

The Fate of Rural America in the Information Age: An Introduction and Preliminary

Application of the 4C's Theory

Sheila Sager

Marsha Ann Tate

Institute for Information Policy  
College of Communications  
The Pennsylvania State University

Paper presented as a Poster Session at the 2004 Association for Education in Journalism  
and Mass Communications (AEJMC) Conference, Toronto, Ontario, Canada



Abstract

Using data gathered for five rural counties in North Dakota and Pennsylvania, this paper frames rural high-speed Internet access in terms of the 4C's theory: context, connectivity, capability, and content. Our analyses suggest that there are significant variations between the two states and among individual counties. Nonetheless, despite these variations, in order to sustain socio-economic success, each of the 4C's must be considered both individually and collectively in all of the cases.

The fate of rural communities in the Information Age is inextricably linked to the quality and speed of access to telecommunications platforms that provide high-speed Internet connectivity, services, and content. As a public policy goal, access to the telecommunications infrastructure provides three levels of value to rural communities—civic, economic, and quality of life. For rural communities faced with decades of struggle against the penalties of isolation, high-speed telecommunications access offers nothing less than the opportunity for a rich quality of life; a quality of life with the potential of an asset capable of generating income (Blizinski & Schement, 1999; Forbes & Schement, 1999; Schement, 2001; Schement & Forbes, 1999).

Although rural broadband access is improving, rural areas still lag behind their urban and suburban counterparts (National Telecommunications and Information Administration [NTIA], 2000, p. xv). Moreover, the issue of information access in rural America extends beyond broadband access. Given the limited availability of alternate information assets broadband access therefore becomes even more critical for the survival for rural communities.

However, access to telecommunications services by itself does not guarantee socioeconomic sustainability for rural America. Indeed, while we acknowledge the integral role played by telecommunications access in rural development strategies, we further argue that a number of additional resources are also necessary for a rural community to successfully achieve full access and participation in an Information Age economy and society. These resources can be grouped into four determinants of access, namely: context, connectivity, capability, and content—hereafter referred to as the 4C's theory. While the 4C's theory distinguishes between the four determinants, it also acknowledges

the multi-layered interrelationships between the determinants and their potential influence as a collective force.

Using data gathered for five rural counties in Pennsylvania and North Dakota, this paper frames rural high-speed Internet access in terms of the 4C's theory. It should be noted that since no two rural areas are identical, broad generalizations for rural America should not be made from these findings. Nonetheless, other rural areas can derive valuable insights from a case study of these counties.

Rural America stands at a crossroads. Across the United States, agriculture and extractive industries have been in decline since World War II. Industrialization, widely hailed as the remedy for rural poverty and unemployment during the 1960s and 1970s, did not prove to be the panacea many predicted. In fact, over the past two decades, manufacturing jobs have increasingly been replaced by low-wage service sector employment (Kassab et al., 1995). Although manufacturing continues to provide the most important source of high paying jobs in many rural communities, the recent recession has proven once again the specific vulnerability of those occupations (U.S. Department of Agriculture [USDA], 2003c; Wilkerson, 2001). Since 2000, non-metro areas have lost 19% of their manufacturing jobs; whereas, comparable jobs in urban areas declined 14%. To make matters worse, traditional rural industries such as wood products, textiles, apparel and leather were hit with the biggest job losses. Employment in the textile and apparel industries alone declined by more than 25% since August 2000 (USDA, 2003d; Wilkerson, 2001).

Recent poverty statistics further underscore the economic crisis facing rural America. Historical poverty rates in rural areas continue to lead the nation. In 2001, out

of a total rural population of 49 million residents, approximately 7.5 million rural residents (14.2%) were living in poverty, compared to 11.1% of residents in metropolitan areas (USDA, 2003b, 2003d, 2003e). In the traditionally poor areas of Appalachia, many counties experience poverty rates in excess of 20%, with children especially at risk. In 2000, while 19% of rural children under age 18 were poor, the comparable figure for urban children is 15% (USDA, 2003a). And, while the rural unemployment rate remains slightly lower than the urban rate (5.6 % vs. 5.8 %), rural earnings are considerably lower. In 2001, median household income in rural areas was \$33,601 compared to \$45,219 in metro areas (USDA, 2003d).

Not surprisingly, a persistently sluggish rural economy has motivated substantial out migration. Although the non-metropolitan population increased modestly by 10% in the 1990s, over 25% of non-metropolitan counties lost population during the decade. Remote, agriculturally dependent counties suffered the steepest population declines. Over half of these counties had fewer people in 2000 than in 1990, and in over a third of these places the loss exceeded 5% (McGranahan & Beale, 2002). Yet, at the same time, the U.S. population grew by a record 32.7 million, with most of this increase occurring in places within and adjacent to metropolitan areas (U.S. Census Bureau, 2001).

In this paper, we examine the conditions under which ten rural counties (five counties in North Dakota and five in Pennsylvania) experience the Information Age. North Dakota and Pennsylvania reflect the American rural experience. Their similarities attest to the success of the establishment of a single national culture. Nevertheless, variations persist, and it is those variations that pose challenges for the making of policy, federal and state.

With this in mind, the first section of the paper provides an introduction to the 4C's theory: context, connectivity, capability, and content. Thereafter, each component of the theory is addressed individually with examples drawn from selected counties with the goal of testing the individual components of the 4C's theory and their relationship and interdependence upon one another.

The policy basis for the analysis stems from the strong stance taken by Congress in support of rural access, as expressed in section 254 of the Telecommunications Act of 1996. That is, in the United States, regardless of whether individuals reside in the middle of Philadelphia or amidst the Badlands of North Dakota, they are entitled to connect, if they so wish, to the nation's telecommunications and information infrastructure. Specifically, "access in rural and high cost areas" is one of the guiding principles underlying "... the preservation and advancement of universal service:"

Consumers in all regions of the Nation, including low income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas (47 USCS § 254 (2003)).

Residents of rural America are less likely to access the Internet than their urban or suburban counterparts. Those who do use the Internet are even less likely to connect via broadband networks (NTIA, February 2002; Kruger, 2002). Broadband options are simply lacking in many areas of rural America. In many cases if telephone systems have Digital Subscriber Line (DSL) capabilities they are not necessarily available (Strover, 2003). Although access is often seen as the primary barrier for rural users, it is not the

only barrier. Additional barriers to access include affordability, content, universal service issues, economic status, and more.

The North Dakota and Pennsylvania counties selected for this study qualify as rural under most, if not all, of the definitions of *rural* accepted by the U.S. government.<sup>1</sup> Data from the following counties make up the body of the study:

- **North Dakota:** Benson, Divide, McIntosh, Ramsey, Sioux.
- **Pennsylvania:** Bradford, Clinton, Forest, Potter, Sullivan.

All of these counties share the designation *rural*. However, the counties of North Dakota represent some of the least densely populated counties in the United States, with the exception of Alaska, while the Pennsylvania counties represent some of the most densely populated rural counties in the country. Table 1 provides a brief introduction to the contrasts between North Dakota and Pennsylvania.

If there is a salient fact to keep in mind while reading this paper, it is that population dispersal confronts public institutions, from telecommunication firms to public libraries, with the problem of high delivery costs due to the great distances between homestead and small towns. In one way or another, beginning with demographics, all of the information structures and telecommunications deployments discussed reflect this one maxim.

#### The 4C's Theory

As noted earlier, access to telecommunications services will not, by itself, guarantee success for rural communities (Malecki, 2003). The other side of the equation requires an understanding of the resources a rural community must acquire to gain full access to the national network. Over the past 10 years a variety of e-readiness indicators have been developed. However, they mainly focus on the national or economic sector level, and so are not directly applicable to community assessments (Bridges.org, 2001)<sup>2</sup>.



The purpose of the 4C's theory is to develop practical e-readiness indicators that are applicable at the community level based upon four primary determinants or *4C's* of access: context, connectivity, capability, and content. Notwithstanding the obvious desirability of telecommunications access, an understanding of the techno-socio-economic determinants of access is necessary, if successful strategies are to be recommended; and, as such, the determinants of access can best be understood within the framework of the 4C's theory (Schement, 2003; Schement & Tate, 2003).

North Dakota and Pennsylvania, the settings for this paper, reflect the diversity of rural America. Each state offers rich farmland, North Dakota at the western end of the Great Plains and Pennsylvania astride the Appalachian Mountains. Their histories span the rural experience, while their topographies challenge efforts to overcome isolation. Pennsylvania and North Dakota stand at the crossroads of the Information Age, as do other states transitioning out of an industrial past. Once, these states respectively served as the blast furnace of America's industrial engine and the heart of its agricultural bounty. Today, however, Pennsylvania and North Dakota languish behind the rest of the country's economy as they painfully follow the path from an agricultural and manufacturing-centered economy to an economy focused on the production and distribution of information. After all, the rise of the information society and economy locates the telecommunications infrastructure that supports it at center stage; so that, when access lags, it drags everything else with it. As Parker (2000) argues, "rural communities not connected to our emerging broadband network will suffer the same economic fate as many communities that were bypassed by the telephone network, the railroad or the Interstate highway system" (p. 2). That is, those communities whose information and

telecommunications infrastructures lag behind urban areas will descend into a spiral of decline that may be irreversible. In the absence of information and telecommunications infrastructure it becomes harder to retain existing businesses and attract new ones. Consequently, with the disappearance of employment opportunities, the population drops, leading to the disappearance of basic services and institutions. And, once this slide begins, public, and especially private, disinvestment almost inevitably follows. Eventually, the social and economic fabric becomes so threadbare that the community is no longer viable, especially when the residents left behind tend to be the ones who were most vulnerable and least connected to local institutions in the first place.

For rural communities of the 21<sup>st</sup> century, achieving telecommunications parity holds the same importance as Rural Free Delivery (RFD) in the 19<sup>th</sup> century, electrification did in the 1930s, and the Interstate Highway System in the 1950s. Unfortunately, many communities lack access and are in danger of being left behind once again. If America's rural communities are to compete in a global economy interwoven by global telecommunications networks, then those communities must have access to those networks at a level of connectivity that matches or surpasses emerging standards of bandwidth. In an era when the potential of information and communication technologies exceeds our collective imaginations, to stand by while rural communities fade away reflects willful blindness at best or at worst gross negligence.

### *Context*

Context encompasses the historic, cultural, environmental, socioeconomic, and demographic characteristics of a community. As a first step in this process, communities can begin by identifying those easily measured factors that are usually associated with

economic and community development. These include regional economic trends, changing local employment patterns, land use change, transportation, zoning, public utilities, distance from major highways and metropolitan areas, educational resources, number of civic groups and voluntary organizations, networks between these groups and organizations, formal and non-formal leadership networks, demographic change, educational attainment, and physical amenities. - consumer/business confidence, young residents going on to college that return to the area, locally owned businesses, business turnover rate, and so forth.

Of course, sustainable community development also requires an understanding of the environmental issues and social equity concerns. To assess environmental health, communities can identify and measure wetlands, open space and land consumption, water supplies, garbage and other wastes, sources of air and water pollution, and wildlife habitat. Potential indicators of social equity include the cost of living, the poverty rate, unemployment, homelessness, the high school dropout rate, crime, drug abuse, and hunger. Because sustainable community development is a fairly new concept, environmental and equity indicators are not as well developed as economic measures. However, as more and more communities attempt to become more sustainable, the number of indicators has grown rapidly. For example, Sustainable Seattle, Washington and Jacksonville, Florida have developed over 100 indicators (Sustainable Seattle, 1998; Jacksonville Community Council Inc., 2003). Sustainable Pittsburgh has used both of these lists to create a set of indicators adapted for that city (Sustainable Pittsburgh, 2002). Other communities can follow Pittsburgh's example and tailor generic indicators to local conditions.

