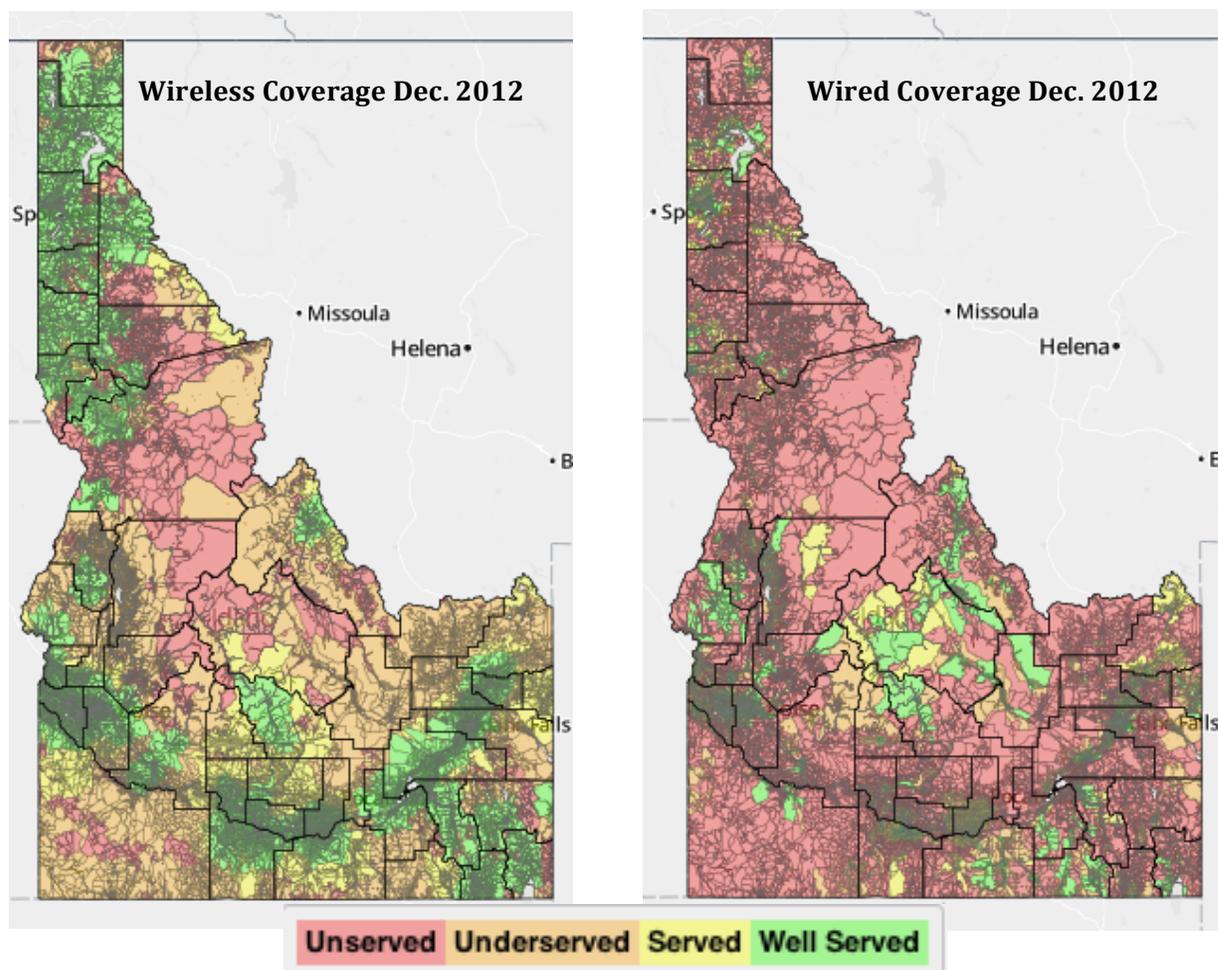


## Phase 2: Idaho Broadband Economic and Social Impact: A Closer Look (Final October 30, 2013)

The initial Phase 1 Idaho Social and Economic Impact Study provided insights into how different levels and types of broadband investment would impact job creation, economic growth and quality of life throughout Idaho. This report takes a closer look at that impact for two major economic sectors: manufacturing and health care. Also examined here is a case study of how available broadband impacts economic opportunity and quality of life in a representative Idaho community. First however, some background on the current availability of broadband serving Idaho businesses and communities is helpful.

### A Closer Look at the Idaho Digital Divide

#### Comparison of Idaho Wired and Wireless Broadband Coverage, December 2012



The quality of available broadband service can be described in several ways. For purposes of this study data is developed at the census block area for the following four categories:

- Unserved: Areas where there is no advertised broadband provider delivering at a minimum speed of 768 Kbps download.
- Underserved: Areas that meet the minimal definition of broadband but do not have a broadband provider advertising a service meeting that FCC broadband aspirational standard of 4 Mbps download speed.
- Served: Meets the national broadband standard of at least 4 Mbps download speed, but does not exceed 10 Mbps download speed.
- Well Served: At least one broadband service provider in an area delivers a broadband speed of at 10 Mbps download or higher.

The two side-by-side maps above compare Idaho's broadband coverage as of December 2012 for wired technologies (such as telephone company DSL, fiber, and cable services) and wireless (including mobile and fixed wireless broadband). In general wireless services extend deeper into Idaho's rural regions than does available wired broadband services. However, because of the rugged terrain present in much of rural and frontier Idaho, wireless signals are often "spotty" even when there is one or more wireless providers in an area.

Idaho has large land areas with limited population. Where population is widely dispersed it is generally very expensive to deploy traditional wired broadband solutions. Consequently there are large sections of Idaho with no wired broadband service (colored red on the "wired coverage" map). The latest available broadband coverage data reveals 72 percent of Idaho's land area (56,287 square miles) is unserved by any wired broadband service provider. However only 8 percent of Idaho's population lives in these wired broadband unserved regions of the state. In fact, of the over 56,287 square miles that are presently unserved by a wired broadband provider, there are approximately 45,000 square miles with nobody living in those areas. These unpopulated areas of the state include wilderness areas, state parks, national parks, forestlands, farmland and so forth. When wireless broadband service is considered, a significant proportion of the inhabited areas of Idaho have access to at least some level of broadband service.

Does this data suggest Idaho has the needed broadband service throughout the state required to accomplish its economic and community development objectives? To help answer this question, the table appearing below provides a more detailed look at current wired broadband coverage in Idaho.

**Comparison of Population in Idaho Regions that are Unserved, Underserved, Served and Well Served by a Wireline Broadband Provider**

	<b>Unserved</b>	<b>Underserved</b>	<b>Served</b>	<b>Well Served</b>
<b>Number of People</b>	120,166	98,331	100,860	1,248,225
% of State	8%	6%	6%	80%
<b>Square Miles</b>	56,287 sq.mi.	8,818 sq.mi.	4,855 sq.mi.	7,910 sq.mi.
% of State	72%	11%	7%	10%
<b>Average Median Income</b>	\$44,079	\$45,528	\$44,148	\$46,680
<b>Age Categories</b>				
% Under 5	6%	7%	7%	8%
% 5 - 17	19%	20%	20%	16.8%
%18 - 34	17%	17%	17%	25%
%35 - 55	28%	27%	26.0%	25%
% over 55	30%	29%	30%	22%
<b>Education (over 25 yrs.)</b>				
%Less than HS	14%	14%	13%	11%
%High School	37%	33%	35%	27%
%Some College	35%	34%	35%	36%
%Bachelors	11%	14%	12%	18%
%Graduate	4%	5%	4%	8%

Source: US Census of Population and National Broadband Map

Of note, about 80 percent of Idaho’s population are in census blocks where at least one wireline provider advertise available broadband that exceeds national standard of 4 Mbps download speed (defined as “well served”). However these individuals with access to at least national standard broadband live in an area representing only 10% of the land area of Idaho. That is, they are largely concentrated in a relatively few cities and towns scattered throughout the state.

