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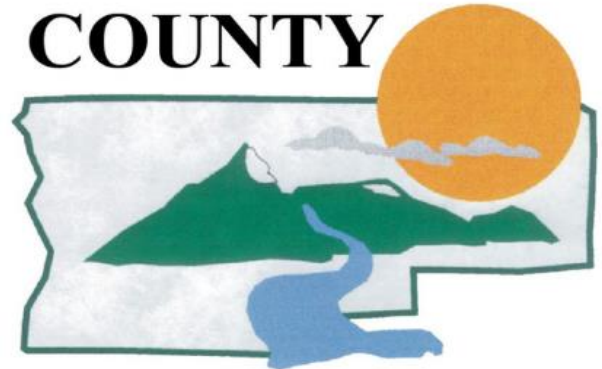
advancing economies in a digital world

# Jefferson County Broadband Assessment and Strategic Plan

Prepared for:  
Jefferson County, Oregon

Final Report – Issued:  
March 8, 2023

**JEFFERSON  
COUNTY**



**OREGON**



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## About Strategic Networks Group, Inc.

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Founded in 1998, Strategic Networks Group, Inc. (SNG) helps communities and regions measure the impacts of broadband investments and make better informed decisions in building a case for digital infrastructure, digital transformation, and digital inclusion.

We assess whether economic growth and community benefits outweigh the costs – and how to drive digital transformation and inclusion for new local economic opportunities, improved quality of life, and new revenue sources for local governments. SNG is technology agnostic and vendor neutral. Our goal is to transform local economies through digital infrastructure, digital equity, and smart community services.

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## 1 Executive Summary

The Jefferson County Broadband Assessment and Strategic Plan uses new methodologies that have produced actionable data and insights to Jefferson County and the Economic Development Agency (EDA) for broadband infrastructure planning. Jefferson County can more effectively respond to digital infrastructure needs of residents and businesses because of this holistic approach to build a case for public investments in digital infrastructure and transformations needed for the next 10-15 years.

This plan utilized the following comprehensive and empirical methods to assess local broadband needs and provide more precise mapping analysis to assess broadband gaps and planning for digital infrastructure improvements in Jefferson County by:

- Conducting a hands-on and inclusive planning process that engaged local leaders at the beginning of the project to focus on how broadband will be used to achieve desired outcomes and impacts, starting with the end in mind
- Rigorous analysis of broadband availability that compared FCC-reported data to on-the-ground end-user experiences to more accurately assess:
  - **Broadband Supply:** service quality, reliability, value, tested speeds, etc.
  - **Broadband Demand:** current and planned use of online practices by households and businesses, such as telehealth, distance learning, public safety, etc.
- Developing cost-per-premise estimates for fiber internet construction by census block for granular analysis, grant applications, and attracting investments
- Mapping demand for broadband and online services, so that market intelligence can be shared with service providers to help them uncover new markets in which they have a business interest

Investments in rural areas, like Jefferson County, have greater potential for economic impact than in areas of higher density where the cost per household might be lower. If Jefferson County can secure the investments and funding for digital infrastructure as quantified in this report, it can avoid intractable broadband gaps that rural areas are increasingly facing.

### Key Plan Findings

1. There is strong demand for broadband and online services across Jefferson County (see **Section 7.4**)
  - Broadband demand is strongest with experienced users (e.g. Camp Sherman, Madras, teleworkers in Crooked River Ranch)
  - Potential for growth in demand and in community impacts is greatest in areas with less exposure to online practices and services, which include Metolius, Culver, and the Confederated Tribes of Warm Springs
2. There are areas unserved and underserved with broadband that do not represent enough of a return for a private sector provider business case – therefore public investment is required in these areas to have future-ready broadband with speeds of in excess of 100/100 Mbps (see **Section 9**).
3. Public investment in broadband for Jefferson County should focus on two foundational elements:
  - Digital infrastructure – that focuses on capital expenditures that are beyond the returns of a private sector business case which can include middle-mile, backhaul, fiber to the premise, wireless towers, etc. (see **Section 12**)
  - Digital inclusion and transformation – that raises awareness, provides training and technical support, and measures outcomes from building local capacity to effectively use online practices including telework, telehealth, smart community services, water management, etc. (see **Section 10**)
4. There is a range of cost to bridge Digital Infrastructure and Inclusion gaps (see *Table 1* below).

Table 1: Estimated Cost to Bridge Digital Infrastructure and Inclusion Gaps

| Address Density per linear road mile                   | Number of Addresses | Population | Estimated Build Cost | Average Build Cost per Address |
|--|---------------------|------------|----------------------|--------------------------------|
| <3<br>(Fixed wireless)                                 | 1,216               | 3,939      | \$10,500,000         | \$8,635                        |
| >3 and <15<br>(Fiber with subsidy)                     | 3,016               | 6,607      | \$34,983,251         | \$11,599                       |
| >15<br>(Private sector fiber)                          | 4,236               | 10,097     | \$17,253,048         | \$4,073                        |
| <b>Underserved Areas Claimed Served by FCC</b>         | 1,055               | 2,071      | \$ 9,170,877         | \$8,693                        |
| <b>Digital Transformation and Inclusion</b> (annually) | 16,500              | 25,068     | \$2,232,900          | \$135                          |

With the needed capital investments summarized in Table 1, Jefferson County will need assistance from federal, state, and other capital funding partners for shorter return on investments over the longer term (10-15 years) that will produce the following benefits:

- Increased business opportunities and revenues. Estimated using the Broadband Utilization Economic Impact Model that helping just 5% of Jefferson County businesses (i.e., 65 businesses) adopt new online practices would generate:
  - \$33,700 in new revenues per business annually
  - \$2.6 million in annual GDP impact and 41 new jobs
- Improved access to Jefferson County addresses that bridge digital divides
- Better paying local employment opportunities, improved access to healthcare, education, etc.

Jefferson County has much to gain in managing the process of digital infrastructure deployment because it is the key that unlocks economic potential, sustainability, and community vitality. Private sector internet service providers, on their own or collectively, have not built digital infrastructure county-wide. As a result, Jefferson County needs to work with its communities, service providers, and the Confederated Tribes of Warm Springs to find solutions that are holistic and longer term, inclusive, leverage economies of scale for sustainability, and enable the private sector to provide internet service cost-effectively across the county.

Based on the findings from this study the following recommendations and next steps are proposed:

- Need to carry forward the recommended eStrategy action items in **Section 12.4** – choose who is responsible and resource appropriately as an investment in Jefferson County’s future
- Discuss, adjust as needed, and implement the recommendations in **Section 12.4**, in particular:
  - Hire full-time employee to manage broadband infrastructure, grant applications, and process; work with local service providers; and drive digital transformation through Digital Navigators
  - Use State Digital Equity funds to setup Digital Innovation Hubs in Madras, Metolius, Culver, Crooked River Ranch, and Warm Springs
  - Deliberate strategy to engage all residents and tribal members and raise awareness about offerings / opportunities
  - Build local capacity and use train the trainer model to deliver resources and technical support onsite – Jefferson County has a trusted role as a vendor-neutral steward of the local economy
- Pursue Federal and State funding opportunities summarized in **Section 12.6**

## 2 Glossary of Terms

The following terms are used throughout this report. To provide clarity to the reader, a definition is provided along with an explanation and examples where needed.

Table 2: Glossary of Terms

| Term  | Definition / Explanation  |
|---|---|
| <b>Mbps</b>   | Megabits per second – speed that data can be downloaded or uploaded on a network. Bandwidth is the theoretical speed. Throughput is the actual speed. The type of connection and speed needed depend on number of users, types of use (video calls, telehealth, gaming, etc.), reliability needed, etc. <sup>1</sup>  |
| <b>Broadband</b><br><br><b>25/3 Mbps</b><br><b>100/20 Mbps</b><br><b>100/100 Mbps</b> | Reliable, high-speed internet connectivity with a minimum speed that evolves with technology improvements.<br>Minimum broadband speed until 2022 according to FCC.<br>Minimum broadband speed for 2022 BEAD funding.<br>Minimum broadband speed for future-ready broadband.   |
| <b>Future-ready Broadband</b>   | Defined in the 2020 State of Oregon Broadband Assessment <sup>2</sup> to be at a minimum 100 Mbps upload and 100 Mbps download  |
| <b>Digital Infrastructure</b>   | Digital infrastructure is more than simply fast broadband. It is a platform for exchange and innovation that allows all residents and businesses to participate in the new economy and for local governments to deliver new and smart community services.   |
| <b>Internet Service Provider (ISP) / Service Provider</b>                             | ISPs are organizations that provide services to personal and business customers for accessing, using, or participating in the Internet. ISPs can be organized in various forms, such as commercial, community-owned, non-profit (including electricity or telephone cooperatives), or otherwise privately owned. ISPs may also provide other services, including email services, domain registration, web hosting, and browser packages.  |
| <b>FCC</b>  | Federal Communications Commission – the agency overseeing telecommunications regulation in the US   |
| <b>Fiber</b>  | A broadband connection that can reach speeds of up to 10 Gigabits per second (Gbps), with low latency. The technology uses fiber-optic cable that can send data as fast as about 70% the speed of light.  |
| <b>Fixed Wireless</b>   | Wireless communication devices or systems used to connect two fixed locations (e.g., building to building, or tower to building) with a radio or other wireless link supporting point-to-point / point-to-multipoint transmissions through the air over a terrestrial microwave platform rather than through copper or optical fiber. Fixed wireless devices usually derive their electrical power from the public utility mains, unlike mobile wireless or portable wireless devices which tend to be battery powered. |
| <b>Wireless Cellular</b>  | A mobile <a href="#">communication network</a> where the link to and from end nodes is <a href="#">wireless</a> and is distributed over land areas called "cells", each served by at least one fixed-location <a href="#">transceiver</a> that provide the cell with network coverage which can be used for transmission of voice, data, and other types of content. A network of cells can provide radio coverage over a wide geographic area, enabling numerous portable  |

<sup>1</sup> <https://broadbandnow.com/bandwidth-calculator>

<sup>2</sup> See: <https://www.oregon.gov/biz/Publications/SNGStudy2020.pdf>



|  |  |
|--|--|
|  | transceivers (e.g., mobile phones, tablets, laptops equipped with mobile broadband modems, pagers, etc.) to communicate with each other and with fixed transceivers, telephones and public internet anywhere in the network.   |
| <b>DSL (digital subscriber line)</b>         | Internet connectivity over phone lines (copper pairs)  |
| <b>Cable</b>                                 | Internet connectivity over coaxial cable   |
| <b>Wireline</b>                              | Wireline broadband internet access is a functionally integrated, finished service that inextricable intertwines information-processing capabilities with data transmission, where the consumer uses as a unitary service. The types of technology used range from DSL to cable and fiber services.   |
| <b>Middle-mile Connectivity</b>              | The middle mile is the physical mid-section of the infrastructure required to enable internet connectivity for homes, businesses, and community institutions. The middle mile is made up of high-capacity fiber lines that carry large amounts of data at high speeds over long distances between local networks and global internet networks.   |
| <b>Current Broadband Demand</b>              | Current demand is the current subscriptions to broadband services, also known as take rates or adoption rates. This is an indicator for the level at which broadband is currently being used. Please note that even if an end user has a subscription, it does not mean they are using their broadband connection to its full potential.   |
| <b>Potential Broadband Demand</b>            | Potential demand is the demand that is nurtured and grown when the value of broadband and online services is understood by end users and personalized to their needs. Potential demand becomes current demand by raising awareness with residents and businesses about what they could and should be doing online.   |
| <b>Affordable Connectivity Program (ACP)</b> | The Affordable Connectivity Program is an FCC benefit program that helps ensure that households can afford the broadband they need for work, school, healthcare and more. The benefit provides a discount of up to \$30 per month toward internet service for eligible households and up to \$75 per month for households on qualifying Tribal lands. Eligible households can also receive a one-time discount of up to \$100 to purchase a laptop, desktop computer, or tablet from participating providers if they contribute more than \$10 and less than \$50 toward the purchase price. The Affordable Connectivity Program is limited to one monthly service discount and one device discount per household. |
| <b>Digital Equity</b>                        | Digital equity is a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy. Digital equity is necessary for civic and cultural participation, employment, lifelong learning, and access to essential services.   |
| <b>Online Education</b>                      | Also known as online education and training, e-learning, distance education, virtual classrooms, etc. are all terms used inter-changeably to describe educational programming delivered over the internet. It can be part of a formal degree or certification program or informal, self-initiated instruction. Interactive modes and increasingly rich graphic content are increasing bandwidth requirements.  |
| <b>Telehealth</b>                            | Provision of health services remotely through internet technology platforms.   |
| <b>Smart Community Services</b>              | Includes internet facilitated emergency services, public safety, online permitting, registrations and bill paying, utility metering, etc.  |
| <b>Smart Agriculture</b>                     | Also referred to as “Next-generation precision agriculture”, includes the incorporation of internet-enabled technologies, such as GPS and sensors to automate agricultural operations and support real-time diagnostic and decision support systems for optimized farm and livestock management.   |

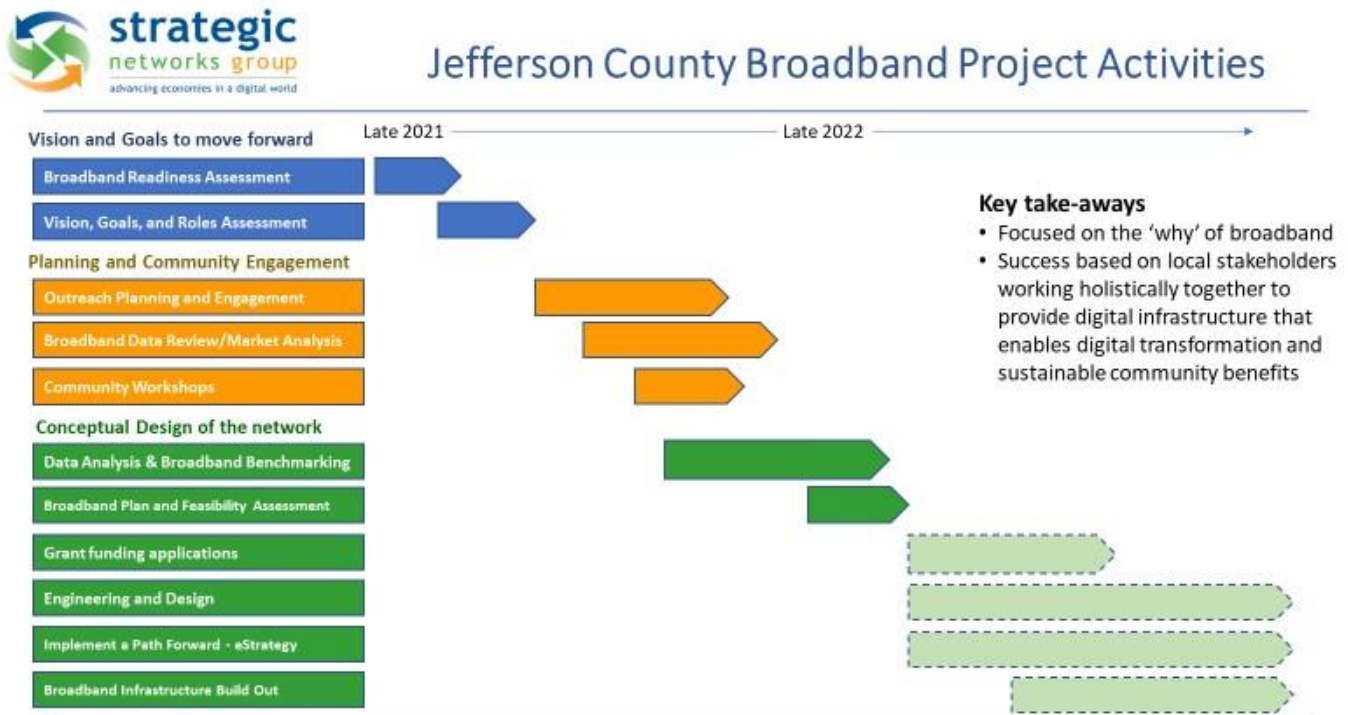
|   |  |
|---|--|
| <b>Digital Innovation Hub</b>                             | A location that is convenient for local residents and businesses to: <ul style="list-style-type: none"> <li>• learn about and access new online practices from showcasing of broadband speeds, new technologies, telehealth services, smart community services, online business practices, etc.</li> <li>• access trusted advice from vendor neutral and technology agnostic technical support accompanied by resources and support to successfully implement and use new online practices</li> <li>• become a community focal point for digital inclusion and transformation</li> </ul> |
| <b>Digital Navigators</b>                                 | Individuals who address the whole digital inclusion process, including home connectivity, devices, and digital skills, with community members through repeated interactions. Navigators can be volunteers or cross-trained staff who already work in social service agencies, libraries, health and more who can offer remote and social distant in-person guidance.   |
| <b>Digital Economy Manager</b>                            | A coordinator for Jefferson County that manages grant applications, broadband infrastructure funding and process, collaborations with local service providers, and drive digital transformation through Digital Navigators.  |
| <b>Digital Needs and Readiness (DNRA)</b>                 | The Digital Needs and Readiness Assessment provides community leaders an objective assessment of the current state of broadband and readiness for initiative within the community. The DNRA report summarizes results of inputs and applies a scoring system to reveal areas where the community leaders may be more ready, or less ready, to move forward successfully.   |
| <b>eCheckup</b>   | The eCheckup is an online data collection and assessment tool by SNG deployed in localities to gather information from residents, businesses, and organizations on broadband connectivity and utilization, satisfaction with services, benefits and barriers to using the internet, priority goals, and impacts to education, telehealth, teleworking, and other broadband related economic insights.  |
| <b>Broadband Utilization Economic Impact Model</b>        | The Broadband Utilization Economic Impact Model estimates economic impacts from businesses adopting online practices for selected geographies and industry profiles. Estimates apply utilization data from tens of thousands of businesses and show how incremental increases in meaningful use of the internet drive significant economic growth. Industry profiles are based on US Census Bureau Business Patterns.  |
| <b>Digital Economy Database (DED)</b>                     | The Digital Economy Database is developed and maintained by SNG to include more than 85,000 records across North America on how households, businesses, and organizations are connected, using, and benefiting from the internet. This allows for the capability to compare broadband data across communities and benchmark the use of online practices to provide insight and evidence related to broadband utilization.  |
| <b>Broadband Action Teams (BATS)</b>                      | BATs are diverse, multi-stakeholder groups that discuss broadband challenges and opportunities, leading to greater awareness, access, and adoption of broadband. BATs have been organized in COIC and in other regions across Oregon to apply best-practice engagement and broadband planning practices at the local level.  |
| <b>Central Oregon Governmental Council (COIC)</b>         | COIC provides services to the counties of Crook, Deschutes, and Jefferson, the cities of Bend, Culver, La Pine, Madras, Metolius, Prineville, Redmond and Sisters, as well as the Confederated Tribes of Warm Springs.   |
| <b>Comprehensive Economic Development Strategy (CEDS)</b> | Prepared and approved by the COIC board, the Comprehensive Economic Development Strategy articulates the region’s priority community and economic development needs, identifies strategies, communicates regional priorities to state, federal, and private foundation funding partners, and helps service the COIC mission.   |

### 3 Introduction

Leadership in Jefferson County, Oregon, with funding from the U.S. Department of Commerce’s Economic Development Administration (EDA), responded to concerns expressed by constituent businesses and residents to their own concerns about the need for enhancing and expanding broadband infrastructure by undertaking in October 2021 an intensive broadband planning project. The EDA’s support for this effort provided credible external endorsement to the perspective that attention needs to be given to addressing broadband gaps in Jefferson County. A rigorous vendor selection process that evaluated proposals from broadband planning consultancies resulted in selection in November 2021 of Strategic Networks Group (SNG). SNG’s approach includes objective identification of broadband gaps, barriers, and opportunities in Jefferson County utilizing a proven, data-driven approach that draws heavily on ground-truth quantitative assessments coupled with stakeholder input garnered through extensive outreach and engagement.

Jefferson County has taken charge of its future by embarking on this year-long broadband assessment and strategic plan. Prepared with locally-derived data that provides critical insights on broadband supply and demand, Jefferson County is gaining a holistic understanding of broadband costs-versus-benefits that is needed to develop actionable strategies that bridge gaps through public investment in broadband infrastructure and building the digital skills and capacity of businesses and residents.

Extensive outreach and public engagement, rigorous analytics benchmarking local utilization against best practices, application of economic analysis, and state-of-the-art geospatial infrastructure mapping tools produced for this strategic plan comprise the comprehensive methodology employed to address broadband challenges unique to Jefferson County. The concluding data-driven recommendations provide a roadmap for short and longer-term actions and serve as a framework for mounting competitive grant applications for the significant state and federal broadband funds becoming available in 2023. Below is a Gantt chart summarizing the project activities.



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Figure 1. Jefferson County Broadband Project Activities Timeline

The Broadband Assessment and Strategic Plan that follows provides Jefferson County with optimal strategies for ensuring digital readiness through (1) robust, affordable broadband infrastructure that will serve the existing and future connection demands into and out of Jefferson County as well as regional accessibility, performance measures, community design, and smart mobility outcomes; and (2) develop place and population-based strategies to optimize the capacity of businesses and residents to utilize broadband for economic and personal benefit.

### 3.1 The Context for Action

Broadband infrastructure and the capacity to utilize it is essential to full participation in all aspects of modern life, leaving those communities and individuals without digital resources severely disadvantaged. Along with most rural regions, Jefferson County has gaps in broadband coverage and utilization, the consequences of which were so viscerally demonstrated during the long months of Covid-19 pandemic. Left unaddressed, these gaps will inevitably weaken the competitiveness of the economy in the county, the sustainability of the region and the quality of life of its residents. The broader context for action on this front is that awareness of the need for broadband investment is at unparalleled levels, making broadband funding a high priority for state and federal economic and community development grant programs. The resulting convergence of need and opportunity provide the context in which the Jefferson County Broadband Plan was developed.

Broadband technology and the increasingly sophisticated applications and services it delivers is extraordinarily dynamic, providing another context for approaching existing gaps in its availability, access and use in Jefferson County. As broadband evolves the data-carrying capacity (bandwidth) and speed requirements steadily ratchet upwards, making the definition of “adequate” a moving target. The current definition of competitive broadband is technology that supports data speeds of in excess of 100 Mbps download and 20 Mbps upload. Future-ready broadband allows for interactive, content-rich applications, including many used in education and telehealth or emergency management, require symmetrical upload and download speeds in excess of 100 Mbps in both directions. Compared to this standard, many areas of Jefferson County are unserved or underserved.

These gaps are explained in large part by the economics of broadband deployment which do not favor rural and low-density communities where the higher costs of deployment and lower returns on investments do not meet the internal business case requirement of private sector internet service providers (ISPs). Hence the need for creative, public-private partnerships that leverage local resources, public grants and/or favorable loan funds. Information gathered in this plan provides Jefferson County with valuable insights as to the scale of the challenge, promising options for addressing existing gaps, optimal location for placement of additional resources, and opportunities to optimize the benefits through targeted initiatives to increase digital skills and capacities.

Infrastructure should not be planned for in a vacuum. The scale of broadband investment is best justified if done in a context where its benefits stand to be optimized; this is especially true when limited public dollars are at stake. The project’s holistic approach involves a hard examination of existing infrastructure against the current needs of the community, projected growth in demand for important applications, the digital capacity of local businesses and demographic groups to take advantage of better infrastructure, and local resources that can be leveraged to attract potential service providers and partners to build digital capacities.

### 3.2 Challenges and Aspirations – the Strategic Role of Broadband

The 2019 Comprehensive Economic Development Strategy (CEDS) for the Central Oregon Intergovernmental Council (COIC)<sup>3</sup> strongly supports the need for better broadband infrastructure and utilization in Central Oregon and specifically in Jefferson County. Broadband and the digital skills to utilize it are absolutely essential to attracting and sustaining firms in these industries and to developing the innovative practices and workforce that will empower competitiveness and growth in sectors cited as growth engines. In particular the healthcare sector will benefit greatly from broadband improvements because of the area’s aging population. Additionally, the leisure and hospitality, professional and business services, and construction sectors would also experience benefits of broadband improvements. The CEDS identified improving broadband capacity as a priority for the region. Although not highlighted by the CEDS, efforts to address broadband gaps in rural areas would enable broader adoption of precision agriculture and smarter resource management practices that could provide an existential advantage to the important farming and ranching sectors in Jefferson County.

The CEDS examination of Jefferson County noted the following challenges:

- Uneven economic development and opportunities across Jefferson County
- Rural-vs-urban differences
- Absence of dedicated facilities and assistance to promote and support remote work
- Disparities in opportunities between different demographic groups (gender, socioeconomic status, ethnicity, etc.)
- Youth unemployment
- Wage disparities and uneven earning potential
- Low educational attainment at high school graduation and bachelor degree levels
- Training/pathway gap between existing skills and those demanded in the workplace

In every instance, better broadband enabled through digital infrastructure and targeted digital inclusion programming to increase the facilities, technical assistance, and digital skills training is essential to effectively addressing these challenges.

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<sup>3</sup> <https://www.coic.org/wp-content/uploads/2019/10/ceds-body3.pdf>

## 4 Jefferson County Digital Needs and Readiness Assessment

Successful planning efforts are predicated on a common understanding among local leaders and stakeholders of the rationale and benefits of the proposed undertaking. There is enormous benefit in curating a common understanding of the need for the undertaking and aligning expectations, goals and readiness to move ahead collectively. The Digital Needs and Readiness Assessment (DNRA) tool used in this assessment assists in developing a shared understanding of the need for broadband improvements.

In December 2021 Jefferson County spearheaded the effort to develop an objective assessment of the current state of broadband and readiness to undertake a broadband planning initiative. Thirty-six (36) leaders from the county participated in the DNRA, including Culver and Madras City Council members, City and County officials and administrative staff, local Industry, Education, Public Health and Safety leaders and other local key stakeholders. Their responses provided a collective assessment of goals, needs, and readiness to take action to address local broadband and/or smart community needs. The DNRA served as a catalyst to encourage local decision makers to move forward more efficiently and with a clearer view of common purpose to moving the initiative forward.

Based on the DNRA completions by 36 leaders from across Jefferson County, the community was progressing towards readiness to make a broadband investment. The DNRA found that there was:

- Alignment on priority goals for the community as well as the current issues and needs, with an understanding of the rationale needed to drive a broadband initiative:
- Strong consensus on the goals centering on economic growth, more robust broadband access, and expanding access to online education and health services.
- Agreement that economic growth is also a priority need that will require stimulating local business growth and innovation, expanding local workforce skills, and retaining and attracting businesses and population.
- A wide range of opinions across the participants as to which issues and needs are of high importance and urgency.
- Agreement that the current state of broadband is inadequate to community needs, with 50 percent or more underserved.
- A vision for the value of digital infrastructure to Jefferson County needs to be developed and bought into by local leadership and the community at large as a preamble to giving a mandate to an organization or organizations that can lead a digital infrastructure and transformation initiative.
- Community leaders are prepared to take action and, in fact, recognize that they have the influence and resource capacity available to improve broadband service availability.

Regarding broadband readiness for Jefferson County, the DNRA found there was strong leadership in the community but they have not developed a formal, clearly-stated vision for addressing broadband and digital infrastructure. To develop this vision, leaders needed to obtain a better understanding of the value of digital infrastructure and anchor applications for the community, such as education, healthcare, and smart community services. Leaders also needed a better understanding of gaps in current broadband availability, as well as the needs and benefits that are available for Jefferson County residents and businesses.

There was a **clear consensus on the level of interest for broadband and smart community services**<sup>4</sup>, but as of December 2021 a lack of formal vision or broadband initiative plan was a stated concern.

Other readiness issues can be addressed over time once a digital infrastructure initiative has been funded and begins moving forward with implementation. Composite responses from the 36 leaders who participated in the DNRA are detailed below.

#### 4.1 DNRA Findings with Jefferson County

Respondents to the DNRA were asked to rank a set of goals for the community of Jefferson County with ratings as high, medium, or low priority. The higher the score, the greater the number of participants who said the goal was a high priority. Thus, a higher score indicates that most leaders considered that goal to be of importance to address for community growth. A 90-100% Score for Goals means "High Priority". The level of convergence indicates the statistical agreement among respondents for each ranking.

The intent of the DNRA scoring system was to reveal areas where the locality may be more ready or less ready to move forward successfully, as well as areas where more agreement may be required. The scoring is not intended to be "pass or fail" criteria, but as an aid in quickly identifying areas that need attention. An overall score above 71% is considered "Ready to Proceed" with a broadband infrastructure project. Localities with a score below 50% are likely to require several actions before being ready to move forward. Those above 50% are in the process of becoming ready by continuing their progress. The participant responses show strong agreement of the goals and rationale that will drive a broadband project forward, with new opportunities for economic growth being the top goal.

#### Ranked Digital Economy Goals of Jefferson County

Table 3: DNRA Ranked Goals

|   | Jefferson County Ranked Goals   | Score | Convergence |
|---|---|-------|-------------|
| 1 | New opportunities for work and economic growth  | 91.7% | 85.2%       |
| 2 | Access to robust and competitive broadband  | 90.7% | 83.7%       |
| 3 | Expanded online education and training opportunities  | 87.0% | 77.1%       |
| 4 | Remote and better integrated access to healthcare services                                    | 84.3% | 74.7%       |
| 5 | New ways of working together to achieve community goals                                       | 75.9% | 68.9%       |
| 6 | Smart community services - smart use of technologies to benefit residents and businesses      | 75.0% | 75.2%       |
| 7 | Better reliability and efficiency with energy supply, including alternative sources of energy | 67.6% | 72.5%       |

DNRA participants in Jefferson County believed that:

- A. New opportunities for economic growth are a high priority for Jefferson County, and that access to robust and competitive broadband was also of high importance.

<sup>4</sup> Smart community services include internet facilitated emergency services, public safety, online permitting, registrations and bill paying, utility metering, etc.

- They considered increased online education and training opportunities<sup>5</sup>, as well as remote and better integrated access to healthcare services to be high priorities. There was strong congruence between the goals expressed by these leaders and those articulated for the region overall in the 2019 COIC CEDS. Community leaders emphasized new ways of working together to achieve community goals to round out the five goals.
- B. It should be noted that while smart community services ranked number 6 in goals, pursuing smart community services was seen as a medium-to-high priority by 90 percent of participants.
- C. The goal of economic growth was also reflected in the top-four issues and needs in the context of stimulating local business growth and innovation, expanding local workforce skills, retaining and attracting businesses and population, and increasing good-paying job opportunities.
- D. Improving emergency service response was also seen as a very important issue, but less urgent.

### Issues and Needs of Jefferson County

Issues and needs for the community were rated based on their importance and urgency. The higher the score, the greater the number of participants who said that the issue or need was very important and urgent. 90-100% Score for Issues and Needs means "Very Important and Urgent".

Table 4: DNRA Ranked Issues and Needs

|    | Jefferson County Ranked Issues and Needs  | Score | Convergence |
|----|---|-------|-------------|
| 1  | Stimulating local business growth and innovation  | 88.9% | 62.4%       |
| 2  | Expanding local workforce skills  | 85.2% | 60.1%       |
| 3  | Retaining and attracting businesses and population                                      | 83.3% | 55.9%       |
| 4  | Increasing good-paying job opportunities  | 79.6% | 51.8%       |
| 5  | Improving emergency services response (health, fire, police)                            | 75.9% | 58.0%       |
| 6  | Enhancing public safety (public spaces, disaster events, etc.)                          | 69.4% | 41.2%       |
| 7  | Crime prevention and reduction  | 61.1% | 50.4%       |
| 8  | Improving resource management and environmental sustainability                          | 60.2% | 31.6%       |
| 9  | Improving effectiveness of public infrastructure  | 58.3% | 36.5%       |
| 10 | Increasing opportunities and ability to participate in the community (social inclusion) | 57.4% | 48.3%       |
| 11 | Better planning and management of public assets   | 55.6% | 34.6%       |
| 12 | Improving the availability and delivery of civic services                               | 51.9% | 43.2%       |

In terms of specifically addressing broadband access and improvement of service in Jefferson County, respondents were asked which needs are important to achieve those goals. The top three needs as identified by community leaders are identified in *Table 5* below:

<sup>5</sup> "Online education and training", "e-learning", "distance education" and "virtual classrooms" are all terms used interchangeably to describe educational programming delivered over the internet. It can be part of a formal degree or certification program or informal, self-initiated instruction.



