

JUNE 15, 2022



Coös County
NEW HAMPSHIRE



mission
broadband
Connecting Rural's Communities



COÖS COUNTY BROADBAND INFRASTRUCTURE MAPPING STUDY

PRESENTED TO

Coös County

PRESENTED BY

NCDE, Mission Broadband, Inc

TABLE OF CONTENTS

Introduction	3
Executive Summary	5
Mapping and Gap Analysis	12
Partnerships and Business Models	23
Financial Resources	26
Recommendations and Next Steps	37
Appendix A: <i>Glossary of Terms</i>	40
Appendix B: <i>Market Analysis</i>	47
Appendix C: <i>Mapping Data, Non-Confidential</i>	54
Appendix C: <i>Mapping Data, CONFIDENTIAL</i>	63
Appendix D: <i>Gap Report, CONFIDENTIAL</i>	106



INTRODUCTION

Coös County established the Coös County Broadband Committee in the fall of 2020 due to growing frustration from constituents on the lack of adequate broadband in many communities across the county. North Country Council was asked to manage and facilitate the meetings. Members were sought from the surrounding city, towns, and unincorporated places within the county to join the committee and work together on the challenges in the wake of Covid and its stress on the current broadband infrastructure.

In early January the North Country Council released the Coös County Commissioners on behalf of the Coös County Broadband Infrastructure Mapping Study RFP with an application deadline at the end of January 2022. The RFP was the result of a larger project that was broken down into manageable tasks with a tight turnaround to provide the first step of mapping broadband county-wide and a service gap analysis utilizing some of the county's American Rescue Plan Act (ARPA) allocation to fund the project.

On January 29, 2022, the National Collaborative for Digital Equity (NCDE), and Mission Broadband (MBI) remitted a proposal to North Country Council and Coös County Administration. In response to The Coös County Broadband Infrastructure Mapping Study RFP, a project team of four was put together to manage every aspect of the project including the following personnel:

Carol Miller, Director of Broadband Initiatives, NCDE

Michael Elliott, Customer Relationship Manager, MBI

Jason Gay, Network Engineer | Project Manager, MBI

Mike Reed, Consultant, MBI

NCDE was notified on February 9, 2022, that the collaborative team of NCDE and MBI was awarded the contract for the Coös County Broadband Infrastructure Mapping Study at the Commissioners Meeting. The team set up a schedule of meetings to give the North Country Council and Coös County Administration regular updates on progress.

Scope of Work

The scope of work provided the following services:

- Network Asset and Deficit Assessment with documentation, and mapping of existing conditions;
- Stakeholder and Community Engagement with meeting facilitation, and survey;
- Gap analysis and Proposed Recommendations with an action plan, and funding sources

It is our hope that by compiling this report, Coös County will be able to help its cities, towns, and unincorporated places with the data that's needed to fill gaps in service coverage with local, state, and federal resources as they become available.

The mapping will provide a solid basis for writing grants, raising capital, creating public-private partnerships, and estimating the cost of fiber-optic to the premise and in some cases a phased-in approach to filling gaps now and planning for fiber-optic later.



EXECUTIVE SUMMARY

Every discussion about broadband needs to answer the following questions. What is broadband and why is broadband important to Coös County?

Educating the public about technology and its limitations helps to provide a clear understanding that broadband is as fragile as the infrastructure used to deliver it. With outside plant, and in many cases the age of the wires and the poles, especially in the north country, and in some cases the conditions of the towers and age of the equipment for all technologies used to deliver broadband have an effect on the quality and capacity of broadband service. It is an ever-changing landscape that needs constant maintenance, and a commitment to keep up with new technologies while delivering broadband seamlessly.

Here is what Steve Naboichuck, a north country resident, and a Senior Fellow at Lockheed Martin (who works remotely) has to say. He defines broadband, describes frustration with slow connections, and comments on the next best technology investment to support our future in the next three paragraphs.

“Broadband Internet can be defined in two different ways. A qualitative description is a reliable Internet connection that can support a variety of communication services and information access, which isn’t limited by the Internet connection to your home or business. A more quantitative description of broadband is referred to as data bandwidth or data speed and the definition varies but according to the Federal Communications Commission (FCC), it is a minimum of 25 megabits/second (Mbps) download speed and 3Mbps upload speed. Where download is the ability to move data into your home and upload is moving data from your home out to the Internet. However, the minimum upload/download speed for effective information transfer is being redefined and speeds of at least 100Mbps are strongly recommended to take full advantage of services and information access.”

“There are a variety of issues you will encounter when your connection can’t reliably support your data speed demands. These include a long delay before completing uploading or downloading files. Examples include sending a picture using email to friends and family or downloading a movie which could take several minutes or even up to an hour or more with a slow connection and would only take seconds with a broadband connection. Another example would be using a video application like Zoom or Skype where the video quality is poor and drops out due to interruptions. Sometimes when the data speed is poor the function you are trying to perform simply doesn’t work at all. This problem can also be exacerbated by several people in a household or business who are simultaneously attempting Internet access.”

“The most robust solution is the use of fiber-optic cable, which has the best data speeds and provides a long-term solution for future needs of businesses and homes. The effort to bring broadband data speeds to our communities is about providing fiber-optic connectivity to the home allowing unimpeded access to the Internet and all that comes with it. As our society becomes more and more reliant upon digital connectivity a reliable broadband connection enables our community and businesses to maintain relevance and remain competitive for both today's as well as future demands. “

Our work began with an initial kickoff meeting with the North Country Council and Coös County Administration on February 25, 2022, to assess a shared broadband vision for the county followed by monthly meetings thereafter to track progress to date. The vision and the future of broadband were supported by the Coös County Broadband Committee which was formed in late 2020 by the Coös County Commissioners and facilitated by North Country Council. The committee members represent cities, towns, and unincorporated places that share information on broadband providers, service coverage and gaps, and challenges in expanding broadband coverage and capacity.

Coös County Broadband Committee members share the understanding that communication infrastructure has a shelf life, and while gaps in service coverage needed to be filled in the near future, there was an opportunity to work together on the long-term goal of fiber-optic to the premise for all. Whether through a phased-in approach or long-term goal, the future of Coös County is dependent upon a stable, reliable, and redundant communications structure to support economic development, job opportunities, adoption of telehealth services, and access to education and government services.

Broadband usage has exploded not only for county residents but worldwide. The need for bandwidth to service a family of four has grown exponentially and has to negotiate for several devices (at least 1 per household member) in use, and sometimes more. Remote workers, students, streaming services, VoIP, and security have created a vibrant marketplace of software platforms that are using broadband bandwidth to get to health care institutions, educational institutions, banking, and government services. A 25Mbps by 3Mbps (FCC broadband definition) connection may barely suffice to service a 1-person household.

In order to accurately capture the challenges and opportunities that are presented to residents and other users of broadband, a Countywide survey was created and disseminated, giving users from every household the opportunity to share their experiences and also what their desired outcome could be in the form of the ideal user experience. Questions covered a range of key issues and topics, including cost, reliability, utilization, technology type/vendor, and other considerations. This information served as a snapshot that highlights the areas of opportunity with respect to broadband in each community. Part of the exercise included the gathering of speed test data, which serves as a baseline that can be used in conjunction with the mapping data that was developed for this project to not only articulate a user's experience, but also determines their location, and how fast their actual speeds happen to be, which can be compared against the advertised speeds that they are paying to providers. When combined together with the rest of the data, it paints a strong picture of what the challenges and opportunities truly are, while also providing a measure of transparency to the quality of service that residents receive.

Despite gaps in coverage, overall, Coös County is in pretty good shape with regards to broadband providers and coverage due to grant initiatives, private funding by providers, and partnerships. The mapping data confirms that most communities have at least 2 providers. There are a few communities that have a fixed wireless provider and a satellite provider but those are low-density areas where a return on investment for a provider is limited. The unincorporated places with residents may have access to fixed wireless, and all places may have access to satellites based on many variables including the availability of a power source. In many cases, providers serve a portion of a town for not everywhere within its borders. This is what is known as the swiss cheese approach to broadband coverage. From a county perspective, broadband is a patchwork of networks built in close proximity to serve rural communities where their return-on-investment margins can be met.

The stakeholders and industry clusters confirmed what the mapping data is showing. The health care industry, the banking industry, libraries, schools k-12, and post-secondary educational institutions were identified as community anchor institutions and pillars in each community that needs a higher level of broadband-only delivered by fiber-optic with service level agreements. These community anchor institutions are welcome partners in aggregating demand which spurs investment in outside plant and fiber facilities. Their presence helps to advance broadband and equity projects by paving the way for high-speed fiber-optic service to our main streets.

We took a look at the k-12 schools' connectivity and bandwidth. Not to say that all schools have access to fiber-optic, but most are using higher bandwidth capacity and fiber-optic connectivity. A query of the superintendents on the homework gap did not reveal any real problems within the school systems. Those problems were addressed early on during the Covid-19 state of emergency quarantines that required the schools to deliver online learning.

Stakeholder interviews revealed that since the start and rapid spread of Covid-19, north country institutions, and businesses were hit hard early on. The state mandate of quarantine and masks affected all institutions, businesses, and citizens. Many developed new ways to deliver services using broadband. They had to come up with ways to maintain and grow services in a highly contagious environment. It presented many challenges to the broadband infrastructure as the need for speed and bandwidth exploded with families streaming data while children did school work and parents worked remotely.

Current Broadband Providers in Coös County:

- Consolidated Communications Inc – DSL Copper/Fiber and Leased Lines
- Spectrum – Cable TV and Broadband
- Bretton Woods Telephone Company (BWTC) - Cable TV and Fiber
- Wireless Partners dba Great North Woods Wireless – Fixed wireless and cell
- Netafy – Fixed Wireless
- Argent Communications – Cable TV and Broadband/Fiber
- Fibercast – Cable TV and Broadband/Fiber
- Firstlight – Fiber for Business and Anchor Institutions
- New Hampshire Electric Coop (NHEC) - Fiber to the Business and Residential

Our municipal communities need to take a leadership role in helping to solve their broadband challenges. Real Estate is worth 20% less without adequate broadband service. On the flip side properties with broadband are worth 20% more. There is no better incentive than value to tip the scales in favor of working together to ensure residents have redundant and reliable broadband service.

The opportunity has never been better to find solutions and funding to enhance broadband in our communities. Several steps can be taken to prepare communities to take advantage of local, state, and federal resources. Communities can be ready by taking the following next steps:

- Do a Broadband Readiness Assessment (Survey);
- Build a community team;
- Set clear goals and objectives;
- Apply for a planning grant;
- Do a mapping and technology analysis (Already done by Coös County);
- Do a cost comparison and analysis;
- Evaluate business models and business plans;
- Evaluate financing strategies;
- Prepare and release a Request for Proposal (RFP) to improve service;
- Educate and share the plan with fellow residents to build consensus;
- Plan for the political process;
- Make decisions collaboratively

For communities looking to improve service, the county has done the mapping which identifies areas of need. Planning and investment strategies need to be developed and approved for each community based on public input and realistic outcomes. It is necessary to recruit local residents to work together to move projects forward. Communities looking to build social capital can engage with professional facilitators to sort through and design a strategy that will accomplish goals and objectives set by local residents.

The investment in new fiber-optic infrastructure will serve our communities and the County for the next 50 years. Coös County is a convener, collaborator, and partner in the economic development strategies of its city, towns, and unincorporated places.

Its strength is in its power to leverage resources on behalf of others within its borders. Help communities understand what “Broadband Ready” in a grant funding frenzy can do for their residents. In a second position, the county can support each with access to data, market research, and financing strategies that will improve access to communications for health, education, employment opportunities, and government services.

How do we get there? It is a long-term plan that will require consistent attention to detail and the education of the general public. There are no quick fixes. Promoting the benefits of a connected population without the constraints and frustration of bandwidth and capacity problems will create value for every property owner in the county and the places they reside. It takes one challenge off the plate while concentration can be placed on poverty, housing, and job opportunities.



Community Meetings

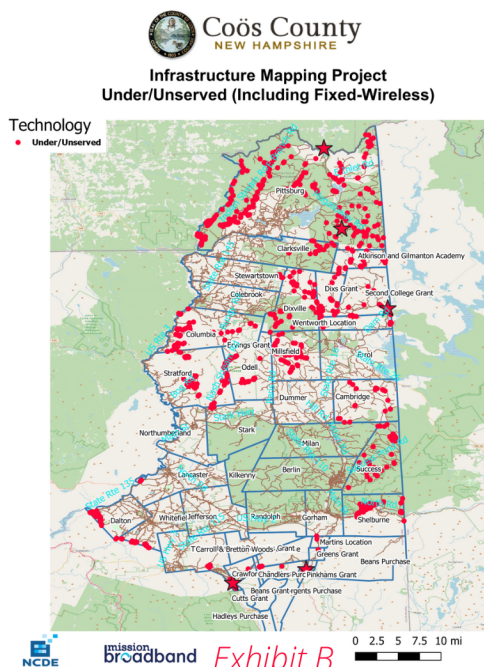
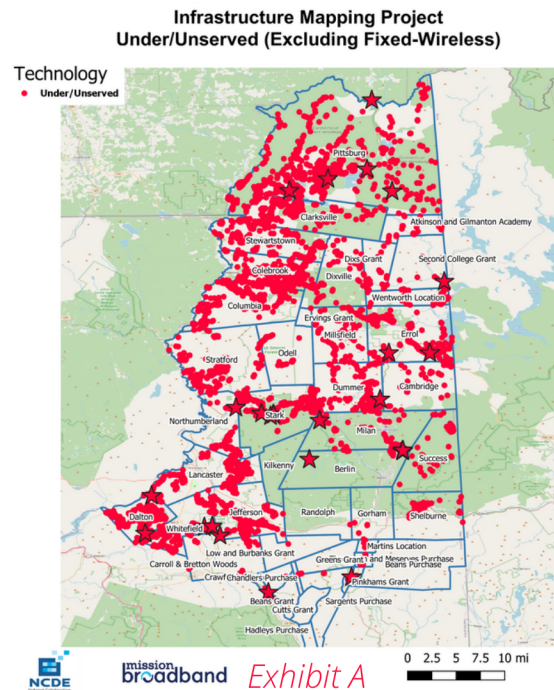
There were three Broadband Open Houses held as part of the data gathering process in the month of May. The Open Houses were advertised in the local newspapers, radio, and social media platforms. Lancaster Town Hall on May 4, Colebrook Town Hall on May 5, and Gorham Town Hall on May 18. Attendees were able to fill out the Broadband Survey while inspecting draft maps developed from the mapping data collection of broadband coverage to date submitted by the providers. With the use of technology, we were able to show how the mapping is used to view each rural address location by type of technology and capacity available.

In Lancaster, Colebrook, and Gorham some attendees came seeking help with inadequate broadband connections on the outskirts of town while others came on behalf of other town residents in need of better service or just wanted to talk about technology. In every case, we were able to zoom in on their properties to confirm the available technology at each location and increase their knowledge of options for service.

