BERRIEN COUNTY
BROADBAND
DATA COLLECTION

EXECUTIVE FINDINGS REPORT

Introduction

Access to and use of the Internet has become an integral component of everyday life in the 21st century, where digital information has reshaped how individuals participate in nearly every dimension of society. It is imperative that communities leverage broadband network access to eliminate the homework gap and improve education, socioeconomic equality, telemedicine, public safety, agriculture, and economic development to maintain and grow the quality of life for their residents. The Berrien County Broadband Internet Task Force (BCBIT, 2020-2021), along with community leaders, suspected that broadband Internet access was lacking in Berrien County, and that this dearth of connectivity was negatively impacting economic prosperity and quality of life for its citizens. As such, a citizen-driven data study was requested to be performed by Merit Network to better understand the magnitude of the County's broadband gap at various granularity levels.

In addition to an already existing need for equitable access throughout the County, profound societal shifts as a result of the COVID-19 pandemic have reinforced the crucial role of broadband. Middle and high school students with high-speed Internet access at home have more digital skills, higher grades, and perform better on standardized tests, such as the SAT (Hampton et al., 2020). When seeking infrastructure funding to address the current broadband gap, understanding which households have access to broadband, and what their quality of experience using the Internet might be, is critical. All state and federal grant programs rely upon coverage data for funding eligibility. The primary existing source of this data, the Federal Communications Commission (FCC) Form 477, is self-reported by service providers and aggregated to the census block level. This data is unreliable and lacks the granularity needed for accurate coverage inferences (Trostle, 2018, Mack et al., 2019). Results from a similar data collection project, conducted by Merit's Michigan Moonshot, in Washtenaw County indicated that 64% of households in participating townships do not have access to fixed broadband at the FCC threshold of 25 Mbps download and 3 Mbps upload. Previous FCC data indicated that in the participating townships only about 1.8% of households did not have access to broadband at 25 Mbps/3 Mbps. This means that the magnitude of the problem is much higher than suggested by official data (Merit Network, 2020).

Recognizing this limitation, the Berrien County Commissioners initiated the BCBIT in 2020.

BCBIT worked in conjunction with the Southwest Michigan Planning Commission to develop a study that established accurate, granular connectivity data in Berrien County. The objective was to collect survey data to better understand broadband coverage (or lack thereof) within the county in order to support the county's broadband planning efforts for broadband infrastructure funding. In addition to this information, Berrien County sought to also:

1. **Gather residents' experience about broadband usage and the ways in which access, or lack of access, impact quality of life.**

2. **Understand residents' positions regarding broadband service pricing and availability in their region.**

3. **Obtain more insights regarding Internet connectivity capabilities for the county's K-12 student population.**

What is Broadband?

To intuitively understand the importance of broadband Internet access consider an analogy from the transportation system. If a road has only one lane and a lot of traffic, it will take a long time for a group of cars to reach their destinations. But if more lanes are available, the same group of cars can reach their destinations much more quickly.

Similarly, "broadband" refers to a high-speed Internet "lane" or connection that provides a user the capability to upload and download data efficiently, thus significantly enhancing the experience for high-quality teleconferencing, video and audio streaming, e-gaming, e-commerce and large file transfers. Broadband also enables the proliferation of new applications, such as the ones supported by the Internet-of-things (IoT) ecosystem, including IoT devices that enable "smart home" capabilities (e.g., room temperature control, security cameras, smart speakers with voice recognition, wearables for health monitoring, and others).

As mentioned earlier, current federal standards define broadband as 25 megabits per second for download and 3 megabits per second for upload. Technology to deliver this connection can include cable, DSL, fiber, wireless, and more.

Impacts of Broadband on a Community

- Homes with access to broadband are valued higher than those that do not. (Molnar et al., 2015).

- Broadband access is associated with increased agricultural yields (LoPiccalo, 2020).

- Middle and high school students with high-speed Internet access at home have more digital skills, higher grades, and perform better on standardized tests, such as the SAT. Regardless of socioeconomic status, students who cannot access the Internet from home or are dependent on a cell phone for Internet access do worse in school and are less likely to attend college or university (Hampton et al., 2020).

- Internet connectivity, particularly access to broadband, is playing an increasingly important role in both healthcare and public health (Bauerly et al., 2019).