The importance of continued efforts to incent additional broadband investment to other areas of the state is underscored by a closer look at the demographics in “well served” areas compared with the remainder of the state. Specifically areas presently well served by a wireline provider on average have a higher medium income as well as a younger

and more educated population than the rest of the state. While the state of Idaho, anticipates continued economic growth into the future, the current digital divide presents a concern that this growth will not be equally shared throughout the state. For example, businesses most often choose to locate or expand in areas where there is a well-educated workforce. The data for the 18 to 35 year old age cohort suggests that young families are choosing to live in areas where there is better broadband access. An aging population that provides a cornerstone for many of Idaho's rural communities will require access to health care to stay in their home communities. Stores and shops are more prosperous when the local population has income to spend. Modern businesses of all types increasingly rely on access to broadband for profitable operation. This raises questions for the longer-term sustainability of rural communities.

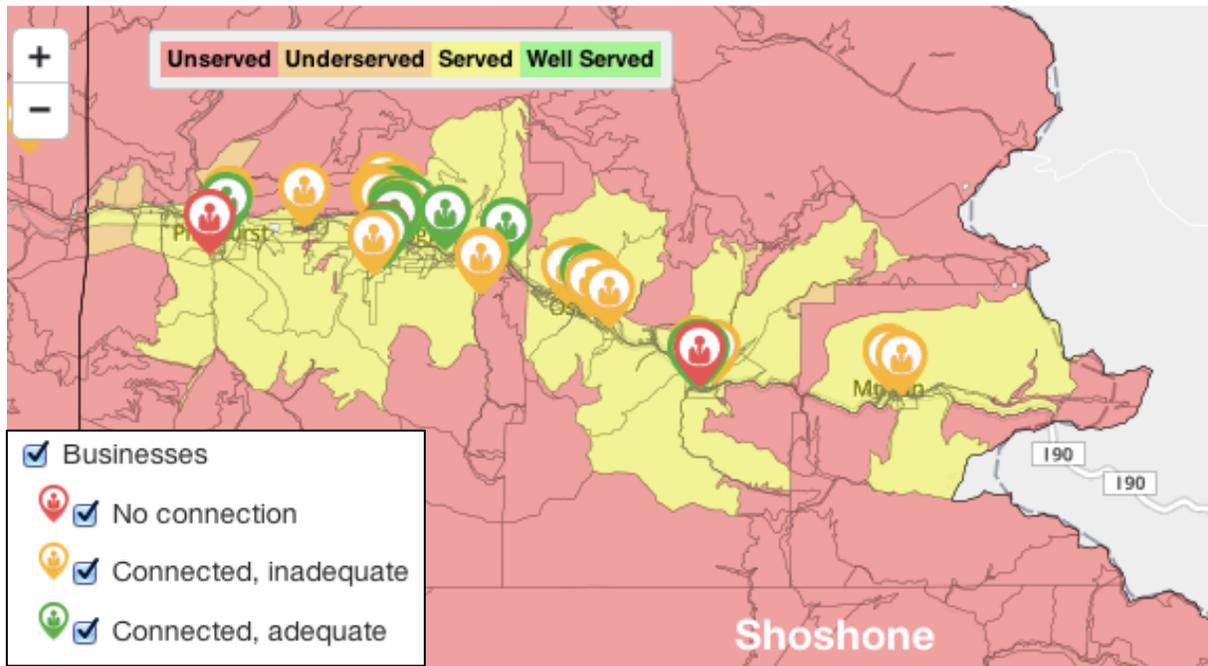
Also the data clearly points to a public safety challenge for Idaho. Idaho mountains, rivers and parks are major tourist destinations. Forestlands are subject to fires. Winter storms can isolate families in their homes and make it difficult for first responders to reach them in the case of an emergency. The commercial incentive to deploy wireline broadband is not adequate to meet the significant public safety needs of Idaho's most rural families and businesses. Consequently, wireless in many cases is clearly part of the solution and is increasingly being deployed.

As noted above, the broadband availability data developed for the state of Idaho indicates most inhabited areas of the state have access to a broadband wireless signal. In fact, when all technologies are considered, approximately 98 percent of the state has access to a broadband service at least delivering national broadband standard quality of 4 Mbps download speed. However, it is important to not overextend this rather optimistic finding. The State of Idaho is currently undertaking an extensive wireless signal ground-truth activity to better refine the data on wireless broadband availability. In all likelihood the current wireless broadband coverage data significantly overstates availability. First, only one-half of a census block needs to have a footprint from a wireless service provider to be considered covered. And second, within that census block, the realities of terrain are such that service, even where good signals are in the area can be spotty. But the data does reveal continued progress in Idaho to bring wireless coverage to the entire state. As wireless coverage gets better and better, possibilities for businesses and people living in areas without a wireline broadband service provider are improved.

### **Importance of Broadband for Idaho Business**

Shoshone County implemented a pilot demand survey to assess and map business access and general satisfaction with broadband. The map below plots responses from that demand survey over wireline broadband service coverage in Shoshone county.

## Most Shoshone County Businesses Located Along the I-90 Corridor



Population patterns in Shoshone County are like much of Idaho. The county has vast areas of relatively unpopulated areas, with the 90 percent of the County's population clustered in smaller communities located along the I-90 corridor (sometimes referred to as the Silver Valley). The Idaho broadband availability data indicates wireline broadband service providers advertise the availability of a "national standard" broadband option (at least 4 Mbps download) in these communities where most of the County's population lives. The Silver Valley Economic Development Corporation implemented an on-line survey of 60 local businesses to assess perceptions of the adequacy of available service. Of note, 85 percent of local businesses responding to this survey indicated access to the Internet was "critical" to their business success. Of the 60 businesses responding, only three indicate they presently do not have an Internet connection. However approximately two-thirds of those responding reported the current Internet service was inadequate to meet their current and anticipated future needs. Reasons for businesses considering their current service to be inadequate range from lack of reliable service to not enough bandwidth to support business uses. Local county leaders report there are businesses that will not even consider locating in the Silver Valley.

The table below provides an overview of how population, national standard broadband access and businesses are distributed across the state.

