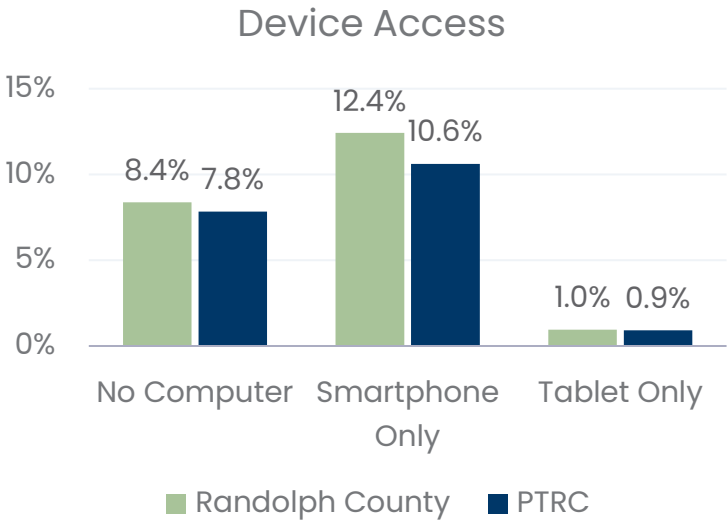
I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

Categories (top to bottom):
- Apply for government services
- Find educational content
- Search or apply for jobs
- Use Zoom or FaceTime
- Protect the privacy of your data
- Know how to keep yourself safe online
- Do word processing
- Install apps on a device
- Access online banking
- Send an email
- Turn on a digital device
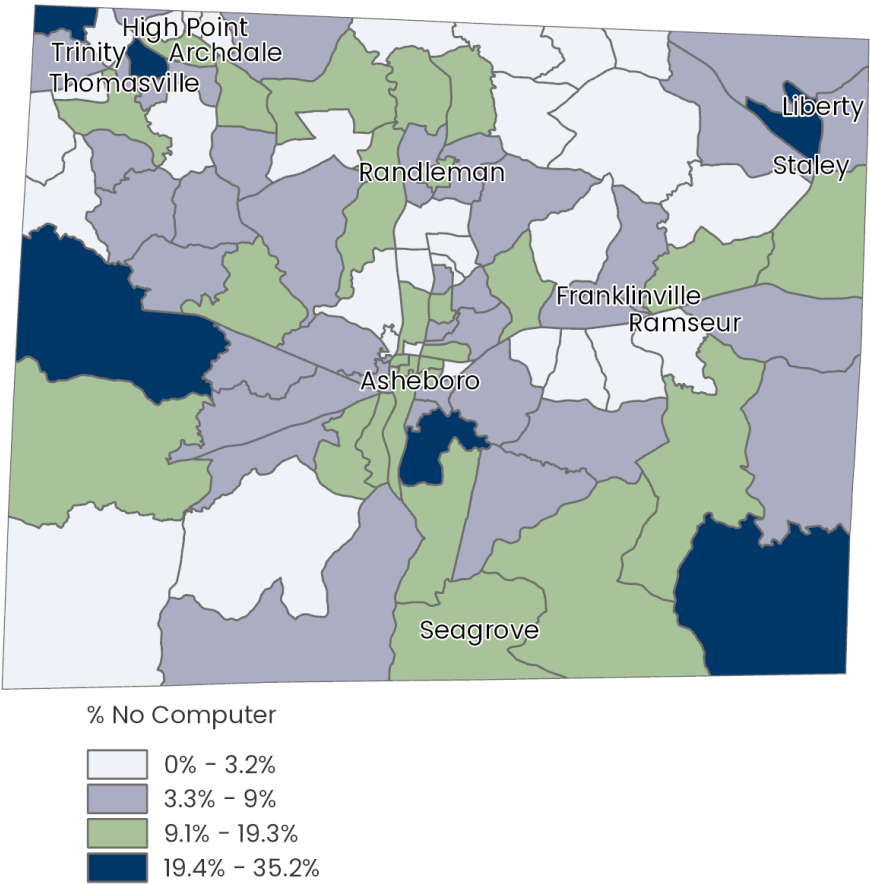
Legend: NORTH CAROLINA, RANDOLPH

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Randolph County, over 8% of households lack any kind of computer (4,689 households), and an additional 12.4% have only a smart phone to connect to the internet (6,946 households).

Device Access

Randolph County: No Computer 8.4%, Smartphone Only 12.4%, Tablet Only 1.0%
PTRC: No Computer 7.8%, Smartphone Only 10.6%, Tablet Only 0.9%

- Randolph County
- PTRC

Households with No Computer

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the vicinity of Troy. At the same time, several census block groups where households are *most* likely to have a computer are also in and around Troy – a visible digital divide.

% No Computer
- 0% – 3.2%
- 3.3% – 9%
- 9.1% – 19.3%
- 19.4% – 35.2%

DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Over 9% of Randolph County's Black population live in a household with no computer. Seniors also suffer a disparity of device access, with over 16% in households with no computer in Randolph County.
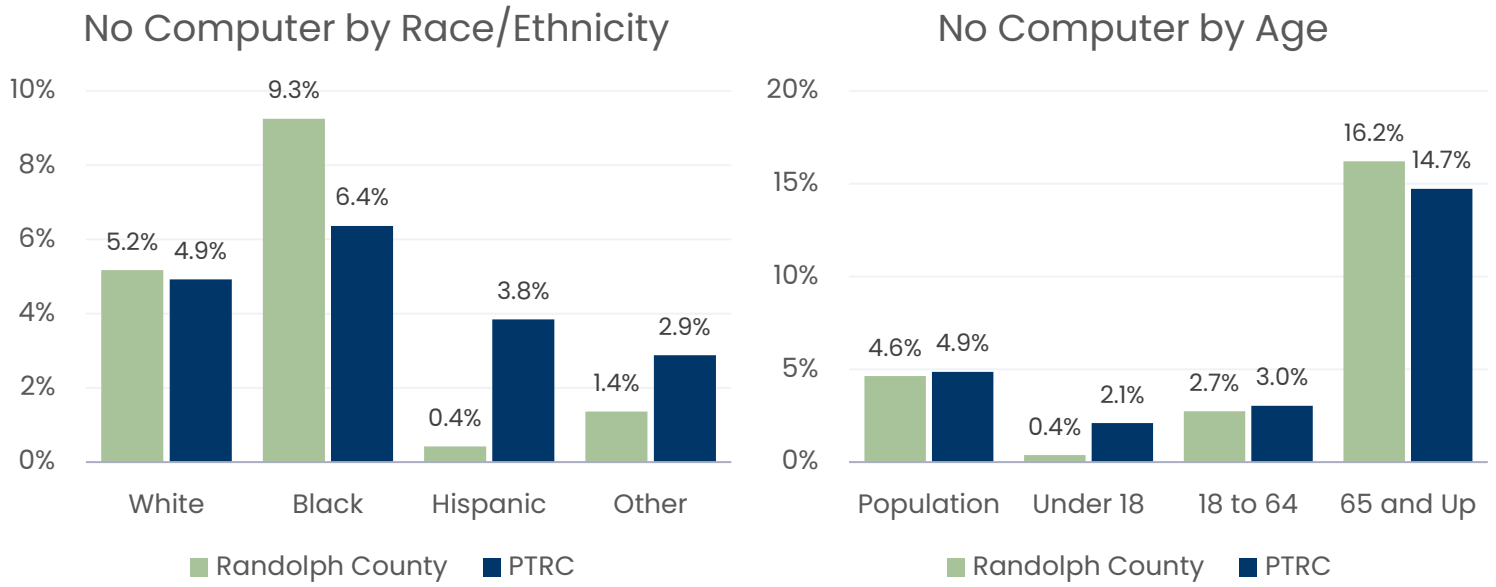
No Computer by Race/Ethnicity

	White	Black	Hispanic	Other
Randolph County	5.2%	9.3%	0.4%	1.4%
PTRC	4.9%	6.4%	3.8%	2.9%

■ Randolph County ■ PTRC

No Computer by Age

	Population	Under 18	18 to 64	65 and Up
Randolph County	4.6%	0.4%	2.7%	16.2%
PTRC	4.9%	2.1%	3.0%	14.7%

■ Randolph County ■ PTRC

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. In Randolph County Public Schools, students in grades 8-12 are all issued a Chromebook for use throughout the year.

Public Device Access. For those having no computer, access to public use computers is vital. The Randolph County public libraries in Archdale, Asheboro, Franklinville, Liberty, Ramseur, Randleman, and Seagrove have computers for library customers to use, and residents can also check out mobile hotspots.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Randolph County, and areas where we see particularly underserved communities.

Randolph County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. In 2021, Randolph County published a digital inclusion plan and appointed a digital ambassador to help close the digital divide. However, funding has remained a critical problem and there are still gaps in broadband service across the county. The Randolph County focus group also identified a lack of digital literacy as a key problem, particularly among seniors, the homeless, and the unemployed.

Households by Digital Distress
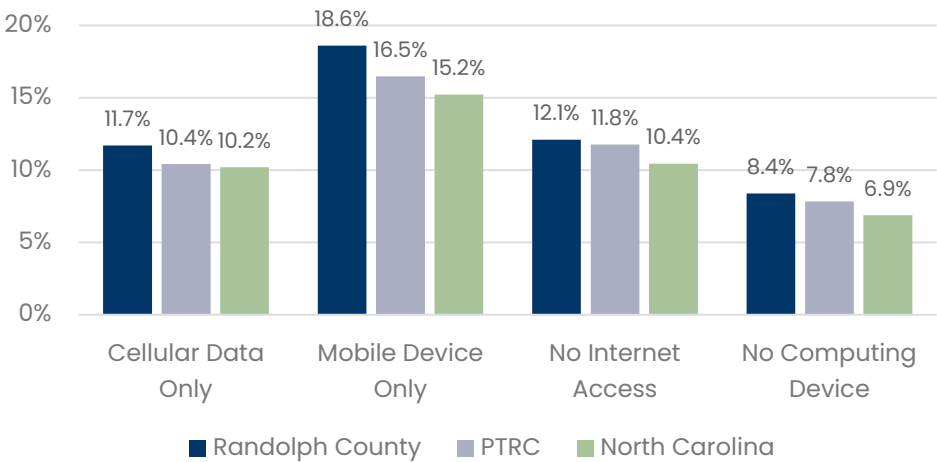
Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Randolph County experiences higher distress levels in all four categories than the PTRC or the state as a whole.

No Internet Access by Household Income
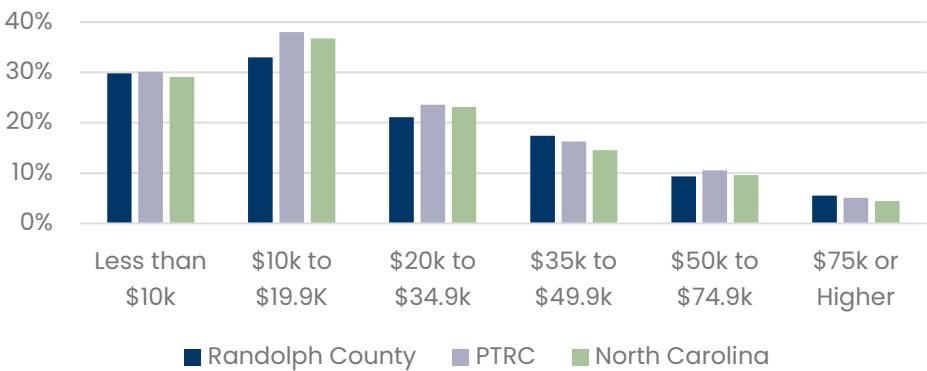
Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Randolph County as elsewhere, that's true, but in Randolph, lack of adoption and access are comparable to the PTRC or North Carolina, regardless of income.

ROCKINGHAM
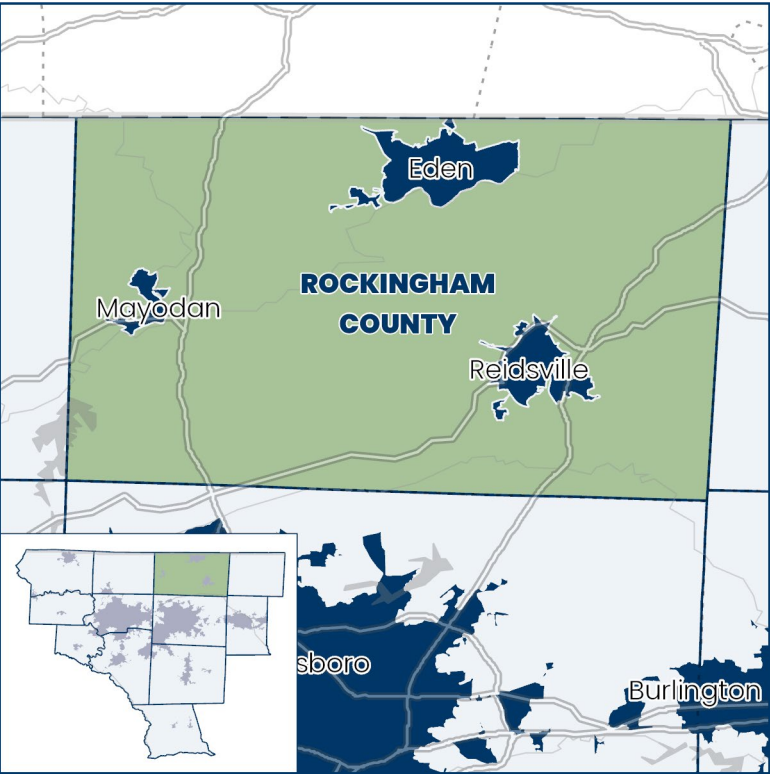
Rockingham County is moderate in population size, ranking 32nd in North Carolina, and moderate in land area, ranking 27th. It's located in the northern section of the PTRC's 12-county service area. Eden is the largest population center, with 15,405. Wentworth, with 2,646 population, is the county seat.

Rockingham County is designated a Tier One county (most distressed) in the NC Department of Commerce distress rankings. It's overall ranking is 23rd in the state, driven by its relatively low tax base per capita and high unemployment rate.

Rockingham County is older, poorer, and less well-educated than North Carolina as a whole and has a larger white population.

DEMOGRAPHICS	ROCKINGHAM	PTRC
Population	91,209	1,745,206
White	64,861 (71.1%)	1,081,094 (61.9%)
Black	15,888 (17.4%)	371,529 (21.3%)
Hispanic	5,910 (6.5%)	181,589 (10.4%)
Other	4,550 (5.0%)	110,994 (6.4%)
Median Age	45.1	42.9 (Counties Average)
Median Income	$50,737	$58,333 (Counties Average)
% Household Poverty	18.6%	14.5%
% College Degree	15.4%	28.7%
% Under 18	20.1%	21.8%
% 65 and Over	20.8%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	ROCKINGHAM	NORTH CAROLINA
Percent Population with Available 25/3 Service	97.8%	98.4%
Percent Population with Available 100/20 Service	96.6%	95.8%
Percent Population with Available Fiber Service	9.2%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
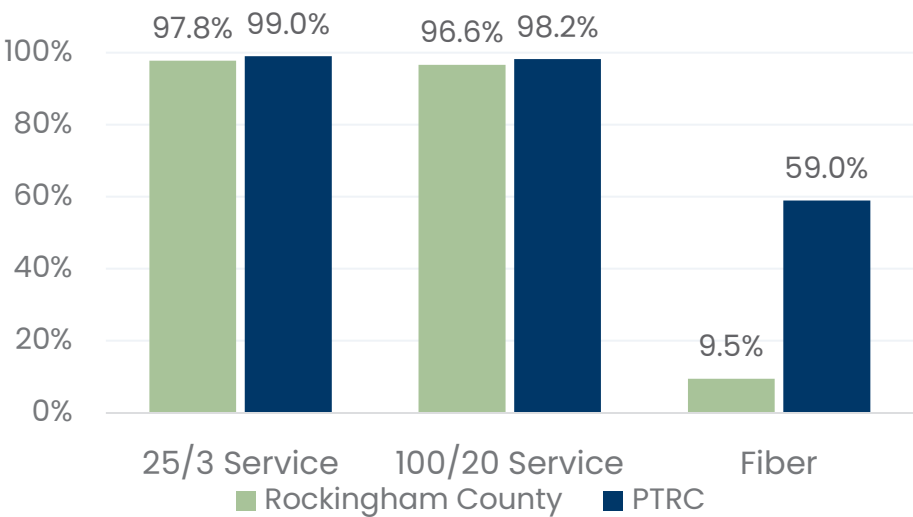
BROADBAND AVAILABILITY SCORE: 60.7

The NC Broadband Availability index awards Rockingham County a score of 60.7, ranking Rockingham in the lower half of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Rockingham's variables are shown in the table to the right:

% with 25/3 access	**97.8**
% with 100/20 access	**96.6**
% with fiber access	**9.5**
Upload / Download Ratio	**0.10**
Household density	**69.2**
% homes built 2010 or later	**4.2**
% with no providers	**0**
% with DSL only	**0**

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:
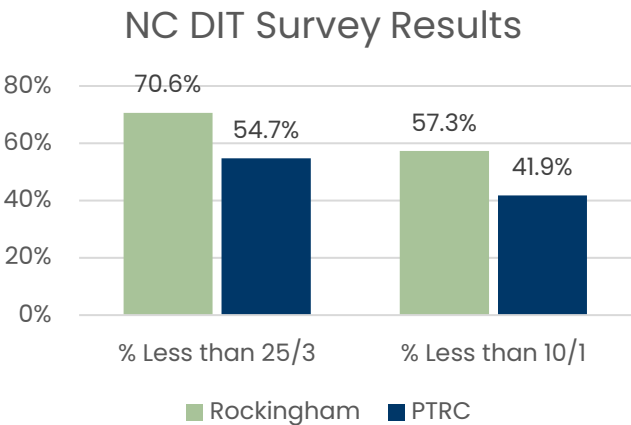
NC Availability Index	**9.5%**
NCDIT Rockingham Profile	**7.6%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**96.6%**
Rockingham Digital Inclusion Profile	**13.5%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Rockingham County Findings. Approximately 1,066, or 2.8% of Rockingham County households have responded to the survey. Some of the responses vary from the official data. For example, 71% of respondents reported download and upload speeds or less than 25/3 Mbps, and 57% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results

Bar chart: % Less than 25/3 — Rockingham 70.6%, PTRC 54.7%; % Less than 10/1 — Rockingham 57.3%, PTRC 41.9%. Legend: Rockingham, PTRC.

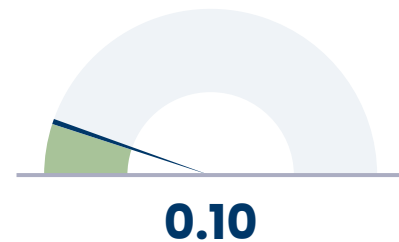| SURVEY RESPONSE	ROCKINGHAM	NORTH CAROLINA
Extremely or somewhat satisfied with service	17%	31%
Extremely or somewhat dissatisfied with service	50%	45%
Monthly cost over $125	20%	19%
Median download speed	8 Mbps	22 Mbps
Median upload speed	2 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. The NC Broadband Availability Index Dashboard assigns moderately low service ratings to Rockingham County. Among the counties of the PTRC, Rockingham has some of the lowest self-reported availability of fiber or 100/20 service. While faster service may be available to more residents, high prices and a lack of choices can deter people from being able to connect.

Symmetry Deficits. The NC Broadband Availability Index rates Rockingham's ratio at 0.10 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio.