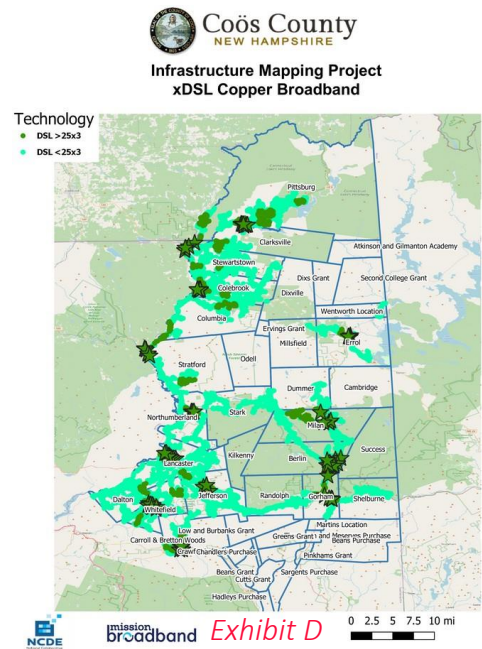
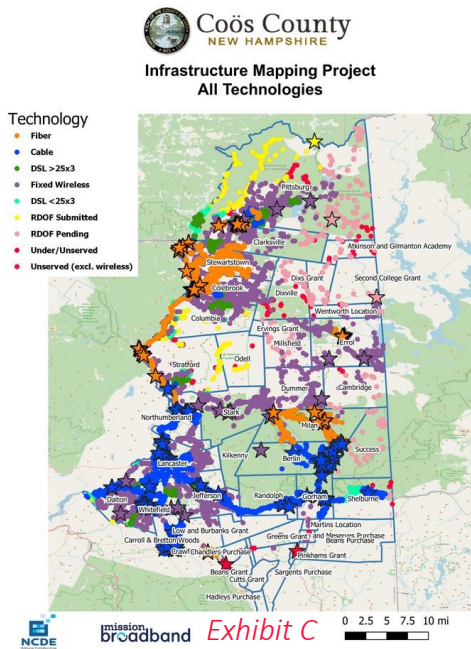


MAPPING STUDY | GAP ANALYSIS

The analysis for the County based on the information outlined below demonstrates that in 6,750 locations in Coös County, approximately 27% do not have access to any broadband service at all unless it is provided by a fixed wireless or satellite provider (see Exhibit A, located in Appendix C: Mapping Data, Non-Confidential), which is contingent on outcomes pertaining to landscape, view shed, view of the horizon, and other factors. Based on the information we have on fixed wireless providers and the potential for RDOF to solve some of the unserved locations, 5,700 addresses in the County may possibly be able to access broadband services, reducing the overall percentage of unserved addresses to around 4%. (see Exhibit B, located in Appendix C: Mapping Data, Non-Confidential).

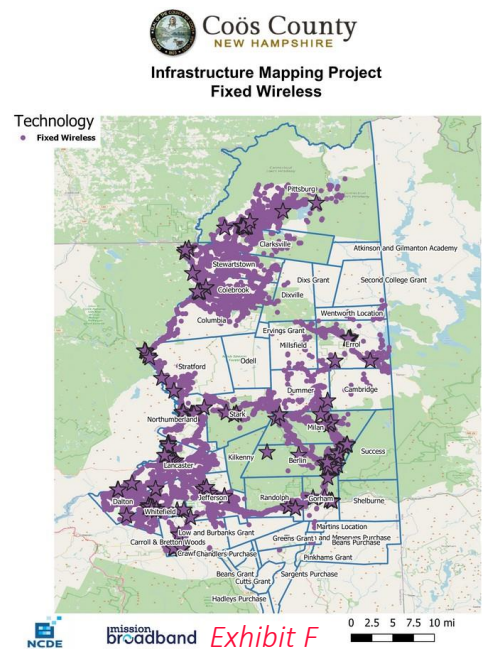
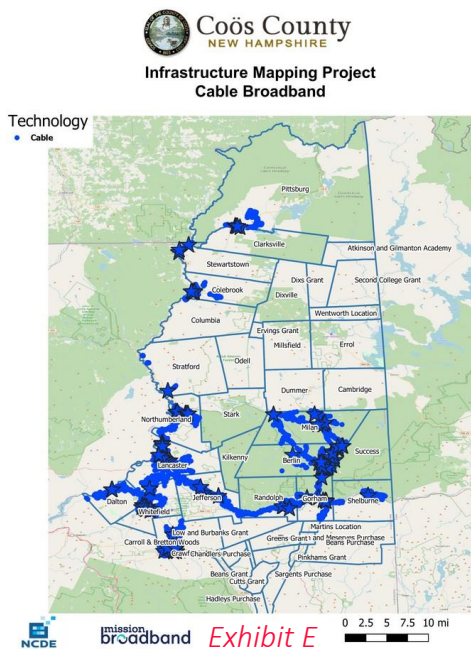


The county overview by technology maps is located in Appendix C: Mapping Data, Non-Confidential (see exhibits C - H) These maps show investments in fiber optic in the Colebrook, Columbia, and Clarksville townships by broadband service providers. Digital Subscriber Line (DSL) serves all of the County within the limits of the technology (up to 3 miles from a telephone central office). Cable TV and broadband service are available in southern and northern regions while the middle of the county and the northernmost tip of the county are primarily served by wireless technologies.



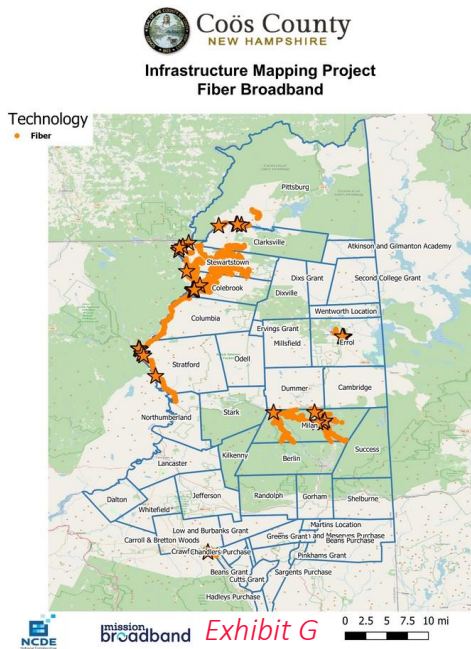
There was an analysis of all of the available technology in Coös County. *Exhibit C* reveals where these technologies are currently available.

DSL Broadband is available in most communities throughout Coös County, as shown in *Exhibit D*.



Coax Cable internet is predominantly available in southern, western, and some northern communities in Coös County, as represented in *Exhibit E* above.

Exhibit F above shows the potential availability of fixed wireless broadband but would need to be independently verified by the provider, as this map does not account for terrain obstructions.



Fiber-Optic technology is predominantly available in the northwestern parts of Coös County, such as Clarksville and Colebrook as shown in *Exhibit G*.

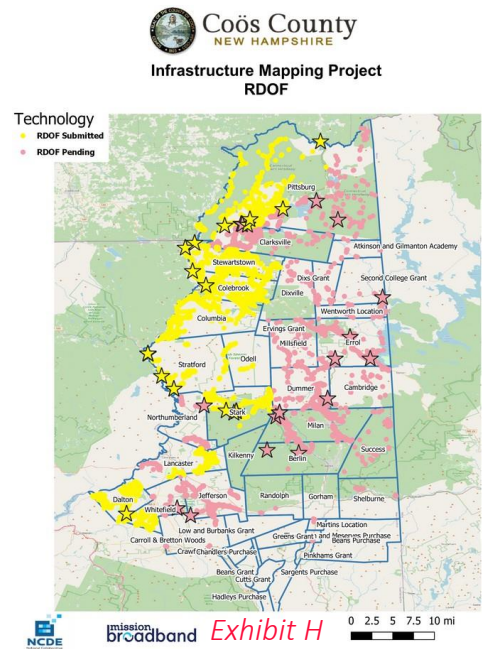


Exhibit H represents all of the locations where providers are building, or planning to build broadband technologies. Please see page 19 for more information on RDOF.



We arrived at this approach based on the fact that each location would require a site survey before determining, conclusively, that they would be eligible for fixed wireless service. Each of the Communities and Unincorporated Places was analyzed and the specific information is included in the individual maps contained in **Appendix C: Mapping Data, CONFIDENTIAL** (see *Exhibits I through YY*).

The Team undertook a detailed, and technical, approach to broadband mapping and gap analysis for the county, by requesting address data from the State. Using the address information as the base layer, Internet and Broadband Service Providers service coverage data points were combined to create detailed coverage maps. The team then cross referenced the provider data to the FCC 477 data for accuracy (The gaps are identified by street level and are located by town and street/road in the attached spreadsheet).



Requests for information (RFIs) were sent to all the known internet and broadband service providers in Coös County utilizing RSA 33:3-g Broadband Infrastructure Bonds. The request came from Coös County Administration using the legislative language which gave providers 30 days to remit their service coverage data to the Network Engineer for the purpose of mapping service coverage within the county: 1 city, 20 towns, and 17 unincorporated places.

In addition, the request asked for information on service plans, pricing, and any discounted programs for low- and middle-income families, disabled and senior citizens on public assistance.

Nine Broadband Providers responded to the RFI coverage in Coös County. This list includes a summary of the company's standing, pricing options, and policy on what each one of these providers has to offer, and is considered ***CONFIDENTIAL, and not for public consumption***. In many cases the pricing is fluid and fluctuates depending on promotions and capacity:

- Consolidated Communications Inc – DSL Copper/Fiber and Leased Lines (County-Wide) Consolidated Communications Inc is the incumbent telecom provider and provider of last resort for voice service uses DSL technology in Coös County to serve the residential market. Business service can be fiber-optic or leased lines that offer higher speeds and service level agreements. Pricing is standard for DSL throughout their franchise footprint. In communities that have partnered with a provider, fiber-optic customers are charged a surcharge over the term of the financial partnership. Consolidated participates in the Affordable Connectivity Fund allowing discounts for low- and middle-income families who qualify. Bundled services offer a range of discounts and higher prices depending on what you order. Promotional pricing offers discounts for a limited time than standard pricing going forward. Don't expect to find pricing on their website located at www.consolidated.com
- Spectrum – Cable TV and Broadband (Berlin, Gorham, Shelburne, Jefferson, Lancaster, Dalton, Whitefield, and Northumberland) Spectrum uses a combination of technologies to support the delivery of broadband services to the residential market. Fiber-optic to the node then coaxes cabling to the premise. Not all pricing and services are offered in all service territories. Bundled services for internet, voice and TV are the most expensive. A promotional 12-month 200 Mbps connection offer is 49.95 Monthly for new customers. No contracts, free modem, and no data caps. After promotion pricing monthly service averages around \$74.00 monthly with other charges for Wi-Fi. Users of this network should renegotiate new terms for lower pricing as the packages change and updates to residential accounts can be made. Spectrum participates in the Affordable Connectivity Fund. In addition, they offer discounts to low-income families with children in the school system and senior citizen discounts for seniors on social security. Visit the website for more details at www.spectrum.net
- Bretton Woods Telephone Company (BWTC) - BWTC is offering cable tv and broadband over a fiber-optic to the premise service network to all of Bretton Woods Resort and parts of the town of Carroll. All service locations are capable of a Gbps service. Gbps pricing is \$116 monthly. More details are available at <https://bwtc.net>

- Wireless Partners dba Trailrunner Broadband Internet – Fixed wireless and cell, FirstNet Partner with AT&T (16 tower sites County-Wide) Trailrunner has a variety of pricing plans starting at \$19.95 monthly for seasonal plans to \$59.95 for unlimited plans. There are no contracts, installation fees, no device fees. Business backup services are offered at \$24.95 monthly. The company website is located at <https://mytrailrunner.com>
- Netafy – Fixed Wireless (Errol, Pittsburg, Clarksville, Colebrook, Berlin, Gorham, Jefferson Northumberland, Dixville, Millsfield, Dalton) Netafy is a fixed wireless provider serving most of the county. They offer a business and residential service with no contracts. Residential service plans and pricing ranges from a 25Mbps symmetrical connection for \$48 monthly to a 100Mbps connection for \$198 monthly. Business plans are quoted on a per location and capacity basis. Both services require an onsite survey. They are in the process of becoming the Affordable Connectivity Fund ready but do offer a discount service for low-income and disadvantaged populations. The website is located at <https://netafy.com>
- Argent Communications – Cable TV and Broadband/Fiber (Milan) Argent offers cable TV over fiber-optic and coax wire services. Up to 100Mbps can be purchased for \$79.95 monthly. Monthly does not include the modem. Gbps service is also available in areas where fiber has replaced traditional wires with pricing on a case-by-case basis. Bundled packages can include TV and broadband to bring down the cost of connection. Seasonal packages and static IPs are additional. More details are available at <https://www.argentcommunications.com>
- Fibercast – Cable TV and Broadband/Fiber (Colebrook, Stewartstown, Stratford, Pittsburg, and Columbia) Fibercast provides cable tv and broadband over fiber-optic and coax wire technologies. They offer coax and fiber-optic to the premises services for business and residential. Asymmetrical broadband starts at \$49.95 for a 10Mbps by 2Mbps connection while a fiber-optic symmetrical 20Mbps connection starts at \$79.95. Up to a Gig is offered over fiber-optic and is available by quote. They are in the registration phase of the Affordable Connectivity Fund program and have offered discounts during the Covid 19 pandemic. More details and contact information are available at www.fibercast.net

- Firstlight – Fiber for Business and Anchor Institutions (Berlin, Gorham, Lancaster, and Northumberland) A fiber-optic to the business premise company. Pricing is only available by request and network services are quoted for qualified customers. They do not offer residential services but are interested in partnering with 3rd party aggregators and communities. Business service information is available at www.firstlight.net
- New Hampshire Electric Coop (NHEC) - Fiber to the Business and Residential (Colebrook, Columbia, and parts of Clarksville) A member-owned ISP offering fiber-optic to the premise who will be offering broadband to their utility membership in 114 towns over the next 3 years. On the residential side, they offer a symmetrical 100Mbps fiber-optic service at \$49.95 monthly for 4 – 6 devices and a symmetrical 1 Gig fiber-optic service at \$89.95 monthly with unlimited devices. They were a recipient of the FCC Rural Digital Opportunity Fund (RDOF) and an NH Cares Act recipient with pilot projects in Clarksville, Colebrook, and West Stewartstown in Coös County. In the process of joining the FCC Affordable Connectivity Program and will offer a \$30 discount to members who qualify. Visit the website for more details at www.nhbroadband.com

The analysis and report do not include mapping cellular coverage or satellite service. Cellular carriers like Verizon, AT&T, T-Mobile, and US Cellular are serving parts of Coös County with voice and some broadband. Satellite services from Starlink and Hughes Net are offered to the entire county. Both of those services tend to be more expensive and some have data caps. Data caps are a limiting factor in the delivery of broadband speeds. Once a cap is reached a connection can be throttled and downgraded until the next month's data plan kicks in.

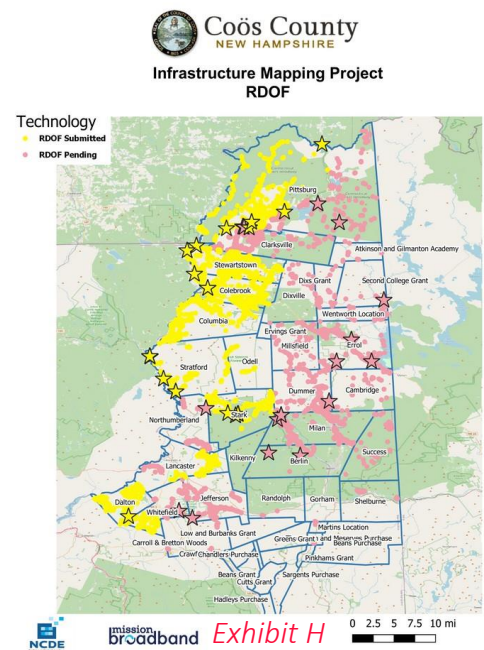
The analysis and report do attempt to evaluate and report on the availability of fixed wireless services. However, it must be noted that coverage mapping for fixed wireless does not account for tree coverage, obstructions in the view shed such as hilltops or granite ledges which may totally block a line-of-sight signal or cause the wireless signal to bounce off natural resources in a way that is unpredictable. Any fixed wireless inquiries result in an on-site survey to determine if the signal is present and strong enough to provide a stable broadband connection.

It is very important for the County to note that many of the currently underserved locations are in areas that the most recent FCC effort the Rural Digital Opportunity Fund (RDOF) is in the process of concluding. As demonstrated on Exhibit H in **Appendix C: Mapping Data, Non-Confidential** and below, these locations will be served by the RDOF recipient as announced by the FCC. All RDOF announced recipients must complete the expansion to the locations in which they are recipients of the RDOF funds within the required timeframe as defined by the FCC.

***** REFER TO COUNTY MAPS IN APPENDIX C: MAPPING DATA, NON-CONFIDENTIAL FOR DETAIL AND A BREAKDOWN OF TECHNOLOGIES DELIVERING SERVICE**

Rural digital opportunity fund (RDOF)

RDOF is an FCC program that auctions off unserved census blocks to qualified broadband, cable, and telephone companies. Awardees have 6 years to build out the census block from approval. In New Hampshire, the latest RDOF funded pending areas (census blocks) are located throughout the county. An awarded broadband provider will receive federal funding for broadband expansion over the next few years. Some of these blocks will be awarded to providers that are in a position to build networks while others will remain unserved till resources can be applied and services rendered. They will receive federal funding for broadband expansion over the next few years. See Exhibit H to the right or in **Appendix C** on page 62.



