Regional Applications
for a Digital Economy

A Report to the
Southwest Alaska Municipal Conference

Prepared by
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Executive Summary
To be created.

Introduction

The National Broadband Plan, released by the Federal Communications Commission in 2010, begins with the following:

> *"Broadband is the great infrastructure challenge of the early 21st century.*
>
> *Like electricity a century ago, broadband is a foundation for economic growth, job creation, global competitiveness and a better way of life. It is enabling entire new industries and unlocking vast new possibilities for existing ones. It is changing how we educate children, deliver health care, manage energy, ensure public safety, engage government, and access, organize and disseminate knowledge."*

The plan notes, that over 100 million Americans do not have access to adequate broadband services, which is defined as 4 Megabits per second (Mb) download with 1 Mb upload. Without these services, this group of Americans will be left behind in the ability to become educated, obtain health services, find employment and enjoy a high quality of life. Until this point, much of rural Alaska, and especially Southwest Alaska, has lacked broadband services that meet the federal standard.

This study, entitled *Regional Applications for a Digital Economy, has been commissioned* by the Southwest Alaska Municipal Conference in anticipation of the notable broadband service improvements that are forthcoming to portions of the region. The primary improvement comes from the deployment of the GCI Terra Southwest Project that will use a combination of fiber optic and microwave wireless technologies to improve middle mile broadband access to a number of communities (see map on page __).

The Terra SW project was funded, in part, through federal broadband stimulus funds. GCI received a $44 million dollar grant and a $44 million dollar loan from USDA Rural Utility Services. The total private investment in this project is $103 million dollars or $11,000 per served household. More information on this project is available at http://terra.gci.com/.

Enhanced satellite broadband services have recently been made available in a relatively small area of the region (see page __) through ViaSat. These improved satellite services provide services that are comparable to DSL broadband services. Unfortunately, the SWAMC region sits at the outer edge of the focused beam of these new advanced satellite services which are centered over Anchorage and more populated sections of Alaska. More information can be found at http://www.exede.com/

SWAMC believes that this improved broadband connectivity represents an opportunity for Southwest Alaska in two important ways.

> To improve quality of life for both permanent and seasonal residents through better
> > Access to health care
> > Access to education
> > Communications in and outside of the region

> To enable economic development through
> > Increased productivity and enhanced marketing opportunities for existing firms
> > Entrepreneur and self-employment opportunities
> > Telework opportunities

Study Process

Community Technology Advisors Corp. (CTAC) has researched connectivity options and current use of technology by key organizations and stakeholders. We have done surveys, conducted focus groups and telephone interviews and interacted with an advisory group to identify present uses of broadband, the impact of current connectivity levels and plans for future technology use.

For most rural communities, providing opportunities for the children, now and into the future, is a primary community goal. Parents want their children to be well educated and have local employment opportunities and choices when they become adults.

We asked students from Bristol Bay the following question: "If there was unlimited Internet, how would your life change?"

This is how they responded…

> "I would be so happy."

> "I could work so much more quickly."

> "I could download presentations."

> "I wouldn't see sunlight for days."

> "I could talk to family far away."

> "I would do the same things – just faster."

> "I'd be able to use the memberships I bought online."

> "Weather is happening every day – we could watch that in real

time.""

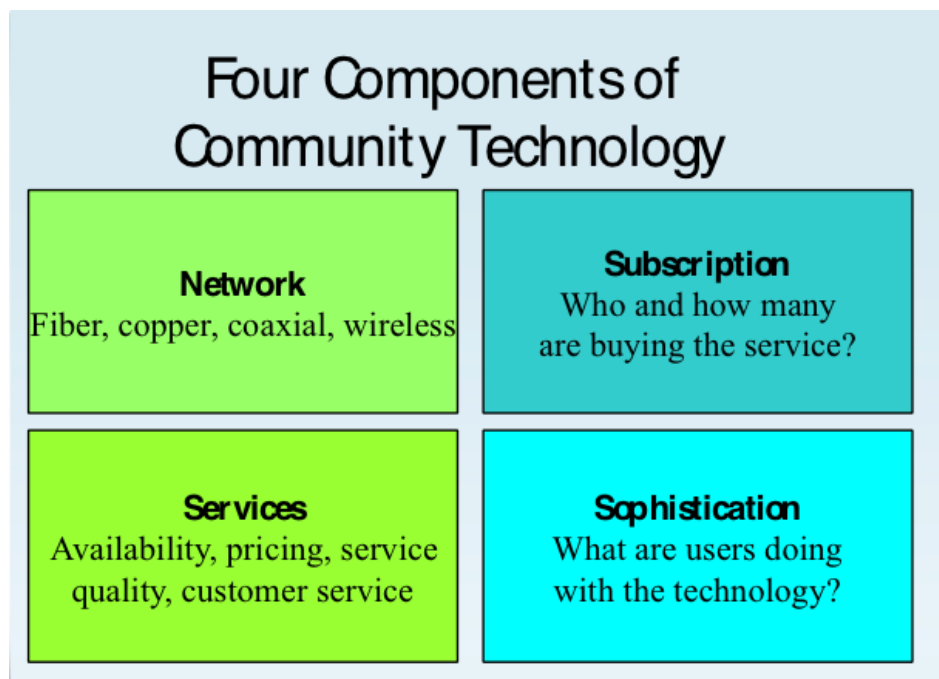"This telephone call would be better via videoconference."