## Upload to Download Ratio

0.10

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Rockingham County has been included in several grants totaling $2 million, but only $200,000 specifically for Rockingham. So far, no households or businesses have been served by these grants.
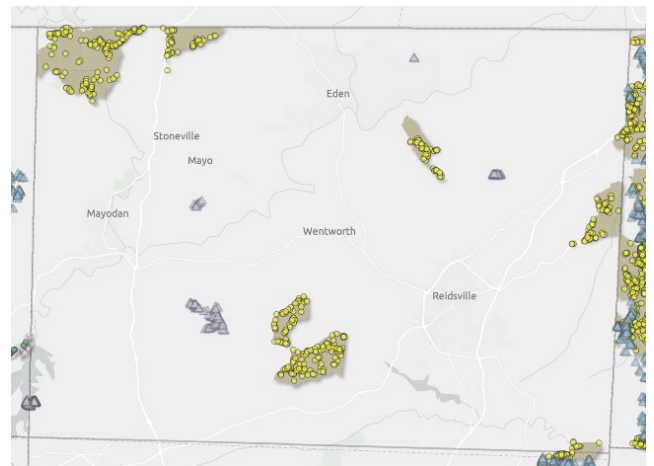
AVAILABILITY – A CLOSER LOOK
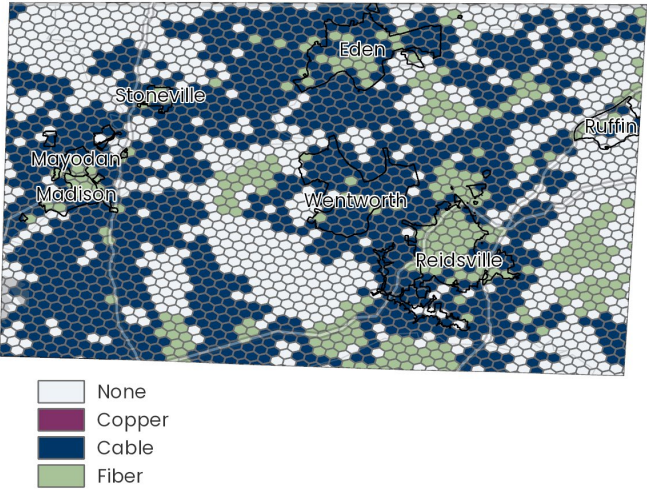

None
Copper
Cable
Fiber

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Rockingham County. The first map shows that most of Rockingham County has no fiber internet options available, with cable service providing most of the coverage. There are large pockets lacking fiber or cable coverage throughout the county.
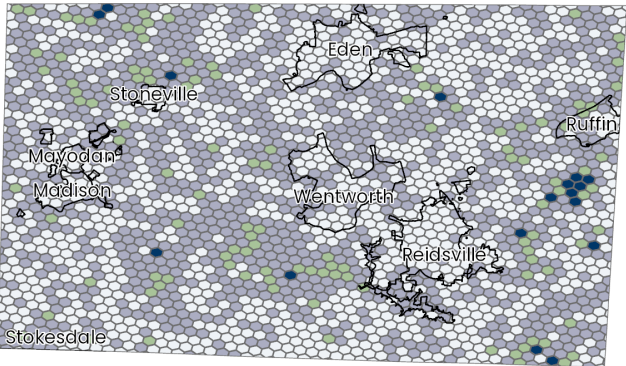
Unserved Locations

0
1 - 10
11 - 24
25 - 67

Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 88% of locations in Rockingham County have high-speed service.
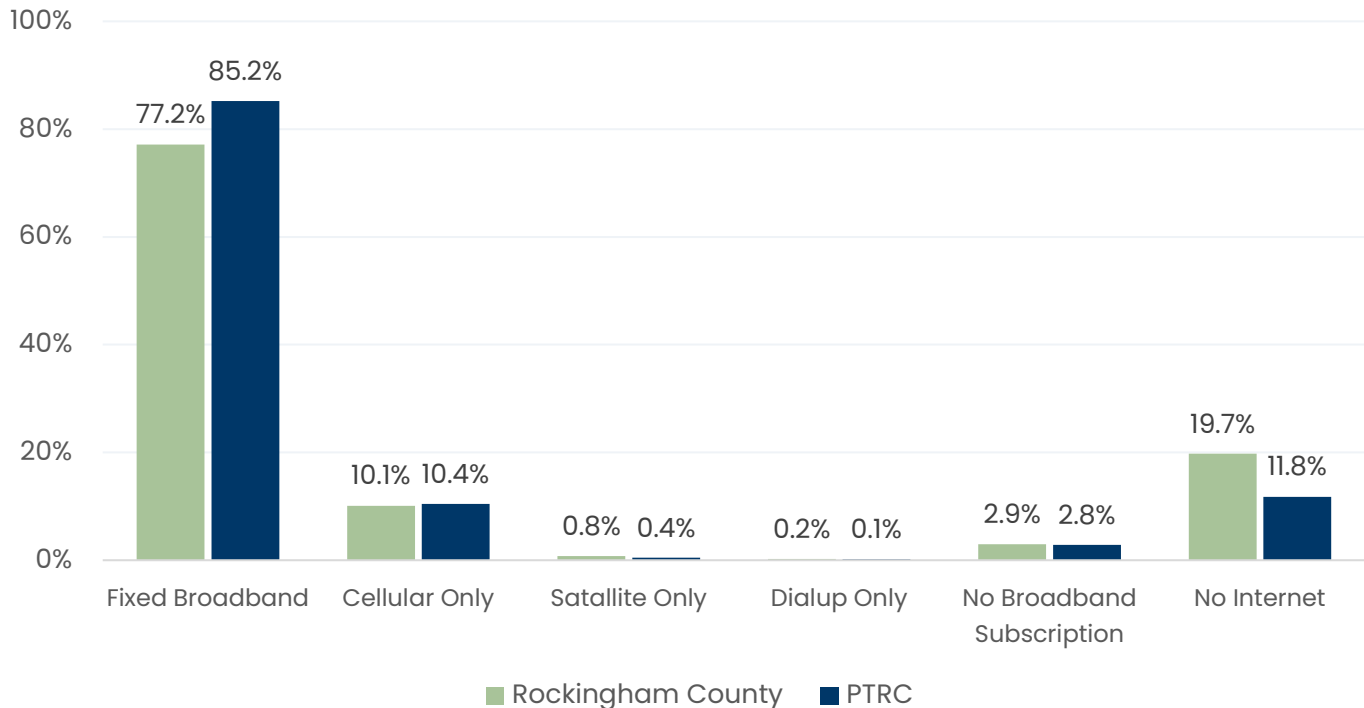

5GNR Mobile Broadband
4GLTE Mobile Broadband
3G Mobile Broadband
Mobile Voice
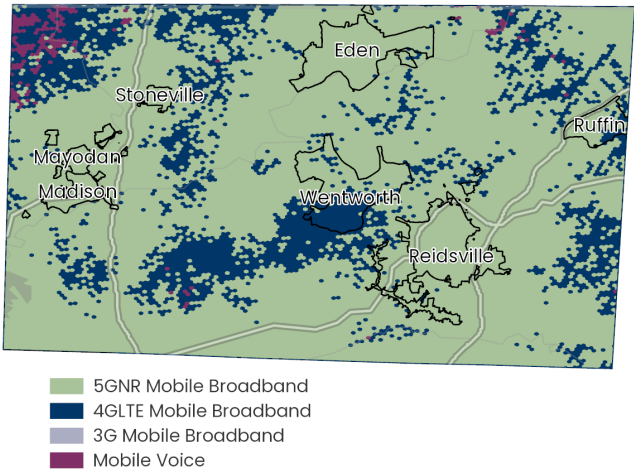
Mobile Broadband Service. 5G and 4G mobile broadband service are available throughout almost all of Rockingham County. Mobile voice data is the only option in some areas in the northwestern area of the county.
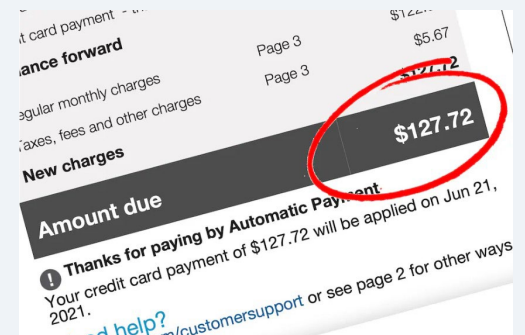
BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.
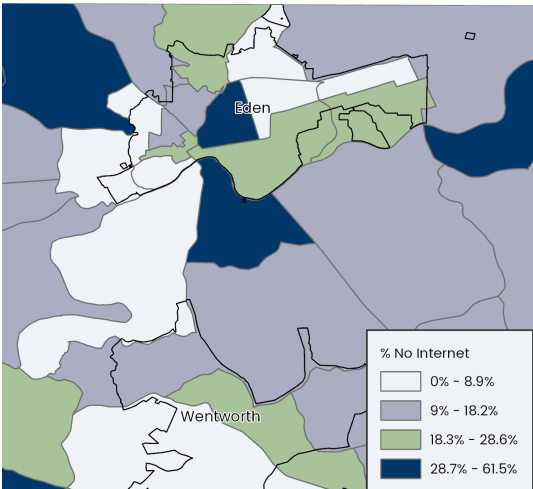
Adoption by Service Type

Legend: ■ Rockingham County ■ PTRC

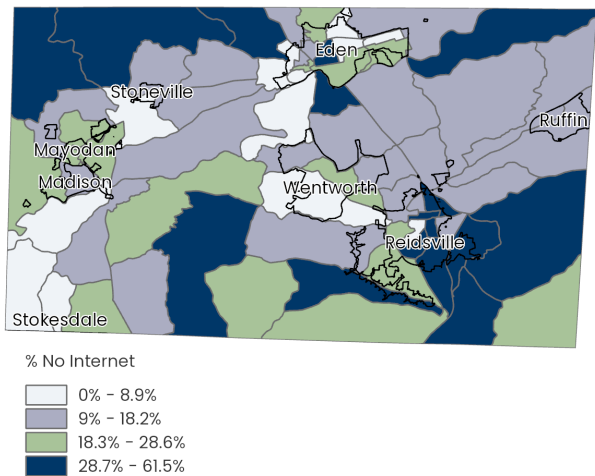| Service Type	Rockingham County	PTRC
Fixed Broadband	77.2%	85.2%
Cellular Only	10.1%	10.4%
Satallite Only	0.8%	0.4%
Dialup Only	0.2%	0.1%
No Broadband Subscription	2.9%	2.8%
No Internet	19.7%	11.8%

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, but at 77% in Rockingham County, that leaves a lot of room for less desirable pathways. Over 10% use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dialup, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

Geography of Adoption. The map of Rockingham County to the left above shows Census block groups where households with no internet service are concentrated. Areas of low adoption occur throughout the county, including some Census block groups with over 60% of the households lacking an internet subscription. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Eden. It, too, has a mixture of high, medium, and low-adoption areas.

BROADBAND ADOPTION SCORE: 36.6

The NC Broadband Adoption Potential index awards Rockingham County a score of 36.6, ranking Rockingham in the bottom half of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Rockingham County variables are shown in the table to the right:
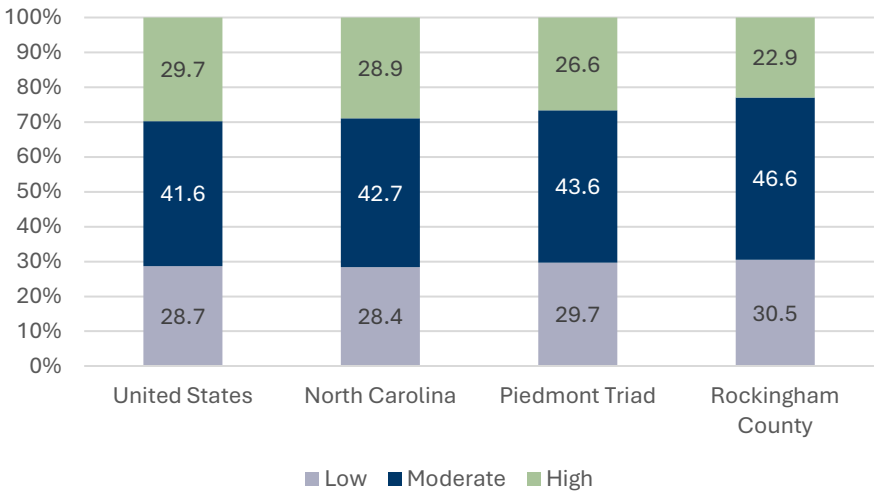
% with broadband subscription	**61.4**
% households no internet	**21.9**
% households no computer	**16.9**
% population ages 18-34	**18.4**
% population ages 65 and over	**20.4**
% households in poverty	**18.2**
% households with children	**28.6**
% limited English	**4.0**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Rockingham County include courses at Rockingham Community College, one-on-one training at the Rockingham County Library, and NC Works.
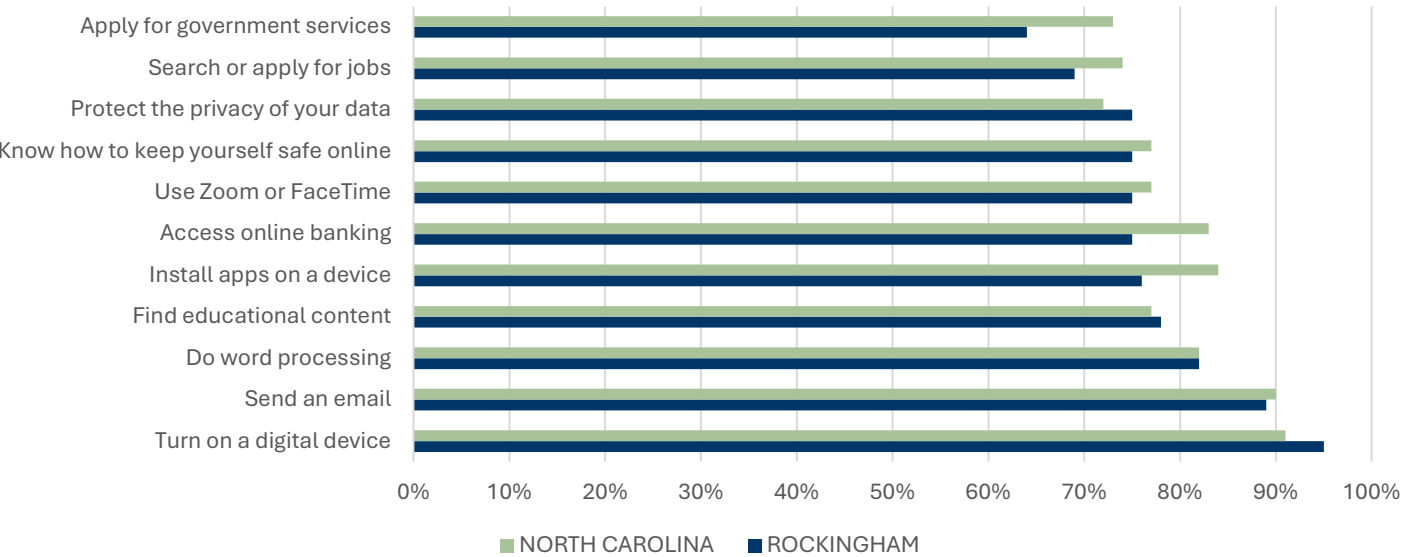
Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Rockingham County
High	29.7	28.9	26.6	22.9
Moderate	41.6	42.7	43.6	46.6
Low	28.7	28.4	29.7	30.5

■ Low ■ Moderate ■ High

We can measure digital literacy in a variety of different ways. The graph to the left shows Rockingham County has a smaller share of occupations requiring high digital literacy. The one below presents Rockingham County residents' responses to the NC Broadband Equity Survey, indicating they have notably less literacy than people in the state as a whole.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Apply for government services
- Search or apply for jobs
- Protect the privacy of your data
- Know how to keep yourself safe online
- Use Zoom or FaceTime
- Access online banking
- Install apps on a device
- Find educational content
- Do word processing
- Send an email
- Turn on a digital device

■ NORTH CAROLINA ■ ROCKINGHAM

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Rockingham County, 15% of households lack any kind of computer (5,801 households), and an additional 13.1% have only a smart phone to connect to the internet (5,081 households).
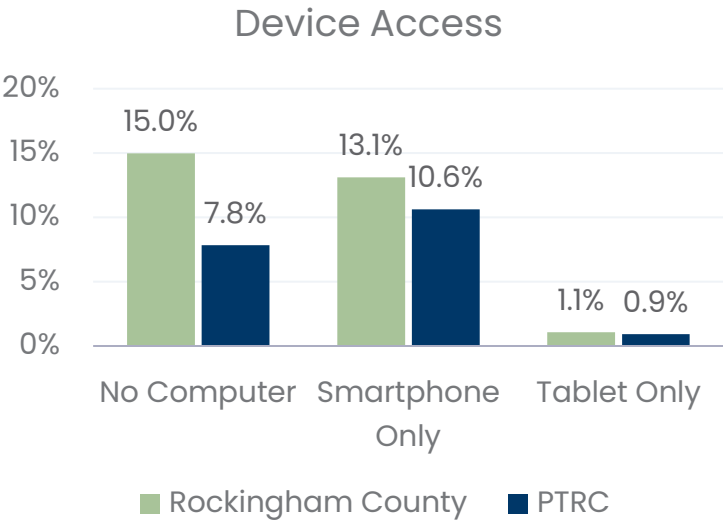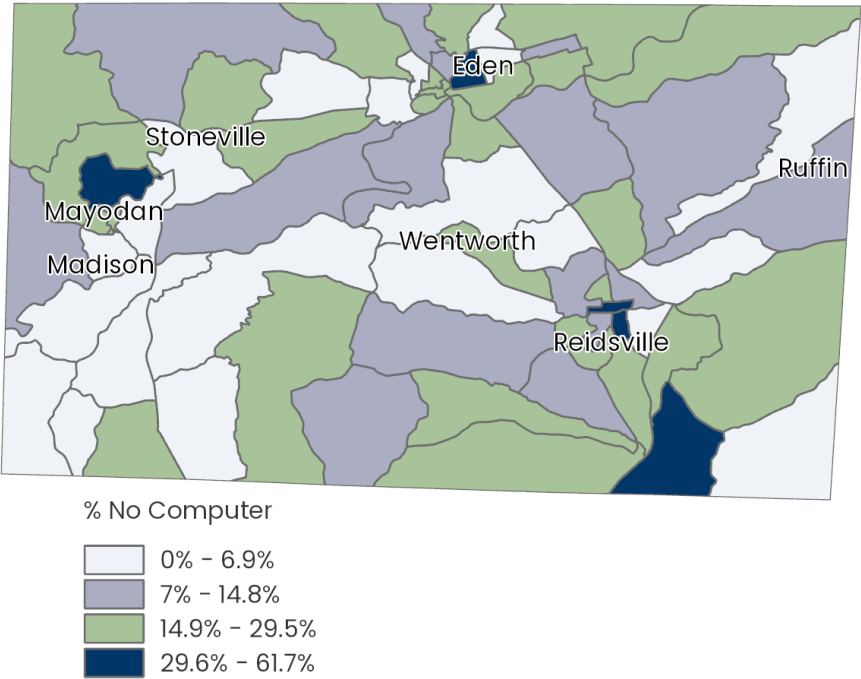
Device Access

Legend: Rockingham County, PTRC

Households with No Computer

% No Computer
- 0% - 6.9%
- 7% - 14.8%
- 14.9% - 29.5%
- 29.6% - 61.7%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the vicinity of Eden. At the same time, several census block groups where households are *most* likely to have a computer are also in and around Eden – a visible digital divide.
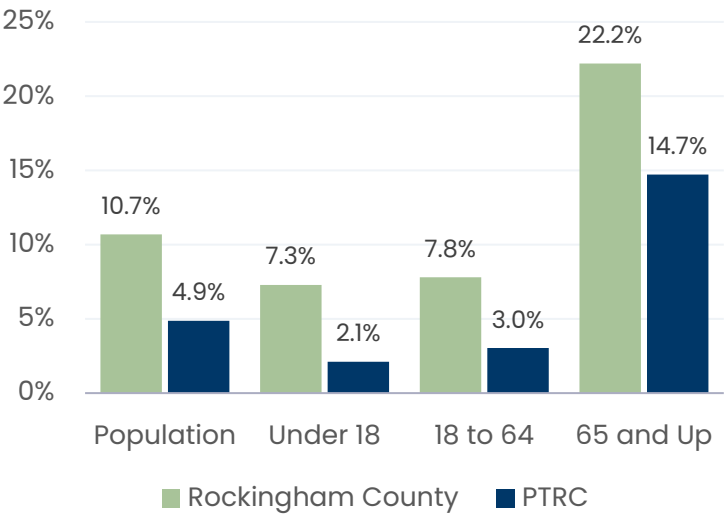
DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Almost 16% of Rockingham County's Black population live in a household with no computer. Seniors also suffer a disparity of device access, with over 22% in households with no computer in Rockingham County.