Table 5: DNRA Requirements to Increase Broadband Access

| Top Three Requirements to Increase Broadband Access |   |
|---|---|
| 1   | Public investment in broadband infrastructure   |
| 2   | More private investment in broadband infrastructure   |
| 3   | Regulatory and/or legislative changes to reduce or eliminate barriers and enable investment |

Additional priority community goals and issues volunteered by the participants are listed below:

Table 6: DNRA Other Participant Goals

| Other Goals Identified by Participants  | Priority      |
|---|---------------|
| Improved emergency response and communication systems                             | High priority |
| Better rural access for communities that don't have access to high-speed internet | High priority |
| Agriculture – water and field management  | High priority |

#### 4.2 Status of Broadband and Smart Community Services in Jefferson County

Local leaders were asked at what stage they were in considering or implementing initiatives to improve broadband availability or smart community services. **The findings from this research preceded the analysis of actual availability and therefore provide a baseline assessment of awareness and priority for action that might be expected to change as they come to understand the actual level of service.**

Local leaders were asked what percentage of Jefferson County's premises are under-served with broadband (not getting what they need in terms of price, quality of service, reliability and speed).

Table 7: DNRA Percent of Community Underserved

| Percent of Community Underserved | Score | Convergence | Consensus Finding                                |
|----------------------------------|-------|-------------|--|
| Underserved                      | 86.1% | 49.0%       | More than 50% of Jefferson County is underserved |

Where there was divergence of opinion among the leadership team, those gaps are critical to be identified, understood, and agreed upon about how to address them. For each response category, the “**Convergence**” percentage represents the level of agreement among the respondents, with a higher percentage indicating greater agreement. The “**Consensus Finding**” is the response most frequently chosen by the respondents. Where the convergence is high, the consensus finding likely represents the view of the majority of respondents.

Table 8: DNRA State of Implementation

| Stage of Implementation | Score | Convergence | Consensus Finding   |
|-------------------------|-------|-------------|---------------------|
| Broadband               | 41.7% | 53.7%       | Under consideration |
| Smart Community         | 32.0% | 48.4%       | Under consideration |

The following charts show how local leaders perceived the state of addressing broadband and community services in Jefferson County.

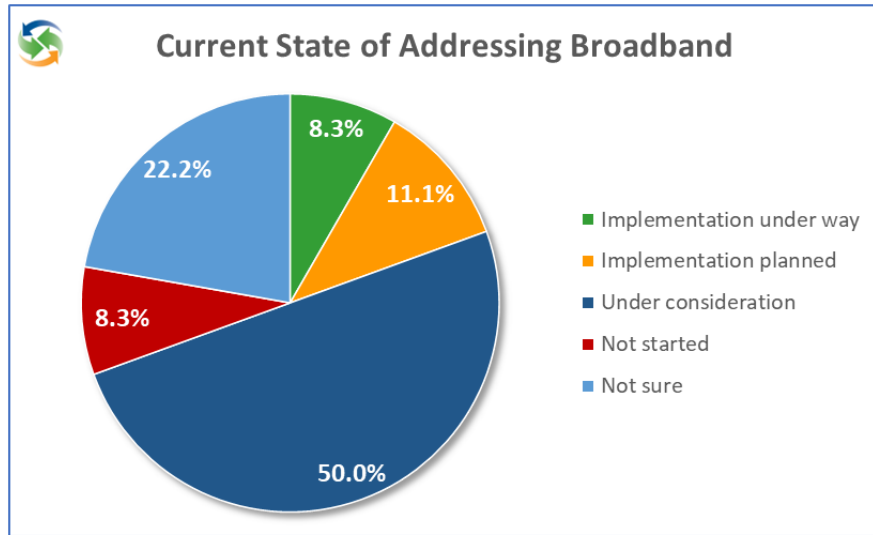


Figure 1. DNRA State of Addressing Broadband

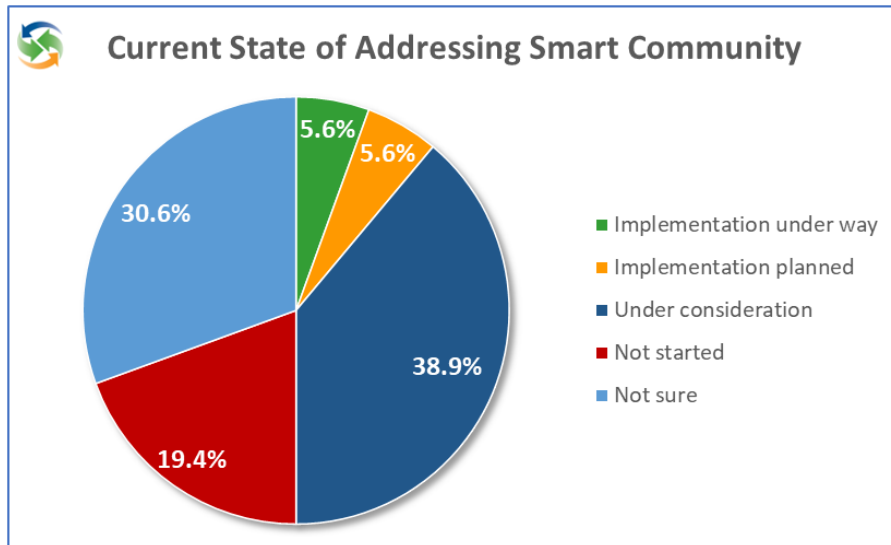


Figure 2. DNRA State of Addressing Smart Community Services

The majority of responses indicated that a broadband initiative is under consideration. At least a quarter stated that addressing broadband in Jefferson County is “Not Started” or are “Not Sure”. It is noted that approximately half of respondents reported that smart community implementation is “Not Started” or are

“Not Sure”. This was significant as 30 percent of local leaders did not know the status of broadband efforts in Jefferson County. An important action item therefore was to implement on-going communication processes to keep local leaders and the public informed and participating in digital inclusion and transformation in Jefferson County. This has been incorporated into **Section 12.7** Recommendations and Next Steps for Jefferson County.

**Participant Feedback on Key Challenges for Jefferson County**

The key challenges for moving forward as expressed by the participants are provided verbatim below.

*Table 9: DNRA Participant Feedback on Key Challenges*

| Key challenges or impediments for moving your smart community initiative forward successfully, as identified from comments by participants   |
|--|
| Educating the community and the people that think there is an issue on what broadband really means and what is currently available. People that do not understand how bandwidth is even used on a network or in a home should not be making any decisions on how money needs to be spent to improve connectivity in a given area.  |
| Ground level communications of what digital infrastructure initiative process is and what would be the anticipated results visually. Faster data streaming, more security, wider availability of providers, etc.   |
| Clear vision and infrastructure plans.   |
| Red tape. Multiple private providers TRYING to provide high-level services at a high price point.  |
| County government is historically slow to respond to any improvements or community needs.  |
| Jefferson County is a largely rural area with few broadband providers and with areas that currently have no access to high-speed internet. This includes large areas of the Warm Springs Indian Reservation. The need for increased access cannot be overstated. It is tremendous that the county is taking steps to improve access in all areas.  |
| Our community is rural and urban with significant terrain issues. We also have unique sovereigns’ side by side. We have not studied what systems and capacities we have and what we do not have and how effectively we can combine what is and what is needed. Even more we need to define what we want, the related priorities and how we work together to be the most effective in securing a sound future for our communities. Available capital for investment may also be an issue.   |
| To me, our community must follow a deliberate and thoughtful process for planning and this effort starts that process. We must be open to different technology for different areas always looking to find the most effective solutions to serve our unique areas. Once that information is gathered, we must prioritize the solutions and examine the costs. We must then design a system to meet the priorities, incorporating effective existing local tools and investing new tools where necessary. This idea assumes very deliberate financial planning is being employed throughout the process. |
| Due to rural status and large distances between communities and/or neighborhoods, the biggest barrier is a reliable backbone upon which to base broadband. There is not enough hardwire connectivity nor extensive enough radio tower support to blanket the region.   |

### 4.3 Key DNRA Takeaways in Jefferson County

Below are key DNRA takeaways identified from local leaders:

- The consensus on the quality of broadband services was that speed and value were “Poor” and “Fair”, respectively, but there was considerable variation of opinion, likely due to the wide range of offerings and availability across Jefferson County.
- There was strong agreement that a broadband initiative was “Under consideration” while there was slightly less agreement on the status of smart community services. There was little indication that implementation efforts are underway.
- One third of respondents did not know how much of the community was underserved. The majority of respondents said that more than 50 percent of residents were underserved (see *Table 7: DNRA Percent of Community Underserved*).
- In considering what would be needed to increase broadband access and use, **respondents favored public investment in broadband infrastructure** almost 20 percent more than increasing private investment in broadband services.

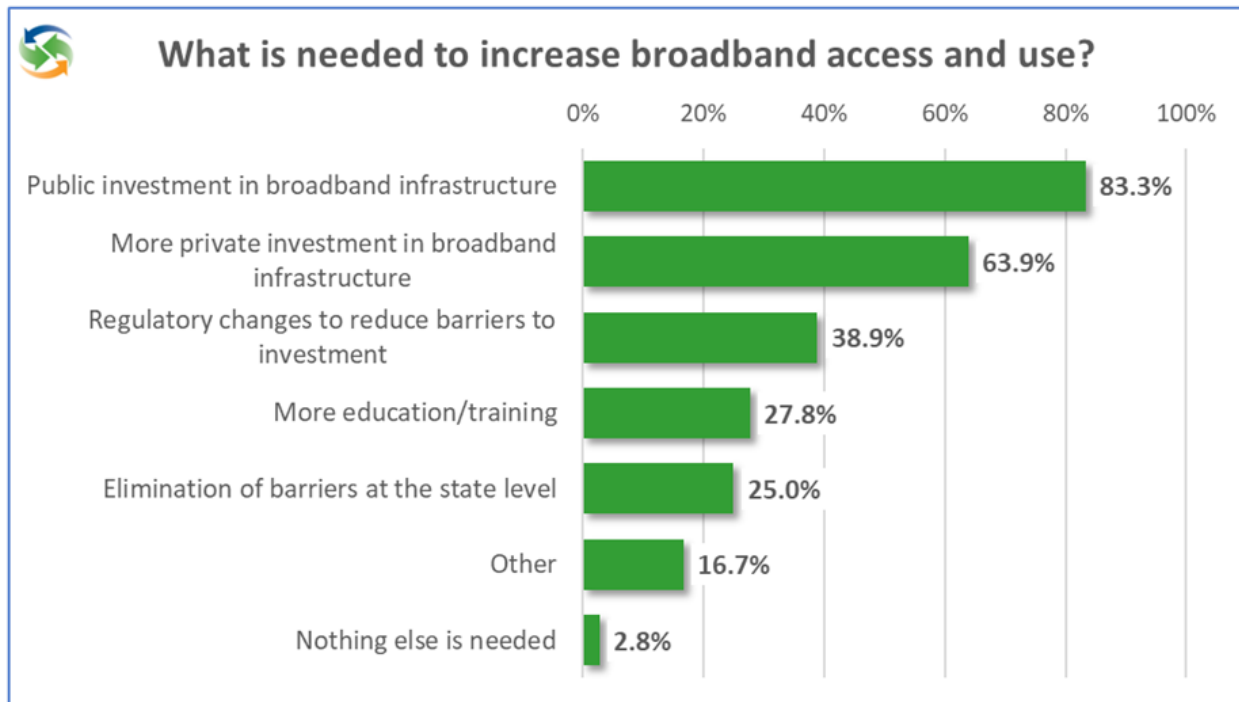


Figure 3. How to Increase Broadband Access and Use?

In summary, the Digital Needs and Readiness Assessment provided a systematic and objective assessment of the current state of broadband and smart community in Jefferson County. Based on the responses and comments from the 36 local leaders in Jefferson County, more efforts needed to be made to address broadband service availability. The affordability of access to broadband was also a key issue identified to be addressed (see *Table 11*). Leaders needed a clearer vision for the community going forward and have fact-based information, with regular communication updates on which to base decisions about broadband and digital inclusion initiatives.

## 5 Jefferson County Project Vision, Goals, and Roles

Jefferson County project principals for this initiative included leadership from Jefferson County, City of Madras, and the Bean Foundation. Following the review of findings from the Digital Needs and Readiness Assessment, this group was engaged to set goals, agreed on action steps, and set the project schedule and deliverables.

In January 2022, Jefferson County conducted meetings with the project principals to discuss the Broadband Assessment and Strategic Plan. Project planning focused on:

- Discussion and development of a clearer understanding of Jefferson County’s vision and goals for Jefferson County Broadband Assessment and Strategic Plan project
- Discussing project roles and participation of local stakeholder organizations
- Developing a preliminary plan for Tribal engagement

### 5.1 Vision

Project principals shared the following vision for the Jefferson County Broadband Assessment and Strategic Plan:

- To use broadband to support and improve Jefferson County’s economy, educational opportunities, and quality of life
- To increase ability of all sectors and populations in Jefferson County to access and effectively use broadband:
  - To effectively participate in an online economy and civic society
  - To prepare for a sustainable and competitive future through improvements in education, healthcare, public safety, economic development, and smart agriculture.

It was agreed that local capacity building requires raising awareness, providing training, and technical support where needed to be provided by local support where possible. Needs, applications and opportunities pertaining to Smart Agriculture are particularly relevant given the important role farming and natural resources play in the region’s economy, thus placing emphasis on engaging this sector. Finally, emerging federal infrastructure funding states a need for inclusion of climate challenges as a consideration in grant applications, making it important to identify linkages between sector needs and infrastructure funding.

The broader vision potentially encompasses partnering with the three tribal communities within the Warm Springs Reservation residing in Jefferson and contiguous counties on efforts of common interest. Similarly, there should be an emphasis on the local element, with trusted local opinion leaders engaged in the outreach process as a means of building broad community participation and encouraging these leaders’ support and involvement in future funding and implementation efforts.

### 5.2 Goals

As previously identified by referencing the 2019 COIC CEDS report and investigated by gauging priorities of community leaders’ priorities within the DNRA, goals identified by the Project Principals for Jefferson County included the following:

### Access and Planning

- Enable affordable, robust, and competitive broadband access for all along with enhanced services – education, healthcare, emergency, smart community, agriculture, water management, public safety, and household management
- Develop capacity to effectively educate key decision makers through our planning

### Digital Inclusion

- Connect to Tribes, Hispanic communities and other underserved populations<sup>6</sup> with locals leaders and champions taking the lead as a means of building trust, participation, and involvement in future funding and implementation efforts.
- Document existing resources and capacity that can help guide a thoughtful, thorough, and sustainable plan to expand digital infrastructure and services in the future.
- Utilize a broad understanding of inclusiveness that incorporates consideration of collaboration with tribes, the needs of underserved communities, climate change (benefits of telecommuting), economic development (retain residents, support existing businesses, recruit new “urban” businesses), and smart (precision) agriculture applications (e.g., water management, fertilizer management)

### Report

- Deliver a report that can be leveraged into grant applications for detailed technical design, engineering, and budgeting.
- Chronicle demand for broadband and online services. We need to understand current capacity and use of broadband for education, healthcare, public safety and business, especially agriculture and smart resource management.
- Understand information needs and gather information needed to inform competitive applications for emerging broadband funding opportunities at all levels, including federal, state, and the Confederated Tribes of Warm Springs.

## 5.3 Roles

Jefferson County was the fiduciary lead for this initiative and the City of Madras was designated as responsible for reporting out on the grant requirements and communicating with the EDA. Local support, outreach, and engagement is critical to any successful community initiative. For this reason, roles for local organizations were defined as Stakeholder Partners and Promotional Partners.

### Stakeholder Partners in Jefferson County

This vital and larger group served key roles that included:

- Ensuring the success of outreach and engagement efforts to maximize participation in the capacity and aspirations assessments; and
- Providing bridges to important external partners, such as the Oregon Broadband Office, Broadband Action Teams (BATs) in contiguous counties, Business Oregon, Regional Solutions, the Warm Springs Tribes, and regional healthcare organizations

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<sup>6</sup> Jefferson County has a considerable population that is older, low-income and little education that has limited their access to technology and technology tools

## Broadband Assessment and Strategic Plan for Jefferson County

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- Sharing their and their organization's expertise to conduct outreach and contribute insights related to the Broadband Plan
- Ensuring the Broadband Plan meets the needs of various stakeholders and users across Jefferson County

Representatives from each of the Stakeholder Partner organizations were invited to the Stakeholder Partner **Steering Committee** with a role to:

- Guiding the project goals and reflect community values
- Planning and supporting project activities, sharing lessons learned, and avoiding pitfalls
- Engaging with their partners and constituencies as needed to promote and maximize participation in the data collection from individual households and businesses throughout Jefferson County and the Warm Springs Tribes
- Advocating for additional broadband initiatives as they develop
- Identifying sub-committee subject areas that could be established based on community needs and priorities, including undertaking effective actions to address challenges

Project Stakeholder Partners that were approached to participate included:

- Representatives from Confederated Tribes of Warm Springs
- Warm Springs Power Enterprises
- Representative from St. Charles as they are a funding partner and a regional health care and hospitalization resource
- Chamber of Commerce
- Hispanic community
- School District
- Jefferson County Broadband Action Team (BAT) members
- St. Charles Foundation
- Oregon State University (OSU) Extension Service
- Central Oregon Community College (COCC) Madras
- Jefferson County / Madras Chamber of Commerce
- Jefferson County Farm Bureau
- Jefferson County School Board
- Warm Springs Telecom
- OSU Open Campus
- Oregon Intergovernmental Council
- Jefferson County Library District
- Mosaic Medical
- Camp Sherman / Black Butte School District
- City of Culver Representative
- City of Metolius Representative
- Jefferson County School District

### Promotional Partners in Jefferson County

A second group of Promotional Partners were engaged to support the Jefferson County broadband project through their active endorsement of the effort and by reaching out to households and businesses through their existing relationships and communications channels. Their proactive participation in promoting this planning effort helped ensure that their constituents could participate and have their voices heard. The project team committed to provide promotional partners access to the findings of project-related research and assessments for their use and benefit for planning, reporting, etc.

Promotional Partners for Jefferson County that were approached to participate included:

- Central Oregon Intergovernmental Council (COIC)
- Jefferson County Public Health
- St. Charles Madras
- Latino Community Association
- Jefferson County GIS
- Crestview Cable
- OSU Open Campus Juntos
- St. Charles Foundation
- Jefferson County School District Superintendent
- COCC Madras
- Bright Wood Corporation
- Business Oregon
- Governor's Office/Regional Solutions



## 6 Community Engagement and Workshops in Jefferson County

On December 16, 2021 Jefferson County leaders participated in an in-depth presentation of the assessment plan, timeline and objectives that would be employed in developing an actionable investment plan for broadband infrastructure.

With support and assistance from these leaders, an extensive outreach effort was conducted (January-March 2022), to key Jefferson County stakeholders, including representatives from the school districts, higher education, Chamber and economic development groups, interested citizens, the library district, medical providers, state regional development, and local municipalities.

The goals for these conversations were to create a widespread understanding of the requirements, goals, objectives and expected outcomes of this planning project and to seek the active support of these key community organizations in promoting participation in the assessment by their stakeholders. Time spent building these connections and soliciting their assistance in community outreach was vital to the success of the data collection that underpins the planning effort for the Broadband Assessment and Strategic Plan. In the process an important asset to eventual implementation of elements of this plan was nurtured as these organizations and individuals form the nucleus of informed and engage community partners that can be recruited to implement aspects of the Jefferson County broadband plan.

### 6.1 Community Workshops

Data collection from online assessments and other primary sources was supplemented with onsite Stakeholder Workshops and community workshops that were convened to engage a broad cross-section of the community in a deeper discussion on topics, concerns and issues. The benefits of conducting a Stakeholder Workshop were three-fold:

- Stakeholders are more likely to participate in ways (eCheckup assessment outreach, community meeting, public comment) that best reflect their interest, engagement and desire for positive outcomes
- Conducting workshops demonstrates that Jefferson County is eager to hear and include as much community input as is offered to accurately reflect the need for robust broadband and to share that when developing public policy and applying for federal or state funding
- The face-to-face with local stakeholders will provide in-person discussion and insights that would otherwise not be collected via a survey tool and secondary research

A key takeaway from the community workshops that were held in May of 2022 is that individuals who understood the value of broadband participated in the community workshops and were engaged in the process. The main challenge identified was to engage with those who need broadband the most, but are often the last to get it because they are lower income and part of the digital divide, live in a rural area, have young busy families, etc. These groups have relatively the most to gain and contribute in terms of economic and community benefits. Appropriate outreach and engagement resources are needed for effective digital inclusion of these groups and these are summarized in **Section 12.4 Developing a Path Forward – eStrategy for Jefferson County**.

Below is an individual summary of each community workshop conducted on-site in Jefferson County.

Table 10: Community Workshop Summary

| Community   | Date          | Participation                 | Outcomes / Notes  |
|---|---------------|-------------------------------|---|
| <b>Camp Sherman</b><br>M.Curri,<br>N.Snead,<br>L.Gleichman,<br>S.Larson,<br>W.Webster | 09May<br>2022 | High – 35<br>participants     | High interest and participation as residents and seasonal residents understand the importance of broadband for their personal and professional activities, as well as to protect their properties (online fire alarms, automated fire sprinkler systems do not work with unreliable connectivity)<br>Low speed and reliability, with very limited service options, plus an affluent and aware population have motivated them to develop a path forward to finding a solution. They understood how the eCheckup could improve the case for funding as well as drive impacts from broadband.<br>Wireless service provider present at workshop to understand “what is going on”. |
| <b>Crooked River Ranch</b><br>M.Curri,<br>N.Snead,<br>L.Gleichman                     | 10May<br>2022 | Moderate – 11<br>participants | Key members of Homeowners Association present who learned about the importance of the broadband data collection, but warned about the difficulty to engage people who most need connectivity and the skills to use online practices (i.e. young families)<br>One resident, who designs circuit boards from his home office and needs to send 75 Gigabit-sized files, completed both the Household and Business eCheckup because his 1.5 Mbps connection is severely inadequate and he knew that participating in the process was the best way to help get change. Wireless service provider technician present  |
| <b>Madras</b><br>M.Curri,<br>N.Snead,<br>L.Gleichman,<br>S.Larson,<br>W.Webster       | 10May<br>2022 | Low                           | Traditional channels for outreach had minimal effect in reaching people. Word-of-mouth most effective. Scheduling conflict with Commissioners meeting at same time.<br>Local official stated “community workshops are dead”<br>Strong advocacy for the eCheckup process by George Neilson – a view shared by other participants.<br>Wireless service provider present   |
| <b>Warm Springs Reservation</b><br>M.Curri,<br>C.Lohman,<br>S.Guerin                  | 11May<br>2022 | Low                           | Flyers, in-person meetings, radio ads, etc. were used to promote event. Challenges in receiving booking confirmation for venue despite three weeks notice – limiting promotion of venue to two days prior.<br>Participants understood the value of the eCheckup – each had completed the Household eCheckup.<br>Word-of-mouth key to engaging participation. Participants agreed to promote the eCheckup to their families, neighbors, and friends.   |

## 6.2 Promotion of eCheckup Participation

The Household and Business eCheckup deployed across Jefferson County and on the Warm Springs Reservation collected needed broadband demand, availability and utilization data. Household and business links to eCheckups were made available on the County’s website ([www.jeffco.net/jc-echeckup](http://www.jeffco.net/jc-echeckup)).

All available channels for outreach and engagement were used (see Appendix 5 – Media Log) between March and June 2022 and these activities were complemented with personal contact by local officials, leaders, neighbors, etc. to promote and advocate participation by all residents and businesses to take the eCheckup. Hands-on outreach and advocacy are critical to securing sufficiently broad and representative participation in the eCheckup, but after conducting four community workshops in May, 2022, it was clear that traditional outreach channels were not sufficiently driving eCheckup completions. Additional approaches were pursued, including:

- A direct appeal to project principals on May 25, 2022 to “reinvigorate” the outreach plan by asking them to reach out to 1-2 of their key contacts every day to encourage them to promote the eCheckup to their respective network of contacts and drive eCheckup completions.
- SNG purchased contact lists (for households and businesses) from providers Data-Axle<sup>7</sup> and Database USA<sup>8</sup> to increase community participation, because the data from completed eCheckups showed that email was the primary method of contact for over 80 percent of household completions.
- Madras Chamber of Commerce provided a business contact list of over 450 businesses in Jefferson County and assisted in outreach communications.

Collectively these efforts generated five contact lists that were used to deploy email invitations with new messaging. Multiple efforts using a variety of methods were required for residents and businesses in the County to complete the eCheckup and that this is not unusual in a rural county with limited broadband access and in some cases low digital literacy. For example, the eCheckup Status Report showed spikes in completions the week of May 30, 2022 and following due to the ‘re-invigorated’ outreach plan with the project principals. Such iterative messaging utilizing a variety of outreach methods to achieve an acceptable level of participation in eCheckup assessments is not unusual in a rural county with limited broadband access and some cases low digital literacy.

Public outreach and engagement continued through June 2022 in the form of a public service campaign, community and stakeholder meetings, workshops, etc., with the goal of getting as many households, businesses and organizations as possible to understand the value and purpose of the assessments and to complete an eCheckup.

## 6.3 Insights from Stakeholders

There was strong general consensus on the need for broadband and that community action was needed to help make broadband happen. Those who were most experienced with the digital economy and online practices were the most passionate advocates for getting better broadband to Jefferson County.

The most significant challenge people recognized is that those individuals not fully participating in the digital economy were the hardest to engage, but often had the most to gain from getting online – such as better access to healthcare services, educational opportunities, new income opportunities, etc. This digital

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<sup>7</sup> <https://www.data-axle.com/>

<sup>8</sup> <https://databaseusa.com/>

inclusion challenge requires ongoing, dedicated in-person outreach and support to those individuals and disadvantaged groups. Public meetings, outreach through media channels (including online), etc. need to be complemented by in-person outreach through existing stakeholder organizations where possible.

Therefore, in **Section 12.7 Recommendations and Next Steps for Jefferson County**, a key recommendation is incorporating community engagement into an on-going communication process to keep local leaders and the public informed and participating in digital inclusion and transformation across Jefferson County.

## 7 Jefferson County Broadband Impact and Market Assessment

To develop an evidence-based strategic plan to address broadband gaps, barriers, and opportunities, a Broadband Market Assessment (eCheckup) was used to collect the data needed to assess broadband demand, availability, and utilization from businesses and households across Jefferson County and on the Warm Springs Tribal Reservation. Jefferson County leadership and SNG worked with local stakeholders on targeted outreach and engagement to maximize participation rates by businesses and households (as detailed in **Section 6.2**).

Data collection began on April 8, 2022 with the launch of the online eCheckup assessments, and continued until the end of June 2022. Preliminary findings were presented to the County in July and August of 2022 with continued data analysis and broadband benchmarking to identify gaps, barriers, and opportunities in development of the Broadband Impact and Market Assessment Report.

### 7.1 Data Collection, Analysis, and Broadband Benchmarking

Using the eCheckup Broadband Market Assessment, data was collected directly from individual residents, organizations, and businesses of how they are connected, using, and benefitting from the internet. Outreach to promote eCheckup participation was conducted through a public service campaign, community and stakeholder meetings, workshops, etc., with the goal of getting as many households, businesses and organizations as possible to understand the purpose of the assessments and the importance that they complete an eCheckup.

A coordinated effort was conducted to reach all parts of the county, especially in areas that are typically under-represented in terms of income, language and other barriers, and connectivity. Responses were received from 790 Households and 90 Businesses within Jefferson County. This is a 9% participation rate by households within Jefferson County.

The analysis of findings from the eCheckup provided insights into the existing market conditions and demand for broadband services in Jefferson County on over 120 indicators on broadband utilization, impacts, needs, barriers, equipment, readiness, skills, etc. This enabled assessing broadband market potential and developing a granular picture of gaps, barriers, and opportunities in broadband supply and demand.

Benchmarking of Jefferson County broadband data and use of online practices against data collected from other regions enabled comparative analysis of both current and future demand at a granular level, coupled with examination of current and potential supply-side solutions. This provides insights and evidence to:

- Optimize investments in digital infrastructure based on user-driven demand research (instead of assumed pro-forma subscription rates)
- Identify broadband needs, gaps, barriers, and opportunities – for targeting user groups, funding, and necessary technical support
- Provide Jefferson County and the Confederate Tribes of Warm Springs data for local planning and evidence-based decision-making
- Provide a baseline of data for measuring progress and evaluating economic and community returns from investments in digital infrastructure and transformation

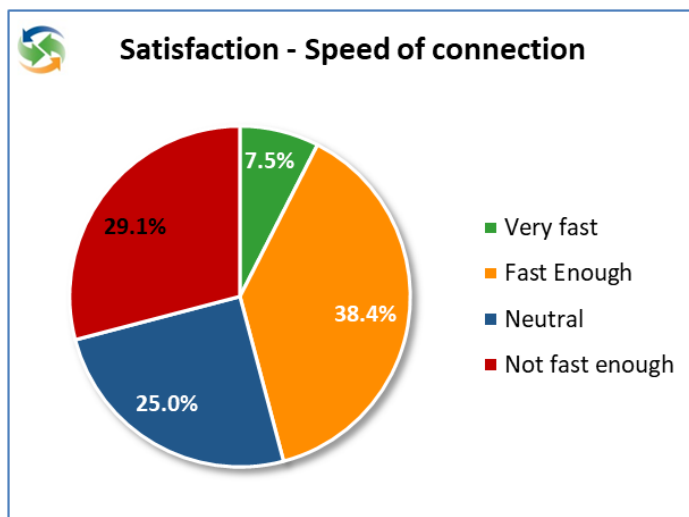
**Section 7.2** provides detail into eCheckup responses, as well as analysis and insights into broadband availability, demand, and utilization.

## 7.2 Key eCheckup Findings

When asked about the priority of goals for the community, over 80 percent respondents in both the Business and Household eCheckups agreed that “Robust and competitive broadband” is a top goal. This was followed by supporting “Smart community services” as a second priority. Households valued “Remote health services” as the next community goal, while businesses third priority is “New opportunities for economic growth”. There is a consensus within the community, and between businesses and households, that broadband is an important consideration for the future of the community.

The analysis and findings from the Broadband Market Assessment document areas that were underserved across Jefferson County, in contradiction of FCC data claiming those areas served by 100/100 Mbps. Underserved business and household locations provide a clear need for a targeted approach to address a need for improved broadband infrastructure. Over half of all household and over one third of business responses that participated in the eCheckup speed test do not meet the FCC standards for 25/3 Mbps broadband speeds. As displayed in the mapping materials and tabular analysis of **Sections 9.1 and 9.4**, many of these underserved areas are located within areas that the FCC designates as having at least 25/3 Mbps, if not faster, available internet service.

The lack of available broadband service is also reflected in the satisfaction ratings recorded in the eCheckup



**Figure 5. Household eCheckup Satisfaction with Speed of Internet Connection**

assessment. Respondents were asked about their satisfaction with current broadband service, in terms of speed, reliability, and value of service. A significant portion of household respondents report they are not satisfied with the speeds of their connection, with 29 percent saying that speeds are “Not fast enough” (see *Figure 5*). Again, many of these low satisfaction ratings are in areas that are designated as served by the most recent FCC coverage maps (see **Section 9.4 Validation / Invalidation of FCC Coverage Data**). Project mapping displaying geo-referenced satisfaction ratings compared to existing FCC claims show the discrepancy and highlight the reality of consumers facing broadband service challenges.

It’s worth noting that when asked what **is the highest priority for broadband service selection, both businesses and households agreed that reliability of service was most important, followed by speed of service and affordability of service**. This is consistent with other community’s that the County’s consultant has surveyed, where the reliability of internet service is the highest priority among respondents.

Over 20 percent of households report spending between \$60 and \$80 a month for internet services, which is the most frequent range selected from eCheckup respondents. In addition, 35 percent of households are paying more than \$80 a month for internet services. This is noted as trending higher than the national average of \$65 per month that households pay for internet<sup>9</sup>.