CARES Act and the Governor's Office of Emergency Resources and Recovery (GOFERR)

In 2019 during the covid-19 pandemic, the state of NH received millions of federal CARES Act funding for various resource and recovery tracks including broadband. GOFERR set aside 50 million for broadband grants to entities that were shovel-ready, and able to complete their network build by December 2020. Projects in Coös County included a Consolidated Communications Inc fiber-optic to the premise project in downtown Errol and NH Electric Coop fiber-optic to the premises in Columbia and Colebrook. Both projects were completed on time and on budget.

New Hampshire Public Utilities Commission - Broadband unregulated

Broadband is considered an unregulated service by the New Hampshire Public Utilities Commission and is not required to be available to the public by law. The only communication service that is regulated is voice, pole attachments, and foliage in the public right of way where utility poles reside. A complete list of what is and what is not regulated is available at <https://www.puc.nh.gov/Telecom>

New Hampshire legislation and Revised Statutes Annotated (RSA)

Many NH Legislators hear from constituents who reside in unserved and underserved districts across the state. Representatives and Senators help to orchestrate legislative fixes to problems when they arise. They work with constituents to bring forth changes to the statutes and rules by submitting legislative service requests (LSRs) that can better define and guide a process.

Here is a list of the 2022 legislative requests and outcomes with regards to communications, broadband bonding, and pending federal funding for broadband that will be managed by the NH Broadband Office in the Department of Business and Economic Affairs:

HB1413

Year: 2022

Title: relative to the privacy of online customer information.

INEXPEDIENT TO LEGISLATE

House Commerce and Consumer Affairs

This legislation would have prohibited a provider of broadband Internet access service from using, disclosing, selling, or permitting access to customer personal information unless the customer expressly consents to that use, disclosure, sale, or access unless exempted under this chapter.

HB153

Title: establishing a committee to study universal Internet access for New Hampshire.

LAID ON TABLE

House Science, Technology, and Energy

This legislation sought to study internet access in New Hampshire. Over the years many of these study committees came to the same conclusion. Allow the providers and municipalities to work together to solve gaps in service.

HB308

Title: relative to broadband access to pole attachments.

INEXPEDIENT TO LEGISLATE

House Science, Technology, and Energy

This legislation sought to transfer some of the cost of make-ready poles to the pole owner if the entity requesting space on the pole is part of a broadband bonding or grant package.

SB247

Title: relative to broadband infrastructure bonds.

INTERIM STUDY

Senate Election Law and Municipal Affairs

This legislation would have allowed municipalities to bond for broadband anywhere removing the rule in place that bonding can only be for unserved and underserved locations that do not meet the FCC definition of broadband.

SB273

Session Year: 2022

Title: relative to broadband infrastructure funding.

PASSED/ADOPTED WITH AMENDMENT

House Municipal and County Government

This legislation allows municipalities to hold special meetings for the purpose of moving a bond for broadband infrastructure forward as opposed to only allowing this to happen at town meetings once a year.

SB445

Year: 2022

Title: (New Title) relative to the broadband matching grant initiative.

CONFERENCE REPORT ADOPTED

House Finance

This legislation transfers funding to the broadband matching grant fund and makes various changes to the broadband matching grant initiative guidelines managed by the NH Broadband Office at the NH Department of Business and Economic Affairs.

Bonding for broadband infrastructure in New Hampshire

In NH Counties and Municipalities are able to bond for Broadband Infrastructure. RSA33 :3 and its associated references to bonding have been codified in the NH RSAs for several years. It is only in the last couple of years that amendments passed have clarified the process for the use of bonding for broadband actually resulting in broadband expansion.

Starting in Chesterfield, a private provider and former town selectman negotiated a public-private partnership to bring fiber-optic connectivity to all 1600 households within the town borders. Since then, about 20 communities and counting in the southwestern region of Cheshire County have followed suit. They have negotiated public-private partnerships through a process of RFI and bonding for broadband infrastructure and getting fiber to the premise for all.

Communications districts

In the 2021 legislative session, NH lawmakers passed RSA 53: G which allows municipalities to ban together and create a district to expand broadband. The law prescribes the formation and responsibilities of membership agreements and their powers.

A Communications District can borrow, bond, and otherwise finance the development of fiber infrastructure while minimizing the risk to each municipality and its taxpayers. It's a way for small towns without resources to benefit from the economies of scale in an aggregated way that could result in a regional municipal network or public-private partnership with a private provider. So far, NH does not have any Attorney General approved and sanctioned communications districts. Carroll County and Grafton County are both working on initiatives that may result in the formation of a district for the express purpose of expanding broadband.

PARTNERSHIPS AND BUSINESS MODELS

I. Private Model

Known as a Private Network. A model where a service provider owns the network and provides retail and wholesale services. Cable Franchise agreements already in place or telephone companies are good examples of private networks.

II. Public Model

Known as community or municipal network. A model where network ownership is separated from service delivery. There are several variations of this model that depend upon who owns which parts of the infrastructure:

- A public entity completely owns the network infrastructure. Some communities may issue bonds to fund the construction of a network, which they lease to private carriers, with the lease payments covering the debt service.
- A public entity owns part of the infrastructure. Some communities create nonprofit organizations to develop networks in collaboration with private carriers or provide seed investment to jumpstart the construction of networks that the private sector is unable to cost justify on its own.

III. Public-Private Partnership Model (PPP or P3)

A model where the Requesting Entity (RE) (municipality or county) desires a public-access network but may not build, own, or operate the network. Public-private partnerships take many forms, depending on community preference and the legal framework in which the municipality operates.

- P3 Open: A model where the network is owned by a public-private entity and operates as an open-access network, and
- P3 Not Open: A model where parts of the network are not owned by a single public or private entity. The network is not necessarily open and the network operator does provide retail services.
- In both cases above the County or Municipality (RE) share financial resources with a private provider, either by applying for grants or by using its rating in the Bond Market to secure funding for the deployment of the network. In both scenarios below the repayment of the financing package or bond should be recouped by a monthly surcharge to the users of the network unless the financing of the network is covered entirely by a grant. The partnership agreement will lay out the terms and timeline.
- The RE can maintain ownership of the network over the life of the asset that was funded with their resources and negotiate with a network services provider to manage and maintain the network while providing broadband and other services. This model requires the RE to be the responsible entity with liability insurance and yearly pole access fees if applicable.
- The RE can hand over the asset at the end of a negotiated term governed by the financing strategy for a dollar amount to be set and agreed upon by the partnership.
 - a. Many versions of Public-Private Partnerships exist today that represent the negotiated terms of ownership and responsibilities.
 - BOT (build, operate, operated)
 - BOOT (build, own, operate, and transfer)
 - BOO (build, own, operate)
 - BLT (build, lease, transfer)
 - DBFO (design, build, finance, operate)
 - DBOT (design, build, operate, transfer)
 - DCMF (design, construct, manage, finance)
 - b. Non-Profit Entities are sometimes created to fund networks that serve a particular initiative or demographic of the population. These non-profits do not operate under the same margins or pressures to provide a return on investment for stockholders as for-profit entities.

Key Legal Considerations for Public-Private Partnerships

In many cases, communities are not interested in owning and managing networks. The best plan of attack is to partner with a provider who already has facilities that can be expanded. They should consider both the opportunities and the pitfalls while factoring in the risk, benefit, and control of the shared asset.

“The more the private partner is willing to assume some of that risk, the more attractive this model becomes for the public sector. But that assumption of risk will frequently make the private partner’s financing more costly—which, in turn, will increase the public sector payments or end-user fees. Except for communities fortunate enough to attract investment from a private sector partner that will pay the capital cost of fiber deployment, most public-private partnerships will require some amount of public investment. But as public funding increases, so does the potential leverage the public has to exert control over the project itself, including the ability to focus on specific outcomes. This might lead to greater benefits for the community”. *

*Taken from the Emerging World of Public-Private Partnerships- A Business Strategy and Legal Guide by the Coalition for Local Choice.

Maintenance, Sustainability, Growth, and Financial Strategy

Regardless of what approach is taken to fund a broadband network, ramping up service and getting paying customers on the network is critical to the overall success of the deployment. Whether it’s phased-in or complete builds, grant-funded or financed, the generated revenue needs to be able to support and maintain the network. Over time it must generate enough revenue to reinvest profits and grow the network.

Grant-funded networks can be built and turned up with one-time injections of funding. Maintenance and sustainability need to be built into any business prospectus. Privately funded networks are built and owned by a private entity. Public-Private networks are built with shared investment schemes that can be managed by the private entity with public oversight.

Plan on a 4-year budget and cash flow to create a prospectus if you are planning on owning, leasing, or transferring any network assets after payoff. You can use an analyzer that can project earnings based on customer onboarding and predicted expenses. There are many business case fiber analyzers available through Broadband Communities for free. You can choose from a basic fiber-optic deployment to a rural deployment with monthly cash flow, and revenue projections. Visit the website at www.bbcmag.com/tools-and-resources/ftth-financial-analyzers for more details.

Cost of Fiber-Optic Infrastructure as an Investment In Our Future

The cost of fiber-optic infrastructure can be calculated by the number of miles (public, private, and secondary roads without Fiber-Optic by the average cost of fiber-optic deployment per mile. For Coös County the cost to deploy fiber-optics county-wide is estimated at 50 million.

When you break down the cost versus the gain, it is a reasonable assumption that the county, municipalities, providers, and citizens could work on a strategy to reduce the cost and spread the responsibility to limit the risk to its taxpayers.

FINANCIAL RESOURCES

Grant and Funding Resources

Agency/Funder:

The US Department of Commerce

- **Funding Resource:** ARPA in the Infrastructure and Jobs Act.
- **Funding Priorities:** Invest in a broadband infrastructure program that will provide high-speed quality internet to locations that lack access to adequate service. Unserved, Underserved then Community Anchor Institutions.
- **Eligible Applicants and Notes:** NH to get \$122 Million to support building capacity and planning efforts: NH Broadband Matching Fund, Broadband Mapping, and Capital Project Fund (CPF) for broadband expansion to the unserved. The federal fund will be managed by the NH Broadband Office at the NH Department of Business and Economic Affairs. The plan has been approved by State and in the US Department of Commerce. NH is one of the first 4 states to receive approval for the state plan.

New Hampshire's Broadband Contract Program will serve as the initial program funded by CPF award funds and is designed to fund a local internet service provider (ISP) to provide internet service to the most rural parts of the state lacking internet service.

 - \$50 Million will be awarded in a single contract to cover 15,000 locations where it would not be possible without CPF funds.
 - The program is designed to fund broadband infrastructure that is designed to deliver reliable internet service that meets or exceeds 100/100 Mbps symmetrical speeds.
 - The program also requires that the ISP participates in the FCC's Affordable Connectivity Program (ACP) – a \$30 per month subsidy for low-income families – and that they provide at least one low-cost option at speeds sufficient for households with multiple users to simultaneously telework and engage in remote learning.
 - Applications will be scored using criteria that encourage the maximum number of properties to be served at the lowest cost and prioritize broadband networks that will be owned, operated by, or affiliated with local governments, non-profits, and co-operatives.
 - The RFP was released on June 10 with proposals due by June 22, 2022. It is available at <https://www.nheconomy.com/about-us/office-of-broadband-initiatives/request-for-proposals>

Agency/Funder:

Grants | National Telecommunications and Information Administration (doc.gov)
www.ntia.doc.gov

- **Funding Resource:** Broadband Equity, Access, and Deployment (BEAD) Waiting for state rules and the application process.
- **Funding Priorities:** Every State gets a guaranteed allocation of dollars in the program. Get Broadband to unserved areas (those below 25/3 Mbps), followed by underserved areas (those below 100/20 Mbps), and then serving community anchor institutions (1/1 Gbps).
- **Eligible Applicants and Notes:** NH to get \$100 Million to support building capacity and broadband expansion. The federal rules on this program are still being reviewed at the federal level.

Agency/Funder:

Grants | National Telecommunications and Information Administration (doc.gov)
www.ntia.doc.gov

- **Funding Resource:** Enabling Middle Mile Broadband
- **Funding Priorities:** This is a competitive grant program. The purpose of the grant program is to expand and extend middle-mile infrastructure to reduce the cost of connecting unserved and underserved areas to the internet backbone.
- **Eligible Applicants and Notes:** Eligible applicants include States, political subdivisions of a State, tribal governments, technology companies, electric utilities, utility cooperatives, public utility districts, telecommunications companies, telecommunications cooperatives, nonprofit foundations, nonprofit corporations, nonprofit institutions, nonprofit associations, regional planning councils, Native entities, or economic development authorities.

Agency/Funder:

Grants | National Telecommunications and Information Administration (doc.gov)

www.ntia.doc.gov

- **Funding Resource:** Digital Equity Programs
 - State Digital Equity Planning Grants
 - State Digital Equity Capacity Grant Program
 - Digital Equity Competitive Program
- **Funding Priorities:** The goal of these programs is to promote the meaningful adoption and use of broadband services across the targeted populations in the Act, including low-income households, aging populations, incarcerated individuals, veterans, individuals with disabilities, individuals with a language barrier, racial and ethnic minorities, and rural inhabitants.
- **Eligible Applicants and Notes:**
 - State Award is based on a funding formula and RFP process in the state.
 - Eligible applicants include specific types of the political subdivision, agency, or instrumentality of a state; tribal governments; nonprofit entities; community anchor institutions; local educational agencies; and entities that carry out workforce development programs.

Agency/Funder:

Grants | National Telecommunications and Information Administration (doc.gov)

www.ntia.doc.gov

- **Funding Resource:** Broadband Infrastructure Program is currently unfunded.
- **Funding Priorities:** A program to support broadband infrastructure deployment to areas lacking broadband, especially rural areas.
- **Eligible Applicants and Notes:** Public-private partnerships between a state, or one or more political subdivisions of a state, and providers of fixed broadband service.

Agency/Funder:

Grants | National Telecommunications and Information Administration (doc.gov)
www.ntia.doc.gov

- **Funding Resource:** Tribal Broadband Connectivity Program awarded on a rolling basis until funds are expended
- **Funding Priorities:** Program funding to tribal governments to be used for broadband deployment on tribal lands, as well as for telehealth, distance learning, broadband affordability, and digital inclusion.
- **Eligible Applicants and Notes:** Indian Tribes

Agency/Funder:

Grants | National Telecommunications and Information Administration (doc.gov)
www.ntia.doc.gov

- **Funding Resource:** Connecting Minority Communities (currently unfunded).
- **Funding Priorities:** A program that funds the purchase of broadband internet access service and eligible equipment or to hire and train information technology personnel.
- **Eligible Applicants and Notes:** Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), and Minority-Serving Institutions (MSIs).

Agency/Funder:

USDA Rural Development www.usda.gov/broadband

- **Funding Resource:** Reconnect Broadband Grants. The application deadline was March 9, 2022, for this year.
- **Funding Priorities:** Up to 350 million available in grants to construct or improve broadband facilities in rural unserved areas including pre-application expenses.
- **Eligible Applicants and Notes:** Eligible entities include corporations, limited liability partnerships, cooperatives, mutual organizations, states, or local government agencies.

Agency/Funder:

Northern Border Regional Commission (NBRC) www.nbrc.gov

- **Funding Resource:** State Economic and Infrastructure Development Program – July 1, 2022, must submit a letter of the intent beforehand and be invited to apply.
- **Funding Priorities:** Up to 5.8 million are available per state. The maximum amount available is 1 million for infrastructure projects in distressed counties unless a waiver is granted.
- **Eligible Applicants and Notes:** Eligible applicants include states, and local governments (village, town, city, land county) and non-profits.