No Computer by Race/Ethnicity
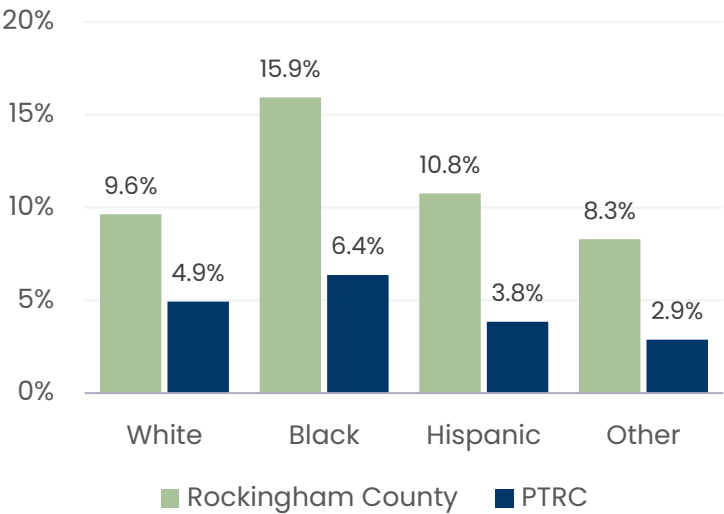
	White	Black	Hispanic	Other
Rockingham County	9.6%	15.9%	10.8%	8.3%
PTRC	4.9%	6.4%	3.8%	2.9%

No Computer by Age

	Population	Under 18	18 to 64	65 and Up
Rockingham County	10.7%	7.3%	7.8%	22.2%
PTRC	4.9%	2.1%	3.0%	14.7%

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. Rockingham County schools is no exception, with students in grades 6-12 issued a laptop for use throughout the school year. Elementary school students are also allowed to check out a laptop as needed.

Public Device Access. For those having no computer, access to public use computers is vital. The Rockingham County public libraries in Eden, Madison, Reidsville, and Stonesville have computers for library customers to use, and also have free Wi-Fi in all branches.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Rockingham County, and areas where we see particularly underserved communities.

Rockingham County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. In 2021, Rockingham County formed a digital inclusion coalition and published a digital inclusion plan to help address the digital divide. This effort resulted in grant funding and in February of 2024, Rockingham reported internet access to an additional 3,264 addresses since they began their project. However, as grant funding expires, the ability to continue the work is jeopardized.

Households by Digital Distress
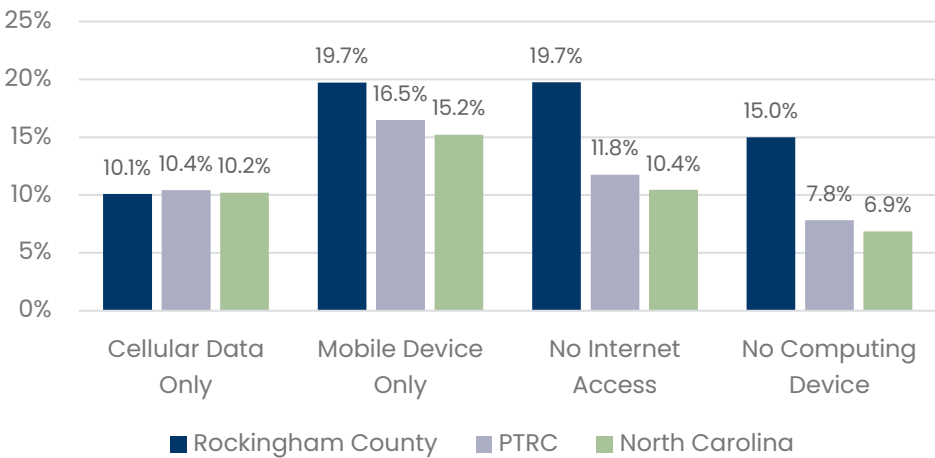
Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Rockingham County experiences higher distress levels in three categories than the PTRC or the state as a whole.

No Internet Access by Household Income
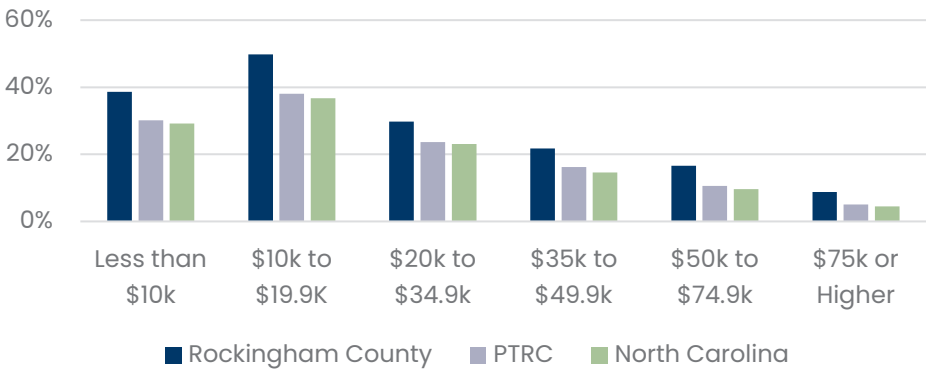
Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Rockingham County as elsewhere, that's true, but in Rockingham, lack of adoption and access are significantly greater across the board, regardless of income.

STOKES
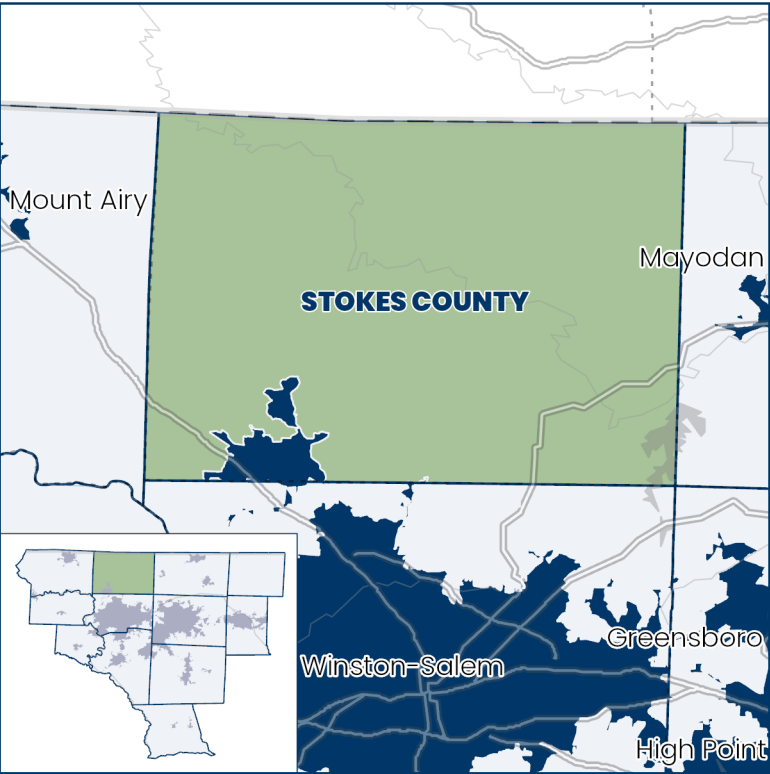
Stokes County is moderate in population size, ranking 56th in North Carolina, and moderate in land area, ranking 54th. It's located in the northwestern section of the PTRC's 12-county service area. King is the largest population center, with 7,425. Danbury, with 189 population, is the county seat.

Stokes County is designated a Tier Two county in its NC Department of Commerce Distress Rank, a rank it has held since rankings began in 2007. It has increased in rank from a low of #40 in 2011 to its current rank of #70.

Stokes County is more rural, older, and less well-educated than North Carolina as a whole and has a larger white population.

DEMOGRAPHICS	STOKES	PTRC	NORTH CAROLINA
Population	44,696	1,745,206	10,470,214
White	40,118 (89.8%)	1,081,094 (61.9%)	6,455,988 (61.7%)
Black	1,943 (4.3%)	371,529 (21.3%)	2,161,841 (20.6%)
Hispanic	1,603 (3.6%)	181,589 (10.4%)	1,051,008 (10.0%)
Other	1,032 (2.3%)	110,994 (6.4%)	801,377 (7.7%)
Median Age	47.4	-	39.1
% Under 18	18.5%	21.8%	21.8%
% 65 and Over	21.9%	17.4%	16.7%
Median Income	$57,539	-	$66,186
% Household Poverty	12.3%	14.5%	13.1%
% College Degree	16.1%	28.7%	33.9%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	STOKES	NORTH CAROLINA
Percent Population with Available 25/3 Service	98.8%	98.4%
Percent Population with Available 100/20 Service	97.4%	95.8%
Percent Population with Available Fiber Service	59.3%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
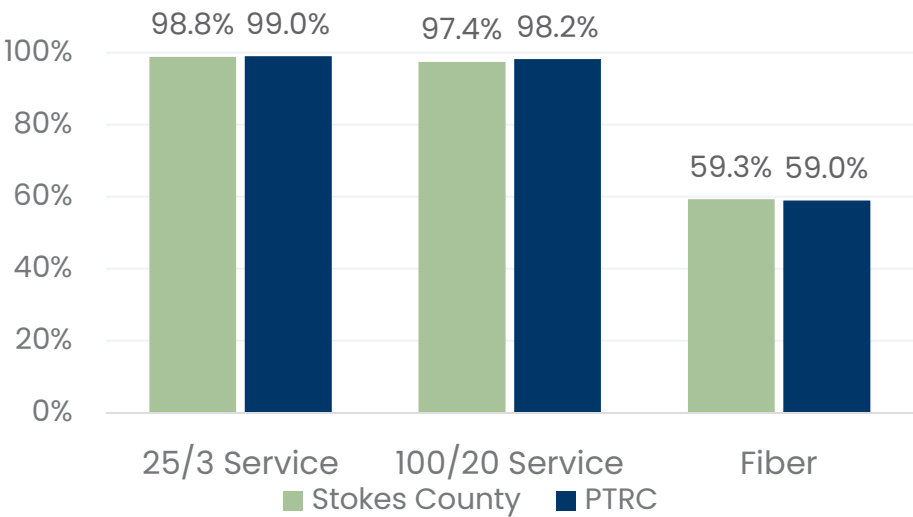
BROADBAND AVAILABILITY SCORE: 69.8

The NC Broadband Availability index awards Stokes County a score of 69.8, ranking Stokes in the top third of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Stoke's variables are shown in the table to the right:

% with 25/3 access	98.8
% with 100/20 access	97.4
% with fiber access	59.3
Upload / Download Ratio	0.18
Household density	42.3
% homes built 2010 or later	4.6
% with no providers	0
% with DSL only	0.9

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**59.3%**
NCDIT Stokes Profile	**24.7%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**97.5%**
Stokes Digital Inclusion Profile	**15.1%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Stokes County Findings.
Approximately 1,911, or 10.1% of Stokes County households have responded to the survey. Some of the responses vary from the official data. For example, 51% of respondents reported download and upload speeds or less than 25/3 Mbps, and 37% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results
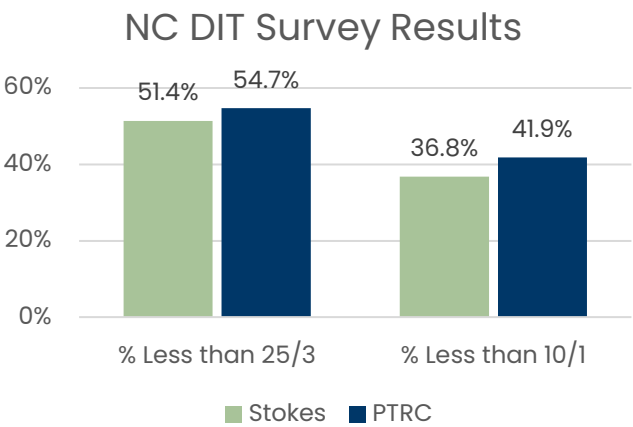
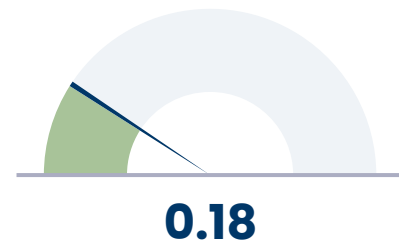| SURVEY RESPONSE	STOKES	NORTH CAROLINA
Extremely or somewhat satisfied with service	36%	31%
Extremely or somewhat dissatisfied with service	40%	45%
Monthly cost over $125	21%	19%
Median download speed	26 Mbps	22 Mbps
Median upload speed	6 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. While the NC Broadband Availability Index Dashboard assigns relatively high service ratings to Stokes County, local leaders say some areas have yet to see improvement. One Stokes County official highlighted the challenges of the cell service with the unique topography of the county, and that areas in the more rural northern part of Stokes do not have the same level of access as areas farther south.

Symmetry Deficits. The NC Broadband Availability Index rates Stoke's ratio at 0.18 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio.

Upload to Download Ratio

0.18

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 140,170 households and businesses served. Stokes County has received $4,035,582 in grant funding, serving 1,315 households and 19 businesses in Stokes as of July 19, 2024. The map to the right shows where grant dollars are going throughout the county.
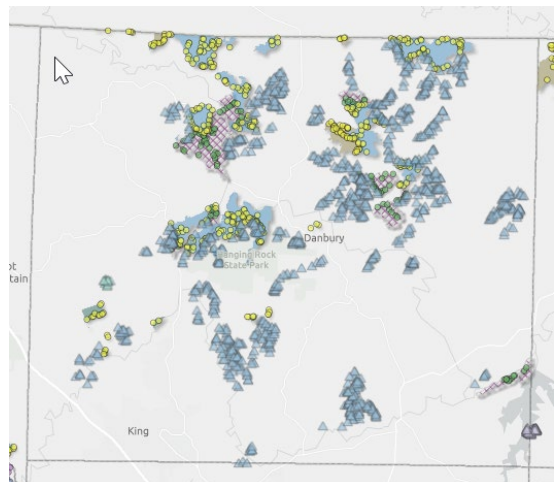
AVAILABILITY – A CLOSER LOOK
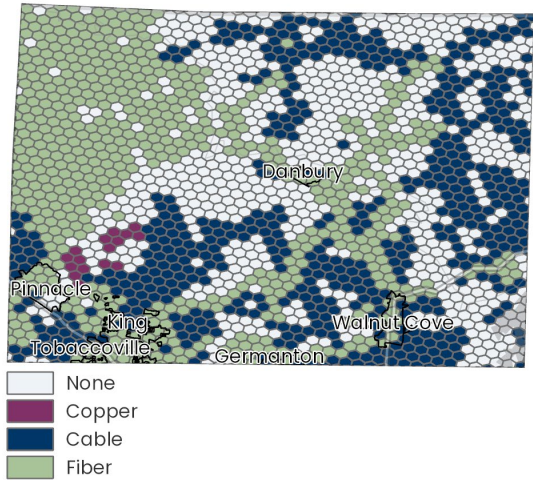
None
Copper
Cable
Fiber

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Stokes County. The first map shows that much of Stokes County has large gaps with no high-speed service. Fiber is predominantly in the western area of the County, with Cable service filling in some of the gaps in the middle and eastern areas of Stokes County.
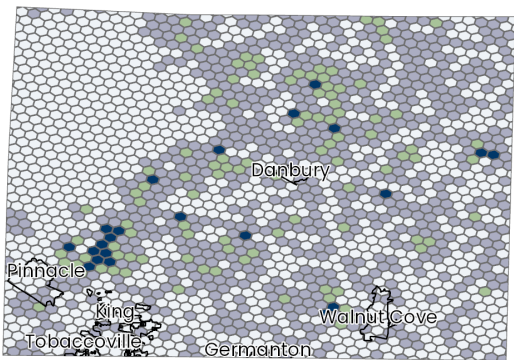
Unserved Locations

0
1 – 8
9 – 17
18 – 37

Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 83% of locations in Stokes County have high-speed service.
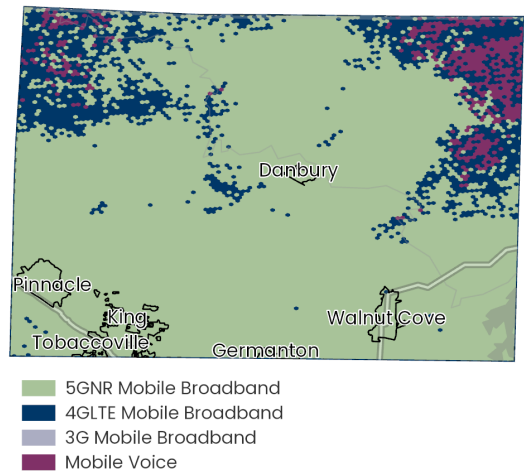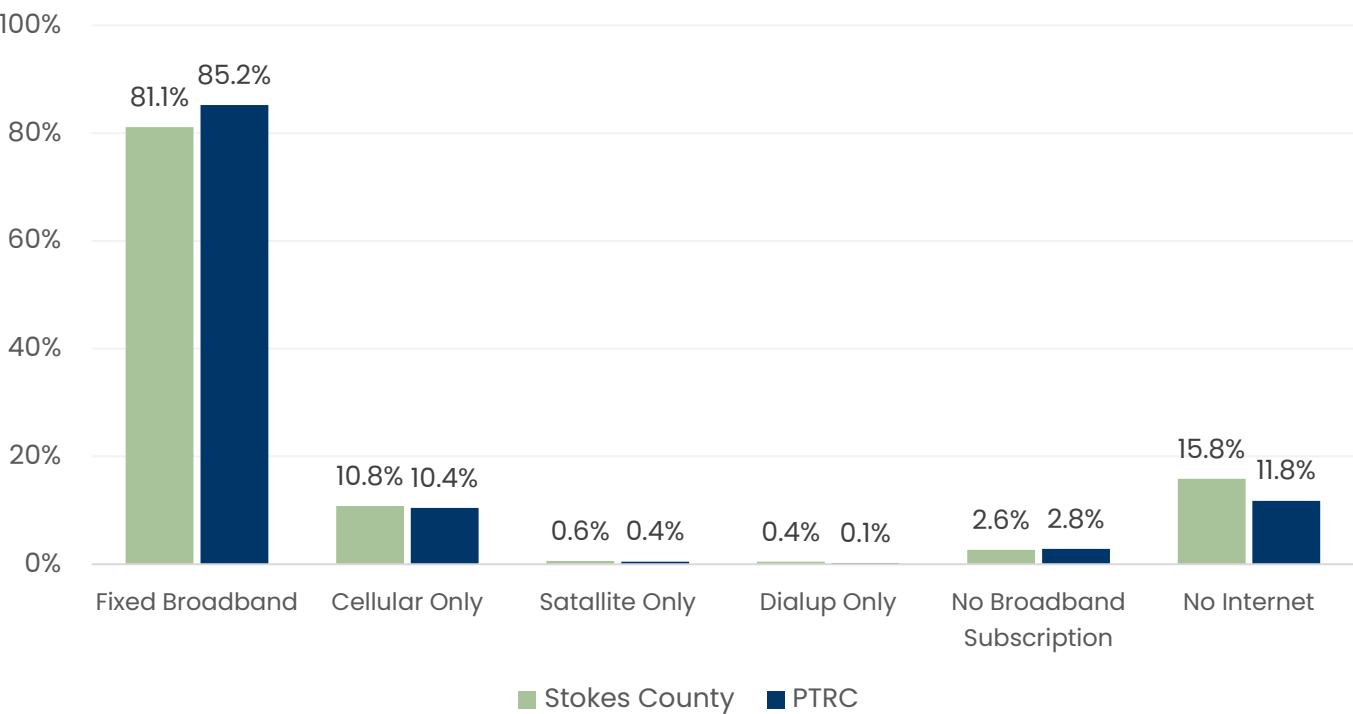

5GNR Mobile Broadband
4GLTE Mobile Broadband
3G Mobile Broadband
Mobile Voice

Mobile Broadband Service. Mobile broadband is available in much of the county as well. Again, there are gaps in coverage in the northeastern and northwestern parts of the county, as shown in the map to the left.
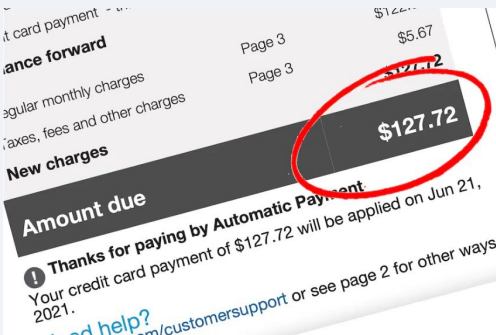
BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.

