

REGIONAL BROADBAND PROGRAM

Ten Year Report • 2022



Contents

Introduction	3
Regional Projects	7
Grand County & Middle Park Health	8
Rio Blanco County	10
Breckenridge Fiber 9600	12
Community Broadband Network	16
Roaring Fork Broadband Project	18
Aspen Community Broadband	20
Summit County	22
Northwest Colorado Broadband	24
YVEA, Moffat County & Craig	26
Town of Red Cliff	28
Town of Vail	30
Eagle County	32
Jackson County	34
Clear Creek County	36
Project Thor	38
Interconnection – The Future of Large Public Networks	40
DOLA 10 Year Grants List	42



INTRODUCTION

Why a report?

Having a Regional Broadband Program means that we get a front row seat to some amazing work going on that doesn't have many cheerleaders in the media – or like any utility once it is working—users who appreciate the story behind how it came to be. We think these stories are evolving, and that public broadband will only increase in importance. We also hope that some leader, some future champion in some community near or far that is not as far along in the public broadband journey as some of those highlighted in the report will recognize their community's future in these pages and find some inspiration to move forward. One thing that local governments are very good at is solving problems, and doing it in a way that fits their community. We have some great examples of that, and that is the reason for this report.

Why a regional broadband program?

Discussions that led to the origination of the NWCCOG Broadband program began prior to 2012 when a DOLA grant was issued that would fund a Regional Broadband Plan published in 2013. As far as we know, it was the first of its' kind in Colorado. A handful of communities in Region 12 were already in the broadband business at that time including the CBN in the City of Glenwood Springs, the Town of Vail's Public WiFi project with fiber connected from CDOT fiber on I-70 and what would become NCB in Steamboat. We are proud to brag about those founding efforts and what they have done since in this report.

Many other communities were considering local projects or wondering if they ought to consider local broadband projects. Few knew where to begin. They didn't have internal expertise. They didn't know what "industry" knew about their communities. Some IT professionals understand broadband, but for most, it was an entirely different content area then what they did.

One thing the regional report recommended was a publicly funded "consultant" who could provide technical assistance to communities at various stages of their inquiry and process at a low cost, who understood the industry but were clearly an advocate from the public sector, and who wouldn't cost money.

Private consultants in the broadband sector exist, but they remain quite expensive, especially for the early inquiry phase. Their value is best leveraged when the local community is further along in the process, if already clear about next steps, for instance needing a community broadband plan researched and written, or when a project is at the scoping, engineering or implementation stages. Also, with consultants, there is always the concern that they may not always exactly

have the community's best interest in mind, they may be selling something, or may arrive with built-in ideas.

In 2014, NWCCOG issued proposals for a Regional Broadband Coordinator whose time would be paid half by NWCCOG member dues and half through a DOLA grant. Turned out, a handful of communities adjacent to the region were also getting active in the public broadband discussion and were willing to pay to play to have such a resource at their disposal as well including Routt, Clear Creek, Rio Blanco and Moffat Counties.

Why would the Regional Broadband Coordinator (now Director) be employed at the COG? For one, there was a critical mass of interest, but not a lot of local dollars committed to exploring broadband. It made sense to aggregate those dollars and expertise at the regional level. Another thing that Councils of Governments do well is to promote regional sharing of ideas and best practices. Of course, that is exactly in line with the mission of the Colorado Department of Local affairs which has funded the position in the early years at 75% to a 25% local match, and in recent years 50/50 with the expectation that the regional advisor at NWCCOG along with a parallel position hired in Region 10 be available to the rest of the state to provide technical assistance.



There was a critical mass of interest, but not a lot of local dollars committed to exploring broadband. It made sense to aggregate those dollars and expertise at the regional level.

Why public broadband? Why local governments?

Just as the “broadband industry” is skeptical of local governments, the reverse is true as well. Few local jurisdictions had open lines of communications with their Internet Service Providers (ISPs), including understanding what might be the impediments to their providing better service or extending service into unserved areas. Few would want to entertain the idea of adding to their competition, let alone advocating for a local public network which might just become competition. Also, though Broadband was increasingly becoming as necessary for everyday life in homes, schools and businesses, it wasn’t (very often) a public utility. Public utilities for water, wastewater or electricity had transparency to where it was investing dollars, where it had deficiencies, how it was funded and prioritized (or not). This is not the case for the incumbent providers, those ISPs serving most of rural Colorado across the NWCCOG region. This was very frustrating to communities. When they called upon ISPs to share their coverage maps, talk about their plans for expansion or explain what appeared to be a slow retreat from aging infrastructure, let alone share what investments would help them succeed—if we only had a fiber connection here, or a tower there, private ISPs tended to not be forthcoming to local governments whose constituents increasingly complained to them about issues with the internet. Regular outages,

outrageous pricing, low bandwidth, poor service or no service at all were common complaints to elected leaders whose main interest in local broadband became having some kind of lever to pull to change the situation.

Many of the local jurisdictions now involved in broadband or connected to Project THOR have stated that their main reason for getting in the public broadband business was to be able to control their own destiny. That may involve providing middle mile services that allow private ISPs to connect to and then serve that community through some kind of agreement as a number of Project THOR host communities do. It may involve creating a public-private partnership that opened because of a dialogue that occurred because the NWCCOG Regional Director helped connect the missing dots between what industry needed to improve local service and what the local community had as an asset – a water tank, a tower, or some money to invest in local fiber. Others just liked how simply talking about having a public broadband project or program brought industry to the table, or as in Eagle and Gypsum where after a decade of talk a major ISP committed to a major investment, deploying fiber throughout both towns.

Why so many stories?

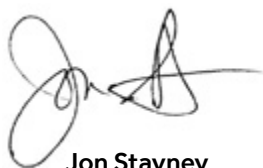
If there were a template for local projects to follow there might be only one story to tell. What NWCCOG has learned in assisting over 30 local governments explore, study, negotiate, issue RFPs, and implement broadband projects is that the pieces of the puzzle are different for each community, the public assets, private assets and service, the local champions, the perceived needs, the urgency, the politics, may be different but they are also common elements. What we have learned in nearly a decade of providing technical assistance to AND LEARNING FROM each of our local jurisdictions individual broadband journeys is that having a regional program means that the lessons from one carry on to inform the next, back and forth. It means that interest in one place that may have a big push, then get stalled over the years, for various reasons, when it gains steam again and is re-examined that it has someone ready to help pick up where it was left off. It means that there is a system of constant learning that persists through changes in personnel locally.

Why is the State involved in funding so many local and regional broadband projects?

The State of Colorado, primarily through the Department of Local Affairs has been a funding partner for nearly all of the local projects mentioned in this report. See the list at the back of this report. For the same reason that industry has not solved the lack of robust, reliable, affordable broadband across the vast expanse and distant communities of Western Colorado, many local jurisdictions need assistance in launching public broadband efforts. Throughout the past decade, that financial support for local funding has primarily been matched by DOLAs grant programs, and because of DOLA leadership in this sector, the region, and by extension the state has improved the lives of many citizens, the economic and social vibrancy of many communities. It is because of generous funding from DOLA that Project THOR exists, that is now able to link with a similar network owned and operated by Region 10, that it is able to now connect to Front Range public broadband powerhouses such as Front Range GigaPop

(FRGP) which supports many local governments and institutions of higher learning on the Front Range. Through the two Regional Middle Mile Networks in Region 10 and 12 (NWCCOG), FRGP will be able to serve colleges on the Western Slope as well. The fact that Project THOR rides on Colorado Department of Transportation fiber just underscores the involvement of state resources and the benefit of even more strategic involvement by state agencies coordinating to assist local communities in broadband.

NWCCOG is proud and encouraged that one of our own, Brandy Reitter formerly Town Manager in Eagle is now the Broadband Director for the State. There a few other states that are leaning much more aggressively into public broadband which we would like to see Colorado emulate. That, perhaps is the topic for another report.



Jon Stavney
Executive Director
NWCCOG



Nate Walowitz
Regional Broadband Director
NWCCOG

A close-up photograph of yellow plastic fiber optic cable trays installed in a rack. The trays are filled with orange and red fiber optic cables. A white label is attached to one of the trays, reading "Fiber Optic Cable Only" and "FiberGuide". The background is blurred, showing more of the rack structure.

REGIONAL PROJECTS

THE PLACE

Why would a regional medical center host three local broadband CNLs?

Grand County is a difficult geography for broadband providers to serve efficiently. The dispersed population among six geographically distant towns and more rural valleys lack a critical mass. As a result, businesses have historically suffered with unreliable credit card service and other uses. Local governments, two school districts, citizens as well as visitors who might choose to telecommute, work from home, or develop home-based startup businesses are at a disadvantage. This is an impediment to growing the citizens, institutions, businesses, economic development in general, and to visitors who are vital to growing the tax base.

This challenge is not unusual across Colorado. Other rural counties struggle with erratic or no broadband service at all, relegating the community economically and socially to services from a prior century. Beyond just the availability of last mile broadband, a single fiber optic cable cut or service outage on middle mile connections to Denver can cause long term adverse impact on businesses, homeowners, guests, travelers, schools, government and public safety personnel. These outages also affect cell phone service availability.

Grand County also has seen robust growth and economic activity and it hosts resort amenities that span from quaint Grand Lake at the base of Rocky Mountain National Park to Winter Park which is one of the top 10 busiest resorts in Colorado the county. Though quaintness is part of the charm of these Grand County amenities, increasingly visitors expect reliable high-speed broadband as part of what defines a high-quality visitor experience.



The board's choice to host a meet-me-center and participate in a regional middle-mile cooperative in 2019 has changed what was an unacceptable situation with regards to imaging for our patients. One example prior to the project of an unacceptable scenario for slow and non-redundant broadband service was a stroke victim requiring remote experts to assess whether there was internal bleeding to the brain. When the internet was working, it took 5 minutes to upload and not much longer to get an assessment from a remote expert so physicians could react quickly, but when the internet was on a backup system for the common instances when the system was down, it sometimes was hours or days at a time, that same critical remote review could take more than 30 minutes to upload.

— Dr. Thomas Coburn, Chief Medical Officer & Emergency Department Physician at Middle Park Health



THE NUMBERS

- Grand County: 4,842 square miles
- Grand County Population: 15,321
- Project THOR MMC Locations:
 - Kremmling
 - Granby
 - Coming Soon: Fraser-Winter Park



INVESTMENT

- Minimal because Project THOR was installed in existing data racks in each hospital.

THE PROJECT

It was during the concept stage of Project THOR that Middle Park Health heard about Project THOR and reached out. Project THOR was late in the network design phase when their provider Mammoth Networks with whom they were discussing upgrading to 1 gig service mentioned that could more effectively be accomplished by hosting a Project THOR location. Mammoth was also working with NWCCOG at the network design phase of Project THOR when it became clear that the network could serve Kremmling with 10 Gig at the same price. Project THOR was also able to serve their hospital location in Granby. Middle Park Health at both location became the first stakeholder of Project THOR to be served as customer.

Because of the Meet Me Center in Kremmling hosted by Middle Park Health, the Town of Kremmling was then able to be served by a new Internet Service Provider that is leveraging Project THOR to support local government agencies, consumers, and businesses. They are providing minimum speeds of 50 Megabits per second to customers.

Recently a newer locally owned and managed ISP has emerged in the county and is providing wireless broadband to communities that were previously unserved, utilizing the MPH locations for affordable, high capacity, reliable access to middle mile transport, allowing them to meet their consumers needs affordably. Middle Park Health will be constructing another facility in the Fraser-Winter Park area and is partnering with both towns to install a third Meet Me Center location there to serve the upper Fraser Valley.