Context is important because it provides the foundation upon which any development strategy rests. Context affects, population growth trends, economic development, interactional networks and the community's relationship to the environment. Realistic plans can only be made if a wide array of internal and external forces and trends are carefully considered. And although context does not determine a community's developmental trajectory, it does suggest what kinds of barriers are likely to be encountered, and perhaps more importantly, what kinds of assets the community possesses. Finally, because context changes over time, it is helpful to develop baseline measures of different dimensions of local life that can be used to assess development over time.

North Dakota—settled during the era of American Westward expansion—sits on the western apron of the Great Plains where the prairie stretches from horizon to horizon. There, outsized tracts of arable land encourage large farms with widely dispersed settlement patterns made up of tiny towns and individual farmhouses. As Remele (1989) notes, "... the essential problem remains the same as a century earlier--finding the capital necessary to provide services and benefits of a modern society to a far-flung population." Despite growing urbanization--since the late 1980's, the majority of North Dakotan's live in urban rather than rural areas--the state's total population has yet to reach one million, while its rural residents live more widely dispersed than did their great grandparents one hundred years ago.

Pennsylvania—one of the original thirteen colonies—exemplifies the earliest phase of nation building. Its mountains run parallel from southwest to northeast, forming barriers that channeled colonial farmers into isolated valleys. Each valley produced one

or more towns to provide markets for local farmers; and, as it has since its founding, agriculture remains Pennsylvania's largest industry, though the state boasts a diversified economy encompassing a wide range of traditional and knowledge-based industries.<sup>3</sup> Total population exceeds twelve million, with the largest portion of the populace concentrated in two major metropolitan areas—Pittsburgh and Philadelphia. Nevertheless, the state's rural population is sizable; Pennsylvania includes 2,567 municipalities, ranking 6th<sup>4</sup> among the states and proof of the persistence of rural community life. Then and now, Pennsylvania contains one of the largest rural populations in the country with 15.4% of the population living in non metro counties in 2000; and, especially in the eastern half of the state, many of its small towns are the same ones recorded in the census of 1790 (USDA, 2002c).

Population growth trends for the two states differ markedly. North Dakota's rural areas have experienced continued out-migration while the majority of Pennsylvania's rural areas have been experiencing population growth. As a window into the rural future, an appreciable amount of Pennsylvania's rural growth can be attributed to the emergence of a "commuter society" wherein individuals and families who formerly resided in New York City or Philadelphia, for example, relocate their residences to rural areas while keeping their jobs in the city (Yes, some Pennsylvania residents commute to New York City on a daily basis.). No such growth pattern seems likely in North Dakota given the spread of rural population beyond its metropolitan areas; especially since metropolises in North Dakota all number less than 100,000 inhabitants (i.e., Bismarck 55,532; Fargo 90,599; Grand Forks 49,321; Minot 36,567).

*Connectivity*

In the Information Age, rural Americans must achieve access to the national information network, in order to realize the promise of democracy and share the good life; indeed, for rural citizens who live geographically isolated from the seats of government, access to telecommunications channels may well offer the only opportunity to participate in political discourse. Equally, America's economy depends on information networks to distribute economic goods and services; and, as such, the economic benefits of an interconnected telecommunications network accrue to all of the individuals on the network. Furthermore, access to communication services available from the network offers benefits in a broad cultural sense; that is, Americans experience a high standard of quality of life precisely because they can communicate and retrieve information in order to make a wide range of life enhancing choices. When residents of rural communities enjoy access, they and society benefit meaningfully; but, when some experience geographic isolation, compounded by telecommunications services of quality lower than those in cities, the potential for alienation grows and all of society suffers. Access to high-speed Internet connectivity is also a function of affordability. Organizations in rural communities often pay two to four times the cost for high-speed bandwidth in urban and suburban communities.

The 1996 Telecommunications Act defines high-speed Internet as connection speeds above 256 kbps. However, higher connection speeds are required to effectively utilize many WWW applications in use today and these bandwidth requirements are expected to grow. Telemedicine applications that could provide rural hospitals and health

clinics access to specialists, telepharmacy services, and video teleconferencing require 1.5 mbps (T1.5) connections.

Many Internet business applications require bandwidths of at least T1.5 or multiple T1.5 connections. Rural businesses industries are at a disadvantage unless they have access to high-speed Internet that permits them to provide goods and services to large corporations across the world. Many businesses are unwilling to locate in communities that don't have redundant access to the Internet backbone.

The federal, state and local governments are increasingly utilizing high-speed Internet to provide information and services to businesses and residents. Some e-government applications such as Web based Global Information Systems (GIS) or video teleconferencing currently requires T1.5 access speeds. High-speed connectivity also provides students in rural school districts with access to educational resources normally available in larger school districts.

The level of a community's high-speed connectivity can be measured in many different ways: a) points of access – availability at public sites such as schools, libraries or community centers, in the home, in businesses or institutions, b) the number of Internet Service Providers (ISPs) that offer high-speed Internet service in a community, c) and the type and speeds of service offerings available from high-speed Internet providers – DSL, cable modem, wireless, T1.5, DS3, etc.). The next section examines the range of information assets available to residents of the 10 counties in the study.

### *Newspapers*

As small newspapers lose out to big papers, and as conglomerates shut down the small town press, North Dakota and Pennsylvania remain the exceptions. North Dakota has 10 total daily newspapers, while Pennsylvania has 83 (U.S. Census Bureau, 2002e). The relatively high incidence of newspaper readership correlates with the older average age of North Dakotans and Pennsylvanians, since older individuals are more likely to read newspapers.

As Table 4 illustrates, larger counties (e.g., Bradford and Clinton counties) are served by one or more daily newspapers while smaller counties such as Forest and Divide are served solely by weeklies. The larger counties also tend to have newspapers in adjacent counties that partially/fully cover their areas (e.g., Elmira New York's *Star-Gazette* in the case of Bradford County and the *Williamsport Sun Gazette* and *Centre Daily Times* in the case of Clinton County).

### *Public Libraries*

Public libraries perform an important role in rural life because they serve to connect rural residents to the Internet, when no other connection is available. Nationally, 75% of Internet users patronize public libraries, while 60% of library users also go online (Rodger & D'Elia, 2000). At present, because almost all public libraries – 98.7% – maintain an Internet connection, functional access extends to nearly every American without household Internet connectivity (Bertot, McClure, & Thompson, 2002, p. 4).

When public libraries install public access computers, increases in patron traffic follow; and, when computer use goes up, so too does book circulation. For residents of disadvantaged communities, public libraries bridge access gaps and make a difference. If



the promise of universal access is to become a reality, institutions of the public sphere, especially libraries, must provide Internet connectivity to those individuals unable to link to the Internet from their homes.

North Dakota's libraries are funded largely via public monies whereas Pennsylvania's public libraries rely upon a mix of public, state, federal, and private funding. 316,599 Pennsylvanians and 63,996 North Dakotans are unserved by libraries (*American Library Directory, 2003-2004*). However, according to Pennsylvania's Office of Commonwealth Libraries, all of the Pennsylvania counties included in the current study are served by at least one public library, and in many instances the counties are served by three or more public libraries (i.e., Bradford County (9); Clinton County (3); Potter County (5) (Pennsylvania, Office of Commonwealth Libraries, 2000). While Pennsylvania is home to 459 public libraries compared to North Dakota's 82 libraries, North Dakota boasts 3.66 volumes per capita while Pennsylvania offers only 2.51 volumes. In North Dakota, 13 bookmobiles serve populations living some distance from the state's public libraries whereas Pennsylvania has 31 bookmobiles serving its more remote patrons (*American Library Directory, 2003-2004*; Chute, et al., 2003). In FY 2001, 75.6% of all libraries in North Dakota had access to the Internet while 98.9% of libraries in Pennsylvania had access.

### *Telephone*

The telephone serves as a primary telecommunications link between individuals both nearby and far away. Lack of telephone service creates a significant barrier to job searching, access to public services, health and safety, as well as one's general contributions to society. After all, if someone lives without a television or a radio, his or

her choice might be interpreted as a charming social rebellion or the adoption of an idiosyncratic lifestyle; but when a person lacks access to a telephone, he or she is functionally isolated. For rural populations, the telephone plays a vital role in the health care, business, and social spheres. When rural populations use telephone lines to access the Internet, its value in everyday life increases yet further. Thus, telephone service acts as one's passport to the economy, to social networks, and to political discourse.

In general, we can say that there is a strong correlation between income and telephone penetration, but income does not operate in a vacuum; other factors compound or lessen the income effect (such as renting a housing unit). We can note that households receiving any kind of government assistance fall below national telephone penetration levels. Likewise, women heads of households with children fare poorly. The unemployed suffer inordinate loss of telephone service. And through it all, minorities, especially Indians, fall to the bottom of nearly all categories.<sup>5</sup>

FCC data indicate that telephone penetration in North Dakota decreased by -0.3% between 1984 and 2001 (i.e., from 94.6% in 1984 to 94.4% in 2001). During the same period, telephone penetration in Pennsylvania went from 94.9% to 97.0%, a 2.2% increase (FCC, 2002). Citing statistics from the U.S. Department's of Commerce, Education, and Labor, the Children's Partnership (2002) notes that "among North Dakota's children, 6% or 11,000 do not have a phone at home" and that the state "... ranks 32nd among states in providing children with access to a phone at home." Pennsylvania fares somewhat better in these areas according to the Children's Partnership (2002). For example, it ranks "... 8th among states in providing children with access to a phone at home."

*Radio and Television Broadcasting*

As shown in Tables 6 through 9, few, if any, of the counties in the study serve as a home base for commercial television stations<sup>6</sup> although some of the counties are home to two or more AM and/or FM stations such as Clinton and Bradford counties in Pennsylvania. Pennsylvania counties such as Bradford, Clinton, and Sullivan also have an advantage over many of their North Dakota counterparts in the study in regards to television and radio broadcasting since they are located within the listening/viewing area of metropolitan stations located in the general region. For example, most Bradford County residents can readily receive radio and television broadcasts from Elmira and Binghamton NY, Wilkes-Barre Scranton, PA and so forth. In some instances in both states, such as in Potter County, residents living in the higher elevations of the county or near the border can also receive Canadian television broadcasts. In the case of North Dakota, television stations "serving" rural counties studied here are solely retransmissions from stations serving Bismarck or other larger cities in the state.

Concerns over a lack of diversity of ideas in rural America are well taken. Rural residents in these counties may find themselves limited to a retransmission station that does not carry local information. And, while satellite relayed channels offer an expanded menu of information for those who can afford the service, local information remains confined to a weekly newspaper. *Cable and Satellite*

According to the National Cable and Television Association (2003), 67% of homes with TV subscribe to cable TV. North Dakota falls just below the national average with 63% of households subscribing to cable while Pennsylvania is well above the national average. with 79% of households with TV subscribing to cable. Table 10

provides a statistical overview of the cable systems for both states in the study while Tables 11 and 12 provide further details about the individual cable systems serving the ten counties.

Pennsylvania's geography, those same mountains that prompted 18<sup>th</sup> century settlement in valleys, also provoked the 20<sup>th</sup> century growth and development of cable television. As a result, Pennsylvania is home to both large and small cable operators that serve cities and towns, where cable services range from small 50 year-old systems with 12 channels, to sprawling urban systems with hundreds of channels. The irony is that cable first developed to serve rural homes unable to receive broadcast television signals. Now, those rural communities find it difficult to attract advanced cable providers because the economies of scale of laying cable make the density of urban markets far more attractive. In the last half century, a significant slice of Pennsylvania's rural population has become exurban; thus, where proximity to metropolitan centers allows for economical cable system expansion, merging towns have benefited.