## About One-Fifth of the Population Living in Twenty-Four Least Connected Idaho Counties

	<u>Population</u>	<u>Percent Population Do Not Have Access to National Standard Wired Broadband</u>	<u>Total Number of Business Firms</u>
<b><i>24 Least Connected Counties</i></b>			
Clark	949	100%	14
Benewah	9,209	87%	232
Idaho	16,446	73%	465
Teton	10,166	70%	402
Boise	7,025	68%	141
Lincoln	5,186	56%	83
Clearwater	8,702	55%	237
Camas	1,124	53%	25
Boundary	10,802	50%	350
Lewis	3,822	47%	130
Franklin	12,850	46%	289
Owyhee	11,438	45%	184
Gooding	15,475	41%	332
Valley	9,638	39%	549
Jefferson	26,301	38%	424
Caribou	6,850	34%	185
Bonner	17,175	33%	1429
Butte	2,822	33%	66
Adams	3,977	31%	125
Jerome	22,682	31%	526
Power	7,766	29%	157
Bingham	45,952	27%	796
Washington	10,255	25%	206
Lemhi	<u>7,967</u>	25%	<u>294</u>
	<b>274,579</b>		<b>7,641</b>

### **12 Well Connected Counties**

Bear Lake	6,001	24%	123
Gem	16,665	22%	331
Cassia	23,186	21%	639
Latah	37,704	20%	877
Oneida	4,215	15%	82
Shoshone	12,672	14%	356
Payette	22,624	4%	472
Madison	37,864	13%	735
Elmore	26,346	12%	426
Nez Perce	39,543	11%	1,119
Blaine	21,199	11%	1,344
Twin Falls	<u>78,005</u>	10%	<u>2,439</u>
<b>Subtotal</b>	<b>326,024</b>		<b>8,943</b>

### **8 Most Connected Counties**

Canyon	191,694	9%	3,437
Kootenai	141,132	7%	4,293
Bonneville	105,772	6%	3,189
Bannock	86,691	6%	1,945
Custer	4,333	6%	155
Fremont	13,128	6%	279
Minidoka	20,155	3%	410
Ada	<u>400,842</u>	2%	<u>11,898</u>
<b>Subtotal</b>	<b>966,747</b>		<b>25,606</b>

Source: Business Count data,U.S. Census County Business Pattern Data, <http://www.census.gov/econ/cbp/>; Broadband penetration LinkIdaho Dashboard <http://Idaho dashboard.org>

Idaho businesses are located throughout the state and tend to locate proportionally with population. Approximately 18 percent of all Idaho businesses and 18 percent of population are in the 24 least connected Idaho counties. On the other end, about 60 percent of population and 60 percent of the total number of Idaho businesses are in the 8 most connected counties.

In general population density is the single most important factor that differentiates the 24 least connected counties from those that are more well-connected to a wireline broadband solution. Population density and terrain are closely associated with the cost of deploying broadband for both wireline and wireless technologies. As such they are significant contributors to the viability of a provider's business case. The average population density for the 24 least connected counties is 5.5 people per square mile. The average population density for the 8 most connected counties is 50 people per square mile. However, there are exceptions. Custer County is one of the most wireline

broadband connected counties in the state, yet the population density is only one person per square mile. On the other hand, Jerome County, with a population density of 37 people per square mile is among the 24 least connected counties.

While one can be encouraged by the broadband access enjoyed in the more populated parts of the state, when looking to how the demand for broadband is growing it is noteworthy that 20% of the state's population is less than "well served" and the issues are especially acute in rural areas. The economy and overall quality of life in these largely rural less connected counties are particularly vulnerable if solutions are not found to extend adequate affordable broadband to unserved and underserved locations. Farms, ranches, small manufacturing, resort properties, mining, forest industries, general stores and a variety of other businesses tend to be widely distributed into more remote locations. Critical public functions such as education, health care and public safety must serve Idaho residents, businesses and visitors no matter where they are. The economic and quality of life impact of expanded broadband (no matter whether wireline or wireless) is of particular importance for these areas of the state.

This study provides extended insights into the economic and quality of life benefits of broadband for two major economic sectors essential to many widely dispersed Idaho communities: 1) manufacturing and 2) health care. In addition a case study of Bonner County Idaho takes a more holistic look at how broadband underlies economic development and quality of life in Idaho.

## **Manufacturing**

Agriculture is an important Idaho industry. Crop production generates nearly 700 million dollars and livestock adds over 1 billion dollars annually to the Idaho economy. The entire agriculture sector which includes crop production, livestock production, forestry, hunting and support activities creates nearly 2 billion dollars of Idaho economic output each year and employs over 14,000 people. The economic importance of agriculture for Idaho is even greater when considering the larger food processing and distribution sector that is linked to agriculture.

## Manufacturing is a Significant Industry in Most Idaho Counties

	EMPLOYMENT:		VALUE OF SALES:	
	<u>Number 2011</u>	<u>Percent of County Total</u>	<u>2011 Value</u>	<u>Percent of County Total</u>
<b><i>24 Least Connected Counties</i></b>				
Clark	74	9.06%	98,530,832	49.43%
Benewah	506	10.25%	146,204,517	27.41%
Idaho	381	4.79%	141,155,735	15.24%
Teton	161	3.76%	76,089,712	16.13%
Boise	15	0.52%	5,752,942	2.26%
Lincoln	178	7.75%	122,280,057	25.03%
Clearwater	226	4.92%	56,085,212	12.71%
Camas	24	4.03%	5,274,364	7.19%
Boundary	474	9.05%	119,714,004	21.07%
Lewis	202	8.21%	57,265,426	21.56%
Franklin	143	2.98%	30,996,261	5.90%
Owyhee	208	4.93%	62,039,343	8.88%
Gooding	742	9.64%	579,239,380	29.88%
Valley	64	1.06%	16,817,010	2.91%
Jefferson	1,478	16.03%	443,984,998	30.83%
Caribou	701	15.70%	783,809,171	61.70%
Bonner	1,919	8.35%	680,593,192	26.14%
Butte	66	0.51%	15,317,592	0.79%
Adams	93	5.31%	21,747,036	11.72%
Jerome	1,442	13.12%	780,134,800	35.16%
Power	1,128	24.88%	507,709,638	53.07%
Bingham	2,506	11.38%	1,149,852,117	35.69%
Washington	449	8.95%	131,240,209	20.32%
Lemhi	70	1.88%	16,592,905	4.25%
<b>Subtotal</b>	<b>13250</b>	<b>8.47%</b>	<b>6,048,426,453</b>	<b>26.49%</b>

<b>12 Well Connected Counties</b>				
Bear Lake	56	1.85%	24,625,813	8.01%
Gem	113	1.69%	26,135,134	4.57%
Cassia	1,190	9.01%	515,322,122	23.29%
Latah	379	1.89%	104,918,345	6.00%
Oneida	19	1.07%	11,371,866	5.63%
Shoshone	204	3.03%	113,530,561	11.70%
Payette	1,103	11.76%	380,221,446	25.28%
Madison	855	4.74%	288,849,553	14.98%
Elmore	457	3.38%	265,338,684	13.02%
Nez Perce	2,863	11.64%	1,373,941,304	38.30%
Blaine	475	2.65%	144,176,952	7.35%
Twin Falls	3,905	8.72%	1,623,488,632	27.74%
<b>Subtotal</b>	<b>11,619</b>	<b>6.47%</b>	<b>4,871,920,412</b>	<b>21.29%</b>
<b>8 Most Connected Counties</b>				
Canyon	7,957	10.65%	3,267,402,187	34.27%
Kootenai	4,660	6.22%	1,887,760,973	22.15%
Bonneville	2,354	4.03%	1,191,119,833	16.78%
Bannock	2,235	5.22%	1,305,678,485	24.75%
Custer	12	0.42%	2,136,277	0.45%
Fremont	75	1.47%	17,240,533	3.21%
Minidoka	1,121	11.72%	639,523,255	38.89%
Ada	16,170	6.08%	10,565,719,383	27.73%
<b>Subtotal</b>	<b>34,584</b>	<b>6.47%</b>	<b>18,876,580,926</b>	<b>26.52%</b>

Source: MIG IMPLAN data

Manufacturing is a significant employer in most every Idaho County. However, it is noteworthy that manufacturing contributes an average of more than one-quarter of the total output and more than 6 percent of total employment in the 24 least connected Idaho counties. In Jefferson and Caribou Counties, more than one-half of the total output is associated with manufacturing activity. The more connected and often more populated well-connected counties are more likely to have greater diversity within the local economy. But for those counties in the state that manufacturing is the primary employer, the availability of adequate affordable broadband can be critical to retain those jobs, as today's manufacturing production and distribution of those products is increasingly tied to the effective use of modern information technologies.