Their responses indicate that they recognize the high value of being connected with quality broadband services – they want information, they want to be productive, they want entertainment, they want to communicate with family and friends. They want to enjoy full citizenship in this globally connected world.

In addition to the quotes from students above, we have included quotes from some of the educators, health care professionals, business owners and community leaders about the importance of broadband to their organizations throughout the report. Their voices provide weight to our analysis about the current situation and opportunities to work together to improve both access and use of technology.

We have gathered information from around this connected world about how others are using broadband to improve their community's economies and enhance their quality of life. A taste of this information is summarized within this report, but is presented comprehensively in an online toolkit, including a full range of applications being used in very rural areas with limited broadband,

Community Broadband Initiatives
The graphic below illustrates the four inter-related components of community technology initiatives. To achieve full benefits, a community or region must have strategies in place to address these four components of community vitality.

Four Components of Community Technology

Network
Fiber, copper, coaxial, wireless

Subscription
Who and how many
are buying the service?

Services
Availability, pricing, service
quality, customer service

Sophistication
What are users doing
with the technology?

Capturing the full benefits of broadband can be a challenging endeavor. Some community sectors can be highly connected and quite sophisticated while other sectors lag behind. Certain benefits come easily and quickly through adoption and use by early adopters. Other desired benefits require investments in network, equipment, software and staff and/or customer training before yielding fruit.

A community needs to assess how it measures up on these four components to determine its broadband priorities and strategies. The following questions are provided as a sample of the types of information needed:

Network
1. What is the middle mile capacity for our community? Is it fiber optic, microwave, copper or satellite? Are we connected to multiple telecommunications networks or just one?
2. What is the last mile technology? Is it fiber optic, copper, satellite or terrestrial wireless?

Services
1. What telecommunications services are available in our community and from whom? Are they adequate to meet the needs of our community?
2. Do we have competitive services or just from one provider? Are they affordable? Are they reliable? How is the customer service?

Subscription
1. What percentage of our residents and businesses subscribe to broadband services? What does this percentage say about our community? What are the characteristics of the non-subscribers? Do people not subscribe because it is not available or not affordable or a lack of interest? Who would like to subscribe but cannot?

Sophistication
1. How are people using broadband in the community? Are they using it to improve their access to health care or education?
2. How are local businesses using broadband and online technologies? For research, marketing, purchasing, customer service, online sales?
3. How are key organizations using broadband to serve the community? Are schools, health care providers making full use of available technologies? Are they connecting to other institutions in the state or within the region? Are they connecting to people in their homes to deliver information and services?

Most communities see opportunity to improve both networks and adoption. Depending on a community or region's unique circumstances, it may decide to focus a significant portion of their resources to one or more of these components. It can be easy for some community leaders place too much emphasis on the

network and services, thus delaying any community engagement until providers make network investments. This is a mistake as a community can increase the tech sophistication of community members even as it relies on sub-standard broadband services.

A community lacking any broadband access may want to focus exclusively on the network side of the model. Those with modern fiber networks serving all the way to the home would spend their resources on the use side of the model.

Impact of Federal Policy
In Southwest Alaska and other rural areas, anchor institutions such as health care providers and schools can be, in comparison to their neighbors in other economic sectors, fairly well connected thanks to federal Universal Service Funding (USF) that subsidizes their broadband connections. They can also be quite sophisticated in their use of broadband, through their role as a partner in statewide efforts around online education or tele-health.

Unfortunately the same policies that have supported network development in anchor institutions have often created policies that prevented, if not outright prohibited, sharing the institutional network with local households and businesses. Federal policymakers are talking about changing such policies, which may create opportunities for rural areas such as those in Southwest Alaska.

"We use broadband in our clinics. We are moving towards using video in consults. We now have 5 Mb via satellite paid for with USF funding. It is doing what it needs but it is behind our need curve." Edgar Smith, Eastern Aleutians Tribes

Effect of Local Landscape
Within the Southwest Alaska region, each sub-region and community will find itself with a unique set of circumstances with regards to these four components of community technology vitality. Each has a unique combination of telecommunications options and community assets of schools, health care providers, tech support companies and local tech gurus.