One thing NWCCOG has learned through its years in providing technical assistance to communities in the broadband realm is that you never know who the local champions will be. Grand County has been active in the NWCCOG Broadband Steering Committee since 2013 and NWCCOG has created a new Broadband Overview for the County to assist in guiding a broadband approach and RFP process for a broadband engineering study and plan. NWCCOG has been having discussions about improving broadband in Grand County since the beginning even going so far with a stakeholder group of local governments to draft a County-wide broadband concept plan. There have been ongoing discussions with the local rural electric association which has discussed at the board level deploying middle mile fiber throughout it's multi-county service area on poles. There have been discussions with the county and with the municipalities. In spite of a lot of interest and a lot of meetings, no plan took form and no entity stepped forward to take the lead.



2 Rio Blanco County

PROJECT POINT PERSON : Trevor Nielsen, RBC Information Systems Director

Why would a conservative, rural county go all-in on public broadband?

Rio Blanco County is a place with a strong independent spirit and not a place that looks first to government for solutions. In 2013, Rio Blanco County residents suffered with limited broadband access to the outside world. After looking to the private sector, leadership developed a vision and a plan for the community to take care of Broadband on their own.

The solution developed was led by the County IT department which contracted to build out a Middle Mile and Last Mile Fiber to the premise (home and business) network delivering 1GB access to every home and business in Meeker and Rangely, and wireless service to the remaining, mostly remote 3,500 homes. It was an ambitious goal, with few rural models to follow. Because of the cost of the plan, the County looked to the voters to approve the plan which received 82% voter support to spend general fund dollars on Broadband in November of 2014. The significant research and planning by Rio Blanco County had paid off. In 2016 Rio Blanco's project won the annual "Community Project of the Year" award at Mountain Connect. Rio Blanco's experience and lessons learned have been shared around the region and the State. The project in Rio Blanco County is now capable of serving the majority of its residents with modern high-speed internet, and also serves as the backbone for critical infrastructure connections among community anchor institutions and emergency services. As of today, the take rate is near 80%. The final push however, is the most difficult, with state and federal dollars being spent to help those projects that remain at early stages of development. Many of the most remote homes still eagerly await a transition from wireless and satellite service to more robust and reliable wireline fiber optic service. That is now the focus of the County's efforts along with service improvement.

NWCCOG ROLE

The regional plan helped raise awareness in Rio Blanco County. NWCCOGs added value and insight to local teams that already had a very high level of technical mastery; promoting information sharing between Rio Blanco County and other jurisdictions which contributed to the effectiveness of the local and network deployment. The Project THOR now sustains the County's municipal broadband network, and provides upstream resiliency to critical services for citizens.



The THOR network and NWCCOG have been a stabilizing factor in the maturity of the County's broadband network. Having sufficient and reliable first and middle mile connections is essential to any broadband network, but especially municipal networks that only reach certain geographic areas.

– Trevor Nielsen,
RBC Information Systems Director



THE NUMBERS

- Rio Blanco County Population: 6,306
- Town of Meeker Population: 2,415
- Town of Rangely Population: 2,402
- 2014 Voter Approval: 82%
- In town fiber service: 1 GB
- Rural wireless Goal: 3,500 homes
- ISPs:
 - Cimarron Telecommunications
 - Visionary Broadband



INVESTMENT

- DOLA: \$3.6M
- Rio Blanco General Fund: \$8.4M (2015-2017)
- Communications Fund (Enterprise)
 - 2018: \$562,210.54
 - 2019: \$532,672.82
 - 2020: \$560,774.30
 - 2021 Projected: \$795,644.29
 - TOTAL: \$2,451,301.95
- CCITF (County Capital Improvement Trust Fund)
 - 2017: \$1,499,999.91
 - 2018: \$744,882.86
 - 2019: \$20,397.19
 - TOTAL: \$2,265,279.96



PARTNERS

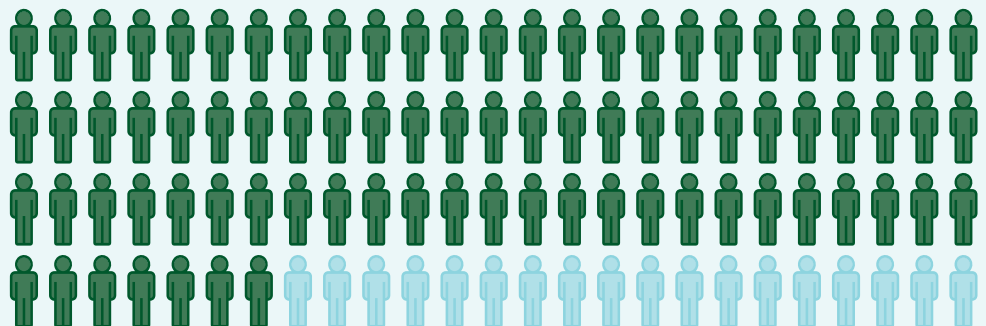
- Rio Blanco County
- Community Anchor Institutions:
 - Towns of Meeker & Rangely
 - White River Electric Association
 - Meeker & Rangely School Districts
 - Colorado Northwestern Community College
 - Rangely District Hospital
 - Pioneers Medical Center
 - Meeker Recreation & Parks District
- Broadband Service Providers:
 - Cimarron Telecommunications
 - Visionary Broadband
- Colorado Department of Local Affairs
- NWCCOG
- Mammoth Networks
- Bureau of Land Management

HEADLINES

- HEADLINES
- Rio Blanco County stays relevant with broadband (Broadband Communities, Dec. 2016)
- Broadband Gaps in Colorado Threaten to Leave Rural Areas in the Dust of Digital Age (Government Technology, Sept. 2017)
- NWCCOG January 2017 Press Release
- <https://www.theheraldtimes.com/kayes-corner-thank-you-fiber-optic-internet/opinion/>
- County Youtube Channel: <https://www.youtube.com/c/RioBlancoCountyColorado>
- County Website: <https://rbc.us>



**VOTER
SUPPORT**



3 Breckenridge Fiber 9600

Town of Breckenridge

PROJECT POINT PERSON: Kristin Brownson, Assistant Director of Public Works
Shannon Haynes, Deputy Town Manager

Can a town advance strategic plans through a clever branding strategy?

The Town of Breckenridge, known for their pioneering spirit and commitment to innovation and sustainability created a strategic plan encompassing various initiatives, and then hired Launch Advertising to pull those elements into a coherent campaign for sustainable programming known as Breck Forward. Under that umbrella, Town designed and delivered multiple successful campaigns including the controversial introduction of paid parking, reusable bags and the town's own fiber infrastructure. For the paid parking, the campaign leveraged humor in an advertisement of a person wearing a parka with remnants of snowballs saying "Paid Parking begins December 1st, we're not expecting confetti." Another campaign for the fiber infrastructure used phrases such as "you may not be accustomed to speed and reliability" over a photo of a retro VW camper. Another advertisement said "soon your love-hate relationship with local internet service will just be love." This portion of the campaign was known as Fiber 9600.

In addition to addressing civic needs, Fiber 9600 is geared toward directly serving residents and business owners in Breckenridge that have been living for years with slower internet speeds and unreliable service for broadband communications. As experienced in other resort communities hosting public WiFi, such as Vail, Breckenridge had found prior to Fiber 9600 that WiFi became exceedingly difficult to use during peak days in peak seasons.

In April of 2018, Town Council gave staff the approval to move forward with the project, as well as adopting a Dig Once ordinance. Through the remainder of 2018 and the spring of 2019, the Town worked with a consultant to design a "Fiber to the Home and Business" infrastructure.

In the spring of 2019, the Town partnered with ALLO Communications to become the service provider (ISP) for the entire project. Partnering with ALLO Communications enabled the Town to give residents and businesses of Breckenridge the opportunity to have competitive pricing, higher speeds, reliable connection, and better customer service. The Fiber9600 project is about stimulating competition and ensuring reliability in Town for citizens, and providing access to an important utility. Breckenridge envisions Fiber9600 as an avenue to better address the critical communication needs of the community. It's an important need that legacy incumbent, for-profit companies have historically not stepped up to meet, therefore, the Town felt that if it didn't take on fiber to be able to strategically steer forward, it wasn't going to get done.

In May of 2019, the project broke ground and from 2019 through 2021, contractors installed a central office, fiber backbone, and were able to provide service to 438 subscribers. During the 2019 build season, the Town was able to partner with Xcel Energy, by utilizing their Dig Once policy, to share a trench along a sizable section of their backbone. This partnership allowed both entities to save a significant amount of money and minimize the construction impacts to the community. Fiber construction in 2020 and 2021 brought service to neighborhoods, businesses along the downtown corridor, and Town facilities. In 2022, the Town will utilize a DOLA grant in the amount of \$850,000 to bring fiber connectivity to six workforce housing complexes either already built or being built around the Town. Additionally in 2022, the Town will connect more anchor institutions and workforce housing.





THE NUMBERS

- Town of Breckenridge Population: 4,885
- Town Investment: \$25M
- ALLO offers:
 - 1 Gig symmetrical for \$92/month
 - Or 500Mbps symmetrical for \$63/month
 - Basic TV with 100+ channels for \$110/month
 - ALLO home phone for \$25/month
- Also Serving Breck: Comcast and Century Link



PARTNERS

- Summit County
- ALLO Communications
- NWCCOG Project THOR (via Summit County)
- DOLA

HEADLINES

- <https://www.summitdaily.com/news/local/fiber-optic-network-projects-expand-across-summit-county/>
- Breckenridge aims to start building its own high-speed internet network soon, Summit Daily 4/22/2019
- Launch Advertising for Breck Forward



Paid parking? Breck has an app for that.



**You may not be accustomed
to speed and reliability.**

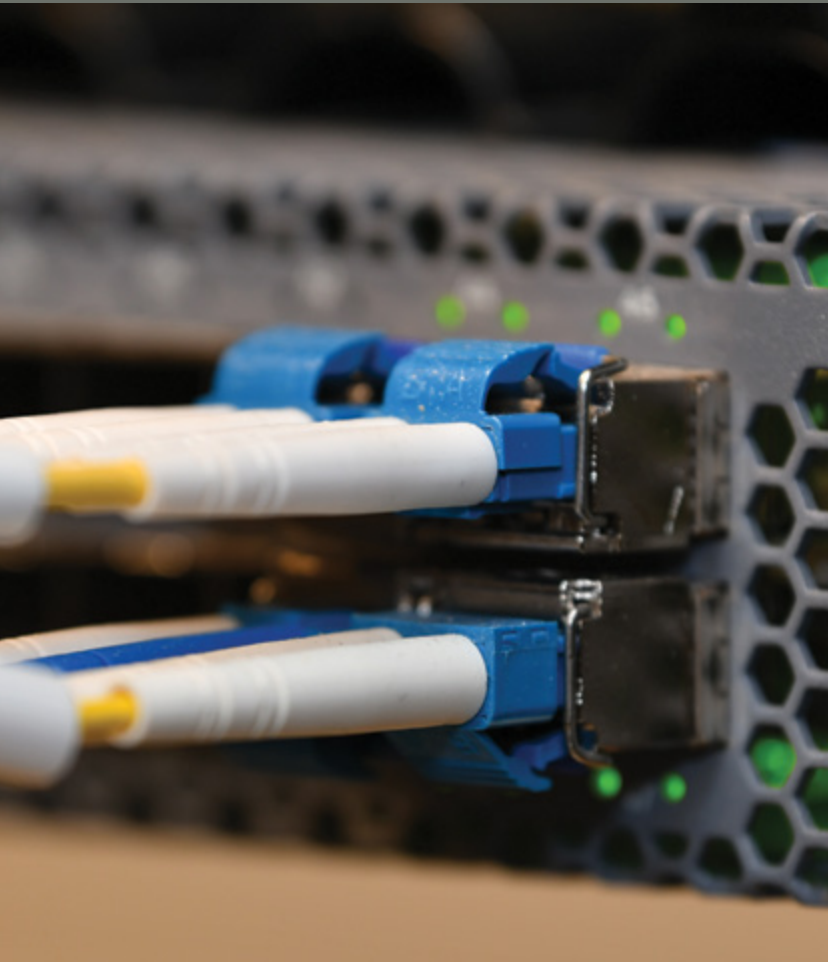
Fiber9600 is coming soon.