- It is anticipated that the Covid-19 pandemic has created permanent change in remote work environments. It is suggested that communities will need an increased investment in bandwidth expansion, network equipment, and software. With employees becoming acclimatized to the idea of work-from-home (WFH), meeting and transacting online, firms will shift to WFH as a norm rather than as an exception. (De et. al, 2020).
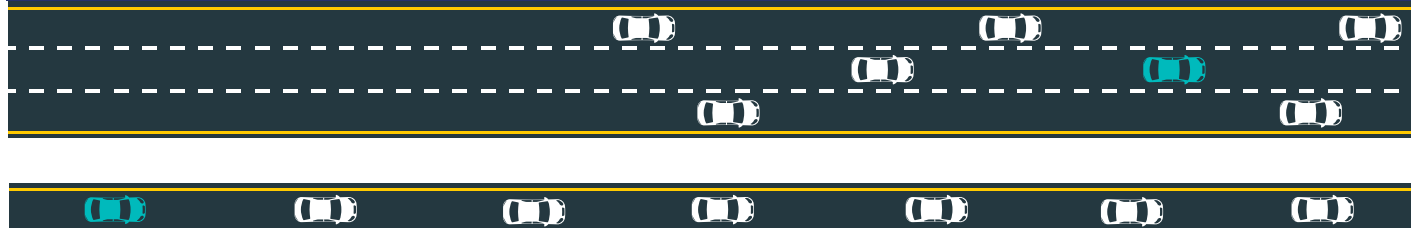
Survey Design
and Methodology

The Berrien County Broadband Internet Task Force partnered with Merit Network's Michigan Moonshot team to develop and deploy a survey for 30 communities. Survey participants were recruited through a printed postcard, radio advertisements and community partner outreach.

Residents with Internet access at their properties were instructed to complete a survey and Internet connection speed measurement online. Residents without Internet connectivity were asked to complete a mobile-optimized survey through their cellular phone or wireless device. After data cleanup, 2,944 surveys of unique addresses were collected for analysis. 1,869 surveys were completed from residents indicating they had some form of Internet service in their home and 1,075 surveys were completed from residents who self-reported that they had no Internet in their home.* There are 59,577 parcels in Berrien County. The response rate represents a participation rate of about 5%.

Survey Results:

The results indicate that 64% of households in participating townships do not have access to fixed broadband at the FCC threshold of 25 Mbps download and 3 Mbps upload.**

All townships within Berrien county have at least some areas that lack access. Coastal areas are somewhat better connected than the central corridor of the county. Additionally, at the lower threshold of 10 Mbps download and 1 Mbps upload (which is the "unserved" threshold for some grant programs), 28.5% of connected households have speeds below that basic level. Finally, 35% of responding households reported having no Internet access at all.

The two primary reasons for lack of home Internet access were service unavailability at their address and high cost. Of those responding, 86% reported that service was unavailable at their address and 12% stated that high costs were the reason they did not have Internet in their homes.

These results are in stark contrast to the FCC Form 477 coverage data. This previous data indicated that in the participating townships only about 22% of households did not have access to broadband at 25 Mbps/3 Mbps, as opposed to the 64% shown in this study. This means that the magnitude of the problem is much higher than suggested by official data.

Furthermore, industry experts suggest that speeds of 100 Mbps/100 Mbps are truly reflective of modern bandwidth needs. Of households participating in the speed test, only 13 (less than 0.5% of) respondents had broadband Internet access at that level.