"High Schools need core classes for AK Performance Scholarships. We need to tap into online classes to get students to qualify.   Offering college/AP courses has been difficult. We need to get into the 21st century."
John Conwell Superintendent, Unalaska Schools

While many communities choose to focus their attention exclusively on the network side of the table, there are many benefits to be gained by broadening this focus to include the use side of the table even if a community or region is in a satellite-only geographic zone. This effort involves empowering local residents and organizations to embrace the possibilities offered by making full use of broadband-enabled technologies, no matter how limited.

Broadband Connectivity in Southwest Alaska

"We have lots of single points of failure. Better redundancy and higher

bandwidth would be good. With the latency, it is hard to host a videoconference."
Jim Jones, IT Manager, Bristol Bay campus

While our study focuses primarily on broadband application development and use, we also reviewed the connectivity options in Southwest Alaska. Adoption, application development and broadband use certainly go hand-in-hand. Without access and then adoption, application development strategies could be frustrated due to a lack of users. On the other hand, a suite of relevant local, regional and state applications from both public and private sectors can be a driver of adoption where broadband services are available and affordable. Applications can increase the affordability of a broadband connection by reducing other costs, such as transportation or supply purchases, or by bringing more value through better access to education or health care or by enabling more regular and robust connections to family and friends.

Broadband quality can be measured in many ways, but capacity (speed) and latency are the two most critical components of quality. Each is a significant barrier to adoption and application deployment in Southwest Alaska.

With the rapid pace of networking technology, the definition of "high-speed" or

"adequate" broadband continues to evolve upward. The State of Alaska's

broadband task force's vision statement sets a goal of 100 Mbps to every person by 2025. As noted earlier, US Federal Communications Commission (FCC) sets a goal of 100 Mbps to 100 million households and 4 Mbps to the balance of the country by 2020 in the National Broadband Plan.

What is clear is that much higher broadband speeds are increasingly available to both urban and rural customers in other parts of the USA and the world. Gigabit (GB) connections are now or soon will be available and relatively affordable to residents in a growing number of communities. A Gigabit is 1,000 Megabits. According the Fiber to the Home Council, almost 20 million homes in North America are now connected to 100% fiber optic networks

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(http://www.ftthcouncil.org/en/newsroom/2012/04/09/continued-expansion-of-north-american-ftth-fueled-by-broad-base-of-telecom-provi).

Bandwidth demand in the health and education sectors is rising even faster. The State Educational Technology Directors Association recommends that by 2014, schools have external Internet connections equal to 100 Mb for every 1,000 students or 10 Mb for every 100 students. Internal school networks should be 10 times faster capacity or 1 Mb per student (http://www.setda.org/c/document_library/get_file?folderId=353&name=DLFE-1517.pdf)
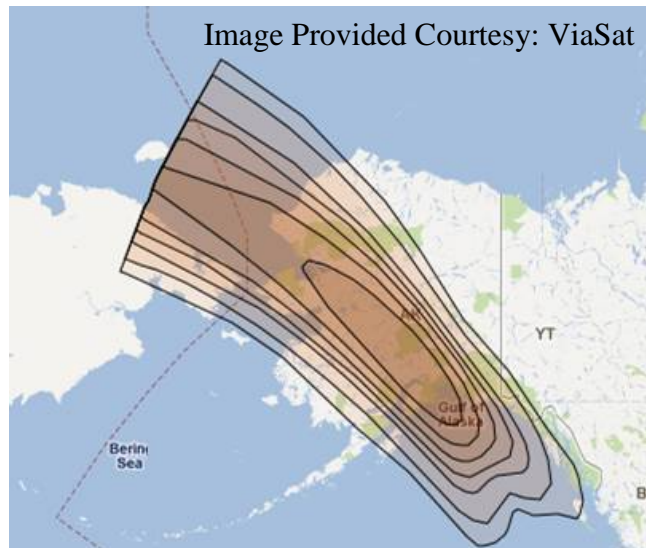
"Since our grant funding for our dedicated T1 expired, it is hard to run the school." Adelheid Herrmann Southwest Alaska Vocational Education Center