<sup>9</sup> <https://www.prnewswire.com/news-releases/parks-associates-as-of-q1-2021-41-of-us-broadband-households-have-standalone-broadband-service-paying-an-average-of-64-per-month-301313691.html>

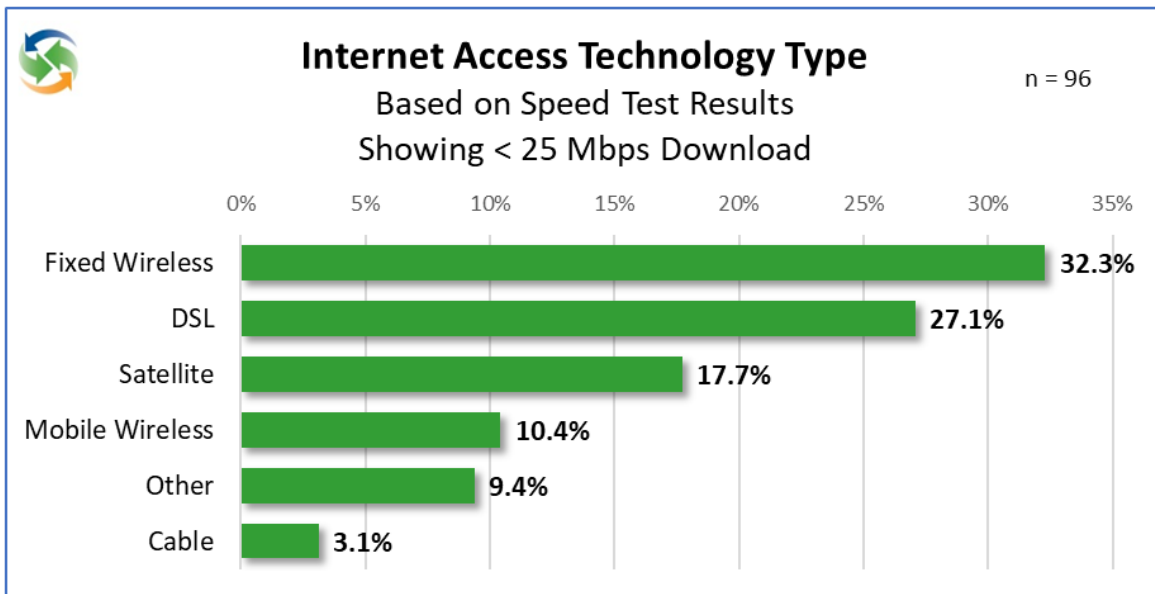
**Connection Types and Future-Ready Broadband**

Broadband infrastructure needs to be present and of a capability to be able to deliver robust, high-speed service that is accessible and meets the needs of those who wish to be connected. A critical consideration is not only does the infrastructure and technology employed meet current needs, but is it capable of supporting anticipated demands, i.e., is it future proof? To assess the situation in Jefferson County, existing broadband infrastructure were analyzed, including the technologies employed to deliver service and speeds, and the cost of service.

This analysis is important to identify gaps in service and to ground truth information reported by the FCC that determines eligibility for federal broadband grants. The FCC’s reported availability data is known to sometimes erroneously designate given locations as being served with qualifying technologies and/or speeds when that is not the case. The eCheckup data showed that there are areas that are underserved across Jefferson County, in contradiction of FCC data indicating that those areas are served by 100/100 Mbps. Underserved business and household locations provide a clear need for a targeted approach to address a need for improved broadband infrastructure.

According to eCheckup respondents, there is a large amount of fixed wireless and satellite as reported internet connection types. Fixed wireless makes up 31 percent of business connections and 19 percent of household connections, making it the most widely used technology type according to eCheckup respondents. Additionally, 285 household respondents (36%) are collectively using DSL, Dial-up or Satellite connectivity. This is to be expected due to the rural nature of many areas found in Jefferson County and market considerations that make it difficult for service providers to make a business case to expand to areas with less dense populations. This issue is further expanded upon in terms of addressing geographic density and broadband infrastructure build-out in later **Section 12** of this report.

eCheckup data collected from businesses and households that registered speeds below the FCC broadband served speed of 25/3 Mbps are shown in Figure 6. These need to be looked into further on a case-by-case basis as fixed wireless and cable can be upgraded to deliver speeds over 100/100 Mbps. If broadband delivered through these technologies cannot be upgraded to atleast provide 100/100, then these technologies cannot be considered future-ready.



**Figure 6. Internet Access Technology Type of Underserved**

There was overwhelming support within the community to improve internet service offerings, where 94 percent of eCheckup respondents indicated that they are at least “Somewhat likely” to change service providers if a better option were available (see Figure 7). Furthermore, there is a correlation between interests in changing service providers to the type of technology used to access the internet. Satellite and DSL users were most likely to respond that they “Want something better now”, whereas those with Fiber internet access had the highest rate of “Happy with what I have” responses.

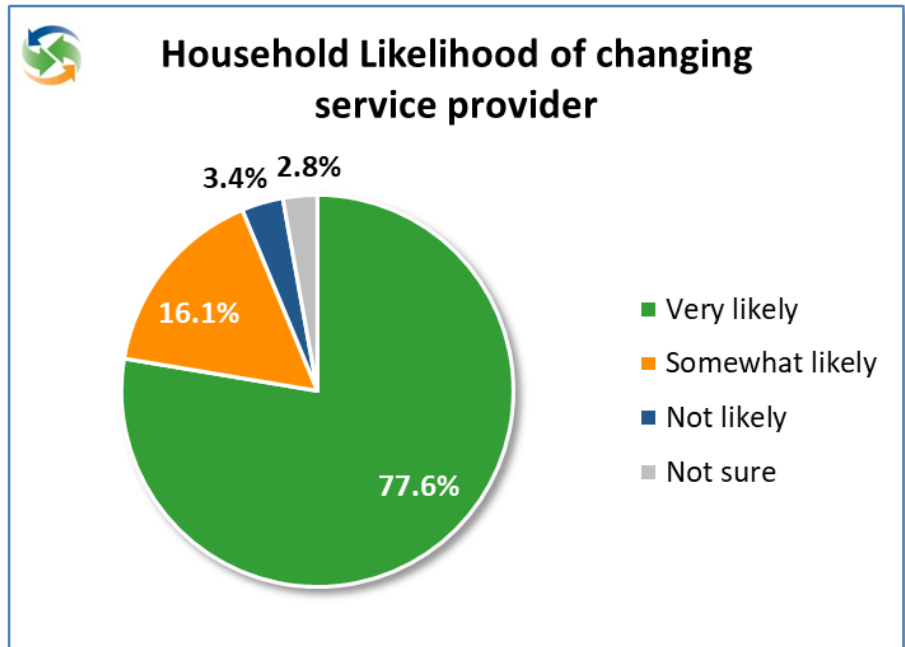


Figure 7. Household Likelihood of changing service provider

**Teleworking**

Teleworking plays a vital role in today’s economy, the importance of which was only amplified by the Covid pandemic. eCheckup respondents indicated that almost half (47%) either work from home or telework on a regular basis. Household incomes are substantially higher with reported telework, underscoring the value of promoting and supporting households in implementing telework. This can be achieved by promoting awareness to the benefits of this type of employment, increasing digital literacy and workforce training with a focus on teleworking opportunities, and working with local businesses to include these employment options as a part of their employment offerings and business practices. Such efforts, in coordination with the rollout of high-capacity broadband, has the potential to increase average household incomes, especially in rural areas, reduce household travel costs, provide lifestyle benefits and deliver environmental benefits by decreasing drive times<sup>10</sup> by reducing carbon emissions. Competitive broadband can become a valuable recruiting tool used to attract virtual workers and companies to Jefferson County.

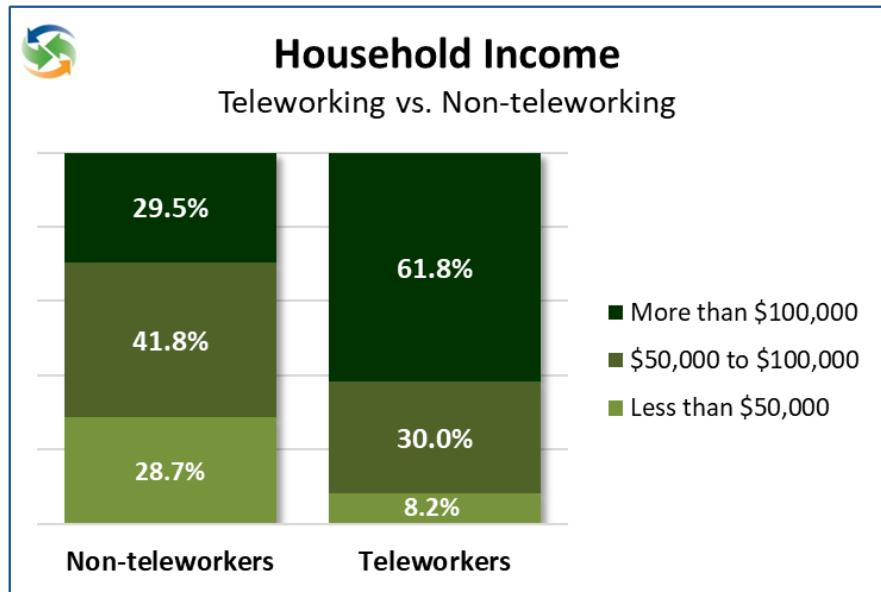


Figure 8. Household Income for Teleworkers

<sup>10</sup> Over one-third of teleworking eCheckup respondents report having to drive 100 miles or more to their office.



**Telehealth**

Telehealth has the immediate benefit of reducing the cost of healthcare while simultaneously providing greater access and convenience to healthcare services and providers, increased time-savings, and ultimately improving health outcomes<sup>11</sup>. This is especially vital in rural

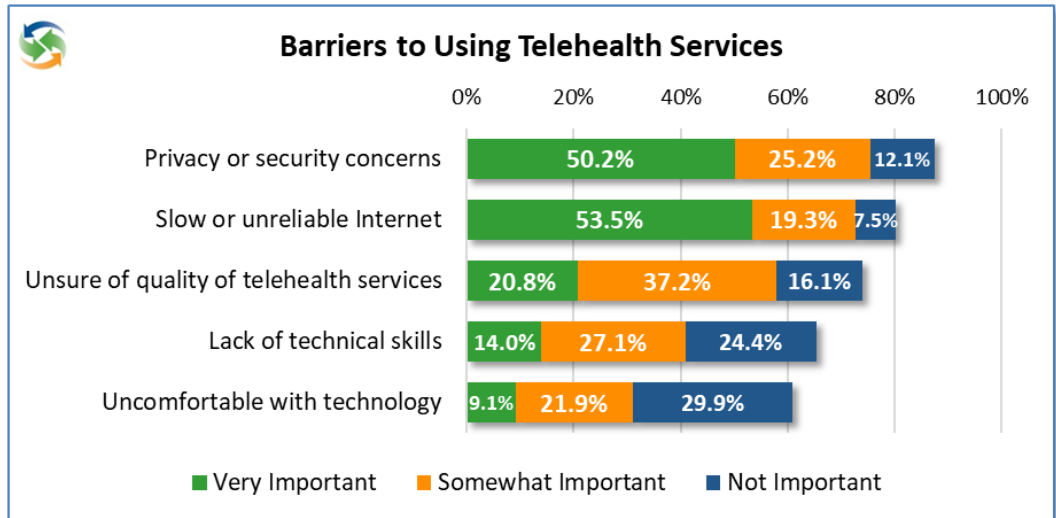
areas that typically experience

a gap in available healthcare services. According to eCheckup respondents, over 70 percent of local respondents “Currently Use”, “Plan to use” or are “Willing to Explore” telehealth services as an option to supplement their medical care. The two greatest barriers to using Telehealth are “Slow or unreliable internet” and “Security and Privacy concerns” (see Figure 9). eCheckup respondents that reported lower satisfaction ratings with existing internet speeds also were more likely to indicate that internet connection speed is a barrier to using telehealth services. This finding suggests that improving available internet speed, reliability, and value will also directly lead to increased utilization of telehealth services and thereby health outcomes. Identifying these as inhibiting factors can support outreach and effectively plan for ways to increase telehealth utilization by directly addressing those concerns. There is a portion of the senior community that does not currently use broadband who would likely need assistance in getting connected and becoming familiar with technologies to access telehealth services. Telehealth supports aging-in-place options for senior citizens, who want to remain in their homes and communities. This is one of the primary areas where digital literacy is needed to fully implement this plan.

**Distance Learning**

Broadband internet is transforming education, providing the platform that makes lifelong, anytime-anywhere education a real possibility. The vital role of broadband in all aspects of education is highlighted in responses to the eCheckup where over 80 percent of respondents with school-aged children rated broadband as: “Extremely or Very Important” for school success.

Additionally, over 80 percent of all respondents agree or strongly agree that improving broadband access and availability leads to better educational opportunities. This suggests a strong demand and willingness to accept outreach efforts to improve awareness and literacy training focused on e-learning tools. An opportunity to partner with local educational organizations to assist and provide resources to engage with the community will be essential to satisfying existing reported interest and demand. Training in the use of e-learning tools and facilitated access to online certification offerings is an especially valuable resource for improving the capacities of the local workforce and opening up virtual employment opportunities.

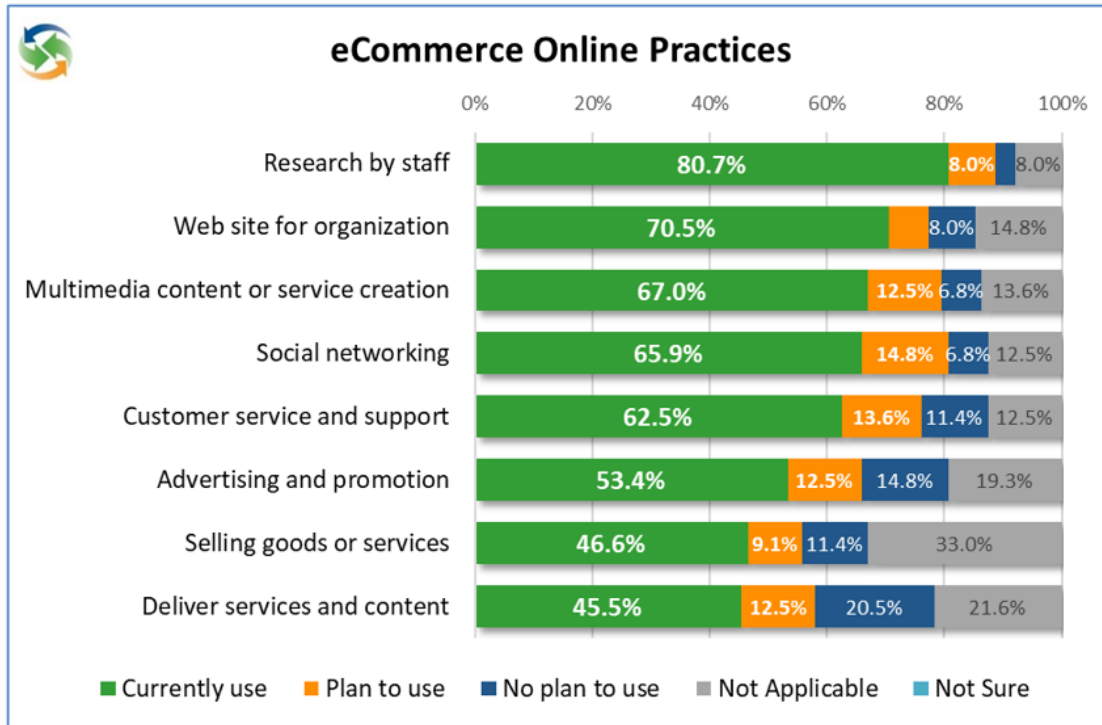


**Figure 9. Barriers to Using Telehealth Services**

<sup>11</sup> <https://telehealth.hhs.gov/providers/telehealth-for-rural-areas/access-to-internet-and-other-telehealth-resources/>

**Digital Gaps Causing Lost Jobs and Revenues**

Businesses responses to the eCheckup provide insights into the underutilization of the internet by many Jefferson County enterprises to optimize their operations. The majority of responding businesses currently have a website, but 26 (30%) of the 98 participating firms are not equipped to capitalize on an active online presence (see *Figure 10*). Helping these businesses adapt to online marketplaces would have significant positive impacts to their revenues, to the economy of Jefferson County, and to new workforce development.



**Figure 10. Business eCommerce Online Practices**

By analyzing utilization, gaps were identified representing new job opportunities and demanded skills. Among business respondents overall there was relatively high interest in expanding e-commerce skills to enhance use of social networks, customer service and support, and advertising and promotion. The primary barriers to expanded use identified by respondents included infrastructure gaps, concerns about online security and awareness of online tools, as well as access to technical support – the latter two can become good-paying new local job opportunities as Digital Navigators and technical support resources for Jefferson County businesses and organizations. Local schools and colleges (Oregon State University Extension Service, Central Oregon Community College Madras, etc.) can adapt and create new course curricula with this market research on future skills demand.

There is a clear interest from the business community to increase online practices, with 55 percent responding “Very High” or “High” interest in adopting new internet practices. It’s important that Jefferson County cultivate this interest by providing resources recognized as a need and reaching out to increase awareness about services available to overcome existing barriers. In addition to county officials, local educational institutions and workforce development entities play an important role engaging and assisting with technical resources. When asked about the types of assistance needed in terms of improving internet utilization, the highest response was over 27 percent indicating that “Selecting solutions that make sense”

is the greatest need. This indicates that the public must be made aware and guided towards solutions that make sense for their particular situations.

Telework has been offered as an example of providing benefits to businesses that take advantage of it to access skilled remote workers and aiding in worker retention. Other options also exist for individuals to take advantage of better internet access and digital skills to increase household income through home-based businesses, eBay sales, etc. According to the Digital Economy Database (DED) which includes other community assessments, respondents within Jefferson County are

currently earning over 10 percent less online compared to other communities (see Figure 11). This represents lost opportunities to increase individual incomes and economic vitality of households within Jefferson County by improving internet access, increasing awareness of online earning potential, and increasing options for learning how to utilize the internet more effectively for commerce.

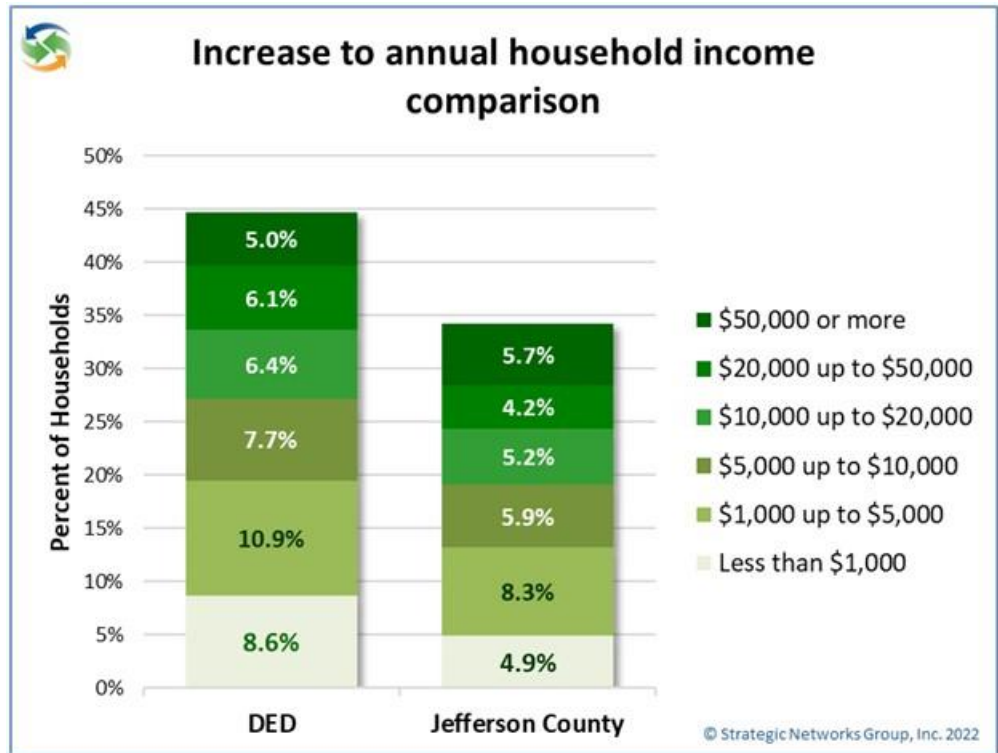


Figure 11. Increase in Annual Household Income Comparison

Other opportunities to financially benefit residents include promoting their awareness and adoption of online services. In order to achieve effective outreach and in turn adoption of promoted practices, a targeted approach that applies to specific communities or demographic groups is needed. For instance, if the goal is to promote ways that residents can increase their income online, then this message would best be received as part of a campaign from Economic Development or local business Chamber of Commerce members. Additionally, the audience would need to be considered to determine how to effectively reach participants. Those with minimal computer literacy would be more receptive to a basic digital literacy course, while participants with more advanced understanding of computer utilization would benefit from a program that focuses on specific tools and platforms that are available which allows users to increase their income online. There was a strong consensus (90%) among eCheckup respondents that a “very or somewhat significant” benefit of online activity is saving money; however, to realize these benefits many households will require improved access and targeted outreach initiatives to increase awareness of practices that can be used to help save money by using online services.

**Relocation Risk for Businesses and Residents**

The risk for Jefferson County in maintaining the status-quo and not addressing a highlighted gap of broadband availability and accessibility is real and significant. According to the Jefferson County eCheckup responses, the likelihood of “Definitely” or “Very Likely” relocating for broadband is nearly 20 percent

higher for household respondents under 65 years of age. In households earning over \$100,000, they are 11 percent more likely to relocate compared to lower-income respondents. This is especially a concern for younger cohorts and higher-income earning households, as shown by research of nation-wide trends according to the eCheckup and Digital Economy Database findings. Without access to affordable broadband, lower income, minority, and aging populations will be left behind as they will have greater challenges relocating to areas with better internet service. This not only perpetuates, but exacerbates the digital divide for Jefferson County. **Due to Jefferson County’s diverse population and low population density, a greater per household and business investment is needed to address digital inclusion challenges.**

75 percent of businesses in Jefferson County agree that having broadband internet service is essential to remaining in their operating location, making it clear that accessible, competitive broadband is vital to sustaining a successful business community. This is a concern for local businesses as reported by 42 percent of business respondents saying that “Available internet is too slow”, which creates a barrier to adopting online practices. Improving access to future-ready broadband can mitigate this risk and allow for existing businesses to continue operating and contributing to the overall economic development in Jefferson County.

### 7.3 Digital Inclusion Gaps in Jefferson County

The number of households in Jefferson County that currently do not use or benefit from the internet, with the underlying factors are listed in the following table. Affordability in Jefferson County and across the country is a primary barrier to internet adoption. Targeted outreach and engagement delivered by local partners serving as digital navigators and registration assistance onsite and in proposed innovation centers could significantly increase ACP participation and address broadband affordability challenges for many Jefferson County residents.

Table 11: Digital Inclusion Assistance Needed

| Digital Inclusion Challenge        | Number of Households         | Estimated Number Needing Digital Assistance |
|------------------------------------|------------------------------|---|
| Poverty <sup>12</sup>              | 12.5%                        | 3,060                                       |
| No Computer                        | 747 households <sup>13</sup> | 2,030                                       |
| Less than High School              | 1360                         | 2,930                                       |
| Senior Citizens                    | 19.7%                        | 4,940                                       |
| Hispanic, limited English language | 20.8%                        | 5,100                                       |
| Disabled                           | 12.7%                        | 3,110                                       |
| Households not registered for ACP  | 21%                          | 5,060                                       |

Source: U.S. 2020 Census

<sup>12</sup> Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty (<https://www.census.gov/topics/income-poverty/poverty/guidance/poverty-measures.html>)

<sup>13</sup> All percentages and numbers included in Table 11 refer to numbers of individuals or percent of population except for the category of Computers, which is reported by the U.S. Census in terms of number and percent of households that do not have a computer.

The third column in Table 11 provides a conservative estimate of the number of individuals or households in Jefferson County that could benefit from targeted interventions to address the digital inclusion challenges that prevent them from utilizing the internet. It is relevant to note that estimates of the computer challenge are reported by the U.S. Census at the household level rather than the individual level for the other factors, necessitating an adjustment using the average household size to derive the number of individuals who are challenged by the absence of a device in their home. It is also important to note that a single individual may confront more than one of these challenges; e.g., a person whose low income make affordability a challenge may also be an older, Hispanic adult who requires an assistive device and English as a second language digital literacy assistance.

The federal government initiated the Affordable Connectivity Program (ACP) in January 2022 to address the affordability issue by providing broadband subsidies to qualifying low-income households. As shown in figure 12, twenty-one percent (5,055) of households in Jefferson County are eligible to receive the ACP subsidy but only 405 have registered, only 8 percent participation. Primary reasons for this lack of participation are that too many of the people who could benefit from ACP are not aware of the program, do not understand its value, and/or lack the technical skills needed to register online<sup>14</sup>. The challenges are multidimensional, suggesting that interventions need to be customized in format and delivery<sup>15</sup>. Strategic infrastructure improvements and supporting programs that are responsive to the specific challenges for different areas in the County can leverage the greatest positive impact. Stakeholders and non-profit organizations in Jefferson County have been identified to assist in this effort, but Jefferson County leadership needs to create and advance successful programs that would ensure the needs of the County are addressed.

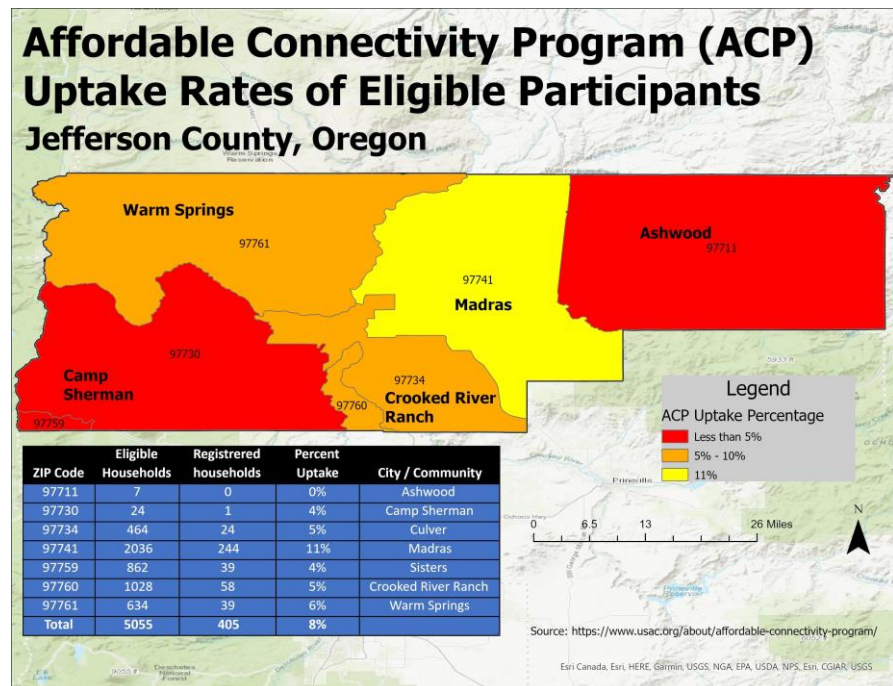


Figure 12. ACP Uptake Rates of Eligible Participants

Jefferson County is best suited to lead economic development and with this in mind, the following strategies are recommended:

- The County should designate digital inclusion as a stated goal and provide the structure and oversight to coordinate and monitor digital inclusion initiatives.
- Digital Navigators should be embedded in partnering service organizations in targeted areas.

<sup>14</sup> <https://docs.fcc.gov/public/attachments/DOC-385348A1.pdf>

<sup>15</sup> The total number of individuals (or households) in Jefferson County that comprise each challenge category is multiplied by the non-adoption factor (not shown on this table) for each category to arrive at a numerical estimate of the number of non-adopters in each challenge category.

- Increase the number and optimize distribution of additional physical resources in the form of public access, devices, technical assistance and digital literacy and skills training located convenient to clusters of residents and businesses who need assistance to accomplish the following:
  - For residents: enhance and expand operating hours, existing digital resources, and instruction offered at Jefferson County and Warm Springs libraries and select community and senior centers, including 2 roaming buses. This needs to be paired with efforts to identify and fund sources of low-cost computers to facilitate home access.
  - For businesses: target improved access and use of telework and entrepreneurship through new/enhanced remote work centers offering technical assistance and digital literacy instruction focused on smart business practices, delivered by part-time business coaches. The innovation hub model discussed elsewhere in this plan could serve this and other purposes.
- Raise awareness and demonstrate relevance of online practices as a key to optimizing value to Jefferson County residents and businesses and to maximizing returns on investment for the internet service providers, local government, and stakeholder organizations that undertake digital inclusion efforts. Trusted, community-based digital navigators can work to increase awareness and use of smart community services and high-value applications, such as telemedicine. Small businesses (fewer than 20 employees) can benefit from targeted coaching that evaluates current online practices and provides guided instruction in using digital tools and applications to optimize online presence and increase revenues.

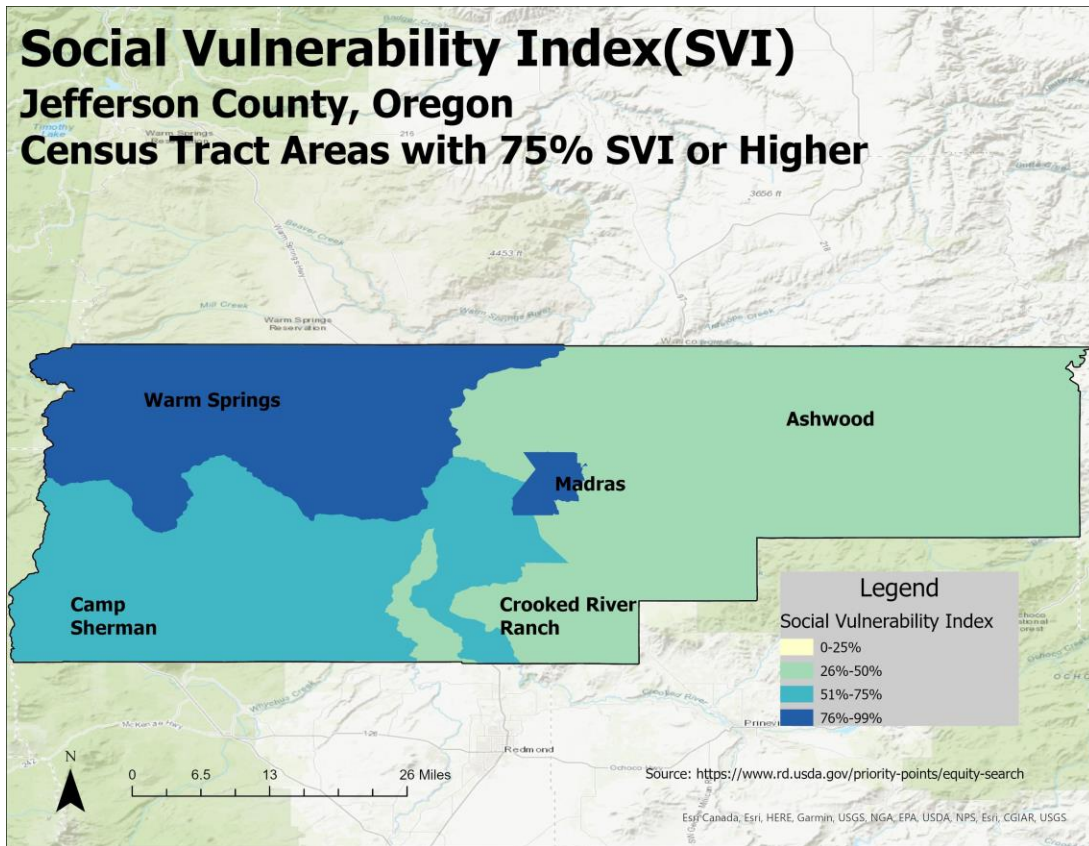


Figure 13. Social Vulnerability Index (SVI)

It is important that Jefferson County address the pressing need to resolve digital equity gaps identified over the course of this project. Without targeted and specific interventions as provided in this report, these gaps will certainly limit the quality of life and earning power of its residents and the economic competitiveness of its businesses. The Social Vulnerability Index (SVI) calculates the degree at which a community is able to prevent human suffering<sup>16</sup>. As shown in figure 13, there are areas within Madras and Warm Springs which meet the 75% threshold of high vulnerability, and therefore are provided greater opportunity to receive grant funding (see *Table 13 Broadband Funding Opportunities* for additional details). Anticipated state and federal grant programs that leverage County resources to support digital equity initiatives could provide significant resources, but County leadership and investment empowered through community-based partners and stakeholders is vital to ensuring the digital future in Jefferson County.