As residents and business owners in Breck, we've been living with slower internet speeds and unreliable service for broadband communications and WiFi. So here's some news worth celebrating. Our town is investing in a fiber infrastructure that will enhance broadband service as soon as it is in place, and ensure that our digital communications, global connectivity, and community technology are future-fit. Beyond cable and DSL, fiber is definitively the best choice for speed, reliability, and longterm sustainability. It will positively impact our local lifestyle, our ability to recruit and retain employees, and compete as a tourist destination. We are building Fiber9600 not just to catch up, but to confidently leap light years ahead.

Visit Fiber9600.com to learn more and receive updates on construction and implementation.

Fiber9600  A @net company



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Community Broadband Network (CBN),
your community owned, City managed
fiber-optic network is now available in
your neighborhood.



Hometown High Speed is Here!

Together,
bringing
the power
of broadband
to Colorado.

Ciena is a proud sponsor of
NWCCOG and Project THOR.



4

Community Broadband Network

City of Glenwood Springs • GSCBN.com



A historic town makes some changes as it invests in it's second generation of public broadband.

In 2002, The city of Glenwood Springs became one of the first municipalities in the U. S. to install a fiber optic-based network. Uniquely, having been in the municipal electricity business for 150 years, the city already had experience with managing and servicing a wired public utility. Beginning in 2002, the city's Community Broadband Network (CBN) served as many as 300 local businesses with a fiber loop, and free public WiFi. It was run as a municipal department, not yet as a separate enterprise in these early years. This network provided backhaul on a municipal owned open-access wireless network, as well as internet services to cornerstone institutions within the city. Multiple privately owned, local Internet Service Providers (ISPs) utilized this open-access fiber infrastructure to deliver much needed internet and phone services to residents of Glenwood. This open-access model shifted towards direct sales from the city to end-users beginning around 2010. Over the following decade competitive forces within the limited service area, and feedback from the community, resulted in the last remaining resold (private ISP) services being migrated off the network in 2019.

After over two decades of providing services on this network in 2020, the city decided it was time to expand this municipal network. This decision point came when significant infrastructure maintenance was up for discussion in the 5-year plan, as well as growing interest in next-gen internet services from the citizens and council of Glenwood Springs. Following a 2019 feasibility study, the city explored various funding options for this project, and ultimately decided to self-fund 100% of the \$9 million cost of a major infrastructure upgrade which would replace the 20 year old fiber for 300 businesses and allow CBN to additionally serve over 5000 potential residential customers. As of Spring 2022, the project was 60% built-out with an expected completion date later in 2022.

Community Broadband Network(CBN), the City's new municipal enterprise originated with the first day of the 2021 budget year on 1/1/2021. That entity thereupon set about building a 100% fiber optic network to deliver

Fiber to the Home (FTTH) services to residences within the city. As of 2021, this FTTH network delivers fully symmetrical 1 Gigabit internet service to homes at \$70.00 a month with plans to in 2022 to offer 2 Gigabit symmetrical internet services. This network is fully owned and operated by the City of Glenwood Springs' Community Broadband Network enterprise. In municipal finance, an enterprise is a subsidiary fund within the municipality that must operate as a self-contained entity for revenues and expenditures and is primarily utilized for municipally operated public utilities.

The CBN network is 100% fiber optic and is uniquely situated to provide service to residents as well as to regional ISPs in need of dark fiber or transport services to Denver via the Project THOR infrastructure. CBN Also provides redundant wholesale IP Bandwidth to community partners via its fully featured Autonomous System (AS) comprising of multiple enterprise grade routers.

PARTNER HIGHLIGHT: Because of its experienced staff and track record, CBN was approached by the Town of Eagle which was at an earlier stage in consideration of municipal broadband. In 2021, the two entered into a public-public partnership through Intergovernmental Agreement (IGA) for the city to provide transparent network operator services to facilitate a potential FTTH build out in the Town. As of early 2022, the Town of Eagle after several years of study and preparations decided to not pursue a bond to provide a municipal network directly serving residents. It serves its municipal needs and that of other community partners through Project THOR. The town's decision was partially because of Comcast's concurrent decision to deploy residential broadband to neighborhoods. With the experience and staff CBN maintains, such back-end Network Operator services and partnerships are another avenue CBN is able to facilitate broader access to high quality connectivity services. While many municipalities have IT staff with some broadband experience, few have staff dedicated solely to broadband like the City of Glenwood Springs.



THE NUMBERS

- Glenwood Springs Population: 9,544
- City Hydroelectric Plant – 1888
- Among first municipal electricity in CO – 1886
- Began Muni Broadband – 2002
- Grandfathered in as municipal ISP upon introduction of SB-152
- SB 152 Opt Out Vote – 2008
- Residential and Commercial Serviceable Addresses: ~5000
- 1 GBps Symmetric Residential: \$70/month



INVESTMENT

- City Enterprise Fund Creation
- Total 2020 FTTH Project: \$9M
- 100% Self-Funded
- 150 miles fiber



PARTNERS

- Bank of Colorado
- Town of Eagle

NWCCOG ROLE

NWCCOG, with Project THOR, contributed to the ability of Community Broadband Network to provide reliable internet services. THOR's middle mile network has provided another point of redundancy to CBN allowing for an even more robust network.

HEADLINES

- Glenwood working toward installing a new broadband system over the next two years, Post Independent, 4/18/2020
- GWS continues its Tradition of Looking Ahead with Fiber Network Expansion, Community Networks 5/7/2020
- Glenwood Springs Voters OK Further examination of Fiber Optic network expansion, Post Independent 4/23, 2008
- Glenwood has Internet with no strings attached, Post Independent 5/15/2006
- Glenwood's wireless Internet system rankles ISPs, Post Independent 8/12/2002



5 Roaring Fork Broadband Project

Pitkin County • telecoms.pitkincounty.com

PROJECT POINT PERSON: Jeff Krueger, Telecommunications Director



Often the path taken by one entity merges with the path of another before the way becomes clear.

So it has been in Pitkin County where the County since 2011 sought to build upon its infrastructure of wireless towers remaining from its days as a local TV provider to improve DTR public safety networks and perhaps serve the remote corners of the County with wireless internet. After early successes that effort seemed to be at a standstill. In the meantime, the City of Aspen connected to Project THOR, and entities up and down the Roaring Fork Valley held a series of discussions which resulted in something much more ambitious now underway and pursuing funding opportunities.

The Roaring Fork Broadband Project is a collaboration between Pitkin County, the City of Aspen, the Town of Snowmass Village, the Town of Basalt and Holy Cross Energy to build a high-capacity, resilient middle-mile fiber network that extends more than 40 miles from Glenwood Springs to Aspen. The project builds on the Pitkin County Broadband Initiative (PCBI) and connects to the highly successfully Project THOR Meet-Me Centers (MMCs) in Glenwood Springs and Aspen bringing accessible, affordable, and reliable broadband to rural communities across the Roaring Fork Valley. For purposes of capacity, reliability, scalability and security, having access to fiber will have far reaching benefits to the Roaring Fork Valley. Advancing middle-mile fiber in Pitkin County will enable digital equity and advance the quality of life by providing communities with unlimited access to jobs, education, healthcare and a path to the future. The project will serve as a backbone and lay the foundation for future public and private investment opportunities to build additional regional and local broadband networks. The Roaring Fork Broadband project represents a new era in communications infrastructure with future-proof technology for facilitating the bandwidth needs of homes, businesses, schools, libraries, institutions, and government agencies.



Photo Left to Right: Nate Walowitz (NWCCOG), Tony Neal Graves (OIT), Greg Winkler (DOLA), Phylis Mattice (PitCo), Jeff Krueger (PitCo), Kara Silbernagel (PitCo).



As a regional facilitator for rural broadband, the RCB has been instrumental in building a network of communities and organizations struggling to deploy broadband services. Through the NWCCOG, the Broadband Steering Committee and the RCB, Pitkin County has been able to leverage the experiences, innovations, and lessons learned of all participating organizations to jumpstart Pitkin County's Broadband Initiative.

—Kara Silbernagel, Policy Manager, Pitkin County



THE NUMBERS

- Populations: Aspen 7,431
- Snowmass Village 2,783
- Basalt 3,847
- Pitkin County 17,767
- Estimated County peak visitor population: 53,000
- DTRS Transition: \$2.5M
- Site Rebuilds and fixed wireless deployment: \$4.2M
- Roaring Fork Middle Mile Fiber: \$3.6M



INVESTMENT

- DOLA Planning Grant: \$150K
- DOLA Phase 1 Upgrades: \$897K
- DOLA Phase 2 Upgrades: \$653K
- DOLA Roaring Fork Fiber Project: \$810K



PARTNERS

- DOLA
- State OIT
- Nine Public Safety Agencies
- NWCCOG
- Holy Cross Energy
- City of Aspen
- Town of Snowmass Village

NWCCOG ROLE

The NWCCOG Regional Broadband Coordinator (RBC) has been actively engaged since 2014 with Pitkin's broadband strategy. In addition to assisting with the vision, writing of RFPs and evaluation of network design and deployment responses, NWCCOG has assisted with technical support for terrestrial and wireless broadband and public safety technology and infrastructure. In the past 12 months, the RBC has continued to provide RFP response review and evaluation, regional information and experience sharing, support for their continued trans-county wireless broadband deployment strategy and addressing the regional need for what has become Project THOR.

BONUS ROUND

The Roaring Fork project has not been focused just on Pitkin County, but the entire Roaring Fork Watershed. One of the advantages of NWCCOG's regional perspective and participation in the Roaring Fork project is that the RBC has assisted Pitkin County staff to coordinate and collaborate broadband initiatives amongst four counties, seven municipalities and two school districts that comprise the Roaring Fork Valley. In 2022, NWCCOG will upgrade the Project THOR network to enhance regional capabilities and also support development and deployment of the Project THOR/Region 10 joint operation middle-mile network.

HEADLINES

- telecoms.pitkincounty.com
- Aspen joins effort for fiber build out, Aspen Daily News 3/10/2021
- City of Aspen expanding its broadband reach, will benefit county, The Aspen Times 5/10/2018
- PitCo's Broadband initiative coming online slowly, surely, Aspen Daily News 8/3/2019



6 Aspen Community Broadband

City of Aspen • aspen.gov

PROJECT POINT PERSON:

Denise White, City of Aspen Communications Director



When being at the end of the country road is just the beginning of the broadband story for one of the West's most celebrated destinations.

The City of Aspen received City Council approval to join NWCCOG Project THOR in May of 2018 and began serving customers in February 2019. The Colorado Government Association of Information Technology (CGAIT) recognized the Aspen Community Broadband project in 2020 for one of three annual Excellence Awards for "Enhancing Public-Facing Communications and Services." In this recognition, CGAIT announced that "Aspen's remote geographic location and the adverse impacts from periodic commercial Internet Service Provider (ISP) network outages led the City of Aspen and Pitkin County to improve communications network resiliency by delivering better and more cost-effective broadband."