Adoption by Service Type

Legend: ■ Stokes County ■ PTRC

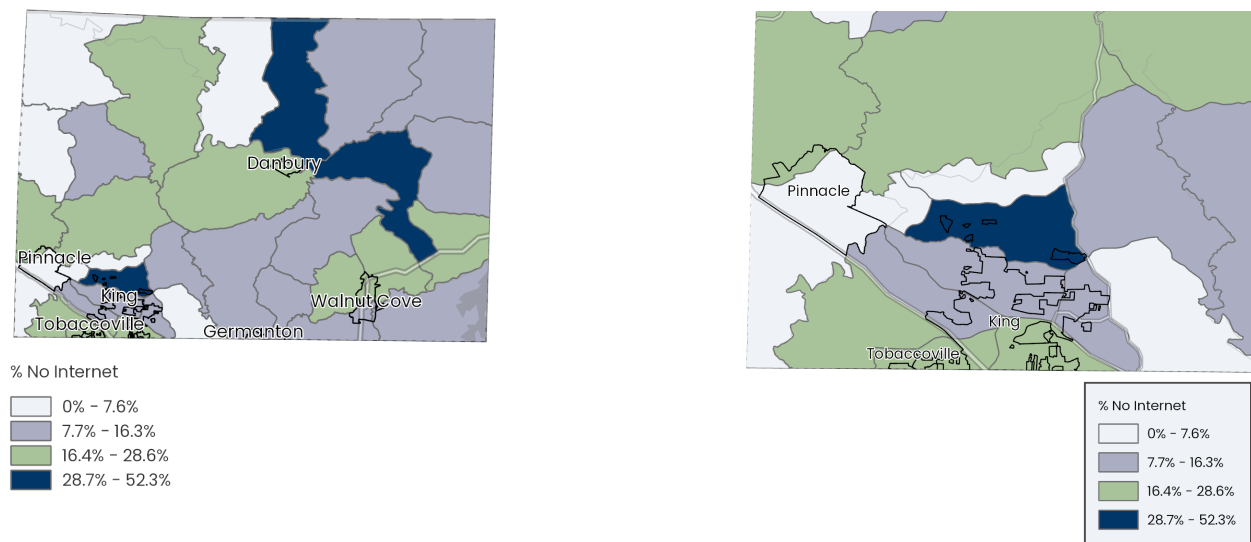| Service Type	Stokes County	PTRC
Fixed Broadband	81.1%	85.2%
Cellular Only	10.8%	10.4%
Satallite Only	0.6%	0.4%
Dialup Only	0.4%	0.1%
No Broadband Subscription	2.6%	2.8%
No Internet	15.8%	11.8%

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, but at 81% in Stokes County, that leaves a lot of room for less desirable pathways. Many use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and DSL, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet

- 0% – 7.6%
- 7.7% – 16.3%
- 16.4% – 28.6%
- 28.7% – 52.3%

% No Internet

- 0% – 7.6%
- 7.7% – 16.3%
- 16.4% – 28.6%
- 28.7% – 52.3%

Geography of Adoption. The map of Stokes County to the left above shows Census block groups where households with no internet service are concentrated. It appears areas of high, medium, and low adoption are mixed together: no one area of the county has the highest concentration of internet adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around King. It, too, has a mixture of high, medium, and low-adoption areas.

BROADBAND ADOPTION SCORE: 37.0

The NC Broadband Adoption Potential index awards Stokes County a score of 37.0, ranking Stokes in the bottom half of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Stokes County variables are shown in the table to the right:
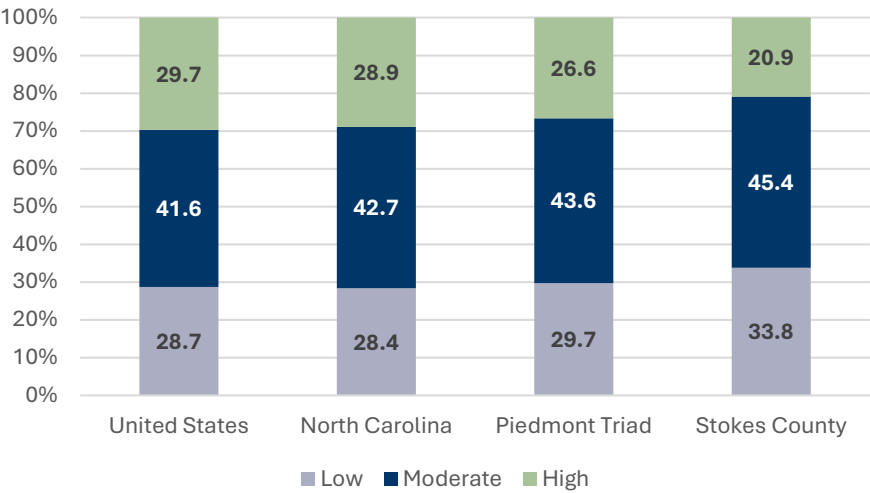
% with broadband subscription	**61.0**
% households no internet	**18.4**
% households no computer	**14.5**
% population ages 18–34	**18.0**
% population ages 65 and over	**20.9**
% households in poverty	**14.8**
% households with children	**26.0**
% limited English	**4.7**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Stokes County include [to be supplied].
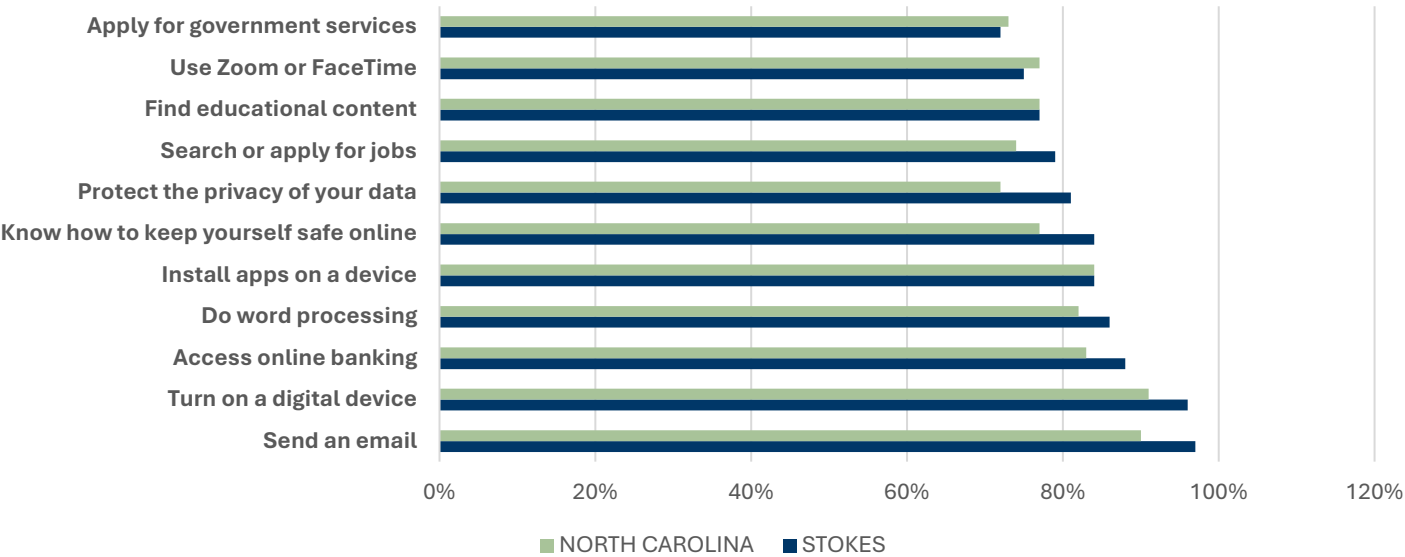
Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Stokes County
High	29.7	28.9	26.6	20.9
Moderate	41.6	42.7	43.6	45.4
Low	28.7	28.4	29.7	33.8

■ Low ■ Moderate ■ High

We can measure digital literacy in a variety of different ways. The graph to the left shows Stokes County has a smaller share of occupations requiring high digital literacy. The one below presents Stokes County residents' responses to the NC Broadband Equity Survey, indicating they have notably less literacy than people in the state as a whole.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

Apply for government services
Use Zoom or FaceTime
Find educational content
Search or apply for jobs
Protect the privacy of your data
Know how to keep yourself safe online
Install apps on a device
Do word processing
Access online banking
Turn on a digital device
Send an email

■ NORTH CAROLINA ■ STOKES

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Stokes County, almost 12% of households lack any kind of computer (2,265 households), and an additional 9.3% have only a smart phone to connect to the internet (1,769 households).
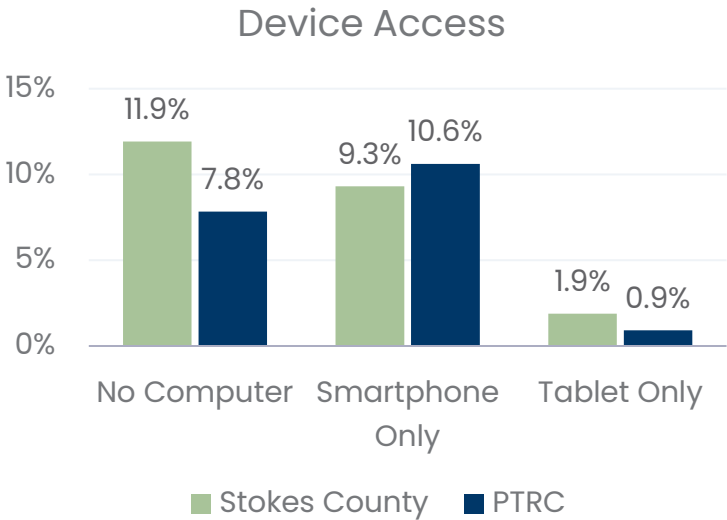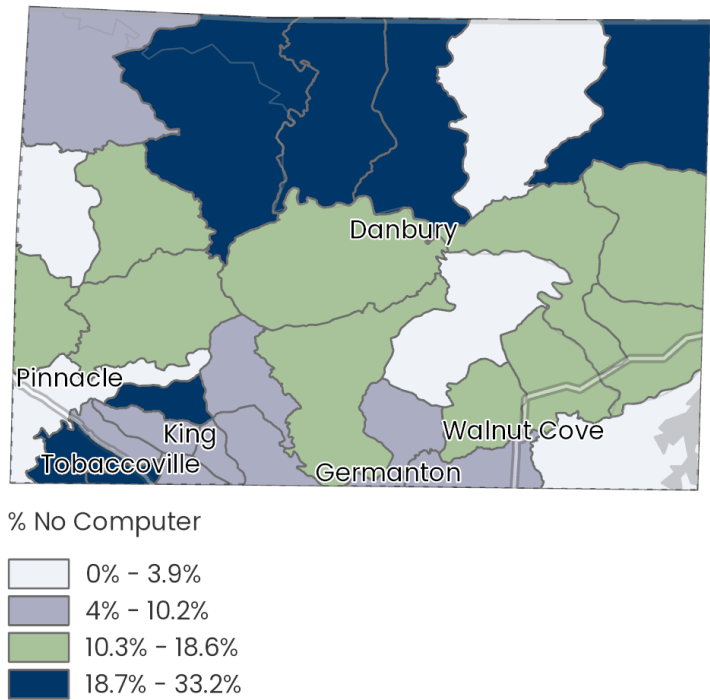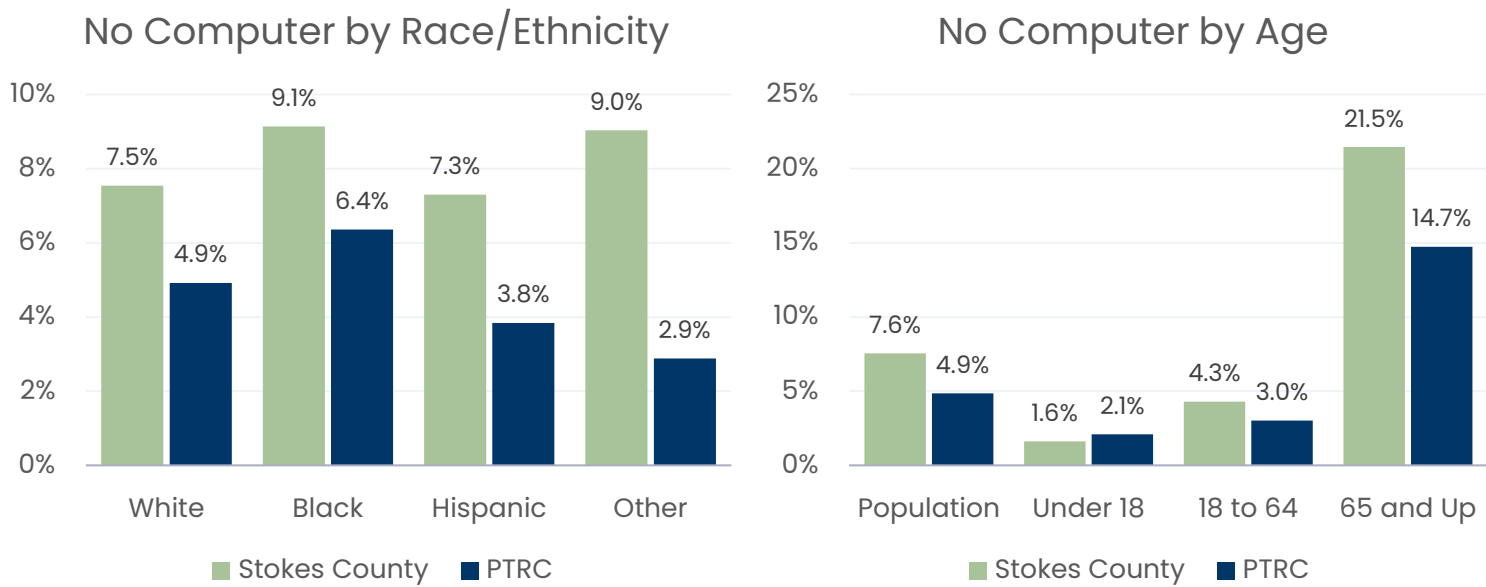
Device Access

Stokes County ● PTRC

Households with No Computer

% No Computer

- 0% – 3.9%
- 4% – 10.2%
- 10.3% – 18.6%
- 18.7% – 33.2%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the vicinity of King. At the same time, several census block groups where households are *most* likely to have a computer are also in and around King – a visible digital divide.

DEVICE ACCESS

Dimensions of Race and Age. There is a racial divide in access to devices. Over 9% of Stokes County's Black population live in a household with no computer. Seniors also suffer a disparity of device access, with over 21% in households with no computer in Stokes County.

No Computer by Race/Ethnicity

White: Stokes County 7.5%, PTRC 4.9%
Black: Stokes County 9.1%, PTRC 6.4%
Hispanic: Stokes County 7.3%, PTRC 3.8%
Other: Stokes County 9.0%, PTRC 2.9%

■ Stokes County ■ PTRC

No Computer by Age

Population: Stokes County 7.6%, PTRC 4.9%
Under 18: Stokes County 1.6%, PTRC 2.1%
18 to 64: Stokes County 4.3%, PTRC 3.0%
65 and Up: Stokes County 21.5%, PTRC 14.7%

■ Stokes County ■ PTRC

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. Stokes County began a one-to-one program following Covid, and middle and high school students are issued a Chromebook, while elementary students can check them out.

Public Device Access. For those having no computer, access to public use computers is vital. The Stokes County public libraries in Danbury and King have computers for library customers to use and have free Wi-Fi in all branches.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Stokes County, and areas where we see particularly underserved communities.

Stokes County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. Officials and community members in Stokes County made tremendous efforts to publicize the NC DIT survey, resulting in over 10% of Stokes County households completing the survey – by far the highest response rate in the PTRC. Additionally, in 2016 the Stokes County council provided a grant to RiverStreet Networks to provide fiber service throughout the county, greatly increasing availability across the county.
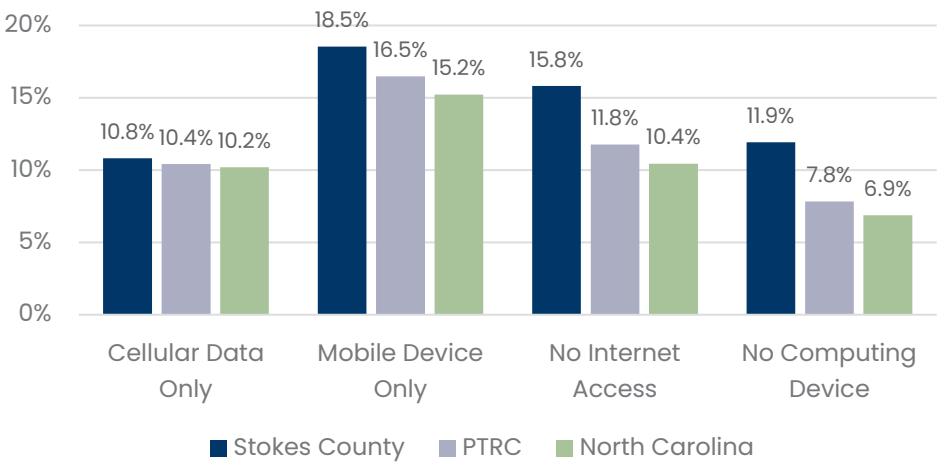
Households by Digital Distress

Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Tokes County experiences higher distress levels in all four categories than the PTRC or the state as a whole.

No Internet Access by Household Income
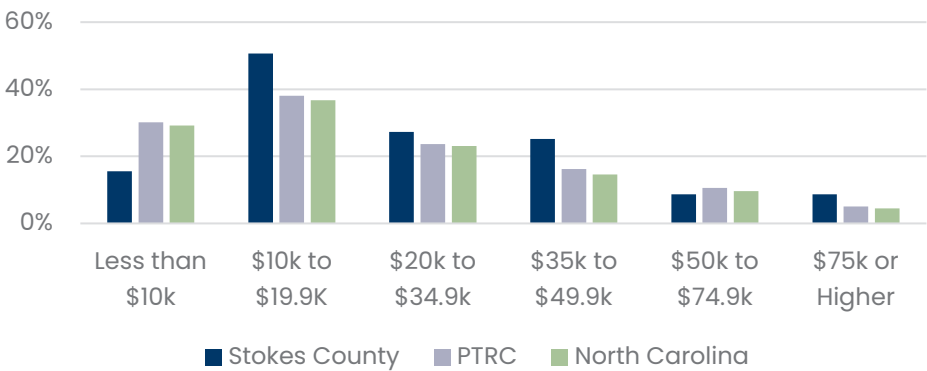
Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Stokes County as elsewhere, that's true, but in stokes, lack of adoption and access are significantly lower for households making less than $10k.