Agency/Funder:

Economic Development Administration www.eda.gov

- **Funding Resource:** Public Works Grants. Awarded on a rolling basis. Contact the EDA office to vet projects before applying.
- **Funding Priorities:** Up to 45 Million are available for the Public Works program which enables communities to attract new industry; encourage business expansion; diversify local economies; and generate or retain long-term, private-sector jobs and investment through the acquisition or development of land and infrastructure improvements needed for technology-based facilities that utilize distance learning networks, smart rooms, and smart buildings; multitenant manufacturing and other facilities; business and industrial parks with fiber-optic cable; and telecommunications and development facilities.
- **Eligible Applicants and Notes:** Eligible applicants must be a state, a political subdivision of a state, a district organization, an Indian tribe, an institution of higher education, or non-profit acting in coordination with a political subdivision of a state.

Agency/Funder:

New Hampshire Community Development Authority (NHCDFA) www.nhcdfa.org

- **Funding Resource:** Planning Grants awarded on a rolling basis.
- **Funding Priorities:** Planning Grants of up to \$25,000 support planning and feasibility-related activities to determine whether a proposed project is viable.
- **Eligible Applicants and Notes:** Municipalities can apply for funding to conduct activities like income surveys, preliminary architectural and engineering design, cost estimates, and market analysis.

Agency/Funder:

Rural Digital Opportunity Fund (RDOF). Auction 904: Rural Digital Opportunity Fund | Federal Communications Commission (fcc.gov) www.fcc.gov/auction/904

- **Funding Resource:** The FCC will award RDOF funds through a descending clock, reverse auction process. Interested service providers can participate in the auction and bid for a percentage of RDOF funds to serve one or more eligible areas.
- **Funding Priorities:** A one-time \$20.4 billion has been allocated for the construction of broadband networks in rural communities over ten years. Now education, health care, economic development, and quality of life in rural areas will no longer be negatively impacted by the lack of fiber infrastructure.
- **Eligible Applicants and Notes:** Eligible areas include those without current (or already funded) access to adequate broadband service, defined by the FCC as 25 Mbps downstream and 3 Mbps upstream (25/3).

Agency/Funder:

FCC Universal Service Fund (USAC) www.fcc.gov/universal-service

- **Funding Resource:**
 - High-Cost Area (Connect America Fund) Providers bid on providing service at the very lowest price.
 - Lifeline program for low-income consumers. Application through the provider.
 - E-Rate for Schools and Libraries. The registration process and reporting requirement. Application windows and deadlines for funding.

- Rural Health Care application and reporting requirements.
- **Funding Priorities:**
 - The federal universal service high-cost program (also known as the Connect America Fund) is designed to ensure that consumers in rural, insular, and high-cost areas have access to modern communications networks capable of providing voice and broadband service, both fixed and mobile, at rates that are reasonably comparable to those in urban areas.
 - The Lifeline program has provided a discount on phone service for qualifying low-income consumers to ensure that all Americans have the opportunities and security that phone service brings, including being able to connect to jobs, family, and emergency services. Lifeline is part of the Universal Service Fund.
 - Funding may be requested under two categories of service: category one services to a school or library (telecommunications, telecommunications services, and Internet access), and category two services that deliver Internet access within schools and libraries (internal connections, basic maintenance of internal connections, and managed internal broadband services).
 - The Rural Health Care Program provides funding to eligible health care providers for telecommunications and broadband services necessary for the provision of health care. The goal of the program is to improve the quality of health care available to patients in rural communities by ensuring that eligible health care providers have access to telecommunications and broadband services.
 - **Eligible Applicants and Notes:**
 - The program fulfills this universal service goal by allowing eligible carriers who serve these areas to recover some of their costs from the federal Universal Service Fund.
 - The Lifeline program is available to eligible low-income consumers in every state, territory, commonwealth, and on Tribal lands.

- Eligible health care providers include
 - Post-secondary educational institutions offering health care instruction, teaching hospitals, and medical schools;
 - Community health centers or health centers providing health care to migrants;
 - Local health departments or agencies;
 - Community mental health centers;
 - Not-for-profit hospitals;
 - Rural health clinics;
 - Skilled nursing facilities (as defined in section 395i–3(a) of title 42 and;
 - A consortium of health care providers consisting of one or more entities falls into the first seven categories. In addition, eligible health care providers must be non-profit or public.

Agency/Funder:

FCC Affordable Connectivity Program (ACP) www.fcc.gov/acp

- **Funding Resource:** The Infrastructure Act provides \$14.2 billion to modify and extend the Emergency Broadband Benefit Program (EBB Program) to a longer-term broadband affordability program called the Affordable Connectivity Program (ACP).
- **Funding Priorities:** Funding provided by Universal Service In the 2016 Lifeline Modernization Order, the Commission included broadband as a support service in the Lifeline program. A surcharge collected on consumer bills as a federal communications tax in each state is remitted to the federal government. It is a reimbursement program for registered providers where a \$30 discount is given to qualified customers and reimbursed by the FCC and paid directly to a provider.
- **Eligible Applicants and Notes:** FCC benefit program that helps ensure that households can afford the broadband they need for work, school, healthcare, and more.

Agency/Funder:

NH Health Care Foundation

- **Funding Resource:** There are 27 rural healthcare hospitals and clinics, 22 federally qualified healthcare centers, and 4 short-term hospitals in NH.
- **Funding Priorities:** The foundation will raise capital and receive endowments to invest in a variety of initiatives. It is in the formative stages and once established could be a source for the match.
- **Eligible Applicants and Notes:** Anyone who is receiving telehealth services needs broadband access and devices. They may fund community programs that could help the digital divide.

Agency/Funder:

Banking Industry and the Community Reinvestment Act

- **Funding Resource:** The Community Reinvestment Act (CRA) is a federal law enacted in 1977 to encourage depository institutions to meet the credit needs of the communities where they are chartered, including low- and moderate-income neighborhoods.
- **Funding Priorities:** The Federal Reserve evaluates how well state member banks have helped meet the needs of their communities. The score is based on performance and rated from Outstanding to Non-compliance. Banks spend over 1 billion a year on projects.
- **Eligible Applicants and Notes:** The Bank could provide funding and receive credit for CRA eligible projects in several ways to be determined on a project-by-project basis.

Opportunity Zones

Opportunity Zones are a place-based community development tax incentive that became a part of the Internal Revenue Code (IRC) as part of tax reform legislation enacted in 2017.

The goal of this program is to invest highly appreciated capital assets into distressed communities, while also rewarding those who invest by allowing the capital gains invested, along with any capital gains accrued due to the investment into the qualified opportunity zone, to essentially become tax-free if all requirements of the investment are met.

Eligible gains include the following:

- Capital gain for federal income tax purposes;
- The gain would otherwise be recognized for federal income tax purposes before January 1, 2027;
- Does not arise from the sale or exchange with a person that is related to the taxpayer

Benefits of this program include:

- Temporary deferral of a gain. This means that the investor can receive a temporary deferral of taxation on gains invested in a Qualified Opportunity Zone Fund (QOF), with no accompanying dollar limit on the number of gains eligible for deferral.
- Partial exclusion of deferred gain. This program encourages long-term investment by allowing a “step-up” for investments that are held for at least five years.
- Exclusion of additional gains. Taxpayers holding an investment in a QOF for at least 10 years are generally exempt from tax on any gains attributed to the disposition of their interest in the QOF.

Coös County has four opportunity zones. They are located in the following areas:

- Lancaster
- Stratford/Groveton
- Colebrook area
- Dixville/Errol/Milan, with a very small area in Berlin

To invest in an Opportunity Zone, a Qualified Opportunity Zone Fund (QOF) is required for a taxpayer to invest gains and remain eligible to make an Opportunity Zone deferral election. A QOF is organized as a corporation or partnership, with the sole intention being the investment into a qualified opportunity zone.

To ensure that a QOF is set up correctly, there are three statutory requirements:

- It must be organized as a corporation or partnership;
- It must be organized solely to invest in an Opportunity Zone;
- It must contain at least 90% of its assets in a qualified Opportunity Zone property.

An example of how this program could be used would be partnering with the administrator of a QOF, who then selects one or more service providers to build out a fiber network, in which the asset is owned by the QOF for ten years. At the end of the term, the community or service providers could purchase the fiber assets, thereby allowing the investors in the QOF to also benefit from the investment they have made. This program is a great way to attract investment into a qualified area to build a broadband network thereby reducing or eliminating the Return on Investment (ROI) of a provider where take rates may not be high enough to justify the investment.

Source: Novogradac. (2019). Introduction to Opportunity Zones.

RECOMMENDATIONS AND SUGGESTED NEXT STEPS

Coös County has a role to play in the future of every municipality and unincorporated place within its borders. The county is a convener, collaborator, and partner in the future of fiber-optic infrastructure for its citizens. Although not directly responsible for service gaps and solutions to those gaps, the county's secondary support position can help to leverage the law of numbers, bonding capacity, and financing packages for investment in the development of fiber-optic communications infrastructure for our future.

The recommendations below are based on what the County could easily undertake without creating a department. Some of the recommendations will require funds to maintain and taking steps further may result in additional study opportunities.

Recommendations

1. Coös County may consider maintaining the role of the convener to help its city, towns, and unincorporated places.
2. Coös County may consider providing and maintaining mapping details for each of its municipalities as a knowledge base for each to work on gaps and planning strategies to fill them.
3. Coös County may consider helping to form and organize a communications district if feasible.
4. Coös County may consider providing letters of support to individual local governments who apply for grant funding.
5. Coös County may consider aggregate demand and work with service providers on behalf of the city, towns, and unincorporated places to prioritize communities with the most need.
6. Coös County may consider providing planning efforts with a central place to store RFIs, RFPs, master plans, and anchor institution reports that can be easily accessed by researchers, grantwriters, and municipalities seeking resources to expand broadband and digital equity programs.
7. Coös County may consider lending its bonding power and position in the bond market to less fortunate towns and unincorporated places.
8. Coös County may consider using allocated ARPA funding to conduct an engineering study for fiber-optics county-wide or fix gaps in a phased-in approach until funding is exhausted.
9. Coös County may consider sponsoring digital equity programs such as recycling and refurbishing devices for low- and middle-income families with children in school and senior citizens.
10. Coös County may consider designating funding to increase the IT budget to include mapping and storage of mapping products for use by municipalities who are planning on improving access to broadband infrastructure.

Next Steps

1. Review, release and share the mapping infrastructure study report.
2. Identify and work with industry sectors and anchor institutions to capture economies of scale that might result in unlikely partnerships to help expand fiber-optic infrastructure and digital equity programs.
3. Offer an incentive to communities to become “Broadband Ready”.
4. Explore partnerships in banking that can leverage CRA investments including broadband to improve infrastructure and access to technology, devices, and services.
5. Support all municipalities and their grant-funded initiatives to improve economic outcomes and employment opportunities by the development of fiber-optic broadband capacity.
6. Request yearly meetings and maintain relationships with service providers throughout the county.
7. Look for ways to attract investment in fiber-optic infrastructure for county residents and businesses through opportunity zones.
8. Keep the city, towns, and unincorporated places informed on fiber-optic investments in the county.
9. Continue to facilitate the Coös County Broadband Committee as a way to keep up with municipal efforts and challenges.
10. Release an RFP to manage and evaluate a design, build, transfer, finance, or public-private partnership plan to fill gaps with new fiber-optic infrastructure or more of the same infrastructure based on the most cost-effective solution for interested towns.

APPENDIX A

Glossary of Terms

BROADBAND: The term broadband commonly refers to high-speed Internet access that is always on and faster than traditional dial-up access. Over the years, as what we use the internet for has demanded a larger capacity for moving data, the speed definition of broadband has increased accordingly. The current definition of broadband internet, set by the FCC (Federal Communications Commission), is a minimum bandwidth speed of 25 Mbps download and 3 Mbps upload.

BANDWIDTH: Internet speed is your allocated bandwidth. Bandwidth is a measure of how much data, measured in bits, a network can deliver per second. Bandwidth determines if you can download a picture in 2 seconds or 2 minutes.

Bit: the smallest unit of digital information

Bps: bits per second

Kbps: kilobits per second (1000 bits per second)

Mbps: megabits per second (1 million bits per second)

Gbps: gigabits per second (1 billion bits per second)

DATA: Content uploaded or downloaded via the internet, such as videos, music, emails, webpages, documents, images, and so forth. Data is to bandwidth as water is to the size of a hose; as the bandwidth increases so does the amount of data that can flow through it per second. Similarly, increases in the diameter of a hose allow more water to flow in a given period. If the allotted bandwidth (or the water) is serving multiple devices, the flow to each can slow to a trickle. The same thing happens on a system where many users are making demands on a limited amount of bandwidth.

FACTORS AFFECTING INTERNET SPEED: Connection type is significant to how fast your internet can be. (see below) Outdated or misconfigured equipment can slow down the transmission of data. Distance from your ISP hub. The longer the distance, the longer it will take for your data to transfer from the internet to your computer.

Congestion usually happens during peak usage times, like when everyone gets off work and logs onto the internet, or any time when more demand is placed on the system). In a home network, congestion slows the internet when everyone is online at the same time: someone streaming a movie, another doing homework, another playing video games, and so forth.

477 FIXED BROADBAND DEPLOYMENT DATA FROM FCC FORM 477: Facilities-based broadband providers are required to file data with the FCC twice a year (Form 477) Where they offer Internet access service at speeds exceeding 200 kbps in at least one direction.

- Fixed providers file lists of census blocks in which they can or do offer service to at least one location, with additional information about the service.
- Mobile providers file maps of their coverage areas for each broadband technology (e.g., EV-DO, HSPA, LTE).

INTERNET SERVICE PROVIDERS (ISPs): They come in several forms including privately owned commercial businesses, electric cooperatives, and municipal providers. ISPs employ several transmission technologies to connect to your home. Digital Subscriber Line (DSL) is a wireline technology, that uses copper phone lines to transmit data. Speed degrades quickly over distance. The longer the distance between the DSL connection point and the user, the slower the service. Speeds for DSL usually top out at 5-7 Mbps.

Cable companies use cable TV infrastructure (coaxial cables) to provide internet access, similar to the way DSL uses the phone network infrastructure. Since a cable network can share the last mile connection among hundreds of subscribers, they are particularly prone to congestion problems.

Fiber-Optic Technology converts electrical signals carrying data to light and sends the light through transparent glass or plastic fibers about the diameter of a human hair. These fibers are capable of transmitting large amounts of data at high transfer rates as pulses of light. Fiber transmits data at speeds far exceeding DSL or cable modem speeds. Often abbreviated as FTTH (fiber to the home) or FTTP (fiber to the premise), fiber-optics connect directly to a home or building.

Satellite broadband is a form of wireless broadband, which is affected by the line of sight to the orbiting satellite and the weather. Often the only option in rural areas, satellite speeds are generally comparable to DSL and cable.

Wireless broadband connects a home or business to the Internet using a radio link between the customer's location and the service provider's facility, often a cell phone tower. Speeds are generally comparable to DSL and cable.

3G, 4G, and 5G: They designate successive generations of wireless technology, each faster than the one before.

3G offered speeds of less than 1 Mbps

4G is 10 times faster than 3G with speeds of 5-12 Mbps.

4G LTE, the next generation of 4G, provides speeds up to 100 Mbps.

5G, which is still under development, is rumored to offer speeds of up to 1 Gbps.

BLUETOOTH: Wireless data standard for transferring data over short ranges. Bluetooth is used for many applications such as wireless mice and keyboards and connecting peripherals to smartphones.

WIFI: Term used for wireless internet or wireless signal.

HOT SPOT: Area where there is a wireless wi-fi signal.

MODEMS and ROUTERS: A modem is a device that converts data to and from a format that's suitable for transmission between devices, like a computer to the internet. A router directs traffic on a home network.

UPLOAD AND DOWNLOAD – SYMMETRICAL AND ASYMMETRICAL: Download and upload describe the direction of the data between the end-user and the provider. Download and upload speeds are expressed in Mbps: 10/10 is a symmetrical system with both download and upload at the same speed. An asymmetrical system, for example, 25/3, lists the download speed first. Most internet services are asymmetric, with wider bandwidth/faster speeds to download, and slower to upload. The assumption is that most users consume data rather than share or upload it. Upload speed is important to users who need to share large files of data.

LATENCY: Reaction speed of a network; the time it takes to send data and receive a reply, measured in milliseconds (ms). Too high a "lag" can be a problem for activities that rely on rapid communications, such as online gaming. Satellite broadband connections have very high latency rates due to the time it takes to transfer data to and from orbit.

