ATCAA Central Sierra Connect
Final Report:

Bringing Broadband to the Central Sierra Foothills

For the California Emerging Technology Fund
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I. EXECUTIVE SUMMARY

Background

Universal access to affordable broadband is a prerequisite for economic growth, job creation, education and healthcare opportunities. A serious concern in California is the growing geographically imposed Digital Divide as many rural communities in the state continue to lack access to affordable broadband infrastructure.

Capital investment required to serve geographically dispersed communities exceeds the likely private market returns on the sale of broadband access. Information collected from the Central Sierra Connect (CSC) Regional Aggregation of Demand Study (AOD) will help remove this barrier by identifying opportunities for increased broadband development and adoption, and enabling the creation and development of new and advanced communications in the five-county region of Alpine, Amador, Calaveras, Mariposa and Tuolumne.

High speed telecommunications services are essential to economic growth and can increase access to health care, education, job training, public safety, and other much-needed services. It is clear that broadband offers immense opportunities for social, economic and educational advancement. Residents in the region are eager and willing to take advantage of these opportunities. According to the Governor's Broadband Task Force service availability maps, approximately 60% of residents in the Central Sierra region have no access to broadband.

A cross-section of factors such as extreme geography, poverty, lack of population and local policy contribute to an environment where the private sector struggles with building a business case to close coverage gaps. To address these challenges, the California Emerging Technology Fund (CETF) partnered with the Amador-Tuolumne Community Action Agency (ATCAA) to accelerate the deployment of broadband and other advanced communication services throughout the region via the establishment of a regional working group comprised of county-level key stakeholders to assist ATCAA with conducting the AOD study.

Methods

To complete aggregation of demand, the following areas were studied:

- Existing and prospective users of broadband service in the five-county region (by category or sector and location);
- Demand potential (by category or sector and location);
- Identification (and mapping) of served and unserved areas;
- Delineation of existing and prospective broadband uses and applications;
- Speed of communications (existing and for prospective demand);
- Affordability and willingness to pay for prospective services (by category or sector and location);
- Open-ended community perspective including assessment of both survey instrument(s) and adequacy and recommendations for improvement in the future; and
- Outreach and engagement plan to inform prospective users of the results.

CSC created working groups to address each area of the AOD study:

Advisory Council
Comprised of key stakeholders across the ConnectKentucky model of nine community sectors: Business; K-12; higher education; healthcare; community-based organizations; government; agriculture; and tourism, parks and recreation. This body provided oversight and guidance for the study. One Board of Supervisor and Administrator (or representative) from each county participated.

Aggregated Demand Survey Working Group
Comprised of participants from the Advisory Council as well as community members. This group helped to further develop the survey tool provided by Redwood Coast Connect to make it more specific to the needs of the CSC region and assisted with survey deployment.

Infrastructure and Mapping Working Group
Comprised of key personnel from local Internet service providers (ISPs), technology companies and county information technology (IT) and/or county geographic information systems (GIS) departments. This group assisted the GIS contractor in identifying and mapping local infrastructure, served and under/unserved communities and provided feedback for future build-out, and broadband rating and raking.

Public Policy Working Group
Comprised of local government officials and ISP personnel. This group reviewed regional, State and Federal broadband policy for potential future regional application.

Outreach and Engagement Working Group
Comprised of community-based, social service and non-profit organizations and community members. This group reviewed disabled access to broadband, broadband advocacy and regional 211 and telemedicine planning to ultimately create an engagement plan to reach prospective users. This group also helped prepare an American Recovery and Reinvestment Act of 2009 (ARRA) submission for a public computer center project in all five counties.

Community Meetings

Over 20 community meetings and an additional 25 regional conference calls were held over Alpine, Amador, Calaveras, Mariposa and Tuolumne counties to provide information to the community regarding the project. Other topics covered during meetings and conference calls include: the status of broadband deployment over the five counties; local needs, concerns and feedback; recruitment and mobilization of community members and key stakeholders towards a regional commitment to broadband deployment and adoption.

Survey Process

The objective of the residential survey was to assess the potential demand for broadband in the Central Sierra Connect five-county region, using five CETF metrics. The surveys gathered demographic information to help facilitate analysis of the results and were completed between November 2008 and January 2009 based on a statistically significant random telephone sample of 396 responses. Survey methodology is detailed in the appendix. The top opportunity identified for broadband adoption in the region is expanding access to broadband service. The demand is significant and broadband adoption is critical.

Offering affordable, ubiquitous broadband is an essential element of a long-term strategy to invest in the future of the region.

Residential Demand and Price Points

A variety of characteristics influence whether consumers purchase (or adopt) broadband service. The residential demand shows about 40% of respondents do not subscribe to the internet as they report that broadband is not available for their household. Of these responses, the majority (46.3%) reported to be in the low-income category. Alternatively, about 40% do subscribe to broadband and the majority (61.5%) of these respondents reported to be in the high-income category. About 7% reported that they didn't want or need broadband and only about 6% reported that broadband was too expensive. Of those who reported that broadband is not available for their household, 84 respondents would be willing to pay for broadband and 36 respondents would be willing to pay for enhanced high-speed broadband.

Though the majority of respondents pay $11-29/month there is a wide spread in monthly plans. Some in this category report that they don't have access to broadband and others report that they do. Most of this group reports that their internet is too slow. Many respondents who report paying over $75/month also report slow internet speeds and gaps in service. Though the majority pay $11-29/month, respondents are consistently willing to pay more than this ($20-$40) for broadband.

There is only an 8% gap between those who don't have broadband and those who can't have broadband due to availability. There is a strong potential uptake rate for broadband. The potential to bundle services with cell phone or TV plans may be an attractive growth opportunity for service providers as only about 10% of the respondents currently report having bundled services.

While rural households are less likely to adopt broadband, the findings indicate that this difference may be related in large part to the lower availability of broadband to these households. The findings show in the chart below that willingness to pay is not a top adoption concern for the region. Those in the high-income band are willing to pay for higher cost satellite services, for example, to get broadband speeds whereas the low-income group is less willing, but even those in the low-income band are willing to pay for Digital Subscriber Line (DSL) at comparable price points, if broadband were or becomes available.

	Which of the following categories best describes your annual household income from all sources?			
	Low income	Middle income	High income	Response Totals
I don't have internet at home	20.7% (18)	6.9% (15)	12.0% (3)	10.9% (36)
Dial-up	26.4% (23)	21.2% (46)	12.0% (3)	21.9% (72)
ISDN	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Satellite internet	8.0% (7)	16.1% (35)	24.0% (6)	14.6% (48)
DSL	**32.2% (28)**	**38.2% (83)**	**28.0% (7)**	**35.9% (118)**
Cable TV modem	6.9% (6)	6.0% (13)	12.0% (3)	6.7% (22)
Wireless broadband (antenna)	0.0% (0)	8.3% (18)	12.0% (3)	6.4% (21)
Not sure / don't know	0.0% (0)	0.5% (1)	0.0% (0)	0.3% (1)
Other (specify below)	5.7% (5)	2.8% (6)	0.0% (0)	3.3% (11)
Other (please specify)	7 view	7 view	1 view	15
answered question	87	217	25	329

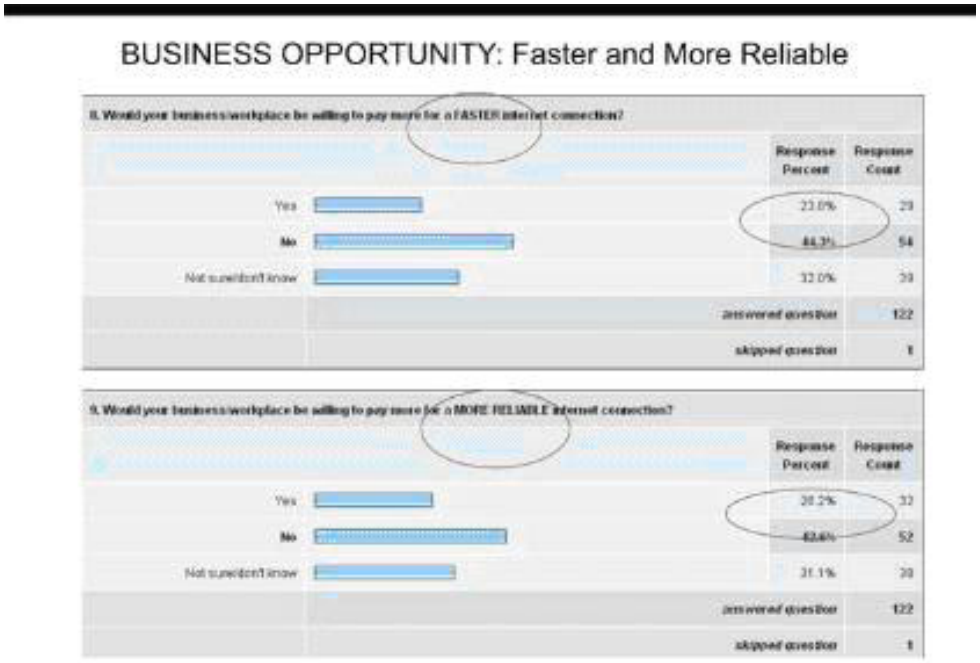
The qualitative data shows a strong frustration in the region toward the lack of access to broadband. Respondents have remarked that the region is much too slow in implementing access to broadband. In addition, respondents have noted an inequality in access between neighboring areas within the community. Though some respondents were hopeful that this survey would help expand availability, more of the respondents simply wanted to know **when broadband would be available** because of their readiness to subscribe. As the region moves forward in local broadband efforts, providers will need to be very cognizant of regional frustration focus on realistic expansion plans and implementing them in a timely manner. It should be noted that the survey was conducted before the full impact of the economic challenges were realized. Today, the region's attitude toward affordability or willingness to pay may have changed with increased unemployment. Additionally as the region replaces jobs and the workforce improves job skills, the lack of broadband availability may become a barrier to adoption and economic recovery.

Business Demand and Price Points

The workplace survey was based on a random telephone survey sample of 123 respondents completed in the December 2008 through May 2009 timeframe. The business survey questions used were from the Redwood Coast Connect survey, allowing consistent comparisons of data from region to region.

Local businesses still lack broadband, with over 20% of local businesses reporting access through dial-up or internet services digital network (ISDN) service. Businesses feel that access is critically or very important to their success. Most of local business respondents are

satisfied with the service provided by their Internet service provider. However, greater than 20% are either unsatisfied or very unsatisfied with their service. Traditional market forces are not at play, an example of the region's pent-up broadband demand; respondents are willing to pay more for services than they are currently paying; and there is a willingness to pay higher rates by those without service since broadband is not yet available.



The key point for service providers in the region is to provide more reliable, faster service to the businesses at an affordable cost. The survey responses show that the economics of affordability are not what one would find in a traditional supply-demand situation because local businesses are suffering from lack of competitive broadband and a potential pent-up demand for high speed and reliability.

Overall Survey Implications

Throughout the five-county region the theme is clear with both residents and businesses: There is an immediate need for affordable, fast, more reliable, and accessible broadband. Businesses are more willing to pay for better availability, but less willing to pay for assistance or support. Service providers have market opportunities in cell phone data plans, Voice over Internet Protocol (VoIP), mobile broadband, and hotspots.

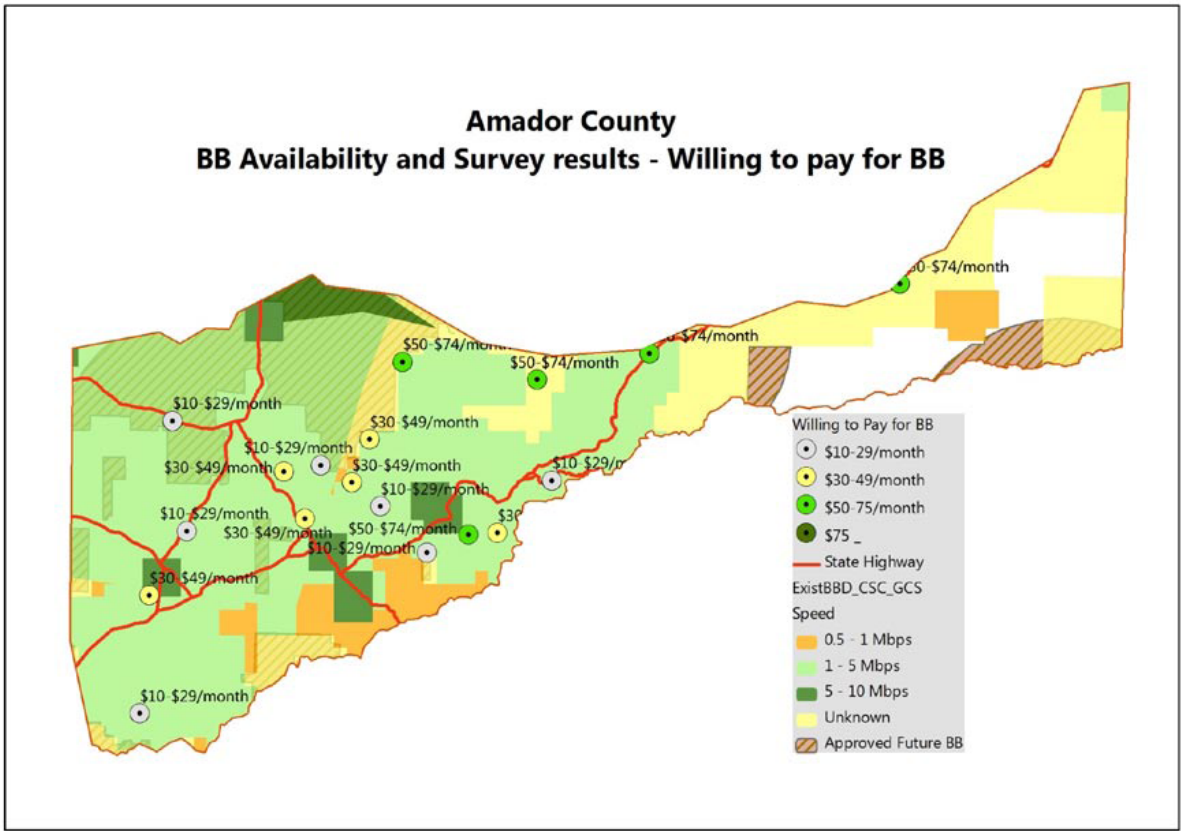
The five-county Central Sierra region is a rural unserved and underserved community, where access is the first, but not the only challenge. The survey shows that access is not an income, willingness to pay, age, race, or education level issue.