### 7.4 Digital and Economic Opportunities for Jefferson County

Based on the needs of Jefferson County identified from interviews conducted and analysis of the eCheckup data collected, there are gaps, needs, and opportunities for local economic and community development for residents, organizations, and businesses to access and effectively use new online practices.

The level of expressed interest for online practices such as telehealth (see *Figure 14*), distance learning, teleworking compared to the dissatisfaction with the level of service **indicates market sophistication and readiness for broadband adoption in Jefferson County**. The eCheckup responses suggest that residents, organizations, and businesses in Jefferson County will be receptive to initiatives that will enable them to access and learn to effectively utilize online

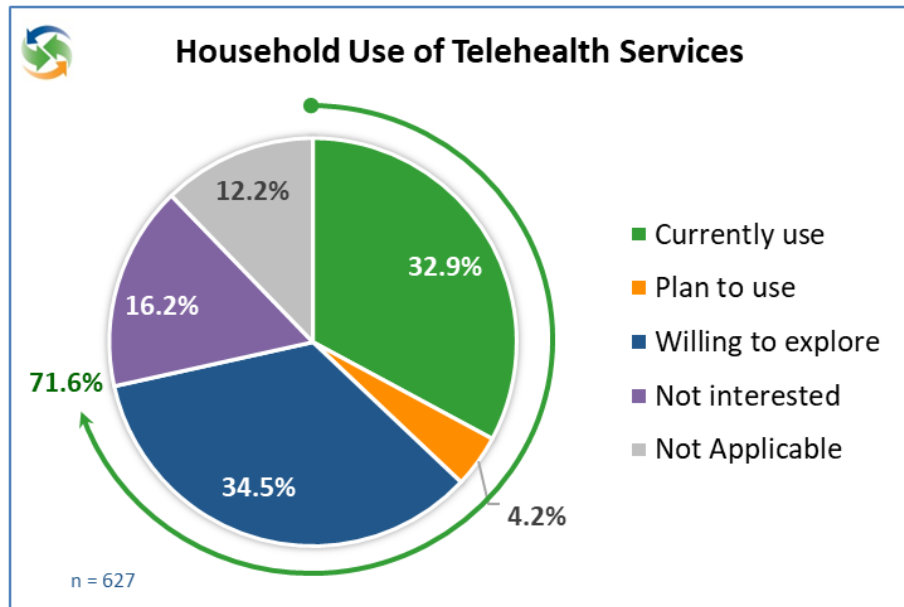


Figure 14. eCheckup Telehealth Interest

practices and services. Government investments in broadband and digital transformation can more quickly and more inclusively bridge gaps and drive local economic development and community benefits through broadband.

As evidenced in the previous **Section 7.3 Table 11 Digital Inclusion Assistance Needed** statistics, there are specific groups of individuals and households within Jefferson County that makeup those disadvantaged by the digital divide. Addressing Jefferson County’s digital gaps, needs, and opportunities will require digital infrastructure to connect the unserved and underserved, as well as access to technology (computers, tablets, etc.), and the know-how (awareness, skills, technical support) to effectively ensure online practices

<sup>16</sup> <https://www.usda.gov/sites/default/files/documents/reconnect-program-faqs.pdf>

will provide an individualized return on investment to users. Raising awareness and skills training are needed to promote effective use of broadband and online practices, including the following:

- Telehealth – awareness and technical support for implementation in homes
- Farm-to-market solutions
- Water and irrigation management solutions
- Smart community services
- Opportunities for entrepreneurship (youth, un/under-employed) – technical support for water management, tourism and recreation, farms, home monitoring/security
- Workforce development for location-neutral workers

To demonstrate the value of the digital opportunities above, setting up digital innovation hubs in Madras, Culver, Metolius, Warm Springs can make the technology more accessible and help implement the practices for residents and businesses.

The eCheckup data and findings reveal significant potential demand<sup>17</sup>, as evidenced by respondent’s priority of community goals in telehealth, smart community services (see *Figure 15*), and interest in other online applications that may have not been considered by existing service providers. For example, in the process of conducting service provider interviews, based on data presented showing high eCheckup participation rates, an existing ISP decided to take another look at providing service in the Crooked River Ranch area when it previously was not a market that they were interested in investing. The growing of demand for online practices contributes to expanding the market and sophistication of subscribers for private sector

internet service providers. By sharing eCheckup findings with service providers in aggregate (respecting individual respondent privacy and confidentiality), service providers have access to market research and intelligence that would not have otherwise been available or they could not afford to research.

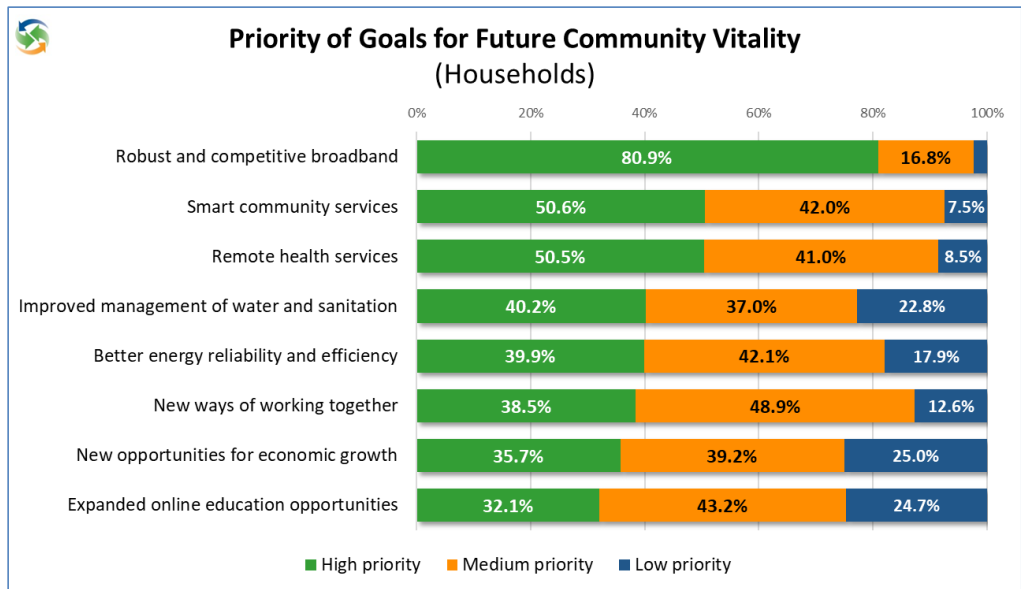


Figure 15. Priority of Goals for Future Community Vitality

<sup>17</sup> Potential demand is the demand that is nurtured and grown when the value of broadband and online services are understood by end users and personalized to their needs. Potential demand becomes current demand by raising awareness with residents and businesses about what they could and should be doing online – this is digital transformation.



### Economic Impacts and Community Benefits

The economic impacts and community benefits from broadband infrastructure are driven by increased access, awareness and participation by businesses, households, and organizations. As businesses gain access to faster and more reliable broadband, they become more willing and able to adopt new online business practices, which enhances, and even replaces, existing business practices while adding new methods to pursue new opportunities opened up by global internet access<sup>18</sup>. Unrestricted broadband access creates the possibility for businesses to innovate and expand their business more easily and in new ways, leading to growth, profitability, and increased capital investment and job creation. This is especially true and important for small businesses that are the life-blood of community vitality, providing the majority of local services and employment.

Households benefit by having access to broadband to more efficiently provide for their individual and family needs, and also in obtaining access to online services and capabilities not otherwise available. Household members have greater employment options through telecommuting, which often leads to higher paying jobs and long-term career development (see *Figure 8. Household Income for Teleworkers*). Households may also choose to pursue a home-based business by using broadband to market and sell products and services over the internet. Both adults and children can supplement their educational activities and skill development through online access to school programs and remote learning opportunities. Similarly, health services can be broadened through access to specialty services in distant locations and provide convenience for seniors and those with mobility challenges. Benefits from telehealth services, as recognized by physicians<sup>19</sup>, include reducing deferred care and increasing timely care, improving efficiency for physicians, enhancing communication, reducing patient travel burdens, and facilitating health outreach and education. The Jefferson County Public Health office currently uses the Ochin<sup>20</sup> platform to connect community members to healthcare providers, and St. Charles Health System offers virtual visits via MyChart<sup>21</sup> and other methods typically at no additional cost for patients.

It is important to note that while Medicare insurance covers telehealth services for patients, healthcare provider's reimbursement for delivering these services is not as clearly defined. Healthcare providers play a key role in the community with the ability to promote and make telehealth services more widely available.

Broadband improvements in communities across the county enables people and businesses to pursue their goals within their community of choice without being disadvantaged by their location. Communities are likely to retain younger community members, and the businesses that support them, which is so essential to maintaining community diversity and vitality. Moreover, broadband infrastructure supports suitable smart community services making communities more attractive to new businesses and households. Over the long-term this combination of retention and attraction supports broader economic growth.

While this chain of benefits accrues from increased online participation does not happen completely on its own without intervention, there will always be a portion of the population and business community who are more aware and capable of taking advantage of opportunities created by enhanced broadband service. There also will be those who need help in understanding what is possible and who need guidance to effectively access and utilize broadband services. Digital inclusion programs are an effective investment

<sup>18</sup> <https://www.ibisworld.com/us/bed/percentage-of-business-conducted-online/88090/>

<sup>19</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8903127/>

<sup>20</sup> <https://ochin.org/telehealth>

<sup>21</sup> <https://www.stcharleshealthcare.org/virtualvisits>

alongside the broadband infrastructure investments. Broadband infrastructure improvements that are not matched with educating residents and businesses how to use them will undermine the return on investment for infrastructure.

Similarly, it is important to proactively develop the relationships between service users and providers, such as in the areas of telehealth and remote learning, as well as local government and social services. The county should aim to engage and work with healthcare and education providers to include online services and promote their availability to members in the community. Facilitating the supply of such services to match demand across communities can “prime the pump” and ensure that innovative online service offerings remain available to members in the community over the long term.

Managing these activities as an ongoing process, using local partners (education, community-based organizations, etc.) to help identify and bridge digital inclusion gaps, and advancing Jefferson County’s economy in a digital age are multi-dimensional drivers for Digital Navigator and Innovation Hubs summarized in **Section 12.4 Developing a Path Forward – eStrategy for Jefferson County**.

## 8 Confederated Tribes of Warm Springs Broadband Assessment

### 8.1 Outreach and Engagement

It was agreed by the project principals that the project team's approach with the Confederated Tribes of Warm Springs (CTWS) needed to:

- Recognize their independence and the respect we must give their status, and that we are seeking to work together for the synergistic benefit of each community.
- Effectively communicate Jefferson County's efforts relating to this project and engage Tribal participation at a level reflective of their interest and ability to participate considering the considerable stress the community is under due to COVID-19, the failure of the water system, no phone lines, and ongoing challenges with recent wildfires.

Similar efforts between CTWS and the County related to information needs, critical services (healthcare, education, public safety) and opportunities to leverage in concurrent infrastructure (broadband and water) developments and funding opportunities identifies the need for collaboration. Early tribal involvement in scoping the project and planning outreach and engagement worked to instill a sense of true partnership and overcome any reluctance of the County's effort. There are related efforts that can be completed more efficiently and effectively through collaborative engagement to pursue funding, implementation, and creating new opportunities.

A native consultant (Cultural Horizons) was hired and tribal managers and leaders were engaged in supporting a separate Warm Springs focused broadband assessment and eCheckup data collection. To encourage participation from the CTWS community, Cultural Horizons worked with CTWS tribal members to inform on the process and importance of data collection. Six (6) Tribal Outreach Coordinators (TOCs) were used to establish an on-the-ground engagement strategy to increase awareness of the ongoing broadband needs, as well as promote involvement in the eCheckup assessment.

In addition to their active endorsement of the effort, the TOCs reached out to households and businesses through their existing relationships and communications channels. Their proactive participation in promotion of this planning effort ensured that citizens in the Confederated Tribes of Warm Springs (CTWS) had their voices heard and that CTWS leadership would have access to the findings of project-related research and assessments for their use and benefit, including:

- Engaging the entire reservation in the broadband planning, not just the Jefferson County portions.
- Focusing on where systems cross boundaries (education, healthcare and wellness, public safety).
- Bringing in Broadband Action Teams from Wasco, Clackamas, Marion and Linn counties when appropriate.

Areas of the tribal reservation were geographically organized to assist in planning effective outreach as part of a concerted attempt to reach as many members as possible. An advertising campaign established through the KWSO local broadcasting website and radio made Tribal members aware of the need to participate in the assessment. In addition, a weekly drawing took place with prizes presented as an incentive for completing eCheckup assessments.

## 8.2 eCheckup Findings for Warm Springs

Following outreach efforts to engage in the community and increase awareness and participation, 109 of 936<sup>22</sup> household respondents (23% of unserved<sup>22</sup> households) contributed to the Warm Springs eCheckup which represents approximately 16 percent of households in the CTWS reservation area according to Census data<sup>23</sup>. Among the respondents, 35 percent reported having school age children and 39 percent are senior aged. Findings from the eCheckup data collection and analysis provide insights into existing internet utilization and help to highlight opportunities that exist in the community to enhance familiarity and services provided by broadband.

Over 20 percent of households in the Warm Springs Tribal Reservation reported no internet service subscription in the 2020 census, there is a desert of connectivity that exists in Warm Springs. This is an issue among members in the community not being able to access internet service, and furthermore making it difficult to encourage use of broadband internet service with a lack of support mechanisms within the community or satisfaction from those currently signed up with service. Those responding to the eCheckup reported that the most common internet connection technology types are Fixed wireless (33%), Mobile wireless (22%), and Satellite (12%). This indicates a need for wireline broadband infrastructure in order to provide enhanced service options within the community.

Those respondents who are using the internet agree that benefits exist for using the internet:

- More affordable learning opportunities (94%)
- Allows for better communication (74%)
- Helps save money (70%)
- Assists in connecting with the community (66%)

Among those who are using the internet, it is reported to be an effective tool to help maintain personal relationships (see *Figure 16*). This is an important point to help encourage participation when so many individuals may feel that technology is not a viable means to stay connected. Members of the CTWS community clearly show that engaging online is useful for maintaining personal relationships. Additionally, there are a minimal number of respondents who are using the internet to generate income. As mentioned in Jefferson County eCheckup findings, the internet is an important resource for residents to earn not only base household salary income, but also increase their earning power through the diverse and flexible opportunities of working online.

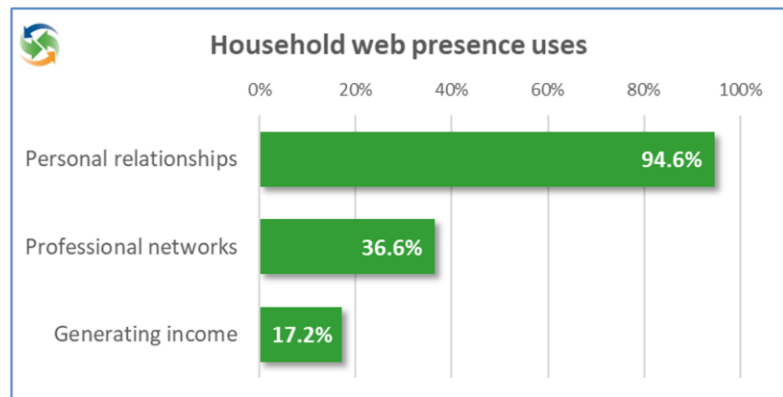


Figure 16. CTWS Household web presence

The largest barrier to using the internet was reported as “Connection speed or reliability” with 70 percent of respondents rating this as very important, over 20 percent more than the next reported barrier of “Privacy or security concerns”. The existing broadband infrastructure is not allowing community members

<sup>22</sup> [NTIA Tribal Broadband Connectivity Program](#)

<sup>23</sup> <https://data.census.gov/table?q=Telephone,+Computer,+and+Internet+Access&g=1600000US4178600>

to effectively use the internet. There is relatively high dissatisfaction reported, with 39 percent of respondents saying current internet is “Not fast enough” and 34 percent responding there are “frequent problems” with reliability. As discussed in earlier eCheckup findings, the type of internet connection technology is a main contributing factor to these findings.

A significant number of respondents (53%) indicate they would be “willing to explore” using Telehealth services. This is in addition to the 20 percent who say they currently or plan to use the internet to access this important health tool. A community outreach effort, especially targeting seniors, would be a valuable method to help increase participation in this area. Especially when considering that this group, who stands to

benefit the most from online Telehealth services, also reports being the least comfortable or willing to trust technological solutions (see *Figure 17*). This breakdown shows that Tribal members over the age of 65 recognize that their existing situation of being uncomfortable with technology contributes to not taking advantage of telehealth options. A campaign to show the effectiveness and benefits – health and cost savings- should help to ease some of these concerns, as well as ongoing support within the community to encourage access to resources and learning material.

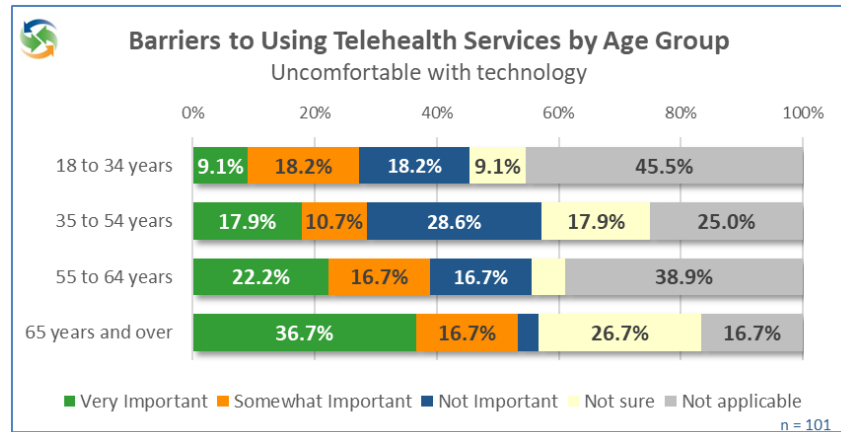


Figure 17. CTWS Barriers to Using Telehealth Services

### 8.3 Recommendations and Funding Opportunities for Warm Springs

The level of expressed interest for online practices (telehealth, smart community services, etc.) and the dissatisfaction with the level of service indicates market demand and readiness for use in Warm Springs. With respect to broadband and digital infrastructure, the situation in the Confederated Tribes of Warm Springs communities is somewhat complicated. Existing broadband infrastructure is inadequate to meet the needs and interests of all tribal members and, beyond broadband, too many tribal households do not even have adequate telephone service and other basic services, which further limits options for internet access. This is evidenced by the CTWS eCheckup respondents saying that “improved management of water and sanitation” is the top community goal (94%), ahead of providing “robust and competitive broadband” (85%). Basic needs must be addressed to restore and maintain confidence in community support.

One positive finding is that the absence of existing broadband technologies makes it possible to leapfrog strategies that focus on fiber for new deployments. The recent award of approximately \$6.5 million<sup>24</sup> to the Confederated Tribes of Warm Springs by the U.S. Treasury Department to deploy fiber to 936 households on the Reservation provides a significant opportunity for leveraging solutions to the broader Tribal holdings.

Warm Springs Telecom, which is tribally owned and was established to serve the residents and businesses in Warm Springs, is in a challenging position as there are private sector internet service providers

<sup>24</sup> <https://broadbandusa.maps.arcgis.com/apps/dashboards/07f987529ae24273aec3320e5033d503>

competing with their service. The 936 households in Warm Springs do not represent a large enough market to sustain one fiber service provider that typically needs over 12,000 addresses in order to make a business case for investment. The Tribal Council should explore the Digital Infrastructure Model described in **Section 12.7 Recommendations and Next Steps for Jefferson County** to develop Tribal-owned infrastructure that is partner-deployed and managed so that all Tribal members have affordable, reliable, future-proof broadband.

Digital equity that comprehensively encompasses broadband availability, access, adoption, and utilization is a persistent challenge for all rural and tribal communities. Information and capacity assessments developed in this study provide a baseline for action on all these fronts for the Confederated Tribes of Warm Springs to work together to build the digital capacity of tribal businesses and residents. Collaboration with Jefferson County to address common challenges, develop model digital inclusion programming and resources can further leverage change on the scale and reach needed to catalyze a digital transformation of the region.

Working independently and in collaboration, as appropriate, the Confederated Tribes of Warm Springs and Jefferson County should pursue the recommended eStrategy action steps summarized in Table 16 of **Section 12.4**. Community anchor institutions and partner organizations can be engaged as active partners to increase awareness and use of value-adding broadband applications. For example:

- Local resources in the form of tribal land and towers need to be inventoried for possible roles in infrastructure deployments.
- Warm Springs Cultural Center and Library can serve as the nexus for digital literacy and capacity building efforts.
- Creation of an innovation hub co-located with existing tribal public service facilities could provide public access and customized training to increase awareness and use of smart community practices and online entrepreneurial and business training.
- Warm Springs Health and Wellness Center could provide a telehealth consult site and programmatic and outreach efforts to increase awareness and use of telehealth.
- The \$75 monthly federal Affordable Connectivity Program (ACP) broadband subsidy for qualifying low-income households is a particularly promising tool to increase broadband adoption in locations where the infrastructure is available. Multiple partners can be engaged in promoting this subsidy and the separate but related Lifeline telecommunications subsidy and in assisting tribal members with registration.

In performing the outreach and engagement efforts it was observed that a major obstacle to high-speed Internet access on the Warm Springs Reservation is the lack of infrastructure. Mobile phones often were the main tools to help residents on the reservation to get online, but many communities did not have reliable cell coverage as reported by those who participated in the survey. Through feedback from the Tribal Outreach Coordinators, residents in areas of the reservation had to go ‘mining for hot spots’ (i.e., mobile wireless coverage) in order to have connectivity, which often was very slow.

Information gathered through this study provides a baseline assessment of the infrastructure gaps and digital inclusion gaps currently confronting the Warm Springs Tribes. Emerging opportunities to access resources for addressing these gaps and opportunities will provide the means for the Confederated Warm Springs Tribes to work together and with Jefferson County to create a more prosperous future for tribal residents and businesses and the broader Central Oregon region.

## 9 Analysis of Existing Digital Infrastructure in Jefferson County

Digital infrastructure includes the existing telecom assets within Jefferson County that currently support broadband internet services and/or provide backhaul network capacity. These include fiber wireline installations and points-of-presence (PoPs), and cell towers that provide fixed wireless broadband internet services. The following sections summarize where those infrastructure assets currently exist within the county and provides recommendations and analysis about how the existing infrastructure can be leveraged to support improved broadband internet access and service to residents and businesses.

### 9.1 Broadband Coverage Data Review and Asset Inventory

While existing telecom assets<sup>25</sup> are in important consideration with build-out strategies and leveraging equipment, these do not provide a comprehensive ‘on-the-ground’ analysis of broadband availability and access within Jefferson County. As shown in the mapping efforts for this plan (Figures 18 and 19), fiber wirelines mainly exist along State highways in Jefferson County. This can be attributed to the density of residents and businesses located within vicinity of these infrastructure assets and past federal broadband investments. Cell towers are also located in areas with high resident and business density.

Therefore, in order to achieve an analysis that includes existing broadband coverage (as depicted by the latest FCC broadband mapping) and consider strategies and costs to provide service to

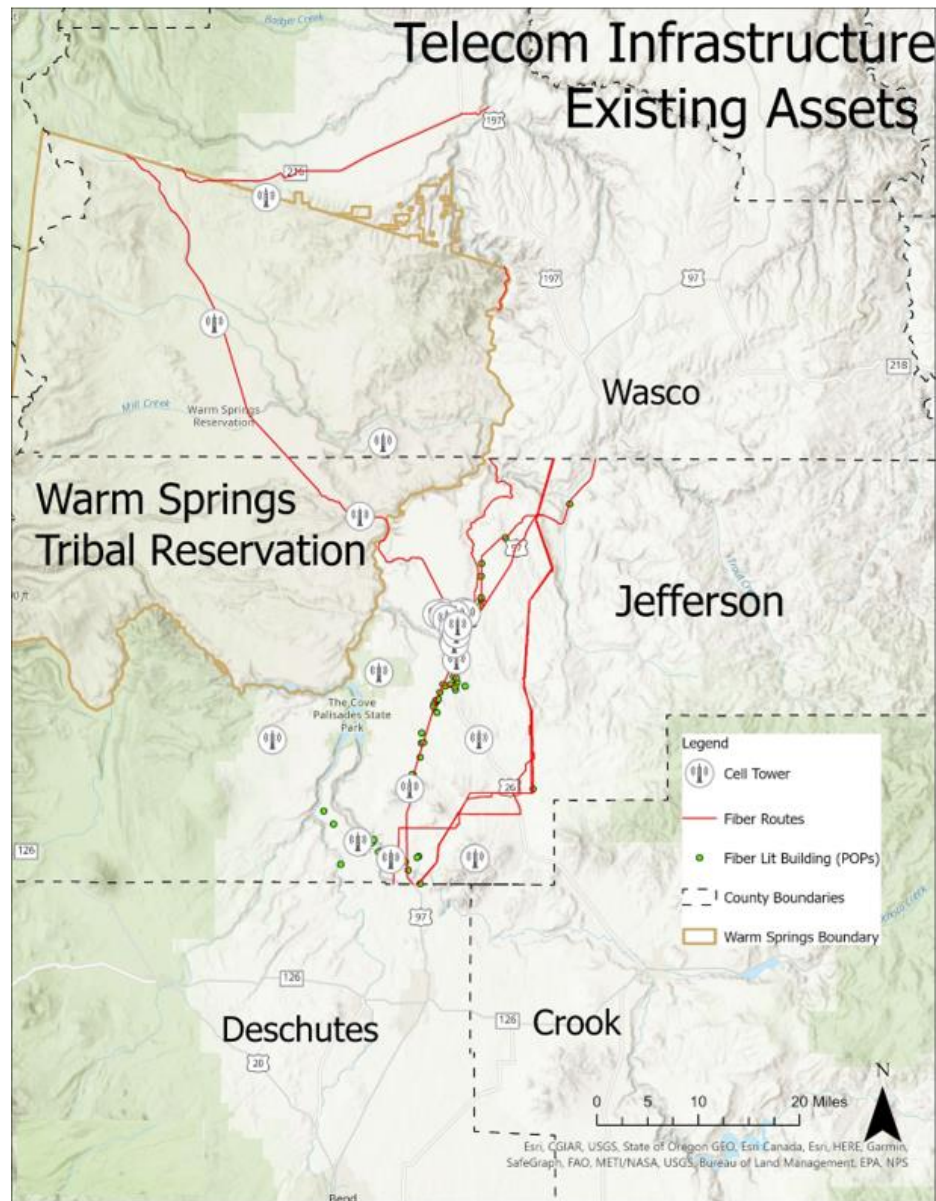


Figure 18. Telecom Infrastructure Existing Assets

<sup>25</sup> Existing telecom infrastructure assets displayed in mapping figure and tables were provided by GeoTel Communications LLC last updated Fall 2022

underserved areas, a household density analysis was conducted to provide valuable insights about where service providers have the ability to make a business case for increasing service offerings in certain areas, and where other solutions such as technology upgrades or subsidies need to be considered. In terms of technology, hybrid solutions between fiber and fixed wireless – pursuing a portfolio of technologies customized to the end uses identified by the eCheckup findings and other demand considerations will be needed to serve the entirety of Jefferson County.

Table 12: Fiber Carriers and Length

| FIBER CARRIER          | Length (in miles) |
|------------------------|-------------------|
| LUMEN                  | 196.39            |
| ZAYO                   | 140.31            |
| NOEL COMMUNICATIONS    | 128.77            |
| ALLSTREAM              | 80.09             |
| COGENT COMMUNICATIONS  | 73.24             |
| SYRINGA NETWORKS       | 40.44             |
| AT&T                   | 37.79             |
| BONNEVILLE POWER       | 35.70             |
| TDS TELECOMMUNICATIONS | 3.27              |

**Household Density Analysis**

The household density analysis used to determine the estimated cost to deploy fiber-to-the-home is based on an intersection of 2020 US Census Tigerline Housing and Population data as of October 2022 and the Tigerline Streets data as of 2022. By calculating the number of linear road miles within each census block, we can determine the number of households per linear road mile within that census block. Traditionally, wireline providers, such as cable and fiber-to-the-home providers, require between 15 and 20 households per linear road mile to make their private sector business case to deploy with no subsidy.

Census blocks that have fewer than 15 households per linear mile generally require subsidy in order to be economical and sustainable, however when the household density drops below 4 households per mile, the costs skyrocket and become unsustainable even with public capital investment. Therefore, the low-density census blocks are considered to be best served with wireless technology, with terrestrial fixed wireless access being preferable to satellite, and low-earth-orbit satellite being preferable to geosynchronous satellite as carriers of last resort.

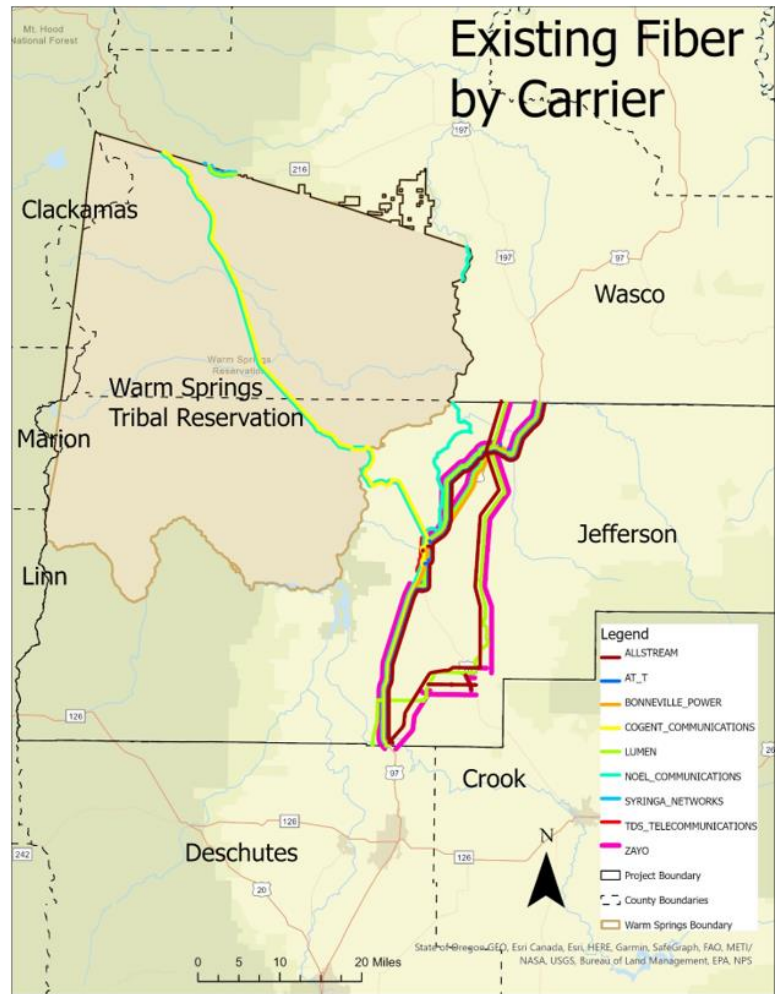


Figure 19. Existing Fiber Carriers



When calculating the costs<sup>26</sup>, a formula was used to determine a mid-range to high-end cost estimate for deploying fiber to the home. This formula takes into consideration two cost factors: the fiber backbone that passes the structures to be served and the lateral connections or "drops" that connect the homes to the backbone. A cost of \$75,000 per linear mile is estimated for the backbone. This cost can be as low as \$25,000 per mile in the more densely populated areas, but areas of lower density can be considerably more expensive to deploy, at times exceeding \$150,000 per mile<sup>27</sup>. The households per linear road mile analysis (see *Figure 20*) is an important component when determining which technology to best deploy in given areas, and is further analyzed in **Section 12.1 Broadband Build-out Cost Estimates for Jefferson County**. The exact costs can be determined during the engineering phase, and this estimate is best used to determine the cost of the engineering services needed for the project.