As of March 2004, two of the primary satellite television providers, DISH Network and DIRECTV offer local channels in 60 markets (DISH Network, 2004; DIRECTV, 2004). Currently, the only market in Pennsylvania or North Dakota that can receive local channels from DIRECTV is the Philadelphia market although the Fargo-Valley City, North Dakota market is scheduled to begin receiving local channels in the 2<sup>nd</sup> quarter of 2004 (DIRECTV, 2004). On the other hand, the DISH Network offers local programming for the following markets in Pennsylvania: Johnstown-Altoona, Harrisburg, Philadelphia, Pittsburgh and Wilkes-Barre. while no local programming is available in North Dakota at the present time (DISH Network, March 31, 2004).

*Internet*

In North Dakota, 47% of households do not own a computer and 54% do not have Internet access" which they also note is below the national averages of "... 43% and 49% respectively." Moreover, "71% of households in North Dakota earning less than \$15,000 per year do not own a computer and 75% do not use the Internet at home" compared to the national average "... of 77% and 82% respectively" (Children's Partnership, 2002).

In Pennsylvania, 47% of households do not own a computer, although fewer PA households--51%--lack Internet access. Moreover, "... 80% of households in Pennsylvania earning less than \$15,000 per year do not own a computer and 83% do not use the Internet at home" (Children's Partnership, 2002).

Tables 13 through 16 are excerpted from The FCC's December 2002 and December 2003 reports, *High-speed services for Internet Access: Status as of June 30, 2002 and 2003*. As the tables indicate, North Dakota has experienced somewhat differing growth patterns in regard to high-speed Internet access and related areas although these differences appear to be narrowing somewhat over time. Maps 3 through 8 illustrate cable modem coverage and DSL enabled wire centers in the state of Pennsylvania. Map 3 shows an overview of coverage for the entire state of Pennsylvania. This map clearly shows large pockets of underserved areas, especially in the Northern part of the state. Maps 4 through 8 provide a more detailed examination of coverage in the five Pennsylvania counties. The maps for Forest and Sullivan Counties indicate that cable modem service is not currently available in either county.

In general, North Dakota and Pennsylvania lag behind national averages though not by a major percentage spread. It would seem that the lag in North Dakota occurs in the rural

counties, since they do not possess much in the way of access. For Pennsylvania, the stories differ somewhat. The inner cities of Pennsylvania's two large metropolises also lag behind the state average; here it would appear that rural communities suffer lack of access comparable to the inner cities.

### *Capability*

Because the utility of any technology derives directly from the skill of the user, as well as from the delivery capacity of local institutions, a measure of capability gauges the abilities to deliver or acquire the service. For both individuals and institutions, capability encompasses both formal and informal educational attainment, levels of technical sophistication and understanding, as well as the willingness to adapt to new technologies and ways of thinking. At the institutional level, capability also relates to the amount of resources a community and its businesses commit to workforce development including teaching effective use of information technology tools, encouraging creativity, productivity, and innovations of local entrepreneurs. For example, do businesses in the community provide professional training programs for Information Technology (IT)? Are community IT education programs available to residents? In order to make optimum use of telecommunications, a community must systematically examine and monitor the knowledge and skills as well as identify core competencies required to survive and thrive in the dynamic economic environment of the 21<sup>st</sup> century. In its broadest sense, capability is defined by how individuals and the community as a whole can deliver at the present time but more importantly, their future potential as well.

High school graduation rates, post-secondary education levels as well as exposure to and knowledge about computers and the Internet provide selected individual

measurements of capacity. At the institutional level, capacity can be measured through interviews of community leaders, businessmen, local government officials among various other methods. The amount and extent of a community's Web presence can also help provide a measure of capability since it demonstrates how local institutions currently use advanced technologies and their level of sophistication. The quantity, type, and ownership of Web sites in the community, the number of transactional Web sites (i.e., sites that allow visitors to conduct financial or other transactions electronically from the site), the frequency of updates of the Web content provided are just some of the indicators that can be used as measurement tools.

### *Content*

Content is interdependent upon the other three C's. Once individuals and communities become connected and have the capabilities and necessary skills to use the Internet they need a reason for use. If content that is relevant to individuals and members of the community is not available it will be difficult to encourage use. Content is necessary because it provides a window to the outside world.

Content can be measured in several ways. One way to measure content is to assess the amount of local content available to individual communities. Do they have a daily newspaper, local radio stations or local broadcast television stations? The presence or absence of other sources of local content could be a good indicator of a communities need for content. Many rural communities no longer have their own daily newspaper; a larger paper in the closest metro area serves them. Often this content is reduced to a monthly page of community information in a larger metropolitan paper. Other ways to measure content would be to determine if the chamber of commerce has a Website, if a

community portal exists and if local government, non-profits, businesses, educational institutions and individuals have a web presence. Simply offering a Web presence is not enough to provide content to communities.

### Conclusion

The methodological strategy used is not without limitations. First, restricting the analysis to two states limits the generalizability of findings. However, the rural diversity of North Dakota and Pennsylvania may help mitigate this problem. Pennsylvania has the second largest rural population in the nation and contains a wide array of community types while North Dakota has a lower concentration of population per square mile and a significant proportion of the lands are federally owned. Moreover, the economic base of rural Pennsylvania is extremely heterogeneous, ranging from traditional agriculture, forestry, and other natural resource extraction enterprises, to a diversified manufacturing structure (both durable and non-durable, high-tech and low-tech), to a large service sector, to a growing population of retirees. Finally, rural Pennsylvania displays a markedly uneven pattern of development. For instance, the eastern portion of the state contains rural communities that are experiencing rapid population and residential growth as a result of exurban sprawl from the New York, Philadelphia, Baltimore, and Washington D.C., metropolitan areas. In contrast, the western region of the state contains many rural communities that once thrived on agriculture, mineral extraction (coal and oil), timber harvesting, and, more recently, manufacturing. Over the past several decades, these communities have dwindled in size and economic prospects and now have little apparent hope for revitalization. Not surprisingly, poverty rates, adequacy of services, access to transportation systems and a number of other social and economic indicators



reveal sharp differences in the development patterns of these two regions. In combination, these factors suggest that the selection of Pennsylvania as a study site will enable us to generate findings that are applicable to rural communities in other parts of the nation. The selection of these cases poses a similar threat to generalizability. While such a design would be poorly suited to formal hypothesis testing in a broad spectrum of research settings, its use in this study will allow us to describe in detail the availability of connectivity and content plus the degree of capability and social context for each community. Such information is invaluable to local decision-makers, business executives, policy-makers, social researchers, and citizen groups. Thus, although we realize that a case study approach sacrifices the generalizability associated with the use of large comparative data sets, we believe that the practical uses to which the findings can be put more than offset the limitations.

## References

- The American Library directory 2003-2004: Vol. 1. Libraries in the United States* (56<sup>th</sup> ed.).  
Information Today.
- Bertot, J. C., McClure, C. R., & Thompson, K. M. (2002). *Public libraries and the Internet 2002: Internet connectivity and networked services*. Tallahassee, FL: School of Information Studies, Florida State University Information Institute. Retrieved March 31, 2004, from <http://www.ii.fsu.edu/Projects/2002pli/2002.plinternet.study.pdf>
- Blizinski, M., & Schement, J. R. (1999). Rethinking universal service: What's on the menu. In B. A. Cherry, S. S. Wildman, & A. S. I. Hammond (Eds.), *Making universal service policy: Enhancing the process through multidisciplinary evaluation* (pp. 69-83). Mahwah, NJ: Lawrence Erlbaum Associates.
- Bridges.org. (2001, March). *Comparison of e-readiness assessment models*. Washington, DC: Author.
- The Children's Partnership. (2002). *North Dakota: Youth and technology fact sheet*. Author. Retrieved February 25, 2003, from [http://www.childrenspartnership.org/youngamericans/statefacts\\_nd.html](http://www.childrenspartnership.org/youngamericans/statefacts_nd.html)
- The Children's Partnership. (2002). *Pennsylvania: Youth and technology fact sheet*. Author. Retrieved February 25, 2003, from [http://www.childrenspartnership.org/youngamericans/statefacts\\_pa.html](http://www.childrenspartnership.org/youngamericans/statefacts_pa.html)
- Chute, A., Kroe, E., O'Shea, P., Polcari, M., & Ramsey, C. J. (2003). *Public libraries in the United States: Fiscal year 2001*. Washington, DC: National Center for Education Statistics.

- Cromartie, J., & Swanson, L. (1996). Census tracts more precisely define rural populations and areas. *Rural Development Perspectives, 11*(3).
- DIRECTV. (2004, March 31). *DIRECTV local channels*. Retrieved March 31, 2004, from <http://www.directv.com/DTVAPP/LocalChannelsAction.do>
- DISH Network. (2004, March 31). *Local channels*. Retrieved March 31, 2004, from <http://www.dishnetwork.com/content/programming/locals/index.shtml>
- Economic Development Association of North Dakota. (2000). *Economic development & technology: A guidebook*. Bismarck, ND: Author. Retrieved February 23, 2003, from [http://www.westgov.org/wga/initiatives/ND\\_econ\\_guide.pdf](http://www.westgov.org/wga/initiatives/ND_econ_guide.pdf)
- Federal Communications Commission. (2002). Table 2: Telephone Penetration by State. In *Telephone subscribership in the United States (Data through November 2001)*. Washington, DC: Author
- Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau. (2002, December). *High-speed services for Internet access: Status as of June 30, 2002*. Retrieved February 24, 2003, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1202.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1202.pdf)
- Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau. (2003, December). *High-speed services for Internet access: Status as of June 30, 2003*. Retrieved March 31, 2004, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1203.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1203.pdf)

- Forbes, S. C., & Schement, J. R. (1999). Changes abound: The Internet and universal service. *NATOA: The Journal of Municipal Telecommunications Policy*, 7(3), 27-29.
- Jacksonville Community Council Inc. (2003). *2003 Quality of Life Progress Report: A guide for building a better community*. [Jacksonville, FL]: Author. Retrieved March 31, 2004, from <http://www.jcci.org/qol/Quality%20of%20Life%20Indicator%202003.pdf>
- Kassab, C., Luloff, A. E., & Schmidt, F. (1995). The changing impact of industry, household structure, and residence on household well-being. *Rural Sociology*, 60(1), 67-90.
- Kruger, L. G. (2002, June 27). *Broadband Internet access and the Digital Divide: Federal assistance programs*. [Washington, DC]: The Library of Congress, Congressional Research Service. Retrieved March 31, 2004, from <http://usinfo.state.gov/usa/infousa/tech/reports/rl30719.pdf>
- Malecki, E. J. (2003). Digital development in rural areas: Potentials and pitfalls. *Journal of Rural Studies*, 19(2), 201-214.
- McGranahan, D. A., & Beal, C. L. (2002). Understanding rural population loss. *Rural America*, 17(4), 2-8.
- National Cable & Telecommunications Association. (2003). *Industry overview*. Washington, DC: Author. Retrieved April 1, 2004, from <http://www.ncta.com/Docs/PageContent.cfm?pageID=302>
- National Telecommunications and Information Administration. (2000, October). *Falling through the net: Toward digital inclusion : A report on Americans' access to*

*technology tools*. [Washington, DC]: Author. Retrieved March 30, 2004, from <http://search.ntia.doc.gov/pdf/fttn00.pdf>

National Telecommunications and Information Administration. (2002, February). *A nation online: How Americans are expanding their use of the Internet*. Washington, DC: Author. Retrieved March 31, 2004, from [http://www.ntia.doc.gov/ntiahome/dn/Nation\\_Online.pdf](http://www.ntia.doc.gov/ntiahome/dn/Nation_Online.pdf)

Parker, E. B. (2000). Closing the digital divide in rural America. *Telecommunications Policy*, 24(4), 281-290.

Pennsylvania Bureau of Market Development. (2000). *Agriculture: Pennsylvania's number 1 industry*. [Harrisburg, PA]: Commonwealth of Pennsylvania. Retrieved February 19, 2003, from <http://www.agriculture.state.pa.us/market/cwp/view.asp?a=3&Q=115874&marketNav=|5401|>

Pennsylvania, Office of Commonwealth Libraries. (2000?). *2000 directory of Pennsylvania Libraries*. [Harrisburg, PA]: Author.