Vast areas of the Southwest Alaska region receive their broadband services via satellite, either directly with a satellite provider or because their local Internet Service Provider is using satellite as their middle mile source of connectivity. Latency, or delay, is a significant feature of satellite broadband with serious impacts on interactive applications such as video conferencing and interactive gaming.
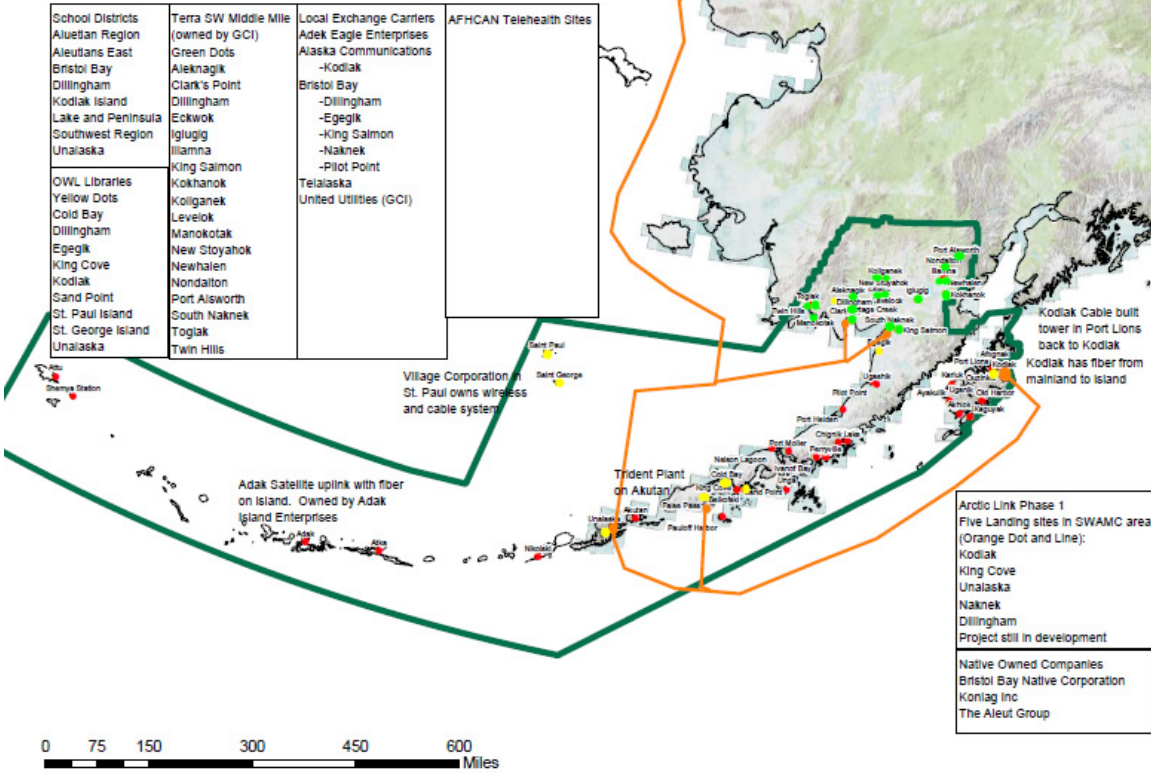
Until recently, satellite services have also had significant capacity/speed restrictions. Recently, new technologies have increased available satellite speeds in some areas, though much of Southwest Alaska has not yet benefitted from these new technologies.

The map to the right illustrates the enhanced services coverage area. Highest speeds are available in the center areas with declining speeds at the edges.

There are essentially five zones of connectivity in Southwest Alaska. The map below illustrates some of the available connectivity while the following table provides examples of how communities fit into the zones with both opportunities and barriers for application and adoption.

Image Provided Courtesy: ViaSat

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Southwest Alaska Municipal Conference

School Districts	Terra SW Middle Mile (owned by GCI)	Local Exchange Carriers	AFHCAN Telehealth Sites
Aluetian Region	Green Dots	Adek Eagle Enterprises	
Aleutians East	Aleknagik	Alaska Communications	
Bristol Bay	Clark's Point	-Kodiak	
Dillingham	Dillingham	Bristol Bay	
Kodiak Island	Eckwok	-Dillingham	
Lake and Peninsula	Igiugig	-Egegik	
Southwest Region	Iliamna	-King Salmon	
Unalaska	King Salmon	-Naknek	
	Kokhanok	-Pilot Point	
OWL Libraries	Koliganek	Telalaska	
Yellow Dots	Levelok	United Utilities (GCI)	
Cold Bay	Manokotak		
Dillingham	New Stoyahok		
Egegik	Newhalen		
King Cove	Nondalton		
Kodiak	Port Alsworth		
Sand Point	South Naknek		
St. Paul Island	Togiak		
St. George Island	Twin Hills		
Unalaska			

Village Corporation in St. Paul owns wireless and cable system

Kodiak Cable built tower in Port Lions back to Kodiak. Kodiak has fiber from mainland to island

Adak Satellite uplink with fiber on island. Owned by Adak Island Enterprises

Trident Plant on Akutan

Arctic Link Phase 1
Five Landing sites in SWAMC area (Orange Dot and Line):
Kodiak
King Cove
Unalaska
Naknek
Dillingham
Project still in development