Survey and study results were conducted by Merit Network. The methodology and results were developed with advisory assistance from the Quello Center at MSU.
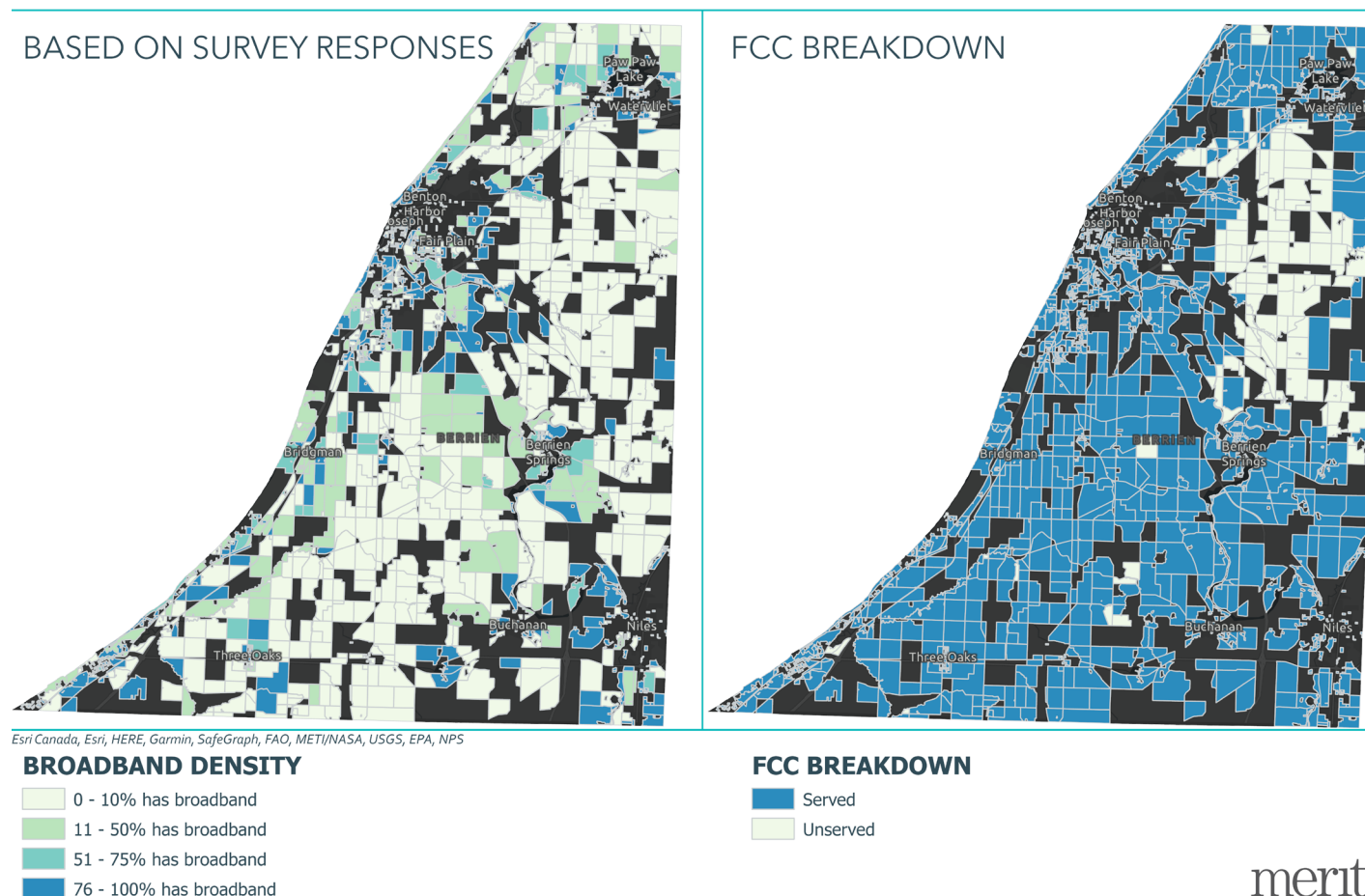
Broadband Density
Per Census Block

FCC Compared to Survey Results

Map is based on the survey results (and not a census of all the households in the area).

PROJECT: BERRIEN

BROADBAND DENSITY PER CENSUS BLOCK

BASED ON SURVEY RESPONSES

FCC BREAKDOWN

Esri Canada, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

BROADBAND DENSITY

- ☐ 0 - 10% has broadband
- ☐ 11 - 50% has broadband
- ☐ 51 - 75% has broadband
- ☐ 76 - 100% has broadband