Remele, L. (1988). North Dakota history: Overview and summary. In North Dakota. Secretary of State. *1989 North Dakota blue book*. Retrieved February 16, 2003, from <http://www.state.nd.us/hist/ndhist.htm>

Rodger, E. J., & D'Elia, G. (2000). *The impacts of the Internet on public library use: An analysis of the current consumer market for library and Internet services*. [Evanston, IL]: Urban Libraries Council. Retrieved March 31, 2004, from <http://www.urbanlibraries.org/pdfs/finalulc.pdf>

Rowe, B. (2003, May). Rural technology deployment and access: Successes upon which to build. *Government Information Quarterly*, 20(2), 85-93.

R. R. Bowker. (2003). *Bowker's news media directory, Volume 1: Newspaper directory* (54th ed., 2004). New Providence, NJ: Author.

R. R. Bowker. (2003). *Bowker's news media directory, Volume 3: TV and radio directory* (54th ed., 2004). New Providence, NJ: Author.

Rural Policy Research Institute (RUPRI). (n.d.). *Rural policy context: Isolated rural areas*. Retrieved March 31, 2004, from <http://www.rupri.org/resources/context/ira.html>

Rural Policy Research Institute (RUPRI). *Rural policy context: Frontier areas*. (2000, May 1). Retrieved November 4, 2002, from <http://www.rupri.org/policyres/context/fa.html>

Rural Policy Research Institute (RUPRI). (2000, May 1). *Rural policy context: Metropolitan and non-metropolitan counties : Definitions from the U.S. Office of Management and Budget*. Retrieved November 4, 2002, from <http://www.rupri.org/policyres/context/omb.html>

Schement, J. R. (2001). Imagining fairness: Equality and equity of access in search of democracy. In N. C. Kranich (Ed.), *Libraries: The cornerstone of democracy*. Chicago, IL: American Library Association.

Schement, J. R. (2003). Measuring what Jefferson knew and De Tocqueville saw: Libraries as bridges across the digital divide. *IT & Society*, 1(4), 118-125.

Schement, J. R., & Forbes, S. C. (1999). The persistent gap in telecommunications: Toward hypotheses and answers. In S. E. Gillett & I. Vogelsang (Eds.),

*Competition, regulation, and convergence: Current trends in telecommunications policy research* (pp. 179-193). Mahwah, NJ: Lawrence Erlbaum Associates.

Schement, J. R., & Tate, M. A. (2003). *Rural America in the Digital Age*. Columbia, MO: Rural Policy Research Institute.

Strover, S. (2003). The prospects for broadband deployment in rural America. *Government Information Quarterly*, 20, 95-106.

Sustainable Pittsburgh. (2002). *SWPA community indicators handbook*. Pittsburgh, PA: Author. Retrieved March 31, 2004, from <http://203.147.150.6/docs/handbook.pdf>

Sustainable Seattle. (1998). *Indicators of sustainable community 1998: A status report on long-term cultural, economic, and environmental health for Seattle/King County*. Seattle, WA: Author. Retrieved March 31, 2004, from <http://www.sustainableseattle.org/Publications/1998IndicatorsRpt.pdf>

*Telecommunications Act of 1996*, 47 U.S.C.S. § 254 (Matthew Bender & Co. 2003).

U.S. Census Bureau. (2002a). *Census 2000 urban and rural classification*. Retrieved August 26, 2002, from [http://www.census.gov/geo/www/ua/ua\\_2k.html](http://www.census.gov/geo/www/ua/ua_2k.html)

U.S. Census Bureau. (2002b). *Metropolitan area definitions*. Retrieved August 26, 2002, from <http://www.census.gov/population/www/estimates/metrodef.html>

U.S. Census Bureau. (2002c). *State and county quickfacts: North Dakota county selection map*. Retrieved February 13, 2003, from [http://quickfacts.census.gov/qfd/maps/north\\_dakota\\_map.html](http://quickfacts.census.gov/qfd/maps/north_dakota_map.html)

U.S. Census Bureau. (2002d). *State and county quickfacts: Pennsylvania county selection map*. Retrieved February 13, 2003, from [http://quickfacts.census.gov/qfd/maps/pennsylvania\\_map.html](http://quickfacts.census.gov/qfd/maps/pennsylvania_map.html)

- U.S. Census Bureau. (2002e). Daily and Sunday newspapers--Number and circulation, 1991 to 2000 and by state: 2001. In *Statistical abstract of the United States* (122nd ed., p. 701). Washington, DC: Author.
- U.S. Census Bureau, Public Information Office. (2001, April 2). Largest census-to-census population increase in U.S. history as every state gains, Census Bureau reports. *United States Department of Commerce News*. Retrieved January 19, 2004, from <http://www.census.gov/Press-Release/www/2001.cb01cn64.html>
- U.S. Department of Agriculture, Economic Research Service. (2002a). *Measuring rurality: Urban influence codes*. Retrieved November 4, 2002, from <http://www.ers.usda.gov/briefing/rurality/UrbanInf/>
- U.S. Department of Agriculture, Economic Research Service. (2002b). *Measuring rurality: Rural-urban continuum codes*. Retrieved February 25, 2003, from <http://www.ers.usda.gov/Briefing/Rurality/ruralurbcon/>
- U.S. Department of Agriculture, Economic Research Service. (2002c). *Population change, 1990-2000 for Pennsylvania*. Retrieved March 31, 2003, from <http://www.ers.usda.gov/Data/Population/PopList.asp?ST=PA&LongName=Pennsylvania>.
- U.S. Department of Agriculture, Economic Research Service. (2003a). *ERS/USDA briefing room: Rural income, poverty and welfare: Rural child poverty*. Washington, DC: Author. Retrieved March 31, 2004, from <http://www.ers.usda.gov/Briefing/IncomePovertyWelfare/ChildPoverty/>
- U.S. Department of Agriculture, Economic Research Service. (2003b). *ERS/USDA briefing room: Rural income, poverty and welfare: Rural poverty*. Washington,



DC: Author. Retrieved January 19, 2004, from

<http://www.ers.usda.gov/Briefing/IncomePovertyWelfare/ruralpoverty/>

U.S. Department of Agriculture, Economic Research Service. (2003c). *ERS/USDA*

*briefing room: Rural industry: Which industries are the most important in rural*

*America?*. Washington, DC: Author. Retrieved January 19, 2004, from

<http://www.ers.usda.gov/briefing/Industry/importantindust/>

U.S. Department of Agriculture, Economic Research Service. (2003c). *Rural America at*

*a glance*. (Rural Development Research Report No. 97-1). Washington, DC:

Author. Retrieved January 19, 2004, from

[http://www.ers.usda.gov/publications/rdr97-1/lowres\\_rdr97-1.df](http://www.ers.usda.gov/publications/rdr97-1/lowres_rdr97-1.df)

U.S. Department of Agriculture, Economic Research Service. (2003d). *United States*

*state fact sheet from USDA/ERS*. Washington, DC: Author.

U.S. Department of Commerce. (2003). *Population change and distribution*. Washington,

DC: U.S. Government Printing Office.

U.S. Department of Commerce, Office of Technology Policy. (2002, September 23).

*Understanding broadband demand: A review of critical issues*. Washington, DC:

Author.

U.S. Department of Education, Office of Educational Research and Improvement.

National Center for Education Statistics. (2002). *Public libraries in the United*

*States: Fiscal year 2000*. Retrieved February 21, 2003, from

<http://nces.ed.gov/pubs2002/2002344.pdf>

U.S.D.A. providing funding for rural broadband service. (2002, July/August). *Rural*

*Cooperatives*, 15.

Warren Publishing Inc. (2002). *TV & cable factbook* (no. 70, 2002 ed.). Washington, DC:

Warren Publishing.

Wilkerson, C. (2001, December). Trends in rural manufacturing. *The Main Street*

*Economist*. Kansas City, MO: Center for the Study of Rural America, Federal

Reserve Bank of Kansas City. Retrieved January 18, 2004, from

[http://www.kc.frb.org/RuralCenter/mainstreet/MSE\\_1201.pdf](http://www.kc.frb.org/RuralCenter/mainstreet/MSE_1201.pdf)

## Footnotes

<sup>1</sup> The definition of rural often differs among local, state, and federal governments; and, at times, can even vary among agencies and programs within a single department. For the purposes of this study, the definitions of rural addressed in this section will be restricted to the primary ones employed by federal government agencies in their routine policymaking tasks. These include: 1) U.S. Census Bureau rural-urban delineation, 2000 census; 2) Metropolitan and Non-Metropolitan Counties: Definitions from the U.S. Office of Management and Budget (OMB); 3) Rural-Urban Continuum Codes (USDA); 4) Urban Influence Codes (USDA); 5) Isolated Rural Areas (Goldsmith definition); and, 6) Frontier Area Designations (FEC) (Frontier Education Center).

<sup>2</sup> Bridges.org's (2001) *Comparison of E-readiness Assessment Models* provides a comparison of a number of e-readiness assessment tools including The Computer Systems Policy Project's *Readiness Guide for Living in the Networked World* and The Asian Pacific Economic Cooperation's *E-Commerce Readiness Assessment*, among others. Harvard University's *Readiness for the Networked World: A Guide for Developing Countries* is also a well-known assessment tool.

<sup>3</sup> Agriculture remains Pennsylvania's number one industry. According to the Pennsylvania Department of Agriculture 1995-96 Statistical Summary, Pennsylvania ranks: fourth in the Nation in milk production and number of dairy cows; Mushroom Production (First); Total Poultry production (excluding broilers) (Fourth); Cattle production (Seventeenth); Calves (Fourth); Hogs (Thirteenth); Sheep (Seventeenth); Turkeys (Eighth); Fruit Trees/Fruits (Fourth/Fifth). The

approximately 51,000 farms in Pennsylvania include 6.5 million acres of crops and hay producing lands in the state. These lands yield products valued at over \$1.5 billion, e.g.: mushroom production (\$274 million); dairy products (\$1.5 billion); livestock (\$1.4 billion); egg production (\$265 million); broiler production (\$203 million); and, turkey production (\$92 million). (Source: United States Environmental Protection Agency. Retrieved February 25, 2003 from [http://www.epa.gov/reg3wapd/nps/pdf/pa\\_agriculture.pdf](http://www.epa.gov/reg3wapd/nps/pdf/pa_agriculture.pdf)).

<sup>4</sup> Pennsylvania ranked 6th in nonmetropolitan population (i.e., the areas outside metropolitan areas as defined by the Office of Management and Budget as of June 30, 1999), U.S. Bureau of Census unpublished data as presented in O'Leary Morgan and Morgan (Eds.), (2002). *Metropolitan Population in 2000, State Rankings 2002*, p. 436.

<sup>5</sup>Contributing factors mentioned here illustrate the interwoven complexity of access to a technology most people think of as simple: the phoneless do not constitute a homogeneous group—any individual without a phone is likely to fall into several of the mentioned groups. To that extent, understanding the causes of low telephone penetration for any one group requires parsing out multiple contributing factors, something that is virtually impossible with our current statistics.

<sup>6</sup>No commercial television stations were listed for the counties studied in R. R. Bowker's *2003 Working press of the nation, volume 3: TV and radio directory*.