Additional community benefits of Aspen Community Broadband include net neutrality, no monthly data caps and fostering healthy broadband competition. The City of Aspen leveraged their existing fiber-optic network to deliver broadband services to community anchor institutions, including Aspen School District, Mountain Rescue Aspen, Grassroots Community Network, City of Aspen, Pitkin County, Pitkin County Broadband Initiative and three local ISPs. Before February 2019, they served only City and Pitkin County government operations.

The Aspen team learned broadband service delivery business and technical skills by collaborating with Northwest Colorado Broadband (NCB), Glenwood Springs, the NWCCOG Project THOR partners and Mammoth Networks. Team Aspen's Lean Startup approach achieved positive results with no additional staff.

The exemplary regional collaboration led by NWCCOG continues to improve broadband services in Aspen, Pitkin County, the Roaring Fork Valley and throughout Northwest Colorado. The City of Aspen has leveraged their hosting of a Project THOR Meet-Me-Center (MMC) more rapidly than any other MMC host and was the first host to need to increase the originally envisioned capabilities of their network by moving up from a Class 4 to a Class 3 MMC host. Their direct engagement with community anchor institutions drove the increased need, and the team is leveraging THOR to serve three local broadband providers. Aspen was one of the first to experience the value of Project THOR's redundancy when fiber up the Roaring Fork Valley was cut in the summer of 2020, and the network seamlessly failed over to a redundant path that goes directly to Denver without any interruption in service.



With current events increasing our demand for critical communications and remote working, Project THOR is reliably delivering the robust broadband services required by the Aspen community, including city, county, school district, GrassRoots Community Network, local ISPs and emergency operations.

— Paul Schultz, Former City of Aspen IT Director



THE NUMBERS

- Aspen Population: 7,431
- May 2018: Council approved creating the Aspen Meet-Me-Center and joining Project THOR
- February 2019: Aspen Community Broadband (ACB) began delivering high-quality, resilient, cost-effective fiber-optic broadband services to the Aspen region
- April 2020: NWCCOG Project THOR officially goes live
- Today/2022: Aspen Community Broadband (ACB) currently serves 16 customers, including Pitkin County Broadband Initiative (PCBI), with further Roaring Fork Valley regional expansion in progress
- Partners for the Roaring Fork Broadband expansion include NWCCOG, DOLA, Holy Cross Energy, City of Glenwood Springs, Pitkin County, Town of Basalt and Town of Snowmass Village

HEADLINES

- <https://www.nwccog.org/programs/broadband-program/stories/aspen-community-broadband/>
- https://www.aspendailynews.com/news/aspen-joins-effort-for-fiber-build-out/article_d10c52b2-814f-11eb-84a6-1baa459270e6.html
- <https://www.aspentimes.com/news/local/city-of-aspen-expanding-its-broadband-reach-will-benefit-county/>
- https://www.aspendailynews.com/news/city-of-aspen-looks-to-open-up-its-broadband-network/article_238d495e-5405-11e8-a48b-db65b967de69.html
- <https://www.cityofaspen.com/1194/Aspen-Community-Broadband>



7 Summit County

summitcounty.gov

PROJECT POINT PERSON: Andy Atencio, Summit County IT Director



A new local broadband network proves robust enough for public safety and a pandemic migration.

Summit County has been an active participant in the NWCCOG Steering Committee since 2013 when a now retired IT Director was an early champion of the concept that developed into Project THOR. It is far from a given that individuals in that role understand broadband or see a lane for local governments in broadband. Consensus for years in Summit County was that the towns each had "decent" internet, the rest of the county, not so much. In fact, the Town of Breckenridge, before it began negotiations to find a partner to operate a local public network was served by two major incumbents. Though the rural populations in Summit County are more heavily populated and concentrated than in some of the more northern counties in NWCCOG, there remained major "holes" in service broadband services in key subdivisions, edges of towns with geographic challenges as well as the northern and southern edges of the County on CO Hwy 9.

After considerable debate on the front end, county staff chose to be "all in" on Project THOR, hosting Meet Me Centers in Frisco at the County Commons and in

Breckenridge which are connected by CDOT fiber. In early 2020, these services were extended to the Town of Silverthorne. The county is in discussions with other communities within the county to extend Project THOR and county network services through a variety of fiber use and construction projects. These include CDOT fiber, county, and local fiber infrastructure to improve the reach, accessibility, business efficiency and affordability of broadband.

Summit County and IT Director Andy Atencio are leading stakeholders in Project THOR and has been among the most active stakeholders in leveraging the project within their communities. The county is delivering services to Internet Service Providers as well as community anchor institutions, importantly, the County 911 Call center. Atencio says that Project THOR was invaluable as the County shifted to support remote work during the pandemic. It has also proven more reliable with fewer outages for public safety than previous services had been.



Breckenridge stand-alone Meet-me-Center with air conditioning units and backup power, both requirements for such locations.



Project THOR provides redundant service to the Summit County 911 Call Center.



THE NUMBERS

- Summit County Population: 31,593
- Project THOR MMC Locations, Frisco, Breckenridge



PARTNERS

- Town of Breckenridge
- NWCCOG Project THOR
- Towns of Frisco, Silverthorne, Dillon
- CDOT

NWCCOG ROLE

NWCCOG is working with the Town of Frisco to leverage CDOT fiber along Highway 9 to accomplish two goals. The first goal is to connect to Project THOR and second to work with CDOT during "The Gap Project" to install conduit and fiber to connect Town Hall and also construct town owned conduit under Highway 9 at reconstructed intersections to enable neighborhood access for future broadband service delivery.

NWCCOG is providing subject matter expertise to Town of Dillon as it develops a local plan to address their connection to Project THOR and support future 5G deployments by wireless service providers. As part of a planned fiber build, the town of Dillon and Silverthorne are exploring a fiber build to coordinate signaling for traffic flow improvements on Hwy 6 and Hwy 9 between the Towns. This project will also involve coordination with and cooperation from CDOT.

HEADLINES

- Fiber Optic Network projects expand across Summit County, Summit Daily 7/6/2021

8

Northwest Colorado Broadband

City of Steamboat Springs & Routt County northwestcoloradobroadband.com



What happens when a remote community gets fed up with too many internet outages?

In this day and age, an entire community having an extended internet outage is no longer acceptable, yet because of a lack of redundancy in the private fiber networks, that is something to which much of rural Colorado had grown accustomed. The Northwest Colorado Broadband group (NCB) began after entities in the Steamboat Springs and Routt County area experienced an extended internet outage in 2011. The outage prompted local leaders to take action. Frustrated by high prices and unreliable service, and in need of robust broadband to serve growing business, educational, health care and residential needs, local government and community leaders began discussions which resulted in the founding of NCB. A 501 (c)(4) non-profit, NCB works to improve regional broadband service in and around Steamboat Springs and achieve ample, affordable and redundant broadband service for participating public and non-profit NCB entities.

In 2012 NCB aggregated the broadband demand of the City of Steamboat Springs, Routt County and the Steamboat Springs School District at a carrier-neutral location and secured a single middle mile service contract at better rates, with redundant pathways to insure against outages. On a parallel track, NCB received a Colorado Department of Local Affairs (DOLA) planning grant and completed the Routt County Strategic Broadband Plan. The plan identified local service deficiencies and a number of options for delivering middle and last mile service throughout Routt County where low population densities and challenging geography have discouraged private investment in telecommunications infrastructure.

In 2015 Routt County applied for and was granted \$748,000 of DOLA funding toward a \$2.2 million open access fiber optic build. With matching funds and in-kind contributions from NCB member entities, the project constructed nine miles of a 288-strand fiber optic trunk line running north-south across Steamboat Springs,

along with three miles of laterals to connect additional community anchor facilities to NCB's carrier neutral location.

Today, NCB operates a Project THOR through the NCB meet-me center and continues to provide service to community anchor institutions and several internet service providers. As a founding partner in Project THOR NCB now can provide more robust network redundancy, and through its fiber build, shared ownership in Project THOR, and open access service contracts, the entity has improved the quality and price of their service all the way from a Point of Presence in Denver through the last mile. NCB recently conveyed much of the NCB trunk line to support Luminate Broadband, a wholly owned subsidiary of Yampa Valley Electric Association. Luminate is building partnerships and leveraging its electrical infrastructure and a variety of public funding sources to deliver high speed broadband service to Routt and Moffat counties. The South Routt School District recently partnered with Luminate to deliver high speed broadband to 200 homes in underserved areas of South Routt with \$5.9 million of funding support from the Colorado Department of Education.





THE NUMBERS

- Routt County: 2362 square miles
- Routt County Population (2020): 24,829
- Steamboat Springs Population (2020): 13,224
- NCB Fiber cost \$2.2M
- DOLA Grant \$748,195



NCB BOARD MEMBER ENTITIES

- City of Steamboat Springs
- Routt County
- Steamboat Springs School District
- UC Health Yampa Valley Medical Center
- Yampa Valley Electric Association
- Steamboat Springs Chamber



PARTNERS

- Luminate Broadband (subsidiary of Yampa Valley Electric Association)
- Colorado Department of Local Affairs
- Colorado Department of Education
- NWCCOG Project THOR

NWCCOG ROLE

Project THOR serves NCB through a local Meet-Me-Center. In many respects the Project THOR concept was inspired by NCB. Both are essentially local co-operatives of public agencies coming together to problem solve the issue of poor broadband service, collectively bargain together for better pricing, and leverage public investment to attract the private sector through an open access model. As with the Town of Vail and City of Glenwood Springs, each of which were in the local broadband business before NWCCOG, NCB has informed NWCCOG's expertise and experience in providing technical assistance to the region from day one, and that information has substantially been shared by NWCCOG with other jurisdictions across the region.

NWCCOG applauds the early innovation and investments made by NCB which has prompted action by other partners, including Yampa Valley Electric Association (highlighted elsewhere in the report) which stepped forward and committed to expand from the electric co-op role into the broadband business through its Luminate Broadband subsidiary. YVEA itself has brought funding to the table and garnered other grants to expand across its entire multi-county service area (see Federal Partnership... link below), and encouraged other ISPs in the area to step up their game including Zirkel Wireless featured in this story.

HEADLINES

- <https://www.steamboatpilot.com/news/broadband-installation-moving-forward-for-south-routt/>
- Improved Broadband planned to reach Routt County in Coming Months, Steamboat Pilot 1/29/2019
- Federal Partnership will grow broadband coverage over next decade in Routt County, Steamboat Pilot 2/2/2021



9

Yampa Valley Electric Association

Subsidiary Luminate Fiber LLC.

PROJECT POINT PERSON: Steve Johnson, General Manager



Why would a rural electric co-op get into the broadband business? Why wouldn't they?

Yampa Valley Electric Association has served citizens across Northwest Colorado and South-Central Wyoming for 80 years providing electricity, and "powering" the well-being and economic development of rural communities, assisting non-profits and funding scholarships for local youth. They began their involvement in broadband through partnering with other anchor institutions in Steamboat Springs through the formation of Northwest Colorado Broadband and providing staff time and funding for Craig Moffat Broadband Initiative towards their feasibility study. In 2018, YVEA committed to deploying broadband services to the Craig area, forming a subsidiary Luminate. In 2019, YVEA/Luminate was a founding stakeholder in Project THOR through the Craig Meet-Me-Center Location.