SURRY
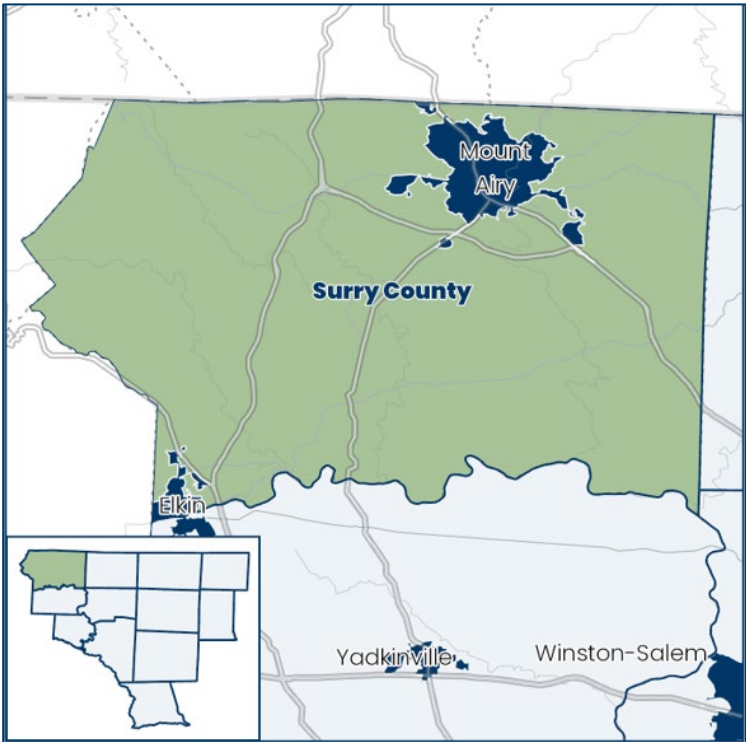
Surry County is moderate in population size, ranking 38th in North Carolina, and moderate in land area, ranking 34th. It's located in the northwestern section of the PTRC's 12-county service area. Mount Airy is the largest population center, with 10,610. Dobson, with 1,463 population, is the county seat.

Surry County is designated a Tier Two county, a 2024 shift from Tier One (most distressed), attributed to a rise in median income and a resulting improvement in its NC Department of Commerce Distress Rank from #38 to #45. Still on the negative side is the population trend, with a decline of 0.04% from 2019 to 2022.

Surry County is more rural, poorer, and less well-educated than North Carolina as a whole and has a larger white population.

DEMOGRAPHICS	SURRY	PTRC	NORTH CAROLINA
Population	71,429	1,745,206	10,470,214
White	58,998 (82.6%)	1,081,094 (61.9%)	6,455,988 (61.7%)
Black	2,496 (3.5%)	371,529 (21.3%)	2,161,841 (20.6%)
Hispanic	8,217 (11.5%)	181,589 (10.4%)	1,051,008 (10.0%)
Other	1,718 (2.4%)	110,994 (6.4%)	801,377 (7.7%)
Median Age	43.8	–	39.1
% Under 18	21.0%	21.8%	21.8%
% 65 and Over	20.6%	17.4%	16.7%
Median Income	$52,743	–	$66,186
% Household Poverty	19.1%	14.5%	13.1%
% College Degree	18.2%	28.7%	33.9%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	SURRY	NORTH CAROLINA
Percent Population with Available 25/3 Service	100%	98.39%
Percent Population with Available 100/20 Service	99.51%	95.81%
Percent Population with Available Fiber Service	78.74%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
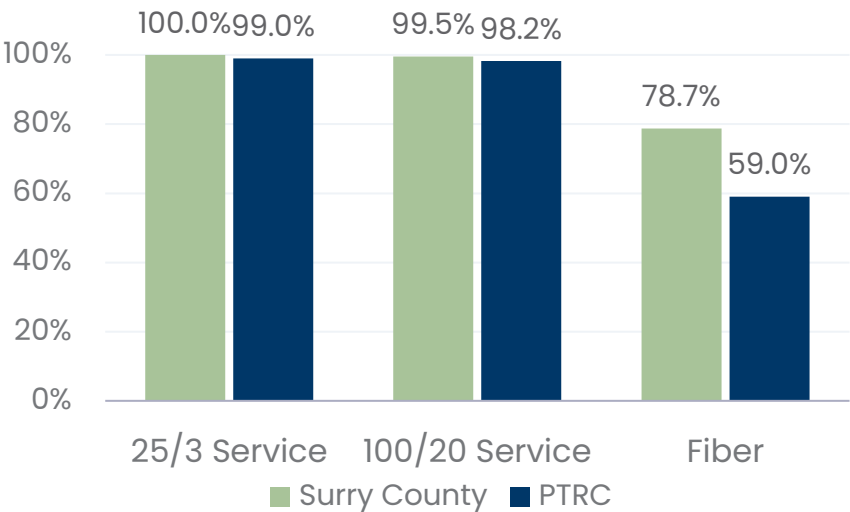
BROADBAND AVAILABILITY SCORE: 85.4

The NC Broadband Affordability index awards Surry County a score of 85.4, ranking Surry in the top quarter of NC counties. (The lowest score was given to Graham County, with 18.1, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Surry's variables are shown in the table to the right:

% with 25/3 access	100
% with 100/20 access	99.51
% with fiber access	78.74
Upload / Download Ratio	0.12
Household density	55.79
% homes built 2010 or later	4.18
% with no providers	0
% with DSL only	0

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

NC Availability Index	**78.74%**
NCDIT Surry Profile	**57.01%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**99.5%**
Surry Digital Inclusion Profile	**22.5%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Surry County Findings.
Approximately 374, or 1.1% of Surry County households have responded to the survey. Some of the responses vary from the official data. For example, 58% of respondents reported download and upload speeds or less than 25/3 Mbps, and 38% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results
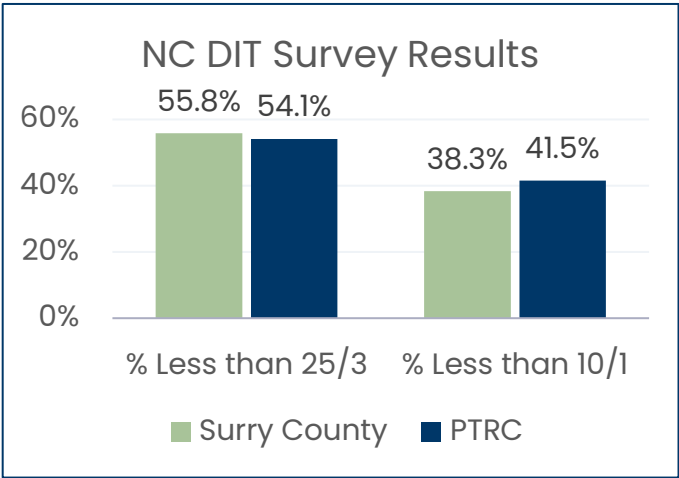
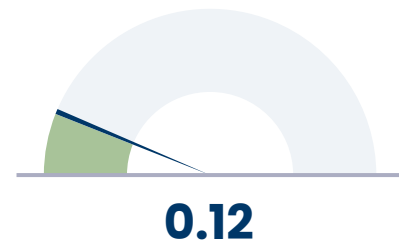| SURVEY RESPONSE	SURRY	NORTH CAROLINA
Extremely or somewhat satisfied with service	35%	31%
Extremely or somewhat dissatisfied with service	49%	45%
Monthly cost over $125	22%	19%
Median download speed	18 Mbps	22 Mbps
Median upload speed	5 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. While the NC Broadband Availability Index Dashboard assigns high service ratings to Surry County, local leaders say some areas have yet to see improvement. One Surry Community College professor says that at her location around Thurmond in the far western part of the County, a 30-minute video can take over an hour to upload for the students.


Symmetry Deficits. The slow upload speeds reported by the college professor are symptomatic of a low ratio of upload to download speeds. The NC Broadband Availability Index rates Surry's ratio at 0.12 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio.

Upload to Download Ratio

0.12

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 140,170 households and businesses served. Surry County is part of a $399,713 multi-county grant in NC, but no households or businesses have been served in Surry as of July 19, 2024. The map to the right shows this lack of activity.
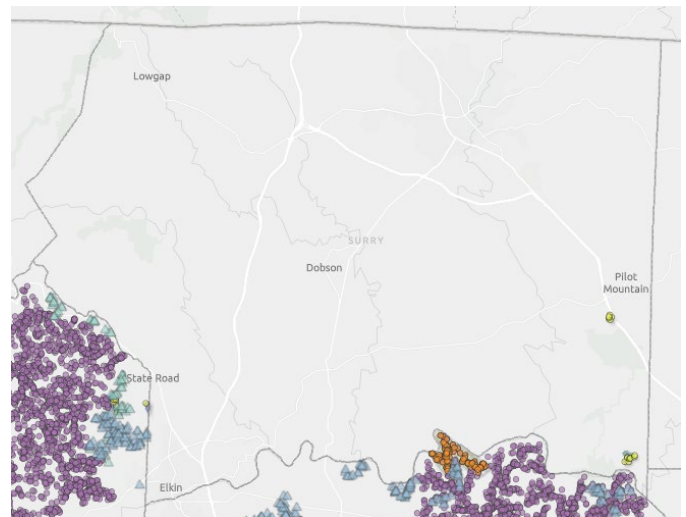
AVAILABILITY – A CLOSER LOOK
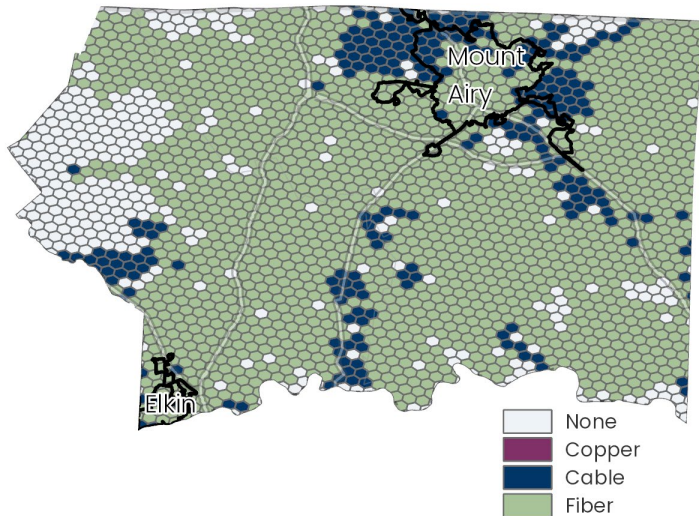
High Speed Service: The maps on this page show in greater detail the geography of broadband service in Surry County. The first map shows that most of Surry County has fiber internet options available, with other areas covered by cable service. Fiber has not reached the far western part of the County, and in small areas to the north of Mount Airy along the Virginia border, there are pockets with neither fiber nor cable.
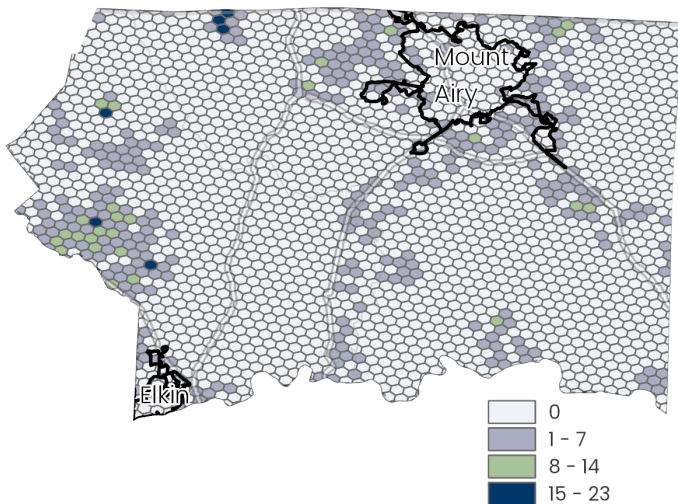
Locations with No High-Speed Service: The light-shaded areas in the map to the left are those with zero locations having no high-speed coverage – covering approximately 95% of Surry County.
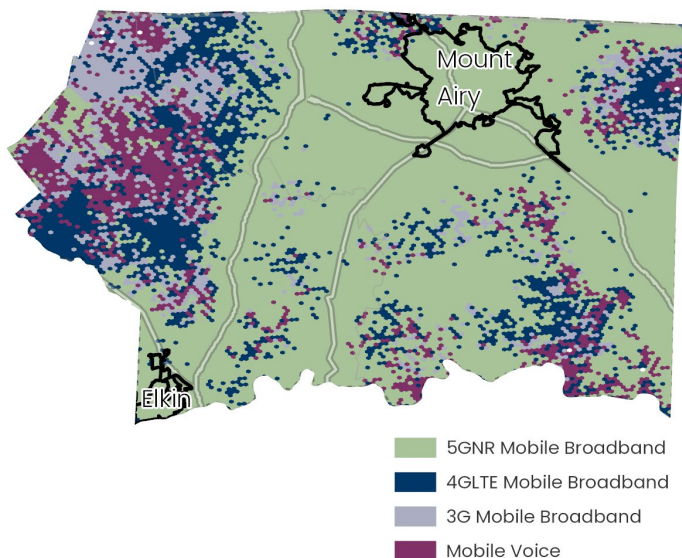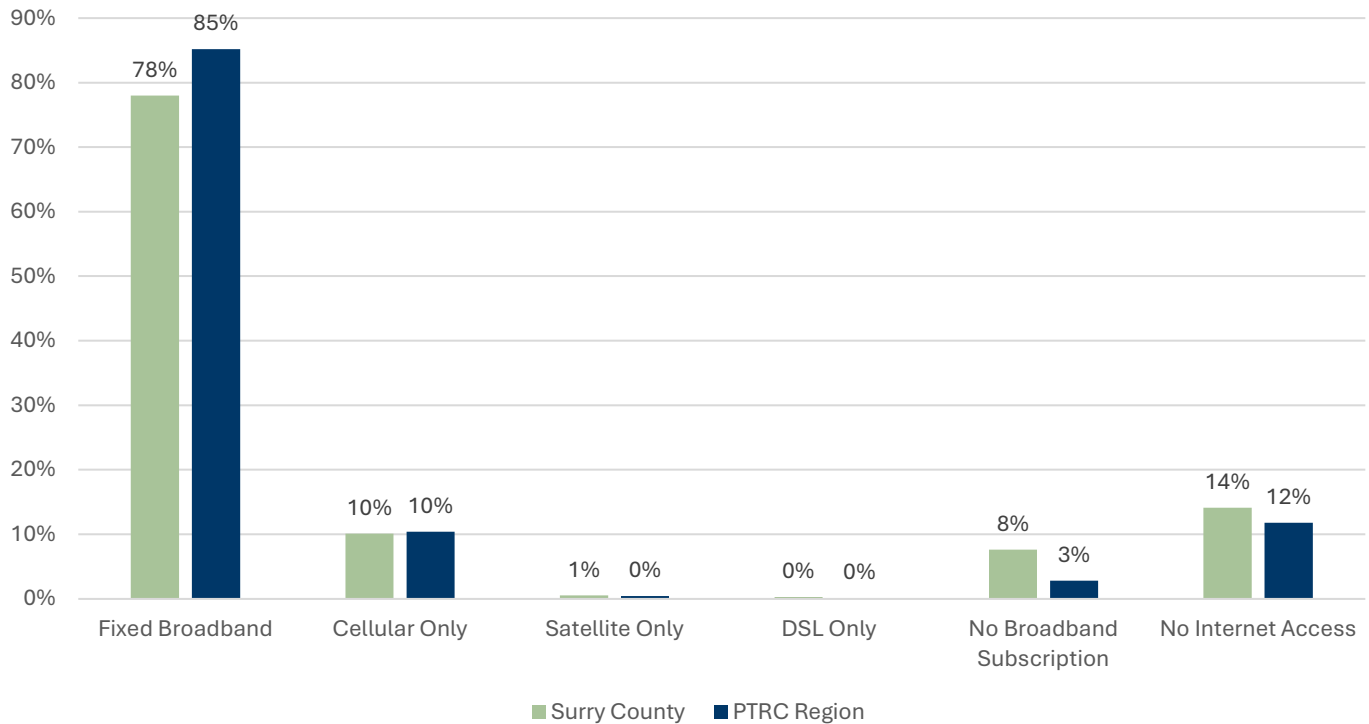

Mobile Broadband Service. Mobile broadband is available in much of the county as well. Again, there are gaps in coverage in the western part of the county, as shown in the map to the left.
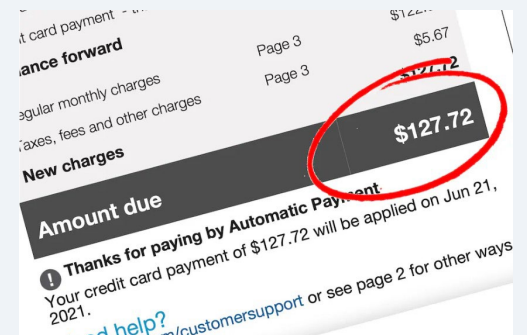
BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.

Adoption by Service Type
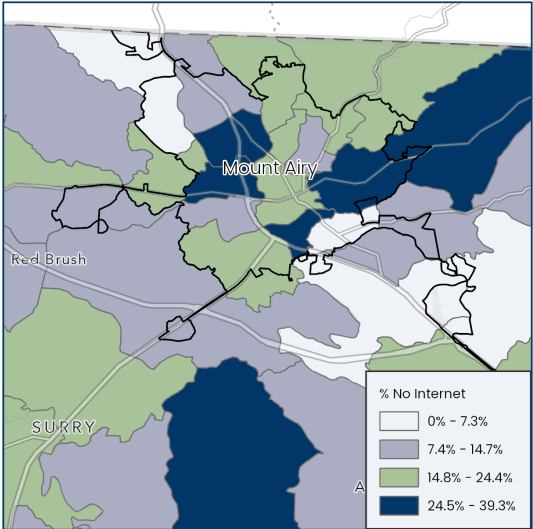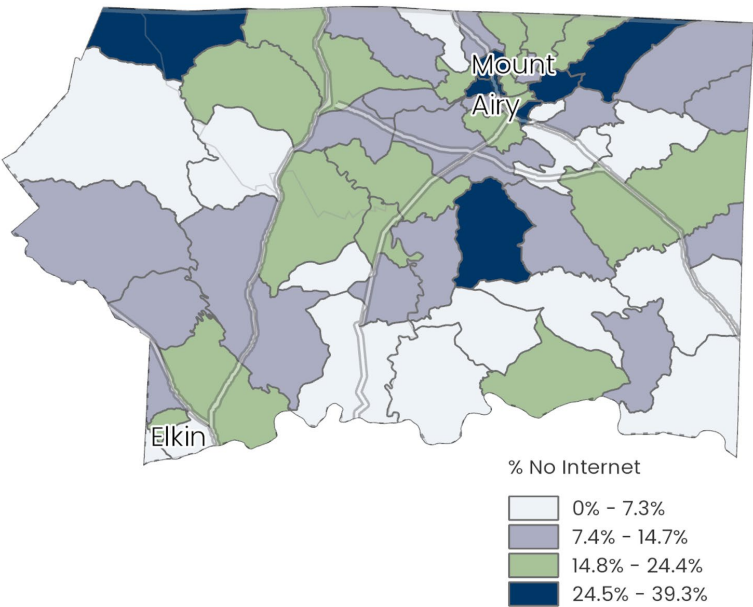

Legend: ■ Surry County ■ PTRC Region

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, but at 78% in Surry County, that leaves a lot of room for less desirable pathways. Many use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and DSL, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet
- 0% – 7.3%
- 7.4% – 14.7%
- 14.8% – 24.4%
- 24.5% – 39.3%

% No Internet
- 0% – 7.3%
- 7.4% – 14.7%
- 14.8% – 24.4%
- 24.5% – 39.3%

Geography of Adoption. The map of Surry County to the left above shows Census block groups where households with no internet service are concentrated. It appears areas of high, medium, and low adoption are mixed together: no one area of the county has the highest concentration of internet adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Mount Airy. It, too, has a mixture of high, medium, and low-adoption areas.