## List of Tables

- Table 1: *North Dakota and Pennsylvania: Selected Characteristics*
- Table 2: *North Dakota: Demographic Statistics for Counties Studied*
- Table 3: *Pennsylvania: Demographic Statistics for Counties Studied*
- Table 4: *Daily and Weekly Newspapers in the Ten North Dakota and Pennsylvania Counties Examined*
- Table 5: *Public Libraries in North Dakota and Pennsylvania: A Statistical Comparison*
- Table 6: *North Dakota and Pennsylvania Radio Stations*
- Table 7: *Commercial Radio Stations in the North Dakota and Pennsylvania Counties Studied*
- Table 8: *North Dakota and Pennsylvania Television Stations*
- Table 9: *Television Stations Serving North Dakota Counties Included in the Study*
- Table 10: *Cable Systems: North Dakota and Pennsylvania*
- Table 11: *Cable Systems: North Dakota Counties Studied*
- Table 12: *Cable Systems: Pennsylvania Counties Studied*
- Table 13: *Providers of High-Speed Lines by Technology as of June 30, 2002 (Over 200 kbps in at Least One Direction)*
- Table 14: *High-Speed Lines by Technology (Over 200 kbps in at Least One Direction)*
- Table 15: *High-Speed Lines by Type of User as of June 30, 2002 (Over 200 kbps in at Least One Direction)*
- Table 16: *Percentage of Zip Codes with High-Speed Lines in Service as of June 30, 2002 (Over 200 Kbps in at Least One Direction)*

Table 1

*North Dakota and Pennsylvania: Selected Characteristics*

<b>North Dakota</b>	<b>Pennsylvania</b>
Population, 2001 estimate: 634,448	Population, 2001 estimate: 12,287,150
Land area: 68,976 square miles	Land area: 44,817 square miles
Home to two large U.S. Air Force bases (Grand Forks AFB (AMC) and Minot AFB (ACC))	Home to numerous public and private universities and colleges
Significant American Indian population (4.9%) Relatively few other minority inhabitants (0.6% Black or African American persons) 14.7% of population, 65 years or older	10% Black/African American population  15.6% of population, 65 years or older
Significant portion of lands federally owned	Relatively small portion of lands federally owned (Exception: Forest county)
Rural counties losing population consistently and rapidly between 2000 and 2001	Rural counties showing modest population gains
Low concentration of population (9.3 persons per square mile)	High concentration of population (274 persons per square mile)

Table 2

*North Dakota: Demographic Statistics for Counties Studied*

<b>North Dakota: Demographic Statistics for Selected Counties</b>	<b>Benson County</b>	<b>Divide County</b>	<b>McIntosh County</b>	<b>Ramsey County</b>	<b>Sioux County</b>
Population, 2001 estimate	6,879	2,203	3,306	11,833	4,066
Population percent change, April 1, 2000-July 1, 2001	-1.2%	-3.5%	-2.5%	-1.9%	0.5%
Population, 2000	6,964	2,283	3,390	12,066	4,044
Population, percent change, 1990 to 2000	-3.3%	-21.2%	-15.7%	-4.8%	7.5%
Persons under 5 years old, percent, 2000	8.9%	3.1%	4.2%	5.7%	10.5%
Persons under 18 years old, percent, 2000	36.1%	20.2%	19.4%	25.0%	40.3%
Persons 65 years old and over, percent, 2000	13.5%	29.5%	34.2%	18.8%	5.6%
White persons, percent, 2000 (a)	50.8%	99.0%	98.9%	92.3%	14.3%
Black or African American persons, percent, 2000 (a)	0.1%	0.0%	0.0%	0.2%	Z
American Indian and Alaska Native persons, percent, 2000 (a)	48.0%	0.1%	0.1%	5.4%	84.6%
Asian persons, percent, 2000 (a)	Z	0.5%	0.3%	0.3%	Z
Native Hawaiian and Other Pacific Islander, percent, 2000 (a)	Z	0.0%	Z	Z	Z
Persons reporting some other race, percent, 2000 (a)	0.2%	0.2%	0.1%	0.2%	0.1%
Persons reporting two or more races, percent, 2000	0.8%	0.2%	0.6%	1.6%	0.9%
Female persons, percent, 2000	49.5%	49.8%	52.2%	50.7%	49.0%
Persons of Hispanic or Latino origin, percent, 2000 (b)	0.8%	0.6%	0.8%	0.5%	1.6%
White persons, not of Hispanic/Latino origin, percent, 2000	50.7%	98.6%	98.2%	92.1%	14.3%
High school graduates, persons 25 years and over, 1990	2,699	1,456	1,458	6,186	1,226
College graduates, persons 25 years and over, 1990	381	269	283	1,354	177
Housing units, 2000	2,932	1,469	1,853	5,729	1,216
Homeownership rate, 2000	68.3%	82.1%	83.1%	65.0%	46.3%
Households, 2000	2,328	1,005	1,467	4,957	1,095
Persons per household, 2000	2.97	2.18	2.19	2.34	3.63
Households with persons under 18, percent, 2000	44.0%	23.5%	22.6%	31.5%	61.1%
Median household money income, 1997 model-based estimate	\$21,833	\$29,291	\$23,018	\$30,355	\$19,120
Persons below poverty, percent, 1997 model-based estimate	28.7%	12.6%	17.0%	14.8%	37.4%
Children below poverty, percent, 1997 model-based estimate	38.5%	18.3%	27.8%	22.0%	40.8%

Source: U.S. Census Bureau. (2002). *State and county quickfacts: North Dakota counts selection map*. Retrieved February 13, 2003, from [http://quickfacts.census.gov/qfd/maps/north\\_dakota\\_map.html](http://quickfacts.census.gov/qfd/maps/north_dakota_map.html)

Table 3

*Pennsylvania: Demographic Statistics for Counties Studied*

<b>Pennsylvania: Demographic Statistics for Selected Counties</b>	<b>Bradford County</b>	<b>Clinton County</b>	<b>Forest County</b>	<b>Potter County</b>	<b>Sullivan County</b>
<b>Population, 2001 estimate</b>	62,859	37,753	4,910	18,154	6,532
<b>Population percent change, April 1, 2000-July 1, 2001</b>	0.2%	-0.4%	-0.7%	0.4%	-0.4%
<b>Population, 2000</b>	62,761	37,914	4,946	18,080	6,556
<b>Population, percent change, 1990 to 2000</b>	2.9%	2.0%	3.0%	8.2%	7.4%
<b>Persons under 5 years old, percent, 2000</b>	6.1%	5.4%	3.6%	6.2%	4.3%
<b>Persons under 18 years old, percent, 2000</b>	25.5%	21.5%	22.7%	26.0%	20.8%
<b>Persons 65 years old and over, percent, 2000</b>	15.7%	16.8%	19.9%	16.7%	21.9%
<b>White persons, percent, 2000 (a)</b>	97.9%	98.3%	95.9%	98.1%	95.6%
<b>Black or African American persons, percent, 2000 (a)</b>	0.4%	0.5%	2.2%	0.3%	2.2%
<b>American Indian and Alaska Native persons, percent, 2000 (a)</b>	0.3%	0.1%	0.4%	0.2%	0.8%
<b>Asian persons, percent, 2000 (a)</b>	0.5%	0.4%	0.1%	0.5%	0.2%
<b>Native Hawaiian and Other Pacific Islander, percent, 2000 (a)</b>	Z	Z	0.0%	Z	0.0%
<b>Persons reporting some other race, percent, 2000 (a)</b>	0.2%	0.1%	0.7%	0.2%	0.5%
<b>Persons reporting two or more races, percent, 2000</b>	0.7%	0.5%	0.6%	0.7%	0.9%
<b>Female persons, percent, 2000</b>	51.3%	51.5%	47.4%	50.7%	49.5%
<b>Persons of Hispanic or Latino origin, percent, 2000 (b)</b>	0.6%	0.5%	1.2%	0.6%	1.1%
<b>White persons, not of Hispanic/Latino origin, percent, 2000</b>	97.5%	97.9%	95.4%	97.7%	95.2%
<b>High school graduates, persons 25 years and over, 1990</b>	29,748	17,028	2,344	8,000	2,893
<b>College graduates, persons 25 years and over, 1990</b>	5,050	2,738	263	1,065	353
<b>Housing units, 2000</b>	28,664	18,166	8,701	12,159	6,017
<b>Homeownership rate, 2000</b>	75.5%	72.9%	82.7%	77.3%	80.8%
<b>Households, 2000</b>	24,453	14,773	2,000	7,005	2,660
<b>Persons per household, 2000</b>	2.52	2.42	2.29	2.54	2.3
<b>Households with persons under 18, percent, 2000</b>	34.4%	30.3%	25.5%	34.0%	26.6%
<b>Median household money income, 1997 model-based estimate</b>	\$32,185	\$30,139	\$25,702	\$30,554	\$28,046
<b>Persons below poverty, percent, 1997 model-based estimate</b>	13.2%	13.7%	15.4%	14.5%	12.8%
<b>Children below poverty, percent, 1997 model-based estimate</b>	19.1%	20.8%	29.6%	22.3%	16.7%

Source: U.S. Census Bureau. (2002). *State and county quickfacts: Pennsylvania county selection map*. Retrieved February 13, 2003, from [http://quickfacts.census.gov/qfd/maps/pennsylvania\\_map.html](http://quickfacts.census.gov/qfd/maps/pennsylvania_map.html)



Table 4

*Daily and Weekly Newspapers in the Ten North Dakota and Pennsylvania Counties Examined*

County	Newspaper	Daily or Weekly	Area of Dominant Influence (ADI)	Circulation	Owner(s)
<b>Benson County, ND</b>	<i>Benson County Farmers Press</i> (Minnewaukan, ND) <a href="http://www.besoncountynews.com">http://www.besoncountynews.com</a>	Weekly (Wednesdays)	Fargo, ND	2,714 free & paid	Benson County Farmers Press (90%)
<b>Divide County, ND</b>	<i>The Journal</i> (Crosby, ND) <a href="http://www.crosbynd.com/journal">http://www.crosbynd.com/journal</a>	Weekly (Wednesdays)	Minot-Bismarck-Dickinson, ND	2,600 paid (Last year 2,700)	The Journal (100%)
<b>McIntosh County, ND</b>	<i>The Ashley Tribune</i> (Ashley, ND)	Weekly (Wednesdays)	Minot-Bismarck-Dickinson, ND	1,450 paid	Tony Bender (Owner & publisher; 100%)
<b>Ramsey County, ND</b>	<i>Devil's Lake Journal</i> (Devil's Lake, ND)	Daily (Monday - Friday)	Fargo, ND	4,300 paid (Last year 4,900)	Liberty Group Publishing (Northbrook, IL)
<b>Bradford County, PA</b>	<i>Canton Independent-Sentinel</i> (Canton, PA)	Weekly (Thursdays)	Binghamton, NY	2,300 free & paid (Last year 2,000)	John Shaffer (Canton, PA; 100%)
<b>Bradford County, PA</b>	<i>Daily Review/Sunday Review</i> (Towanda, PA) <a href="http://www.thedailyreview.com">http://www.thedailyreview.com</a>	Daily	Binghamton, NY	9,000 paid (Morning ed.) 9,200 paid (Sunday ed.)	Towanda Printing Co. (100%)
<b>Bradford County, PA</b>	<i>Evening Times</i> (Sayre, PA)	Daily (Monday - Saturday)	Binghamton, NY	9,000 paid	Liberty Group Publishing (Northbrook, IL) Note: Co. owns PA & ND paper
<b>Clinton County, PA</b>	<i>Express</i> (Lock Haven, PA) <a href="http://www.lockhaven.com">http://www.lockhaven.com</a>	Daily (Monday - Saturday)	Wilkes-Barre - Scranton, PA	11,200 paid	Ogden Newspapers Inc. (100%)
<b>Forest County, PA</b>	<i>Forest Press</i> (Tionesta, PA)	Weekly (Wednesday)	Erie, PA	4,500 paid (Population served: 10,000)	Journal Register (Trenton, NJ) (100%)
<b>Potter County, PA</b>	<i>Potter Leader-Enterprise</i> (Coudersport, PA)	Weekly (Wednesday)	Buffalo, NY	12,000 paid	Tioga Publishing Co. (Coudersport, PA) (100%)
<b>Sullivan County, PA</b>	<i>Sullivan Review</i> (Dushore, PA)	Weekly (Thursday)	Wilkes-Barre - Scranton, PA	7,000 paid	John A. Shoemaker (Dushore, PA) (50%)

Source: R. R. Bowker. (2003). *Bowker's News Media Directory, Volume 1: Newspaper directory* (54th ed., 2004). New Providence, NJ: Author.