DIGITAL DIVIDE: The gulf between those parts of the population who have access to the internet and other digital technologies and those sections that do not. There is concern that as so many services become available online, groups without digital access will be left behind and miss opportunities in life and at work.

DIGITAL EQUITY: Ensures that all individuals and communities have the information technology capacity needed for full participation in society, democracy, and the economy. Equity is necessary for civic and cultural participation, employment, lifelong learning, and access to essential services.

INTERNET OF THINGS: Objects with embedded electronics and sensors which share data and can be remotely controlled. A “thing” can be anything from a smart thermostat to a security camera, a smart home device like Alexa to an internet-connected refrigerator.

VoIP: Voice over Internet Protocol. Technology for making phone calls using an internet connection from any device, including mobile and landline phones. Skype is currently the most popular VoIP application.

TELEMEDICINE: The use of high-speed, high-capacity internet to support long-distance health care services. Goals include the ability to bring quality health care to those living far from hospitals or to elderly patients wishing to age in place. Patients can be seen, treated, monitored, and given tools to manage their health care.

ONLINE EDUCATION: Creating access for all eliminates the “homework gap” for those students increasingly required to complete assignments online. Adult learners benefit from remote learning opportunities to complete academic degrees and access technical and mechanical training.

RURAL DIGITAL OPPORTUNITY FUND (RDOF): The Rural Digital Opportunity Fund (RDOF) is an FCC initiative designed to inject billions of dollars into the construction and operation of rural broadband networks. FCC is disbursing funds through a reverse auction. Interested broadband carriers can participate in the auction and bid for these funds, with bidders promising to deliver broadband and voice services at the lowest cost to those same territories.

TELECOMMUTING: Working from home. More and more corporations and small companies are hiring workers to work full-time from home. Those who have that ability today are weathering the pandemic while maintaining their livelihoods. Online job opportunities allow one to live wherever they choose while still making a good living. Telecommuting also encourages entrepreneurship and helps small businesses compete in a wider marketplace.

SOCIAL INTERACTION: Online conferences, meetings, and social gatherings have become the norm. Internet connections support the ability of isolated people to maintain contact with often widely scattered family and friends, as well as access to information and networks of shared interests. Social support and interaction have positive influences on physical and mental well-being, especially among people living alone, decreasing loneliness and fostering a sense of belonging.

Terms for constructing a system:

GRANT: A legal instrument reflecting the relationship between a government agency and a recipient. The main purpose is to dispense money and/or resources to accomplish a public purpose.

BACKBONE: The internet is a network of networks, and the large trunk lines that connect them are referred to as the backbone. Like a highway network, the interstate highways are the backbones that connect regions that have highway networks of their own.

BACKHAUL or MIDDLE MILE: Section of the network that connects the last mile portion of the network to the service provider's core network.

LAST MILE: Final leg of the connection between the service provider and the customer.

MAKE READY: Work necessary to make a pole or right-of-way available for the attachment of additional lines, wires, or cables.

TAKE RATE: The number of subscribers to a service, typically expressed as a percentage of those taking the service divided by the total number of people who could take the service. If a community fiber network passes 1000 people and 600 people subscribe, it has a take rate of 60%. When planning a network, it will be built to be profitable at or above a certain rate.

MUNICIPAL NETWORK: A broadband network owned by the local government. Some are run by the municipality and others are managed by an ISP under contract.

PPP: A public-private partnership divides the risks and responsibilities of an infrastructure project between public and private entities.

FIBER AS A FUTURE-PROOF TECHNOLOGY

- **Tried and tested over decades throughout the world.** Fiber-optic is not a new technology and has been used across America since the 1980s.
- **Capability.** Bandwidth use roughly doubles every two years, as the expansion and demand from the Internet of Things, HD content, and the amount of data generated and transmitted increases. FTTP will be able to handle the increased demands with ease.
- **Easily upgradable.** As the demand becomes greater, fiber can easily deliver upgraded speeds.
- **Affordable.** The cost of fiber internet service is comparable to other technologies. However, the fiber is significantly more reliable and is not affected by distance from a hub or traffic congestion on the lines. Fiber offers one delivery system for telephone (cell and landline), video, audio, television, and almost any type of data transmission, using a single seamless FTTP connection.

Technologies

Digital Subscriber Line (DSL): A technology for high-speed network or Internet access over voice lines, where the last mile is usually copper wire. There are various types, including asymmetric DSL (ADSL), high-bit-rate DSL (HDSL), symmetric DSL (SDSL) and very-high-bit-rate DSL (VDSL). The whole group is sometimes referred to as xDSL.

Coaxial cable: Offers a shared system, meaning that the signal strength is dependent on how much bandwidth is being drawn on by other users connected to that same line. Moreover, cable systems are designed primarily to push data down to the customer, a significantly different model than the emerging needs of telecommuting and interactive video which require high bandwidth for both downloading and uploading.

Fixed Wireless: Fixed wireless networking refers to the operation of wireless devices in fixed locations such as homes and offices. Fixed wireless devices usually derive their electrical power from utility mains, unlike mobile wireless devices, which tend to be battery-powered. Fixed wireless is the typical form of internet deployed in areas with no fiber internet infrastructure, mainly rural areas.

APPENDIX B

Market Research

One of the key deliverables for the study was to draft and publish a broadband survey for Coös County residents within each of their respective communities that could help to paint a picture of the actual gaps in broadband access according to the federal guidelines of 25Mbps download speed and 3Mbps upload speed, which by definition is considered “served”, while those who do not meet that requirement are considered unserved.

It is difficult to accurately quantify the true gaps in access when looking at the broadband maps that are currently available, as there is no accurate source of truth as of this writing. Therefore, a broadband survey, coupled with relevant speed test data, helps to showcase the actual speeds, technology, and service quality that each participant is experiencing in Coös County. This data is critical when examining the gaps in broadband access, and challenges the legacy method of determining access, which was through census block; in which a single address could be served – and a service provider could then report the entire census block as served according to that 25/3 Mbps requirement.

The following information will showcase the results of the survey, including a summary, relevant charts, and speed test data, and will help to provide a high-level analysis that can be used with the mapping data that has been developed specifically for this project.

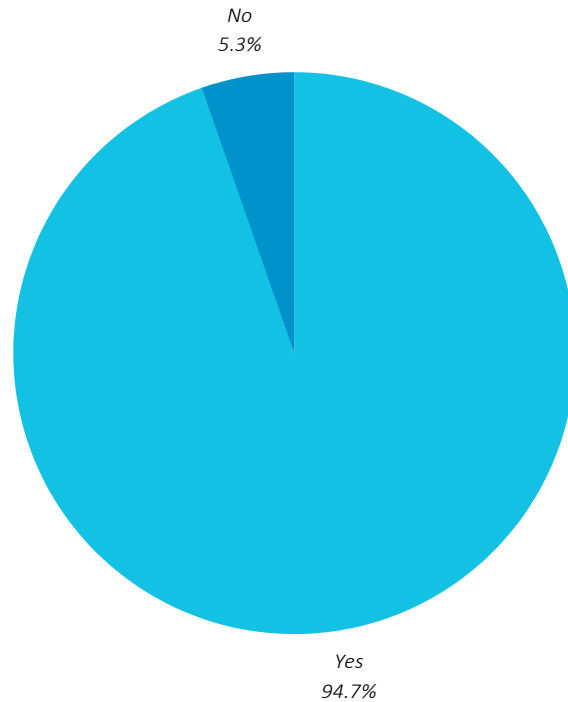


Survey Results

Question 1

“DO YOU HAVE ACCESS TO INTERNET SERVICE AT YOUR HOME?”

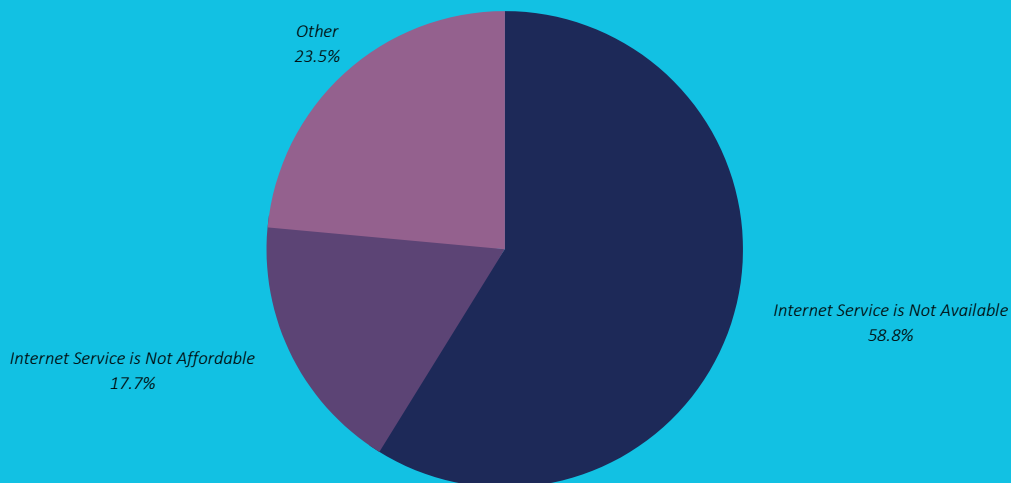
Of those who completed the survey, it was reported that 94.6% of the respondents reported that they had access to some form of broadband internet service, while only 5.33% of respondents claimed that they had no access to internet service at their home. This question does not examine why a respondent has broadband internet or not; it simply seeks to identify the mix of residents who have access to no internet whatsoever – the unserved.



Question 2

“IF YOU DONOT HAVE INTERNET ACCESS AT THIS LOCATION, WHY NOT?”

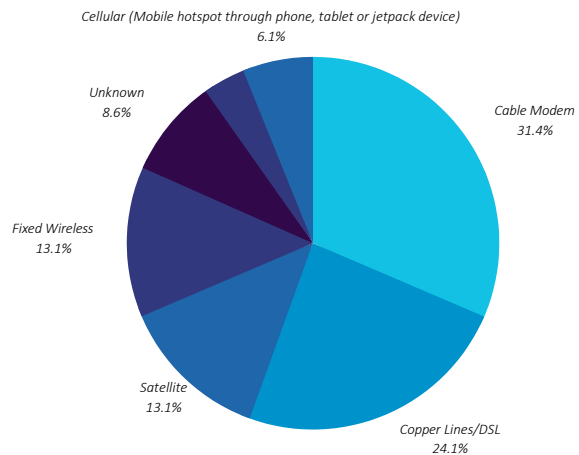
This question seeks to dive deeper into the reasons 5.33% of respondents do not have broadband access. Of this percentage, 58.82% report that internet service is not available where they live. 17.65% of users also report that they do not have internet service because it is not affordable, which highlights another challenge that transcends the issue of access to the technology they need to connect to the internet, which is the affordability gap that these residents in Coös County have to endure. The remaining 23.53% of respondents in question 2 chose “other” as their response, and those reasons include the difficulty of finding a way to get service, which could be due to a digital knowledge gap, as well as access to service in their area, is no better than cellphone hotspot speeds as a noted reason.



Question 3

“WHAT TYPE OF INTERNET SERVICE DO YOU HAVE AT THIS LOCATION?”

Of the 94.67% of respondents from question 1 who reported that they do have access to broadband internet, this question helps to determine which service providers and/or technology are available to them. 31.56% of respondents report that they have access to cable internet, while 24.18% of users report that they have access to some form of DSL. Notably, over 13% of those surveyed report using a satellite provider for their broadband internet, which implies that they may not have access to hardwired technology such as fiber, cable, or DSL. Only 3.69% of participants reported having access to fiber-optic broadband technology.

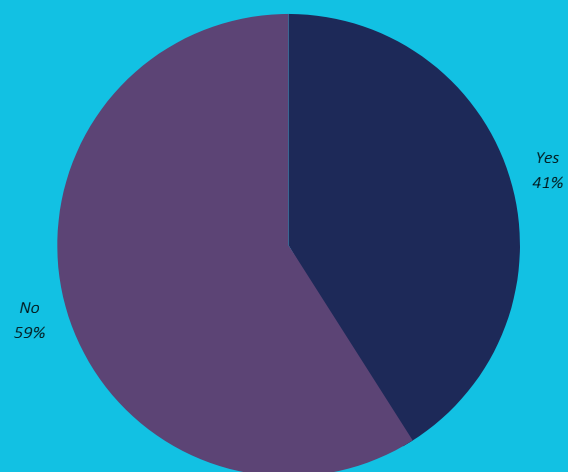


Also of note is the fact that nearly 9% of respondents do not know who or what type of provider they use for broadband, underscoring the further need for digital literacy efforts in Coös County.

Question 4

“DOES YOUR INTERNET SERVICE MEET THE NEEDS OF YOUR HOUSEHOLD?”

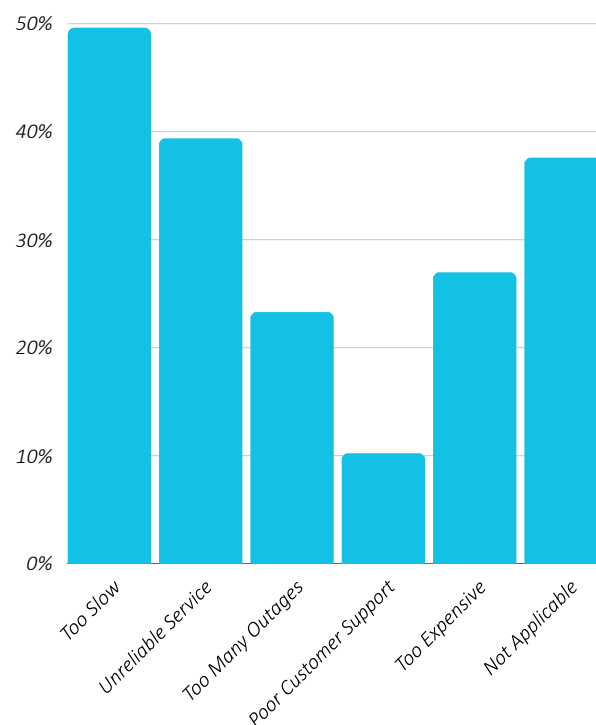
While about 95% of respondents reported that they did have access to broadband service in their homes, 59.02% say that the service does not meet their household needs. It is a feasible assumption that some of them may not be aware that there could be faster speeds; however, that could also be impacted by affordability constraints as well. The rest simply report that they do not have access to the speeds that they need to meet the requirements of their respective households. 40.98% report that their internet service meets the needs of their household, but again, they may not know the full potential of how broadband internet can benefit them and their family. That said, as of this writing, those respondents report that the speeds do meet the needs of their household.



Question 5

"IF THE SERVICE DOES NOT MEET YOUR NEEDS, WHY NOT? (SELECT ALL THAT APPLY)"

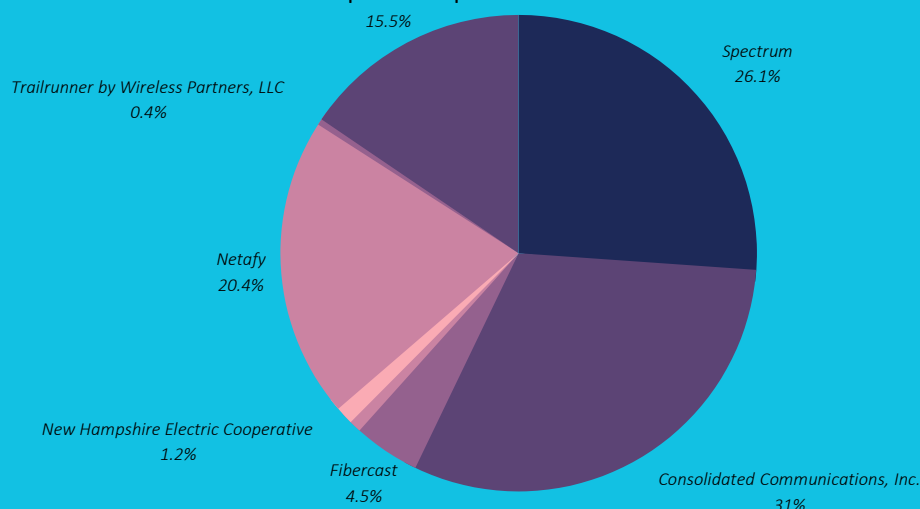
This question helps to establish the performance requirements of an ideal broadband network by highlighting the areas of opportunity that the end-user currently experiences with their service today. Of the 59.02% of respondents from question 4 who report that the internet service they currently have does not meet their needs, 49.59% say that is due to the speeds being too slow. Unreliable service was the second-highest reason, at 39.34%. The service being too expensive is also notable, as 27.05% say that what they are being asked to pay doesn't equate to the value that they receive from the service providers.