BROADBAND ADOPTION SCORE: 41.3

The NC Broadband Adoption Potential index awards Surry County a score of 41.3, ranking Surry in the bottom half of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Surry County variables are shown in the table to the right:

% with broadband subscription	**62.36**
% households no internet	**16.544**
% households no computer	**14.047**
% population ages 18–34	**18.65**
% population ages 65 and over	**20.424**
% households in poverty	**16.58**
% households with children	**28.35**
% limited English	**3.72**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. Digital literacy training opportunities in Surry County include [to be supplied].
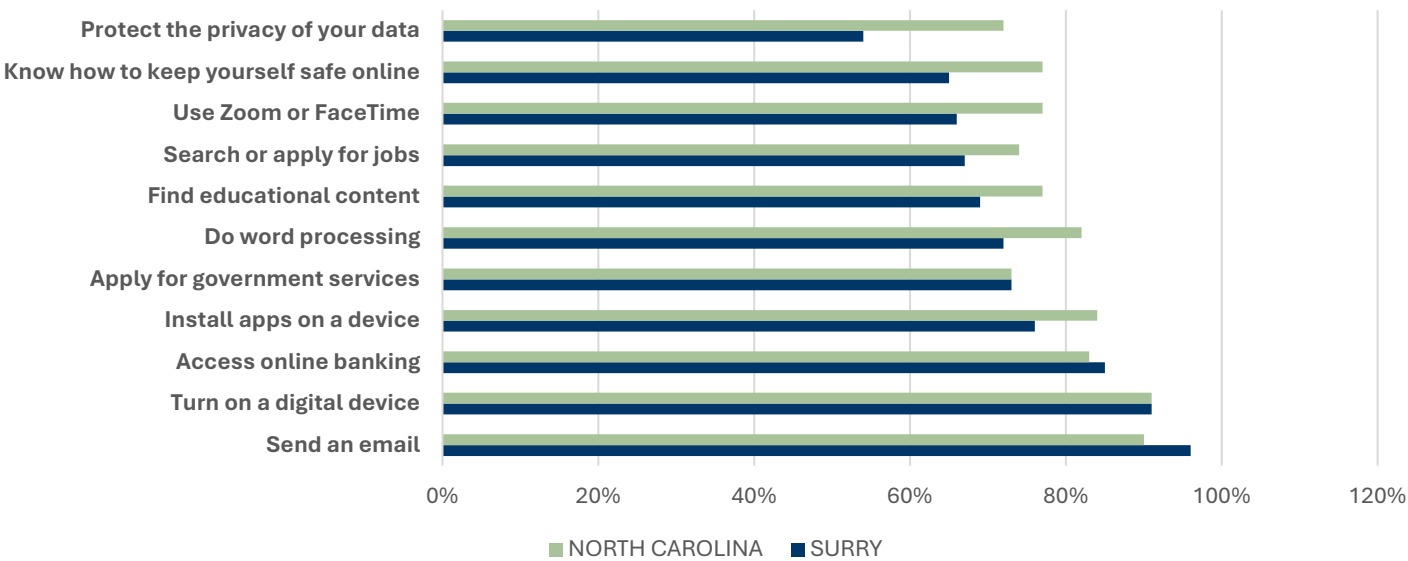
Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Surry County
High	29.7	28.9	26.6	20.2
Moderate	41.6	42.7	43.6	45.5
Low	28.7	28.4	29.7	34.3

Legend: Low, Moderate, High
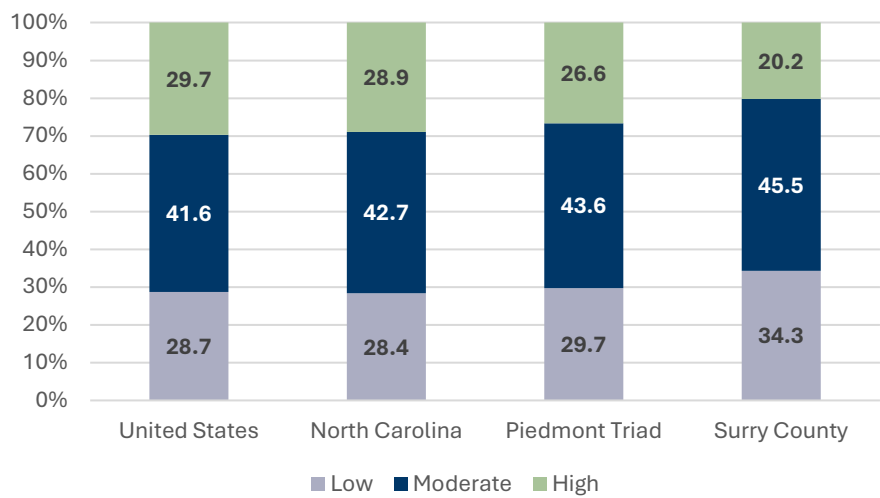
We can measure digital literacy in a variety of different ways. The graph to the left shows Surry County has a smaller share of occupations requiring high digital literacy. The one below presents Surry County residents' responses to the NC Broadband Equity Survey, indicating they have notably less literacy than people in the state as a whole.
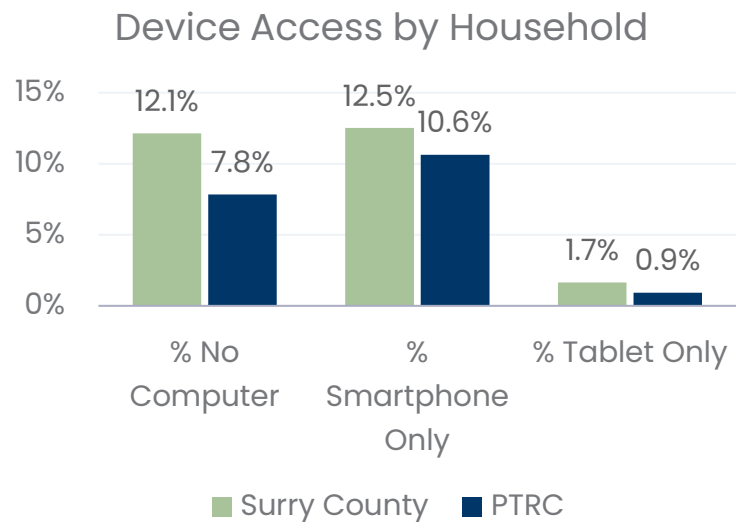
I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

Categories (top to bottom):
- Protect the privacy of your data
- Know how to keep yourself safe online
- Use Zoom or FaceTime
- Search or apply for jobs
- Find educational content
- Do word processing
- Apply for government services
- Install apps on a device
- Access online banking
- Turn on a digital device
- Send an email
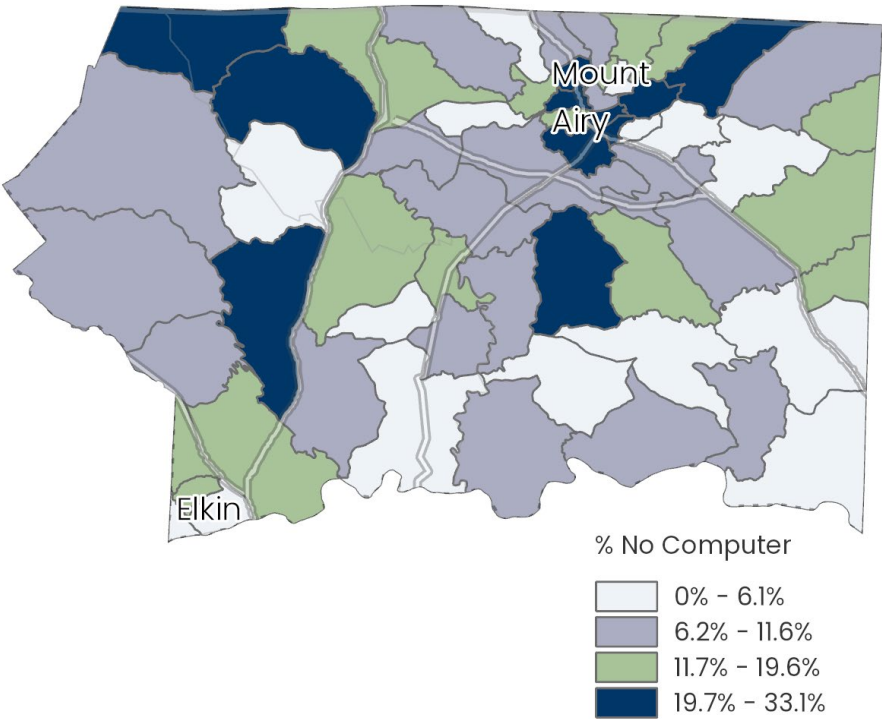
Legend: NORTH CAROLINA, SURRY

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Surry County, over 12% of households lack any kind of computer (3,522 households), and an additional 12.5% have only a smart phone to connect to the internet (3,629 households).
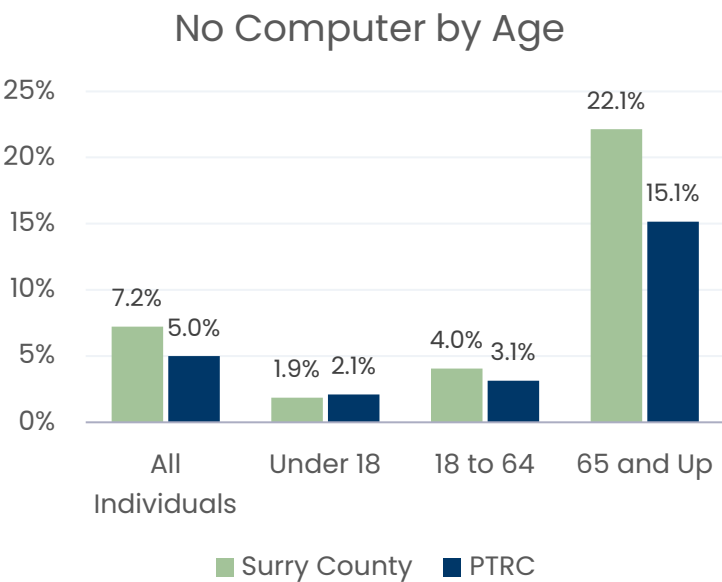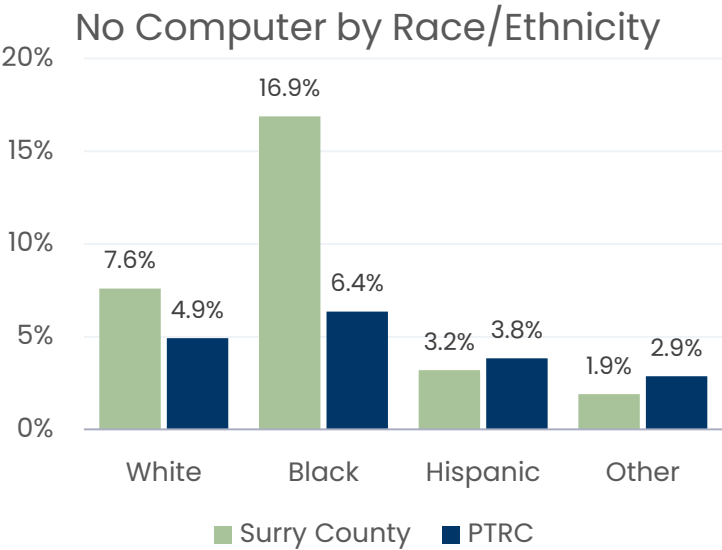
Device Access by Household

Legend: Surry County (green), PTRC (dark blue)

% No Computer: 12.1% / 7.8%
% Smartphone Only: 12.5% / 10.6%
% Tablet Only: 1.7% / 0.9%

Households with No Computer

Mount Airy

Elkin

% No Computer
- 0% - 6.1%
- 6.2% - 11.6%
- 11.7% - 19.6%
- 19.7% - 33.1%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the vicinity of Mount Airy. At the same time, several census block groups where households are *most* likely to have a computer are also in and around Mount Airy – a visible digital divide.

DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Almost 17% of Surry County's Black population live in a household with no computer. Seniors also suffer a disparity of device access, with over 22% in households with no computer in Surry County.

No Computer by Race/Ethnicity

	White	Black	Hispanic	Other
Surry County	7.6%	16.9%	3.2%	1.9%
PTRC	4.9%	6.4%	3.8%	2.9%

■ Surry County ■ PTRC

No Computer by Age

	All Individuals	Under 18	18 to 64	65 and Up
Surry County	7.2%	1.9%	4.0%	22.1%
PTRC	5.0%	2.1%	3.1%	15.1%

■ Surry County ■ PTRC

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. [Surry County is no exception, with all school systems – Surry County, Mount Airy City, and Elkins Schools – providing Chromebooks to students in elementary and upper grades.]

Public Device Access. For those having no computer, access to public use computers is vital. The Surry County public libraries in Dobson, Elkin, Mount Airy, and Pilot Mountain, have computers for library customers to use, and also have free WiFi in all branches.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Surry County, and areas where we see particularly underserved communities.

Surry County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. In Surry County in 2023, government and community leaders convened the Surry County Broadband Committee, to assess the broadband resources they have, the areas where the resources fall short, and possible initiatives and programs to remedy the shortfall.

## Share of Households by Digital Distress Metrics
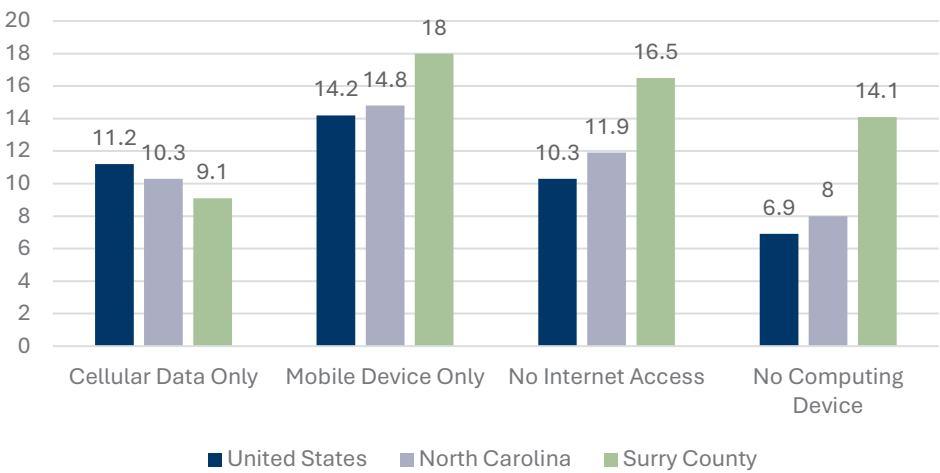
Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Surry County experiences higher distress levels in three categories than the country or the state as a whole.
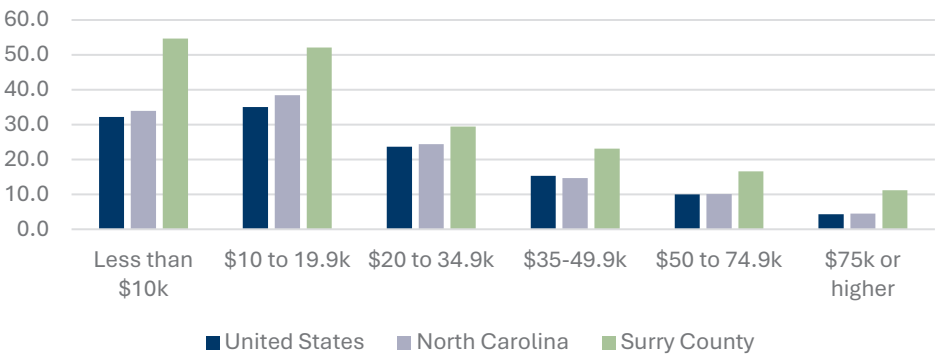
No Internet Access by Household Income

Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Surry County as elsewhere, that's true, but in Surry, lack of adoption and access are significantly greater across the board, regardless of income.

YADKIN
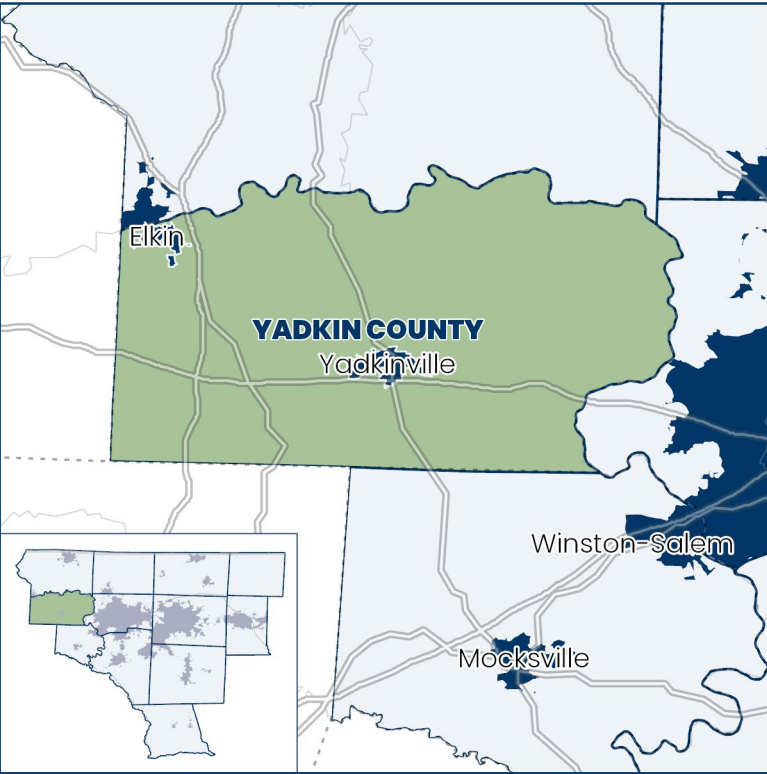
Yadkin County is moderate in population size, ranking 66th in North Carolina, and low in land area, ranking 78th. It's located in the northwestern section of the PTRC's 12-county service area. Yadkinville is the largest population center and the county seat, with a population of 2,995.

Yadkin County is designated a Tier Two county in the NC Department of Commerce distress rankings. It is ranked 51st in the state (1 is the most distressed). While it has a low unemployment rate (3.2%), it's low tax base per capita decreases its rankings in the state.

Yadkin County is more rural, less diverse, and less well-educated than the PTRC as a whole, although it does have a lower percentage of households in poverty than the PTRC average.

DEMOGRAPHICS	YADKIN	PTRC
Population	37,280	1,745,206
White	30,922 (82.9%)	1,081,094 (61.9%)
Black	1,070 (2.9%)	371,529 (21.3%)
Hispanic	4,319 (11.6%)	181,589 (10.4%)
Other	969 (2.6%)	110,994 (6.4%)
Median Age	44.5	42.9 (Counties Average)
Median Income	$57,486	$58,333 (Counties Average)
% Household Poverty	12.2%	14.5%
% College Degree	14.1%	28.7%
% Under 18	20.6%	21.8%
% 65 and Over	20.6%	17.4%

BROADBAND AVAILABILITY

"Availability" for a particular location means a service provider is offering internet service to residences and businesses in the location. That usually means fixed, wireless, or satellite infrastructure is in place to provide the rated service.

BROADBAND INDICATOR	YADKIN	NORTH CAROLINA
Percent Population with Available 25/3 Service	99.9%	98.4%
Percent Population with Available 100/20 Service	99.6%	95.8%
Percent Population with Available Fiber Service	86.1%	48.2%

The table above shows several availability measures from the NC Broadband Availability Index Dashboard, with comparisons to the state of North Carolina as a whole. The graph to the right shows the same measures, with comparisons to the twelve-county area served by PTRC.
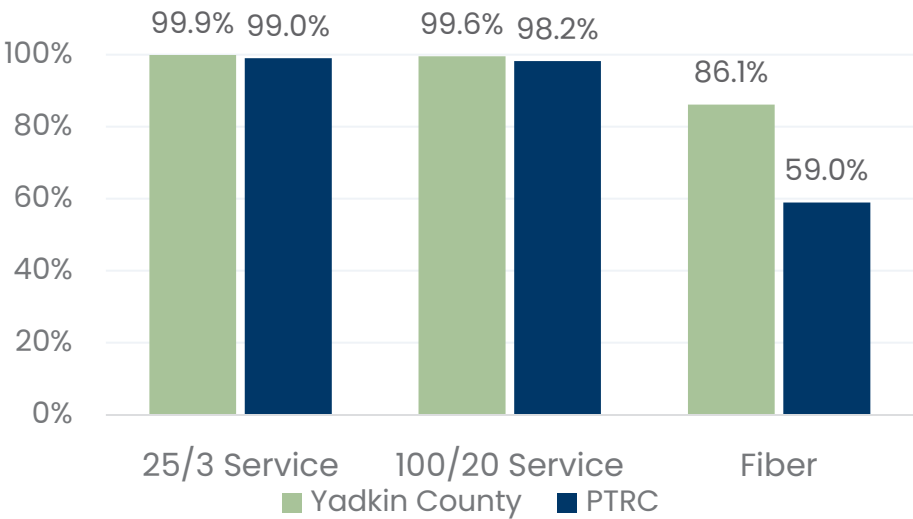
BROADBAND AVAILABILITY SCORE: 71.6

The NC Broadband Availability index awards Yadkin County a score of 71.6, ranking Yadkin in the top third of NC counties. (The lowest score was given to Hyde County, with 0, and the highest to Mecklenburg County, with 100.) The score is calculated as the weighted average of eight variables (including those displayed above). All eight of Yadkin's variables are shown in the table to the right:

% with 25/3 access	99.9
% with 100/20 access	99.6
% with fiber access	86.1
Upload / Download Ratio	0.04
Household density	44.8
% homes built 2010 or later	3.7
% with no providers	0
% with DSL only	0.1

AVAILABILITY DEFICITS

FCC service availability data displayed on the NC Broadband Availability Index may not tell the whole story. Other sources provide supplemental or alternative calculations. Having more definitive and reliable broadband data is one of the key objectives of this Plan.