YVEA/Luminate is proud to have partnered with many of the partners listed above to serve what were once broadband deserts. Part of their story is that not all funding opportunities prove worth pursuing. In March of 2020 YVEA applied for and was awarded USDA ReConnect funding to serve 264 underserved homes and businesses. "After great consideration" they

rescinded acceptance of those \$6M of ReConnect funds after assessing that compliance with the programs structure was "simply proven to be too expensive, time-consuming and burdensome to be in the best long-term interests of our membership at this time." They have a series of recommendations for changes to the program which they are advocating, including categorical exclusions to environmental reviews when attaching broadband to existing infrastructure on Federal lands, allowing state control over federal broadband funding, preventing the Federal government from having environmental oversight on private land easements specific to the S106 process, and generally less cumbersome requirements with Federal broadband funding. They have kept the door open if some of those changes come to fruition to apply again to the ReConnect fund.

YVEA/Luminate continues to seek other grant opportunities after successfully partnering with South Routt School District for a \$2.9M grant award through Connecting Colorado Students Grant Program for the start of the 2022-2023 school year connecting 1,192 homes and schools with highspeed broadband.



Through initial fits and starts, YVEA is persevering with a clear mission. Their priority is to provide affordable high-speed services throughout their territory over time to "drive economic development and be a stabilizing force in our communities, as well as offer families the ability to work and school from home" through speeds up to 1 gig symmetrical and VOiP.



THE NUMBERS

- 80 Years as Rural Electric Co-Op since 1940
- Currently serving 1,400 locations with FTTP
- Potential to Add service to 4,000 more by end of 2022
- CCSG grant with South Routt School District connected 1,192 homes and schools



PARTNERS

- State Broadband Fund
- Founding member Northwest Colorado Broadband (NCB)
- Connecting Colorado Students Grant Program, Colorado Department of Education
- South Routt School District (Stagecoach, Yampa, Phippsburg, Oak Creek area)
- Hayden School District
- Craig Moffat Broadband Initiative
- Project THOR

One of NCB's other partners in Steamboat is the other school district in the County. YVEA has since contracted with NCB to provide ISP services leveraging their Project THOR meet-me-center.

Through initial fits and starts, YVEA is persevering with a clear mission. Their priority is to provide affordable high-speed services throughout their territory over time to "drive economic development and be a stabilizing force in our communities, as well as offer families the ability to work and school from home" through speeds up to 1 gig symmetrical and VOiP. It is a double bottom line effort as broadband is essential to the operation of the electric grid to decrease the duration of outages, share large amounts of data between meters substations and the YVEA central office.



10 Town of Red Cliff

PROJECT POINT PERSON: Duke Gerber, Mayor • Barb Smith, Town Administrator

What if we just had a tower up there?

Situated in a deep canyon near the headwaters of the Eagle River, Red Cliff is only 20 minutes from Vail over Battle Mountain Pass and about the same from Leadville over Tennessee Pass on a good-weather day. The rail line and the nearby mine have been shut down for years, leaving the town a rugged lifestyle option. In 2016, when Eagle County Schools converted to an on-line platform for K-12 kids to work on homework, Red Cliff never felt further from civilization. Cell phones and broadband had become standard tools for living and working. Red Cliff had neither. The challenge of driving up the pass to get a cell signal might work for an emergency situation, but it didn't work for school children some of whom stayed late a school or at friends miles away to do homework.

The story of bringing broadband service to isolated Red Cliff, one of Western Colorado's first towns, has been much celebrated including a ribbon cutting ceremony attended by then Governor Hickenlooper and representatives from U.S. Senator Bennet's office and the U.S. Forest Service, the Town of Vail, Eagle County, NWCCOG and the Colorado Department of Local Affairs, the Colorado Broadband Deployment Board, each of which were integral at various sticking points during the complex series of actions and funds required for the project.

It was only after a number of years of persistent inquiry by Town leadership that a possible solution was cobbled together using a combination of fiber and wireless technology up and across miles of mountainous terrain. The unique project involved connecting fiber at Tennessee Pass serving Ski Cooper in one County in the San Isabel National Forest with new fiber installed up a ski run to a tower the top of the ski area which transmitted a microwave signal by line-of-sight to a new tower constructed twenty miles away in another County on an inholding of private property within the White River National Forest. That receiving tower would be located 1000' above the town with a line of sight to most residences in Red Cliff. The layers of permissions involving two national forests, and private as well as other public entities took significant navigation.

When a local internet service provider, Forethought, made the wireless connections from the new tower owned by the Town to residents, it marked nearly 4 years of active technical assistance from NWCCOG and the other partners. Red Cliff had bootstrapped its way into a broadband and public safety network. In December of 2017, homes and businesses were being connected on a daily basis.

As many other rural communities know, just having an internet connection isn't the end of the story. The necessity of a even better robust internet service increases each year. Town Administrator, Barb Smith, who saw the town through the decade searching for solutions is grateful. Smith says, "it has improved our property values and helped students as well as adults greatly," still she notes, "coverage is up and down and scattered at times. We would like to have fiber someday."



Former Red Cliff Mayor Anushka Bales and NWCCOG Executive Director Stavney try first wireless internet service at town hall.



THE NUMBERS

- Red Cliff population 279. Households 150, Children 46.
- ISP: Forethought
- Residential Service: 25Mbps down, 5 up for \$70/month
- Commercial Service: up to 100Mbps, \$140/month
- Phone –available via internet/WIFI



INVESTMENT

- Colorado Broadband Deployment Board \$70,103
- DOLA, Colorado Department of Local Affairs \$144.1K
- NWCCOG Mini-Grant in 2015 \$3.5K
- SIPA, State Internet Portal Authority \$5K
- Eagle County Community Grant \$56.22K.
- Red Cliff General Fund \$75.5K and \$20K from Conservation Trust Fund for the land



PARTNERS

- United States Forest Service
- Battle 1 Developers
- Senator Bennet's Office

NWCCOG ROLE

NWCCOG was an active facilitator in the project from start to finish, across all phases of the project from concept, through technical consulting, project management and partner coordination. It is estimated that the Regional Broadband Coordinator's time on the project was a value of well over \$30,000, considerably less than a private consultant.

HEADLINES

- Red Cliff Takes Step toward Internet, Vail Daily 10/7/2016
- Source: Red Cliff broadband just days away, Vail Daily 9/19/2017
- Red Cliff to start beaming broadband soon: USFS approval coming this week, Vail Daily 9/18/2017
- Red Cliff, Eagle River Valley's oldest town now has broadband speed internet, Vail Daily 10/14/2017
- Christmas Brings Broadband to Children in Redcliff, a-public-observer.com January 2018

PROJECT POINT PERSON: TJ Johnson, IT Director



You can't host the world without world-class broadband.

The Town of Vail was years ahead of most local governments in the region in envisioning a need for public broadband and doing something about it. After nearly fifty years hosting visitors from around the world, the main driver from the start was the relatively new experience of having most of those visitors expect cell and streaming services on their personal devices. It is easy in this age to forget that twenty years ago, not everyone had a cellular phone with a camera and access to the internet yet. Public wireless internet was new to Vail in 1999 as it prepared for the FIS World Alpine Ski Championships.

Since then, the town has updated technology numerous times and successfully hosted as many as 220,000 visitors...and their smart phones. The communications infrastructure prepares town for international TV coverage. It also provides the security infrastructure necessary for those occasional visitors, such as the Obama Family or Vice President Cheney and what their Secret Service details expect.

The topic may be uncomfortable to some, but the Town's communications infrastructure is also designed for what the Department of Homeland Security refers to as "mass gatherings." Surveillance capabilities extend to the town's transit system where buses are equipped with cameras. Police, if requested by a driver, can observe late-night incidents on board in real time. Though pushed by local media on the question (see below) the town insists it does not "snoop," and frankly with all the cameras and the endless hours of recorded footage, having humans constantly monitoring activity would not be of use. Less dramatically, Vail Police have solved crimes, tracing suspects through town from a crime scene. Doing so with the many cameras deployed by the town but without some time stamp for an incident would be a monumental task.

The origins of the Town's interest in public wireless technology originated with a much less dramatic need: preventing the system from crashing from overload.

Besides providing public WIFI, the Town finds other ways to leverage its long-time and on-going investment in public broadband infrastructure. In 2010, Vail and Eagle County partnered to invest \$1.2 million to assist CDOT to complete fiber from the top of Vail Pass where CDOT had intended to stop its fiber build that year to Vail Public Works facility, connecting Vail to Denver on public fiber. In addition to bringing Comcast to Eagle County, this project allowed the Town of Vail to assist CDOT in delivering web cameras and traffic monitoring information to CDOT's ITS headquarters in Golden. Traffic safety on Vail Pass is critical to the financial health of Vail. Economic impacts of pass closures are measured in financial losses by the hour. The Colorado State Patrol, CDOT, Vail Police and the Eagle County Sheriff's office plan and coordinate extensively in traffic management during weather events, utilizing various tools, including preemptive closures to shorten the duration of pass closures. The ITS variable message system deployed by CDOT through the I-70 fiber is a cornerstone tool for communicating with motorists, and the traffic cameras assist both motorists and public safety during outages. The fact that the Town of Vail negotiated with CDOT to install fiber for local use established a model that was later leveraged by Project THOR on that same fiber, and leveraging subsequent fiber installed for the same purpose.

Vail has among the most ambitious public WiFi networks in Colorado. In 2013, Vail partnered with Crown Castle to deploy microcell technology throughout town. Built in 2014, the network is supported by a local fiber network and network center built and hosted by the Town. Town of Vail fiber network and Project THOR also support the 911 call center for the entire County.

Locally the town continues to innovate and improve use of Wireless technology with the Vail Transit system. In a project funded by a \$350,000 grant from the Colorado Department of Transportation, the Town of Vail announced November 8 2021 in a press release that it has implemented a new Synchromatics



THE NUMBERS

- Town of Vail Population: 5,300
- Vacation Property Population: 5,000
- Peak Spectator Capacity 220,000 for 2015 FIS AWSC
- First WIFI
- Public WiFi Coverage: 10 square miles
- WiFi Towers: 29
- Public Safety Cameras: 250

intelligent transportation system (ITS) replacing previously used Nextbus to provide passenger-facing information about anticipated bus arrival time. That new ITS public face is hosted at www.ride.vailgov.com, providing intelligent real-time information and alerts to riders. In addition transit information can be found via Google Maps. For transit staff, the systems provide much improved operational data including boarding and disembarkment counts for individual bus stops to help inform planning decisions. While the capacity of a bus shelter or the frequency of bus intervals at a specific location may not be the subject of a Hollywood blockbuster it is information of value to management.

The Town of Vail is an original stakeholder in Project THOR and hosts a meet me center.

HEADLINES

- Street Smarts: Resort Town Vail Carves the Smart Tech Curves, StateTech Magazine 2/17/2022
- Vail rolls out new tech for bus system: website has real-time info on passenger loads, Vail Daily 12/25/2021
- Vail's surveillance cameras are becoming more useful: Cameras first installed for 1999 ski championships was upgraded again for 2015 championships, Vail Daily 1/13/2020
- Vail Increases Network Connectivity with Millimeter Wave Radios, SecurityInfoWatch.com, 9/10/2016



12 Town of Eagle/Eagle County

Eagle & Gypsum

PROJECT POINT PERSON: Kevin Aoki, IT Director



Public solutions can be politically challenging in places where most of the public has sort of good enough broadband.