Native Owned Companies
Bristol Bay Native Corporation
Koniag Inc
The Aleut Group

0   75   150   300   450   600
Miles

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Connectivity Zones

Connectivity	Place	Opportunities	Constraints
1. 100% Fiber	Kodiak Island and Road Fiber System	High bandwidth applications	Possible cost of bandwidth from Anchorage. Lack of similar connections to villages.
2.Satellite – fed fiber local loop	Adak	High bandwidth opportunities within the Adak community. Low to moderate bandwidth opportunities to other locations.	Cost of satellite bandwidth. Latency of satellite middle mile. Download caps.
3. Satellite – fed copper or wireless local loop	Dillingham and other communities	Low to moderate bandwidth opportunities within community and externally	Cost of satellite bandwidth. Download caps. Latency of satellite middle mile. Capacity of local loop.
4. Fiber-microwave backbone with a) wireless last mile b) wired last mile	Terra SW Areas	Moderate to high bandwidth opportunities internal and external to the community depending on the last mile technology.	Limitations of last mile technology that may limit high bandwidth applications.
Satellite only	Villages	Low bandwidth opportunities.	Latency. High costs. Download caps.

Impact of Affordability on Connectivity Choices

Affordability and funding also drive connectivity options in Southwest Alaska and other rural communities. The price of a connection determines how readily residents and organizations adopt broadband. Unlike commodities where prices are set in a global marketplace, broadband pricing is extremely variable depending on a community's location and the local competitive situation.

For the 65 communities connected to the GCI Terra SW Project, broadband

access has become both more robust and more affordable. GCI is offering a 6 Mb / 2 Mb plan within these communities for $164.99 per month with a 25 Gb bandwidth cap. While an entry level connection (512k) is priced at $29.99 per month, a subscription that meets the federal broadband goal speed of 4 Mb costs $114.99 per month.   In a somewhat unfair, but revealing comparison, Google will soon offer 1 Gb (1,000 Mb) connection in Kanas City for $70 per month.

As noted earlier, organizations that are eligible for broadband funding subsidies through the Universal Service Fund and other federal funding sources are much more likely to have faster connections than other organizations in the Southwest Alaska region. These USF subsidies provide thousands of dollars per month per connection in savings to schools, libraries and health care providers across the region. Even with these subsidies, these organizations have relatively low bandwidth access compared to urban areas and even to rural areas in other states. In many places, schools or health clinics in other rural localities with similar markets and client bases would have 100 Mb or even 1 Gb Internet connections while USF-funded entities in Southwest Alaska make due with 5 Mb or even 1.5 Mb connections.

Organizations paying retail prices for connectivity seem likely to have 1.5 Mb or slower broadband connections. In addition, these slower connections may also have download caps that limit effective usage of the service. USF funded organizations may not share their bandwidth with ineligible organizations even if they share a building or mission. Especially in the case of Southwest Alaska, these restrictions discourage the practice of aggregating demand, a common strategy for improving high-speed broadband availability in rural communities.

Application Development
Applications are developed to fill a market or community need. Successful applications do several things.
> Provide quality information and services to people when and where they need it
> Reduce costs of providing that information and service
> Reduce transaction costs of selling goods and services

Application development generally takes place at one of three levels. Applications such as Amazon, Google, Pandora, Skype and others are developed and deployed nationally and internationally. Successful start-up application companies are often purchased by larger companies and delivered within of a bundle of applications.

Other applications are developed, either by the private sector, by entrepreneurial public sector employees or through a public-private sector partnership, around health care or education services. Many times, regional or state application development and adoption is driven by the presence of a high-capacity fiber network that connects schools or health care providers. Bandwidth availability

and a shared network spurs use of the network and drive collaboration on shared services and application development. The lack of these institutional networks in Southwest Alaska deters the development of broadband applications in these economic sectors. In many cases, application adoption is driven by new federal or state regulations or funding programs. Adoption of these types of applications can mean a long-term commitment and significant funding requirements. They require negotiating collaborative agreements

The third place where application development occurs is locally. In most cases, tech-savvy people create applications that use existing tools – Skype, GPS, and other mash-up Internet tools. These tools can be simple to use and adapt for local use.   Single organizations can deploy these online tools, like the school or hospital. Or more community-wide efforts to make wide use of online technology can be launched and supported. This broader initiative requires local champions and long-term institutional commitment though open source tools have made application development more achievable.

"We use Internet with our 400 members. It's faster, it's easier, it's convenient. We maintain an e-commerce site for crafters which helps get global buyers for local products." Lale Gurer Kodiak Chamber

Through our research, interviews and focus groups, we have found that many organizations in Southwest Alaska are using advanced applications up to and past the limits of the available bandwidth. Technology managers are forced to use their own ingenuity, bandwidth management tools and application scheduling to make the applications effective.