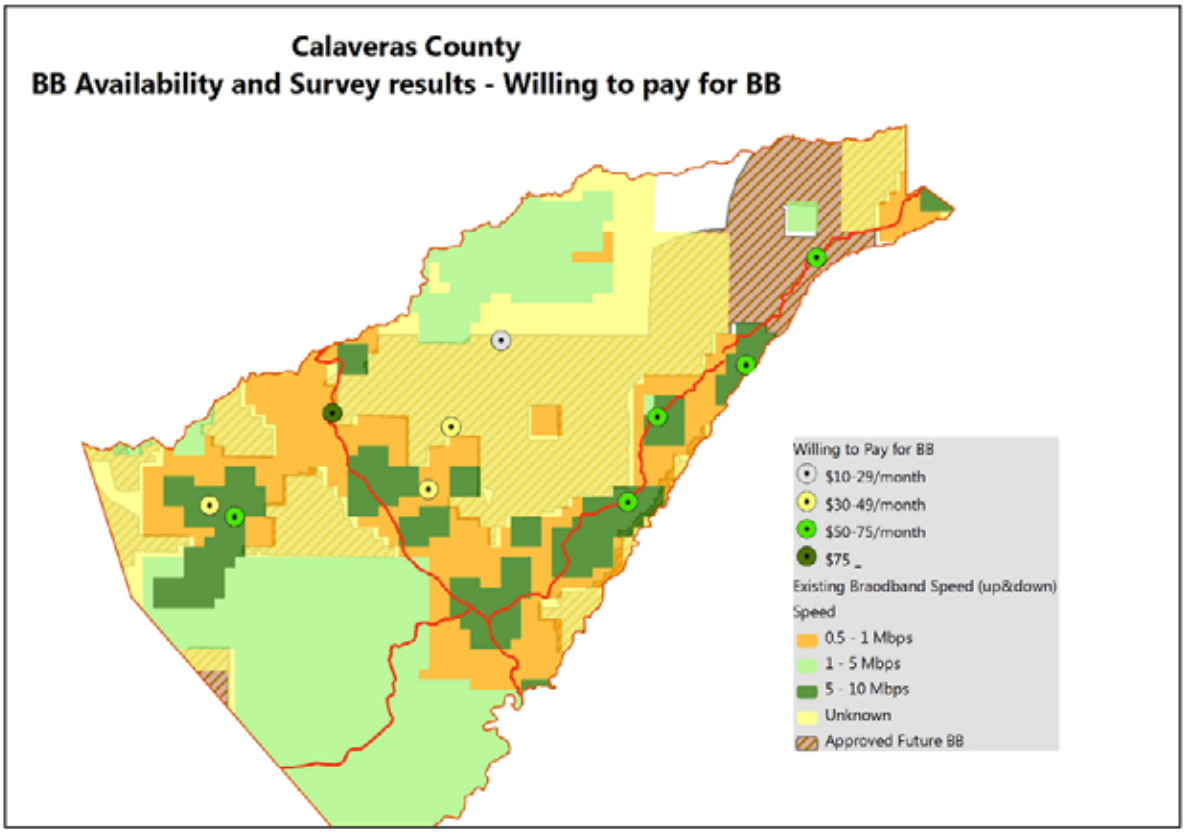
In summary, the survey results present an accurate snapshot of the region's broadband gaps and needs, and the region's frustration. It is a clear message to providers and community advocates that broadband availability is needed now, as illustrated in the above tag cloud.

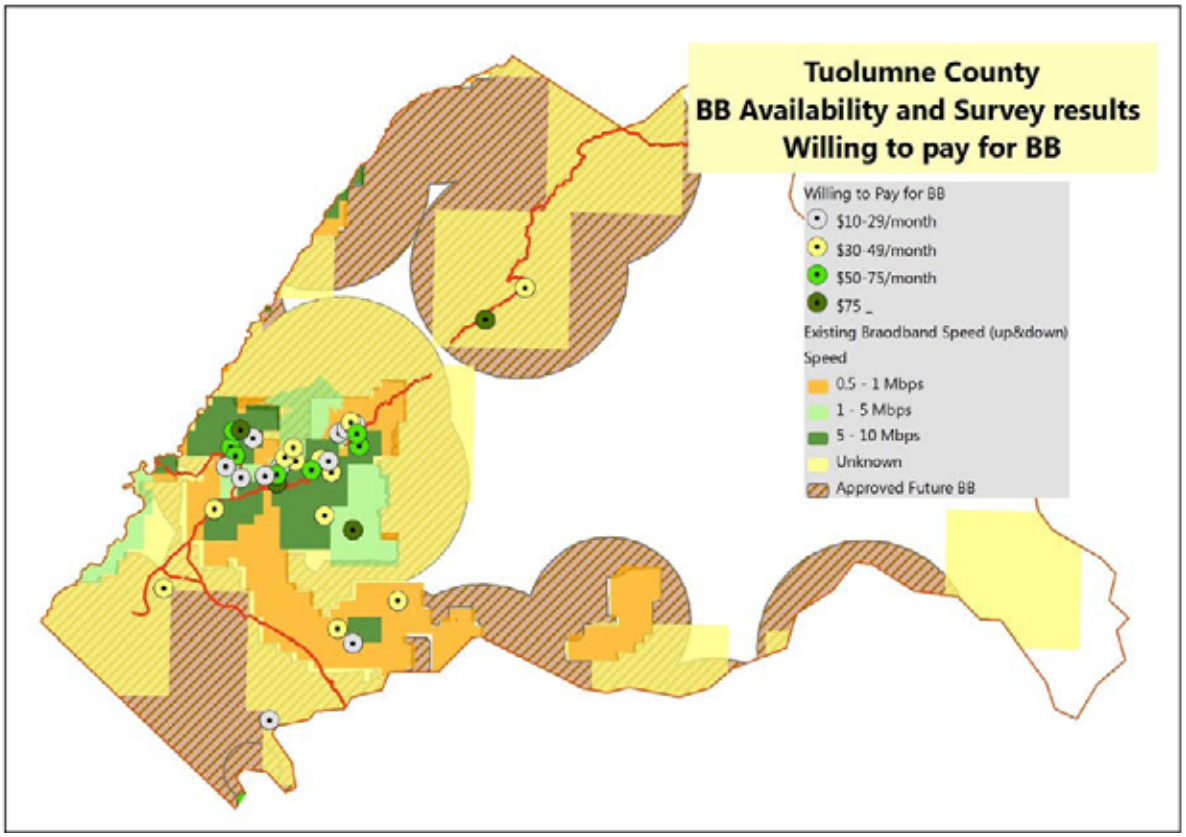
Supply

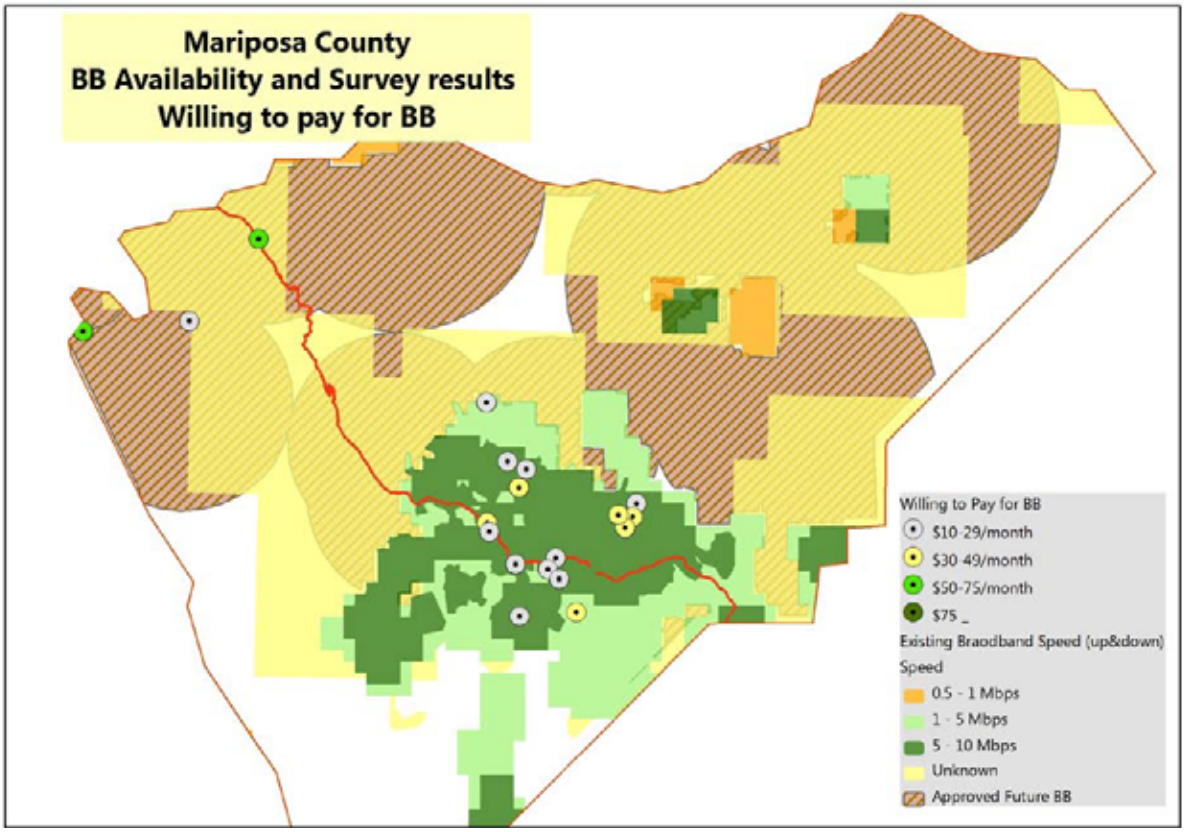
Amador, Calaveras, Mariposa and Tuolumne counties are served by fiber optic lines traveling east from the San Joaquin Valley (mainly along state highway corridors). Two major companies control the backhaul with the exception of two small wireless internet service providers (WISPs). These WISPs provide wireless broadband service to areas that are prohibitively expensive for the major providers to service. All other local providers currently receive backhaul from the two major companies. Alpine is served in a bifurcated manner due to the high mountain pass between the two residential areas on the East and West slopes. It receives wireline access on the western side through the Calaveras connection to Kirkwood, and bandwidth comes for the county seat of Markleeville from Nevada via WPTI Telecomms's POP in Gardnerville for the county T-1 line which does not serve residents or businesses. The East slope's limited connectivity is expected to expand in the future thanks to one awarded and one pending United States Department of Agriculture (USDA) Rural Utilities Service (RUS) Community Connect grants.

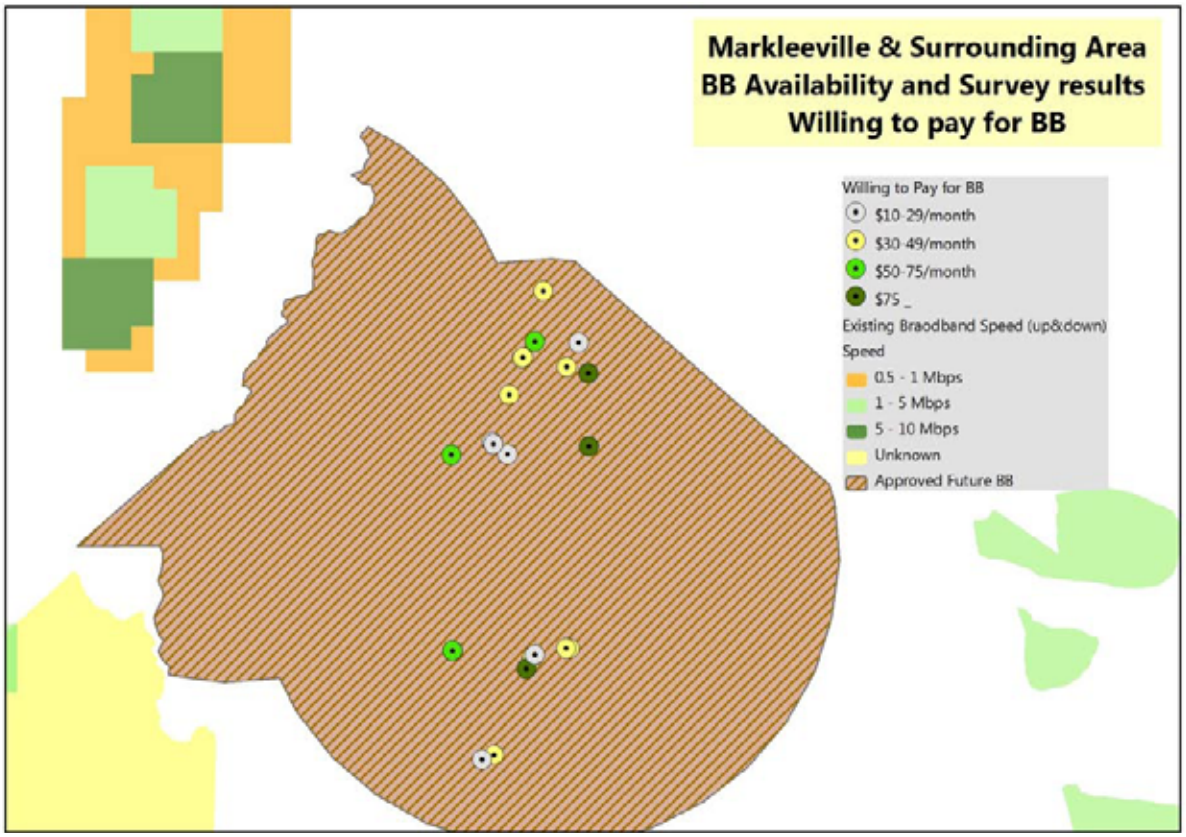
Broadband availability, the survey results and willingness to pay are illustrated in the following maps. The key to providing last mile service is affordable, competitive backhaul independent of the major companies as the return on investment (ROI) is too low for deployment otherwise.


Amador County
BB Availability and Survey results - Willing to pay for BB
$50-$74/month
$10-$29/month
$30-$49/month
$10-$29/month
$30-$49/month
$10-$29/month
$10-$29/month
$30-$49/month
$50-$74/month
$10-$29/month
$30-$49/month
$10-$29/month
Willing to Pay for BB
$10-29/month
$30-49/month
$50-75/month
$75 _
State Highway
ExistBBD_CSC_GCS
Speed
0.5 - 1 Mbps
1 - 5 Mbps
5 - 10 Mbps
Unknown
Approved Future BB


Calaveras County
BB Availability and Survey results - Willing to pay for BB
Willing to Pay for BB
$10-29/month
$30-49/month
$50-75/month
$75 _
Existing Broadband Speed (up&down)
Speed
0.5 - 1 Mbps
1 - 5 Mbps
5 - 10 Mbps
Unknown
Approved Future BB


Tuolumne County
BB Availability and Survey results
Willing to pay for BB
Willing to Pay for BB
$10-29/month
$30-49/month
$50-75/month
$75 _
Existing Broadband Speed (up&down)
Speed
0.5 - 1 Mbps
1 - 5 Mbps
5 - 10 Mbps
Unknown
Approved Future BB


Mariposa County
BB Availability and Survey results
Willing to pay for BB
Willing to Pay for BB
$10-29/month
$30-49/month
$50-75/month
$75 _
Existing Broadband Speed (up&down)
Speed
0.5 - 1 Mbps
1 - 5 Mbps
5 - 10 Mbps
Unknown
Approved Future BB



ARRA and CASF possibilities

Mother Lode Broadband Project (MLBBP)
With assistance and support from ATCAA CSC, the MLBBP (Mother Lode Internet of Sonora and partner Rapid Link of Sacramento) was awarded $2.9 million by the California Advanced Service Fund (CASF) to help improve infrastructure through deploying new independent backhaul and wireless service to bring high-speed connectivity to unserved residents of Alpine, Amador, Calaveras, Mariposa and Tuolumne counties. A second multi-million dollar application for underserved communities is pending and anticipating approval in the near future. Upon completion this project is projected to provide service of up to 14 Mbps to over 95% of the regional population of unserved and underserved residents.