**Largest Manufacturing Contributors to the Economy in 24 Least Connected Counties**

<b>Industry</b>	<b>2011 Employment</b>	<b>2011 Output</b>
Fruit and Vegetable canning	1,979	960,077,393
Cheese Manufacturing	943	776,293,701
Fertilizer Manufacturing	560	726,293,701
Frozen Food Manufacturing	1,626	521,912,842
Sawmills and Wood Preservation	1,154	298,609,619

Agriculture provides the fundamental economic base for most of the 24 rural counties that presently have less than 25% of the population connected to a national standard wireline broadband connection. Dairy, crop production and livestock producers generate nearly 4 billion dollars annually within the 24 Idaho Counties identified as least connected. The manufacturing sector in these 24 counties reflects that reality. Of the top five manufacturing industries in these less connected counties four are directly connected to the areas agriculture production and the fifth is wood manufacturing..

The economic importance of manufacturing is even more significant when economic linkages within the local economy are considered. The owners of manufacturing firms and the employees they hire make purchases from local stores, banks, insurance companies, parts suppliers, veterinarians and so forth. These local businesses in turn are more economically successful and they too have more money to spend in local stores and for local services. The economic impact of manufacturing on the local economy varies with the type of manufacturing firm. For example, as identified in Phase 1 of the Idaho Economic and Social Impact Study, every \$1,000 dollars of output generated by a frozen food manufacturing operation creates an additional \$250 for local stores and business suppliers (including local farms). However, every \$1,000 generated by local cheese manufacturers creates an additional \$630 dollars in the local economy. Especially for the less diversified and smaller Idaho counties, anything that can be done to strengthen the profitability of local agriculture enterprises including the related manufacturing sector is very beneficial to the overall future viability of Idaho’s rural communities. Improving available broadband is one important step towards strengthening the future economic viability of Idaho agriculture and agriculture manufacturing.

### **Examples of how Idaho Manufacturing Firms Use Broadband**

- On-line banking
- Searching for the best price of critical production inputs
- Posting job announcements
- Managing records
- Implementing “just-in-time” delivery approaches
- Supporting the use of robotic and other smart production technologies
- Managing trucking and other delivery logistics
- Researching business opportunities
- Fulfilling government compliance obligations
- Remote connections with technical support
- Video-conferencing
- Computer Assisted Design and similar applications
- File Sharing

Manufacturing is a technology-intensive industry. Over the past century technological advances have allowed manufacturers to reduce costs, increase efficiency and productivity, and stay ahead of the competition. For today’s manufacturers, broadband is integrated into all phases of the operation. Many modern manufacturing processes are highly computerized. High-speed Internet connections are used to manage those processes in ways such as monitoring the production operation, smart systems that coordinate the integrated tasks, the use of digital robotic technology or quality control systems. Modern broadband technologies are utilized to communicate with suppliers whether they be a local dairy farmer or a critical parts supplier. In today’s modern economy, manufacturing efficiency requires highly scheduled delivery of both key inputs as well as the manufactured product to customers. With a combination of mobile and wireline technologies transportation fleets can be efficiently managed with high speed communications. Then there are the business operations of a modern manufacturing firm where broadband communications is the key to managing complex records, government compliance, finding workers with the necessary skills, on-line banking or communications using both video and voice.

In rural Idaho, the economic health of the important production of the agriculture and forestry sectors is closely tied to the profitable success of the manufacturing firms that process those products for final market. Broadband is a key infrastructure required for both modern agriculture and manufacturing. Because many manufacturing firms are larger and tend to make more intense use of high-speed Internet connections, the bandwidth requirements are higher than for an average business. Often required is bandwidth delivered to the plant at speeds of 50 Mbps download and often greater. It is also important to recognize that for a successful manufacturing operation, both fixed broadband and mobile broadband will play a role in their future success.

## Health Care

Health care employs approximately 79,000 people in Idaho and contributes nearly 7 billion dollars annually to the Idaho economy. In many smaller communities, health care along with education is often one of the larger employers. The health care sector is an important contributor to local economies across Idaho. Health-related jobs are projected to expand by more than 36 percent between 2011 and 2020. Equally important, access to health care is a key factor impacting quality of life in an area. Businesses and families are less likely to be attracted to or stay in areas where health care access is limited.

Broadband availability and use is particularly important for an efficient modern health network. According to the Bureau of Labor Statistics, 98 percent of health care occupations rely significantly on utilizing the Internet. The table below highlights several examples of how broadband contributes to both efficiency and access to healthcare.

### Examples of Health Care Broadband Applications

- Electronic Health Record management
- Accounting & payroll support
- Access to professional training and education
- On-line and video consultation with specialty medical staff
- On-line research
- Access to professional journals and publications
- Transmitting and receiving medical images
- In-home care
- Receive early alert and medical data from first responders at the accident site.
- Physician on-line and video consultation to remote locations (homes, schools, elder care facilities, etc.)
- Tele-pharmacy applications

The use of on-line and video technologies is closely integrated with addressing gaps and needs within the modern Idaho health sector. Most of Idaho is designated as a health care shortage area for primary medical care. Idaho ranks at the bottom of 50 states and the District of Columbia for the number of primary care physicians per capita. Idaho has a lack of specialty care, particularly in areas like psychiatry, dermatology, and neurology. Speech pathology is also hard to come by, especially in areas outside of Boise. Idaho ranks last for the number of psychiatrists and pediatricians per capita as well. Eleven counties and two partial counties are designated as geographic Health Professional Shortage Areas (HPSAs). The remainder of the counties, except for Ada and parts of Blaine and Bonneville, are designated as population HPSAs, which means there are not enough providers serving the low-income population in those areas. All of Idaho is

considered a geographic mental health professional shortage area based on the number of psychiatrists.

Broadband enables people to stay in their communities and access the health care they need. For example, broadband is already being used for telepsychiatry in Idaho. Approximately three psychiatrists in Idaho are doing telepsychiatry, seeing patients in communities such as Grangeville, Cottonwood, Clearwater, Orofino and Cascade remotely.

According to some providers, telepsychiatry has decreased the need for emergency care resources like emergency rooms and clinic walk-ins. Prior to the telepsychiatry resource, patients used to have to wait two to four months to see a psychiatrist. Now they can see one within a week or two. Patient outcomes are improved with enhanced patient and medication monitoring.

Many smaller hospitals and clinics do not have a radiologist on staff to read CTs and MRIs. Scans get transmitted via broadband and read by a third party. This helps to control rural health care costs and provides quick access to a critical service for rural areas.