Question 6

"WHO IS YOUR INTERNET SERVICE PROVIDER?"

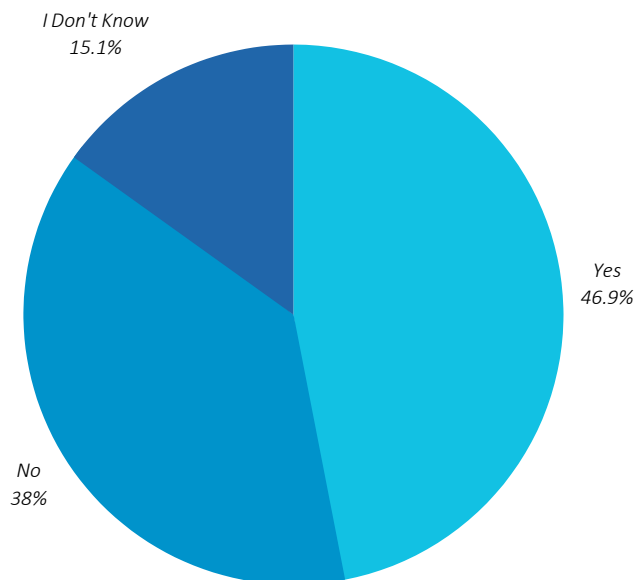
The largest single provider that is utilized in Coös County is Consolidated Communications, Inc. at 31.15%. Spectrum is the second largest provider servicing the respondents coming in at 25.82%, and Netafy, a fixed wireless provider, came in third with 20.49%. This dovetails with the data in previous questions, supporting DSL as the largest utilized technology in the County, and Cable internet as the second largest. Under "Other", there is a mix of satellites, such as Starlink and HughesNet, and cellular providers, such as Verizon/T-Mobile/AT&T. Overall, this category represents a total of 15.57%. Again, this data matches well with the answers to the previous questions.



Question 7

"ARE YOU AWARE OF OTHER INTERNET SERVICE PROVIDERS AVAILABLE TO YOU AT YOUR LOCATION?"

This question serves to highlight the respondent's awareness of the competitors in their area, which highlights the available choices they may have to switch providers and potentially improve their service. Most respondents (46.94%) report that they are aware of other options, while the remaining users either did not know there were options or were not sure. In this question, they were invited to list the providers they knew of, and most of the options they listed fell under satellite or fixed wireless as options, which indicates that most respondents have access to one wired provider before having to choose between other technologies that are either wireless or satellite.

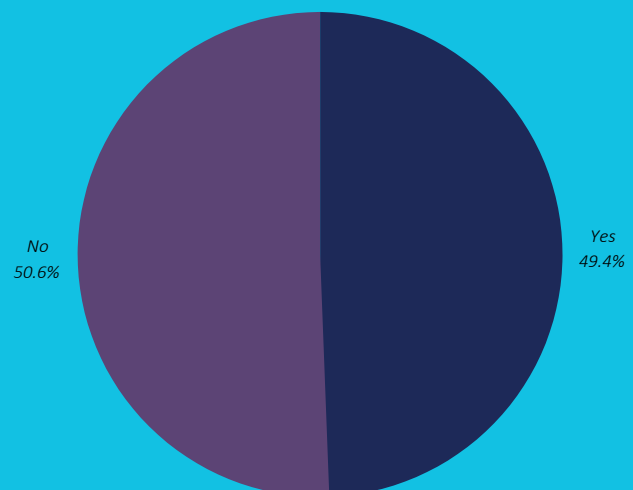


Question 8

"DO YOU FEEL YOUR INTERNET SERVICE IS AFFORDABLE?"

Respondents were essentially split with this question, where 49.59% of respondents claimed that their service was affordable, while 50.41% claimed it was not affordable. When reviewing the comments that they left, there were some notable anxieties and exasperated responses to the question. The majority of comments included phrases such as "Too expensive"; and "Too expensive for what I get". One user in particular stated:

"Come on! \$60/month for a nominal 25 meg download and 2 meg upload! And if it's been rainy, well maybe there's a connection. Gimme a break. For instance, Vodafone, in Bremen, Germany, offers 1 gig download and 50 meg upload for - wait for it - \$42/month long term. And Vodafone is no cheapo service provider. The USA can't beat high-cost Germany? What's with that? Thank goodness I'm not desperately poor. As it is, I'm thinking about what place to call home."

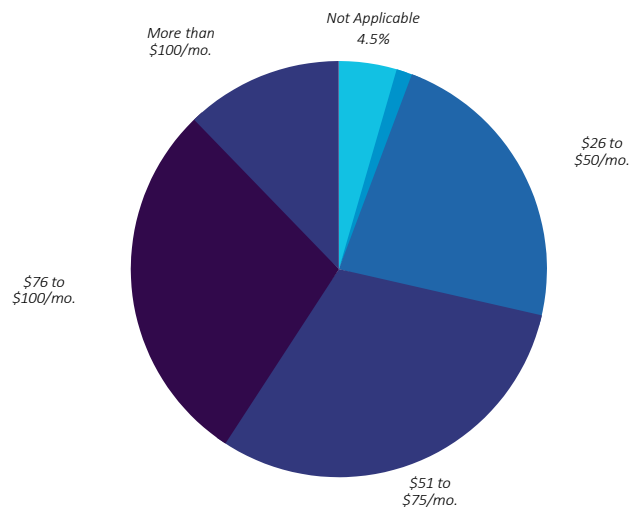


Notably, this respondent is receiving speeds of 25/2 Mbps via DSL, which is below the threshold of what is considered "served" by the FCC.

Question 9

“WHAT IS THE MONTHLY COST OF YOUR INTERNET SERVICE?”

This question helps to identify and determine what the cost expectations are for the end-users within the County. Of all of the respondents, 59.02% claimed that the cost of their broadband internet service fell within the range of \$51-\$100/mo. Interestingly, this range falls within the national average of \$64/mo. per user nationwide.

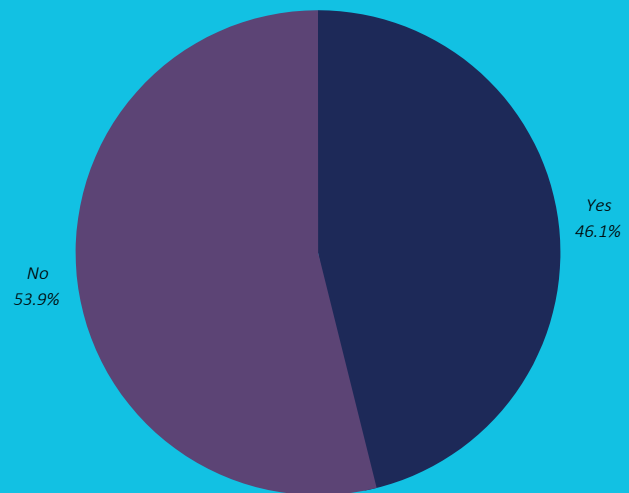


While the pricing is in alignment with the average cost of service that the typical customer in the US pays, the average national internet speed per household is astonishingly skewed away from Coös County residents. Nationally, the average speed per household is 127.19 Mbps, whereas less than 40% of Coös respondents even have access to a technology that could deliver 127.19 Mbps. This indicates that the average broadband customer in Coös County is likely paying a similar amount to the national average, yet receiving significantly less speeds for a similar price.

Question 10

“IF BETTER SERVICE WERE AVAILABLE WOULD YOU PAY MORE TO ENHANCE THE SERVICE DELIVERED BY YOUR INTERNET SERVICE PROVIDER?”

Coös residents who responded to this question were fairly split on this question. 53.88% said that they would not pay more than what they were already paying to enhance their current service; while 46.12% said they would. Factors to consider with this question include the digital literacy issue, along with the affordability piece. The latter is important because that consideration was not quantified in the survey, but the overall trend from respondents claiming that they already pay too much, coupled with the current poverty rates in the county could indicate that the respondent is not in a position to pay more. However, the question simply asks if the user is willing to pay more money for more service, and 54.10% say they would not.



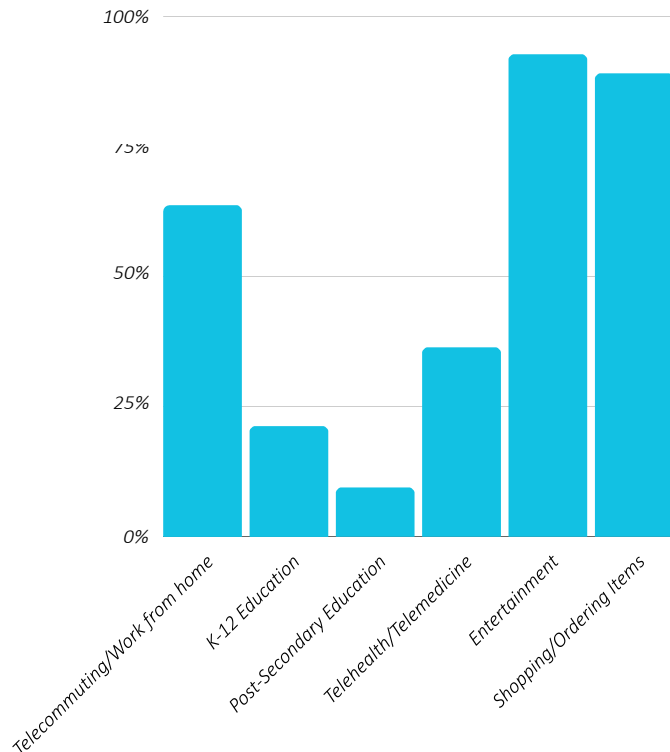
Question 11

“WHAT DO YOU USE THE INTERNET FOR? (SELECT ALL THAT APPLY)”

While over 92% of respondents included entertainment, the three most important uses to consider with this question include:

- Telecommuting (work from home): 63.67%
- Telehealth: 36.33%
- Education: 30.61%

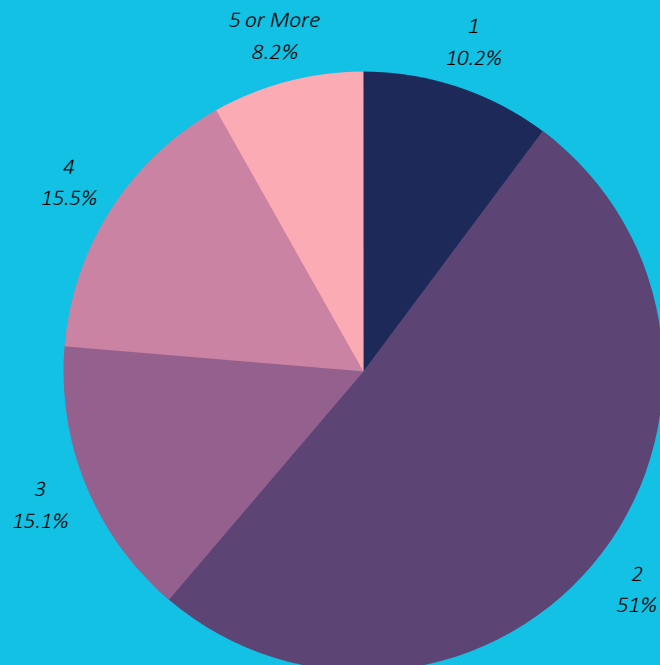
Also notable is the percentage of respondents (88.98%) who utilize the internet to make purchases. This has implications within the local business community, and whether or not Coös County businesses have access to the technology required to compete in the global (or regional) market.

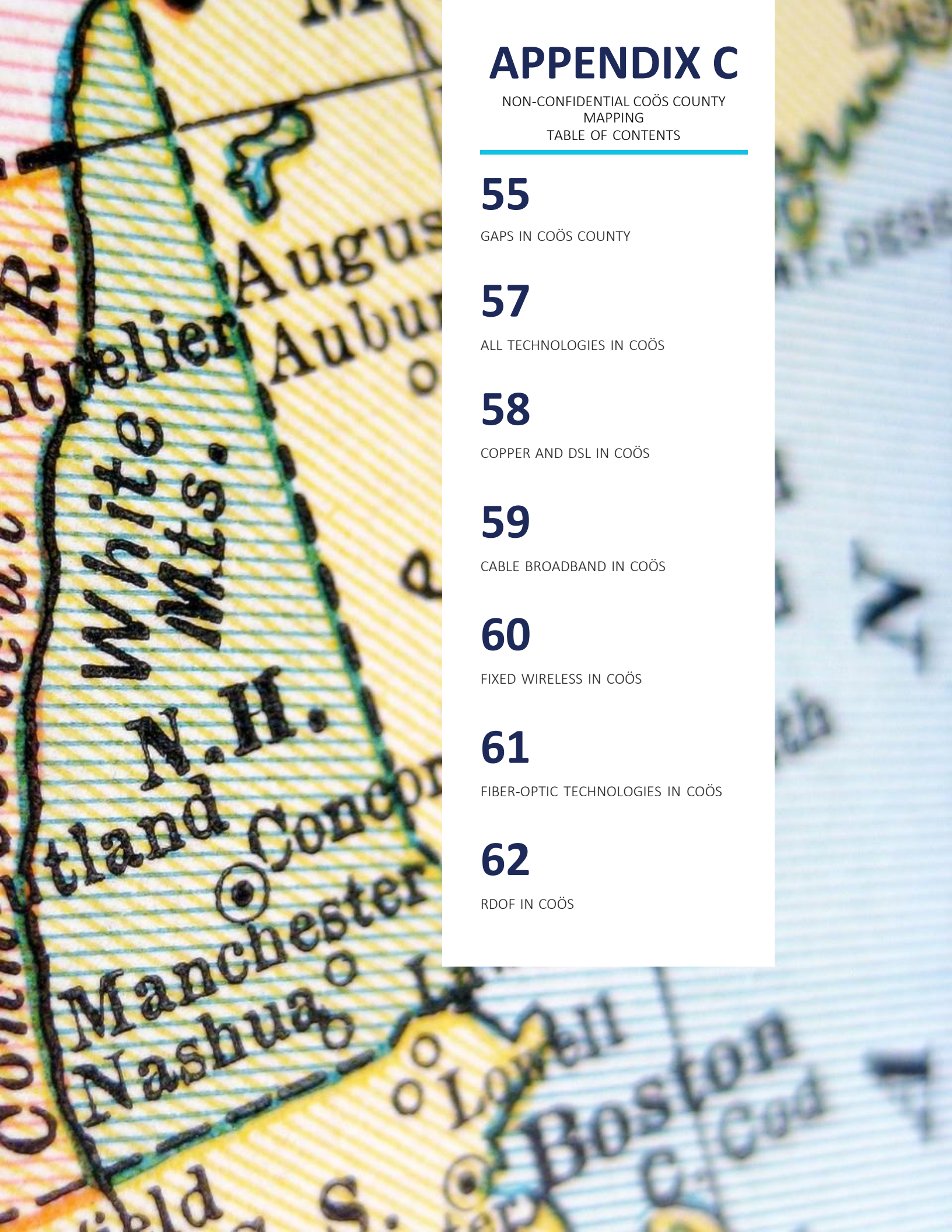


Question 12

“HOW MANY PEOPLE LIVE IN YOUR HOUSEHOLD?”

In Coös County, the average respondent reported that over 50% have a household of two residents; and that approximately 10% of households contain a single resident. The remaining respondents have a range of between 3-5 household members on average, which aligns with the current demographic data available. This also reflects why online education is less of a factor than other categories of use in the County.