California Teleheath Network (CTN)
The project is a statewide telemedicine proposal partially funded by CETF to improve access within rural and underserved areas to high quality, collaborative health services through a dedicated telehealth network. 36 medical facilities in the region were deemed eligible for participation in this Rural Health Care Pilot Program which will bring expanded wireline and wireless service to the region, with potential public and commercial uses of the expanded statewide network.

Alternative Scenarios and Other Expected Deployment

Open Range Communications
Open Range was awarded Rural Development funds to provide 4G broadband service to two areas in the Central Sierra Connect region: Phoenix Lake in Tuolumne County and Ione in

Amador County. Open Range has also applied for ARRA funding to expand those two sites substantially to surrounding areas.

Golden State Cellular (GSC)
GSC plans on expanding their current cellular network to provide 3G mobile broadband service to all five counties in the region. Deployment is expected in early 2010.

ThrockWISP and REMNet
These are two independent wireless providers purchasing bandwidth from a third independent provider in the San Joaquin Valley. The companies plan on expanding further into Calaveras, Mariposa and Tuolumne counties as they provide special service to very remote areas with extreme terrain challenges which may not be served by MLBBP.

Great Basin Internet Service
Washoe Tribe of Nevada and California was awarded Rural Development funds in 2008 to provide broadband services to the community of Woodfords, CA with GBIS as the service provider for deployment.

WPTI Telecomm
WPTI has applied for Rural Development funds to provide broadband service to the community of Markleeville, CA and is currently in the due diligence process with USDA.

Major Findings and Conclusions

The Central Sierra region faces many disadvantages inherent in its rugged terrain, large low income, senior and disabled populations and geographically dispersed residential areas. This translates into a hesitation on the part of service providers to deploy due to unsustainable ROI. The sparsely populated areas of the region have not attracted the same level of investment and innovation as urban areas of the state.

Lack of Investment
A regional strategy to maximize private sector return through broadband adoption on capital investment along with full advantage of ARRA opportunities can stimulate market solutions as a potential "Anchor Tenant" situation; i.e. California Teleheath Network, Mother Lode Broadband Project, Corporation for Education Network Initiatives in California (CENIC), Open Range to close coverage gaps. Additional leverage for closure of coverage gaps is continuing work on local public policy by creating an environment conducive to stimulating further private sector investment.

Pent-Up Demand

The top opportunity for broadband adoption is expanding access to broadband service. The demand is significant and broadband adoption is critical. Over 92% of survey respondents are willing to pay for DSL or enhanced high-speed Internet, yet almost 40% report that broadband is not available to their household.

Multiple Build-Out Barriers

Expensive backhaul; lack of access to potentially available "dark fiber;" California Environmental Quality Act (CEQA) review hurdles; and uneven right of way (ROW) requirements make deployment of broadband an unequal, burdensome, virtually insurmountable barrier for local companies wishing to expand their footprint. Local applicants to CASF and ARRA have been forced into "marriages of convenience" with each other to leverage existing infrastructure but also are creating unique regional solutions to avoid burdensome CEQA and ROW issues and bring in independent backhaul from major carriers. Further work with the Policy Group is recommended to ensure regional broadband policies are adopted.

Difficulty Aggregating Demand

Due to the competitive and proprietary nature of service provider data, the high expense of traditional data collection, and the challenges of explaining technology issues to a nontechnical population, the study turned to alternative methods for completing the project that may benefit future projects.

Key factors that contributed to project completion include:

- Strong leadership in building a large, broad-based community coalition to keep the public "fired up" and moving forward;
- Social media and social networking as a new tool and training mechanism to facilitate communication past traditional email, newsletters and phone conferences;
- Free and open source applications (FOSS) to keep down costs and open the process to as many non-technical people as possible; and
- Turning to the region itself as a reliable source of information, first with the demand survey as a part of the mapping process and culminating in the launch of a "Crowdsourcing" application that will track the location of the service, the price, the speed, and customer satisfaction with the service provided.

Outcomes and Next Steps

Community Participation and Coalition Building

Over 100 local participants worked together to keep the project moving forward. This same group of people is prepared to continue to work towards broadband deployment and adoption in the future.

Mother Lode Broadband Project (MLBBP)

With assistance and support from ATCAA CSC, the MLBBP (Mother Lode Internet of Sonora and partner Rapid Link of Sacramento) was awarded $2.9 million by CASF to help improve infrastructure to bring high-speed connectivity to unserved residents of Alpine, Amador, Calaveras, Mariposa and Tuolumne counties. A second multi-million dollar application for underserved communities is pending and expecting approval in the near future.

Regional Plans in Place

Working groups are in place to start 211 and regional telemedicine and are currently striving to find funding to continue the work.

USDA-RUS Community Connect Applications

Two applications were successfully submitted for communities in the region; one is currently in due diligence. Final notice for grant awards for USDA-RUS Community Connect is currently on hold due to ARRA applications but the community coalitions are still conducting letter writing campaigns and contacting local elected officials to bring attention back to the community applications as soon as possible.

ARRA Applications

ATCAA participated in the successful submission of CETF's ARRA application for $1.25 million for public computer centers and computer training for the CSC five-county region. The working group has two further applications to submit on subsequent ARRA funding rounds, depending on the outcome of the first round application. The grant application details plans and leadership for several key community programs as follow-on to the CETF project, keeping the adoption momentum alive.

Future Adoption Planning

The regional working group anticipates applying for funding for future deployment and adoption projects as funding becomes available, along with a regional 211 start-up. CSC grant awards from the California Consumer Protection Foundation (CCPF) and California Virtual Campus serve as a model for future adoption projects.

The Central Sierra Connect region is grateful to CETF for the grant and resources that made the project possible.

II. AGGREGATED DEMAND

A. Contract Requirements

Quantified and Qualified Prospective Demand that Can Be Aggregated

- Delineation by category or sector of prospective users for broadband service in the five-county region. This includes outreach to public agencies (i.e., law enforcement and public safety including prisons, emergency response and services, K-12 education, higher education and research, libraries, general government services from federal, state and local agencies, public health and medical care, and national and state parks) and key business sectors (at least the top ten employer groupings);
- Development of the interview or survey instrument(s) to be used to quantify and qualify prospective broadband users. The interview or survey instruments(s) will ascertain demand potential, broadband uses, speed of communications and affordability;
- Development of the process and format for tracking the demand potential by user category in order to quantify the potential aggregated demand by community and county;
- Identification of the specific personnel who will be involved in the interviews or surveys; and
- Description of the outreach and engagement plan directed to elected local, state and federal officials as well as civic leaders.

Demand Aggregation and Market Analysis Report: A summary of quantified and qualified prospective aggregated demand, which will include the following data and information:

- Prospective users of broadband service in the five-county region (by category or sector and location);
- Demand potential (by category or sector and location);
- Identification (and mapping) of served and unserved communities;
- Delineation of prospective broadband uses and applications;
- Speed of communications (existing and for prospective demand);
- Affordability for prospective demand (by category or sector and location);
- Survey instrument(s) and assessment of adequacy and recommendations for improvement in the future; and
- Outreach and engagement plan to inform prospective users of the results.

B. Project Area Profile

The counties of Alpine, Amador, Calaveras, Mariposa and Tuolumne are alike in geography, economy, population and demographics. Only two in five homes in the region have broadband access, and the population here reflects nearly every factor contributing to the Digital Divide - lower incomes, sparsely populated rural communities, mountainous terrain and a high percentage of elders.

All five counties face similar challenges inherent in delivering services to isolated communities with limited resources. With a combined population of 167,000 people, these five counties have fewer people than many California cities. Per capita income for all five counties averages $26,000/year, significantly less than the state average of $33,000. There are also several pockets of extreme poverty where per capita income averages less than

$16,000. The region has had a history of boom-and-bust cycles since the discovery of gold in 1849. As the lucrative timber and mining jobs have dried up, more residents are living on the edge, economically and socially. The regional ethnic composition is primarily Caucasian (ranging from 71-83%), with a steadily growing Hispanic population (average 7.7% and growing annually), a Mi-Wuk Native American population (average 6%), and a small number from other ethnic groups (Black 1.8%, Asian 2.7%, Native Hawaiian/Pacific Islander .2%, 2 or more races 3.1%). The Sierra Foothill mountain region has an older population than California residents as a whole (average 16.5% as compared to 10.8%). The number of disabled residents total 28,880, and represent .004% of disabled residents in California. The geographic area covered is immense; it covers some 6,122 square miles.

These communities are beautiful, appealing places to live - but difficult places to make a living. Wide access to broadband and emerging technology is an essential ingredient to change that and allow communities in the region to thrive.

C. Survey Results Summary

Every region has unique challenges for adoption of broadband, including cultural, social and geographic considerations. CSC surveyed a broad group of residents, businesses and youth to assess the issues, concerns and patterns of adoption using the metrics established by CETF: Access + Applications + Affordability + Accessibility + Assistance = Adoption. A large cross-section of the local population was sampled:

1. Random telephone surveying – based on a statistically significant sample population.
    a. Residential survey 396 respondents.
    b. Business survey 123 respondents.
2. Self-select survey - for residents with some business implications.
3. Business leadership interviews.
4. Community meetings for qualitative feedback.

The survey timeframe was from November 2008 until May 2009 and the surveyors were community volunteers.

This following section presents key findings and implications from the regional surveys.

1. Residential Demand Key Findings

Access: the top opportunity for broadband adoption in the region is having access to broadband service. The demand is significant and broadband adoption is critical. Over 92% of survey respondents are willing to pay for DSL or enhanced high-speed Internet, yet almost 40% report that broadband is not available to their household.

Accessibility: up to 6% of the population have challenges that make it difficult to use the Internet, though this number includes difficulty with walking or leaving home which could be improved if broadband was to be made available in the household.

Applications: up to 75% of respondents feel that certain broadband applications are important to their household.

Affordability: though it is difficult to assess affordability, a small portion of those surveyed, 6.7%, reported that broadband is too expensive.

Assistance: over 64% reported that they need little or no assistance to access the Internet.

Access is the key opportunity and challenge to broadband adoption for the CSC region.

2. Residential Demand Survey

The objective of the residential survey was to assess the potential demand for broadband in five Central Sierra Counties: Alpine, Amador, Calaveras, Mariposa and Tuolumne, using five metrics established by CETF. The survey also gathered demographic information to help facilitate analysis of the results.

The residential survey was completed from November 2008 until January 2009 based on a statistically significant random telephone sample of 396 responses. Survey methodology is detailed in the appendix.

a. Availability of Broadband Service (Unserved, Underserved)

Over 90% of respondents have landlines and 70% of the respondents have a cell phone calling plan yet only around 60% subscribe to Internet plans. Over 80% subscribe to paid television (satellite plus cable) which is also higher than Internet plans. The penetration of technologies such as VoIP, cell phone data plan and mobile broadband is very low, less than 10% for all of these types of technologies. Plans were not significantly skewed toward income or education levels.

Almost half of respondents do not have residential broadband and almost 40% report that broadband is not available for their household. 23% are still on dial-up, 15% have satellite Internet and over 10% have no Internet at home at all. 34% of respondents reported to have DSL, 8% have cable modem and almost 6% have wireless broadband. There is only an 8% gap between those who don't have broadband and those who can't have broadband due to availability. There is strong potential uptake rate for broadband.

With broadband rates at only about 40% in the region, residential broadband demand is a significant opportunity.

b. Current Service Satisfaction

To assess service satisfaction in the residential random telephone survey, the survey asked about any concerns or frustrations that current users face. The three key issues were:

1) Service is too slow when accessing large files;
2) Service has gaps in availability; and
3) Downloads are too slow.

These service issues are largely due to the fact that many Internet users in the region are limited to dial-up access, which is not fast enough or reliable enough for user satisfaction.

According to the additional self-select survey, the majority of cell phone and telephone users are satisfied with their service, but the majority of Internet users are not satisfied or are very dissatisfied with their service. This frustration is a key concern for the region.

c. Accessibility for People with Disabilities

The most significant challenge reported by respondents was difficulty with mobility (walking or leaving the home) at 5.8%, followed by difficulty typing at about 4%. Of those with mobility challenges, 30% don't have broadband available at home and most are over 45 years old. This group spends significantly more hours on the Internet (25-50 hours per week compared to the majority of 1-10 hours per week). If home broadband was available, those with mobility or other physical impairments might have adoption rates equal or better than average. For those in the region with physical challenges, broadband is a potential lifestyle opportunity or even necessity.

d. Willingness to Pay for Broadband Service

One of the key economic concerns for service providers in the region is the financial business case for infrastructure investment, including the willingness of the local population to pay for services.

Though the majority of respondents pay $11-29/month there is a huge spread in monthly plans. Some in this category report that they don't have access to broadband and others report that they do. Most of this group reports that their Internet is too slow. Many respondents who report paying over $75/month also report slow internet speeds and gaps in service. Though the majority pay $11-29/month, respondents are consistently willing to pay more than this ($20-$40) for broadband.

The chart below demonstrates that willingness to pay is not a top adoption concern for the region. Those in the high-income band are willing to pay for higher cost satellite services for example to get broadband speeds whereas the low-income group less willing, but even those in the low-income band are willing to pay for DSL at comparable price points, if broadband becomes available.

	Which of the following categories best describes your annual household income from all sources?			
	Low income	**Middle income**	**High income**	**Response Totals**
I don't have internet at home	20.7% (18)	6.9% (15)	12.0% (3)	10.9% (36)
Dial-up	26.4% (23)	21.2% (46)	12.0% (3)	21.9% (72)
ISDN	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Satellite internet	8.0% (7)	16.1% (35)	24.0% (6)	14.6% (48)
DSL	**32.2% (28)**	**38.2% (83)**	**28.0% (7)**	**35.9% (118)**
Cable TV modem	6.9% (6)	6.0% (13)	12.0% (3)	6.7% (22)
Wireless broadband (antenna)	0.0% (0)	8.3% (18)	12.0% (3)	6.4% (21)
Not sure / don't know	0.0% (0)	0.5% (1)	0.0% (0)	0.3% (1)
Other (specify below)	5.7% (5)	2.8% (6)	0.0% (0)	3.3% (11)
Other (please specify)	7 view	7 view	1 view	15
answered question	87	217	25	329

e. Assistance

About 64% of respondents do not need assistance accessing the Internet and 27% reported sometimes needing assistance. 2.5% reported needing a lot of assistance and the majority of these have accessibility challenges as mentioned above. The majority of those needing assistance are households with persons over 60 years old. Though about 6% of respondents reported wanted some kind of training or support, less than 1% were willing to pay for it.

f. Residential Demand Implications

Qualitative data from the survey shows a strong frustration in the region toward the lack of access to broadband. Respondents have remarked that the region is much too slow in implementing access to broadband. In addition, respondents have noted an inequality in access between neighboring areas within the community. Though some respondents were hopeful that this survey would help expand availability, more of the respondents simply wanted to know **when broadband would be available** since they were ready to subscribe.