For example,

> On Kodiak, the school system buildings connected by fiber enjoy the ability for quality video conferencing. However, the satellite links to village schools limit quality video conferencing and other online learning tools due to latency issues and the inconsistent quality of the satellite links that can be greatly affected by weather.

> The Southwest Alaska Vocational Education Center at King Salmon faces imminent loss of funding for its dedicated T1 line. They will have to downgrade connectivity that will make it difficult for students to access information from other locations and negatively impact their ability to videoconference.

> The Iliuliuk Family and Health Services in Unalaska have a dedicated T1 and collaborate through the Alaska Primary Care Association on Electronic Medical Records and on the transmission of X-rays, EKGs,

ultrasounds and other imaging technologies to the regional hospital. They cannot utilize streaming video that precludes continuing education and ad hoc health research. With the relatively poor connectivity available to local residents, their patient portal is limited to providing text –only health information.

The City of Unalaska has a Geographic Information System for creating customized maps and displaying information. Use of this system is now limited to internal users only due to poor connectivity within the community.

Again, most health, government and schools in the Southwest Alaska region are severely limited by the availability and affordability of connectivity. While these institutions purchase 1.5 Mb – 5 Mb connections, similarly sized organizations in other states, even in very rural areas, have 10 Mb, 20 Mb or even up to 100 Mb connections for data sharing, video conferencing and other applications.

Application Development Case Study

The Minnesota Rural Intelligent Community (MIRC) program is a federally funded Broadband Technology Opportunity Program project. Eleven rural Minnesota "communities" were selected to participate as demonstration communities, including individual cities, counties, a five-county economic development region and a tribal government.

Each community received a commitment of $100,000 to work on community broadband activities. Each community worked through a benchmarking and planning process to understand their current situation and to set strategies for improving their use of broadband. Communities selected an average of eight projects for implementation over a two-year period. Project

Application Guide

The Community Technology Advisors consulting team has created an online tool, an application in itself, to provide guidance to Southwest Alaska community leaders about the range of opportunities to use online tools to enhance economic development, health care, education and quality of life. This tool is available at www.swakbroadband.com/toolkit .

The tool provides many examples of online applications grouped by community sector and bandwidth required. Many examples from rural Alaska are included.

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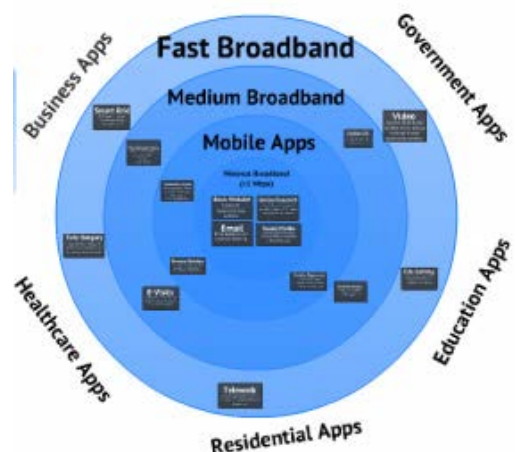
A team promoting community broadband adoption could use this toolkit in the following ways:

- Better understand the constraints that limited bandwidth presents in application deployment

- Educate themselves as to "state of the art" application practices in the key economic sectors before conducting community technology assessments with community organizations.

- Identify applications that would have high value for their community and then working in partnership with affected organizations to build community and financial support of the deployment of the application

- Collaborate with regional and state partners to promote shared application development.

The following applications are highlights from the toolkit that regional leaders may consider emulating or promoting within their communities. Many more application examples are included in the toolkit.

Business Applications
Mobile checkout for retailers - using wireless technologies, vendors are able to accept credit card transactions using their mobile telephones.
http://swakbroadband.com/toolkit/?p=259

Mobile phones can also be used to transfer money (useful in villages with no banks or conduct local surveys of visitors, customers or local residents.
http://swakbroadband.com/toolkit/?p=252

Sensors can be used for shipping or fishing logistics to keep track of inventory, temperature and other considerations
http://swakbroadband.com/toolkit/?p=249
.

Health Applications
PatientView is an electronic medical record application that runs on standard cell phones, especially good for health workers working in village clinics and in peoples' homes
http://swakbroadband.com/toolkit/?p=245

Government Applications
Make sure that all of your local government information is current and accurate with Alaska's 511 telephone application.
http://swakbroadband.com/toolkit/?p=305

In addition, we have created a presentation using Prezi to give online viewers

quick context about how available bandwidth enables different types of applications. That presentation is available at www.swakbroadband.com .