Table 5

*Public Libraries in North Dakota and Pennsylvania: A Statistical Comparison*

	<b>North Dakota</b>	<b>Pennsylvania</b>
<b>Population, 2000 census</b>	642,200	12,281,054
<b>Population Served by Public Libraries</b>	578,204	11,964,455
<b>Population Unserved by Public Libraries</b>	63,996	316,599
<b>Number of Public Libraries</b>	81	457
<b>Total Volumes in Public Libraries</b>	2,349,450	28,787,956
<b>Volumes per capita</b>	3.66	2.47 (population served)
<b>Total Public Library Circulation</b>	4,436,074	55,006,947
<b>Circulation per capita</b>	8.08	4.74 (population served)
<b>Total Public Library Income (including grants-in-aid)</b>	\$9,692,671	\$235,350,703
<b>Mean Library Income</b>	NA	\$300,106 (excluding Phila. & Pittsburgh)
<b>Source(s) of income</b>	Mainly public funds	Public funds: \$144,144,300 State aid: \$44,196,817 Federal: \$2,495,410 Private funds (including gifts): \$44,370,510
<b>Total Operating Expenditures</b>	NA	\$232,759,436
<b>Expenditures per capita</b>	\$13.44	\$19.91 (Operating expenditures per capita; population served)
<b>Number of county or multi-county libraries</b>	Counties Served: 30; Counties unserved: 22	Libraries: 55 Counties served: 67 of 67 total
<b>Number of bookmobiles in state</b>	13	33
<b>Grants in aid for public libraries</b>	\$444,372	Federal (Library Services & Technology Act), 1999-2000 Public Libraries: \$4,496,641 Other Libraries: \$2,579,034
<b>State Aid</b>	\$444,372	\$47,289,000 <sup>1</sup>
<b>Quality Libraries Aid</b>	NA	The rate of distribution based on a population served at \$1.57 per capita.

Sources: *American Library Directory, 56th ed., 2003-2004*, v. 1. Date of Statistics: 2001 (North Dakota), 2000 & 2001 (Pennsylvania); Chute, A., et al. (2003). *Public libraries in the United States: Fiscal year 2001*. Washington, DC: Author. Accessed March 23, 2004, from <http://nces.ed.gov/pubs2003/2003399.pdf>

Table 6

*North Dakota and Pennsylvania Radio Stations*

	<b>Radio Stations (Total)</b>	<b>Radio Stations (AM)</b>	<b>Radio Stations (FM)</b>
<b>North Dakota</b>	79	34	45
<b>Pennsylvania</b>	397	167	230

Source: *Gale Directory of Publications and Broadcast Media*, 136th ed. (2002).

Table 7

*Commercial Radio Stations in the North Dakota and Pennsylvania Counties Studied*

County	Date Established	Radio Station/Location	FM or AM?	Format	Airtime	Frequency/Power	Population Served	Licensee
Ramsey County, ND	1925	KDLR (Devil's Lake)	AM	Country/News	NA	1240 khz; 1 kw-U	NA	Double Z Broadcasting Inc.
Ramsey County, ND	1967	KDVL (Devil's Lake)	FM	Oldies	24 hours	102.5 mhz; 100 kw	90,000	Double Z Broadcasting Inc.
Ramsey County, ND	1996	KQZZ (Devil's Lake) www.zzcountry.com	FM	Classic Rock	24 hours	96.7 mhz; 45 kw	NA	Two Rivers Broadcasting Inc.
Ramsey County, ND	1984	KZZY (Devil's Lake) www.zzcountry.com	FM	Country (Network Affiliation: ABC/I)	24 hours	103.5 mhz; 100 kw	13,000	Double Z Broadcasting Inc.
Bradford County, PA	1950	WATS (Sayre, PA)	AM	Adult Contemporary (Network Affiliation: UPI)	NA	960 khz; 5 kw-D	100,000	WATS Broadcasting Inc.
Bradford County, PA	1991	WREQ (Elmira, NY) -- Ridgebury (Arbitron Metro Market: Elmira-Corning, NY) q969online.com	FM	Christian, Educational	24 hours	96.9 mhz; 3.6 kw	NA	CSN International
Bradford County, PA	1978	WHGL (Troy, PA) www.wiggle100.com	FM	Country (Network Affiliation: ABC/C)	24 hours	100.3 mhz; 3.9 kw	NA	Cantroair Communications Inc.
Bradford County, PA	1959	WTTC (Towanda, PA)	FM	Oldies	6 a.m. - 11 p.m.	95.3 mhz; 3 kw	NA	WATS Broadcasting Inc.?
Bradford County, PA	1959	WTTC (*Sayre, PA) *Listed under Towanda	AM	Oldies (Network Affiliations: Motor Racing Net; CNN)	NA	1550 khz; 500 w-D	30,000	WATS Broadcasting Inc.
Bradford County, PA	1982	WTZN (Troy, PA) www.wtzn.com	AM	Sports (Network Affiliate: ABC/C)	NA	1310 khz; 1 kw-D, 72 w-N	NA	Cantroair Communications Inc.
Clinton County, PA	1947	WBPZ (Lock Haven, PA)	AM	Oldies	NA	1230 khz; 1 kw-U	50,000	Lipez Broadcasting Corp.

Table 7, Continued

*Commercial Radio Stations in the North Dakota and Pennsylvania Counties Studied*

County	Date Established	Radio Station/Location	FM or AM?	Format	Airtime	Frequency/Power	Population Served	Licensee
<b>Clinton County, PA</b>	1965	WSNU (Lock Haven, PA) Note: Co-owned with WBPZ (AM) Arbitron Metro Market: Williamsport, PA	FM	Adult Contemporary	24 hours	92.1 mhz; 3 kw	70,000	Lipez Broadcasting Corp.
<b>Clinton County, PA</b>	1989	WQBR (McElhattan, PA) www.bear999.com	FM	Country (Network Affiliations: AP, Jones Satellite Audio)	24 hours	99.9 mhz; 900w	300,000	Maximum Impact Communications Inc.
<b>Clinton County, PA</b>	1979	WVRT (Williamsport, PA*) *Listed under Mill Hall Arbitron Metro Market: Williamsport, PA www.variety977.com	FM	Country	24 hours	97.7 mhz; 6 kw	136,000	Clear Channel Radio Licenses, Inc.
<b>Clinton County, PA</b>	1996	WZYY (Renovo, PA) www.y1069.com	FM	Adult Contemporary	NA	106.9 mhz; 650 w	NA	Westview Communications Inc.
<b>Potter County, PA</b>	1953	WFRM (Coudersport, PA)	AM	News/Talk (Network Affiliations: ABC, Unistar)	NA	600 khz; 1 kw-D, 46 w-N	2,831	Farm & Home Broadcasting Inc.
<b>Potter County, PA</b>	1985	WFRM (Coudersport, PA) www.wfrm.net	FM	Adult Contemporary (Network Affiliation: Unistar)	24 hours	96.7 mhz; 1.45 kw	NA	Farm & Home Broadcasting Inc.?
<b>Sullivan County, PA</b>	1998	WCOZ (*Dushore, PA) Listed under Laporte, PA Arbitron Metro Market: Williamsport, PA	FM	Adult Contemporary	24 hours	103.9 mhz; 6 kw	20,000	Smith and Fitzgerald, Partnership

Source: R. R. Bowker. (2003). *Bowker's News Media Directory, Volume 3: TV and radio directory* (54th ed., 2004). New Providence, NJ: Author.

Table 8

*North Dakota and Pennsylvania Television Stations*

	<b>TV Stations (Total)</b>
<b>North Dakota</b>	24
<b>Pennsylvania</b>	46

Source: *Gale Directory of Publications and Broadcast Media*, 136th ed. (2002).

Table 9

*Television Stations Serving North Dakota Counties Included in the Study*

<b>County</b>	<b>Stations</b>	<b>Network Affiliation</b>	<b>Service</b>	<b>Total TV Households</b>
<b>Benson</b>	WDAZ-TV, Grand Forks, ND (Satellite of WDAY-TV, Fargo, ND)	ABC	Grade A (approximately 25% of county); Grade B (approximately 50% of county); DTV (approximately 25% of county)	79,710 (estimated)
<b>Divide</b>	KUMV-TV, Williston, ND (Satellite of KFYZ-TV, Bismarck, ND)	NBC	Grade A (minute portion of county); Grade B (approximately 75% of county)	25,350 (estimated)
<b>McIntosh</b>	KXMB-TV (Satellite of KXMC-TV, Minot, ND)	CBS	Grade B (approximately 40% of county);	51,700
<b>McIntosh</b>	KFYZ-TV (Operates satellites KQCD-TV, Dickinson; KMOT, Minot & KUMV-TV, Williston, ND)	NBC	Grade B (approximately 50% of county)	56,390 (estimated)
<b>Ramsey</b>	KNRR (Satellite of KVRR, Fargo, ND)	Fox	Grade B (approximately 5-10% of county); DTV (approximately 20% of county)	25,490 (estimated)
<b>Ramsey</b>	KVLY-TV, Fargo, ND	NBC	Grade B (minute portion of county)	218,570 (estimated)
<b>Ramsey</b>	WDAZ-TV, Grand Forks, ND (Satellite of WDAY-TV, Fargo, ND)	ABC	Grade A (approximately 95% of county); Grade B (100% of county); DTV (approximately 95% of county)	79,710 (estimated)

Table 9, Continued

*Television Stations Serving North Dakota Counties Included in the Study*

<b>County</b>	<b>Stations</b>	<b>Network Affiliation</b>	<b>Service</b>	<b>Total TV Households</b>
<b>Sioux County</b>	KXMB-TV (Satellite of KXMC-TV, Minot, ND)	CBS	Grade A (approximately 75% of county); Grade B (approximately 95% of county)	51,700
<b>Sioux County</b>	KFYR-TV (Operates satellites KQCD-TV, Dickinson; KMOT, Minot & KUMV-TV, Williston, ND)	NBC	Grade A (approximately 50%); Grade B (approximately 99%)	56,390
<b>Sioux County</b>	KBMY (Operates satellite KMCY, Minot, ND)	ABC	Grade A (approximately 50% of county); Grade B (approximately 75% of county); DTV (almost entire county)	54,110

Source: *TV & cable factbook, no. 70* (2002 ed.).

Note: Grade A service indicates "satisfactory service expected at least 90% of the time for at least 90% of the receiving locations whereas Grade B service indicates "the quality of picture expected to be satisfactory to the median observer at least 90% of the time for at least 50% of the receiving locations within the contour. In the absence of interfering co-channel and adjacent channel signals" (1999 ed., p. A-15).



Table 10

*Cable Systems: North Dakota and Pennsylvania*

<b>State</b>	<b>Cable Systems (Total)</b>	<b>Total Communities Served</b>	<b>Miles of Plant</b>	<b>Homes Passed</b>	<b>Number of Basic Subscribers</b>	<b>Number of Expanded Basic Subscribers</b>	<b>Number of Pay Units</b>
<b>North Dakota</b>	102	219	2,731	226,062	156,878	126,019	50,553
<b>Pennsylvania</b>	349	3,310	67,898	3,035,073	3,919,430	2,159,624	905,397

Source: *TV & cable factbook*, no. 70 (2002 ed.).