As the region moves forward in local broadband efforts, providers will need to be very cognizant of the frustration the region shows regarding lack of access, and focus local communication on realistic plans for improving availability on a timely basis.

To note, this survey was done during a time period before the huge impact of the economic challenges were realized. Today, the region's attitude toward affordability or willingness to pay may have changed with increases in job loss. Additionally as the region redevelops jobs and job skills, the lack of broadband availability may become and even more severe barrier to adoption and economic recovery.

3. Workplace Demand Survey

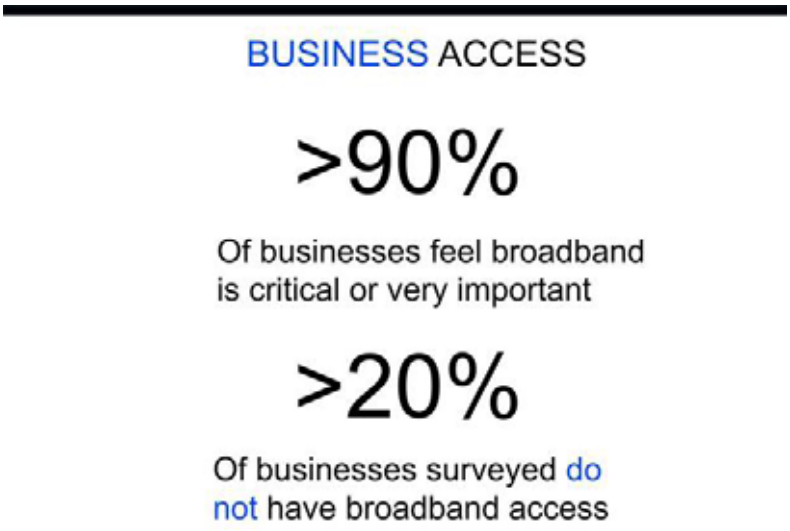
CSC made a pointed effort to engage with local businesses during the survey process. However, the business survey questions were fully leveraged from other CETF grantees. This allowed consistent comparisons of data from region to region.

The workplace survey was based on a random telephone survey sample of 123 respondents completed in the December 2008 through May 2009 timeframe.

The summary of results is attached in the appendix.

a. Availability of Service

Local businesses are still lacking broadband, with over 20% of reporting access through dial-up or ISDN service. Businesses surveyed feel that access is critically or very important to their success.



b. Current Satisfaction

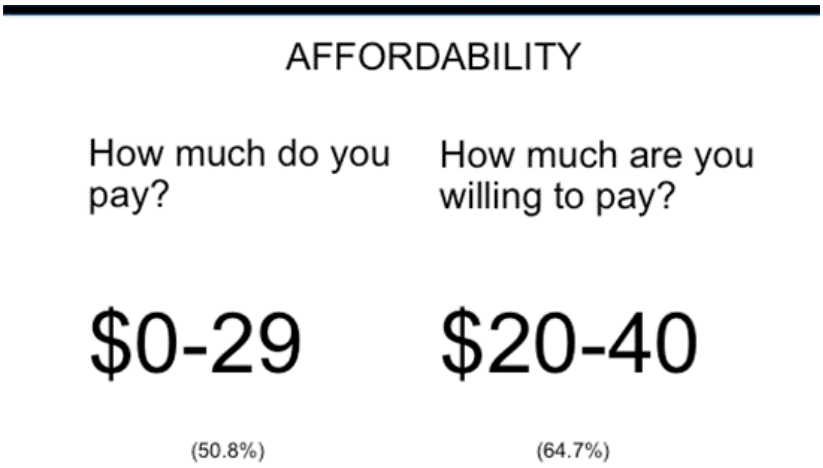
Most business respondents are satisfied with the service provided by their Internet service provider (ISP). However, greater than 20% are either unsatisfied or very unsatisfied with their service.

7. How satisfied are you with our business/workplace internet service provider (ISP)? (Check only one)

	Response Percent	Response Count
Very satisfied	5.0%	6
Satisfied	**47.1%**	**57**
Neither satisfied or unsatisfied (neutral)	26.4%	32
Unsatisfied	14.9%	18
Very unsatisfied	6.6%	8
Not sure/don't know	0.0%	0

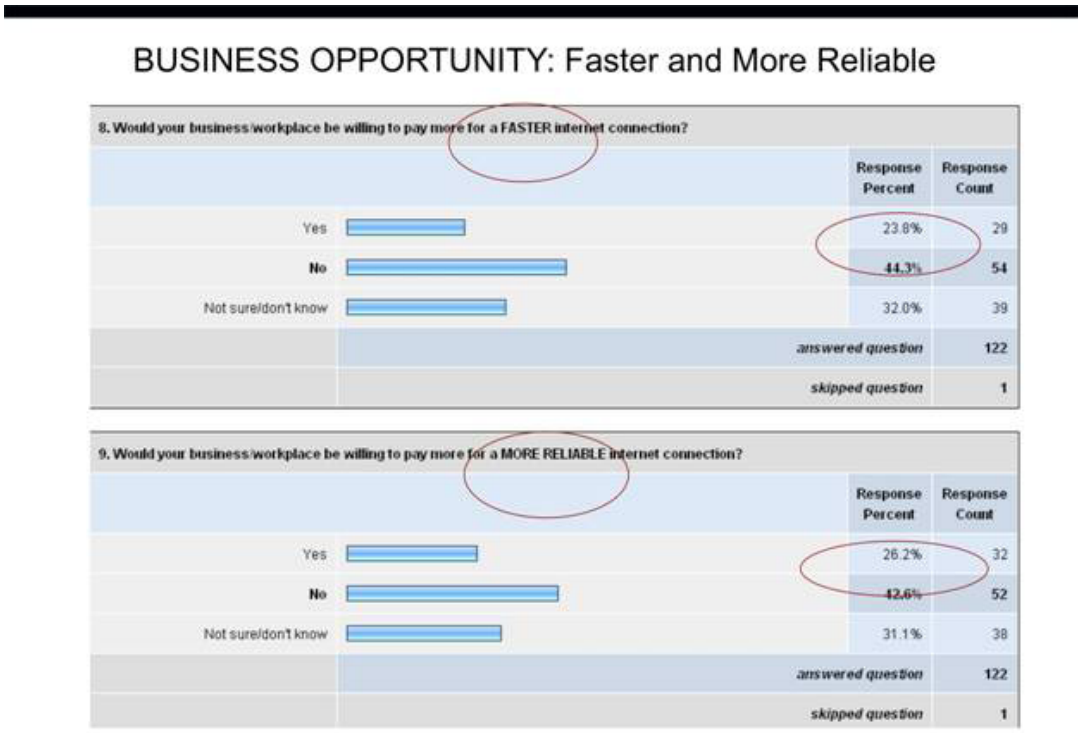
c. Willingness to Pay

The following image is an excellent representation of the business community's willingness to pay. Traditional market forces do not play here since there is a situation where people are willing to pay more for services than they are currently paying. This can be explained by the anomaly in the region of pent-up willingness to have broadband at seemingly more expensive rates than current, since broadband is presently unavailable and yet is critical to business.



d. Workplace Demand Implications

The key point for service providers in the region is to provide more reliable, faster service to local businesses at an affordable cost. Though this seems like a business basic, according to the survey results, the economics of affordability are not what one would find in a traditional supply-demand situation because regional businesses are suffering from lack of competitive broadband and a potential pent-up demand for high speed and reliability.



4. Youth Demand Survey

The key objective of the Tuolumne County youth survey was to assess the potential demand for broadband by youth in the Central Sierra, leveraging the five metrics used for the

residential and business survey and established by CETF. The survey was completed from April through September 2009 based on a sample of 106 youth responses.

Key findings: the most salient issue found in the youth broadband survey analysis is that broadband is not available to the majority of the youth respondents. 54.7% of respondents report that high-speed Internet is not available. The second, but largely less significant issue is that 21.3% report that high-speed Internet is too expensive.

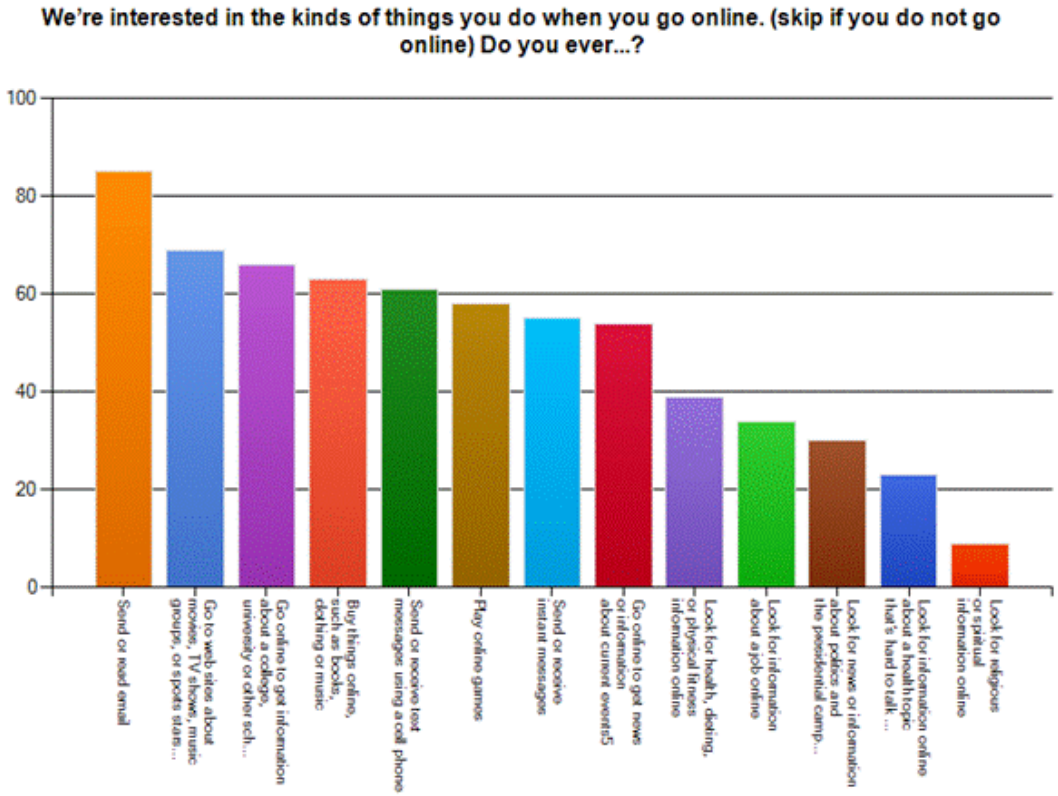
The survey respondents were in 9th through 12th grade, which represents ages around 14-17 years old. This survey population is a relatively technically savvy population, where 91.3% of the population claim that most people they know are connected online. Less than 3% reported needing much support to get on the Internet.

The majority of the respondents have been online for more than 3 years (71.8% of respondents) and almost 90% go online several times a week.

The respondents connect to the Internet using wireless devices (60%) and spend more time on cell phones than on traditional landlines.

a. Applications

Survey results show a high demand for all types of Internet applications, including those functional through dial-up as well as broadband applications. Email ranked the highest in terms of online applications. Local youth respondents are highly connected: email, text messaging and instant messaging are all communication activities performed by more than 50% of the respondents.



b. Youth Demand Implications

The survey results raise the following questions or ideas for further research:

- Are unconnected youth more likely to fall behind their peers academically and socially? And if so how much impact would this disability have on youth?
- This survey was limited to youth in 9-12th grade. How would results be different for younger respondents?
- How likely is it that the region's youth will leave their rural community to seek better access to broadband technologies? One of the concerns in the region is that the younger population will leave and not be able to return due in part to technological inequalities.

5. Overall Implications

Throughout the five-county region the theme is clear with both residents and businesses: There is an immediate need for affordable, fast, more reliable, and accessible broadband. Businesses are more willing to pay for better availability, but less willing to pay for assistance or support. Service providers have market opportunities in cell phone data plans, Voice over Internet Protocol (VoIP), mobile broadband, and hotspots.

CSC represents a RURAL, unserved and underserved community, where ACCESS is the first, but not the only challenge. The survey implies that accessibility is:

- NOT an income issue
- NOT a willingness to pay issue
- NOT age, race, education level issue

The five-county Central Sierra region is a rural unserved and underserved community, where access is the first, but not the only challenge. The survey shows that access is not an income, willingness to pay, age, race, or education level issue.

In summary, the survey results present an accurate snapshot of the region's broadband gaps and needs, and the region's frustration. It is a clear message to providers and community advocates that broadband availability is needed now, as illustrated in the tag cloud below.

III. SUPPLY INFRASTRUCTURE

A. Pre-Project Status

Preliminary Infrastructure Mapping List	
Roads	Antenna
Parcel data	Radio
Land Cover	Cell towers
Population	CDF towers
Demographics	Public safety/emergency services towers
Land use	Fiber routes
Schools/Hospitals	Territories and switches
Community Service Districts	Power grid info
Fire districts	

B. Providers

Broadband Wireline Provider (ISP)	Wireless Providers (WISP)	Satellite Providers	Dial-up
ATT	Clearwire	Earthlink	Big Valley
Calaveras Telephone	Mother Lode Internet (future plans)	Hughes.net	Central House
Comcast	Rapid Link	Starband	Earth Link
Goldrush	Sonnet	Wild Blue/Dish	Frontier
Hub3	ThrockWISP		Frys.com
Markleenet	REMNet		Great Basin
Mother Lode Internet	hStar.net		Inreach.com
Sierra Telephone	BitsStar		MSN
Sonnet			People PC
Verizon			Sonnet
Volcano Communications			lakedonpedro.net

C. First Mile Rating and Ranking

The CSC project is utilizing the Geographic Information System (GIS) layers compiled for the five-county region for First Mile rating and ranking. The analysis to date has not been completed as some GIS layers are nearing review and completion, as well as possible enhancement with future public input regarding the current coverage.

1. Broadband Service Providers

The service providers within the study area are fairly limited, though many service territories have not been mapped accurately. Service provider data will also be derived from the CSC residential and business surveys, as some ISPs have not made their territories available to CSC. There are also challenges in accurately mapping the WISPs in the region due to the varying terrain and lack of information provided to the CSC. Satellite broadband will not be included in the analysis per the First Mile recommendations: "We do not advocate counting satellite broadband as part of the deployed service base in our measurement criteria" (1). The number of service providers ranking method will be

compiled in a GIS layer which will be used to overlay with other factors (pricing, coverage, speed and backhaul).

Examples of ISPs from the surveys can be seen in Figures 3.D.1A.