The towns of Eagle and Gypsum as well as Eagle County were each involved in early negotiations to join Project THOR. The Town of Gypsum declined to join in 2019 noting that Comcast had just announced that it would install Fiber To The Premise (FTTP) throughout Town which has been occurring during construction seasons through 2020-2022. The Council decided it preferred to let market competition solve the issue of poor service provided by the existing providers.

The Town of Eagle joined Project THOR as a founding stakeholder, and negotiated with Eagle County to serve the County building four blocks up Broadway from Town Hall. After initial considerations of standing up a Project THOR meet-me-center in the upper or lower Eagle River Valley, Eagle County decided that it wanted to further study the need for broadband which it later did

through a DOLA grant in 2021. The general findings of that effort confirmed what they suspected, that many of the urbanized, unincorporated portions of Eagle County including Edwards, nearby Metro Districts and Beaver Creek had adequate broadband while more rural centers lacked adequate service. As of early 2022, NWCCOG continues to discuss with Eagle County how it might leverage Project THOR to serve underserved workforce communities in Dotsero. Neighborhoods in North Edwards as well as the Town of Avon have been in regular contact with NWCCOG about when Project THOR might be available to their residents.

Since joining Project THOR, the Town of Eagle has worked with Uptown Services to poll residents and businesses interest in municipal broadband. Comcast made a similar announcement in the Town of Eagle as it did for Gypsum and has been installing a fiber network with coaxial to the premise throughout 2021-2022. A lengthy customer survey in Eagle gauged whether residents would prefer current provider, Comcast or municipal broadband at various pricing and service levels. The response was robust enough in favor of municipal broadband that through 2020-early 2022 town positioned itself for a \$10M municipal bond to deploy FTTP throughout town. After some change of elected leadership from when it began that inquiry, the Town Council decided to indefinitely table the bond issuance and the question of a full-blown municipal network and wait to see if citizens felt better served following a full deployment by Comcast.

As of the spring of 2022, the town is building a new location for their Project THOR meet-me-center to the Public Works facility on Chambers which has more robust backup power. Once that infrastructure is complete, town is also weighing providing wireless internet to businesses in the Central Business District around Town Hall. Through a newly developed Downtown Development Association local businesses



Workers on Cell tower in Vail.



THE NUMBERS

- Town of Eagle Population: 7,484
- Town of Gypsum Population: 8,078
- Eagle County Population: 55,624



PARTNERS

- Visionary Communications (ISP)
- Pathfinder (ISP)
- NWCCOG Project THOR
- City of Glenwood Springs
- Holy Cross Energy

have expressed great interest in town providing municipal broadband to them. Town is extending fiber from Town Hall on Broadway to the Public Works building on Chambers where a new telecom shelter will be built through a DOLA grant.

Besides serving the County building, town is also providing service to two local ISPs and a Verizon tower via a Mammoth, Visionary and Holy Cross Energy partnership as well as a tower for Pathfinder. It is in negotiations with the Eagle Valley Library District to provide services to the Eagle Library.

Town continues to operate under an IGA with Community Broadband Networks (Glenwood Springs) that was established for technical support for the Municipal Broadband roll-out. The agreement is still in place should the need arise. By the end of 2022, the Town of Eagle plans to leverage Project THOR to provide internet services to town facilities including water facilities at the top and bottom of Brush Creek, the wastewater plant, and all water tanks for SCADA monitoring, as well as public facing internet with WiFi at Brush Creek Pavilion, Brush Creek Studio, City Park Stage, Eagle Information Center, Eagle River Park.



Subcontractor for Comcast installing at Eagle Ranch.

13 Jackson County

PROJECT POINT PERSON: County Administrator, Matt Canterbury



For the most remote places, it is ok to take your solutions one at a time.

More than 60 miles from neighboring towns in three directions, Jackson County as well as its largest town and county seat of Walden don't have internet service providers clamoring to provide services. There is an incumbent provider which has said to locals for a number of years that there is not additional bandwidth for additional customers. For the most part, speeds are low, unreliable and expensive outside of Walden when it is available by line of site to a tower. In 2017, with urging from the County Commissioners, and funds from the Broadband Deployment Board following a study of the options, the county contracted with Nebraska based Vista Beam which delivers broadband via microwave from Wyoming.

That 2017 microwave project was funded by Local Economic Development Fund and the CBDB grant of \$260,313 (75% grant to 25% local match) on the condition that the provider, Inventive Wireless of Nebraska, LLC. DBA Vista Beam provide at least 25 Mbps up and 5Mbps down service. It was a mid-term solution according to County Administrator, Matt Canterbury who says, "speed and reliability has improved, but there is still room for a lot of improvement."

Canterbury notes there are other possibilities afoot. "There is a trend for people in remote areas in the county turning to satellite internet such as Starlink. Also, Visionary Broadband has been working on bringing fiber to serve town residents. The county continues their partnership with Vista Beam in an effort to find a county-wide solution. There have been discussions with the rural electric co-op, Middle Park Electric which serves Grand and Jackson Counties about serving both counties, starting in Granby with middle mile fiber strung on their existing overhead power lines. The hurdle for that option remains the wording on their historic easements over many private properties across hundreds of miles of their territory.

Interestingly, a Denver-based company is using Jackson County oil drilling sites to turn flared gas into electricity to power supercomputer banks to mine Bitcoin. This article from Crusoe Energy as well as this article from their website explains that concept in better detail. That company is utilizing satellite internet for those transactions from four sites across Jackson County right now with 8 more scheduled to arrive in 2022. Though this may only loosely be connected to improving internet service for residents and local businesses, the amount of investment in this innovative use of otherwise wasted energy may point to the opportunity in the future to more robust internet.

Another future potential option for residents and businesses in Jackson County along CO 14 and CO 128 may be found in the award of funding from the USDA Reconnect program to Conexon Connect, LLC out of Kansas. Their proposal would bring fiber to the premise to some of the most remote locations of southern Jackson County. Conexon has not coordinated or shared plans with Jackson County or NWCCOG, so beyond a proposed services map supplied by USDA, there is no information about timing.



THE NUMBERS

- Jackson County: 1,600 square miles
- Jackson County Population: 1,400
- Local saying, "More Moose than people"
- Town of Walden Population: 982
- Town of Walden: 103 businesses
- Saying, "sixty miles from anywhere"
- 2017 microwave project funded by Local Economic Development Fund and the CBDB grant of \$260,313 (75% grant to 25% local match) on the condition that the provider provide at least 25 Mbps up and 5Mbps down service.
- Provider: Inventive Wireless of Nebraska, LLC. DBA Vista Beam.

NWCCOG ROLE

The NWCCOG Regional Broadband Director assisted commissioners leading up to 2017 in investigating various options, and continues to work in parallel in staying focused on long term solutions as opportunities arise.



14 Clear Creek County

clearcreekcounty.us/892/Broadband-Study



County leadership means it is no longer a drive-by place for broadband service.

Clear Creek County began their engagement with NWCCOG in 2018 as a founding partner and stakeholder in Project THOR. NWCCOG assisted the county in evaluating broadband plan consultants and initiating their existing broadband plan. This update published October of 2017 was prepared in concert with Gilpin County, see the press release, providing unique solutions to the topographically-challenged and remote population centers.

Clear Creek County's participation in Project THOR came about serendipitously because NWCCOG pulled together an informal meeting of potential Project THOR future partners and communities at Mountain Connect Conference in 2018. John Bottomley CCC IT Director at the time, recognized synergies between their existing challenges and the opportunities and solutions brought by NWCCOG's broadband program. It became obvious that Project THOR fiber would be accessible on Interstate 70 which cuts right through the County – providing an excellent opportunity for a string of smaller communities along the corridor to be easily served with broadband. Since then the County IT team has been actively collaborating with NWCCOG and with its local governments to leverage strategic splice points along the corridor to expand broadband to the much needed rural communities.

Project THOR connected Georgetown to its dark fiber infrastructure in late 2019 and the County has gone on to build a Meet Point in Idaho Springs at the new Clear Creek County Health & Wellness Center. They are now working on a publicly funded fiber-to-the-premise plan in Georgetown and Idaho Springs, as well as expanding I-70 adjacent community anchor institution connections at Dumont and Central City Parkway. The county owns many public safety towers across the remote terrain, none of which are yet serving internet, something the county is considering. The county is also considering the deployment of wireless middle mile connections to address more remote areas including St. Mary's, population 620, 15 miles from Idaho Springs.

Clear Creek County has a history of partnering with last mile ISPs to support last mile deployments and continues to solicit these partnerships with both wireless and fiber-in-the-ground last-mile providers.

HEADLINES

- Mixed Signals – proposed broadband towers pick up some static: Expanding internet service isn't without visual impacts as some neighbors argue over plan, Clear Creek Courant, 1/20/2021



THE NUMBERS

- Clear Creek County Population: 9,700
- Georgetown Population: 1,131
- Idaho Springs Population: 1,858
- Project THOR MMC Sites: 2
- ISPs Supported: Clear Creek County Broadband
- 100 Gig Symmetrical service at MMC



PARTNERS

- NWCCOG
- DOLA
- Clear Creek County Health and Wellness Center



Clear Creek County Health and Wellness Center

15 Project Thor

nwccog.org/project-thor

PROJECT POINT PERSON: Nate Walowitz, Regional Broadband Director of NWCCOG



NWCCOG has provided technical assistance to communities across the region for roughly a decade. One lesson learned early was that it made little sense to believe the marketplace would provide fast, affordable, robust broadband for most of rural Colorado. The same big incumbents here are in competition to win customers in more lucrative urban areas, competing across the nation to provide new generation equipment and faster service. With widely dispersed populations between 2,000 and 14,000 residents across vast Western Colorado, it made sense that better broadband services often required local partnerships and customized innovations.

Local governments learned when their constituents complained of poor internet services that they had no lever to pull to motivate incumbents. This report highlights how many places responded, each in their own way to improve the situation. Some did it all themselves, build and operate their own network to serve their own needs (Vail, Summit, Eagle), or to serve the public (Aspen, CBN, NCB, Rio Blanco, YVEA). Occasionally the pieces were all there; build or allow access to a public tower here (Vail, Red Cliff, Pitkin County), or invest in infrastructure to attract private investment (Breck, Clear Creek). Most found that getting involved in broadband opened opportunities. For some places, just discussing it appeared to get attention from incumbents (Gypsum, Eagle). In all cases, public involvement in broadband became a tipping point. One way or the other, the Regional Broadband Coordinator assisted, and heard over and over that these last mile projects solved many issues, but the lack of affordable, robust middle-mile continued to be an problem for the local projects. Distances proved an impediment. No wonder rural electrification had required massive government assistance in the 1930s when "fewer than 11 in 100 farms were receiving central station electric service."

Project THOR sprang from regular what-if discussion between staff at NWCCOG, local broadband stakeholders, some smaller ISPs. By 2017, the idea of

purchasing circuits, including dark fiber from CDOT and linking them together into a loop that connected various Western Slope communities had made it onto a small grant in early 2018 from DOLA to NWCCOG to take the concept to a level that it could be engineered and priced.

NWCCOG then went "on the road" meeting with staff and elected officials across the NWCCOG region to secure initial stakeholders through a signed letter of intent to join Project THOR. Matching funds were secured. For some meet-me-center host communities Project THOR monthly fees were a wash for what they were already paying. Moreover, it meant they had control, predictable pricing, and something none of them could get from incumbents —redundancy.

The DOLA grant presentation for Project THOR in Burlington in November of 2018 was made by NWCCOG Broadband Director Nate Walowitz, and Executive Director, Jon Stavney. The middle mile network was to be an open network hosted at carrier neutral locations, by meet-me-center host partners paying a monthly fee to the network, each of which would control access to last mile at their location and be able to leverage that location for cost recovery or their own use. NWCCOG made no profit, nor did it draw any fees for owning the network until 2022. In the Fall of 2018, NWCCOG began an RFP process for the Network Operator.