With stage 2 of the Federal Affordable Health Care Act Meaningful Use Standard, hospitals are required to be able to communicate with other facilities. Idaho is implementing the Idaho Health Data Exchange or IHDE. The IHDE system is comprised of a community-wide electronic patient data system that is capable of being shared across different IHDE-connected health care providers. Patient data including but not limited to labs, radiology, reports, ADT, medications, allergies and images are available instantly and securely, 24x7, to IHDE-participating health care providers. The IHDE system includes the Virtual Health Record (VHR) and the Image Exchange. The IHDE provides instant access to patient data electronically and securely in the form of the Virtual Health Record (VHR). The traditional workflow of obtaining and waiting for patient medical records via phone call, fax requests, mail and courier are eliminated with a connection to the IHDE VHR. Health data from IHDE-participating hospitals, labs, providers and imaging centers is “virtually” retrieved, aggregated and displayed in the VHR. With a username and password, the VHR provides IHDE-authorized providers and medical staff with a patient's comprehensive health record at any time, any place, through a secure browser. The VHR enables providers with more accurate diagnosis, faster and more effective treatment, and better outcomes for the patient.

Another component of the VHR is access to patient images via Image Exchange. Common problems that burden both patients and providers, such as lost medical images and films, non-viewable CDs, and large file transfers are eliminated with the Image Exchange feature. If a patient has images that accompany a radiology report, the VHR provides single click access to any X-ray, CT scan, PET scan, MRI or ultrasound, right from a patient's VHR record. The Image Exchange features a full suite of viewing tools used in

most PACS systems and allowing a provider to seamlessly access, view and collaborate on their patient images with other providers.

Hospitals can leverage the IHDE to consult with heart specialists at another facility. The IHDE serves as a central repository for patient information, which helps when transferring patients to other clinics.

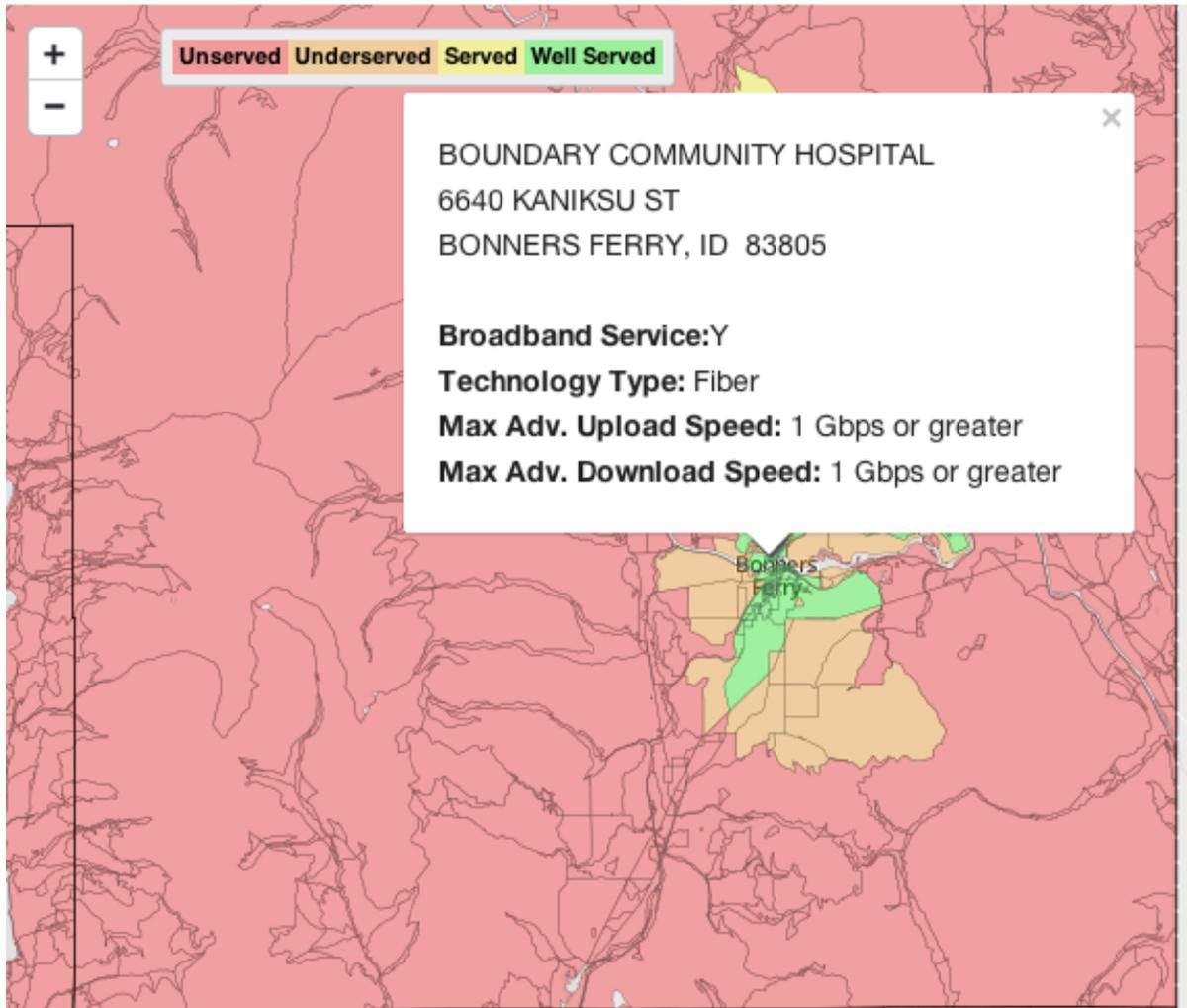
Reliable mobile wireless connectivity is important data for health care as well, particularly for emergency personnel. Health data such as EKGs can be transmitted from ambulance to the hospital via mobile connectivity. In Region 2 (North Central Idaho), currently there are gaps in wireless coverage. Broadband is used for patient Electronic Health Records (EHR), ambulances and hospitals connectivity. By 2016, many Idaho hospitals and clinics plan to have a Patient Portal, which will support the ability of patients to access records electronically from home.

Broadband can be used for chronic disease monitoring as well. For rural hospitals in particular, there is a need to reach out to residents to use home health services to offset the pressures on traveling nurses. Basic broadband service in homes would allow the patient to send data to health professionals. At a higher bandwidth, patients could use streaming video for home health consultations with doctors.