Table 11

*Cable Systems: North Dakota Counties Studied*

<b>County/Town</b>	<b>Cable System Name</b>	<b>Subscribers</b>	<b>Channel Capacity</b>	<b>Miles of Plant</b>	<b>Homes Passed</b>
<b>Benson (Esmond)</b>	Midcontinent Communications	68 (basic service)	40 (not 2-way capable)	2.3 (coaxial); None (fiber optic)	132
<b>Benson (Leeds)</b>	Midcontinent Communications	211 (basic service)	40 (not 2-way capable). Channels available but not in use: 1	8.0 (coaxial); None (fiber optic)	375
<b>Benson (Maddock)</b>	Maddock Cable TV	205 (basic service)	28 (operating 2-way); Channels available but not in use: 18	5.0 (coaxial)	253
<b>Benson (Minnewaukan)</b>	Midcontinent Communications	126 (basic service)	40 (not 2-way capable); Channels available but not in use: 4	2.9 (coaxial); None (fiber optic)	173
<b>Divide (Crosby)</b>	Northwest Communications Cooperative	649 (basic service)	40 (not 2-way capable). Channels available but not in use: 1	9.6 (coaxial); none (fiber optic);	1,072
<b>Ramsey (Devils Lake)</b>	Midcontinent Communications	3,340 (basic service)	40 (not 2-way capable)	67.0 (coaxial); None (fiber optic)	4,800
<b>Sioux (Solen)</b>	Midcontinent Communications	20 (basic service)	35 (not 2-way capable). Channels available but not in use: 22	1.3 (coaxial); None (fiber optic)	48

Source: *TV & cable factbook*, no. 70 (2002 ed.).

Table 12

*Cable Systems: Pennsylvania Counties Studied*

<b>County/Town</b>	<b>Cable System Name</b>	<b>Subscribers</b>	<b>Channel Capacity</b>	<b>Miles of Plant</b>	<b>Homes Passed</b>
<b>Bradford and Sullivan (Dushore)</b>	Blue Ridge Cable TV	853 (basic service)	42	N.A.	N.A.
<b>Bradford (East Smithfield)</b>	Community Cable Corp.	134 (basic service)	17 (not 2-way capable)	8.0 (coaxial)	150
<b>Bradford (Leroy Township)</b>	Blue Ridge Cable TV	41 (basic service); 39 (expanded basic service)	54 (2-way capable; not operating 2-way). Channels available but not in use: 2	3.0 (coaxial). Additional miles planned: 1.0 (coaxial)	63
<b>Bradford (Little Meadows)</b>	Beaver Valley Cable Co.	239 (basic service); 129 (expanded basic service)	45 (2-way capable; not operating 2-way). Channels available but not in use: 10	25.0 (coaxial)	250
<b>Bradford (Meshoppen)</b>	Blue Ridge Cable TV Inc.	7,556 (basic service)	42	178.1 (coaxial)	N.A.
<b>Bradford (Rome)</b>	Beaver Valley Cable Co.	585 (basic service); 348 (expanded basic service)	45 (2-way capable; not operating 2-way). Channels available but not in use: 10	45.9 (coaxial)	N.A.
<b>Bradford (Sayre)</b>	Time Warner Cable	8,475 (basic service)	60	143.0 (coaxial)	9,469; Total homes in franchise area: 10,185
<b>Bradford (Towanda)</b>	Adelphia	2,511 (basic service); 2,410 (expanded basic service)	36	61.4 (coaxial)	3,059

Table 12, Continued

*Cable Systems: Pennsylvania Counties Studied*

<b>County/Town</b>	<b>Cable System Name</b>	<b>Subscribers</b>	<b>Channel Capacity</b>	<b>Miles of Plant</b>	<b>Homes Passed</b>
<b>Bradford (Troy)</b>	Blue Ridge Cable TV Inc.	N.A.	35 (not 2-way capable)	25.0 (coaxial)	1,800; Total homes in franchise area: 1,800
<b>Bradford (Ulster)</b>	Beaver Valley Cable Co.	400 (basic service); 240 (expanded basic service)	45 (2-way capable; not operating 2-way)	25.9 (coaxial); Additional miles planned: 20.0 (coaxial); 10.0 (fiber optic)	450
<b>Bradford (West Burlington Township)</b>	Barrett's TV Cable System	35 (basic service)	13	4.0 (coaxial)	N.A.
<b>Clinton (Eastville)</b>	Eastville TV Cable	N.A.	12. Channels available but not in use: 8	1.5 (coaxial)	28
<b>Clinton (Lock Haven)</b>	Adelphia	5,193 (basic service)	40 (not 2-way capable). Channels available but not in use: 11	N.A.	N.A.
<b>Clinton (Mill Hall)</b>	Susquehanna Communications Co.	4,000 (basic service)	36 (2-way capable)	Miles of plant included with Williamsport, PA	Homes passed included with Williamsport, PA
<b>Clinton (Tylersville)</b>	Community TV	N.A.	12. Channels available but not in use: 5	N.A.	N.A.

Table 12, Continued

*Cable Systems: Pennsylvania Counties Studied*

<b>County/Town</b>	<b>Cable System Name</b>	<b>Subscribers</b>	<b>Channel Capacity</b>	<b>Miles of Plant</b>	<b>Homes Passed</b>
<b>Clinton (Williamsport)</b>	Susquehanna Communications Co.	37,000 (basic service); 3,600 (digital basic service); Internet service available	78	885.0 (coaxial)	49,000
<b>Forest (Marienville)</b>	CableVision Communications	389 (basic service); 312 (expanded basic service)	N.A.	16.0 (coaxial)	663
<b>Potter (Coudersport)</b>	Adelphia	6,827 (basic service); 2,033 (digital basic service); 2,236 (Internet service)	77 (operating 2-way partially)	373.6 (coaxial)	7,841; Total homes in franchised area: 7,864
<b>Potter (Gaines)</b>	Gaines-Watrous TV Inc.	300 (basic service)	36 (not 2-way capable)	20.0 (coaxial)	330
<b>Potter (Galeton)</b>	Blue Ridge Cable TV Inc.	574 (basic service)	35	12.0 (coaxial)	640; Total homes in franchised area: 640
<b>Potter (Oswayo)</b>	Kellogg Communications	N.A.	N.A.	N.A.	N.A.
<b>Potter (Ulysses)</b>	Time Warner Cable	168 (basic service)	61	6.0 (coaxial)	244
<b>Sullivan (Laporte borough)</b>	Eagles Mere/Laporte Cablevision Inc.	535	40 (not 2-way capable). Channels available but not in use: 2	37.5 (coaxial)	800

Source: *TV & cable factbook*, no. 70 (2002 ed.).

Table 13

*Providers of High-Speed Lines by Technology as of June 30, 2002  
(Over 200 kbps in at Least One Direction)*

	ADSL		Coaxial Cable		Other		Total (Unduplicated)	
	June 30 2002	June 30 2003	June 30 2002	June 30 2003	June 30 2002	June 30 2003	June 30 2002	June 30 2003
<b>North Dakota</b>	7	16	*	4	6	16	12	22
<b>Pennsylvania</b>	12	16	9	9	20	19	29	32
<b>Nationwide (Unduplicated)</b>	142	235	68	98	138	217	237	378

\* Data withheld to maintain firm confidentiality. In this table, an asterisk also indicates 1-3 providers reporting.

Note: From "Table 6: Providers of High-Speed Lines by Technology as of June 30, 2002 (Over 200 kbps in at Least One Direction)," by Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau, December 2002, *High-speed services for Internet Access: Status as of June 30, 2002*. Retrieved February 24, 2003, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1202.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1202.pdf) and "Table 6: Providers of High-Speed Lines by Technology as of June 30, 2003 (Over 200 kbps in at Least One Direction)," by Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau, December 2003, *High-speed services for Internet Access: Status as of June 30, 2003*. Retrieved March 25, 2004, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1203.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1203.pdf)

Table 14

*High-Speed Lines by Technology (Over 200 kbps in at Least One Direction)*

	ADSL		Coaxial Cable		Other		Total (Unduplicated)	
	June 30 2002	June 30 2003	June 30 2002	June 30 2003	June 30 2002	June 30 2003	June 30 2002	June 30 2003
<b>North Dakota</b>	6,575	11,593	*	10,066	*	3,815	14,164	25,474
<b>Pennsylvania</b>	162,258	230,322	300,840	197,794	53,390	59,483	516,488	772,276
<b>Nationwide</b>	5,191, 493	7,675, 114	9,172, 895	13,684,22 5	1,928,15 2	2,100,33 2	16,202,54 0	23,459,67 1

\* Data withheld to maintain firm confidentiality

Note: From "Table 7: High-Speed Lines by Technology (Over 200 kbps in at Least One Direction)," by Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau, December 2002, *High-speed services for Internet Access: Status as of June 30, 2002*. Retrieved February 24, 2003, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1202.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1202.pdf); "Table 7: High-Speed Lines by Technology (Over 200 kbps in at Least One Direction)," by Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau, December 2003, *High-speed services for Internet Access: Status as of June 30, 2003*. Retrieved March 25, 2004, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1203.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1203.pdf)

Table 15

*High-Speed Lines by Type of User (Over 200 kbps in at Least One Direction)*

	<b>Residential &amp; Small Business</b>		<b>Other<sup>1</sup></b>		<b>Total</b>	
	June 30 2002	June 30 2003	June 30 2002	June 30 2003	June 30 2002	June 30 2003
<b>North Dakota</b>	13,105	24,411	1,059	1,063	14,164	25,474
<b>Pennsylvania</b>	425,676	652,903	90,812	119,373	516,488	772,276
<b>Nationwide</b>	13,984,287	20,645,769	2,218,253	2,813,902	16,202,540	23,459,671

<sup>1</sup>Other includes medium and large business, institutional, and government customers.  
 Note: From "Table 8: High-Speed Lines by Type of User as of June 30, 2002 (Over 200 kbps in at Least One Direction)," by Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau, December 2002, *High-speed services for Internet Access: Status as of June 30, 2002*. Retrieved February 24, 2003, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1202.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1202.pdf); Note: From "Table 11: High-Speed Lines by Type of User as of June 30, 2003 (Over 200 kbps in at Least One Direction)," by Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau, December 2003, *High-speed services for Internet Access: Status as of June 30, 2003*. Retrieved March 25, 2004, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1203.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1203.pdf)



Table 16

Percentage of Zip Codes with High-Speed Lines in Service as of June 30, 2002 and June 30, 2003 (Over 200 Kbps in at Least One Direction)

	Number of Providers																					
	Zero		One		Two		Three		Four		Five		Six		Seven		Eight		Nine		Ten or More	
	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003	June 2002	June 2003
<b>North Dakota</b>	5	2	3	5	1	2	2	3	1	2	0	1	0	0	0	0	0	0	0	0	0	0
	1	0	6	4	0	1																
<b>Pennsylvania</b>	1	1	1	1	1	1	1	1	9	1	9	8	5	6	3	4	3	3	2	5	9	7
	5	0	6	8	5	5	2	3		0												
<b>Nationwide</b>	1	9	1	1	1	1	1	1	1	1	7	8	5	5	3	4	3	3	2	3	6	1
	6	%	8	6	6	7	3	4	0	1	%	%	%	%	%	%	%	%	%	%	%	%
	%		%	%	%	%	%	%	%	%												%

Note: From "Table 10: Percentage of Zip Codes with High-Speed Lines in Service as of June 30, 2002 (Over 200 Kbps in at Least One Direction)," by Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau, December 2002, *High-speed services for Internet Access: Status as of June 30, 2002*. Retrieved February 24, 2003, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1202.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1202.pdf); "Table 13: Percentage of Zip Codes with High-Speed Lines in Service as of June 30, 2003 (Over 200 Kbps in at Least One Direction)," by Federal Communications Commission. Industry Analysis and Technology Division. Wireline Competition Bureau, December 2003, *High-speed services for Internet Access: Status as of June 30, 2003*. Retrieved March 25, 2004, from [http://www.fcc.gov/Bureaus/Common\\_Carrier/Reports/FCC-State\\_Link/IAD/hspd1203.pdf](http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/hspd1203.pdf)