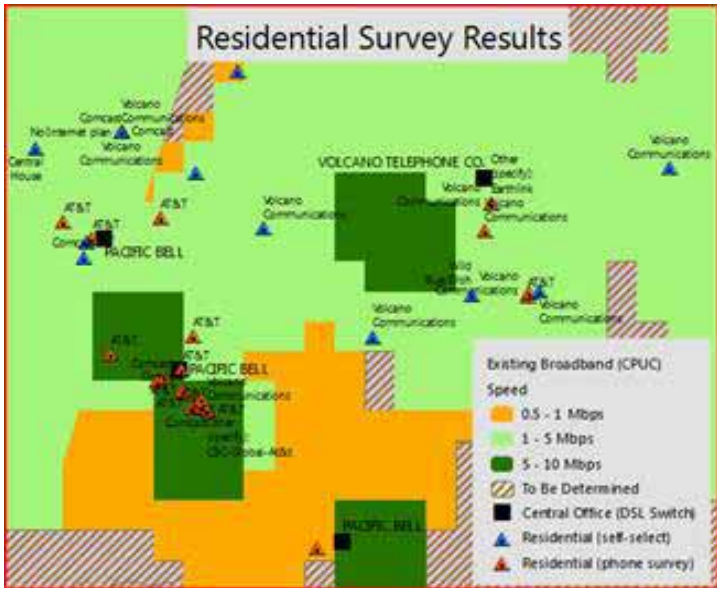


Figure 3.D.1A – Residential survey results

2. Price

Pricing has also been compiling from both the residential and business surveys and will be enhanced by additional public input. Based on available information, the comparison pricing method will be utilized with the urban area of Los Angeles. These results will also be mapped in a separate layer and overlaid with the other factors.

3. Coverage

Broadband coverage within the territories will be derived from current survey data and enhanced by the future public input phase (crowdsourcing). The only current coverage layer CSC has obtained is from the California Public Utilities Commission (CPUC) and is not classified to correspond to the First Mile ranking specifications (768K up or down). In the existing CSC database there is data about business and residents served by central office (CO) which can help identify broadband penetration.

4. Highest Upload / Download Speed

The basis of analyzing highest upload and download speed will be the CPUC GIS layer of existing broadband but it will also be possible to classify the survey results to enhance this data layer for more accurate ranking. There have been a few discrepancies already noted with the CPUC layer, with central office locations and estimated broadband speed.

5. Backhaul / Middle Mile Availability

This will be the most challenging factor to map due to the lack of availability of this information.

The CENIC backhaul information will serve as the basis of the analysis, in addition to existing survey results and the future crowdsourcing survey.

6. Summary of Broadband Supply

The final ranking will be attempted at the census block level which is the most accurate and available information CSC has been able to develop. All uninhabited areas within public lands will automatically receive a ranking of 0. This method will help isolate uninhabited areas versus unserved/underserved areas with potential consumers.

D. Crowdsourcing Map of Local Broadband Coverage

1. Methodology

The methodology to be used for the crowdsourcing map is to gather as much public input of available broadband coverage of the local region as possible. The biggest challenge faced in this project was gathering accurate broadband speed data from local ISPs. Upon deployment of the application, residents and businesses within the local region and input their location, broadband speed, ISP and service satisfaction.

2. Providers, Coverage, Satisfaction

The residential and business surveys were mapped (if locational information was provided) and analysis of coverage, satisfaction and other demographic information can be derived from this data. The crowdsourcing input will enhance the analysis allowing the creation of a more accurate broadband speed boundary.

3. Analysis and Implications

Initial results have shown that the CPUC boundary of broadband speed and the "underserved" population are not accurately placed and it is possible to better identify those in the five-county region who need broadband access.

A Comprehensive Determination of Broadband Deployment to Designate Unserved and Underserved Communities Using Fact-based Measurement Criteria is needed.

IV. PUBLIC POLICY AND PROCEDURES

An online Google Group comprised of one member of each County Administrator or designee and one member of the Board of Supervisors as available, plus representatives of local ISPs, utility districts, tribes and other interested parties was formed to review and address local broadband policy issues.

Each county submitted any relevant ordinance regarding broadband, wireless and/or telecommunications and the items were uploaded to the Google Group files section. The group reviewed the ordinances that were available. The group also spent time attempting to identify and review existing or potential state and federal policies that could either hinder or facilitate broadband deployment and implementation of the preferred scenario.

One comment was that CEQA created undue burdens on local service providers but there was no specific recommendation on this other than a call for a review of CEQA.

CETF passed on Broadband Example Policies Project - Request for Input from Local and Regional Officials and Summary of Example Policies and Ordinances from California Local Governments - Working Draft - Work in Progress May 2009 for policy group review. The group reviewed the documents online and was given copies to serve as a resource for public officials and policymakers in formulating policies for their own jurisdictions. Input was solicited from the ISPs regarding the documents.

The Policy Group made no recommendations for a common set of ordinances or recommendations for appropriate legislative action. The group stated they were not averse to doing so at a future date.

Conclusions, recommendations, and lessons learned: this issue was considered to be a low priority by the group. This group was almost entirely comprised of conservative rural county residents who stated a general belief that deployment was a function of the market and private enterprise, not necessarily the local government beyond support and encouragement. Local ISPs expressed fears that further regulation would be costly and burdensome, stalling deployment. The group seemed to be hesitant to add additional requirements or burdens on local businesses but did promise to take the materials back to their respective jurisdictions for further review. It would be beneficial to have a local representative for the ATCAA CSC project continue to work on local policy issues. An energetic person spearheading the group would move the issue further given sufficient time.

A. Existing (.pdf format)

- Amador County Wireless Ordinance (http://centralsierraconnect.org/finalreport/amc-ordinance.pdf)
- Tuolumne County Wireless Ordinance (http://centralsierraconnect.org/finalreport/tc-ordinance.pdf)

B. Proposed (.pdf format)

- Calaveras County Proposed Policy (external link, broadband mentioned on page 20) (http://

- www.calaverascap.com/docs/GP_Issues-Opportunities_080805bd.pdf)
- Example 1 (http://centralsierraconnect.org/finalreport/broadband-example-policy01.pdf)
- Example 2 (http://centralsierraconnect.org/finalreport/broadband-example-policy.pdf)

V. OUTREACH AND ENGAGEMENT

A. Community Forums

Engagement with the community was a key objective of the project for awareness and relationship building. The themes presented included economic and job development, wages, telehealth, community access, computer education and refurbishment and social networking.

The Central Sierra Connect team held community forums, and also participated in other forums in the region. One example discussion was the presentation to the Calaveras County Economic Summit in the fall of 2009. This summit is one of the most significant business gatherings of its kind in the county. Partnering with one local ISPs, CSC showed the potential of broadband, gave an update on the project and offered ideas for adopting broadband applications in the workplace. Motherlode Internet talked about the CASF grant and shared information on the broadband infrastructure deployment plans. A press release for the event is located online here:

http://www.calaverasenterprise.com/articles/2009/10/20/news/news01_summit.txt

B. Meetings with Local Elected Officials

ATCAA CSC staff met with members of regional legislative offices over the course of the project. At these meetings, held either in-person or over the telephone, the officials were provided with materials from CETF as well as a one-page summary of the whole project. Handouts provided: drafts of regional shove-ready projects, Stimulus recommendations, CETF Approach to Federal Funding, CETF Strategic Partners and ARRA.

Meetings:

- April 6, 2009 Congressman Dan Lundgren's office with Eric Shippam of the MLBBP; met his Chief of Staff and presented handouts, gave project update;
- April 23, 2009 14th District CA State Senator Dave Cogdill's office; met with the State Senator in person, presented handouts and gave project update;
- April 27, 2009 Congressman Radanovich's staff via telephone; emailed all handouts and gave project update;
- May 22, 2009 25th District CA State Assemblyman Tom Berryhill's office via telephone; emailed all handouts and gave project update;
- May 22, 2009 10th District CA State Assemblywoman Alyson Huber's office via telephone; emailed all handouts and gave project update; and
- May 22, 2009 1st District CA State Senator Dave Cox's office via telephone; emailed all handouts and gave project update.

CSC kept in touch with the officials' staffers via email and contacted them as needed for project updates.

Weekly regional conference calls were established on Friday at 10 AM for all five-county members of the Board of Supervisors and County Administrators to keep them up-to-date with project developments.

C. 211 Development

In an effort to bring 211 to the Central Sierra region, planning and preparation has begun to build a strong collaborative committed to a unified Information and Referral program. Staff attended both the California 211 conference as well as the Alliance of Information and Referral Systems (AIRS) National Conference. CSC has received the 211 Toolkit, which will familiarize the team with the process of forming a 211. In addition, key stakeholders have been identified to determine which of these partners are in favor of forming a 211 and which need more information, started to develop a needs assessment and are researching funding opportunities.

D. Telemedicine Development

California Telehealth Network (CTN) is a project parallel to CETF and brought to the attention of CETF as a result of the broadband imitative and studies.
Objectives:

- Connect more than 300 rural sites with each other, and with a network of specialty providers at academic medical centers.
- Improve access within rural and underserved areas to high quality, collaborative health services.
- Provide state-of-the art technology and security; high levels of reliability, scalability and flexibility; and improved telecommunications quality for rural health providers.

All five CSC counties have medical facilities that would benefit from the CTN funding, bringing Telehealth to these rural communities. Faced with isolation and the lack of psychologists, the region does not have ready access to this type of medical care.

Bringing broadband to the area will help facilitate that access.

- The Telehealth Network will create new telecommunications infrastructure, eventually allowing California's rural communities to access a broad range of technology-enhanced services to improve the quality of health care.
- Strong emphasis will be placed on infrastructure development, telecommunications quality and technical support.
- The network will also be developed for use as a resource for emergency services and disaster preparedness. Given the location and propensity to be affected by wildland fires, a comprehensive readiness for disasters of this type is critically needed.

The CTN project, spearheaded by University of California, Davis, sent out a request for Letters of Agency from interested medical facilities. All the medical facilities in the five-county region that would meet the criteria and some that CTN did not identify but would be beneficial to the region, were contacted and encouraged to participate. As a result 36 medical facilities in the Central Sierra Connect Region were deemed eligible for participation in this Rural Health Care Pilot Program that will support the connection of more than 6,000 public and non-profit health care providers nationwide to telehealth networks to improve patient care.

Identified facilities include four major hospitals; three County Behavioral Health Departments; MACT Health Board in four counties; Indian health dental clinic, in addition to various outlying clinic locations.

Future broadband access will provide residents in rural locations better quality of care. Home health care workers will be connected remotely with specialists. The ability to utilize a combination of images from digital cameras, video phone encounters, and access to electronic health records will improve care for home-bound isolated community members and will provide for a better overall well being for the region.

E. Neighborhood Information Centers

ATCAA has a 26 year history of serving families and individuals in the region with the mission to create opportunities for low-income residents to help themselves economically and to become active and contributing members of the community. ATCAA has innovative programs that have addressed the Digital Divide in the region: ATCAA InfoNet is a model community information-and-referral project that improves access to community services via a five-county interactive community website and 21 independent public access terminals at Neighborhood Information Centers (NICs) which provide free Internet access. These centers are located in libraries and community-based organizations, local homeless and domestic violence shelters, Community Centers, Family Learning Centers and Job Connection sites. The website has a combined total of 1200 health and human service agency/program/healthcare listings made up of non-profit and public service organizations and local healthcare providers. The NICs provide trained staff and equipment to assist residents in accessing online detailed information about local services. In addition, the InfoNet websites position the region for the statewide implementation of 211 by developing a comprehensive database component necessary for implementation of a regional 211 center. ATCAA's regional system of five Family Learning Centers over three counties serve some of the region's most extreme pockets of poverty and provide family services including computer literacy and computer labs for job training, free Internet access, educational opportunities and seeking out services to move families towards self-sufficiency.

ATCAA CSC was awarded a grant for $40,000 by the California Consumer Protection Foundation (CCPF) to assist with meeting CETF project.

Goal 2, Objective A: Regional 211/ Information and Referral database;
Goal 3, Objective A: Establish two new Neighborhood Information Centers in Mariposa and Alpine Counties;
Goal 3, Objective B: Expand/enhance/add NICs in Amador, Calaveras and Tuolumne counties; and
Goal 3, Objective C: Develop public-private partnerships for donated funds and equipment with technology providers and local business to help close Digital Divide.

The InfoNet website http://infonettc.org was successfully rebuilt and re-launched with the addition of Alpine and Mariposa county information and the database was cleaned up and realigned with 211 taxonomy in preparation for a potential 211 application to the CPUC.

Three new NICs were established: one at the Markleeville Library in Alpine County, one at the Lodge in Bear Valley, Alpine County and one at Mariposa Safe Families in Mariposa County. Three NICs were refurbished: one at Summerville Community Center, one at the Jamestown Family Resource Center in Tuolumne County and one at the Camanche Lake Community Center in Amador County. A plan was developed with the assistance of Mary Sawicki, Director of Calaveras Works and Human Services to receive pass-throughs of county equipment from various local governmental agencies to ATCAA for redistribution, pending receipt of ARRA or other grant funds.

F. ARRA Public Computer Center Grant Application

ATCAA Central Sierra Connect had the privilege of participating in the California Emerging Technology Fund's $7 million ARRA Public Computer Center Application. The application is still pending as of the time of this report.

Central Sierra Connect formed to address a common lack of technology resources in the rural, remote five-county region. More than 50 local public, private and government partners have teamed up with ATCAA CSC on this effort. The ATCAA Central Sierra Connect Rural Access Model provides greater access to technology-based cultural, health and human services and connectivity in isolated outlying communities distinguished by a high level of low-income and a low level of technical skills.

This project will increasingly meet current basic survival and quality of life needs and will lay the foundation for future communication and economic well-being. A trilogy of infrastructures - emerging wireless (wireless) technology, a regional Information and Referral (I&R) network of computer labs with digitally literate staff and volunteers, and skills training for service providers and residents - is the backbone for progress in an isolated environment.

CSC's continuing strategy is:

- Upgrade and expand the existing network of drop-in Neighborhood Information Centers through creation of dedicated computer labs in both outlying communities and high-traffic agencies that target unserved and underserved populations to provide improved access to computers and the Internet.
- Expand trained staff and volunteers who provide outreach and teach technology skills.
- Provide computer literacy training including Internet skills, basic computer instruction, youth-focused digital life skills, certification in applications in demand by local employers, and internships in partnership with the local Workforce Development Board.
- Bring in public and private partners to strengthen local web content as well as establish programs for low and no-cost equipment, broadband service and technical support.

Each county will have stronger public-private partnerships, heightened regional interest and access in technology, broadband and the Internet, current and complete information on needs, options and costs for broadband service and training, and a prioritized course of action to make dramatic strides to close the rural "Digital Divide." Residents in all parts of the rural region will have comprehensive access to affordable broadband technology and support services, so that they can be prepared to make full use of emerging technology in all aspects of their lives to connect, communicate and compete.

Work Plan:

- Select five centers for expanded computer labs.
- Purchase computers and peripherals for five computer labs.
- Purchase tracking software.
- Purchase certification courses.
- Hire center coordinators.
- Develop training plans for community-based organization (CBO) staff.
- Recruit and train 200 CBO staff for job creation/retention.
- Recruit and train 50 interns through MLJT and other agencies.
- Increase positions retained in CBOs by 40%.
- Increase technology adopters at CBOs by 25%.