### **Most Idaho Hospitals are Well Connected**

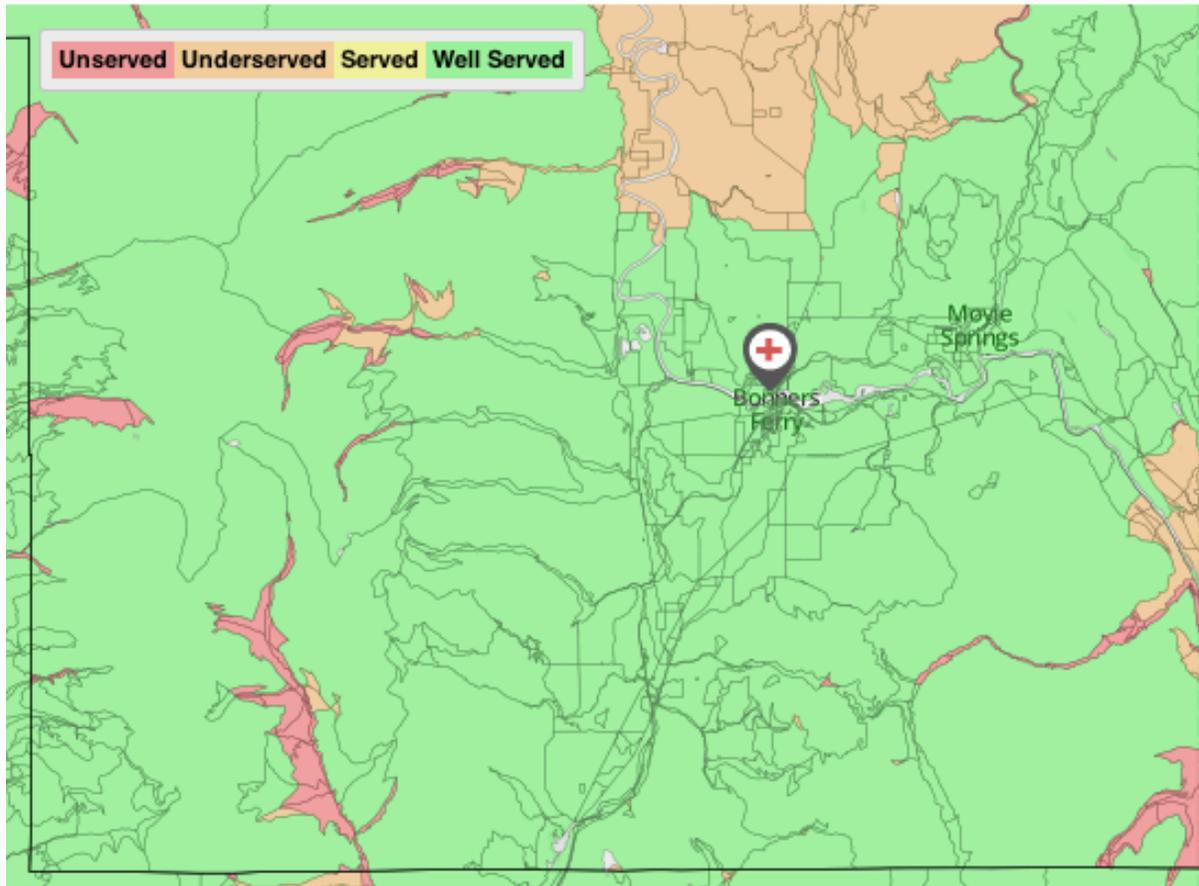
According to “anchor institution” data collected by LinkIDAHO, 23 out of 40 hospitals for which connection speed data is reported have a Gigabit connection. An additional five have at least a 100M connection. These well connected hospitals are located throughout the state and provide a strong foundation for health care delivery. However, while most hospitals are well connected to a quality broadband service, as noted the modern health care system requires connections to places such as clinics, doctor offices, schools and individual residences.

## Idaho Hospitals Often Have Good Broadband Connections, But Connections are Often More Limited in Surrounding Areas



The above example for Boundary County is typical of the situation in many of Idaho's counties. There is a symmetric 1 Gbps fiber connection available to the Boundary Community Hospital. However connectivity is generally more limited for the surrounding area. In Boundary County approximately half of the population lives in an area for which there is no wireline provider offering a broadband connection meeting the national standard of 4 Mbps download speed.

## Idaho Wireless Providers Help Fill Broadband Service Gaps in Outlying Areas



Wireless service providers help to fill gaps where there is no wireline broadband service option. In Boundary County less than 1000 people live in areas where there is neither a wireline nor a wireless service provider offering a national standard broadband connection. It is important to recognize however that even in areas where there is a broadband service option, issues such as terrain often result in numerous service gaps. In many areas, the available wireless option may not be robust enough to support medical related connectivity needs.

While in Idaho, the connectivity to most hospitals is quite robust, the connectivity to outlying clinics and to residents is not always adequate. People, businesses, schools, clinics and first responders in unserved and underserved areas lack the opportunity to benefit. This means both reduced opportunity to participate in jobs offered by the expanding health industry and as consumers to benefit from quality of life improvements associated with on-line and video access to health resource.

Adequate and redundant broadband connectivity is critical for public safety and for the operations of health care institutions. To illustrate, a fiber was cut outside of Worley earlier this year, which meant that EMTs and ambulances needed to communicate via

two-way radio. Orofino had no Internet or long-distance telephone service and Cottonwood had no Internet connectivity. Remote clinics had to send patients home because they could not access EHRs. Service is typically cut off two to three times per year.

Physicians need around 4 to 10 Mbps upload and download speed of broadband at their homes to be able to communicate with other doctors and patients and to access patient health records and radiology imagery. There is a handful of physicians that rely on satellite to connect to the Internet. With adequate broadband, doctors can access patient information securely from home, enabling them to write prescriptions and monitor their patients. This also helps enhance the quality of life of physicians to be able to do some work from home at night.

St. Mary's and Clearwater Valley Hospitals & Clinics report that patients will need access to broadband connectivity to be able to schedule their appointments and access their health records via the new Patient Portal. With the Idaho Health Data Exchange (IHDE) they will be able to post patient imagery in the Patient Portal from radiology, requiring higher upload and download speeds. The hospital system is trying to push a home health monitoring approach, but most homes do not have the connectivity needed.

The table below highlights the direct economic importance of health care throughout the state.

## Health Care is a Significant Industry in Most Every Idaho County

	EMPLOYMENT:		VALUE OF SALES:	
	<u>Number 2011</u>	<u>Percent of County Total</u>	<u>2011 Value</u>	<u>Percent of County Total</u>
<i>24 Least Connected Counties</i>				
Clark	19	2%	1,376,361	1%
Benewah	246	5%	16,320,476	3%
Idaho	505	6%	40,211,641	4%
Teton	77	2%	6,355,866	1%
Boise	58	2%	3,949,283	2%
Lincoln	109	5%	4,323,564	1%
Clearwater	373	8%	30,911,851	7%
Camas	8	1%	705,215	1%
Boundary	341	7%	25,846,953	5%
Lewis	136	6%	7,483,557	3%
Franklin	203	4%	17,100,839	3%
Owyhee	109	3%	7,003,362	1%
Gooding	264	3%	24,120,256	1%
Valley	285	5%	30,946,815	5%
Jefferson	316	3%	29,389,729	2%
Caribou	205	5%	18,139,592	1%
Bonner	1082	5%	88,649,677	3%
Butte	213	2%	26,400,355	1%
Adams	52	3%	4,372,949	2%
Jerome	401	4%	37,732,018	2%
Power	43	1%	3,495,739	0%
Bingham	1315	6%	134,895,187	4%
Washington	255	5%	15,927,833	2%
Lemhi	196	5%	14,516,834	4%
<b>Subtotal</b>	<b>6,811</b>	<b>4%</b>	<b>590,175,952</b>	<b>3%</b>

<b>12 Well Connected Counties</b>				
Bear Lake	162	5%	10,125,663	3%
Gem	475	7%	33,448,935	6%
Cassia	1277	10%	99,846,276	5%
Latah	1368	7%	120,316,595	7%
Oneida	70	4%	3,081,859	2%
Shoshone	338	5%	25,191,590	3%
Payette	571	6%	47,379,102	3%
Madison	1248	7%	109,671,932	6%
Elmore	339	3%	28,144,551	1%
Nez Perce	3252	13%	306,830,704	9%
Blaine	721	4%	93,790,723	5%
Twin Falls	4837	11%	451,154,519	8%
<b>Subtotal</b>	<b>14,658</b>	<b>8%</b>	<b>1,328,982,449</b>	<b>6%</b>
<b>8 Most Connected Counties</b>				
Canyon	5646	8%	455,018,867	5%
Kootenai	4394	6%	405,819,321	5%
Bonneville	6894	12%	674,794,250	10%
Bannock	5968	14%	475,506,386	9%
Custer	64	2%	4,192,348	1%
Fremont	168	3%	14,027,417	3%
Minidoka	326	3%	23,913,957	1%
Ada	25675	10%	2,865,048,057	8%
<b>Subtotal</b>	<b>49,135</b>	<b>9%</b>	<b>4,918,320,603</b>	<b>7%</b>

Source: MIG IMPLAN data

With only a couple of exceptions, the health care sector contributes hundreds and in several cases thousands of jobs at the county level each year. Overall, the number of health care jobs in the seven “most connected” counties (49,135) is approximately 7 times that of the 24 “least connected” counties (6,811). In terms of overall economic output, health care contributes a total of approximately 4.9 billion dollars to the economy of the 8 most connected counties and just a little over a half billion dollars to the economy of the 24 least connected counties. For several counties, health care is a major economic engine (Cassia, Nez Perce, Twin Falls, Bonneville, Bannock and Ada) contributing 10 percent or more of total county employment.