The second cost factor is the cost to connect each structure, which is estimated to be \$1500 per home passed. We do not assume every structure the fiber passes will become a subscriber. The average cost to connect a structure to the fiber backbone is between \$3,000 and \$4,000 provided the structure is within 250 feet of the backbone. For structures that are more than 250 feet from the backbone, the cost to connect the structure can be significantly higher and potentially as high as \$150 per foot or more where trenching is required and conditions are difficult. This factor is an additional reason that the cost to deploy fiber-to-the-home is higher in rural areas where homes tend to be farther from the road on average.

Serving the low-density census blocks in Jefferson County with wireless will require nearly complete wireless coverage of the county due to the distributed nature of these census blocks. While this increases the cost of the wireless build, it should not be considered a viable alternative to fiber-to-the-home in areas where it is financially feasible to deploy wireline service. Rather, the wireless coverage, which will have limited capacity on each tower, will generally provide a lower cost entry point for new adopters, which helps to build the capacity and demand for traditionally more costly fiber connections. Engineering and design phase plans will need to detail the specific areas of unserved and underserved and which technologies are best suited to build-out for those area.

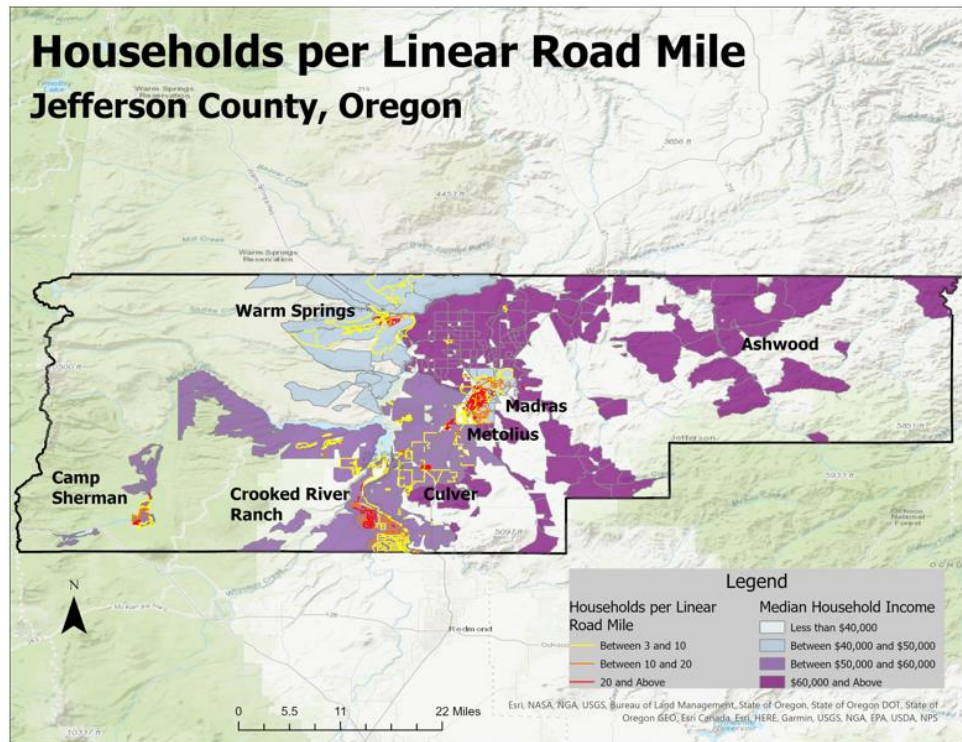


Figure 20. Census Tracts Household Income plus Household Density by Linear Road Mile

<sup>26</sup> <https://dgtlinfra.com/fiber-optic-network-construction-process-costs/#:~:text=On%20average%2C%20it%20costs%20between,or%20bury%20fiber%20optic%20cable>

<sup>27</sup> <https://www.fiercetelecom.com/broadband/cost-running-fiber-rural-america-200000-passing>

## 9.2 Existing Internet Service Offerings in Jefferson County

The following table displays an overview of existing residential internet service offerings with advertised speeds and pricing available in Jefferson County as of October 2022. Additional mapping with coverage areas and existing telecommunication infrastructure are provided in the appendix and as a part of the deliverable package.

Table 13: Residential Service Providers in Jefferson County<sup>28</sup>

| Service Provider     | Technology     | Internet Speed | Internet Cost                | ACP Participation |
|----------------------|----------------|----------------|------------------------------|-------------------|
| CenturyLink          | Fixed Wireless | up to 100 Mbps | \$50/month                   | ✓                 |
| HughesNet            | Satellite      | 25 Mbps        | \$49.99/month <sup>29</sup>  | ✓                 |
| Prinetime Solutions  | Fixed Wireless | up to 12 Mbps  | \$94/month <sup>30</sup>     |                   |
| Starlink             | Satellite      | up to 200 Mbps | \$110/month <sup>31</sup>    |                   |
| Sureline Broadband   | Fixed Wireless | up to 300 Mbps | \$59.95/month <sup>32</sup>  |                   |
| TDS Telecom          | Fiber          | up to 1 Gbps   | \$35/month <sup>33</sup>     |                   |
| T-Mobile Home        | Fixed Wireless | 33-182 Mbps    | \$50/month                   | ✓                 |
| Viasat               | Satellite      | up to 50 Mbps  | \$149.99/month <sup>34</sup> | ✓                 |
| Warm Springs Telecom | Fixed Wireless | 4 Mbps         | \$79.99 month <sup>35</sup>  | ✓                 |
| Webformix            | Fixed Wireless | up to 25 Mbps  | \$109/month <sup>36</sup>    |                   |
| Yellowknife Wireless | Fixed Wireless | up to 10 Mbps  | \$59.95/month <sup>37</sup>  |                   |

Satellite service providers can cover remote areas (without heavy forest coverage) that traditional providers may not be able to reach through wireline or even fixed wireless technologies; however, wireline is preferred for reliability and latency. Speeds from satellite technology providers have been shown to be decreasing over recent years<sup>38</sup> in addition to high costs for service.

Also of note, while LS Networks currently offers business internet services in Jefferson County, there are plans to provide residential service in Jefferson County area within the next 2 years due to recent acquisitions. In some cases, service providers offer various technology options depending on the area. For example, CenturyLink also provides DSL services in Camp Sherman.

<sup>28</sup> Service providers plans and packages based on advertised plans in October 2022 from company provided information, websites and aggregated data from <https://broadbandnow.com/>.

<sup>29</sup> Requires contract and \$14.99/month modem purchase.

<sup>30</sup> Other speeds and pricing options available.

<sup>31</sup> Requires \$599 modem one time purchase.

<sup>32</sup> Symmetrical download and upload speeds. Other speeds and pricing options available.

<sup>33</sup> Other speeds, pricing, and technology types available.

<sup>34</sup> Requires \$14.99/month modem purchase.

<sup>35</sup> Other speeds and pricing options available.

<sup>36</sup> Other speeds and pricing options available.

<sup>37</sup> Other speeds and pricing options available.

<sup>38</sup> [https://www.theregister.com/2022/09/23/starlink\\_broadband\\_speeds\\_slow/](https://www.theregister.com/2022/09/23/starlink_broadband_speeds_slow/)

### 9.3 Service Provider Interviews

Outreach to existing service providers within Jefferson County was conducted in order to gain an understanding of existing service footprints, plans for upgrades and expansion of broadband service, identification of economic and environmental challenges to providing broadband service in Jefferson County, and to share findings that indicate a demand within the community for improved services.

While reaching out to service providers operating within Jefferson County, it was noted that the Wireless Internet Service Provider (WISP) market landscape is saturated with local carriers and satellite providers that are reporting coverage areas including most of the County. While actual internet service satisfaction ratings show that the existing service is not meeting the needs of residents or businesses, it's important to note that there is a perception of broadband market saturation, especially among wireless providers in Jefferson County.

For competitive local service provision, Jefferson County will want at least 2 if not 3 service provider options in every market so that residents and businesses have competitive service options. With the low-density and small size of rural markets, having 2-3 service provider options may not be feasible.

#### **What is preventing service providers from serving underserved areas?**

1. Affordable middle mile connectivity
2. Access to existing easements by publicly owned right of way (municipality), or is it served by an electrical cooperative which can have their electrical easement leveraged for broadband
3. Not having a local broadband champion to support and promote community engagement.
4. A defined density that is consistent with wireline and fixed wireless markets where community digital infrastructure will be invested.

Providers are open to using infrastructure that is digital infrastructure provided by the locality. Operational service levels, length of terms, etc. need to be discussed so that when operations and service provision become long term, those markets can be considered assets by the partnering private sector service provider. Local service providers sometimes have a local advantage in knowing their markets and having vested interests in ensuring their families, friends, and their communities have the broadband they need to thrive in an increasingly digital economy.

Service providers that were contacted were also interested in broadband assessment findings which included qualifying the demand for improved internet access and services within different areas of Jefferson County. Ensuring that service providers operating in the area are made aware of this demand will be a key component to enhancing the broadband market within Jefferson County. With respect to the eCheckup broadband assessment's data collection and analysis, "We need to look at Crooked River Ranch" was what one service provider responded after reviewing the "Interest in better broadband" map from the eCheckup Findings for Service Providers presentation (see **Appendix 5**).

### 9.4 Validation / Invalidation of FCC Broadband Coverage Data

The FCC has recognized the importance of providing mapping to show where existing broadband internet is and is not available. Recently released in late 2022, an updated version of the National Broadband Map<sup>39</sup> was released to the public with information about internet services available as reported by ISPs. Since the release of the BDC data, there has been a process to verify reported locations and service availability.

To verify claimed FCC and BDC broadband coverage data, a GIS analysis that overlaid end-user speed test findings against what service providers reported as served to the FCC. Figure 21 below shows maps from the eCheckup speed test results for download and upload compared to the FCC broadband coverage maps. eCheckup results show that the existing broadband speeds are well below reported FCC download and upload speeds. These are further detailed in **Section 10.6 Community Solutions and Analysis Groupings**, and in provided mapping deliverables, where specific area analysis shows the contrast between reported and actual customer download and upload internet speeds.

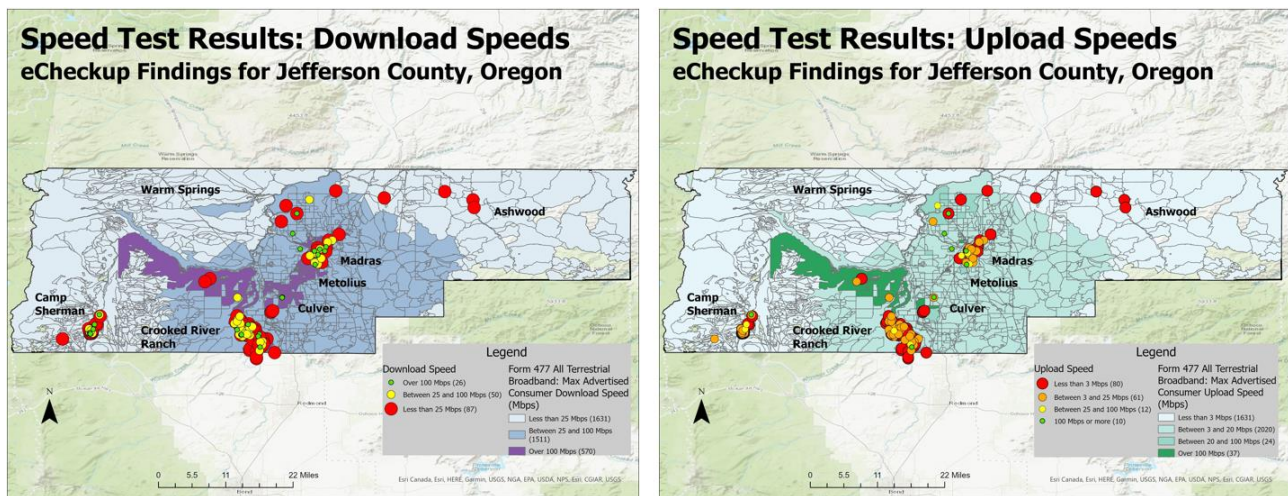


Figure 21. Speed Test Results Mapped with FCC Broadband Speeds

For larger maps of *Speed Test Results*, see *eCheckup Findings for Service Providers* in **Appendix 5**.

<sup>39</sup> <https://www.fcc.gov/BroadbandData>

Additionally, findings from the eCheckup show that there is interest across Jefferson County to improve broadband internet service offerings. There are particular areas with high levels of interest, as depicted in Figure 22 showing the percentage of respondents by Census Block who were interested in better broadband.

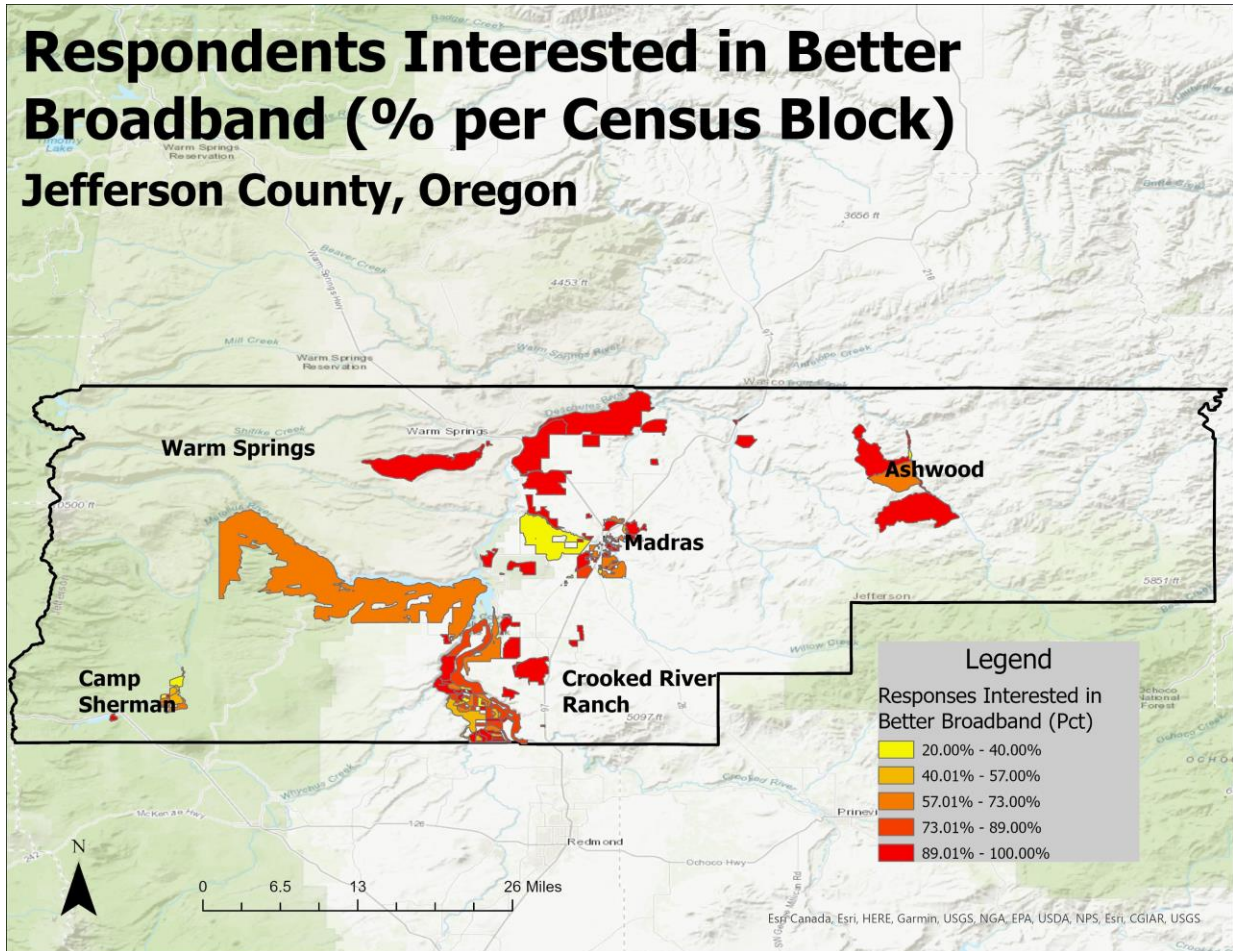


Figure 22. eCheckup Responses Interested in Better Broadband Map

## 10 Converting Broadband Investments into Business and Community Returns

### 10.1 Local Economic Development, Digital Equity and Inclusion

Jefferson County, like all communities and regions, is challenged in how to allocate scarce resources among various interests – especially when those interests appear to be competing for funding. Digital infrastructure should not be seen as competing for funding nor as an end in itself, but as enabling infrastructure for local economic growth, improved delivery of civic services, and enhanced access to new opportunities and services.

Digital inclusion that ensures that all residents, organizations, and businesses have access to future-ready broadband (in excess of 100/100Mbps) is fundamental to sustainable economic and community prosperity. Digital inclusion goes beyond infrastructure. Because digital technologies underpin every aspect of the modern economy, any business or individual that is not equipped with the knowledge, skills and access to take advantage of digital services and resources will be disenfranchised from benefitting from or contributing to their communities. Holistic thinking that addresses both broadband supply and demand, married with inclusive solutions are needed to bridge Jefferson County’s digital divides.

### 10.2 Why SMBs Need Help Using the Internet

The internet and online practices have the potential to be transformative and impactful – if the technology is leveraged for practical use. Unfortunately, a majority of businesses, especially small and medium sized businesses (SMBs), do not understand what they could and should be doing online to be more competitive and to grow.

More needs to be invested to bridge digital divides so that all businesses and households have affordable broadband. Even with broadband service available, there is a digital divide with small businesses leaving too much behind in terms of improving their internal operations and marketing outreach. Research from this project confirms that a majority of small and medium sized businesses do not understand what they could be doing online to thrive – and should be doing to stay competitive and relevant in an increasingly digital economy.

Some businesses are proficient and comfortable with using technology and online practices – however research shows that many are not. Empirical evidence collected since the early 2000’s from over 40,000 business respondents shows that the higher the level of utilization the more competitive the business and greater the local economic and community benefits. Pursuing recommendations for Jefferson County per this report will provide guidance to many businesses to consider new technologies and methods of adapting to the digital economy.

### 10.3 Why Driving Utilization Matters for Local Economic and Community Development

Small and medium businesses are the engine of employment growth in most communities, while large employee firms often get the most attention. According to the Small Business Administration between 1995-2020 small businesses have accounted for 66 percent of employment growth<sup>40</sup>. Effective utilization of broadband leads to financial gains for businesses, stimulating and accelerating business growth.

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<sup>40</sup> <https://cdn.advocacy.sba.gov/wp-content/uploads/2022/04/22141927/Small-Business-Job-Creation-Fact-Sheet-Apr2022.pdf>

This leads to positive employment impacts for a given area. Research shows that a high use of online business practices accelerates employment growth with more than twice the job creation compared to businesses with low use of online practices. The challenge is that SMBs, especially those with fewer than 20 employees, often do not have the expertise nor technical resources to be aware of and be able to implement online practices needed for them to be competitive.

#### 10.4 Analysis of Capacity and Utilization Gaps in Jefferson County

According to the 2021 US Census<sup>41</sup> regarding Computers and Internet Subscriptions, 1,111 (13.5%) of Jefferson County households lack an internet subscription, and an additional 1,245 (15.1%) of households have a cellular data plan with no other type of internet subscription. In some cases, the availability of service may be lacking, and in others, the available services are insufficient to justify the cost. Jefferson County also has high satellite service subscription rates, with 1,373 (16.7%) of households subscribing to the service – which is often expensive and underperforms.

New high-speed and affordable internet service to address connectivity gaps are likely to address most of the resident and business needs. However, availability is only part of the solution. This section will address digital inclusion and participation that harnesses the economic impacts of broadband.

Digital inclusion is the process to achieve digital equity when all segments of society have equal opportunity to access the information technologies necessary to participate and flourish in our modern society. Broadband technologies enhance life, expand educational opportunities, facilitate commerce, improve career and work options, stimulate economic opportunities and benefits for residents and businesses, provide access to remote healthcare and other social services, and will continue to accelerate equal opportunities and economic benefit for all communities. Equal access to affordable and reliable broadband networks, regardless of social, economic, racial, age, physical impediments, or language barriers is essential to bridge the digital divide.

Universal access alone, however, will not deliver digital equity. Too many residents lack the knowledge, skills, and financial capacity to benefit from the resources and services delivered by broadband and too many businesses have not adopted the full range of value-adding applications and e-solutions to ensure sustainable competitiveness. Factors underlying digital inequities strongly correlate with poverty, low educational attainment, disabilities, and advanced age. Ethnicity also factors in, primarily as a function of the higher prevalence of the previously listed factors in minority populations as well as issues arising from English not being the dominant spoken language in the homes of some minority groups. The interplay of these factors compounds the challenge and underscores the need for creative and collaborative policy, investment and programmatic interventions involving government in partnership with schools and universities, non-profit organizations, other community anchor institutions (CAIs), the business community, and the Internet Service Providers (ISP).

A rough estimate of the scale of the digital opportunity challenge in Jefferson County (*Table 18- Appendix 1*) finds (1) that factors that negatively impact digital opportunities at the individual and/or household level in Jefferson County exceed the level of challenge in the State of Oregon overall; and (2) that almost half of the population of Jefferson County is directly affected by at least one of these factors. This analysis strongly supports the need for targeted efforts to address the factors that underlie challenges to digital equity. The pillars of digital inclusion summarized in Table 14 below provide a framework for developing a

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<sup>41</sup> <https://data.census.gov/table?q=computers+in+Jefferosn+Coutny+OR&tid=ACSST5Y2021.S2801>

comprehensive digital inclusion strategy. Findings presented in this report quantify gaps between needs and available digital inclusion resources and point to priorities for action.

Table 14: Primary Factors Affecting Digital Equity

| Primary Factors Affecting Digital Equity  | Specifics and Benefits  |
|---|---|
| <p><b>Infrastructure Availability</b></p> | <p>The residence or business (single family, multi-unit) does not have sufficient ISP-provided broadband infrastructure (fiber, cable, telco, wireless) to deliver the required data throughputs. New or updated infrastructure must be provided by an ISP, or agent of the ISP. In developing broadband funding programs, the federal government has designed the following minimum data throughout speeds to classify the broadband unserved and underserved:</p> <ul style="list-style-type: none"> <li>• <b>Unserved:</b> Less than 25Mbps downstream (DS) and 3Mbps upstream (US)</li> <li>• <b>Underserved:</b> Less than 100Mbps DS and 20Mbps US</li> </ul> <p>In addition to having access to broadband infrastructure, multi-unit commercial and residential buildings, including apartments, condominiums, townhouses, and all multi-family facilities require in-building cabling to deliver wired broadband service into the building. If the residence or business does not have the proper in-building cabling to support broadband communications, new or upgraded cabling must be installed in the affected buildings and connected to the outdoor broadband infrastructure.</p> |
| <p><b>Affordability/Access</b></p>        | <p>Broadband infrastructure may be available; however, subscribing individuals, families, and businesses may lack the direct financial capability to afford and purchase the service. Those with low household income and those living on fixed incomes, such as seniors, retirees, the disabled, and others may lack the means to afford a broadband service subscription.</p> <p>Broadband affordability is crucial to achieving digital equity. While there are a variety of federal programs that provide broadband access subsidies to eligible individuals, knowing about these programs and understanding how to apply for them is fundamental to obtaining them. Additional details on the FCC’s Affordable Connectivity Program (ACP) and the Lifeline programs are described within this report.</p> <p>Public access facilities and free Wi-Fi address access challenges for some low-income individuals but transportation challenges preclude others from being able to take advantage of public access. Strategic location of public access resources needs to be aligned with public transportation.</p>   |
| <p><b>Devices</b></p>                     | <p>Owning a device, or at a minimum, having access to a device capable of navigating the internet is essential to bridge the digital divide. Viable devices include desktop computers, laptop computers, Chromebooks, tablets, and cellular smartphones. It is also important to have access to a device that best supports the intended use. For example, it is challenging to conduct remote learning, or to complete and sign a job application on a smartphone. Desktop and laptop computers, tablets, and</p>  |



|                                |   |
|--------------------------------|---|
|                                | <p>Chromebooks will provide a better user experience when used at home and at work to conduct a variety of fundamental and advanced internet access-based activities.</p> <p>Device affordability is a challenge for many low-income residents, highlighting the need for low- or no-cost devices. A conservative estimate of 527 households (or 1,435 residents) in Jefferson County do not have a computer and need to rely on public access facilities. An additional 709 (8.6%) of households only access the internet through smartphones. Disabled and/or older individuals may require devices with customized assistive features or physical keyboards. The device and the training to use it needs to be tailored to the challenges of the individual.</p>   |
| <p><b>Digital Literacy</b></p> | <p>To confidently, correctly, and safely utilize and benefit from the internet, users must have the proper skills and knowledge to establish the connection and to securely navigate to desired websites, applications, and other tools and information of need and interest. Digital literacy covers a wide range of capabilities and information that is foundational to broadband adoption and use; individuals lacking these skills will remain unserved.</p> <p>Digital literacy incorporates an understanding of the key attributes and features of the broadband network and the internet, including but not limited to the following:</p> <ul style="list-style-type: none"> <li>• Broadband network service and equipment <ul style="list-style-type: none"> <li>○ What ISPs serve my residence or business?</li> <li>○ What ISP service plans are available and what plan and data speeds are needed?</li> <li>○ Are there broadband subsidy programs available? Am I eligible? How do I apply?</li> <li>○ What internet router equipment is required?</li> <li>○ What is Wi-Fi and where best to locate the Wi-Fi access point in my residence or business?</li> </ul> </li> <li>• Devices <ul style="list-style-type: none"> <li>○ What internet access device is required?</li> <li>○ Where can the devices be purchased and what is a fair price?</li> <li>○ How do I configure the device to simplify use?</li> <li>○ How do I use the device?</li> <li>○ Are there internet access device subsidies available? Am I eligible? How do I apply?</li> <li>○ How do I log off my device?</li> <li>○ Where can I obtain technical assistance?</li> </ul> </li> <li>• Internet navigation <ul style="list-style-type: none"> <li>○ How do I safely access the internet?</li> <li>○ What security risks exist and how to avoid them?</li> <li>○ What do I do if my device is infected by a virus?</li> </ul> </li> <li>• How do I search the internet?</li> <li>• How do I use email, set up and log into video calls, use social media?</li> <li>• How do I access and use various telehealth services?</li> <li>• How do I access remote training opportunities?</li> <li>• How to search for employment opportunities?</li> </ul> |

|                          |  |
|--------------------------|--|
|                          | <ul style="list-style-type: none"> <li>• How and where can I shop and safely pay for my transactions?</li> </ul>   |
| <b>Technical Support</b> | <p>Anyone who uses broadband networks and devices to access the internet inevitably, even frequently, requires technical support. Having access to an IT help desk, the Geek Squad™, or similar level of technical support is an essential part of the broadband experience.</p> <p>While many of us have access to a trusted friend or family member, or to a technician at work, at school, or for hire, others do not have the ability to obtain this help when required. Technical support, regardless of the source from which it is provided, is much harder to obtain for the elderly, for lower-income families, for the under educated, for those with language barriers and for many others.</p> <p>Providing free or very inexpensive technical assistance and informing the community about eligibility and availability of such assistance will contribute significantly to closing the digital divide.</p> |

### 10.5 Community Anchor Institutions and Opportunities in Jefferson County

Leveraging existing community facilities and resources is an essential part of comprehensive, cost-effective solutions to improve broadband services and availability in Jefferson County. Engaging localities within Jefferson County in order to support the development of high-speed communication and technology is a recognized policy goal of Jefferson County officials and leaders<sup>42</sup>. Community assets can provide benefits to both the physical infrastructure build-out to improve broadband internet services and, by providing outreach services to the community, to improve awareness and participation throughout the community.

Community Anchor Institutions (CAIs) are facilities that support the locality through public safety, education, municipal administration, health, and other vital services. Their locations specific to Jefferson County are displayed in **Appendix 3** mapping and provide opportunities to provide services and improve infrastructure offering. CAIs play a vital role in establishing a foundation of broadband service availability and ample community resources to achieve outreach to residents and businesses. According to the FCC and information provided from the Broadband Technology Opportunities Program (BTOP), broadband education, awareness, training, access, equipment, and support should be incentivized through schools, libraries, medical and healthcare providers, and community colleges and other institutions of higher education. Also, this definition applies to organizations and agencies within the community that can facilitate greater use of broadband service by low-income, unemployed, elderly, and otherwise vulnerable populations, as well as job-creating and economic development strategic facilities.

These facilities can support community programs such as E-Rate, which serves schools and libraries, and Rural Health Care, which supports providing improved broadband service to health care facilities through Universal Service Fund (additional details in **Section 12.6 Funding Opportunities**). The FCC is currently working to ensure that CAIs are accurately and completely represented within communities as they develop broadband mapping. An important role of Jefferson County and the State of Oregon going forward, will be to verify that local facilities able to assist in the improvement of broadband service and availability are included in future program planning initiatives.

<sup>42</sup> Based on the Jefferson Comprehensive Plan last amended 2013:  
[https://www.jeffco.net/sites/default/files/fileattachments/community\\_development/page/3341/comprehensive\\_plan\\_05\\_22\\_13\\_ord\\_o-060-13.pdf](https://www.jeffco.net/sites/default/files/fileattachments/community_development/page/3341/comprehensive_plan_05_22_13_ord_o-060-13.pdf)

Community anchor institutions that provide public access and technical assistance are especially vital in rural areas of Jefferson County where sometimes long distances to middle mile infrastructure creates hurdles to obtaining residential service and where transportation challenges place a higher premium on proximity to public access facilities. Creative, outside-the-box, strategies that expand the portfolio of potential digital inclusion partners to include fire stations, community centers, churches and other organizations with a presence in rural communities is needed to ensure that digital equity challenges in all areas of the county are addressed.

## 10.6 Jefferson County Community Solutions and Analysis Groupings

Geographically diverse communities comprise Jefferson County, including the cities of Madras, Culver, and Metolius, and the unincorporated areas of Crooked River Ranch, Ashwood, and portions of the Confederated Tribes of Warm Springs. Outside of the cities and unincorporated areas in Jefferson County has over 60,000 irrigated acres of farmland that serves as the economic base for the County<sup>43</sup>. The following analysis insights and resulting actionable recommendations focus on these communities individually, with particular focus on the main populations that are in need of interventions. The goal is to match a highly curated portfolio of feasible solutions with specific gaps and opportunities identified through this study, which include the following:

- Broadband availability to unserved and underserved households and businesses
- Access to technology devices (computers, tablets)
- Telehealth: awareness and technical support for implementation
- Distance e-learning support through schools
- Opportunities for entrepreneurship (youth, un/under-employed)
- Awareness and technical support for water management, tourism and recreation, farms, home monitoring/security
- Workforce development and training for location neutral workers
- Digital innovation hubs in Madras, Culver, Metolius, Crooked River Ranch, and Warm Springs that can showcase and help implement digital opportunities

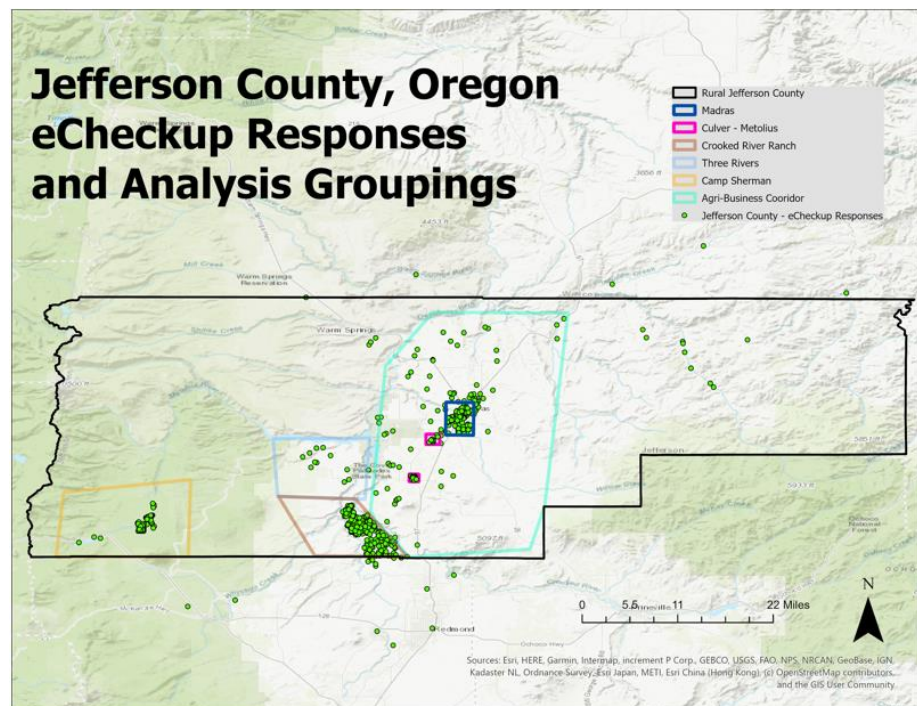


Figure 23. Jefferson County Analysis Groupings Map

<sup>43</sup> <https://agsci.oregonstate.edu/coarec/jefferson-county-information>

## Agriculture

Agriculture exists on the irrigated farm land in the County for which the majority of this area is underserved as 100/100 Mbps broadband speeds are unavailable, as reported by the FCC. The prominent connection type in this area is fixed wireless. This report validated speed test results that showed over half of Agricultural business area respondents have less than 25 Mbps internet download speeds. The benefits for enhanced broadband for the agricultural community should focus on smart water management, agriculture operations, and providing business training and resources to enhance the development of broadband utilization. Further focus is needed on promoting awareness and capacity to implement precision agricultural practices. The Oregon State University Extension<sup>44</sup> Service is a potential resource for such efforts.