- Develop and implement broadband training public awareness campaign.
- Recruit and train 500 adults in certified course.
- Recruit and train 500 adults in increased computer proficiency.
- Develop youth "digital life skills" curriculum.
- Train 250 youth in digital life skills.
- Conduct surveys and self assessment.
- Create agreements with ISPs and provide low cost BB to targeted residents.
- Track adoption in targeted population with ISP assistance.
- Develop and implement broadband availability public awareness campaign.
- Distribute 500 computers to low-income households over the five-county region.
- Increase the number of targeted regional residents adopting technology by 25%.
- Increase connectivity of targeted regional low-income users by 10%.
- Recruit local tech group to provide low cost tech support.
- Provide ongoing tech support for distributed computers.

Jobs Created:

- 100 low wage earners placed.
- 100 internships.
- 10 full-time equivalent (FTE) CBO positions.
- 40% increase in CBO positions retained.

Outcomes:

- 1000 Low-income persons trained for living wage jobs in the digital workforce.
- 100 Low-income persons placed into, full-time, living wage jobs in the digital workforce.
- Create 10 FTE jobs and train 100 CBO staffers in community-based organizations enabling digital literacy.
- 40 % increase in retained jobs in community-based organizations enabling digital literacy.
- 25% increase in technology adopters at CBO's.
- 100 interns trained for jobs in low-income communities.
- 500 Low-income youth gain digital literacy.
- 500 Low-income adults gain digital literacy.
- 500 computers distributed.
- 25 % increase in low-income households utilizing broadband services and adopting technology.
- 10% increase in low-income households with high-speed connectivity.

G. California Virtual Campus Grant Applications

Currently Amador County has limited access to traditional brick and mortar establishments for higher learning. Distance learning opportunities are ideal, but because access to highspeed Internet options are scarce, satellite learning sites are an ideal option to provide learning opportunities to the population.

The first of these "satellites" will be the Camanche Lake Community Center (CLCC). Through a T1 connection provided by a grant award from California Virtual Campus, the Center will be able to provide the facilities for community members to access online learning options, as well as the education, assistance and counseling necessary to give local students every opportunity for success, whatever their goals. CLCC will also be partnering with the ATCAA Ione Family Learning Center (IFLC), to connect with the Hispanic population. IFLC provides English language instruction, GED preparation, citizenship classes, job skills, parenting, early childhood education and interactive literacy activities in Amador County. Through this

partnership the Center will engage English Language Learners to provide computer literacy courses as well as access to the USA Learns! program, which would give these community members the tools to improve their English skills while increasing their comfort level with the computer and the Internet, increasing broadband adoption.

CLCC also intends to work with Cosumnes River College (CRC) to provide instruction to those students ready to take advantage of online and distance learning in how to use the online services offered by the college. They will learn how to communicate with instructors and classmates through CRC's i-mail system, how to enroll and pay for their classes through e-services and how to use the online learning systems used by the college.

Through these strategies, the Center will help increase student readiness and success, as well as build the skills necessary to become a part of a talented and skilled workforce.

H. USDA-RUS Community Connect Grant Applications

The CSC team partnered with two ISPs and two local key stakeholders in two separate counties to apply for USDA Community Connect grants for their counties.

Markleeville, Alpine County

CSC worked with Rita Lovell of the Alpine County Library and Bruce Komito of WPTI Telecomm to apply for a CC grant to establish broadband service and a community center at the Library for Markleeville, CA. The Markleeville Rural Internet Access Project, proposed by a community partnership of public and private businesses, agencies and community groups, seeks to provide critical broadband access, technology services and upgrades to the library community center in the remote, unserved community of Markleeville in Alpine County.

Markleeville, the county seat and home to nearby Grover Hotsprings State Park, currently has no broadband access for its year-round residents or the thousands of visitors to the region, and is about to lose its only library to budget cuts.

Located between Lake Tahoe and Yosemite National Park, Alpine County is a remote rural, mountainous area of the Sierra Nevada in central eastern California. Alpine County borders five other rural counties - Eldorado, Amador, Calaveras, Tuolumne, and Mono - and includes portions of three national forests, two national wilderness areas and a state park (Humboldt-Toiyabe, Stanislaus, and Eldorado National Forests, the Mokelumne and Carson-Iceberg Wildernesses and Grover Hot Springs State Park). Alpine County consists of approximately 465,00 acres over 730 square miles, with less than two residents per square mile. Most of the county's 1,200 permanent residents are concentrated in the remote mountain communities of Markleeville, Woodfords, Bear Valley and Kirkwood. Only one highway serves Markleeville year-round, as two of the three major highways in Alpine County, Highways 4 and 88, close in the winter for as long as six months, and are only passable by snowmobile. The elevation in Alpine County ranges from 4,800 to over 11,400 feet above sea level.

WPTI Telecom LLC (WPTI), a provider of broadband network and telecommunications services, will serve the Markleeville community. The company focuses on specialized connectivity and Internet Technologies, including DSL, Wireless, Virtual Private Networks (VPN's), VoIP and the latest Web technologies. WPTI's network services provide cost effective solutions to ISPs and large end-users in the Western United States. WPTI has been granted a Certificate of Public Convenience and Necessity to operate as a Competitive Local Exchange Carrier (CLEC) in the state of Nevada and is providing dedicated digital telephone services in Nevada and California.

Goals of the project:

- To save and upgrade an important community center and library which would otherwise be diminished because of budget constraints in the current economic downturn.
- To provide long-awaited high-speed Internet access to the region, which currently has only dial-up service.
- To provide knowledge and technology skills to community members so they can take advantage of online learning, information and opportunities.

The application is currently in due diligence with USDA.

Greeley Hill, Mariposa County

CSC worked with Ken Pulvino of Birder's Homestead and Matt Ashe of BitsStar to apply for a Community Connect grant to establish broadband service and expand an existing community center into a public computer lab in Greeley Hill, CA. Greeley Hill, is a remote, rural community located in the Sierra Foothills of California. The terrain surrounding the Community Center (~ 3,100 ft. elevation) is mountainous with a widely dispersed population spread throughout the hills surrounding the small group of homes and businesses comprising the Rand McNally estimated population of 350. The Greeley Hill community does not have a broadband Internet service capability at this time and has a history of suffering from widespread, chronic poverty level conditions with high unemployment and fixed income senior citizens. The project is needed to create an opportunity for residents to participate more fully in the marketplace of modern America and the world as a means of reducing the harsh economic conditions that have plagued this area.

The goals of the project are centered on using broadband web access availability as a means of empowering residents to be the drivers in improving all aspects of the health of the region. In addition to the enriching effect that affordable, high speed web access can have on the personal and social aspects of residents' lives, the following key areas of shared regional benefits will clearly be the focus with the arrival of this proposed broadband system.

- Career opportunities will be expanded tremendously for families who seek jobs as virtual or telecommuting employees of companies recruiting from other parts of the state and country.
- Local business owners and residents who wish to start a business will no longer be forced to compete from the disadvantaged position of not having competitive access to the World Wide Web both in terms of marketing their products and services as well as interacting with market opportunities.
- Job training and skill development will be enhanced with the provision of access points at the Community Center where students and graduates can add new and sought after skills for obtaining employment via e-learning options.
- Senior citizens will have much improved communication and awareness of current government and private offerings to serve their needs.
- Young job seekers will have a better view of what positions are available via websites and how to compete for those positions.
- Telemedicine will be a more accessible option for health professionals at the clinic and in other emergency services.
- Police and public safety can respond more quickly to quickly developing needs as they arise in the Greeley Hill area.
- Local students will be much better prepared to meet the requirements of their curriculum both at the local elementary school and in the large percentage of families where the children are home schooled.

- Remote E-government participation in the deliberations and county sessions that have a direct impact on the quality of life in Greeley Hill will be possible in conjunction with streaming video from the Board of Supervisors' meeting hall.
- There will be a direct financial benefit to residents and to the county with the replacement of costly ISDN services to current critical services locations. The county budget is already facing financial gaps between revenues and expenses that this affordable service will help to alleviate.

This application is also currently in due diligence.

Mi-Wuk Library

Due to budgetary constraints, one of the county branch libraries has been temporarily closed. A taskforce was developed to investigate the possibility of keeping the library open part-time by applying for USDA-RUS community center funding. CSC created a grant application to renovate the library building for community Internet access in the library building, thereby providing Internet to the community and saving the library from full closure. Unfortunately this grant application did not progress due to the constraints that the service provider would have in taking on responsibility for building infrastructure costs. But the grant application did rally the community and the ISP to creatively generate infrastructure solutions.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Pent-Up Demand

During the timeframe of the CETF project guidelines were released for grants from CASF, USDARUS and ARRA. These grants are an excellent opportunity for local ISPs to secure critical funding. With the help of CETF, CSC invested resources educating ISPs and giving them support for applications.

The ISPs will be accountable to the grantees for further follow-up. They ISPs are also now taking leadership for communication of broadband expansion. As deployment progresses and service providers extend their networks, these commercial business communications will be outside of the scope of the community project.

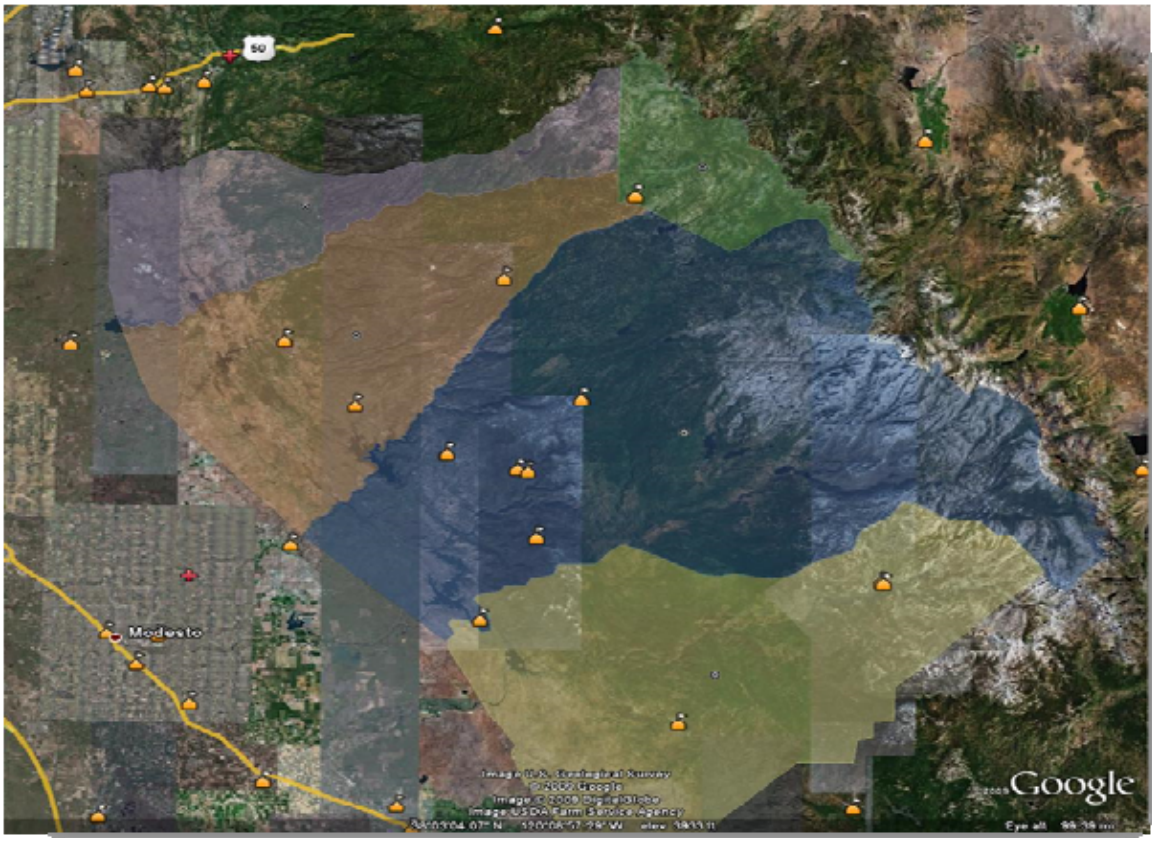
B. Multiple Build-Out Barriers

In the CSC five-county region, local communities suffer from lack of broadband availability. As already mentioned several times in this report, the key issue for adoption/penetration is to have affordable backhaul in the area. In the view of the region CSC has taken too long and/or has failed to deliver access in a timely and affordable manner. The region is somewhat frustrated and weary, and does not want to hear something which could be perceived as a false promise. Once deployment is planned and on course it will be possible to continue to outreach into the community for greater penetration and adoption.

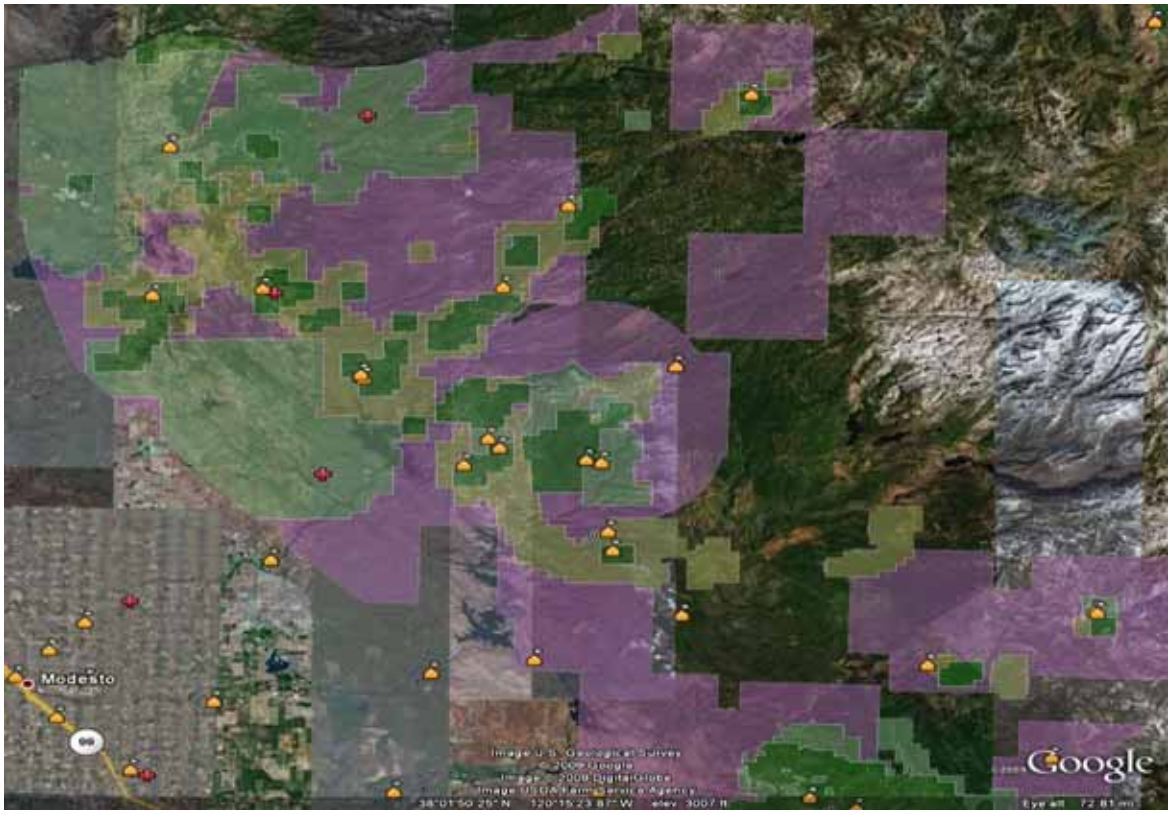
C. Mapping Engine

All data compiled by CSC that is not subject to confidentially issues will be available to the public through an interactive web-map utilizing an open source GIS server, greatly reducing the cost of implementation. The interactive mapping interface and links to downloads of GIS layers will be maintained by ATCAA for a limited time. The data format for the GIS downloads will be in both ESRI shapefile format and Google Earth KMZ.