One way or the other, the Regional Broadband Coordinator assisted, and heard over and over that these last mile projects solved many issues, but the lack of affordable, robust middle-mile continued to be an problem for the local projects.



THE NUMBERS

- Coverage: 20% of the landmass of the state, 17,121 square miles
- Over 233,191 residents in service area
- 23% of the non-front range (rural) population
- 4% of the total state population.
- 2019 DOLA Grant \$1M from the state (startup), and \$260K for IRU
- 2022 DOLA Grant enhancements grant \$2.18 M
- Local matching investment startup \$1.5M
- I-70 Fiber 170 miles
- Other Circuits leased, over 450 miles of fiber

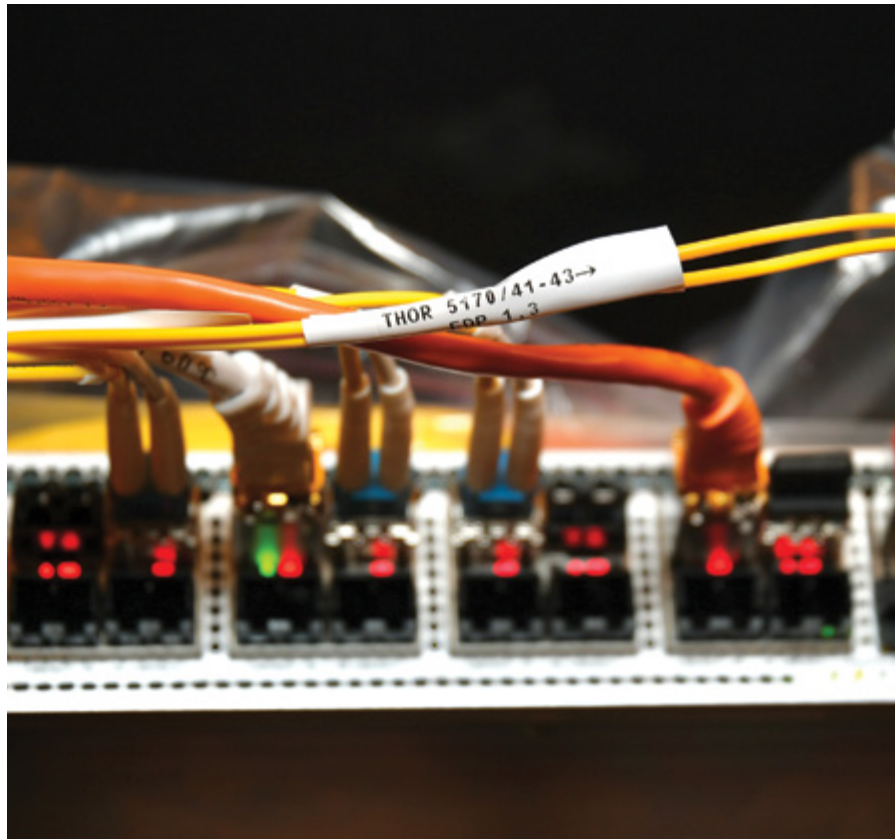


PARTNERS

- City of Aspen
- City of Glenwood Springs
- Clear Creek County in two locations
- Town of Eagle
- Town of Breckenridge (host Summit County)
- Summit County (Frisco campus)
- Town of Vail
- Northwest Colorado Broadband (Routt County)
- Middle Park Health (in Granby and Kremmling)
- Rio Blanco County in Meeker
- Yampa Valley Electric Association in Craig

There was another round of negotiations with the host communities together to finalize the language of contracts in early 2019. A joint press release was drafted by NWCCOG for use by Meet Me Center hosts in November of 2019 outlining the project. By the end of April 2019, each of the contracts had been signed. The DOLA grant award was announced. NWCCOG finalized the IRU from CDOT. Mammoth Networks (original Operator) set about purchasing access to the fiber circuits required to complete the loop. Equipment was bid out and ordered by NWCCOG. Through the summer and fall of 2019 equipment arrived and installation occurred at each Meet Me Center. The entire Project THOR was lit and the network officially launched on April 6th. Since that time, the Project THOR network has undergone continuous refinements, upgrades and improvements including upgrades to capabilities along I-70.

In 2021, NWCCOG embarked on an effort to rebid both our network operator and leased circuit agreements. An agreement with reached with Hye Tech Network and Security to contract as the Project THOR network operator. Hye Tech has experience operating publicly owned educational and broadband service networks in Arizona. NWCCOG also renegotiated all circuits in early 2022 obtaining lower prices for higher bandwidth for those communities connected via leased circuits. In 2022, NWCCOG was awarded additional grant funds from DOLA to connect Project THOR with other public networks and upgrade equipment to enhance the capabilities. As of Summer 2022, NWCCOG is in discussions with a number of other communities to connect to Project THOR.



Interconnection

The Future of Large Public Networks

Project THOR is hardly alone as a public middle-mile network growing in reach and impact.

Within Region 10, the Delta-Montrose Electrical Association (DMEA) was among the first Rural Electric Co-Ops to get into the public broadband market as a service to its customers. Today the front-facing part of that network is Elevate Internet, a for-profit subsidiary of DMEA providing Gig services across rural Delta and Montrose Counties. Within NWCCOG, there are three Rural Electric Co-ops, each at various stages of participation in broadband services including Yampa Valley Electric which is all-in on last mile Fiber to the Premise (FTTP) deployments in Routt and Moffat Counties, Holy Cross Energy which is partnering in middle mile fiber in the Roaring Fork, and Mountain Parks Electric which has conceptual plans for a regional fiber network to serve Grand County and perhaps eventually, Jackson County. In one of the most rural settings in all of Colorado, Rio Blanco County has one of the most mature publicly funded and owned FTTP networks in Colorado which because of the distance could also be considered a middle-mile network as well.

At NWCCOG, Region 12 continues to grow the reach of the Project THOR network, including interconnections with Region 10 at Grand Junction, Estes Park and Denver. As far as larger networks supporting local efforts, there are parallel efforts on the cutting edge that are operating in Northern Colorado where there are also large municipalities in the broadband ISP business to serve their citizens directly including Fort Collins Connexion and Loveland Pulse.

In March of 2022, a pair of Department of Local Affairs (DOLA) broadband grants to NWCCOG (Region 12), and to Region 10 are funding a partnership with

interconnectivity between the two regions as well as network extensions in Region 10. Funding will provide additional redundancy to the south and east for Region 10.

While the obsession with redundant connections and resiliency may not make sense to internet users in urban areas, it is a core value for Project THOR which was designed to combat the many single-points-of-failure to fiber serving most Western Slope communities. One of the many benefits of the network hardware upgrades is to leverage the two-sided connection at each meet me point, and the ability for the system to use AI and "mesh architecture" to dynamically re-route traffic in response to various scenarios, making broadband less like an electrical "home run" and more like vehicle traffic on a street grid. Real time experiences in recent years continue to prove the concept and stress test the Project THOR network including mudslides in Glenwood Canyon, wildfires, equipment failures, as well as "routine" outages due to fiber cuts. Each has taught lessons that have further reinforced the network. Public networks, as well as public/private partnerships which are much less celebrated are increasingly cooperating to strengthen resilience.

For example, the attached map labeled BiSON West Covid-19 Response was a concept developed during the pandemic which would help strengthen the two West Slope networks. Some interconnections which were not envisioned on this concept map occurred very quickly. Out of necessity in response to the East Troublesome and Cameron Peak Fires during the

summer of 2020 NWCCOG's Broadband Director negotiated a connection between Project THOR in Grand County using Western Power Authority fiber. Assisted by a variety of entities an emergency connection was made across the Continental Divide to Estes Park using WAPA fiber (water and power authority) so that if the fire cut off their eastern connection, the town would have an alternate connection. The story was covered by the Colorado Sun, and later, NWCCOG's Nate Walowitz was awarded Honorable Mention for the Tom Clements Better Governance award by the Governor Jared Polis' office for that effort. Partnerships forged during that emergency response effort reinforced the urgency of redundant paths between the East and West slopes and prompted efforts that spawned many relationships that are now evolving.

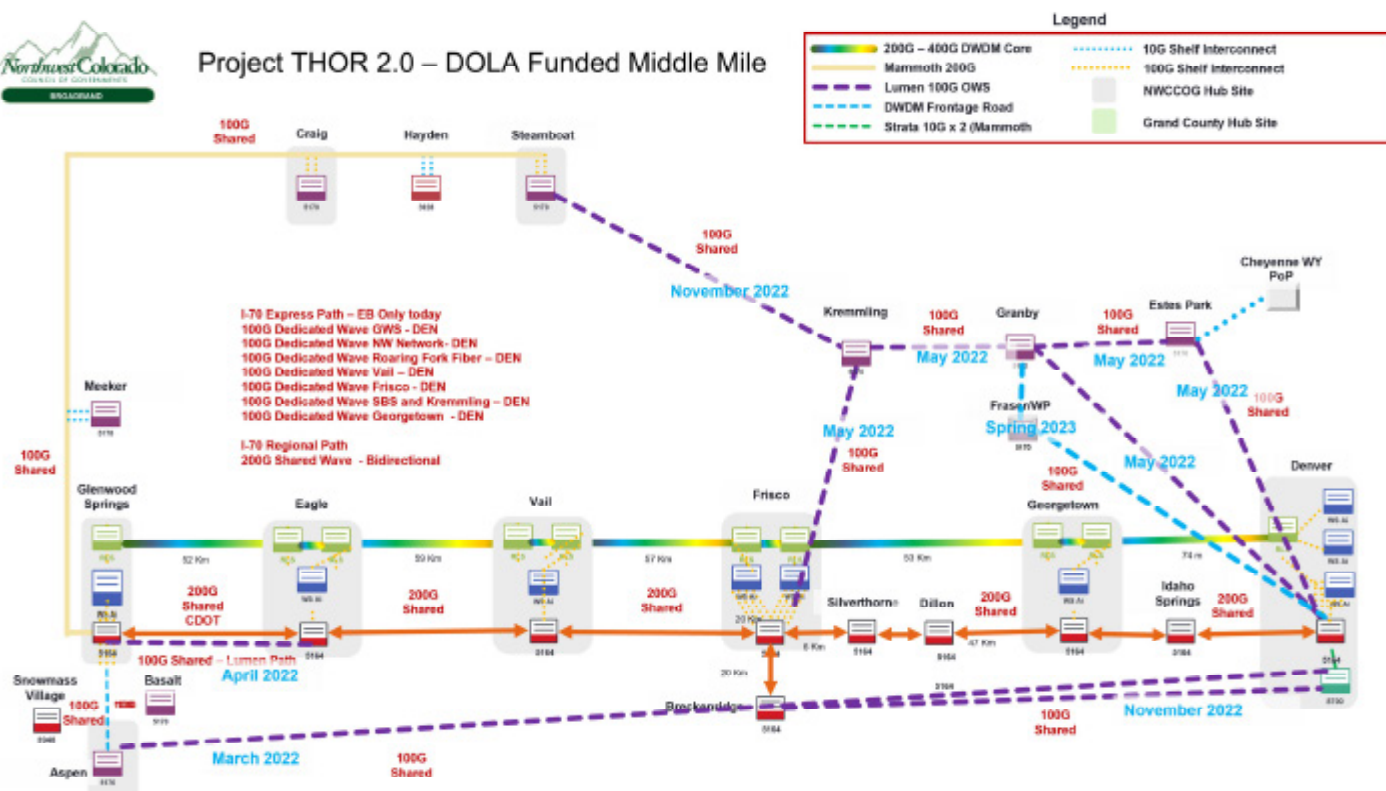
One of those relationships envisioned is Front Range GigaPoP (FRGP at frgp.net), which is a consortium that wanted to extend their support of higher education to the West Slope. FRGP membership includes most of the flagship colleges and Universities in the state as well as many community colleges, local school districts, some municipalities and the states of Colorado and Wyoming on the Front Range. Through the connection between Region 10 and 12 will also support institutions of higher education on the West Slope. This was the BiSON West concept in the attached map. BiSON or Bi-State Optical Network is described here by University of Wyoming. FRGP is managed, engineered, and operated by the University Corporation for Atmospheric Research (UCAR). The FRGP refers to their consortium of regional Research and Education Networks. That "member quilt" serves over 1 million users and continues to double traffic growth every 2-3 years. The BiSON West network expansion was described in the Colorado Sun article from May 20, 2020. Both Region 10 and Project THOR have contracts with FRGP as of early 2022.