APPENDIX C

NON-CONFIDENTIAL COÖS COUNTY
MAPPING
TABLE OF CONTENTS

55

GAPS IN COÖS COUNTY

57

ALL TECHNOLOGIES IN COÖS

58

COPPER AND DSL IN COÖS

59

CABLE BROADBAND IN COÖS

60

FIXED WIRELESS IN COÖS

61

FIBER-OPTIC TECHNOLOGIES IN COÖS

62

RDOF IN COÖS

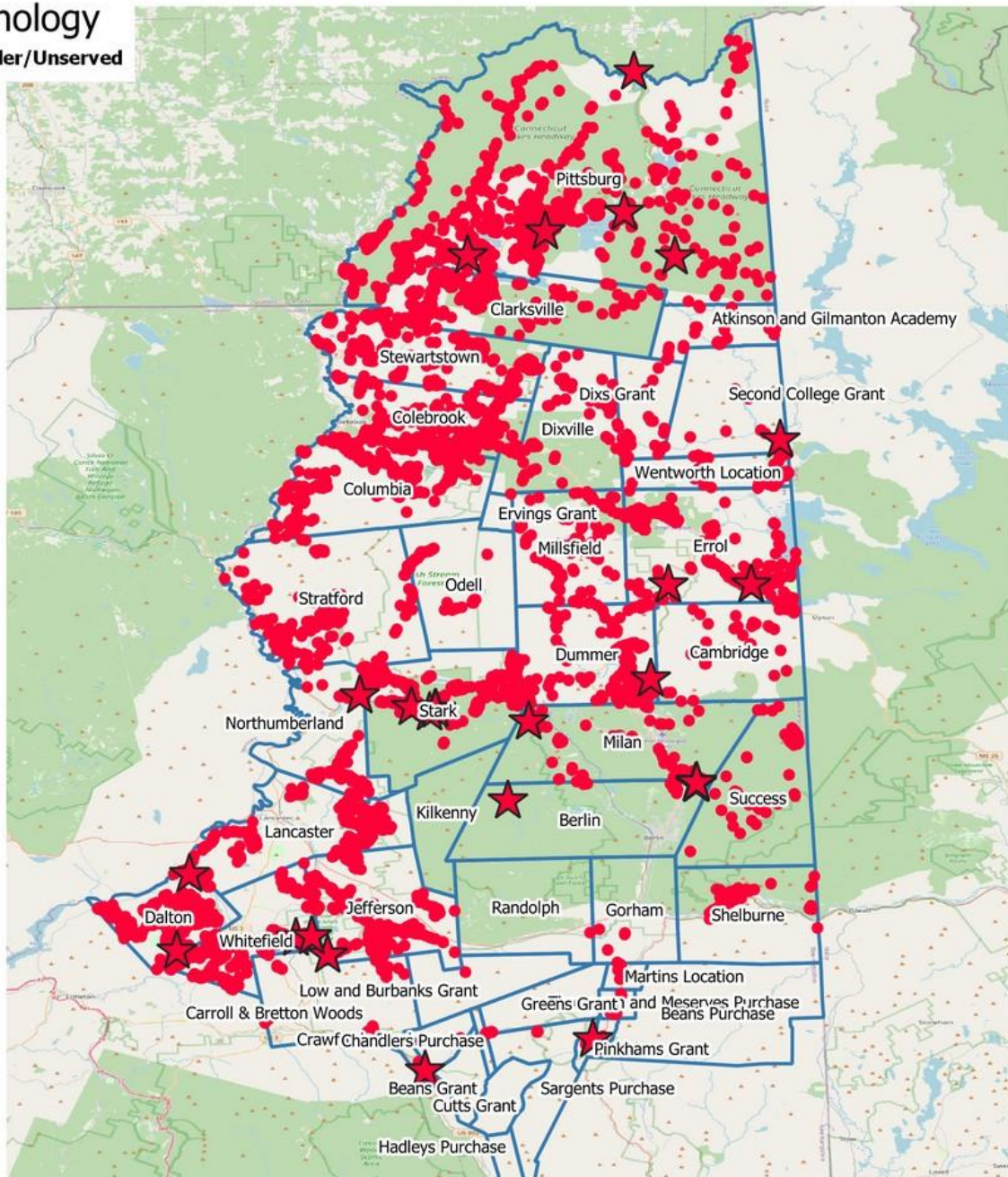


Coös County NEW HAMPSHIRE

Infrastructure Mapping Project Under/Unserved (Excluding Fixed-Wireless)

Technology

● Under/Unserved



mission
broadband

0 2.5 5 7.5 10 mi

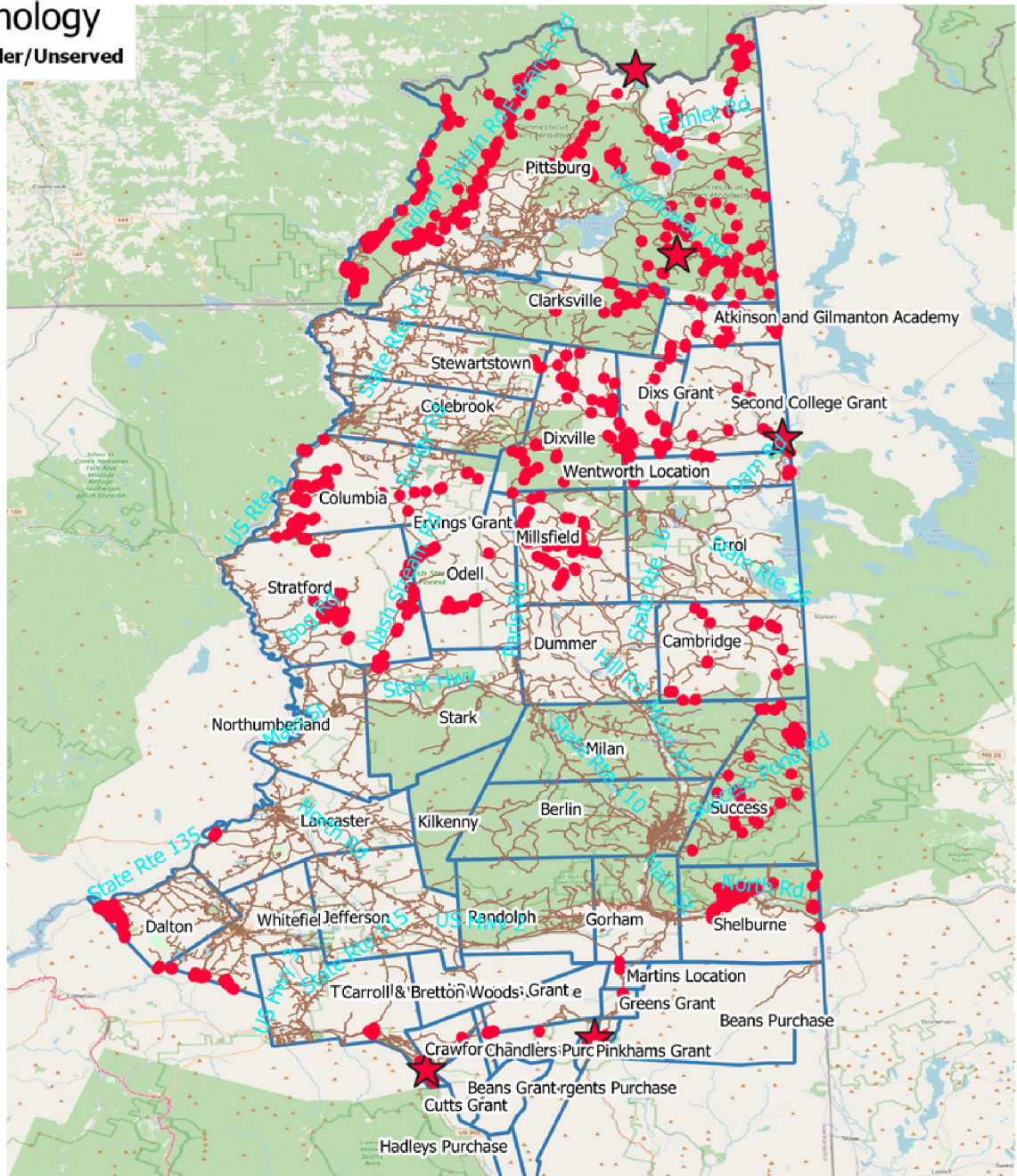


Coös County NEW HAMPSHIRE

Infrastructure Mapping Project Under/Unserved (Including Fixed-Wireless)

Technology

- Under/Unserved



mission
broadband

0 2.5 5 7.5 10 mi



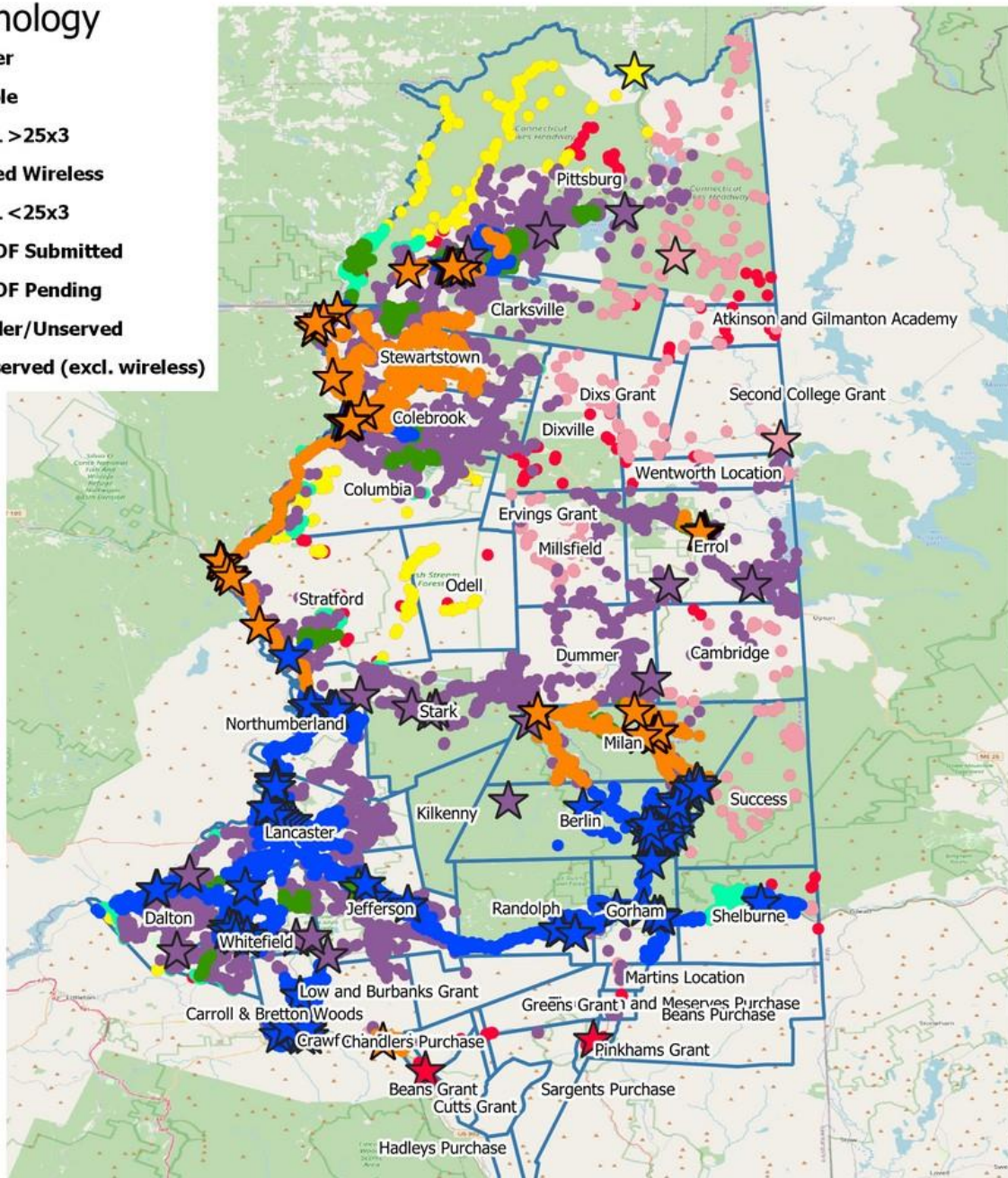


Coös County NEW HAMPSHIRE

Infrastructure Mapping Project All Technologies

Technology

- Fiber
- Cable
- DSL >25x3
- Fixed Wireless
- DSL <25x3
- RDOF Submitted
- RDOF Pending
- Under/Unserved
- Unserved (excl. wireless)