Like manufacturing, health care is what economists refer to as a “basic industry”. Basic industries bring new dollars into the state and certainly to a county because payment for

those goods or services primarily is from sources outside of Idaho. In the case of health care, payment is predominantly from both government and private insurance. Particularly in the case of health care, available quality broadband is a key resource needed to support health care enterprises and as a result bring new dollars into the local economy. Basic industries are key to economic sustainability and growth. Those new dollars entering the local economy have a multiplied value as the medical firm and workers spend dollars at local restaurants, office supply stores, accounting firms, etc. At a high level, every 1,000 dollars received by a health care provider creates about 770 new dollars in sales for local stores and service suppliers. Consequently, while the Idaho health care sector creates approximately 12 billion dollars of economic output for Idaho each year, the total impact is closer to 3 billion dollars each year.

The state of Idaho has established a Telehealth Advisory Committee to explore opportunities to reduce costs and improve access through the application of broadband. An example of a promising broadband application is to provide access to mental health resources. Only Nevada and Mississippi have a lower ratio of psychiatrists per 100,000 population than does Idaho. In Idaho, 80.3 percent of the population live in a designated professional shortage area for mental health. The shortage is particularly acute in rural areas of Idaho.

A recent pilot study conducted in the Clearwater Valley illustrates the benefits of telepsychiatry. There are no psychiatrists that practice privately in the Valley. The nearest child psychiatrists are 3 to 6 hours away in Coeur d' Alene or Boise. And the area has a high percentage of high-risk population. Specifically, compared to the rest of Idaho, the local population in the Valley is older, lower income, lower educational attainment and geographically dispersed.

The objectives of the pilot project was to utilize broadband connections to:

- Improve the health of the population
- Enhance the patient experience of care
- Reduce or control cost

The study demonstrated benefits in all three of these areas. An interactive technology was utilized to deliver patient counseling and observation to health clinics and hospitals in the areas where patients live. Direct benefits of the use of telepsychiatry is to optimize use of both patient and provider time, reduce access challenges including travel time and time taken from work. As a result, there is more early involvement of care partners.

Overall the results beyond just financial cost were highly positive. Patient health outcomes were high and missed appointments were down compared to the traditional face-to-face options. Both required outpatient visits and hospitalization rates were lower than for traditional care. The total cost per patient under the telepsychiatry program were less than half of that required under the traditional full face-to-face care

approach. The larger societal benefits of a health population and personal patient costs such as time taken away from work or travel suggest the overall economic benefit of programs such as this are even greater.

**A Representative Idaho Community Scenario**

The previous two examples (manufacturing and health care) demonstrate the economic importance of available quality broadband for specific Idaho sectors important especially to broadband unserved and underserved areas. This final example takes a more holistic look at the importance of broadband for the economy and quality of life in a representative Idaho county, Bonner.

**Business Sources of Economic Growth and Development for Bonner County**

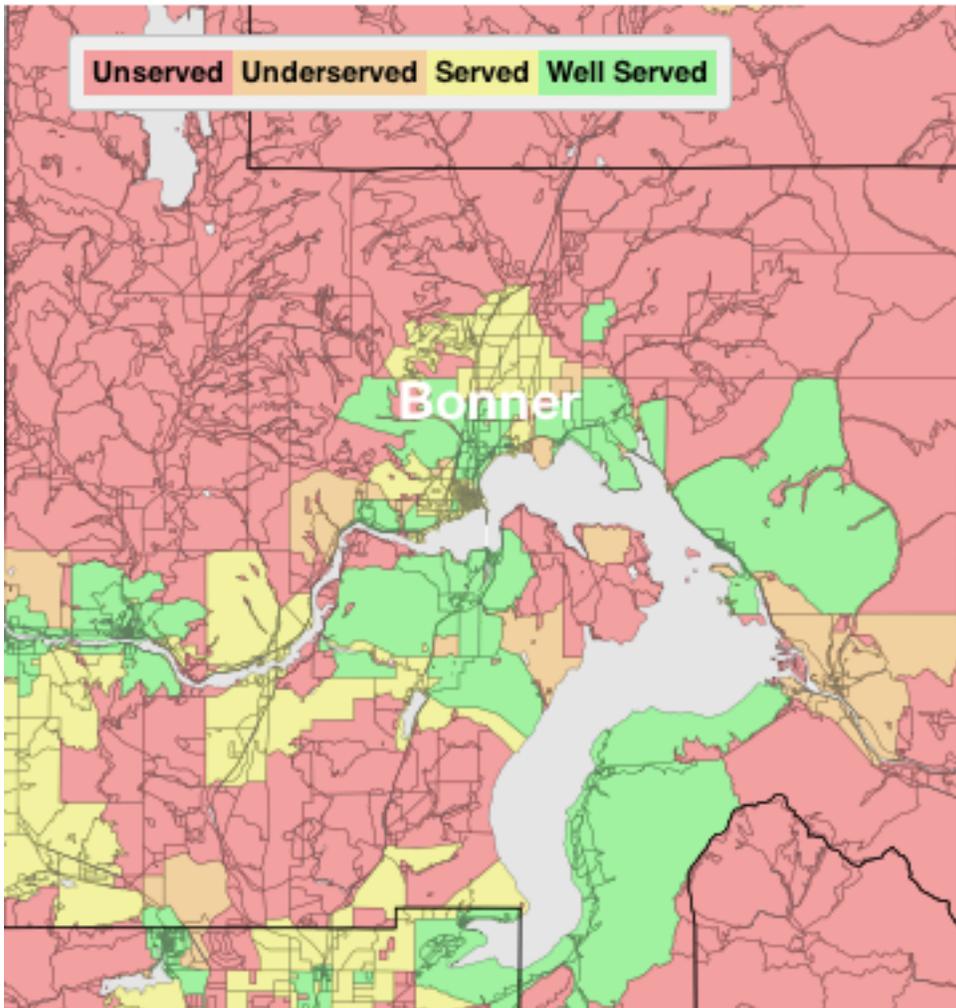
	EMPLOYMENT		VALUE OF SALES	
	<u>Number</u>	<u>Percent of County Total</u>	<u>Number</u>	<u>Percent of County Total</u>
Agriculture	950	4%	45,452,661	2%
Mining/Petroleum	108	0%	37,673,055	1%
Construction	2,332	10%	187,999,922	7%
Manufacturing	1,919	8%	680,593,193	26%
Transportation/Utilities	435	2%	136,776,471	5%
Trade	3,563	16%	275,748,389	11%
Real Estate/Banking	2,831	4%	334,974,345	13%
Professional/Technology	1,987	9%	156,197,893	6%
Health Care/Education	2,377	10%	144,403,637	6%
Hospitality/Entertainment	3,005	13%	175,281,266	7%
Other Services	1,847	8%	303,177,628	12%
Government	1,630	7%	125,846,333	5%
<b>TOTAL COUNTY</b>	<b>22,984</b>		<b>2,604,124,793</b>	