FCC BREAKDOWN
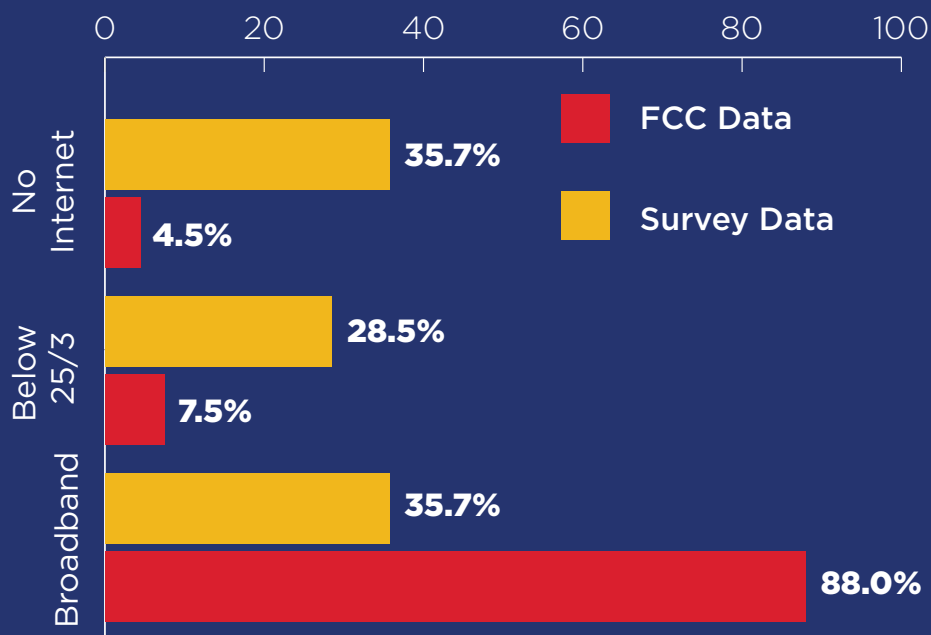
- ☐ Served
- ☐ Unserved

merit

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

The map on the left reflects the share of respondents who indicated having broadband. Using these numbers as indicators of the share of all households (including those who did not respond) that have broadband must take margins of errors into consideration, which depend on the total number of responses and the total households in an area. At the county level, the margin of error is in the 2% range. For individual townships, the margin of error is in the 5%-19% range. Response rates at the level of some census blocks were low and therefore imply higher margins of error.

The map on the right reflects broadband service availability as reported by the FCC. **Out of 1,062 census blocks, we have found that in 76% of these, based on survey responses, there were customers who could not obtain service at their address though they are located in a census block that is reported as served based on FCC maps.**

Availability by the Numbers:

FCC Data
Survey Data

No Internet
- 35.7% (Survey Data)
- 4.5% (FCC Data)

Below 25/3
- 28.5% (Survey Data)
- 7.5% (FCC Data)

Broadband
- 35.7% (Survey Data)
- 88.0% (FCC Data)

Survey speed data as well as FCC data on the maximum advertised upload and download speeds per census block were each bucketed into one of the following categories: 1) No Internet, 2) Below 25/3 Mbps, or 3) At or Above 25/3 Mbps. Each survey result was then directly compared to the FCC census block the survey point falls within. The differences between coverage reported by the FCC and data from this survey are drastic.

This study suggests that:

52% fewer homes have access to broadband Internet speeds

21% fewer homes have some connectivity at speeds lower than broadband

31% more homes have no Internet connectivity whatsoever

Satisfaction With Home Internet Service Provider Options:

Satisfied 37% | **Neutral 25%** | **Dissatisfied 36%**

37%

Only 37% of residents were satisfied with the Internet service provider options at their homes.

Broadband Access in Households With K-12 Students:

38.5%

40% of households in Berrien have K-12 students. In these homes, **38.5% have broadband Internet.**

34%

34% of households with no K-12 students report internet access at broadband speeds or higher.

Berrien County Resident Sentiment:

86%

Of Berrien County residents that have no Internet access, **86% report that no services are available at their address** and **12% state that the price for service is too high.**

72%

72% of residents with no Internet access indicated that they are willing to pay between **$26 and $100 for service,** indicating that the majority of these **residents would pay for Internet service** at their properties if it was available.

CONCLUSION

Broadband is critical to a community's ability to thrive and remain competitive in terms of education, economic development, talent retention, employment opportunities and population growth. Much of Berrien County is unconnected or insufficiently connected. Connectivity data indicates a problem more stark than established FCC data suggests. Residents without broadband desire service, and connected citizens believe that more provider options are needed. Data from this study will be used to support grant applications and broadband planning efforts in Berrien County.

TO LEARN MORE, VISIT:

MichiganMoonshot.org

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Footnotes:

*We received 5,377 total speed test responses. Speed test results that seemed to originate from 1) cellular or satellite Internet connections and 2) from connections originating from an ISP not serving Berrien County or connections over a Virtual Private Network (VPN) were excluded. As a result, a total of 548 survey responses were omitted from our data analysis. Only responses from within the county were included in the analysis. After data cleanup, 3,533 speed test measurements were viable. 1,885 were households responding multiple times. The highest recorded speed from an address was used in the calculations.

**Individual household speed test results can vary depending upon time of day and network traffic. All figures and calculations in this report reflect the highest measured speed from a household.

Merit Network, Inc. is a nonprofit corporation owned and governed by Michigan's public universities. Merit owns and operates America's longest-running regional research and education network. Since its formation in 1966, Merit Network has remained on the forefront of research and education networking expertise and services, providing high-performance networking and IT solutions to Michigan's public universities, colleges, K-12 organizations, libraries, state government, healthcare, and other non-profit organizations.

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