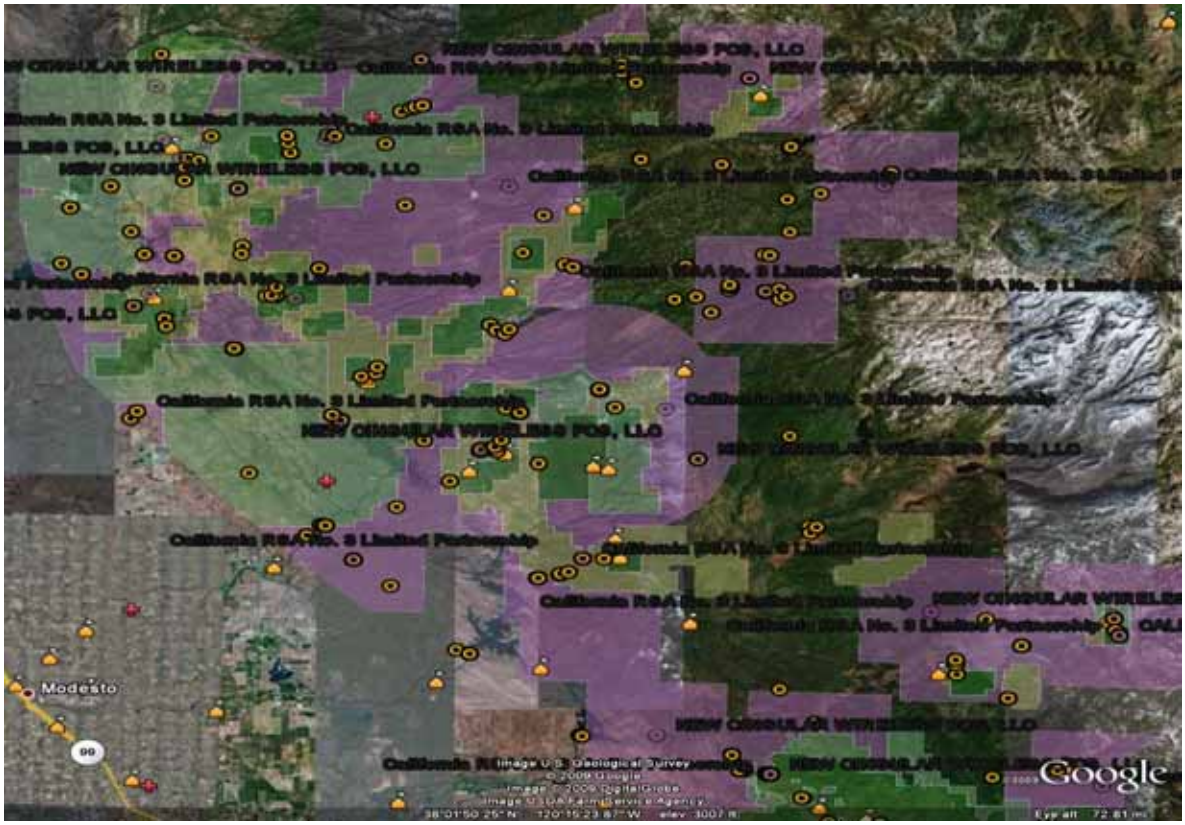
CSC Data Elements: Last update 10/9/09			
Data Elements	**Source**	**Scale**	**Notes**
Antenna	FCC, Counties	~ 100ft	Use may be limited
Business Survey	CSC	Approx Street Address	Business locations, ISP provider and customer satisfaction.
CDF towers	CDF	~100ft	Potential future tower locations, use for future BB planning
Cell towers	FCC, Counties	~100ft	May need verification of owner (if possible)
CENIC Backhaul	CENIC	Unknown	Help with identifying middle mile and served areas
Central Offices	Various	Street Address	Also contains businesses served, residents served, address. Can also derive a buffer around each active Central Office to determine preliminary footprint.
Demographics	US Census, Geolytics	Census Block	2009/2014 estimated demographics
Existing Broadband Coverage	CPUC	CBG?	Needs refinement, has some data shift and does not correspond with central office
Fiber routes	CENIC	Unknown	
Hospitals	Various	Approx Street Address	Data needs verification and categorization of type of medical facility.
Land Cover	USGS		Need to define what to analyze from Landcover (public lands, populated areas)
Land use	Counties		Not using for analysis at this time
LATA Boundaries	CENIC		For reference purpose
Parcel data	All Counties if available	Parcel/Street Address	Mariposa may not exist, will only get APN, not owners,
Population	Geolytics	Census Block	
Power grid info	PGE	Unknown	Not pursing the power grid from PGE at this time
Public safety/emergency services towers	FCC, Counties	~100 ft	Potentially use for wireless analysis.
Radio	Unknown	FCC	
Residential Self Select	CSC	Approx Street Address	Mapping of the survey results, will help with First Mile Determination
Residential Phone Survey	CSC	Approx Street Address	Mapping of the survey results, will help with First Mile Determination
Roads	Amador, Calaveras, Tuolumne, ESRI	Streetmap	Mariposa may have gaps, use basemap from Web applications except for arterials data for routing
Schools	Various	Approx Street Address	Some schools were missing from DB
Telco Territories	Various	County	May not be able to publish
Unserved Communities	Geonames/CPUC	Town	Based on information from the BB taskforce
Unserved/Underserved	Various	CBG and Blocks	Areas considered to be underserved/unserved based on information provided by the BB taskforce
Water Towers	TUD, CCWD, Amador Water		Potential future tower locations, not really relevant



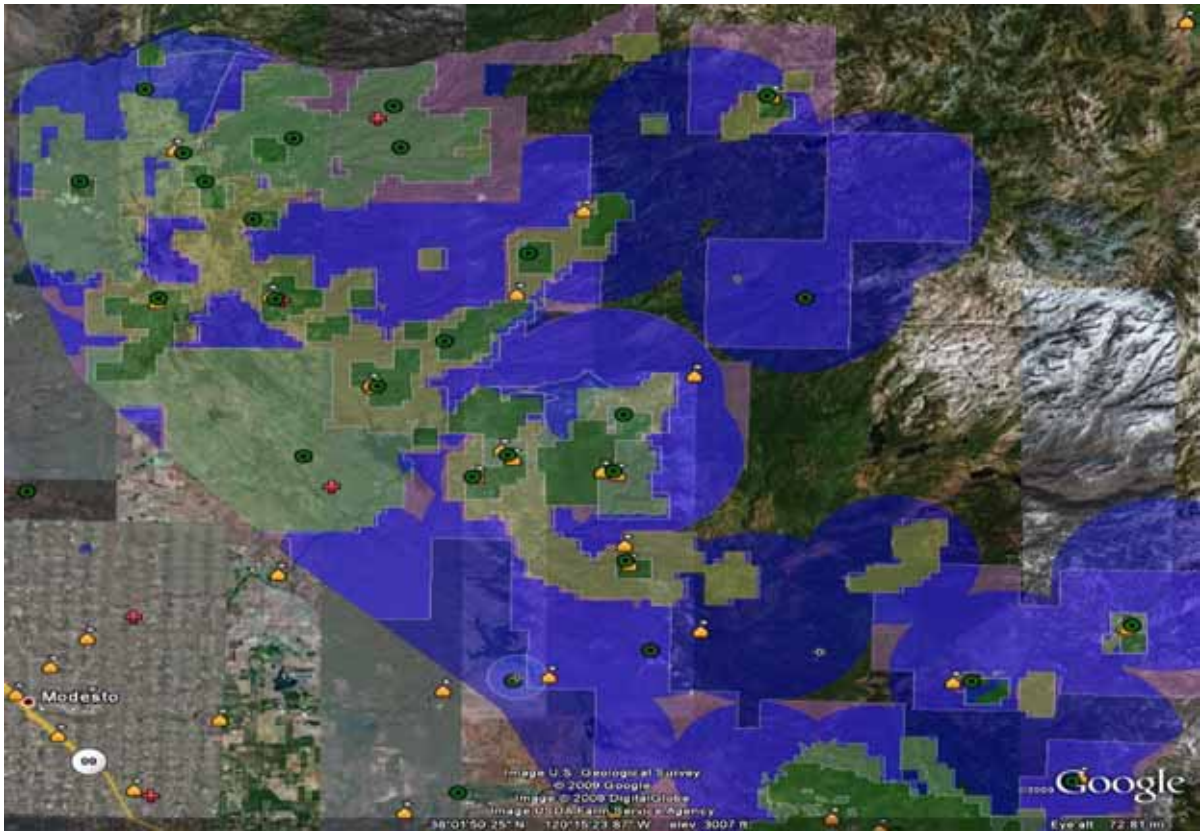
Central Sierra Connect Study Area



Existing Broadband Coverage



Existing Broadband w/ Cell Towers & Microwave Towers



Existing Broadband & Approved Broadband Projects w/ Central Offices

VII. LESSONS LEARNED

A. Survey

Telephone surveying

- The survey was a great way to engage the region. Some respondents asked if they could help out or continue to get further information. Some respondents asked if they could donate to the cause.
- There has been a lot of frustration in the region and the surveyors had to deal with respondents who were angry about the situation and wanted to express their frustration to the surveyor. Since the survey was random, the surveyors did not have a specific info/frequently asked questions sheet to manage this.
- Surveyors were community volunteers, not professionally trained surveyors. Though this could have been a concern, the phone surveyors were actually perceived positively since they were part of the community.
- The data cleansing was quite a tedious process, particularly for the data input and cleaning of the open-ended questions. This would have been improved by professional surveyors or additional training/testing before and during the surveying.
- The survey was biased toward those who had telephones which may have missed some of the more rural community members who are a critical part of this surveying.

Survey methodology

- CSC used online survey tool SurveyMonkey.com. This is an excellent choice for this type of survey, analysis and reporting. The greatest benefit was the ability to post self-select results online automatically and real-time after someone took the survey so that they could see the results.
- It was a challenge to determine which type of survey sampling to use (self-select versus random) and an expert opinion was useful in making the decision. Also, after speaking to the local community there were additional questions it would have been helpful to answer through the course of the survey, had it not been limited to a questionnaire already created by another collaborative. It would have been more productive to have known up front that the questionnaire could not be expanded to be more relevant to the region.

Overall survey lessons learned

- Asking questions sets expectations.
- New technology adoption is difficult to assess in populations who do not understand the new technology.
- Every survey touchpoint is an opportunity for engagement.
- Consistent comparisons across regions difficult due to lack of maturity on process and regional differences.
- Community coalition building is ESSENTIAL for the whole process to works smoothly and provide insightful results.

B. Mapping

The CSC group initially utilized the work of Redwood Coast Connect (RCC) as far as the data analysis, data gathering, mapping and distribution of data. Due to the high cost of ArcServer, CSC instead implemented Geoserver data server and MapFish browser client to distribute the results of the study.

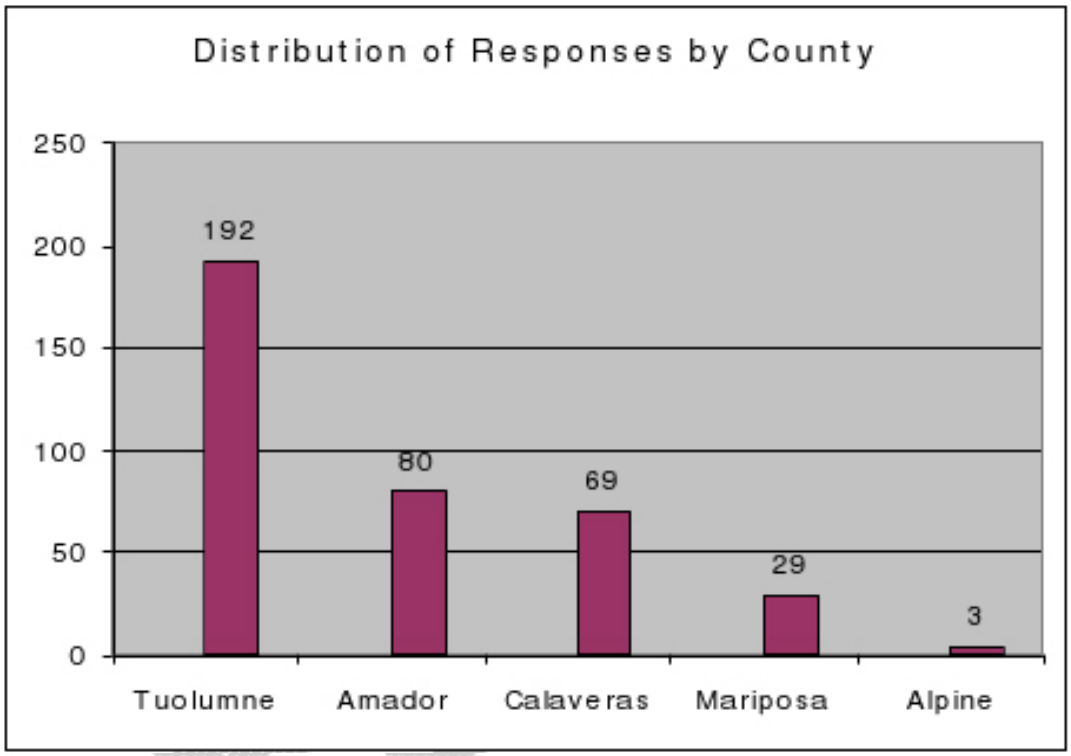
The mapping of broadband aggregation and demand had some challenges especially in the areas of data gathering, replication of existing data and definition of standards. Data gathering efforts were difficult as broadband service providers were reluctant to distribute information to CSC. This constraint coupled with the ambiguous definition of "unserved and underserved" created a challenge in identifying unserved and underserved residents and business. It was also necessary to recreate certain GIS layers after they were distributed to CSC in a non-GIS format. The project focused on seeking public input and compiling information available from other sources to help finalize layers and assist in the analysis.