As this Report goes to publication in Spring of 2022, Governor Jared Polis has just recently signed Executive Order D 2022 009 Accelerating Broadband Deployment in Colorado which implores concrete steps towards a state broadband plan, and more systematic management of the state's approach to broadband through various state agencies including the Colorado Department of Transportation which has been an

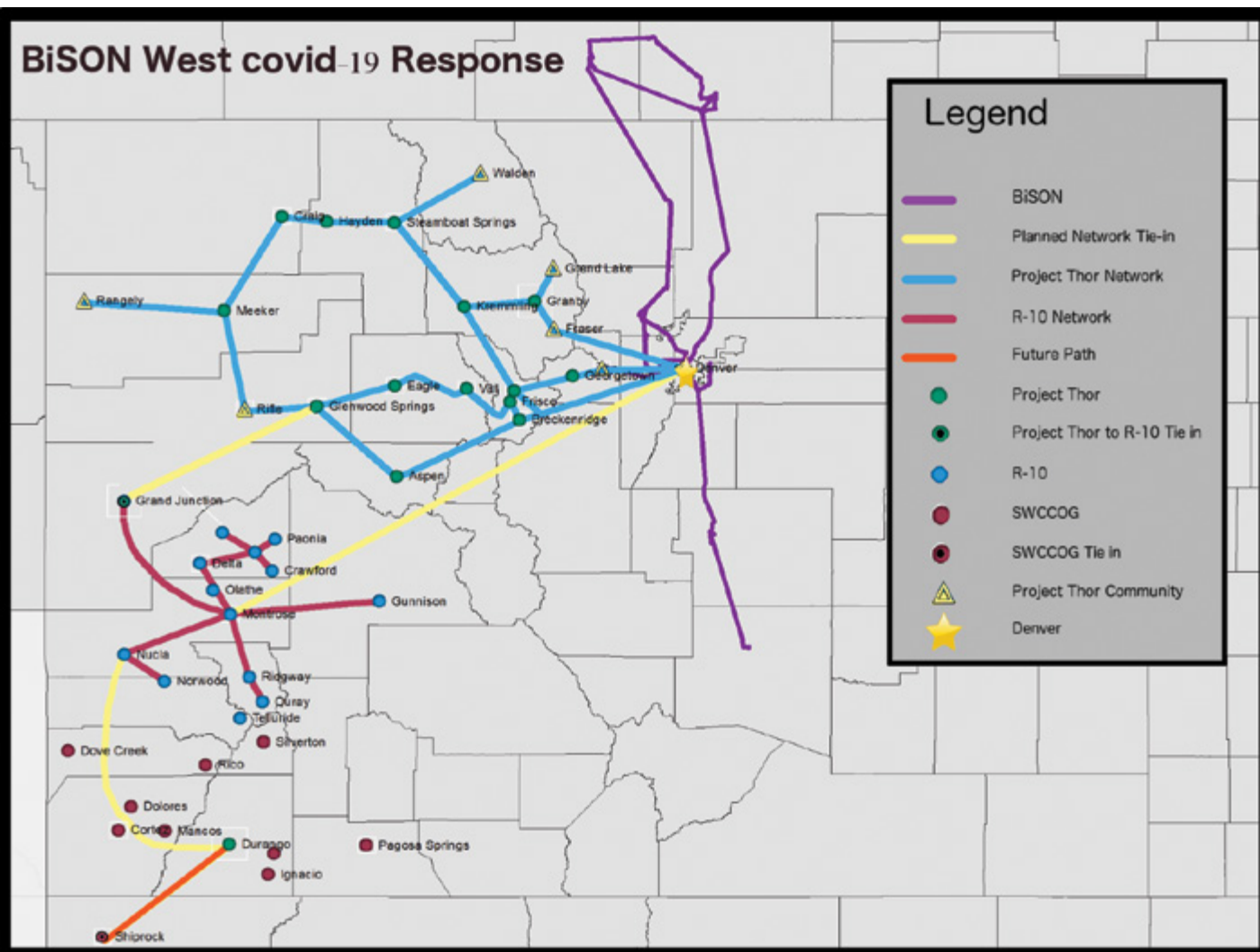
integral partner in Project THOR. The order also seems to breath new life into the Colorado Broadband Office. The Director of CBO was announced this winter to be former Eagle Town Manager, Brandy Reitter, who in her time in Eagle positioned town for a \$10 million dollar bond to deploy municipal broadband. A newly reconfigured town council declined to go to bond just before she left stating they would like to take a more incremental approach, likely supplying broadband to the town core first, and waiting to see how the recent arrival of a second incumbent is received by consumers. There is hope that Reitter's experience with the support of the Governor's office will oversee a quantum leap through an historic level of federal funding for broadband—on the order of \$600,000,000 to \$700,000,000 directed towards broadband in Colorado alone. This could represent a shift from DOLA and the Broadband Deployment Board being the primary funders of local projects as has been the case for the past decade.

This report may be highlighting "the golden age" of DOLA support of local broadband and the burgeoning of local projects and regional networks across Western Colorado that may soon be eclipsed by even more ambitious advances; we shall see. In some neighboring states, leadership and operations of such widespread regional networks or statewide networks are led by the state, but with Colorado's tradition of local control, the current public regional networks in Colorado seem to spring from the bottom up (and mostly with some financial support from DOLA and EDA in rural places). Increasingly these network owners are sharing notes and forging partnerships. As a result, they are starting to interconnect and appear like a de facto state network. In the meantime, there is rampant innovation and collaboration going on across much of Colorado in the area of regional public broadband and local public broadband services, a portion of which we have been delighted to highlight from our region in this report.

Project THOR 2.0 – DOLA Funded Middle Mile



BiSON West covid-19 Response



DOLA 10 years Grants List

ENTITY	DESCRIPTION	YEAR	DOLA	LOCAL	TOTAL PROJECT
NWCCOG	Regional BB Assessment Study	2012	\$65,000.00	\$65,000.00	\$130,000.00
NWCCOG	Regional BB Strategic Study	2013	\$72,000.00	\$72,000.00	\$144,000.00
NWCCOG	Implementation of Strategic BB	2015	\$310,000.00	\$60,110.00	\$370,110.00
NWCCOG	Regional Broadband Coordinator	2017	\$140,142.00	\$46,714.00	\$186,856.00
NWCCOG	Regional Broadband Coordinator	2018	\$103,347.00	\$103,347.00	\$206,694.00
NWCCOG	Regional Broadband Coordinator	2019	\$43,250.00	\$43,250.00	\$86,500.00
Routt County	Broadband Action Plan	2015	\$24,500.00	\$24,500.00	\$49,000.00
Pitkin County	BB and Microwave Study	2015	\$150,000.00	\$150,000.00	\$300,000.00
Moffat/ Craig	Sub Plan	2016	\$25,000.00	\$25,000.00	\$50,000.00
Summit County	Sub Plan	2016	\$24,850.00	\$49,700.00	\$74,550.00
Fraser/Winter Park	Broadband Plan	2016	\$31,125.00	\$31,125.00	\$62,250.00
NWCCOG	Project THOR Network Design	2018	\$11,000.00	\$11,000.00	\$22,000.00
Breckenridge	Needs Assessment	2018	\$22,925.00	\$22,924.00	\$45,849.00
Eagle, Eagle County, & Gypsum	Broadband Plan	2019	\$18,500.00	\$18,500.00	\$37,000.00
Town of Eagle	Broadband Plan	2020	\$25,000.00	\$35,000.00	\$60,000.00
Rio Blanco County	Broadband Infrastructure	2016	\$2,000,000.00	\$3,366,028.00	\$5,366,028.00
Rio Blanco County	Broadband Infrastructure	2019	\$1,669,459.00	\$1,669,459.00	\$3,338,918.00
Town of Red Cliff	Communications Tower	2018	\$144,100.00	\$77,500.00	\$221,600.00
Pitkin County	Broadband Infrastructure	2020	\$896,800.00	\$896,800.00	\$1,793,600.00
Garfield & Pitkin Counties	Broadband Infrastructure	2022	\$1,055,898.00	\$1,283,398.00	\$2,339,296.00
NWCCOG	Project THOR	2020	\$1,000,000.00	\$1,571,873.00	\$2,571,873.00
NWCCOG	Project THOR 3 yr IRU	2020	\$270,000.00	\$2,752,200.00	\$3,022,200.00
Clear Creek County	Broadband Infrastructure	2021	\$97,805.00	\$97,806.00	\$195,611.00
Town of Eagle	Middle Mile Infrastructure	2021	\$200,000.00	\$207,791.00	\$407,791.00
NWCCOG	Northern Broadband Coordinator	2020-22	\$242,000.00	\$242,300.00	\$484,300.00
Garfield and Pitkin	Supplemental MM Infrastructure	2020	\$163,318.00	\$163,319.00	\$326,637.00
Eagle County	Broadband Plan	2020	\$8,250.00	\$8,250.00	\$16,500.00
Town of Snowmass Village	Middle Mile Infrastructure	2021	\$344,238.00	\$344,238.00	\$688,476.00
Town of Avon	Broadband Plan	2020	\$25,000.00	\$40,000.00	\$65,000.00
Pitkin Roaring Fork	Middle Mile Infrastructure	2021	\$809,946.00	\$809,946.00	\$1,619,892.00
Town of Breckenridge	Middle Mile Infrastructure	2021	\$850,000.00	\$850,000.00	\$1,700,000.00
NWCCOG	Northern Broadband Coordinator	2022-23	\$260,000.00	\$260,000.00	\$520,000.00
NWCCOG	THOR Backbone Enhancement	2022	\$2,195,758.00	\$0.00	\$2,195,758.00
Town of Snowmass Village	Middle Mile Infrastructure	2022	\$644,296.00	\$348,099.00	\$992,395.00
NWCCOG Region/Partners TOTALS			\$13,943,507.00	\$15,747,177.00	\$29,690,684.00
DOLA All State TOTALS same period			\$37,700,174.00	\$37,258,644.00	\$74,958,818.00



Dedicated to Retiring DOLA Regional
Manager for Region 12, Greg Winkler.

Thank you for your partnership with
NWCCOG in our Broadband endeavors.



COLORADO
Department of Local Affairs

The purpose of the Northwest Colorado Council of Governments is to be responsive to our members' needs and interests by providing guidance and assistance in problem solving, information sharing and partnership building, advocating members' interests and needs with local, state and federal entities, and providing quality services to our membership that are relevant, effective, and efficient.

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