## Recommended Actions

- Because of the low-density but high-income farms in the Agri-Business Corridor, one of the first priorities is to support/facilitate deployment of fixed wireless solutions with local providers, accompanied by an awareness and digital inclusion campaign that includes:
  - Showcasing water management and irrigation systems and precision/smart agriculture applications and systems at the Madras innovation hub(s).
  - Conducting connectivity audits with farm operators and residents to ensure their setup optimally configured
- Follow-through with farm operators on their eCheckup findings to:
  - Review findings and compare their use of online practices to peers/competitors.
  - Discuss online applications, especially those related to precision agricultural practices not currently being used, or planned to be used.
  - Develop individualized action plans for implementing online practices that will help them generate new revenues, better monitor their properties and operations, etc.

## Camp Sherman

Camp Sherman residents and businesses are highly engaged in efforts to improve broadband internet service, as evidenced by high participation rates to the eCheckup assessment and community engagement summarized by the Camp Sherman fiber project (<https://www.campshermanfiber.com/>). The location is relatively remote and surrounded by National Forests making it difficult for service providers to make a traditional business case to build out broadband infrastructure. Currently, the area is shown as underserved below FCC standards. Over half of eCheckup speed test results from this area were under 25/3 Mbps, and 42 percent reported low satisfaction with “Not fast enough” internet speed. There is a planned expansion of broadband infrastructure from Blue Mountain Networks which should address many of the area’s needs relating to improving internet service and availability. This expansion has identified fiber as the best solution for the Camp Sherman area due to unreliable satellite service through the heavy forest coverage. Continued engagement with the community and regional coordination alongside the expansion of middle-mile and backhaul infrastructure are needed for a path forward.

## Recommended Actions

- Continue to support ongoing community broadband planning activities as needed
- Incorporate middle-mile and last-mile capital costs into funding requests
- Showcase online monitoring systems for fire, security, telehealth, etc. at Digital Innovation Hubs

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<sup>44</sup> <https://extension.oregonstate.edu/broadband>

### **Crooked River Ranch**

The Crooked River Ranch area is characterized as having a high participation rate in the eCheckup and community engagement with improving broadband service. While the FCC indicates that this area is served, half of the recorded speed test results were below 25 Mbps download speed. The main internet connection types in this area are DSL and fixed wireless. In addition to improving broadband infrastructure and service offerings, identifying digital economy opportunities and establishing a digital innovation hub are recommended actions for this community.

#### **Recommended Actions**

- Because of the low-density, but high number of families and remote work opportunities, one of the first priorities is to support/facilitate deployment of fixed wireless solutions with local providers, accompanied by an awareness and digital inclusion campaign that includes showcasing distance education, teleworking, etc. at Digital Innovation Hubs

### **Culver and Metolius**

The cities of Culver and Metolius areas are mapped by the FCC as being served; however, many responses to the eCheckup assessment indicated that residents and businesses consider existing internet service “Not fast enough”. Cable is the most common internet connection technology type. A significant number of responses to the eCheckup (70%) reported they are paying more than \$60/month for internet service, which is above the national average. Increasing broadband availability options is important, along with working to increase ACP sign-ups to assist with internet subscription costs. Workforce development and digital literacy training should also be prioritized with the establishment of Digital Innovation Hubs.

#### **Recommended Actions**

- Establish a digital innovation hub in Culver (at school, fellowship hall, or city hall)
- Establish a digital innovation hub in Metolius (at school, fellowship hall, or city hall)
- Develop and implement digital inclusion plan that focuses on increasing awareness and capacity to access and use ESL, teleworking, online education, telehealth and other online resources.

### **Madras**

As the most densely populated area of Jefferson County, Madras is vital to laying the foundation for increasing broadband availability within Jefferson County. The FCC reports Madras as being served with 100/100 Mbps broadband service. Responses to the eCheckup support this report, with satisfaction ratings generally high in terms of speed and reliability, and 70 percent of speed test results were over 25 Mbps download speed. Broadband adequacy is a moving target however, making an increase in fiber availability important to achieving future-ready broadband speeds. It was noted from service providers that smaller towers will be needed in Madras, not a macro tower for fixed wireless. Madras should also focus on supporting community outreach efforts and establishing a digital innovation hub as recommended to enhance internet utilization efforts for residents and businesses.

#### **Recommended Actions**

- Establish digital innovation hubs in Madras
  - In downtown empty storefronts focusing on showcasing online practices for precision/smart agriculture, water management, co-working space, etc.
  - At fellowship hall focusing on ESL and entrepreneurship
  - At library, CCOC, school, or other location focusing on distance learning, ESL, etc.
  - At St. Charles hospital to showcase and support telehealth applications

- Develop and implement a digital inclusion plan that encompasses all of Jefferson County (e.g., Ashwood) and includes Warm Springs, focusing on digital literacy, entrepreneurship, teleworking, online education, etc.

### Three Rivers

The Three Rivers area located west of the Cove Palisades State Park is reported as being served by the FCC, as RDOF<sup>45</sup> funding has been awarded for planned broadband infrastructure expansions. The current dominant connection type in this area is fixed wireless technology. While there was limited participation in the eCheckup assessment from this area, it is worth noting that of the speed tests conducted all were below 50 Mbps download speed. It will be important to monitor the planned build-out in this area to ensure broadband availability, as well as supporting the community with connectivity resources.

### Recommended Actions

- Monitor implementation of awarded RDOF build-out funding – need to develop strategy if award is returned, or if build-out is not timely enough
- Develop outreach and engagement strategies to showcase telework, telehealth, etc.

In summary, each area and their respective communities need to review these plans, adjust, expand, and enhance on the ground based what their goals and needs are.

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<sup>45</sup> The FCC disbursed \$20.4 Billion nationwide funds through a reverse auction that is funding low-cost rural broadband and voice services over 10 years in designated qualifying locations.

## 11 Digital Inclusion and Transformation

### 11.1 Options for Jefferson County in Addressing Broadband Gaps

Broadband has become a necessary infrastructure. However, most of the economic impacts and community benefits from broadband investments do not accrue to private sector internet service providers. This results in an under-investment in broadband as providers only target areas they assess to be profitable.

Areas remain unserved, underserved, and overcharged with broadband in Jefferson County because private sector internet service providers do not expect enough of a financial return from investing in those areas. In Jefferson County, the lack of investment in networks that provide in excess of 100/100 Mbps broadband is an outcome of private sector internet service providers not viewing those areas as providing sufficient financial return<sup>46</sup>. Even for areas that are considered ‘served’ based on the FCC’s 25/3 Mbps definition of broadband, COVID-19 has highlighted the need for broadband and robust digital infrastructure areas across Jefferson County because unequal access, degrading internet speeds, and unreliable connectivity hurt the local economy and quality of life.

Although communities see significant benefits from broadband investments in terms of retention and growth of local jobs and businesses, improved access to civic services, etc., such community benefits are ‘off-balance sheet’ to facilities-based carriers<sup>47</sup> (traditional private-sector service providers). From a community’s perspective, this results in underinvestment in broadband relative to a community’s needs. From the service providers’ point of view the level of investment is rational because they can receive higher returns elsewhere with higher population densities and lower buildout costs.

Facilities-based carriers are owned by pension funds, banks and large private equity companies who use the telecommunications companies to deploy their capital into digital infrastructure that will provide the required return for their investors. For facilities-based companies, they will earn a better return if they invest new capital in areas where they have existing customers, for example, upgrading to 5G, or upgrading existing customers from DSL to fiber. With that economic model in play, areas remain underserved as long as other areas can provide a better return in investment by the incumbents. To tip the scale, governments pool their resources from tax revenues, or bonds to lower the cost of entry and effectively subsidize profits needed for incumbents to enter a new territory. for service providers so they can enter the market and compete for customers.

To address the broadband gaps identified in this report, there a number of options Jefferson County has which include:

- Do nothing
- Subsidize a private service provider
- Become a service provider
- Develop a public-private partnership.

There are variants within each of these options and the table below summarizes the main costs, benefits, and expected longer term outcomes for each option.

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<sup>46</sup> Private internet service providers are challenged to make a business case in areas of low household density, difficult terrain to build, etc. when expected financial returns are lower than the cost of capital and operations.

<sup>47</sup> The term “facilities-based carrier” means an entity that owns communications transmission facilities, is responsible for the operation and maintenance of those facilities, and holds an operating license issued by the Federal Communications Commission under the authority of title III of the Communications Act of 1934.

Table 15: Options for Jefferson County in Addressing Broadband Gaps

| Options for Jefferson County in Addressing Broadband Gaps  |  |  |  |
|--|--|--|--|
| Option   | Costs  | Projected Benefits   | Expected Outcomes  |
| 1. <b>Do nothing</b> – leave unserved and underserved market to private sector service providers   | <ul style="list-style-type: none"> <li>• Reduced economic opportunities and quality of life in unserved and underserved areas</li> <li>• Reduced tax base and property values for Jefferson County</li> </ul>  | No financial implications to Jefferson County because County not getting involved  | <p>Unserved and underserved areas will persist where there is not enough of a private sector business case to serve them</p> <ul style="list-style-type: none"> <li>• Risk of continued digital divide</li> <li>• Limited ability to implement smart community services</li> <li>• Declining economy and population</li> </ul>   |
| 2. <b>Subsidize a private service provider</b> (in some cases called a public private partnership, when in fact it is a subsidy to one provider) | <ul style="list-style-type: none"> <li>• Subsidies (financial, allocation of broadband funding, rights of way, middle mile infrastructure, market exclusivity, etc.) by County to attract private sector partner to serve area(s)</li> <li>• Oversight of service agreement</li> </ul> | Service to unserved and underserved areas as designated in the service agreement   | <ul style="list-style-type: none"> <li>• Jefferson County picks a winner: the service provider</li> <li>• Potential for limited competition and internet services in areas where provider under with service agreement has exclusive access</li> <li>• County’s goals of economic vitality, community benefits, smart community services, and long-term planning may not align with providers goals (revenues, profitability, enough return on investment compared to other investment opportunities)</li> </ul> |
| 3. <b>Become an internet service provider</b> (build digital infrastructure, operate network, and provide services)                              | <ul style="list-style-type: none"> <li>• Resources to build, operate, maintain, and manage network</li> <li>• Continual need to acquire customers</li> <li>• Need to compete against incumbent and new providers</li> <li>• Legal challenges from incumbents</li> </ul>                | <ul style="list-style-type: none"> <li>• Ability to direct investments to neighborhoods, and potentially to generate positive cash flow, if there is a business case</li> <li>• Control over technology updates</li> </ul> | Operating as a competitive provider in an incumbent provider market (i.e., pre-existing providers serving area), which means that demand in unserved and underserved neighborhoods may not be enough to sustain a business case for a community-owned ISP  |



| Options for Jefferson County in Addressing Broadband Gaps  |  |  |  |
|--|--|--|--|
| Option   | Costs  | Projected Benefits   | Expected Outcomes  |
| <p><b>4. Develop a public-private partnership (PPP) for digital infrastructure</b></p> <ul style="list-style-type: none"> <li>Enabling local stewardship of digital infrastructure</li> <li>Using an open access model for retail internet services</li> </ul> | <p>Time and resources needed to build partnership and create a Broadband Utility, or Special Purpose Vehicle (SPV) that will:</p> <ul style="list-style-type: none"> <li>seek grant funding and/or private investment</li> <li>contract building and maintenance of digital infrastructure</li> <li>outsource operations and internet retail services</li> </ul> | <ul style="list-style-type: none"> <li>In excess of 100/100 Mbps service to unserved and underserved areas</li> <li>Potential for lower internet service costs because network provided through digital infrastructure</li> <li>Opportunities for innovation with smart community services, smart grid, etc. with ubiquitous community access</li> </ul> | <p>Services generated from the digital infrastructure incentivize the operator of that infrastructure to maintain and upgrade the network, with operator and equity partners managing risk and receiving revenue returns</p> <ul style="list-style-type: none"> <li>Jefferson County as a passive owner of digital infrastructure retains control of its digital and economic future</li> <li>PPP manages operations and retail internet services</li> <li>Open access offers greatest alignment between community needs and broadband services</li> </ul> |

**Review of Options for Jefferson County to Address Broadband Gaps**

**1. Do Nothing – Not recommended**

Unserved and underserved areas of Jefferson County will miss out on economic opportunities and civic services. If private sector providers are not serving those areas already with future-proof broadband, i.e. in excess of 100/100 Mbps, then some level of public investment will be needed to bridge the gap between the build cost and expected investment returns by private sector providers.

**2. Subsidize a private service provider – Not recommended**

Public investments in digital infrastructure should retain public ownership, or at the very least local stewardship, of that digital infrastructure. A competitive bidding procurement process may select the best value a service provider brings to Jefferson County at that time, however subsidizing one provider’s ownership of their network expansion, or subsidizing their middle-mile, may limit choice to end-users and enable that provider to exercise market power over competitors.

Since deregulation countless communities have gone down this path, and yet, we still have underserved communities because the option to subsidize someone else’s network is a one-and-done. If 30 years ago money was given to extend a telecommunication company’s DSL network, today that community would be underserved. Furthermore, over the longer-term private sector profit-seeking interests may not align with Jefferson County’s economic and community interests and the County may have little recourse if they do not have stake in the network.

**3. Become an internet service provider – Not recommended**

Jefferson County becoming a service provider using a traditional broadband service provider approach will be a challenge. If broadband were financially feasible in the unserved and underserved areas identified in

this report, providers would be there already. Furthermore, Jefferson County attempting to become a service provider to those areas would have several disadvantages, most notably competing with experienced incumbents while trying to serve low-profitability areas.

Another challenge is that a vertically integrated service provider carries the costs of infrastructure, operations, and retail services without having the economies of scale of large incumbent providers. New entrants into the market need to have enough market share (usually at least 35%) to cover those costs to generate the returns they need for a viable business case. This is a challenge when competing with incumbent providers who often have targeted and are already serving, the most lucrative neighborhoods. In smaller markets this precludes market entry, leaving communities with minimal broadband provider choice and underinvestment in broadband.

#### **4. Develop a public-private partnership (PPP) for digital infrastructure – Recommended**

Like roads, with an open-access infrastructure in place, service providers can access rural customers for the same customer acquisition cost as in an urban area. This infrastructure creates a free market for providers to compete and the market will decide who wins or loses, not the government. This option enables public ownership, or at the very least, local stewardship, of public investments in digital infrastructure. Rather than attempting to directly compete with service providers, Jefferson County has a vested interest to enable service providers to access new customers in unserved and underserved areas.

Digital infrastructure ownership options include partnering with an existing utility, or creating a Broadband Utility, or Special Purpose Vehicle that invests in essential digital infrastructure where ownership and operations are structurally separated from retail internet service delivery. This retains local assets and economic sovereignty, while enabling contracting for operations and internet services that enable competitive internet service offerings without becoming a direct competitor to incumbent providers. A similar model is an airport authority<sup>48</sup> where operations of the infrastructure are outsourced and services are provided by private airlines who pay gate fees and compete for passengers' business service and cost. This proven model for airports mirrors the 'open access' model for digital infrastructure. By enabling competition among broadband providers, broadband subscribers across Jefferson County get the added benefits arising from competition rather than subsidizing one provider which can create a monopoly position.

This PPP option enables an economic model where services generated from the infrastructure incentivizes the neutral operator of that infrastructure to maintain and upgrade the network. Under this option, the job of the passive owner (the community) is to make sure the operator meets the contractual requirements with the community to maintain an open access, free market infrastructure for service providers in which to compete. This works because the operator only makes money if there are service providers on the network and the community does not get involved in the free market – similar to how airport authorities are run.

Jefferson County can **invest in and own digital infrastructure** through a public private partnership (PPP) where investors and the County can pursue grant funding, outsource network build, maintenance, operations, and retail internet services.

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<sup>48</sup> Airports are high-cost infrastructure investments that individual airlines would be challenged to build and operate. A proven model is for the locality to own the airport, but outsource the operations (with a performance contract) and charge gate fees to carriers like Air Canada, WestJet, etc.

Choosing the goal of ubiquitous, affordable broadband across Jefferson County increases local innovation, grows the local economy, which grows the local market for broadband and value-added services. These spillover effects are indirect benefits to communities and a primary driver for Jefferson County to pursue public investment in digital infrastructure – as has been invested in other infrastructure like roads, water and sewer systems, electric grids.

## 11.2 Public-Private Partnership (PPP) for Digital Infrastructure in Jefferson County

Broadband gaps will continue in Jefferson County until investors find a viable solution that better aligns the County's internet connectivity needs with investors' expected returns on their investments. The **critical first step is to pivot to a digital infrastructure approach** that can internalize the longer-term economic impacts and community benefits.

Investing in digital infrastructure<sup>49</sup> is more than simply fast broadband access. Digital infrastructure connects all residents and businesses in the community (like roads) so that all can effectively participate in an increasingly online economy – rather than only serving the most profitable areas.

Because of the high upfront investment costs in unserved and underserved areas, it is recommended that Jefferson County develop a public-private partnership to invest in digital infrastructure that:

- enables amortizing community benefits over the longer-term from new opportunities for the County to retain and attract businesses and residents. As with roads and electrical grids, broadband enables benefits to local economic vitality, competitiveness, resilience, and quality of life that are 'off-balance sheet' to private sector providers
- enables competition between multiple retail service providers. This leads to a greater choice of internet service offerings, better pricing, and improved customer service

### Digital Infrastructure Operational Model

As with airport authorities or road infrastructure, communities can invest in digital infrastructure and retain digital sovereignty by structurally separating network ownership (digital infrastructure) from operations and from retail services. This enables the appropriate network operating model to be chosen (one provider, multiple providers via open access, etc.) based on local market circumstances, interest by private sector partners, and network demand (current and potential)<sup>50</sup>. Providing high-capacity digital infrastructure to last mile (connecting premises) and middle mile enables competitive retail service providers to operate within the locality.

To enable these digital infrastructure benefits for Jefferson County, an operational model for needs to be selected that minimizes the market entry-costs for service providers to start selling services on the network. This favours a **lit open access model**, also known as true open access, where customers can freely choose between services and freely build a personalized bundle of services that best meets their needs and providers have an open and level playing field with no restrictions on the introduction of future services. Other operational models exist, such as dark fiber distribution network access, dark fiber last mile open access, lit open access with a single provider – however none of these options enables creates a free market for providers to compete where the market will decide who wins or loses, not the government.

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<sup>49</sup> Digital infrastructure is a platform for broadband (high-speed internet) networks that are reliable, affordable, and future-ready with over 100/100 Mbps download and upload speeds.

<sup>50</sup> <https://sngroup.com/broadband-demand-definitions/>

## Governance Model

For Jefferson County, a lit open access operational model can be realized through public-private partnership investment in the digital infrastructure, while outsourcing operations of the network and internet retail services. There are numerous options for public-private ownership based on the needs and capacities of a community and those investing the capital. To enable Jefferson County to retain digital and economic sovereignty while ensuring that capital investors get their returns, a governance model needs to be selected that enables a governance model where services generated from the infrastructure incentivizes the operator of that infrastructure to maintain and upgrade the network to support competition. This favors a broadband utility, or special purpose vehicle (SPV) to own the digital infrastructure, where ownership share is based on what has been invested by each party: the capital partners and by public investment (whether through Jefferson County's own funds, or from grant awards received). The capital partners would take all, or the majority share of revenues to ensure that they get their investment returns. Jefferson County may consider negotiating some revenue returns, but those are short term benefits that come at a capital cost. Jefferson County's return is the longer-term benefits from all residents and businesses connected to affordable, future-ready broadband.

The network operator would make network upgrade and expansion decisions under the guidance of the capital partners (active owners) and Jefferson County. The role of the passive owner (Jefferson County) is to make sure the operator meets the requirements to maintain an open access, free market infrastructure for service providers in which to compete. This works because the operator only makes money if there are service providers on the network and the community does not get involved in the free market.

Developing a governance model is a process in which Jefferson County has a vested interest to participate as it includes:

1. Find a capital investor and an operator that will work together with Jefferson County to form a longer-term public-private partnership. Note, capital investors may cost-share with operational capital to assist in the development of a public-private partnership and governance model with qualified localities.
2. Develop a governance and operations structure that meets the needs of the investors and Jefferson County, which the operator can implement
3. Identify and pursue grant funding opportunities (e.g., BEAD)
4. Structure capital investment for capital and operational expenditures based on needed returns from capital partners (return rate, term length, etc.) and Jefferson County (ownership of conduit, ownership of network that connects community anchor institutions, representation on board of broadband utility, etc.)

Local ownership of infrastructure is the key that unlocks community sustainability and economic potential. Once these infrastructure components for the County are operational and have financially stabilized, Jefferson County will have available assets that enable local businesses and residents to have social, political, and economic independence in the new economy. The network operator can work with community leadership and partners (both public and private) to implement value-added services, such as:

- **smart community services** – for public safety and security, redundancy for all county networking and communications needs, civic services, smart street lighting, smart buildings, water management, etc.
- **online access to Jefferson County's education network and resources** – with an open access platform, a Jefferson County education layer can be created with in excess of 100/100 Mbps service to all residents with no operational costs – enabling Jefferson County to provide access to online education at no charge to all residents connected with the digital infrastructure

## Broadband Assessment and Strategic Plan for Jefferson County

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- **eHealth and integrated community healthcare** – so health care providers and patients (from their home, local sites, mobile van) can access health care services remotely and better manage their health care (virtual visits, remote monitoring, increased access to specialists, etc.) and access (reimbursement, travel time and expense, etc.)
- **regional market ecosystems** (e.g. local food systems) – that can aggregate and disseminate local market data and insights to improve coordination and integration of local supply, demand, and distribution in real-time, which is critical to meeting evolving market demands. This drives organic growth of supply and demand, local workforce development with good-paying local jobs, creates new local business / start-up opportunities, and offers local businesses access to a more highly skilled / trained local workforce with greater ability to retain them. Coupled with partners that can setup and operate local data centers, data confidentiality and privacy from local businesses and residents can stay and be protected within Jefferson County.
- **smart grids** – enable energy management and the integration of distributed energy generation that fluctuate widely (such as solar panels, wind power, etc.) and energy use (electric vehicles, energy storage, etc.) needed to sustainably power the county in an increasingly digital economy

These and other value-added services need to be assessed on Jefferson County's priorities and their economic viability. A management and coordination capacity with Jefferson County is needed to ensure that the right programs are selected and taken forward for the county. A Digital Economy Manager for Jefferson County is needed to plan this process, as well as manage:

- grant applications for broadband funding
- the broadband funding and process
- collaboration with local service providers,
- digital transformation with local schools/ colleges,
- Digital Navigators and their outreach and engagement activities

Availability of robust and competitively priced broadband is increasingly a non-negotiable determinant of location. Jefferson County has multiple use cases for digital infrastructure that can drive operational cost savings, new economic opportunities, and improved access and delivery of civic services. These benefits include:

- Affordable, ubiquitous, robust, and future-proof broadband (in excess of 100/100 Mbps with no data caps)
- Retention and expansion of local businesses, plus new business start-ups
- New good-paying local jobs
- Retention and attraction of skilled workforce

## 12 Broadband Assessment and Feasibility Plan for Jefferson County

Jefferson County should continue to take the lead on digital infrastructure, local economic and community development because as a county government:

- It has a holistic, longer-term view to retaining and growing the tax base
- It is the entity that State and Federal funding agencies are most likely to recognize, which is critical for the grant application process for BEAD, ACP, etc.

Based on stakeholder engagement, analysis of findings from Jefferson County, and modeling the digital infrastructure case for broadband, the following **Principles for Public Investment in Broadband** to find an equilibrium between the county's needs (residential, business, and civic services) and fiduciary responsibilities with private sector market interests.

### Principles for Public Investment in Broadband for Jefferson County

- Approach broadband as digital infrastructure – public investments in infrastructure should be owned by the locality so they can be stewards of their own future, whether roads, water or sewer, or in excess of 100/100 Mbps broadband.
- Public funds should not be used to subsidize one service provider's infrastructure (private or public) over other service providers, strengthening the market power of the provider receiving public funds. Instead, public funds should enable improved and competitive services.
- Competition is a means to enable competitive services and pricing, where markets are large enough to support multiple providers (with at least two internet service provider options for residents or businesses, three is better). Where markets are not large enough, public-private partnerships between the service provider and the locality can achieve competitive service and pricing levels (in such cases long-term service contracts with performance metrics would be signed into agreements)
- For service providers that can and are interested to expand their footprints, Jefferson County can support providers with:
  - Affordable last-mile and middle-mile infrastructure that is built with an open-access design, but may be operated as a public-private partnership where the market size does not support multiple providers
  - Aggregation of demand, market intelligence, and qualified leads for more effective sales and marketing, customization of offerings, and better customer service by providers (see **Appendix 5 Presentation of eCheckup Findings for Service Providers**)
  - Faster and simpler access to easements
  - Community engagement because service provider outcomes are always better when supported by local champions. This can be achieved by a Digital Economy Manager who can work as a liaison between service providers and community digital inclusion efforts
  - Defined population density that makes sense for digital infrastructure investments (see *Table 15*)

## 12.1 Broadband Build-out Cost Estimates for Jefferson County

As census blocks and areas of unserved broadband internet service have been identified in Jefferson County through this study, a methodology was developed to provide technological and economic recommendations to meet the specific needs presented. To understand as clearly as possible which areas are served, underserved, or unserved by broadband in Jefferson County, following **cost analysis methodology**:

### Broadband Cost Analysis Methodology

1. **Fiber Cost Analysis based on Reported Coverage** – first phase of wireline infrastructure costs based on FCC data based on the three cost thresholds:
  - A. Fiber Un-economic (Between 0-3 premises per linear road mile)
  - B. Fiber Subsidized (3-15 premises per linear road mile)
  - C. Fiber Marginal Business Case (greater than 15 premises per linear road mile)

**Outcome:** Fiber costing of (B) and (C) above. Fixed wireless costing of (A).
2. **eCheckup Verification of Fiber Cost Analysis based on Reported Coverage** – this second phase of wireline cost will be validating or invalidating the FCC data based on eCheckup findings. This phase assesses how wireline cost numbers change based on tested speeds, satisfaction, and interest to change service provider.

**Outcome:** Fiber costing of b) and c) above, plus fixed wireless costing of a) after adjustments from eCheckup findings.
3. **Broadband Demand Mapping** – this phase layers-on the eCheckup demand data to map out potential demand in the unserved and underserved areas. This will be shared with providers to help them see potential new markets in unserved and underserved areas.

**Outcome:** Broadband demand maps that can be shared with service providers to help them identify new customers and new service opportunities that require higher levels of bandwidth and reliability (e.g., eHealth, cloud-based services, etc.)
4. **Internet Service Provider Expansion Plans** – this fourth phase will overlay the network expansion plans that providers have reported publicly or shared as part of the interview process.

**Outcome:** Costs to bridge broadband gaps in Jefferson County with fiber and fixed wireless based on what is needed after verification against end-user experiences and what providers will build-out as part of their network expansion plans.

The final cost analysis presented to Jefferson County is the total cost for building out 100/100 Mbps future-ready digital infrastructure to Jefferson County. The funding request Jefferson County submits will have two elements:

- Cost for fixed wireless infrastructure to cover the high-cost areas
- Total build cost and potential provider partnered cost for fiber subsidized areas

A cost of \$75,000 per linear mile is estimated for the backbone. This cost can be as low as \$25,000 per mile in the more densely populated areas, but areas of lower density can be considerably more expensive to deploy, at times exceeding \$150,000 per mile. A per address cost of \$1,500 to connect each address to the backbone was incorporated in the Address Density per Linear Road Mile cost estimate in *Table 15*.

Table 16 summarizes the build-out costs of fiber for Jefferson County based on the following densities:

- Less than 3 addresses per linear road mile (typically a fixed wireless solution at this density)
- Between 4 and 15 address per linear road mile (typically not enough of a business case, but that could be with government investment)
- Over 15 addresses per linear road mile (typically enough of a business case for private sector investment without subsidy)

Table 16: Address Density per Linear Road Mile with Cost Estimates

| Address Density per linear road mile               | Number of Addresses | Population | Length of Fiber Build Needed | Fiber Build Cost | Average Fiber Build Cost per Address |
|--|---------------------|------------|------------------------------|------------------|--------------------------------------|
| <3   | 1,216               | 3,939      | 2029.95                      | \$154,070,567    | \$126,703                            |
| >3 and <15<br>(Fiber build with public investment) | 3,016               | 6,607      | 406.00                       | \$34,983,251     | \$11,599                             |
| >15<br>(Private sector fiber build)                | 4,236               | 10,097     | 145.32                       | \$17,253,048     | \$4,073                              |

Figure 24 below shows the demarcation between **fixed wireless market** (tan shaded Census Blocks) versus **wireline market** (green shaded Census Blocks). The blue shaded Census Blocks are reported served with 100/100 Mbps and the purple shaded Census Blocks should be addressable by the private sector.