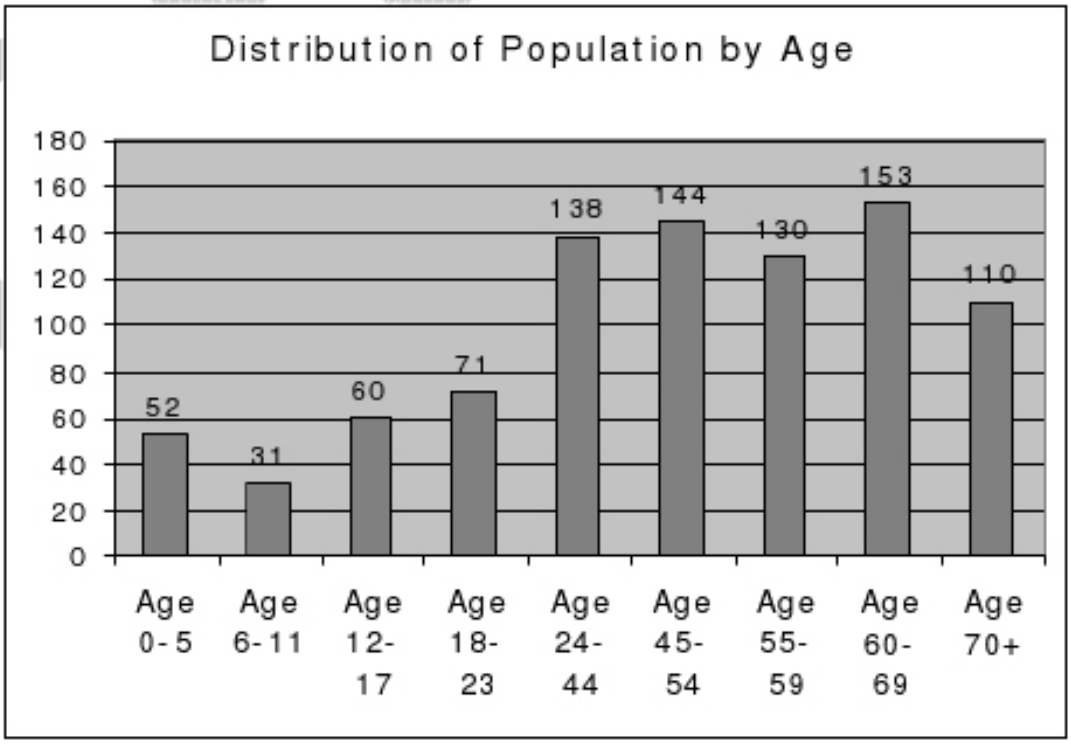
C. Providers

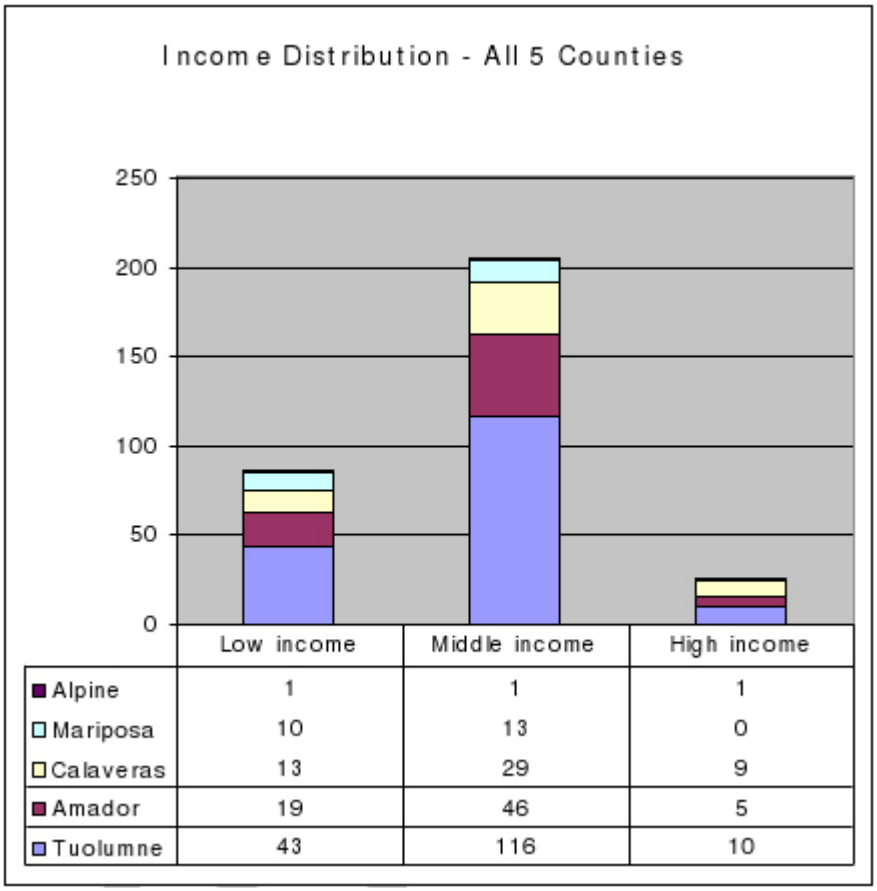
In the initial stages of the CETF project, the CETF team pulled together the service providers to draft a collaborative CASF grant application. Since local ISPs have expertise in various markets and technologies, it was hoped that a collaborative solution could be viable for the region. CSC met with the ISPs in a room together and separately, to discuss and brainstorm alternative scenarios. Service providers are widely measured on business returns and are accountable to their shareholders as is normal for commercial operations. This made collaborative agreements quite difficult, particularly due to short grant application timeframes. But as a result of these discussions, two of the ISPs did end up developing a business understanding resulting in a CASF grant application and eventual award.

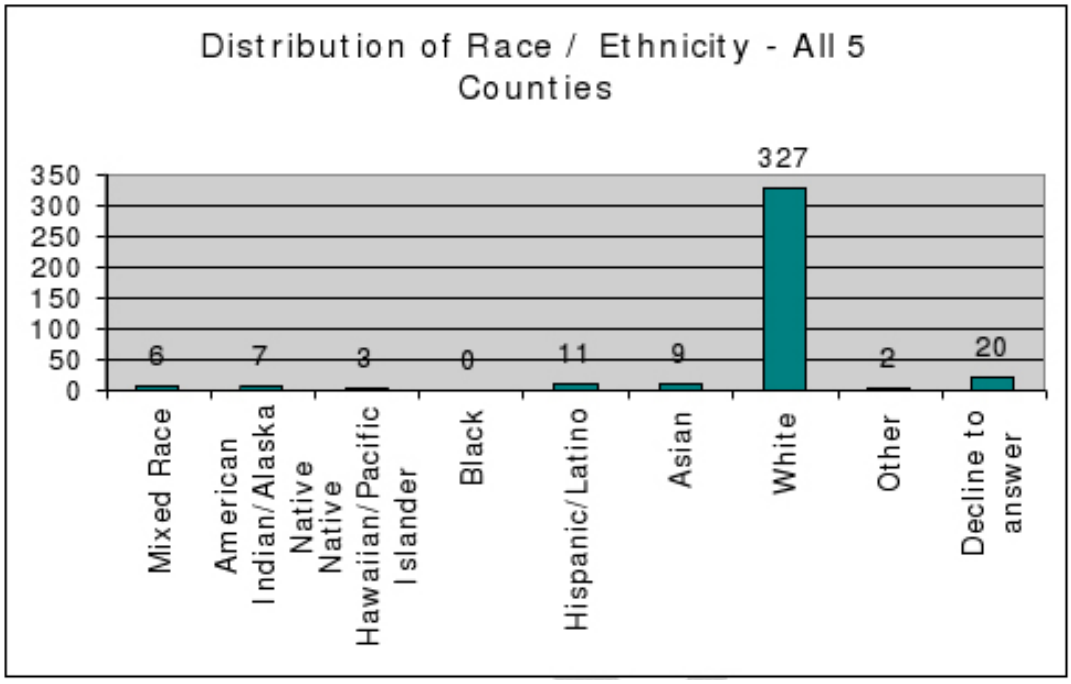
VIII. APPENDICES

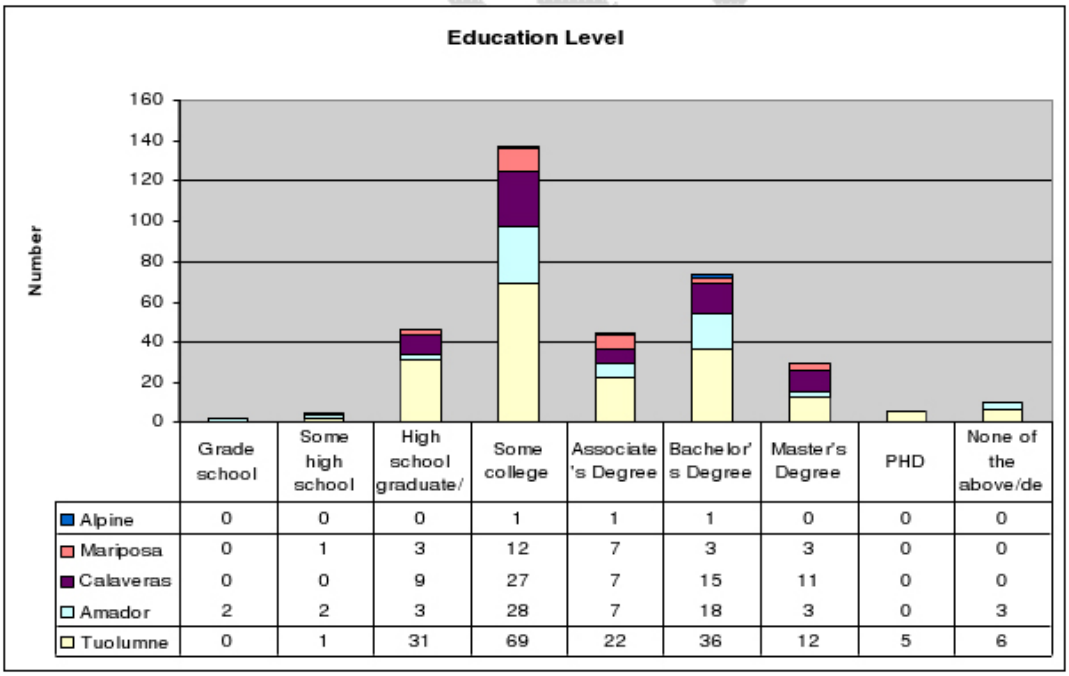
A. County Demographics






Income Distribution - All 5 Counties
250
200
150
100
50
0
Low income
Middle income
High income
Alpine 1 1 1
Mariposa 10 13 0
Calaveras 13 29 9
Amador 19 46 5
Tuolumne 43 116 10


Distribution of Race / Ethnicity - All 5 Counties
350
300
250
200
150
100
50
0
6
7
3
0
11
9
327
2
20
Mixed Race
American Indian/Alaska Native
Native Hawaiian/Pacific Islander
Black
Hispanic/Latino
Asian
White
Other
Decline to answer



	Grade school	Some high school	High school graduate/	Some college	Associate's Degree	Bachelor's Degree	Master's Degree	PHD	None of the above/de
Alpine	0	0	0	1	1	1	0	0	0
Mariposa	0	1	3	12	7	3	3	0	0
Calaveras	0	0	9	27	7	15	11	0	0
Amador	2	2	3	28	7	18	3	0	3
Tuolumne	0	1	31	69	22	36	12	5	6

B. Survey Methodology

Process Steps:

1. Determine overall draft types of questions and analysis needed.
2. Review and sign-off on questions with key stakeholders.
3. Determine random versus self-select, sample size and population.
4. Procure telephone numbers for phone surveying.
5. Determine survey format (electronic versus written).
6. Select and procure online survey tool.
7. Create survey form.
8. Input test survey questions.
9. Send out test survey to colleagues for beta testing and feedback.
10. Test analysis of survey results.
11. Test download of survey results to project database.
12. Create scripts for telephone surveyors.
13. Create final survey in written and electronic forms.
14. Train Surveyors.
15. Collect random phone surveys.
16. Audit survey collection.
17. Input data into electronic tool.
18. Cleanse data.
19. Monitor and analyze results.
20. Download final results to project database.
21. Close survey.

Survey Sampling

- Based on discussion with CETF and UC Davis (Jim Fletcher) and Carolyn Ward, the recommendation was to sample about 500 people in the five-county region.

- 3400 random phone numbers were purchased from SSI, corresponding to population statistics for the county as it was recommended that with that number it would be possible to reach the approximate sample number.

Electronic Survey Process

- The electronic survey format used was based on a 3rd party tool called "Survey Monkey" to collect, analyze and download information.
- All of the phone surveys were manually into the online survey tool.

Surveying by Telephone

- Volunteers and in-kind resources helped call the candidates using scripts and answering on paper input forms.
- Alternatively, the workgroups and listening sessions were used to get qualitative input.

Survey response rate

- CSC contacted approximately 3400 candidates by phone, based on a statistical sampling provides by Survey Sampling International (SSI).
- Many of the candidates did not answer the phone or choose to complete the survey so the final sample size was 396, about 11% completion rate.

Survey Analysis

- All surveys were eventually input into the online tool for consolidation and analysis.
- The survey tool allowed continuous monitoring of responses and results. The tool also allowed the full project team to enter into the survey for analysis, though the project team did not widely use this option.
- The survey also allowed us to provide results online for public access. Only the consolidated results were visible, demographics and comments were not visible.
- Survey results were downloaded into the database discussed in the next section.

Templates and Examples

- An example of the survey is attached in the appendix.
- The results analysis is currently visible on the CSC website: http://centralsierraconnect.org/index.php?option=com_content&view=article&id=85&Itemid= 72.

Process Wins, Losses, and Learnings

- The survey process engaged from the region. Some respondents asked if they could help out or continue to get further information.
- The phone surveyors were perceived positively since they were part of the community, but were not professionally trained surveyors.
- The data cleansing was quite a tedious process, particularly for the data input and cleaning of the open-ended questions.
- The survey was biased toward those who had telephones which may have missed some of the more rural community members who are a critical part of this surveying.

Methodology Recommendations

- The online survey tool is an excellent choice for this type of survey, analysis and reporting.
- CSC highly recommends creating analysis and report samples before finalizing the survey.

C. Detailed Survey Results (.pdf format)

- Residential survey analysis (http://centralsierraconnect.org/finalreport/csc-res-demand-survey.pdf)
- Residential survey data (http://centralsierraconnect.org/finalreport/csc-res-survey-summary.pdf)
- Youth survey analysis (http://centralsierraconnect.org/finalreport/csc-youth-demand-survey.pdf)
- Youth survey data (http://centralsierraconnect.org/finalreport/csc-youth-survey-data.pdf)
- Business survey analysis (http://centralsierraconnect.org/finalreport/csc-business-demandsurvey.pdf)
- Self-Select survey analysis (http://centralsierraconnect.org/finalreport/csc-self-selectdemand-survey.pdf)
- Demand survey methodology (http://centralsierraconnect.org/finalreport/csc-demandsurvey-methodology.pdf)
- Detailed survey data (http://centralsierraconnect.org/finalreport/csc-survey-ip-address-data.xls)

D. Community Workshop Power Point Presentations (.pdf format)

- Central Sierra Connect presentation: November 28, 2007 (http://centralsierraconnect.org/finalreport/csc-ppt.pdf)
- CSC: Building Community Connections: 2009 (http://centralsierraconnect.org/finalreport/cscrural-ppt.pdf)