Community Broadband Case Study
The Minnesota Rural Intelligent Community (MIRC) program is a federally funded Broadband Technology Opportunity Program project. The Intelligent Community approach is documented at www.intelligentcommunity.org. Essentially, Intelligent Communities use the model illustrated below to drive their technology-based economic development initiatives.

Eleven rural Minnesota "communities" were selected to participate as demonstration communities, including individual cities, counties, a five-county economic development region and a tribal government.

Each community received a commitment of $100,000 to work on community broadband activities. Each community worked through a benchmarking and planning process to understand their current situation and to set strategies for improving their use of broadband. Through a community Request for Proposal process, community organizations submitted proposal for projects. Communities selected and implemented an average of eight projects for implementation over a two-year period. Individual projects received from $1,000 - $50,000 in grant funding.

The following represents a sampling of projects implemented through the MIRC project categorized by the five components of Intelligent Community. A table with all of the projects is included appendix ___.

Broadband
- The City of Winona partnered with Hiawatha Broadband to install multiple outdoor wireless hotspots at key attractions, including parks, campgrounds, and downtown.

- Benton County supported wireless networks at public libraries, at assisted living facilities and in partnership with private businesses, creating at least 13 new public access points.

- Multiple school districts have enhanced the wireless networks within their schools with several opening their networks to student devices like laptops, IPADs and phones as well as general community access.

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Knowledge Workforce
- The Leech Lake Band of Ojibwe require that each member seeking to participate in their Temporary Employment Program first complete a digital literacy training curriculum. Several hundred tribal members have been trained at one of four public computer labs assisted by tribal college students tutors.

- In Winona, the Workforce Center purchased a mobile laptop lab to bring to local businesses for computer assessment and training.

- Adult Basic Education teachers in each of the eleven communities have been teaching digital literacy programs in partnership with the Workforce Centers.

Innovation
- In Benton County, Willmar and the Upper Minnesota Valley region, elders have been able to stay in their homes using digital monitoring and communication technologies. Highlights of these efforts include one great grandmother seeing her great grand daughter over video conference and another long-time Head Start volunteer reading to her kids over Skype.

- In the Upper Minnesota Valley region, a rural county now makes all Geographic Information Systems (GIS) mapping and property records available online saving staff time and enabling remote access from customers who may be some distance away.

- In Cook County, there is a concerted effort to promote the use of digital video technologies, for live streaming and archiving of community events, including county board meetings, sporting events, festivals, etc. leading to a local YouTube video channel.

Digital Inclusion
- In partnership with PC's for People, a Minnesota non-profit, over 1,000 computers have been refurbished and distributed to low-income families through school districts, Head Start programs and workforce programs. Many of the local communities have arranged discounted broadband services through partnerships with Internet Service Providers.

- The already noted public access spots and digital literacy training are strong digital inclusion strategies.

- In Itasca County, a local bank partnered with the Elder Circle program to offer digital literacy training centered around online banking.

Marketing

- In Cook County, the local Convention and Visitors Bureau has converted all of their tourism web sites to be mobile device friendly. Over 25% of all web site visitors are now connecting via mobile devices.

- In Benton County, broadband service availability and wireless hot spot directories have been printed and placed online.

- Through the University of Minnesota Extension Service, thousands of small businesses have claimed and verified their Google map locations and multiple communities are using Google Mapmaker to map community assets and attractions.

A key to the success of this project is that each community developed their own set of priorities and sought proposals from interested and willing community partners. Once project ideas were identified, MIRC steering team leaders facilitated collaboration among those projects with shared elements.

Community leaders in Southwest Alaska can set a goal to increase the technological sophistication of the region as can leaders in individual communities. Determining the priorities, the correct partners and scale, funding sources, best vendor and appropriate use policies requires local discussions, planning and implementation.

Not each project ended up where they thought that they would. Several were reworked to take advantage of ongoing learning. But by working with willing and enthusiastic partners, the communities were able to see strong positive results from almost every project.

Findings and Recommendations

Findings

Through a series of surveys, interviews and focus groups, the Community Technology Advisors team found the following:

Access is the primary barrier to adoption of broadband services and advanced applications due to low bandwidth, poor reliability and high cost of service.

Organizations in Southwest Alaska make aggressive use of the available, yet very expensive bandwidth.

Organizations generally seem to be working independently rather than collaboratively to improve access.

TERRA SW has not yet had an appreciable impact on the bandwidth available in the project area, as deployment of the GCI last mile wireless network infrastructure is not yet complete.

There are some concerns over proposed GCI pricing which is causing technology managers to consider maintaining existing satellite connections. While the TERRA SW-based services provide the advantage of significantly reduced latency (delay), technology managers will need to balance the value of this reduced latency with the added bandwidth expense.

Those outside the TERRA SW project area are unlikely to see significant improvements in terrestrial broadband services anytime soon and that all improvements will be dependent on enhanced satellite services.