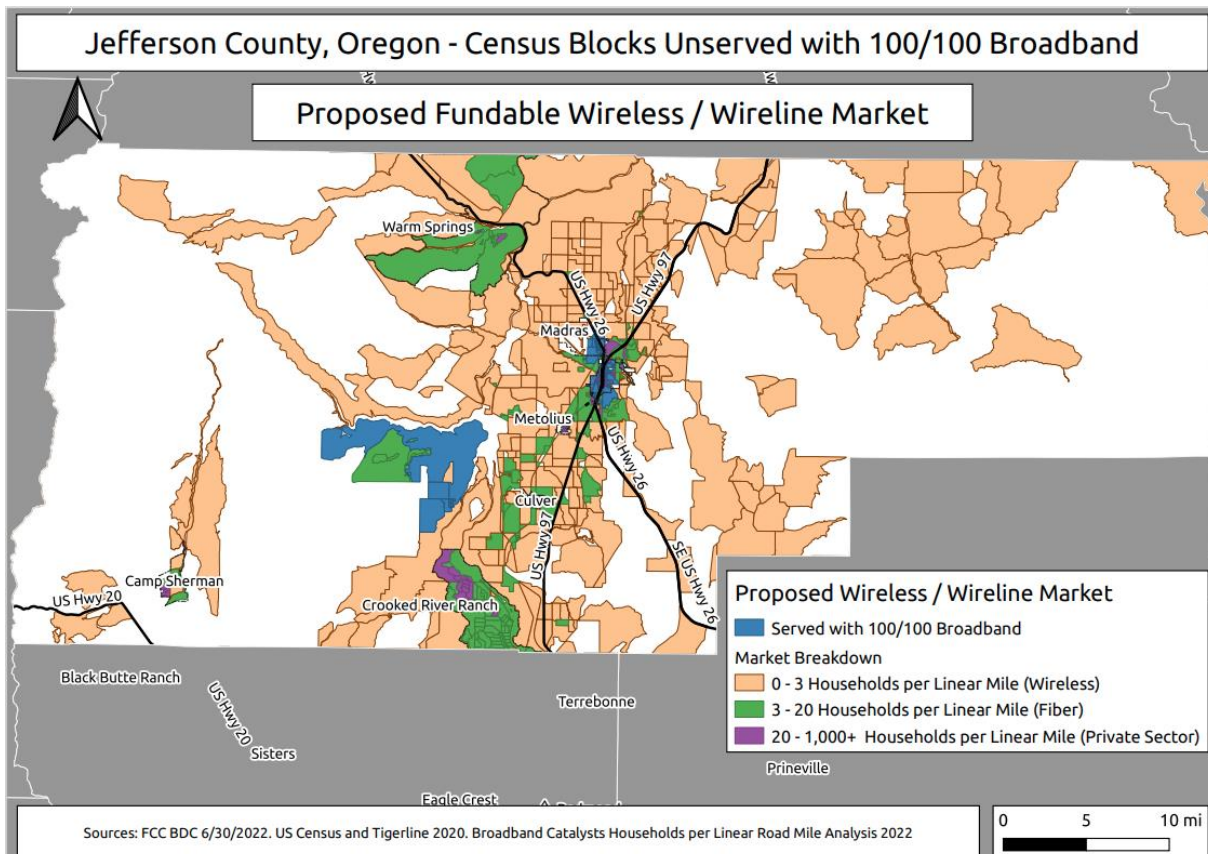


Figure 24. Wireless / Wireline Market Map (see Appendix 7 for detailed maps)



## 12.2 Cost to Address Underserved Areas Claimed Served by FCC

Based on the eCheckup data collected from end-users, the household "interested in better broadband" and the business "broadband is a barrier" responses and overlaid that data to the census blocks indicated by the FCC as served with 100/100. These Census Blocks were then deemed "underserved" based on the eCheckup data. When the FCC's BDC data was overlaid to the eCheckup "underserved" findings, it validated the eCheckup data by indicating many of the same Census Blocks as underserved – matching BDC data with eCheckup data.

In summary, there are 21 census blocks that are underserved based on eCheckup findings, despite the FCC data reporting 100/100 service available. This represents:

- Households: 1,055
- Population: 2,071
- Miles of roadway: 101
- Additional cost: \$9,170,877

## 12.3 Fixed Wireless Costs

As the \$154,070,567 to connect with fiber 1,216 addresses (\$126,703 per address) is prohibitively costly, fixed wireless is the proposed solution for areas in Jefferson County that are low-density with less than three (3) addresses per linear road mile (see *Table 15* in **Section 12.1**).

The low-density census blocks are highly distributed throughout the county, making it difficult to cover with a small number of towers. A comprehensive coverage solution is proposed that includes the construction of new towers even if they have a relatively small number of potential subscribers. This should be considered a high-cost estimate for the wireless.

### Proposed Infrastructure for Fixed Wireless Coverage Estimate

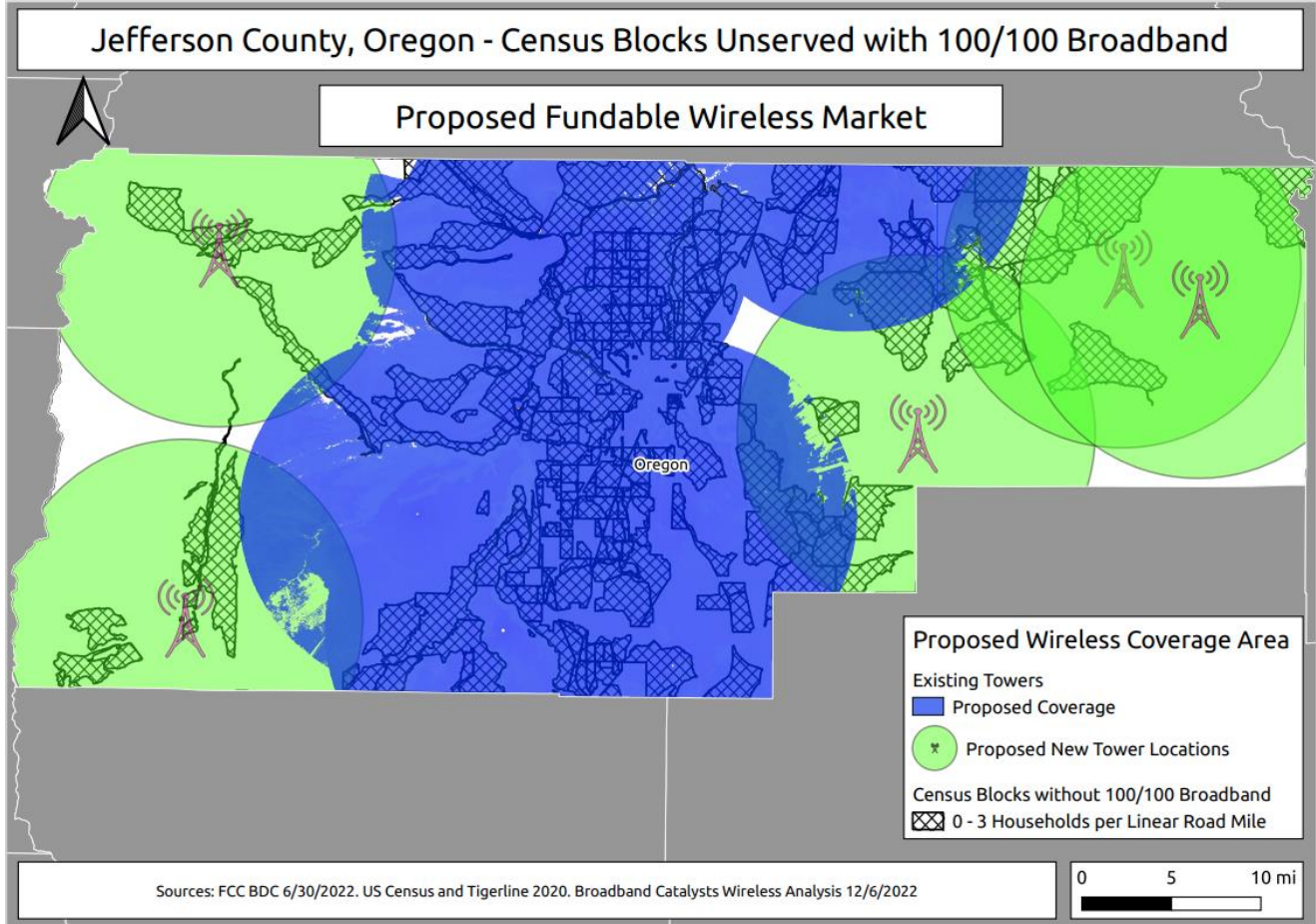
- 9 existing towers and 5 newly constructed towers
- Fixed wireless equipment capable of providing 100/100 Mbps speeds can be installed on existing towers for approximately \$250,000 - \$500,000 depending on the site readiness and fiber availability

A total preliminary estimate of \$1.25 million is needed to construct a new tower (Note that three of the proposed towers are at the post offices, which could potentially lower that cost).

### Comprehensive Fixed Wireless Coverage Estimate

- 9 existing towers x \$500,000 = \$4.5 million
- 5 new towers x \$1,250,000 = \$6 million
- **Wireless total cost estimate: \$10.5 million**

The map below (Figure 25) shows the proposed fixed wireless coverage areas for Jefferson County.



**Figure 25. Proposed Wireless Coverage Areas**

The following summarizes the fixed wireless build-out cost estimate where fiber is prohibitively expensive because of low-density.

| Address Density per linear road mile | Number of Addresses | Population | Estimated Build Cost | Average Build Cost per Address |
|--------------------------------------|---------------------|------------|----------------------|--------------------------------|
| <3<br>(Fixed wireless)               | 1,216               | 3,939      | \$10,500,000         | \$8,635                        |

## 12.4 Developing a Path Forward – eStrategy for Jefferson County

The following eStrategy for Jefferson County is based on digital inclusion and transformation so that all residents and businesses in Jefferson County have access to affordable, future-ready broadband and that they have the awareness and skills to fully benefit from online practices. Digital Navigators and Digital Innovation Hubs are key elements to guide residents and businesses through this process.

In order to raise awareness and ensure that the community benefits from available broadband resources, Digital Navigators and Digital Innovation Hubs are key assets that can be deployed by Jefferson County and facilitate recommended outreach. A Digital Navigator can be volunteers or cross-trained staff who will work to address the whole digital inclusion process, including home connectivity, devices, and improving digital skills. Digital Innovation Hubs would serve as physical locations that are convenient for local residents and businesses to learn about and access new online practices by showcasing broadband speeds and technologies, telehealth services, available smart community services, online business practices, etc. This allows the community to become a focal point for digital inclusion and transformation while providing technical support and resources to residents and businesses.

The following table summarizes the proposed initiatives for Jefferson County based on a holistic approach examining existing infrastructure against the current needs of the community, projected growth in demand for important applications, the digital capacity of local businesses and demographic groups to take advantage of better infrastructure, and local resources that can be leveraged to attract potential service providers and partners to build digital capacities.

Table 17: eStrategy Recommendations Summary

| Initiative  | Funding   | Partners   | Outcomes   |
|---|---|--|--|
| <b>Immediate - Action items to be started in next 3 months (March – June 2023)</b>  |   |  |  |
| <p><b>1. Digital Navigators for ACP</b><br/>Apply for ACP Outreach Grant Program.<br/>Begin hiring Digital Navigators through existing local stakeholder organizations with Federal/State funding to help residents access ACP and Lifeline subsidies</p> <p>Either on site at libraries, government offices, Tribal offices, or home visits by appointment</p> | <p>ACP Outreach Grant Program to be submitted by Jan 9, 2023 (plus additional anticipated funding for implementation)<br/>\$30/ month<br/>\$75/month for Tribes</p> <p>3 Half-time at \$35/hr for 6 months, renewable upon review</p> | <p>Lead: Jefferson County<br/>Partners:</p> <ul style="list-style-type: none"> <li>Libraries</li> <li>St. Charles</li> <li>CTWS</li> </ul> | <p>Move uptake of ACP up from current 8% to:</p> <ul style="list-style-type: none"> <li>15% in 6 months</li> <li>30% in 12 months</li> <li>50% in 2 years</li> </ul> <p>Impacts from increased ACP uptake:</p> <ul style="list-style-type: none"> <li>Funding of \$30 per month adds to residents’ disposable income that can be spent local</li> <li>Increased use of eLearning, eHealth, telework, etc.</li> </ul> |
| <p><b>2. Digital Economy Manager</b><br/>Hire full-time to manage grant applications, broadband infrastructure funding and process, collaborations with local service providers, and drive digital transformation</p>   | <p>Jefferson County (3-6 months) until State funding becomes available<br/>\$85K/year<br/>3 years, renewable upon review</p>  | <p>State and federal agencies providing support through funding and collaboration</p>  | <p>Dedicated, strategic, and managed process to move Jefferson County quickly and efficaciously to be future-ready by understanding future needs and better coordinating local schools with Jefferson County workforce opportunities and job needs</p>   |

|  |   |   |  |
|--|---|---|--|
| with local schools/ colleges and coordinating Digital Navigators   |   |   |  |
| <b>3.Design and Engineering</b><br>Focus on areas identified in study to assess existing assets and where possible leveraging those assets to design digital infrastructure that enables open access so that providers can build a business case to provide future-ready service | Economic Development Administration (federal) and Business Oregon (state) funding requests will start as soon as approved, plan 6-12 months. Cost is estimated to be between \$500,000 - \$800,000. | EDA<br>Digital Economy Manager to work together, where possible, with providers   | Design-build plan that addresses identified market needs (current and future) and leverages where possible existing assets to create a platform that reduces barriers to entry (capital expenditures) for service providers  |
| <b>Medium-term – Action items to be started in next 3-12 months (April 2023 – March 2024)</b>  |   |   |  |
| <b>4.Prepare and Manage Broadband Funding Applications</b><br>Use study findings and data to prepare competitive applications for broadband funding that detail gaps, customize solutions to local contexts, and estimate returns on investment                                  | Existing budget in <b>Digital Economy Manager</b> role<br>Funded by state and federal funding   | State and federal agencies providing support through funding and collaboration  | Jefferson County getting what residents and businesses actually need to bridge broadband gaps and drive utilization so that all can participate in the digital economy going forward   |
| <b>5.Digital Innovation Hubs</b><br>Use State Digital Equity funds to setup in Madras, Metolius, Culver, Crooked River Ranch, Warm Springs   | State and federal agencies<br>Tribal Funding<br><br>5 Hubs at \$45K per Hub for equipment and operations per year<br>Total of \$225K/year over 3 years, renewable upon review                       | Local education, library, health, municipal / county organizations who will provide location as an in-kind contribution, plus some staff time | New equipment and resources to showcase new applications for health, smart community services, water management, teleworking, etc.<br>All Hubs to provide at least 7 computers, meeting area, teleworking space.<br>Specialization of Hubs to be determined with partners based on local demand and partner support. |
| <b>6.Digital Navigators for eHealth, eLearning, etc.</b><br>Customize digital literacy action plans and facilities based on study findings to personalize the relevance and returns to individuals, accompanied with the resources needed to drive digital transformation        | State and federal agencies providing support through funding and collaboration<br><br>3 part-time staff at each of the 5 Hubs<br>Total: \$790K/year, renewable upon review                          | Local education, library, health, municipal / county organizations who will provide some staff time   | Those who are the last to adopt, but often would have the greatest benefit are engaged by Digital Navigators who raise awareness, personalize the return of getting online to individuals and provide technical assistance to drive utilization and impacts  |
| <b>7.Digital Transformation of Service Delivery with local stakeholders</b><br>Setting-up and coordinating with local organizations online services for smart community,   | Management and coordination role of <b>Digital Economy Manager</b><br>Implementation funding from State and federal   | Lead: Jefferson County<br>Madras, Culver, Metolius  | Moving service delivery online (health, civic, education, etc.) is accelerated and done so comprehensively so that all residents of Jefferson County can benefit without constraints of time of day, or end-user location  |

|  |  |  |  |
|--|--|--|--|
| eHealth, eLearning, water management, etc.   | agencies, as well as private investment<br><br>\$750K/year over 3 years, renewable upon review   |  |  |
| <b>8. Small Business Growth Program</b><br>Provide small, local businesses who often do not have expertise with online processes and commerce, with individualized assessments (DEi Scorecards <sup>51</sup> ) of how using broadband and online business practices can increase their revenues and decrease costs | Management and coordination role of <b>Digital Economy Manager</b><br>Deployment by <b>Digital Navigators at Digital Innovation Hubs</b><br><br>\$85K/year over 3 years, renewable upon review | Jefferson County<br>Madras Chamber of Commerce<br>EDA                                    | Driving local business growth by providing the insights small and medium-sized businesses need to develop an internet game plan for reaching new customers and markets and developing new products and services<br>Differentiate Jefferson County as a place for business by offering DEi Scorecards to businesses, which will enhance business retention and attraction |
| <b>9. Performance Measurement and Impact Tracking</b><br>Set-up online process managed by Digital Economy Manager to track progress of initiatives, as well as report to funding agencies for compliance and accountability  | State and federal agencies<br>Private investment<br><br>\$250K/year over 5 years   | Lead: Jefferson County<br>Project delivery partners (city and stakeholder organizations) | Having forecast impacts, project managers can demonstrate to funders progress towards goals and impacts with target groups   |
| <b>10. Develop Governance, Business, and Operating Models for Digital Infrastructure</b><br>Setup Special Purpose Vehicle (SPV), funding support (public, private), public-private partnerships  | State and federal agencies<br>Private investment<br><br>\$60K  | Lead: Jefferson County<br>Madras, Culver, Metolius<br>Public Private Partnership (PPP)   | Focus investments and governance on digital infrastructure needed, gaps to be prioritized, markets to be served, and goals to be achieved (for Jefferson County, financial stakeholders)   |
| <b>Longer term – Action items to be started in next 12-36 months (March 2024 – March 2026)</b>   |  |  |  |
| <b>11. Participate on Board of SPV / Broadband Utility</b><br>Represent Jefferson County's interests in the building, operations, and maintenance of Digital Infrastructure  | State and federal agencies<br>Private investment   | Lead: Jefferson County<br>Madras, Culver, Metolius<br>Public Private Partnership (PPP)   | Jefferson County has voice on build-out, operations, expansion, and maintenance of network as stewards of local residential and business interests   |

<sup>51</sup> <https://sngroup.com/dei-scorecards/>

## 12.5 Economic and Community Returns from Investments in Digital Inclusion and Transformation

The investments in the **Section 12.4 eStrategy Recommendations** will have a system implemented for performance measurement and impact tracking (item 9 in Table 16). This system will provide oversight for the Digital Economy Manager and the Jefferson County Commissioners to:

- Set target economic impact and community benefits for Jefferson County
- Measure progress towards those targets on a regular basis (e.g., every 6 or 12 months)
- Adjust activities and funding based on performance review of whether targets have been achieved, exceeded, or have fallen short

There are significant economic impacts and community benefits that will be generated for Jefferson County as described in **Section 10**. To quantify some of these impacts, an economic impact estimate has been prepared for Jefferson County based on improved broadband and utilization by businesses using the Broadband Utilization Economic Impact Model. **For every 65 businesses that adopt and implement new online practices with the help of Digital Navigators, Digital Innovation Hubs, the Small Business Growth Program, etc.** SNG has estimated the following impacts:

- \$33,700 in new business revenues for businesses in Jefferson County
- Over 41 new jobs
- Over \$2.6 million in increased local GDP

Investments in rural areas, like Jefferson County, have greater potential for economic impact than in areas of higher density where the cost per household might be lower. If Jefferson County can secure the investments and funding for digital infrastructure as quantified in this report, it can avoid intractable broadband gaps that rural areas are increasingly facing.

## 12.6 Funding Opportunities

More than two decades of efforts to address broadband gaps at every level—federal, state, local—point to this single reality: ***there is no silver bullet solution to the broadband gap problem***. Rather the solution inevitably needs to be location specific and involve the efforts and resources of multiple parties including funders, developers and operators and stakeholders whose investments and interests are layered to optimize the approach and outcome for broadband development and utilization. Fortunately, the funding environment has never been more encouraging due to:

- Existing federal broadband funding programs are being augmented with massive new federal funding as a result of the COVID Pandemic distributed to communities directly and through state-directed programs that are detailed in the following table.
- Additional resources are potentially on offer through private investment available from financial institutions that choose to meet their Community Reinvestment Act requirements by supporting local broadband efforts.
- Opportunity Zones utilize creative tax benefits to investments in designated low-wealth locations: Jefferson County has two designated Opportunity Zones.
- Philanthropic organizations are beginning to engage in solving broadband gaps through Program Related Investments (PRI)<sup>52</sup> that require repayment but generally over a longer period of time

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<sup>52</sup> <https://learning.candid.org/resources/knowledge-base/pris/>

and at below market rates, making PRIs the sort of “patient capital” needed to fund broadband in communities where the standard business case is not met.

- Electric and telephone cooperatives in Oregon are eligible for federal and state broadband funding programs and are free to pursue broadband provision as a stand-alone venture or in partnership with local governments or other co-ops. A new model of start-up broadband co-ops<sup>53</sup> is emerging as an instrument for local communities banding together to solve their broadband challenges.

Resources for addressing broadband gaps, barriers, and opportunities are available as never before and from a range of potential partners that support creative solutions customized to meet local needs and opportunities. The energy and efforts captured in this plan prepare Jefferson County to mount competitive proposals to access these funds.

Broadband Equity, Access, and Development (BEAD) grant program and the Digital Equity Act (DEA) program funded out of the federal Infrastructure Investment and Jobs Act (IIJA), are opportunities for continued investment in unserved and underserved areas and communities within Jefferson County. The table below summarizes grant and subsidy opportunities available. In many cases, coordination with the State of Oregon Broadband Office will be important to ensure that timelines and necessary guidance is achieved.

Table 18: Broadband Funding Opportunities

| Program  | Description  | Timeline for Funding   |
|--|--|--|
| <b>BEAD Program</b><br><a href="#">Broadband Equity, Access, and Deployment (BEAD) Program</a> | <p>Deploy high-speed internet infrastructure where needed, supports job training, provides the equipment needed, and drives partnerships to get everyone online. Focus on improving broadband access for the following:</p> <ul style="list-style-type: none"> <li>• Unserved locations (No access to 25/3 Mbps)</li> <li>• Underserved locations (No access to 100/20 Mbps) <ul style="list-style-type: none"> <li>• Funded using Infrastructure Investment and Jobs Act (IIJA)</li> <li>• \$42.5B nationwide <ul style="list-style-type: none"> <li>○ Estimates as much as \$900M</li> <li>○ Planning grant recently submitted by the State</li> </ul> </li> </ul> </li> </ul> | <p>Funding to begin in 2023 based on the submission and approval of the State plan</p> <p>Managed by the State of Oregon Broadband office – will accept and award approved applicant subgrants</p> |
| <b>Digital Equity</b><br><a href="#">Digital Equity Act Programs</a>                           | <p>Program funding of \$2.75B to promote digital inclusion and advance equity to ensure all communities have affordable access and can use the internet to improve their lives.</p>  | <p>State Planning Grants (state awards) - \$60M total (for all states)</p> <ul style="list-style-type: none"> <li>• State plans are due not later than August of 2023</li> </ul>                   |

<sup>53</sup> <https://ilsr.org/wp-content/uploads/downloads/2016/05/RS-Fiber-Report-2016.pdf>

| Program   | Description  | Timeline for Funding  |
|---|--|---|
|   | <ul style="list-style-type: none"> <li>• FCC ACP Outreach Grants: \$100 Million</li> <li>• Covered Households: Income not more than 150% of the poverty level, veterans, disabled population, English learners, minorities, rural residents</li> <li>• State Digital Equity Capacity Grant Program (State managed)               <ul style="list-style-type: none"> <li>○ \$1.44 formula grant program</li> <li>○ Program begins once the State plans are approved anticipated in fiscal year 2024</li> <li>○ Subgrants awarded and implemented over a 5-year timeframe</li> </ul> </li> <li>• Digital Equity Competitive Grant Program (Federally managed)               <ul style="list-style-type: none"> <li>○ IIJA funded</li> <li>○ 10% match (waivable)</li> <li>○ \$250M/year over 5 years</li> </ul> </li> </ul>  |   |
| <p><a href="#"><u>Affordable Connectivity Program (ACP)</u></a></p> | <p>This program provides assistance to qualified individuals and families to purchase affordable high-speed internet service and technology.</p> <p>Available to those not earning more than 200% above the poverty level, and to those currently eligible for various social assistance programs.</p> <ul style="list-style-type: none"> <li>• Funded by Infrastructure Act               <ul style="list-style-type: none"> <li>○ \$14.2 billion allocated for the Affordable Connectivity Program (ACP)</li> </ul> </li> <li>• A low-income subsidy, not a grant for broadband service</li> <li>• \$30 per month (\$75 in tribal areas) for eligible households</li> <li>• \$100 subsidy for devices (PC, tablet, Chromebook)</li> <li>• Offered directly from participating ISPs; not all ISPs participate</li> </ul> <p>Families can get up to \$30 per month, or \$75 per month if they live on qualifying Tribal Lands. They can get \$100 to help pay for a desktop, laptop, or tablet computer.</p> | <p>Individual subsidy available through eligible service providers.</p> <p>ACP Outreach Program - \$100M</p> <p>Notice of Funding Opportunity (NOFO) due out Q4 2022 that will contain the application process</p> <p><a href="#"><u>Navigator Pilot Program (NPP) and Your Home, Your Internet Pilot Program</u></a> to strengthen outreach partners to increase awareness and adoption</p> <ul style="list-style-type: none"> <li>• Applications due January 9, 2023</li> </ul> |
| <p><a href="#"><u>Lifeline Support for Affordable</u></a></p>       | <p>FCC's program to help make communications services more affordable for low-income</p>   | <p>Available through eligible service providers.</p>  |



| Program  | Description   | Timeline for Funding  |
|--|---|---|
| <a href="#">Communications   Federal Communications Commission</a> | <p>consumers. Lifeline provides subscribers with a discount on monthly telephone service, broadband Internet service, or bundled voice-broadband packages purchased from participating wireline or wireless providers.</p> <ul style="list-style-type: none"> <li>• Funded by Universal Service Fund</li> <li>• A low-income subsidy</li> <li>• Up to \$9.25 per month for telephone and broadband service</li> <li>• Not all providers participate (primarily pre-paid MVNOs)</li> </ul>   |   |
| <a href="#">Capital Projects Fund</a>                              | <p>This \$10B state ARPA program helps state governments fund capital broadband projects and infrastructure. It works to expand high-speed internet to deliver vital services.</p> <ul style="list-style-type: none"> <li>• Inconclusive how State will leverage its ARPA for statewide broadband initiatives</li> </ul>  | <p>Managed by the State of Oregon Broadband office – will accept and award approved applicant subgrants</p> |
| <a href="#">RDOF Program Rural Digital Opportunity Fund</a>        | <p>The \$20.4 billion Rural Digital Opportunity Fund is designed to bring high speed fixed broadband service to rural homes and small businesses</p>  | <p>Service provider funding opportunity. Round 4 funding closed November 2022.</p>                          |
| <a href="#">USDA Distance Learning &amp; Telemedicine Grants</a>   | <p>Competitive program helps rural communities use advanced telecommunications technology to connect to each other - and the world - overcoming the effects of remoteness and low population density. Funds may be used for:</p> <ul style="list-style-type: none"> <li>• Audio, video, and interactive video equipment</li> <li>• Broadband facilities used for distance learning or telemedicine (up to a certain percentage)</li> <li>• Computer hardware, network components, and software</li> <li>• Instructional programming</li> <li>• Limited technical assistance and instruction on how to use distance learning and telemedicine equipment</li> </ul> <p>Jefferson County meets criteria for application based on Rurality as well as parts of the county included as Socially Vulnerable Communities and the Warm Springs Tribal area. State and</p> | <p>Application period from December 1, 2022 – January 30, 2023</p>  |

| Program | Description  | Timeline for Funding |
|---------|--|----------------------|
|         | <p>local government organizations, federally recognized Tribes, Non-profit organizations, Incorporated or for-profit businesses, and groups of eligible entities working together may apply. Awards range from \$50,000 to \$1 million. 15% match is required.</p> |                      |

## 12.7 Recommendations and Next Steps for Jefferson County

Jefferson County has much to gain in owning and managing the process of digital infrastructure because it is the key that unlocks economic potential, sustainability, and community vitality. Jefferson County should work with its communities, service providers, and the Confederated Tribes of Warm Springs to find solutions that are holistic and longer term in their approach, inclusive, and leverage economies of scale to better ensure sustainability.

Based on the findings from this study and discussions with stakeholders in Jefferson County, the following recommendations and next steps are proposed:

- Need to carry forward the recommended eStrategy action items in **Section 11.4** – choose who is responsible and resource appropriately as an investment in Jefferson County’s future
- Discuss, adjust as needed, and implement the e-Strategy recommendations – in particular:
  - Design and Engineering**
    - Focus on areas identified in study to assess existing assets and where possible leveraging those assets to design digital infrastructure that enables open access so that providers can build a business case to provide future-ready service
  - Digital Economy Manager**
    - Hire full-time to manage grant applications, broadband infrastructure funding and process, collaborations with local service providers, and drive digital transformation through Digital Navigators
  - Digital Navigators for ACP**
    - Hire through existing local stakeholder organizations with Federal / State funding to help residents access ACP and Lifeline subsidies
  - Digital Innovation Hubs**
    - Use State Digital Equity funds to setup in Madras, Metolius, Culver, Crooked River Ranch, Warm Springs
    - Deliberate strategy to engage all residents and tribal members and raise awareness about offerings/opportunities
    - Build local capacity and use train the trainer model to deliver resources and technical support onsite. Jefferson County has a trusted leadership role as a vendor-neutral, technology agnostic steward of the local economy and community vitality because it has the mandate for the county’s local economy and quality of life that is long-term, holistic, and inclusive
- Pursue Federal and State funding opportunities summarized in **Section 12.6**
- Implement digital infrastructure and transformation as a process which will be an ongoing effort and focus needed to identify evolving digital divides, strategically address them, measure outcomes and share performance stories
- Implement an on-going communication process to keep local leaders and the public informed and participating in digital inclusion and transformation across Jefferson County. This ongoing community engagement is key to:
  - being inclusive – which is needed for digital inclusion across Jefferson County
  - keeping stakeholders and the public engaged in the ongoing process– especially when outcomes and impacts in Jefferson County can be measured and performance stories are shared

## Appendix 1 - Digital Inclusion Data for Jefferson County

Table 19: Digital Inclusion Demographics Statistics Breakdown

|                                    | Number    | Poverty<br>(% Pop) | < High<br>School<br>(% Pop) | American<br>Indian<br>(% Pop) | Hispanic<br>(% Pop) | Disabled<br>(% Pop) | Senior<br>Citizen<br>(% Pop) | % HH w/o<br>Broadband<br>Subs | % HH<br>w/o<br>Device |
|------------------------------------|-----------|--------------------|-----------------------------|-------------------------------|---------------------|---------------------|------------------------------|-------------------------------|-----------------------|
| <b>Oregon</b>                      |           |                    |                             |                               |                     |                     |                              |                               |                       |
| Households                         | 1,658,091 |                    |                             |                               |                     |                     |                              | 10.5%                         | 5%                    |
| Population                         | 4,246,155 | 12.2%              | 8.5%                        | 1.9%                          | 14%                 | 10.2%               | 18.6%                        |                               |                       |
| <b>Jefferson County</b>            |           |                    |                             |                               |                     |                     |                              |                               |                       |
| Households                         | 8,244     |                    |                             |                               |                     |                     |                              | 3.9%                          | 6.4%                  |
| Population                         | 24,502    | 12.5%              | 12.2%                       | 18.3%                         | 20.8%               | 13.6%               | 19.7%                        |                               |                       |
| % non-adopters                     |           | 45%                | 54%                         | 50%                           | 35%                 | 24%                 | 36%                          | 100%                          | 100%                  |
| Jefferson County Target Population | 11,867    | 1,378              | 1,614                       | 2,242                         | 1,784               | 800                 | 1,738                        | 875                           | 1,436                 |

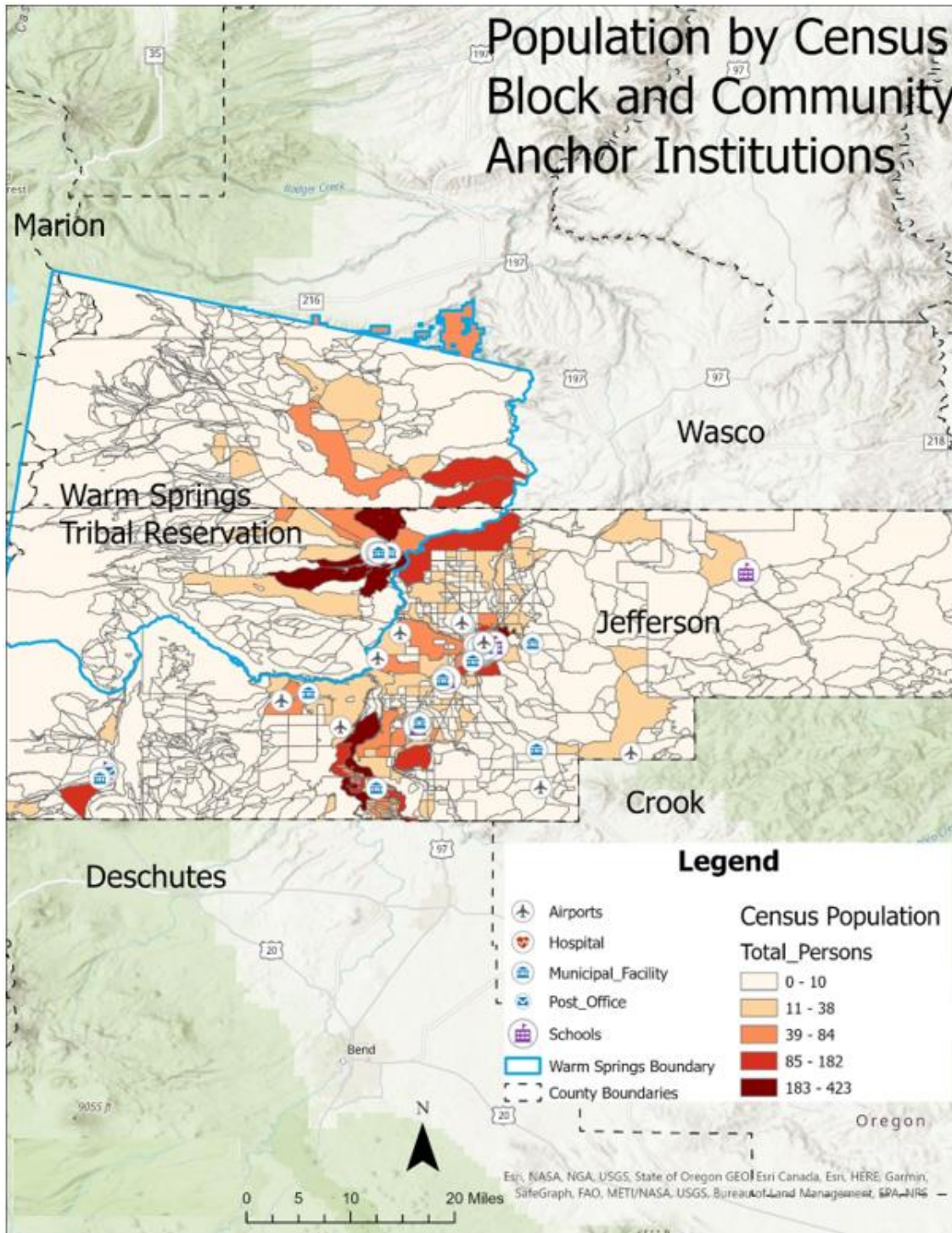
## Appendix 2 - Cell Tower Locations in Jefferson County