Percent of Population with Available Fiber Service: For example, the table to the right shows two quite disparate readings for this fiber service:

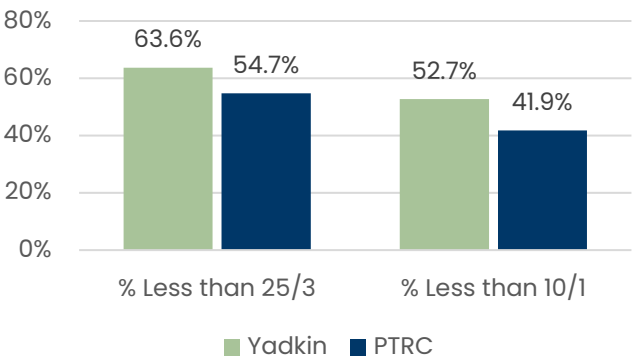|	
NC Availability Index	**86.1%**
NCDIT Yadkin Profile	**64.6%**

Percent of Population with 100/20 Mbps Service: The table to the right compares the FCC estimate to a leading crowdsourced network test project:

NC Availability Index	**99.6%**
Yadkin Digital Inclusion Profile	**50.9%**

NC Broadband Survey. The North Carolina Department of information Technology's Broadband Infrastructure Office has been conducting a survey to gather information on locations in the state without adequate internet access and speeds. The survey findings are intended to guide investment of grant funds and development of digital inclusion policy.

Yadkin County Findings.
Approximately 70, or 0.5% of Yadkin County households have responded to the survey. Some of the responses vary from the official data. For example, 64% of respondents reported download and upload speeds or less than 25/3 Mbps, and 53% reported speeds less than 10/1. Selected additional findings are in the table below.

NC DIT Survey Results

Bar chart showing: % Less than 25/3 — Yadkin 63.6%, PTRC 54.7%; % Less than 10/1 — Yadkin 52.7%, PTRC 41.9%.

Legend: Yadkin, PTRC

| SURVEY RESPONSE	YADKIN	NORTH CAROLINA
Extremely or somewhat satisfied with service	31%	31%
Extremely or somewhat dissatisfied with service	46%	45%
Monthly cost over $125	13%	19%
Median download speed	20 Mbps	22 Mbps
Median upload speed	1 Mbps	5 Mbps

AVAILABILITY DEFICITS

Infrastructure Deficits. The NC Broadband Availability Index Dashboard assigns high service ratings to Yadkin County, but there are still areas with low connectivity. A director at a local ISP stated that funding remained a problem for providing service in rural areas that offered no return on investment to businesses.

Symmetry Deficits. The NC Broadband Availability Index rates Yadkin's ratio at 0.04 to 1.0. This reflects a system built for traditional internet uses; for purposes of finding information, streaming, and shopping, fast download speeds are desirable. But for business, remote work, content creation – where sharing data with others is essential – fast upload capabilities are needed. "Symmetry" is achieved when the two speeds are equally fast – a 1 to 1 ratio. Yadkin's ratio of 0.04 is tied for the lowest in the PTRC.
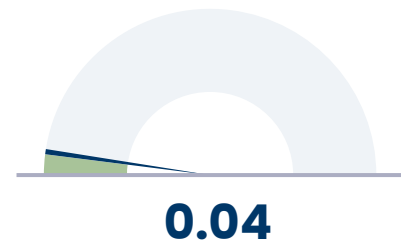
## Upload to Download Ratio

0.04

Funding Deficits. NCOneMap displays locations that have benefited from broadband grants under the Growing Rural Economies with Access to Technology (GREAT) and Completing Access to Broadband (CAB) programs – 141,773 households and businesses served. The map excerpt at right reveals that Yadkin County has been included in several grants totaling $4 million, including $2.6 million specifically for Yadkin – with 668 households and 74 businesses served.
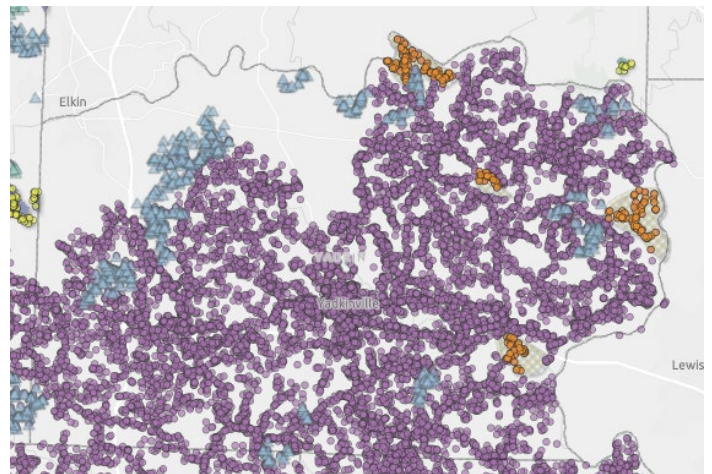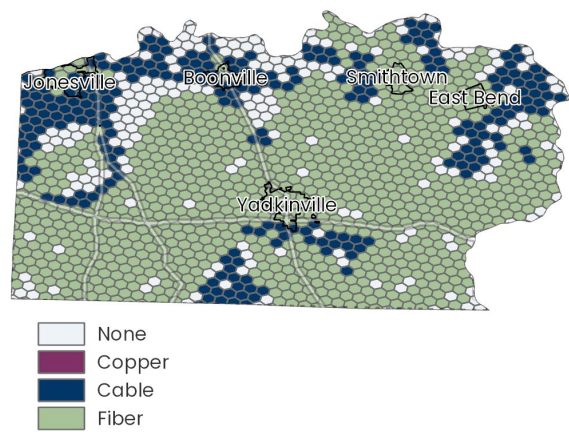
AVAILABILITY – A CLOSER LOOK

High Speed Service: The maps on this page show in greater detail the geography of broadband service in Yadkin County. The first map shows that most of Yadkin County has fiber internet options available, with other areas covered by cable service. There are pockets of no high-speed service options throughout the county, with the largest gaps occurring in the northwestern area of the county.
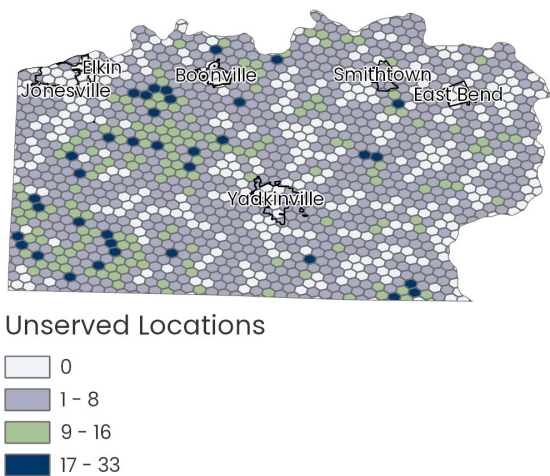
Locations with No High-Speed Service: The map to the left shows the number of locations (home or business) that have no high-speed coverage – approximately 74% of locations in Yadkin County have high-speed service.
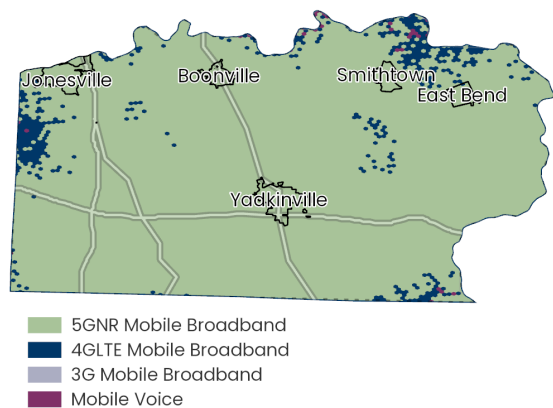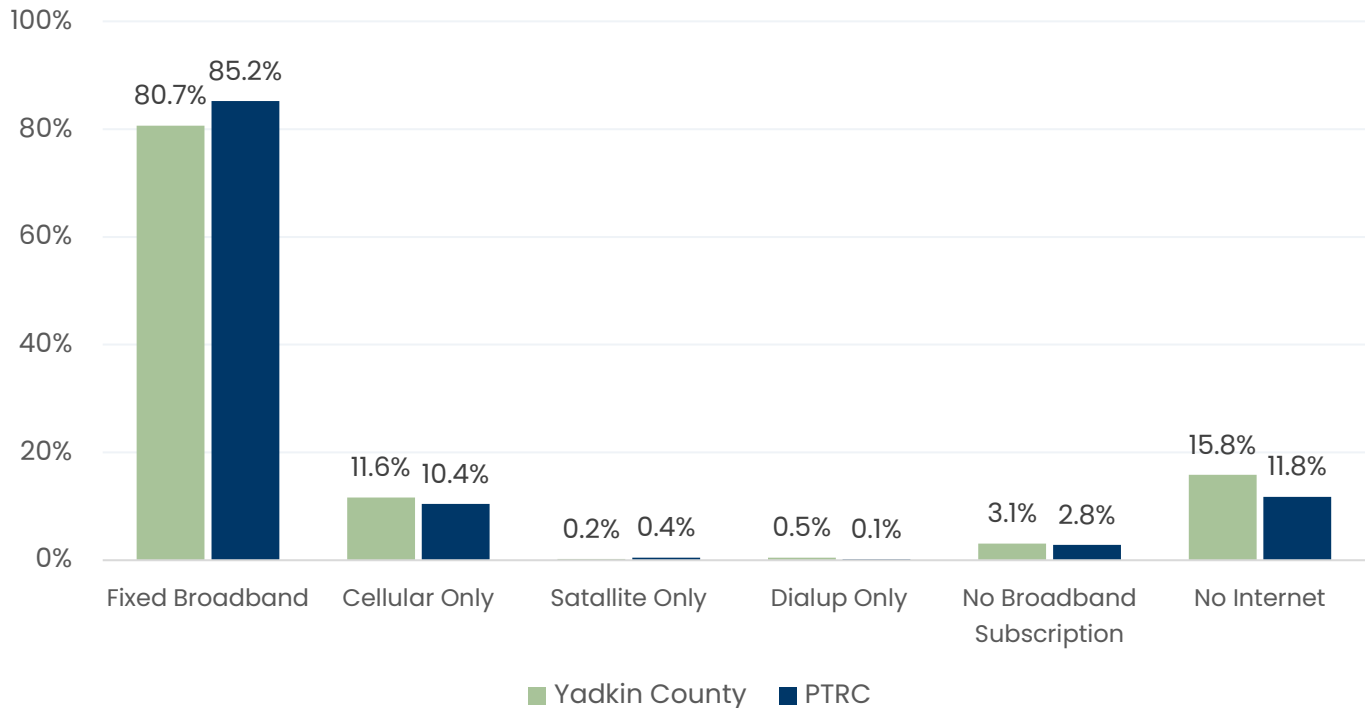

Mobile Broadband Service. 5G mobile broadband coverage is available across the majority of Yadkin County. In the areas where it is not available, 4G coverage fills in the gaps.
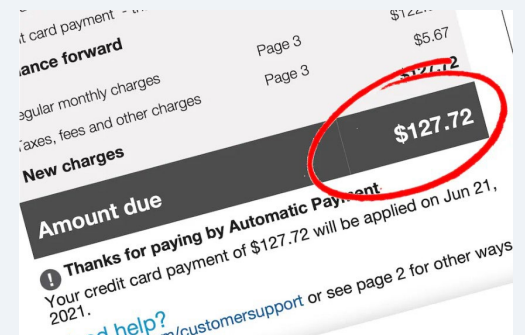
BROADBAND ADOPTION

"Adoption" for an available service means a household obtains use of the service, usually with a monthly broadband subscription. Digital inclusion means the service is available, even in hard to reach or underserved places, but then the service must be adopted, even by lower-income and underserved households.

Adoption by Service Type

Legend: Yadkin County (green), PTRC (dark blue)

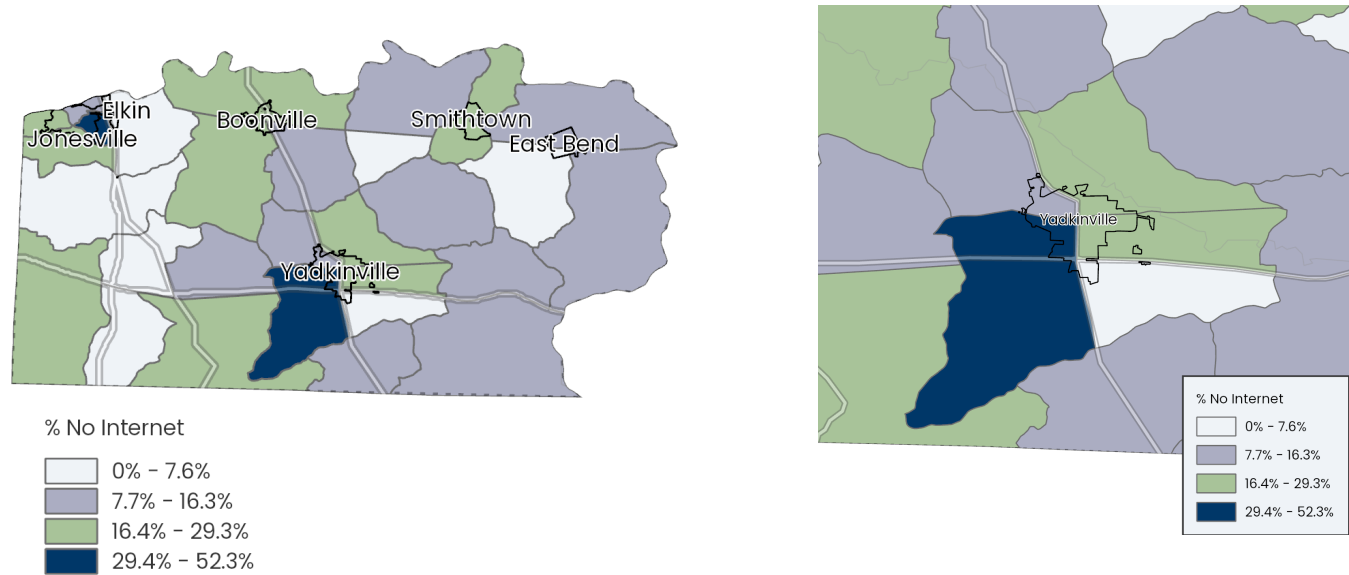| Service Type	Yadkin County	PTRC
Fixed Broadband	80.7%	85.2%
Cellular Only	11.6%	10.4%
Satallite Only	0.2%	0.4%
Dialup Only	0.5%	0.1%
No Broadband Subscription	3.1%	2.8%
No Internet	15.8%	11.8%

The chart above shows adoption by service type. As expected, fixed broadband is by far the most common, but at under 81% in Yadkin County, that leaves a lot of room for less desirable pathways. Many use the smartphone, or the cell signal and a hotspot, to gain access to the internet – because they prefer it or because broadband is not available. Satellite and dialup, from opposite ends of the technological spectrum, seem equally unpopular. But the most underserved are reflected in the numbers for no broadband – or no internet access at all.

Reasons for Low Adoption. There are two main reasons why households remain non-adopters. "Affordability" is one. "Relevance" is another – where a person doesn't know or doesn't believe that the internet is important for them to have in their households. The latter number is declining since the pandemic, when many who never had to use the internet before were forced to for the first time.

BROADBAND ADOPTION

% No Internet

- 0% – 7.6%
- 7.7% – 16.3%
- 16.4% – 29.3%
- 29.4% – 52.3%

% No Internet

- 0% – 7.6%
- 7.7% – 16.3%
- 16.4% – 29.3%
- 29.4% – 52.3%

Geography of Adoption. The map of Yadkin County to the left above shows Census block groups where households with no internet service are concentrated. The majority of block groups contain high to medium levels of adoption, with only two block groups having very low adoption. To much the same effect is the map excerpt at right, showing a zoomed-in view of the area around Yadkinville. It show the low adoption area around the town.

BROADBAND ADOPTION SCORE: 46.7

The NC Broadband Adoption Potential index awards Yadkin County a score of 46.7, ranking Yadkin in the top half of NC counties. (The lowest score was given to Washington County, with 0, and the highest to Wake County, with 100.) The score is calculated as the weighted average of eleven variables (including those displayed above). Eight of the eleven Yadkin County variables are shown in the table to the right:

% with broadband subscription	**64.1**
% households no internet	**17.7**
% households no computer	**12.1**
% population ages 18–34	**19.2**
% population ages 65 and over	**19.7**
% households in poverty	**15.4**
% households with children	**29.1**
% limited English	**5.0**

DIGITAL LITERACY

Digital Literacy Programs. Digital Literacy is an individual's ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills. Digital inclusion depends on everyone being able to reach this ability. The Yadkin County library offers access to the Northstar Digital Literacy training courses.
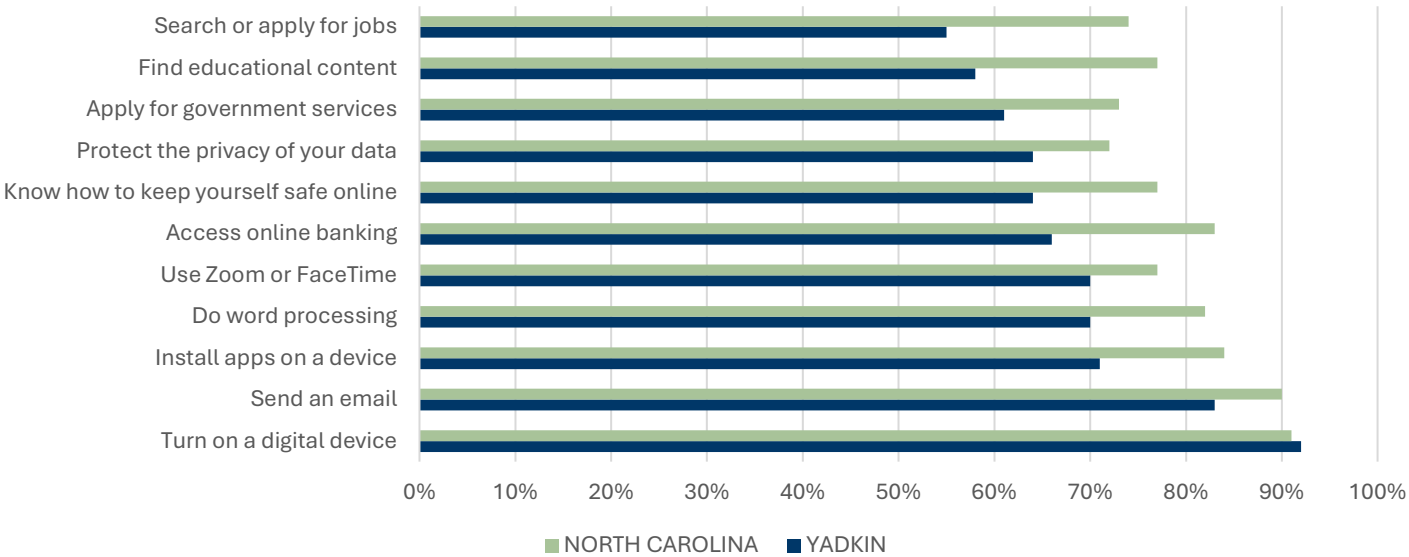
Share of Occupations by Skill Level

	United States	North Carolina	Piedmont Triad	Yadkin County
High	29.7	28.9	26.6	20.7
Moderate	41.6	42.7	43.6	46.1
Low	28.7	28.4	29.7	33.2

■ Low ■ Moderate ■ High
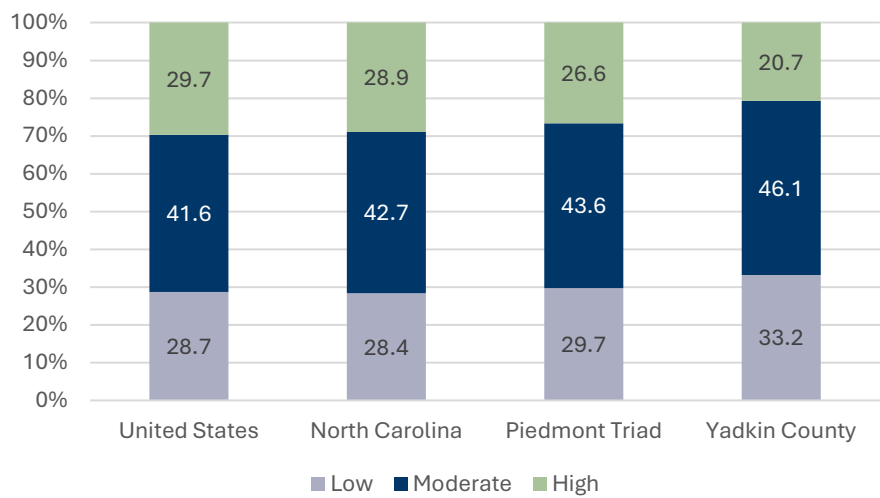
We can measure digital literacy in a variety of different ways. The graph to the left shows Yadkin County has a smaller share of occupations requiring high digital literacy. The one below presents Yadkin County residents' responses to the NC Broadband Equity Survey, indicating they have notably less literacy than people in the state as a whole.