Recommendations

Empower Leadership
> Raise broadband to a higher level of priority for regional and community leaders from all sectors
> Increase the capacity of local leadership to understand and act on broadband policy questions through training and ongoing provision of understandable information
> Bring health, government, education and private sector technologists
>
> together to share information and leverage each other's investments and
>
> purchasing power
> Facilitate regional, sub-regional and community broadband planning meetings to discuss
> Access
> Applications
> Digital Inclusion

> **Rationale**
> Stimulating broadband access and use seems to be a low priority of many Southwest Alaska leaders who are dealing with many other important issues. Showcasing how broadband can serve as a platform for problem solving in these other issue areas is critical.

Proposed action steps:
> 1. Formalize and enhance the regional broadband advisory created through this project to provide a forum for ongoing discussion and action.
>
> 2. Include broadband and technology information in all newsletters, web communications, etc.
>
> 3. Convene key regional policy and technology leaders from the region for a SWAMC broadband technology summit.
>
> 4. Create an action plan with identified activities and leaders.

Stabilize and increase federal and state resources for broadband development

Monitor federal regulatory and policy developments around rural broadband finance, especially USF and Inter-carrier compensation; collaborate with a variety of telecom providers to understand the range of positive and negative outcomes from policy choices
Advise elected officials about the impacts of policy changes on the region
Monitor and pursue federal and state funding opportunities for to implement a regional plan
Develop an understanding of existing federal and state network investments and how they might be used by the wider community

Rationale:
Based on market revenue potential and extremely high deployment costs, unsubsidized private sector investment for advanced broadband deployment is highly unlikely.

Proposed action steps
1. Develop relationships with subject matter experts that can provide ongoing updates on federal and state broadband policies and programs. Target advisors include telecommunications providers, congressional and legislative staffs and state regulatory staff.
2. Communicate this information to local leadership and coordinate a SWAMC response upward to policy makers.

Satellite Improvements

Demonstrate and/or aggregate demand for advanced satellite services over the SW region.
Gather information from fishing, mining, oil and gas industries, Homeland Security and others regarding the demand for advanced satellite-based broadband services
Communicate with existing satellite providers on this market opportunity
Work with elected and administration leaders at both federal and state levels to improve bandwidth and modify or remove bandwidth caps to allow reasonable use

Rationale
Satellite technology is likely to be the primary source of middle mile and last mile broadband service for the foreseeable future in areas outside of the Terra SW project. Current practice is every person and institution is required to negotiate for itself in contracting for satellite services.

Aggregation of community market demand - that is, the business community, health care, education and others - join together to jointly negotiate pricing and terms of service - is a common rural broadband market development strategy.

Increase Community Quality of Life

Ensure that every community has a public access location with a minimum of 10 – 20 Mb capacity

Include dedicated space and support services within this center for prospective and current teleworkers
Promote joint purchasing of bandwidth and other telecommunications services across economic sectors and communities
Ensure that all Alaska public schools meet the recommended 100 kb per student goal
Ensure that every student and their family has a computer, is trained and can connect to the Internet

Rationale:

Effective Internet use begins with a computer and a connection. Providing adequate broadband for students in public elementary and secondary schools living in the more remote areas of Alaska could be perceived as an attempt to provide a "free and appropriate" education for each student as required by both the U.S. and Alaska State Constitutions. Conversely, failure to provide this access to web based course content and learning opportunities, could be perceived as denying these students access to opportunities readily available to students in other areas of the state, creating inequity and inequality of learning, educational services and workforce training.

We heard in listening sessions that schools that previously have permitted students to use personal devices on the networks are needed to consider changes to this policy due to broadband constraints. To make sure that youth get the experience and education they need online, they need to have places to go to get online.

Increase Business Vitality

Provide ongoing training and information to small and home businesses about the opportunities to use technology to reach markets, lower costs and increase competitiveness
Identify and use best practice training curriculum available through the NTIA web site.

Identify, certify and promote local tech support firms to provide web development, social media and network support to small business and other community organizations
Continue to create and maintain portals for collaborative small business marketing
Create and support locations in cities and villages with quality bandwidth and other support services to enable prospective and current business owners to learn and implement broadband-based marketing and management strategies

Rationale:
The Internet allows people in any location to develop and operate a successful small business based on their unique talents and interests, going well beyond local food products and artisan products.

Increase Local Government Efficiency
Create and support collaborative web sites and web site applications to support local government deployment of online services
Provide ongoing training and information to local units of government about the opportunities to use technology to improve services and lower costs

Rationale:
There is an excellent opportunity to bring large numbers of small government and non-profit organizations online in a timely and cost – effective manner through the use of templates, shared professional services and training and promotion.