Table 19: Cell Tower Locations in Jefferson County

| Name  | CITY         | STATE | ASSET TYPE | FCC ID  | FAA ID           | LATITUDE | LONGITUDE |
|---|--------------|-------|------------|---------|------------------|----------|-----------|
| CO TOWER  | WARM SPRINGS | OR    | TOWER      |         |                  | 44.7697  | -121.251  |
| EAGLE BUTTE TOWER                               | WARM SPRINGS | OR    | TOWER      |         |                  | 44.8379  | -121.231  |
| MILLER FLAT TOWER                               | WARM SPRINGS | OR    | TOWER      |         |                  | 44.7697  | -121.264  |
| PELTON DAM TOWER                                | WARM SPRINGS | OR    | TOWER      |         |                  | 44.7404  | -121.252  |
| SCHOOLIE FLAT TOWER                             | WARM SPRINGS | OR    | TOWER      |         |                  | 44.9563  | -121.356  |
| SEEKSEEUQUA TOWER                               | WARM SPRINGS | OR    | TOWER      |         |                  | 44.6627  | -121.288  |
| SIDWALTER LOOKOUT TOWER                         | WARM SPRINGS | OR    | TOWER      |         |                  | 44.9234  | -121.537  |
| KGI WIRELESS                                    | MAUPIN       | OR    | TOWER      | 0       | 0                | 45.0871  | -121.4    |
| AMERICAN TOWER                                  | MADRAS       | OR    | TOWER      | 1219462 | 99-ANM-2042-OE   | 44.9603  | -121.474  |
| KWSO RADIO                                      | WARM SPRINGS | OR    | TOWER      | 1035881 | 2013-ANM-2171-OE | 44.8399  | -121.233  |
| NEW CINGULAR WIRELESS SERVICES                  | EAGLE BUTTE  | OR    | TOWER      | 1035276 | 92-ANM-0010-OE   | 44.8397  | -121.233  |
| AMERICAN TOWER                                  | WARM SPRINGS | OR    | BUILDING   | 0       | 0                | 44.7647  | -121.266  |
| AT&T MOBILITY WIRELESS OPERATIONS HOLDINGS INC. | WARM SPRINGS | OR    | TOWER      | 1035881 |                  | 44.8399  | -121.233  |
| AMERICAN TOWER                                  | WARM SPRINGS | OR    | BUILDING   | 0       | 0                | 44.7647  | -121.266  |
| AFCOMM  | MADRAS       | OR    | TOWER      | 1242434 | 2004-ANM-29-OE   | 44.6676  | -121.118  |
| ITT   | MADRAS       | OR    | TOWER      | 1272555 | 2009-ANM-623-NRA | 44.6668  | -121.147  |
| HORIZON BROADCASTING GROUP                      | MADRAS       | OR    | POLE       | 1231220 | 01-ANM-2897-OE   | 44.6657  | -121.114  |
| CITY OF MADRAS                                  | MADRAS       | OR    | TOWER      | 1280873 | 2011-ANM-356-NRA | 44.6653  | -121.156  |
| PACIFICORP                                      | MADRAS       | OR    | TOWER      | 1241412 | 2003-ANM-1812-OE | 44.6648  | -121.129  |
| JEFFERSON COUNTY 911                            | MADRAS       | OR    | TOWER      | 1291043 | 2013-ANM-2432-OE | 44.6635  | -121.147  |
| PACIFICORP PACIFIC POWER & LIGHT CO             | MADRAS       | OR    | POLE       | 1035438 | 87-ANM-0517-OE   | 44.6603  | -121.142  |
| UNITED STATES CELLULAR CORPORATION              | MADRAS       | OR    | POLE       | 1045478 | 98-ANM-0313-OE   | 44.6536  | -121.126  |
| CCATT   | MADRAS       | OR    | TOWER      | 1035275 | 2006-ANM-2497-OE | 44.6531  | -121.126  |
| BNSF RAILWAY CO                                 | MADRAS       | OR    | TOWER      | 1225132 | 2011-ANM-1036-OE | 44.6506  | -121.133  |
| BNSF RAILWAY CO                                 | MADRAS       | OR    | POLE       | 1046450 | 2016-ANM-3385-OE | 44.6506  | -121.133  |

|   |            |    |          |         |                  |         |          |
|---|------------|----|----------|---------|------------------|---------|----------|
| AAT COMMUNICATIONS CORPORATION                    | MADRAS     | OR | TOWER    | 0       | 0                | 44.6378 | -121.132 |
| SBA TOWERS  | MADRAS     | OR | TOWER    | 1214821 | 00-ANM-0645-OE   | 44.6189 | -121.128 |
| UNITED STATES CELLULAR CORPORATION                | MADRAS     | OR | TOWER    | 1253318 | 2006-ANM-895-OE  | 44.6063 | -121.239 |
| SPECTRASITE COMMUNICATIONS (AMERICAN TOWERS)      | MADRAS     | OR | TOWER    | 1222799 | 01-ANM-3557-OE   | 44.5383 | -121.096 |
| PINE TELEPHONE SYSTEMS                            | CULVER     | OR | TOWER    | 1292327 | 2013-ANM-407-OE  | 44.538  | -121.391 |
| SBA STRUCTURES                                    | OPAL CITY  | OR | TOWER    | 1214437 | 00-ANM-1555-OE   | 44.4883 | -121.195 |
| UNITED STATES CELLULAR CORPORATION                | MADRAS     | OR | TOWER    | 1253894 | 2006-ANM-1188-OE | 44.4342 | -121.269 |
| DAY MANAGEMENT CORPORATION (DAY WIRELESS SYSTEMS) | MADRAS     | OR | TOWER    | 1260227 | 2007-ANM-2546-OE | 44.4172 | -121.102 |
| CROWN CASTLE                                      | MADRAS     | OR | POLE     | 111     |                  | 44.6531 | -121.126 |
| CROWN CASTLE                                      | MADRAS     | OR | BUILDING | 0       |                  | 44.6357 | -121.131 |
| CROWN CASTLE                                      | MADRAS     | OR | BUILDING | 0       |                  | 44.6456 | -121.128 |
| AT&T MOBILITY WIRELESS OPERATIONS HOLDINGS INC.   | CULVER     | OR | TOWER    | 0       |                  | 44.4162 | -121.222 |
| OREGON RSA #2, INC.                               | TERREBONNE | OR | TOWER    | 0       |                  | 44.4171 | -121.101 |
| OREGON RSA #2, INC.                               | MADRAS     | OR | TOWER    | 0       |                  | 44.6537 | -121.126 |
| UNITED STATES CELLULAR (COMPANY OF MEDFORD)       | TERREBONNE | OR | TOWER    | 0       |                  | 44.4171 | -121.101 |

Appendix 3 - Community Anchor Institutions and Census Population



## Appendix 4 - Digital Inclusion and Transformation Budget for Jefferson County

| Digital Inclusion and Transformation Budget for Jefferson County |                    |                    |                    |                    |                  |                                    |
|--|--------------------|--------------------|--------------------|--------------------|------------------|------------------------------------|
| eStrategy Recommendations  | Year 1             | Year 2             | Year 3             | Total              | Network          | Funding Source                     |
| 1 Digital Navigators for ACP                                     | \$50,400           |                    |                    | \$50,400           |                  | BEAD - 100%, no match              |
| 2 Digital Economy Manager  | \$85,000           | \$85,000           | \$85,000           | \$255,000          |                  | BEAD - 100%, no match              |
| 3 Design and Engineering   |                    |                    |                    |                    | \$800,000        | EDA                                |
| 4 Prepare and Manage Funding Applications                        | incl. in item 2    |                    |                    |                    |                  |                                    |
| 5 Digital Innovation Hubs  | \$225,000          | \$225,000          | \$225,000          | \$675,000          |                  | BEAD Digital Equity                |
| 6 Digital Navigators for ehealth, elearning, etc.                | \$787,500          | \$787,500          | \$787,500          | \$2,362,500        |                  | BEAD Digital Equity                |
| 7 Digital Transformation of Service Delivery with Stakeholders   | \$750,000          | \$750,000          | \$750,000          | \$2,250,000        |                  | BEAD Digital Equity                |
| 8 Small Business Growth Program                                  | \$85,000           | \$85,000           | \$85,000           | \$255,000          |                  | BEAD, EDA, Jefferson County        |
| 9 Performance Measurement and Impact Tracking                    | \$250,000          | \$250,000          | \$250,000          | \$750,000          |                  | BEAD - project evaluation          |
| 10 Network Governance and Operating Model                        |                    |                    |                    |                    | \$60,000         | JeffCo, Public Private Partnership |
| 11 SPV Investment and Board Participation                        |                    |                    |                    |                    | TBD              | Public-Private Partnership, BEAD   |
| <b>Total</b>   | <b>\$2,232,900</b> | <b>\$2,182,500</b> | <b>\$2,182,500</b> | <b>\$6,597,900</b> | <b>\$860,000</b> |                                    |



## Appendix 5 - eCheckup Findings for Service Providers

[see PDF of eCheckup Findings for Service Providers provided to Jefferson County]

## Appendix 6 - Media Log for Community Engagement

| Media Log - Jefferson County |                      |                               |                            |
|------------------------------|----------------------|-------------------------------|----------------------------|
| Date                         | Audience             | Media                         | Topic                      |
| 3/28/22 - 4/6/22             | Jefferson County     | Web Page                      | Assessment Intro & Links   |
| 04/05/22                     | Jefferson County     | Graphics                      | Assessment is Live         |
| 4/7/22 - 4/8/22              | BAT/Leadership       | 200+ emails                   | Launch                     |
| 04/11/22                     | Central Oregon Media | Press Release-1               | Launch                     |
| 04/13/22                     | JCBA FB Page         | Posts                         | Launch                     |
| 04/15/22                     | JCBA FB Page         | Business Groups               | Business Focus             |
| 04/19/22                     | BAT                  | Email                         | BAT Update                 |
| 04/19/22                     | FB Groups            | Madras Comm Events &. News    |                            |
| 04/19/22                     | Jennifer Oppenlander | Email, Flyer                  | Hispanic Community         |
| 04/19/22                     | La Bronca (KRDM)     | Spanish Radio                 | Assessment is Live         |
| 04/20/22                     | Madras Pioneer       | Ad, Press Release *4 Week Run | Assessment is Live         |
| 04/20/22                     | FB JeffCO Groups     | Post                          | Students                   |
| 04/20/22                     | Warm Springs (KWSO)  | PSA *4 Week Run               | Launch                     |
| 04/20/22                     | 3RREC.com            | Emails, Phone                 | Assessment Live            |
| 04/20/22                     | La Bronca (KRDM)     | Radio *4 Week Run             | eCheckup                   |
| 04/21/22                     | 3RREC.com            | phone call                    | Assessment                 |
| 04/21/22                     | 3RREC.com            | email to JR, NS               | Meg Cummings               |
| 04/21/22                     | Jefferson County     | Graphics                      | Comm Meetings              |
| 04/21/22                     | CRR                  | Email                         | Meeting invite             |
| 04/21/22                     | Camp Sherman         | Email                         | Meeting invite             |
| 04/21/22                     | Horizon Broadcasting | Radio Ad -1,2 *4 Week Run     | Business Focus             |
| 04/21/22                     | FB BB Group          | Post                          | Families Focus             |
| 04/27/22                     | Madras Pioneer       | Ad2                           | Businesses                 |
| 04/27/22                     | Madras Pioneer       | PR2                           | Businesses                 |
| 04/28/22                     | Central Oregon Media | PR3                           | Comm Meetings              |
| 04/28/22                     | BAT                  | Update, PR3                   | Comm Meetings              |
| 04/28/22                     | Culver/Metolius      | PR3                           | Comm Meetings              |
| 04/28/22                     | Madras Pioneer       | PR3                           | Comm Meetings              |
| 04/28/22                     | Horizon Broadcasting | PR3, Ad3                      | Comm Meetings              |
| 05/02/22                     | Madras/Culver/Met    | FB Posts                      | Comm Meetings              |
| 05/03/22                     | Madras Pioneer       | Ad3                           | Finalized Comm Mtgs        |
| 05/04/22                     | CS/CCR/Madras        | Follow up emails              | Zoom/PPTX at Comm meetings |
| 05/04/22                     | Hispanic Comm        | Flyer                         | Complete the Assessment    |
| 05/04/22                     | Horizon Broadcasting | Radio ad-3                    | Community Meetings         |
| 05/05/22                     | Facebook Groups      | 4 posts                       | Graduation Rates/No BB     |
| 05/05/22                     | Email                | Camp Sherman                  | Zoom Invite                |

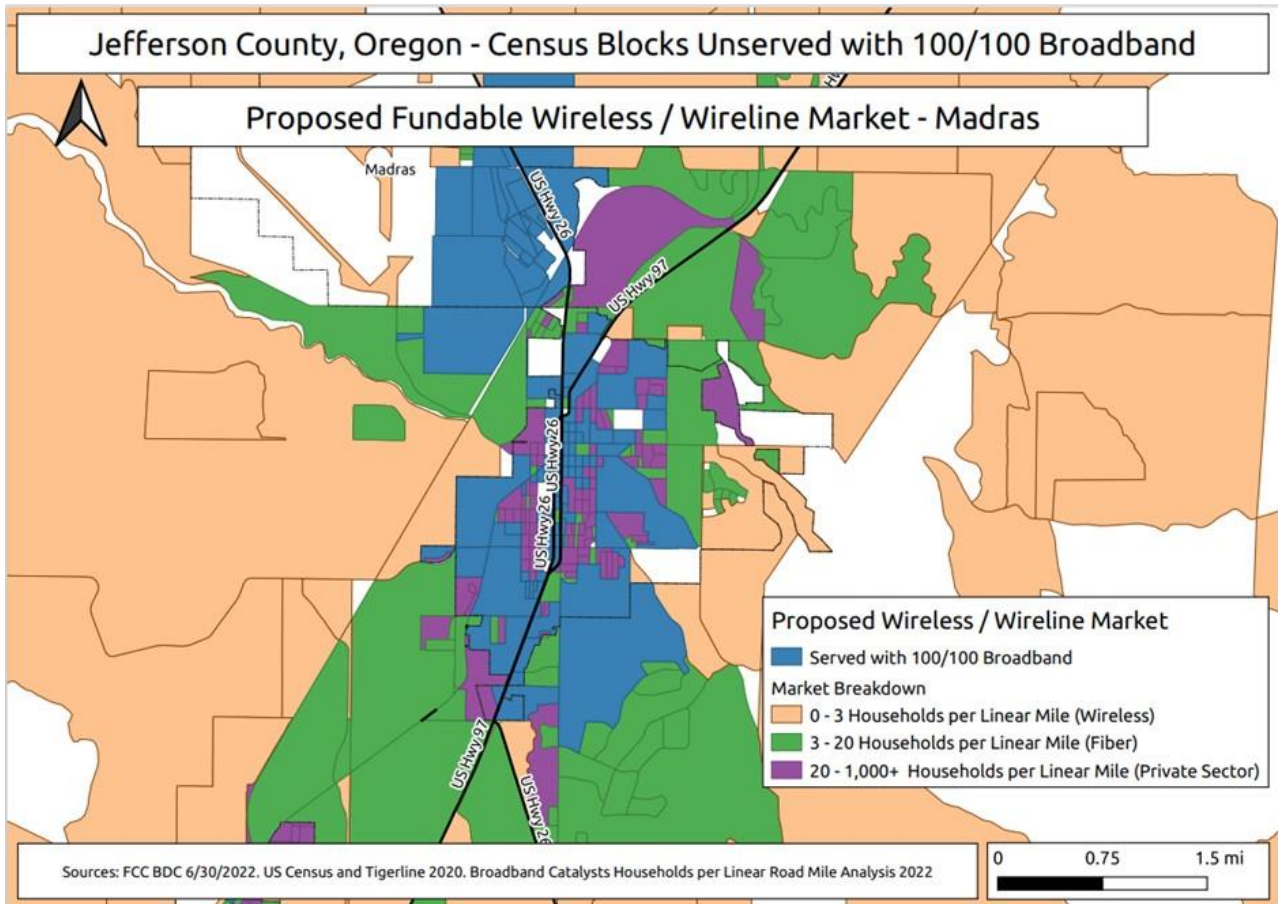
|          |                         |                      |                        |
|----------|-------------------------|----------------------|------------------------|
| 05/05/22 | Email                   | CCR                  | Zoom invite            |
| 05/05/22 | Email                   | Culver/Met/Madras    | Zoom Invite            |
| 05/05/22 | Email                   | Leadership List      | Meeting invite         |
| 05/09/22 | Madras Pioneer          | PR4, Display         | Student Success        |
| 05/09/22 | Horizon<br>Broadcasting | Radio Ad-4           | Student Focus          |
| 05/10/22 | CRR                     | Comm Meetings        | Purpose of Assessment  |
| 05/11/22 | Warm Springs            | Radio, Comm Meetings | Purpose of Assessment  |
| 05/11/22 | COIC                    | Deschutes County     | Launch                 |
| 05/23/22 | Follow Up Planning      | Emails               | New Messaging/Outreach |
| 05/24/22 | Ashwood                 | Emails               | Invite/PPT             |
| 05/24/22 | FB Groups               | Posts                | Tired of Poor BB?      |
| 05/24/22 | Follow Up Planning      | Documents            | Media Summary          |

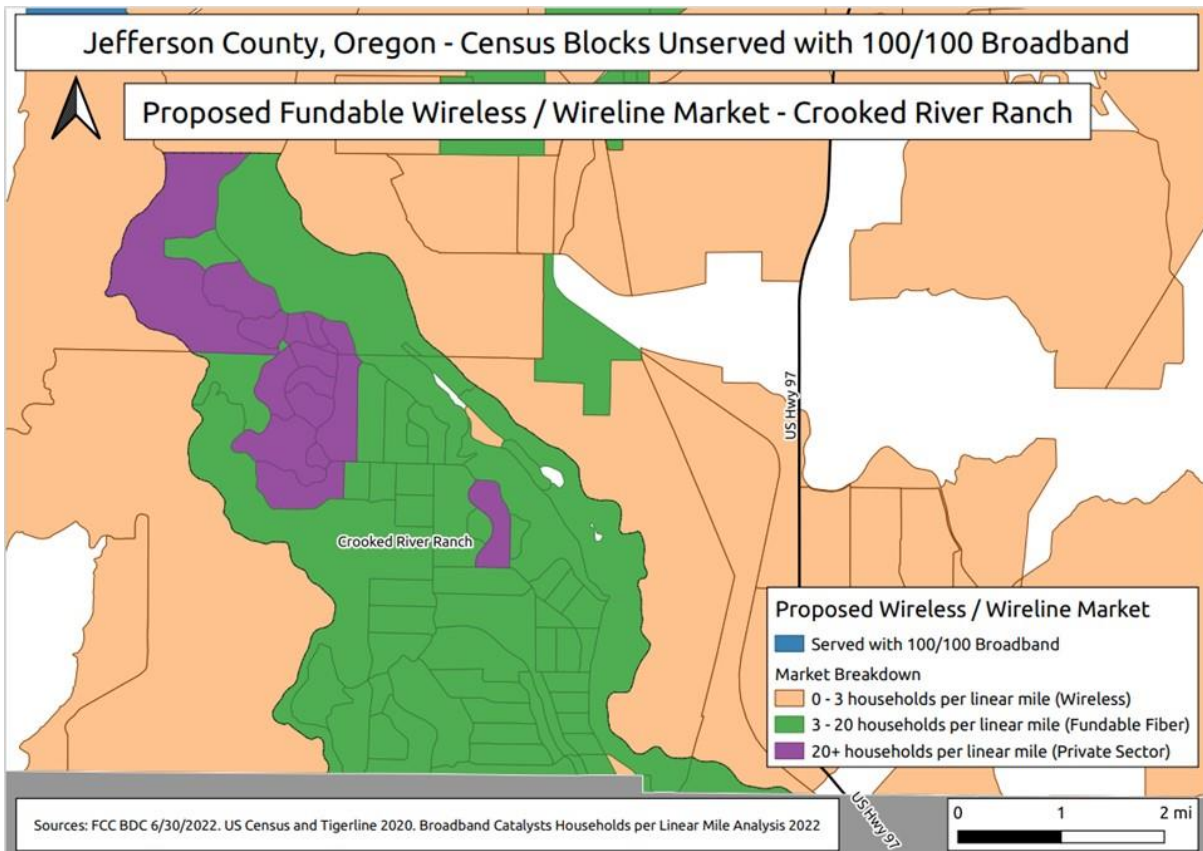
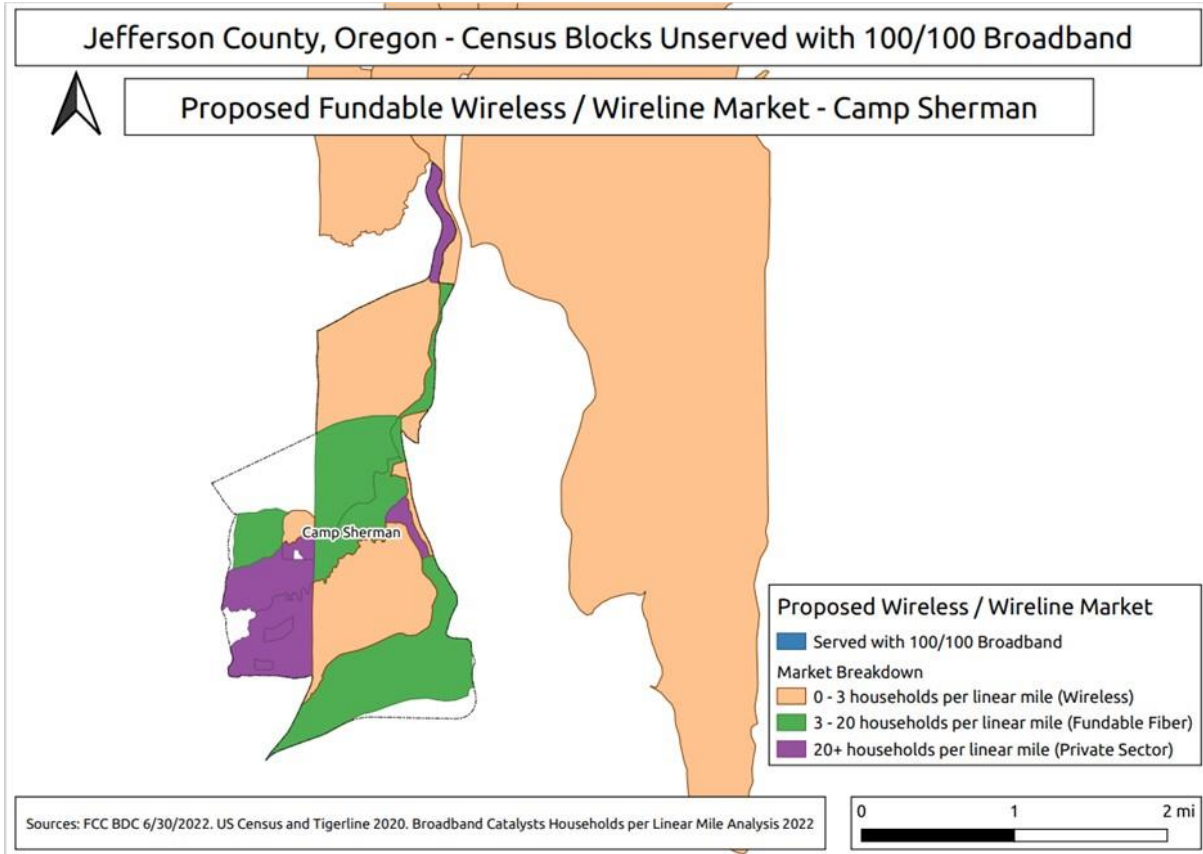
Social media groups engaged February to June 2022:

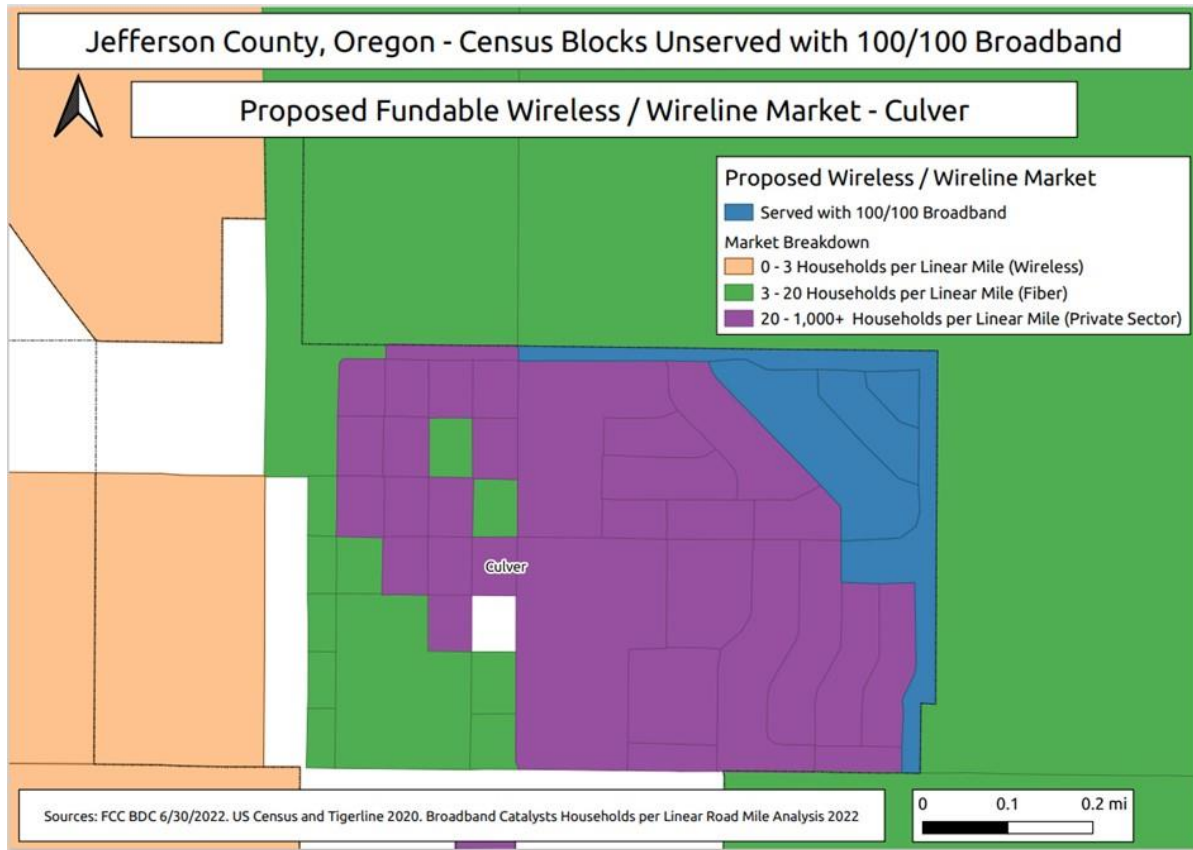
- Madras Oregon Community & Events
- Madras Neighborhood Community
- Culver Oregon Community Group
- Jefferson County Broadband Assessment

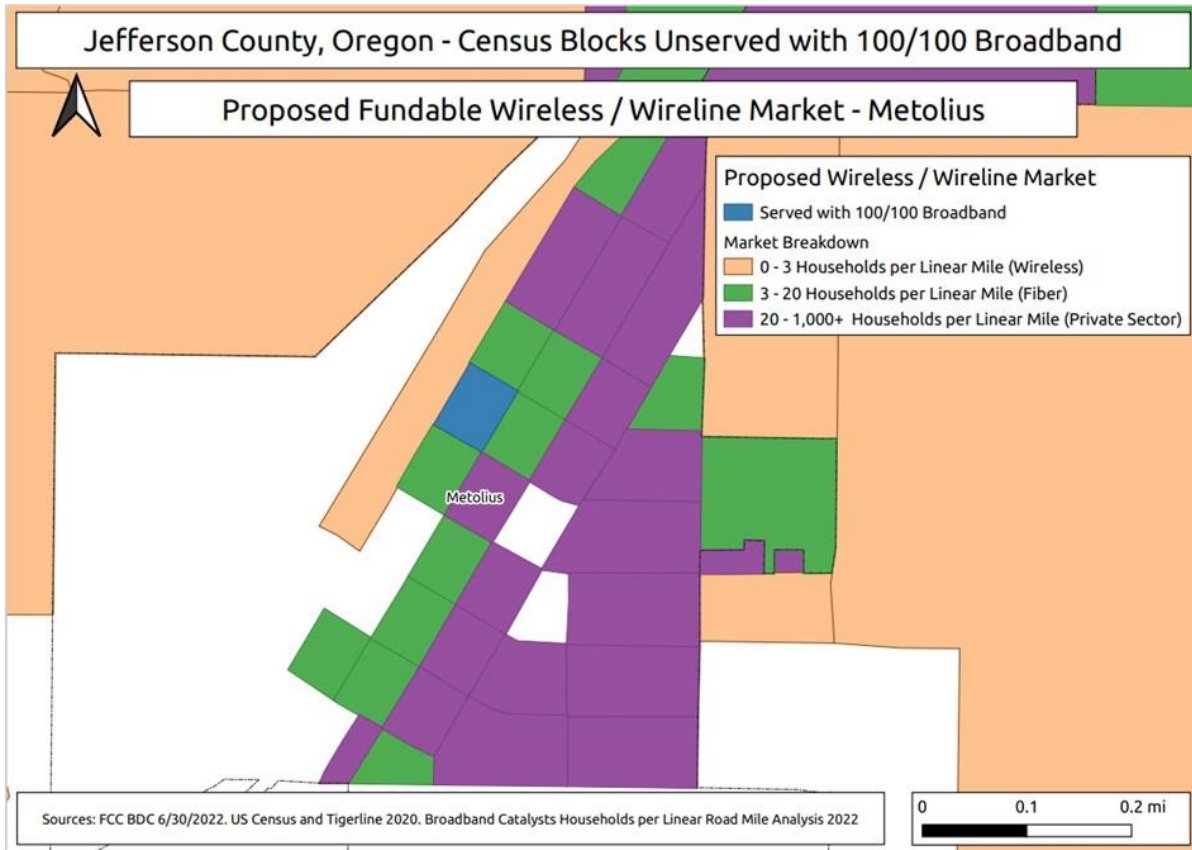
## Appendix 7 - Detailed Maps of Proposed Wireless / Wireline Markets

Below are detailed maps of the demarcation between **fixed wireless market** (tan shaded Census Blocks) versus **wireline market** (green shaded Census Blocks). The blue shaded Census Blocks are reported served with 100/100 Mbps and the purple shaded Census Blocks should be addressable by the private sector.











**strategic**  
**networks group**

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advancing economies in a digital world