I'M SOMEWHAT OR VERY CONFIDENT IN MY ABILITY TO:

- Search or apply for jobs
- Find educational content
- Apply for government services
- Protect the privacy of your data
- Know how to keep yourself safe online
- Access online banking
- Use Zoom or FaceTime
- Do word processing
- Install apps on a device
- Send an email
- Turn on a digital device

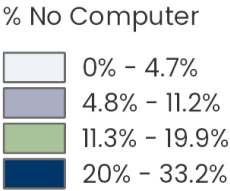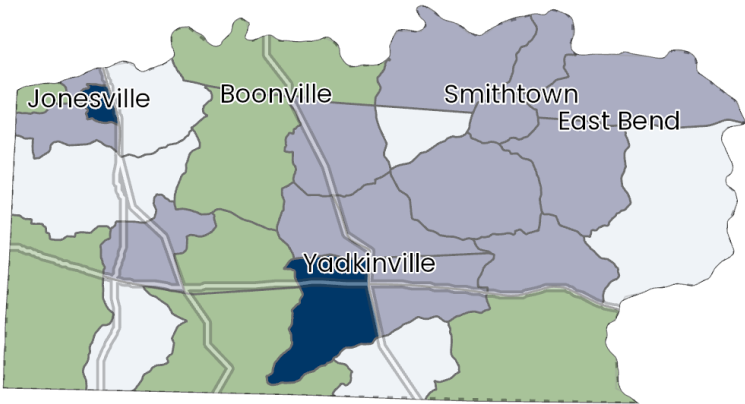■ NORTH CAROLINA ■ YADKIN

DEVICE ACCESS

In addition to availability, adoption, and literacy, access to the internet is only possible with a device that can make an internet connection. Access to an internet-capable device is a critical component of digital inclusion.

Therefore, "households with no computer" is a key measure of device access. As shown in the graph to the right, in Yadkin County, over 11% of households lack any kind of computer (1,646 households), and an additional 13.3% have only a smart phone to connect to the internet (1,969 households).
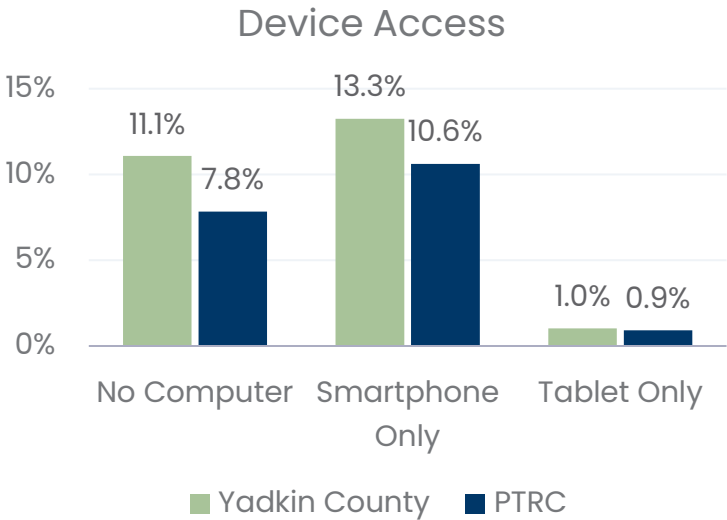
Device Access

Legend: Yadkin County, PTRC

No Computer: 11.1%, 7.8%
Smartphone Only: 13.3%, 10.6%
Tablet Only: 1.0%, 0.9%

Households with No Computer

Jonesville, Boonville, Smithtown, East Bend, Yadkinville

% No Computer
- 0% - 4.7%
- 4.8% - 11.2%
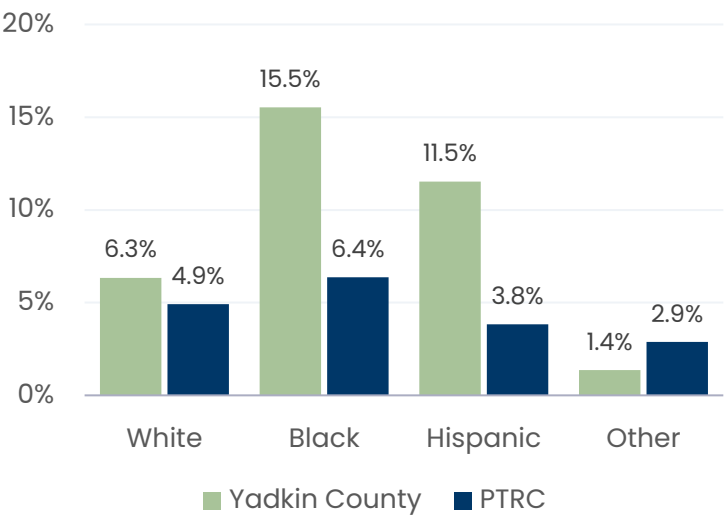- 11.3% - 19.9%
- 20% - 33.2%

Device access is not evenly distributed geographically. The map to the left shows households with no computer by census block group. Some of the highest percentages of such households are in the vicinity of Yadkinville. At the same time, several census block groups where households are *most* likely to have a computer are also in and around Yadkinville – a visible digital divide.
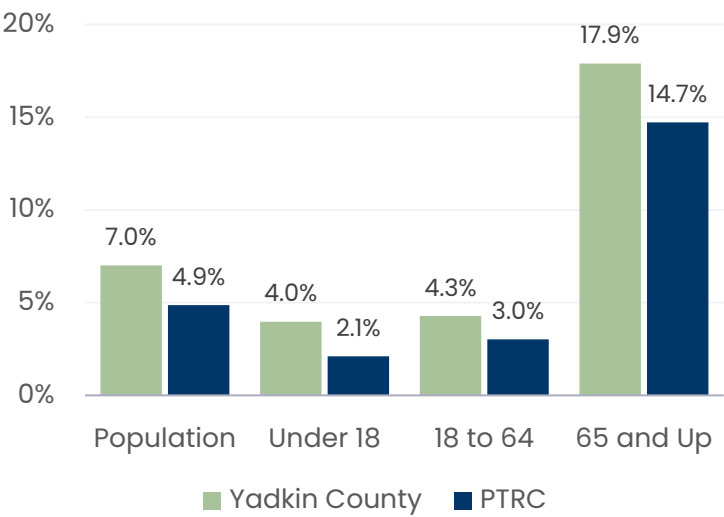
DEVICE ACCESS

Dimensions of Race and Age. There is a significant racial divide in access to devices. Over 15% of Yadkin County's Black population live in a household with no computer. Seniors also suffer a disparity of device access, with almost 18% in households with no computer in Yadkin County.

No Computer by Race/Ethnicity

	White	Black	Hispanic	Other
Yadkin County	6.3%	15.5%	11.5%	1.4%
PTRC	4.9%	6.4%	3.8%	2.9%

No Computer by Age

	Population	Under 18	18 to 64	65 and Up
Yadkin County	7.0%	4.0%	4.3%	17.9%
PTRC	4.9%	2.1%	3.0%	14.7%

Children's Access. As the graph above right shows, persons under 18 have the least access deficit of all age groups. We attribute this to the one-to-one policy of making sure all students in an educational setting have a computer or other electronic device for learning. Yadkin County Schools has a one-to-one initiative for all grades in the school system.

Public Device Access. For those having no computer, access to public use computers is vital. The Yadkin County public libraries in Boonville, East Bend, Jonesville, and Yadkinville have computers for library customers to use and have free Wi-Fi in all branches.

DIGITAL INCLUSION

The goal of digital Inclusion is to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. We have many ways of measuring success in achieving digital inclusion, many of which concern availability, adoption, literacy and access to devices. On this page, we focus on digital initiatives under way in Yadkin County, and areas where we see particularly underserved communities.

Yadkin County Digital Inclusion Initiatives. This Regional Digital Inclusion Plan identifies many steps that must be taken – and many that are already underway – to achieve true digital inclusion. Like many counties in the PTRC, Yadkin has benefitted from state and federal grants that have allowed for new infrastructure to be built to provide access, particularly to rural areas. However, the county is lacking a consistent applied plan to close the digital divide.

Households by Digital Distress
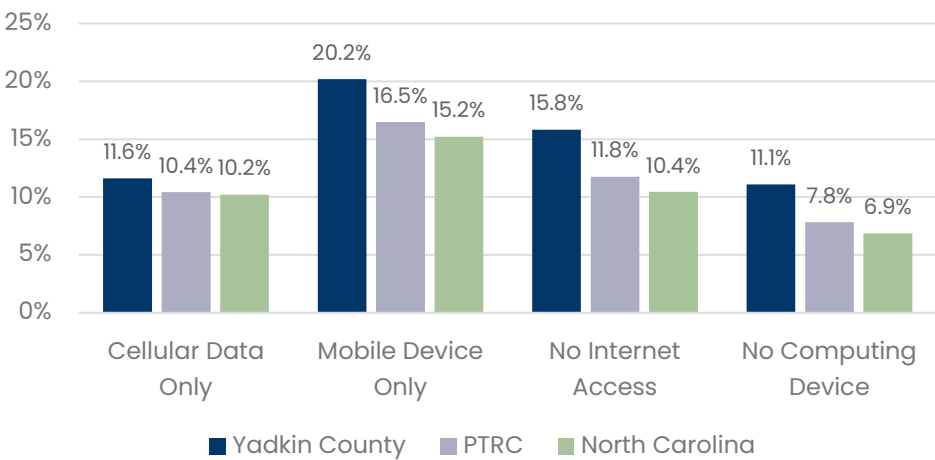
Digital Distress. "Digital Distress" is a measure referring to a any of four situations where households have limited digital capability. The graph to the left suggests that Yadkin County experiences higher distress levels in all four categories than the PTRC or the state as a whole.

No Internet Access by Household Income
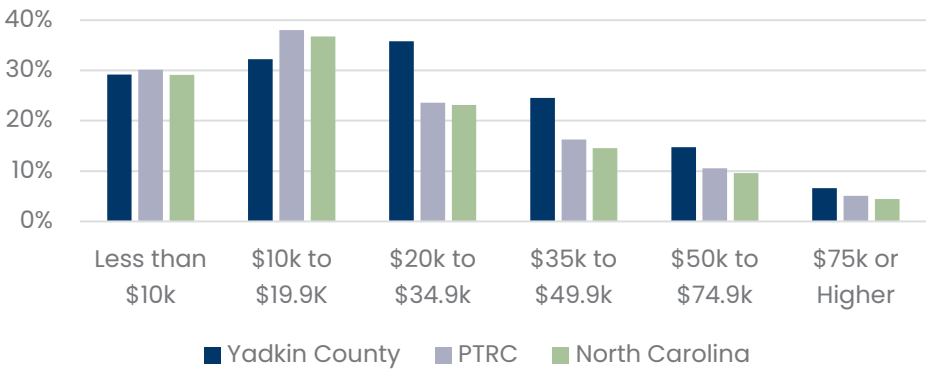
Disparity by Income. It's expected that lack of adoption or access will be more pronounced in lower income groups. The chart to the left shows that in Yadkin County as elsewhere, that's true, but in Yadkin, lack of adoption and access are significantly greater among households with an income between $20k to $34.9k.

APPENDIX B: COMMUNITY PROTOCOLS

PIEDMONT TRIAD
REGIONAL COUNCIL

UNC GREENSBORO
Center *for* Housing
& Community Studies

Key Informant Interview Script

My name is _ _ _ _ _ _ _ _ _ _ _. I'm with the UNCG Center for Housing and Community Studies. We're partnering with the Piedmont Triad Regional Council to develop a Digital Inclusion Plan for their twelve-county service area. As the first step in our work, we're talking to community leaders and experts whose work gives them a unique perspective on the broadband services available in their areas, what obstacles hinder access to those services, where are the gaps, who's getting left out, and what we can do to provide the needed resources to bridge that digital divide.

Before we start, I'm going to turn on the recording function, with your permission.

START RECORDING

We do this because it's the best way to make sure we remember the things people tell us, but this interview is confidential. Only our research team will review the recording, and in our reporting to the PTRC, we might include your comments, but we won't attribute any comment or statement to you by name or affiliation – so speak freely.

INTRODUCTION

1. Tell us about your organization, and how your work intersects with these issues of digital inclusion that we're going to be talking about today.

2. Before we get to digital inclusion, I'd like to begin with a question about the big picture in Greensboro and Guilford County. What are the social, economic, and demographic trends that form the background to these digital inclusion issues?

- Community and economic development? Health, education, aging in place? Education, public safety, quality of life?

- Where does digital inclusion fit into the bigger goals of the community?

3. What does "digital inclusion" mean to you?

- Who's being left out?

- Race or ethnicity, age, income, language, disability?

- Geographic areas, such as urban neighborhoods or rural areas?

- What's the goal of digital inclusion?

- Is it to make sure everyone has equitable access to resources they need to succeed?

- Is it to make the community an attractive place for businesses to locate?

DIGITAL ASSET INVENTORY

5. Describe broadband services in your community.

- Who are the service providers?
- What download/upload speeds are available?
- Are the prices affordable?
- Does anyone offer broadband subscription discounts or subsidies?
- Any infrastructure upgrades happening?

6. Are there public Wi-Fi or public access points in your community?

- Schools, libraries, community colleges, parks, career centers?
- Is there a mobile hotspot lending program?

7. Do members of your community have the digital skills they need?

- School kids, workers, seniors?
- Any classes, trainings, workshops available?
- Do the schools have computer training programs?
- Where can someone turn who needs help with skills or tech support?
- Are any digital navigators working in your community?

8. What do people do who don't have a computer?

- Is anyone providing refurbished or low-cost devices to eligible users?
- Do the schools have equipment access programs for the kids?

9. Describe the mobile broadband assets in the community?

- Who are the service providers?
- Is mobile service an adequate mode of internet access?

10. Do you have access to the data you need to support digital inclusion policymaking?

- Percent of households with broadband subscriptions?
- Percentage of households with mobile or cellular subscriptions?
- Percentage of households with digital device?
- Have you conducted a digital or broadband survey?

- Poverty and other social, economic, and demographic indicators?

THE WAY FORWARD

11. Who in your community is responsible for digital inclusion initiatives?

- Who are the community partners that are part of the digital inclusion coalition?

- Municipal and county government, school system, libraries, colleges and universities, housing authority, nonprofits, businesses, faith organizations, foundations, internet service providers?

12. Does your community have the resources needed to move forward with digital inclusion initiatives?

13. If you could wave a magic wand, what's the one thing that you'd do to move digital inclusion forward in your community?

Focus Group Moderator Script: Digital Inclusion and Broadband Access

Introduction:

Today, we're going to be talking about digital inclusion and broadband access in [County Name Here] County. Your insights will help the PTRC in shaping ongoing efforts to close the digital divide in our community.

Icebreaker:

Let's start with a quick round of introductions. Please tell us your first name and share one way you regularly use the internet.

Section 1: General Digital Inclusion and Broadband Access

Barriers to Access: Based on your experience, what are the main barriers to broadband access for [County Name Here] County residents?

Role of Organizations: How do you see the role of governmental and non-governmental organizations in addressing digital inclusion challenges in [County Name Here] County?

Section 2: Infrastructure Deficits

Key Infrastructure Issues: What do you think are the most pressing infrastructure deficits in [County Name Here] County when it comes to broadband access?

Addressing Gaps in High-Speed Access: Some parts of the county still lack high-speed internet, particularly in underserved areas. How should [County Name Here] County prioritize efforts to close these gaps?

Impact of Upload/Download Ratio: [County Name Here] County has a low upload-to-download ratio (0.35 to 1.0). Locally the upload speed is about 35% that of downloads. How do you think this affects remote work, content creation, or small businesses in the area?

Section 3: Digital Adoption and Literacy

Digital Literacy Programs: The plan highlights digital literacy as a key skill for inclusion. What types of digital literacy programs are currently available in [County Name Here] County, and how effective have they been?

Current Efforts and Gaps: How do you view the current efforts to improve digital literacy in [County Name Here] County? Are there any gaps that need to be addressed?

Role of Institutions: What role do schools, libraries, and community centers play in increasing digital literacy and access to devices? How well are they performing in [County Name Here] County?

Training for Specific Populations: Are there gaps in digital literacy training, particularly for older adults, non-English speakers, or low-income families?

Section 4: Device Access and Infrastructure

Device Access Issues: The plan notes that device access remains a barrier in some parts of the county. Do you agree with this assessment? Are there other factors that need further attention?

Public Initiatives for Devices: How do you assess public initiatives that provide devices, such as Chromebooks for students or devices in public libraries? Are these initiatives sufficiently addressing the need?

Public Device Access: Public libraries and community centers provide access to devices and the internet. Is the current level of public device access sufficient in [County Name Here] County?

Expanding Access: Do you think there's a need to expand hours or services in public facilities that offer digital access, especially in areas with higher digital distress?

Leveraging Other Public Spaces: What other public spaces could be used to provide device access in underserved areas, particularly for those who cannot afford their own devices?

Section 5: Digital Inclusion Initiatives

Key Champions: Who do you see as the key champions or stakeholders who can drive digital inclusion efforts in [County Name Here] County in the long term?

Current Initiatives: What are the most impactful digital inclusion initiatives currently underway in [County Name Here] County, and how can they be expanded or replicated in other parts of the county?

Community-Led Initiatives: Are there any community-led or grassroots initiatives in [County Name Here] County that have been successful in promoting digital inclusion? How can these be supported or scaled?

Serving Non-English Speakers and Immigrant Populations: How should the plan address the needs of non-English speakers and immigrant populations when it comes to digital inclusion?

Section 6: Children's Access

Lessons from the Pandemic: With the shift towards online education during the pandemic, what have we learned about children's access to technology? What improvements can be made?

Ensuring Consistent Access: How can [County Name Here] County ensure that all students, especially those in low-income areas, have consistent access to devices and reliable internet at home?

Unaddressed Challenges: Are there any specific challenges related to children's access that remain unaddressed in the current digital inclusion plan?

Section 7: Final Thoughts

Most Significant Action: In your opinion, what is the one initiative or action item that will have the most significant impact on closing the digital divide in [County Name Here] County?

Closing:

Thank you all for your valuable insights today. Your feedback will play an important role in shaping the future of digital inclusion efforts in [County Name Here] County. If you have any further thoughts or questions, feel free to reach out to us. We really appreciate your time and participation!