Source: MIG IMPLAN data

Bonner County is fortunate to have a fairly diverse economy with the highest concentration of employment in trade, hospitality and entertainment. However, in terms of economic output, manufacturing represents 26% of total county economic activity. As noted above, broadband is very important to the economic success of manufacturing enterprises. Many Bonner County businesses rely heavily on visitors who travel to the area for recreation and second homes. Again, in today’s economy, the length of stay for visitors as well as their safety while in the area is impacted by available broadband. Without adequate broadband businesses that rely on attracting, hosting and supporting the visitor population would be greatly disadvantaged. The booming real estate sector in Sandpoint utilizes broadband to market available properties and the community as a

whole. Because many of today's real estate customers looking for places in areas such as Sandpoint are digitally savvy, the community must be able to support those needs to convey value. There are many looking for second homes or full-time homes in recreation communities that will not consider locations lacking adequate mobile and high-speed wired options. These individuals must stay connected with their business, family and friends while in the area. Many of those choosing to move to the Sandpoint area start businesses from their home or telecommute.

### Wireline Broadband Service Levels in Bonner County



The above map illustrates that a substantial portion of the county is unserved by a wireline broadband provider (area in red). However approximately 27,000 people or about 67 percent of the total county population live in the immediate Sandpoint city region which is well served by wireline broadband with download speeds in excess of 6 Mbps or at least served by a wireline provider delivering a national standard speed for

broadband. Of note approximately a quarter of the Bonner County population do not have access to any wireline broadband service. However, when wireless broadband is considered, the available National Broadband Map data suggests that 97 percent of the County's population is well served. But it is important to recognized while wireless service is available throughout the county, the signal often lacks robustness and service can be spotty due to the difficult terrain throughout the county.

Because of the perceive importance, Bonner County economic development and municipal leadership have placed priority on strengthening connectivity to the Sandpoint area in particular. The Bonner County Economic Development Corporation has been working on a fiberoptic infrastructure project for the past several years, trying to bring fiber to homes and organizations in Sandpoint. The original project was in partnership with the Panhandle Area Council and was going to leverage taxable municipal bonds for financing. That project fell through when Blackfoot Communications, the potential anchor service provider backed out. Bonner County Economic Development Corporation continues to pursue the project for the Sandpoint area, but concerns about the project viability remain.

Another community challenge is redundancy and fiber route diversity. A redundant connection improves reliability and the potential economic loss of business down time. Also with multiple routes, there is usually competition which helps keep prices affordable.

Recently Sandpoint was named the 2013 Google eCity for the state of Idaho. The eCity Award recognizes the strongest online business community in each of the 50 states, and for Idaho, that was the destination town of Sandpoint. Google determines the eCities by looking at the ways that local businesses in those areas are using to web to connect with customers and contribute to their local economies. The search engine pulls the data from their advertising service, AdWords. A pool of businesses from the strongest cities is analyzed to determine how many of them are online, have a social media presence and to see if they allow eCommerce, among other categories. Points are given for each category that the business indicates with a yes..

This is further evidence of the extent Sandpoint businesses rely on broadband for their profitability and connection to the world. Interviews with local business and economic development leaders in Sandpoint indicate that while there is substantial reliance and use of broadband by area business, the current service still needs improvement to support those business needs. In particular higher speeds are desired as well as more competitive pricing. Currently a download speed of 24Mbps down by 2Mbps up can be purchased for around \$80 per month, whereas outside of town it costs around \$129 per month for 5.5Mbps down and 2Mbps up.

With a recent introduction of a new broadband infrastructure capability in downtown Sandpoint, the community is connected to the Internet with additional high-speed fiber.

Both the quality of new fiber technology being deployed to the community and competition is hoped to reduce the cost of high speed access to the community.

For example, Intermax, a service provider based in Coeur d'Alene provides a connection from the Bonner Cancer Center in Sandpoint to Kootenai Hospital in Coeur d'Alene via high-speed fiber service. With the higher speed capacity, doctors in Sandpoint can now connect with a network of doctors in Northern Idaho counties and there is greater bandwidth available for transmitting patient records and x-rays. This means that diagnoses can be made more quickly with better access to information. Intermax has also connected a Sandpoint bank to their Liberty Lake office in Washington.

Expanded connectivity speeds and service are important for growing existing businesses and attracting new ones to the community.

Sandpoint is trying to expand its economy and attract new businesses to the area. There are already many successful businesses and manufacturers located in Sandpoint like Litehouse Foods, Coldwater Creek, aeronautics companies, and some high-tech industry, including one company, Playexpert, which relocated from the Silicon Valley. Downtown Sandpoint currently has 11 vacant buildings and the city is trying to attract more technology-based businesses to the area. Enhanced connectivity can reduce costs of customer service for Coldwater Creek and improve profitability. With better connectivity, Litehouse Foodswould be able to connect with other offices' internal networks and access common data storage for manufacturing and inventory controls.

North Idaho College just relocated to downtown Sandpoint to take advantage of the high-speed broadband, which is important for delivering and accessing online video classes.

Verizon, Sprint and AT&T offer 3G and 4G mobile broadband service in the area. Wireless broadband is particularly important for the city's public works department, mapping, and police. Intermax has been offering microwave Internet service to folks located in the more rural areas of Sandpoint using Motorola Canopy (a fixed wireless technology) for many years. Mobile broadband is particularly important to the hospitality, recreation and real estate industries for which many jobs depend. While overall both mobile and fixed broadband connectivity is improving in the Bonner County area, additional investments will be needed to achieve economic and social impact, especially outside of the immediate Sandpoint area.

## Conclusion

Idaho like many western states is characterized by vast land area with limited population. While the majority of the population live in communities of all sizes where it is generally commercially feasible to provide broadband service, for the most part the service available in these areas is at or above the targeted 4 Mbps download speed prescribed by the National Broadband Plan.

However, 83 percent of Idaho's land area is not served or is presently underserved by a current wireline broadband service. About 210,000 people (or 14% of the state's population) currently live in these areas. Wireless carriers help fill the gap and in addition provide for important mobile broadband communication needs. But for states with extensive frontier and rural areas such as Idaho, meeting the challenge of making sure adequate affordable broadband service is available to all parts of the state is particularly important. This is because core economic sectors such as manufacturing, dairy, farming, as well as tourism and recreation are located in these outlying areas and like all businesses they depend on available broadband to be successful. Rural counties such as Bonner seek to diversify their local economies attracting more manufacturing and technology industries; while providing the 21<sup>st</sup> Century infrastructure needed to support the core visitor and real estate businesses. This is in addition to meeting the health care, education and other core services needed for sustainable rural communities. However, without affordable quality broadband, these efforts at economic diversification are difficult. Without adequate affordable broadband across the state the digital divide will grow, communities will be increasingly limited in how they can participate in economic opportunity and the rural fabric of Idaho will continue to be challenged.