mission
broadband

0 2.5 5 7.5 10 mi

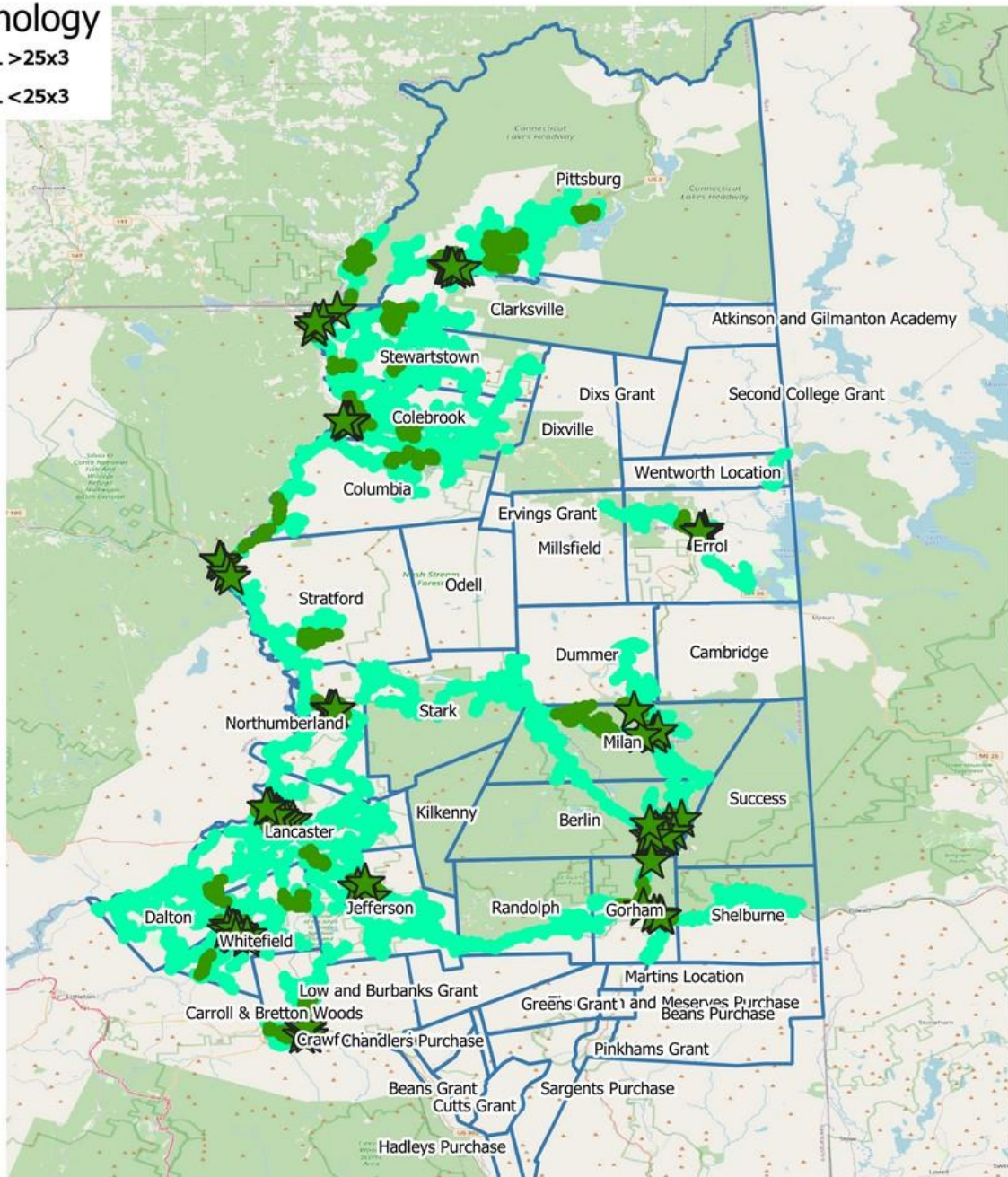


Coös County NEW HAMPSHIRE

Infrastructure Mapping Project xDSL Copper Broadband

Technology

- DSL >25x3
- DSL <25x3



mission
broadband

0 2.5 5 7.5 10 mi

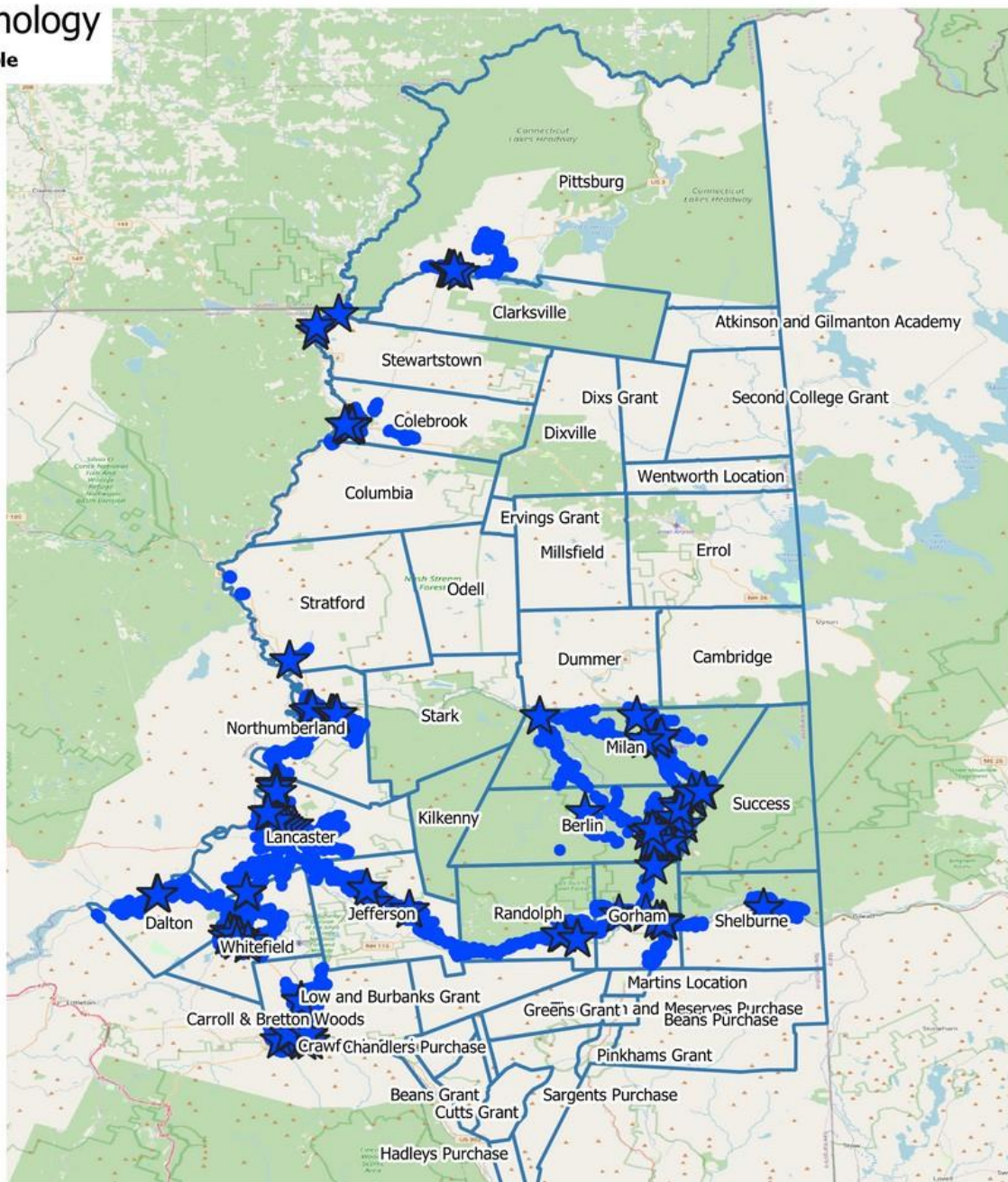


Coös County NEW HAMPSHIRE

Infrastructure Mapping Project Cable Broadband

Technology

- Cable



mission
broadband

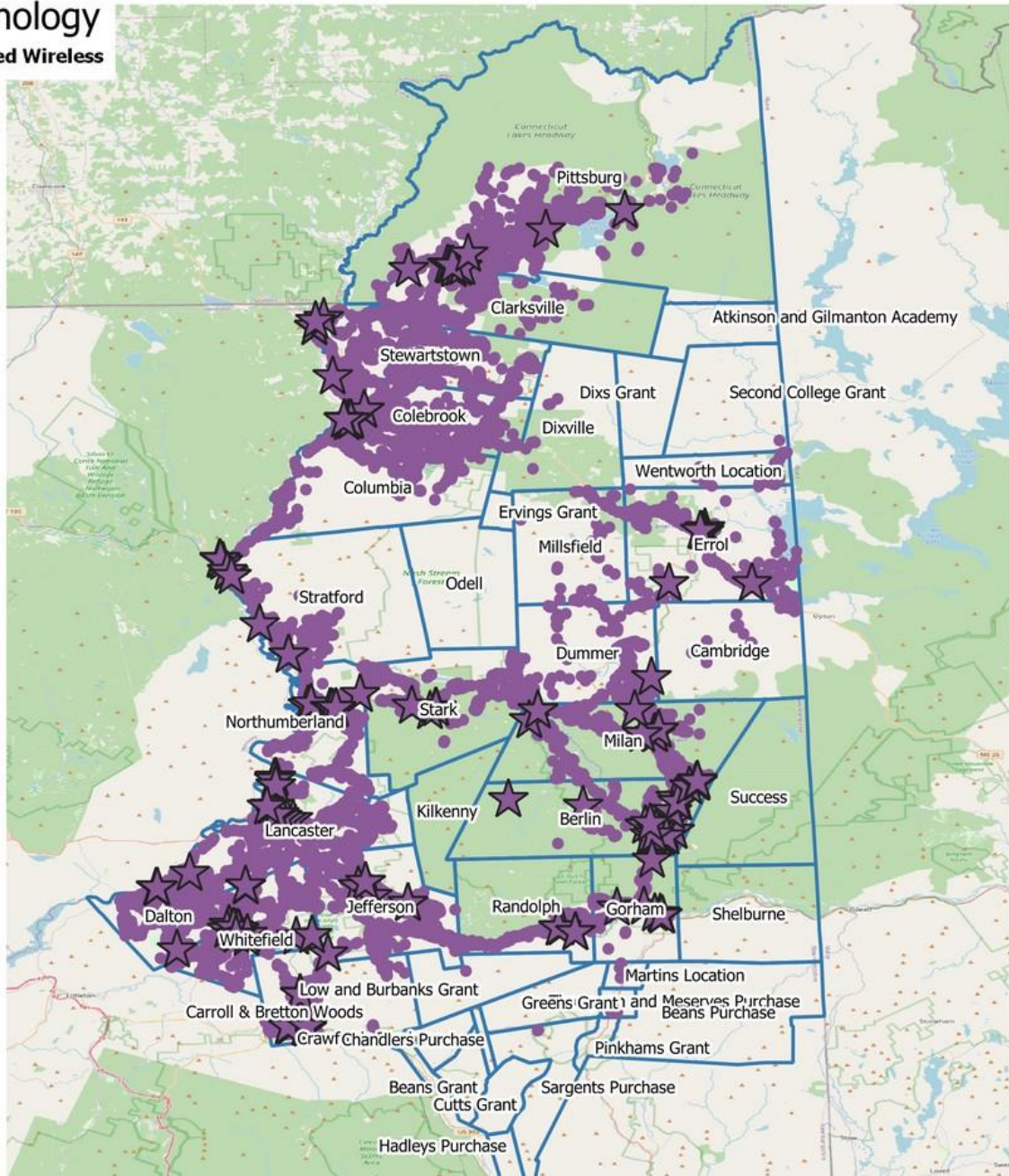


Coös County NEW HAMPSHIRE

Infrastructure Mapping Project Fixed Wireless

Technology

- Fixed Wireless



mission
broadband

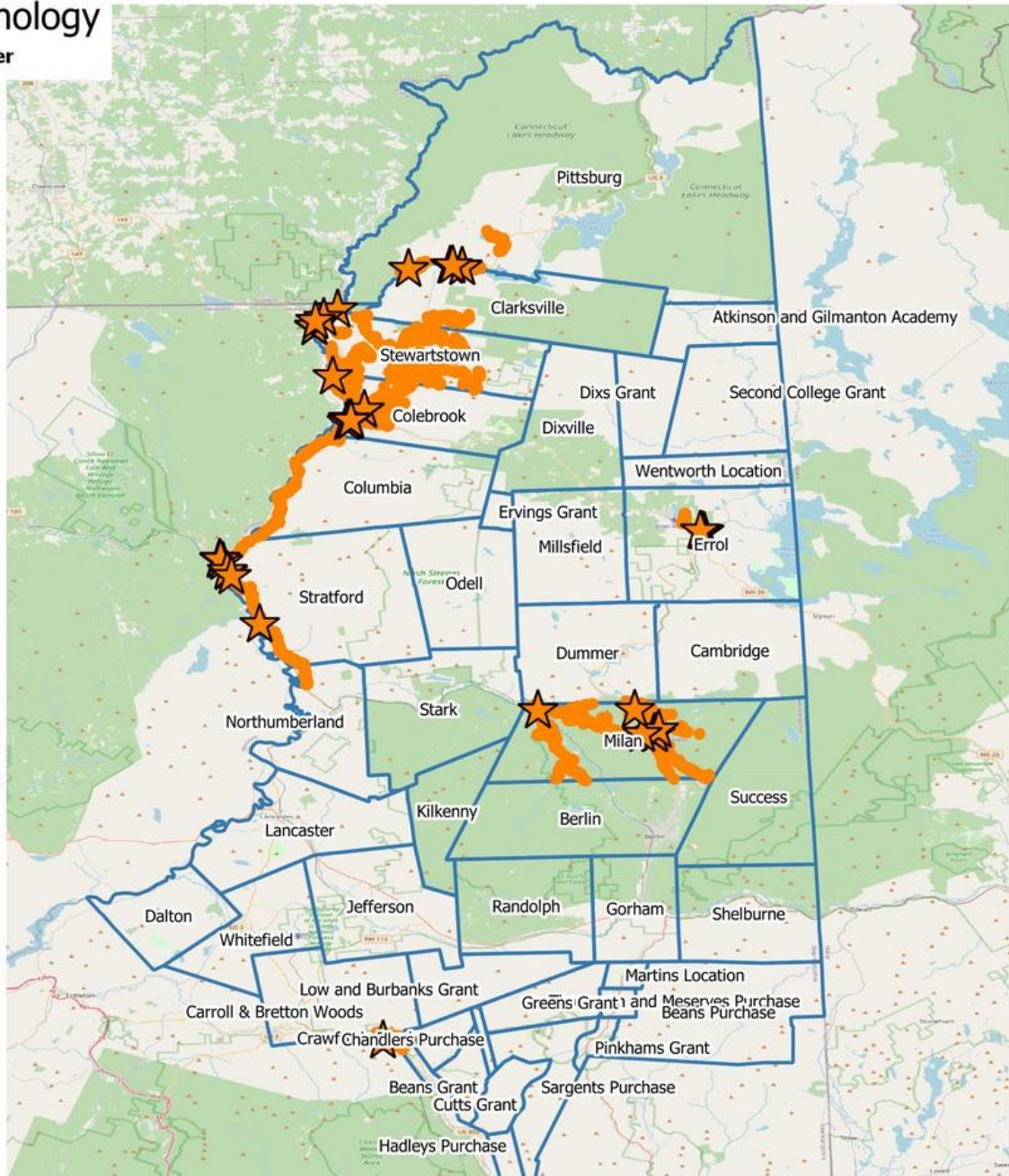


Coös County NEW HAMPSHIRE

Infrastructure Mapping Project Fiber Broadband

Technology

● Fiber



mission
broadband

0 2.5 5 7.5 10 mi



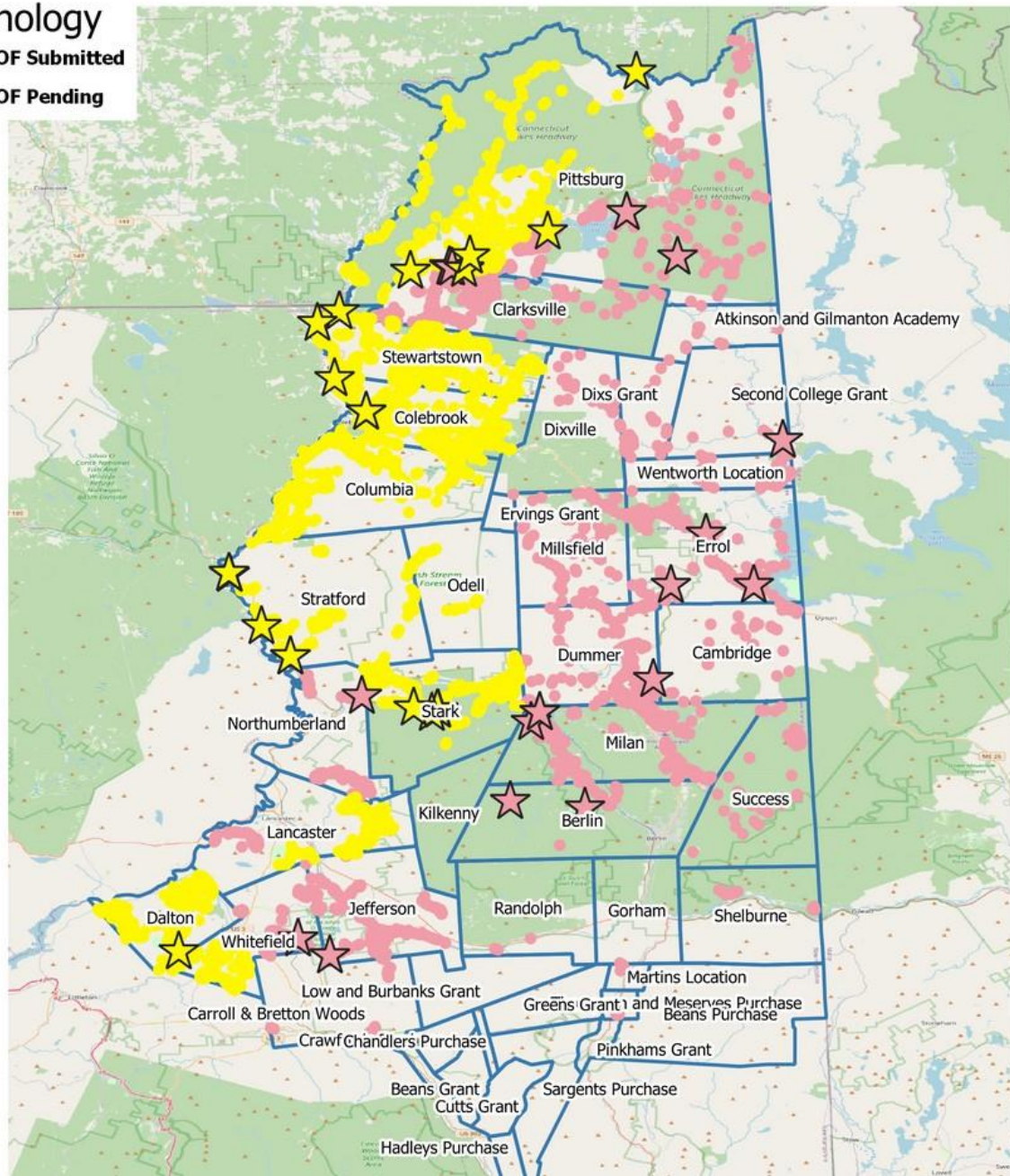


Coös County
NEW HAMPSHIRE

Infrastructure Mapping Project RDOF

Technology

- RDOF Submitted
- RDOF Pending



0 2.5 5 7.5 10 mi