List of Maps

Map 1: *Map of North Dakota Counties Studied*

Map 2: *Map of Pennsylvania Counties Studied*

Map 3: *Cable Modem Coverage & DSL-Enabled Wire Centers: Pennsylvania*

Map 4: *Cable Modem Coverage & DSL-Enabled Wire Centers: Bradford County  
Pennsylvania*

Map 5: *Cable Modem Coverage & DSL-Enabled Wire Centers: Clinton County  
Pennsylvania*

Map 6: *Cable Modem Coverage & DSL-Enabled Wire Centers: Forest County  
Pennsylvania*

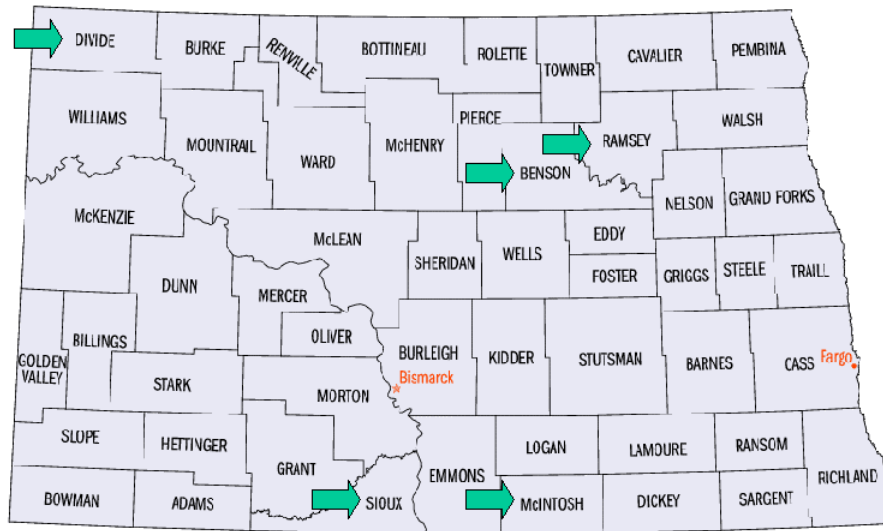
Map 7: *Cable Modem Coverage & DSL-Enabled Wire Centers: Potter County  
Pennsylvania*

Map 8: *Cable Modem Coverage & DSL-Enabled Wire Centers: Sullivan County  
Pennsylvania*

Map 1

Map of North Dakota Counties Studied

### North Dakota Counties

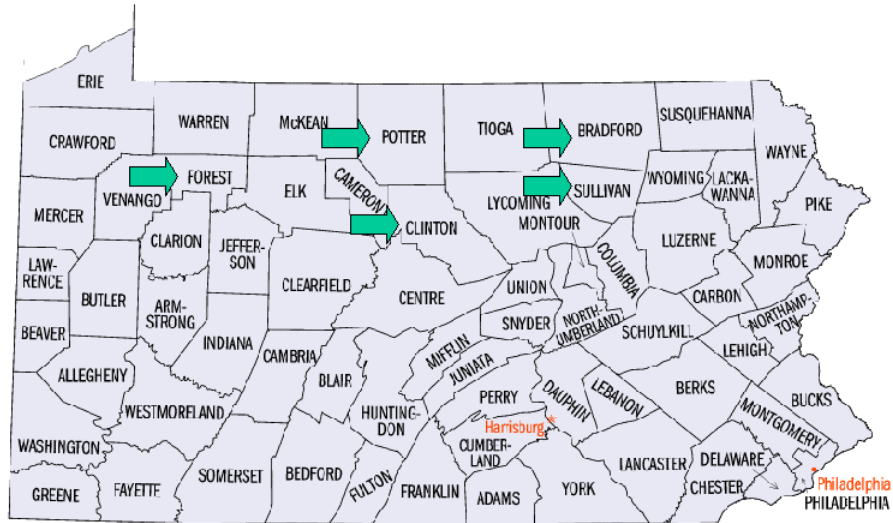


Source: U.S. Census Bureau. (2002). State and County Quickfacts: North Dakota County Selection Map. Retrieved February 13, 2003 from: [http://quickfacts.census.gov/qfd/maps/north\\_dakota\\_map.html](http://quickfacts.census.gov/qfd/maps/north_dakota_map.html)

Map 2

Map of Pennsylvania Counties Studied

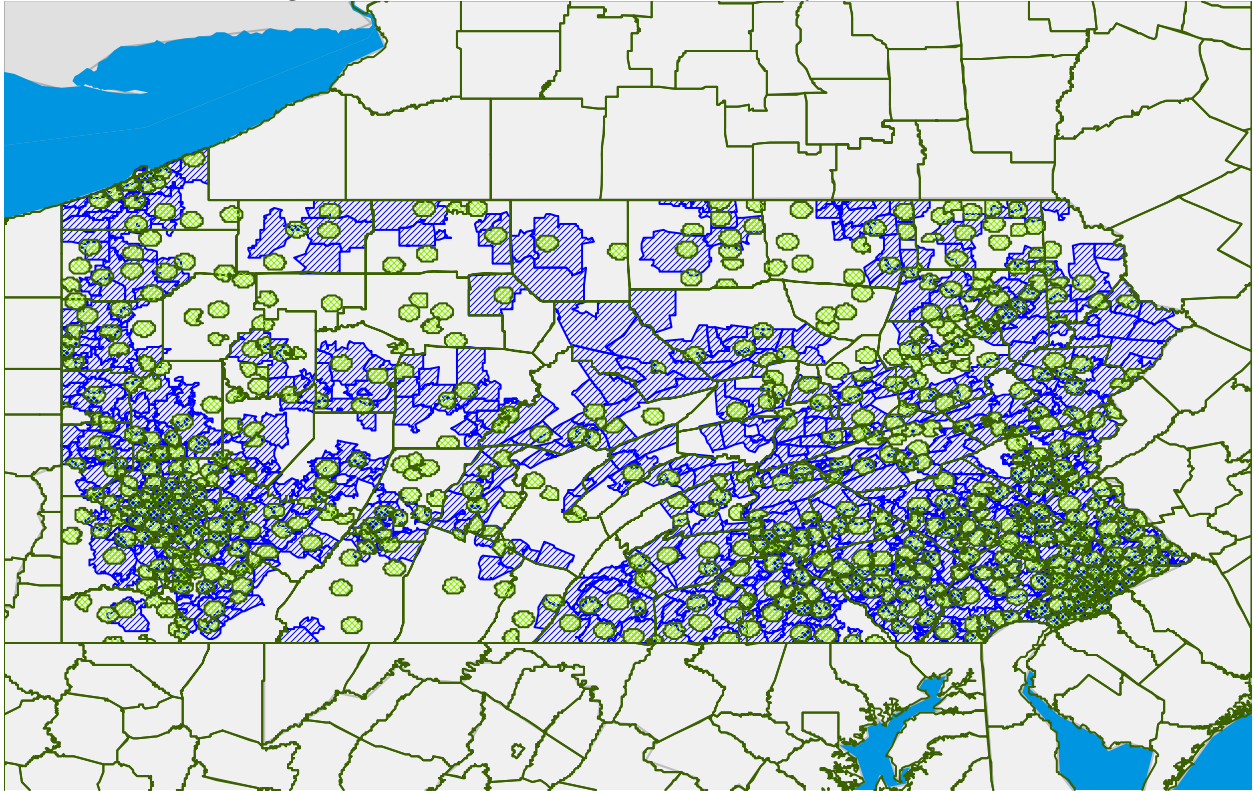
**Pennsylvania Counties**



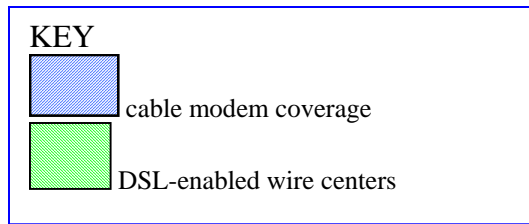
Source: U.S. Census Bureau. (2002). State and County Quickfacts: Pennsylvania County Selection Map. Retrieved February 13, 2003 from: [http://quickfacts.census.gov/qfd/maps/pennsylvania\\_map.html](http://quickfacts.census.gov/qfd/maps/pennsylvania_map.html)

Map 3

*Cable Modem Coverage & DSL-Enabled Wire Centers: Pennsylvania*

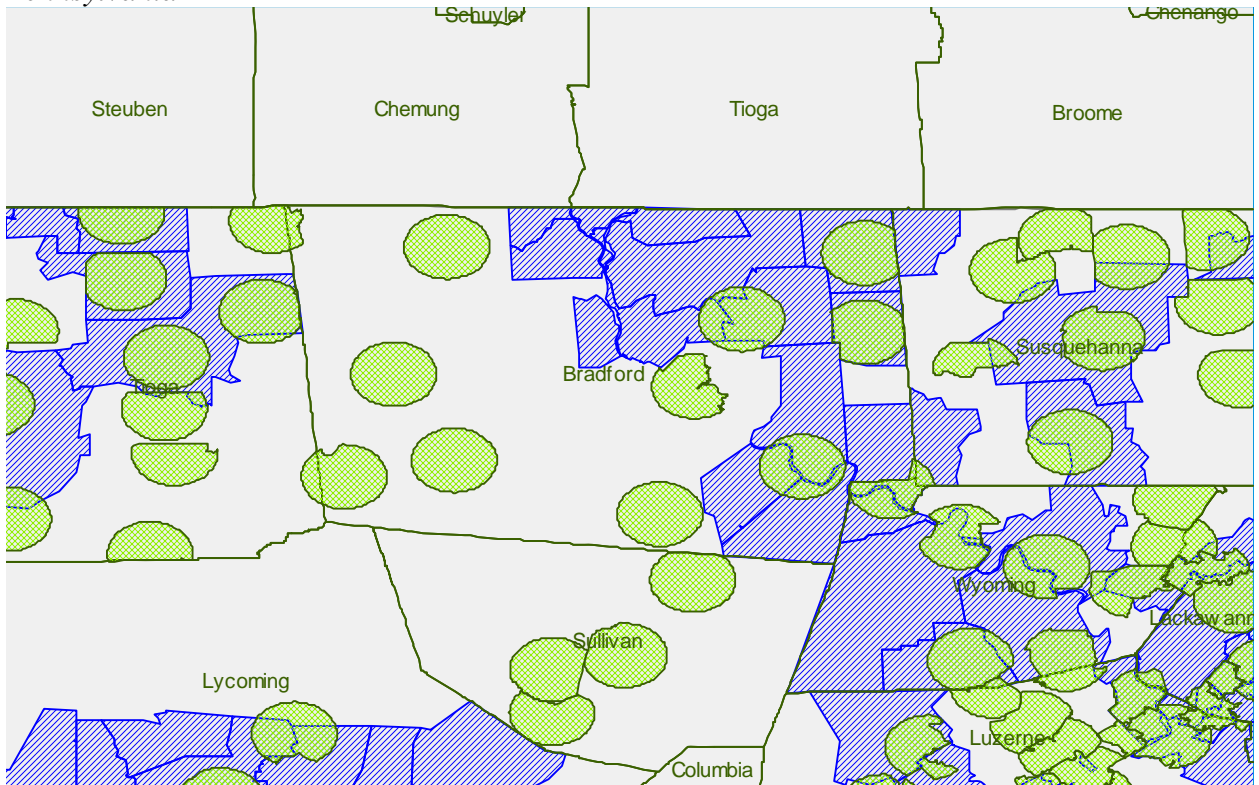


Sources: Cable Modem Coverage - iMapData, January 2003; DSL-Enabled Wire Centers - MapInfor Exchange Infor/iMap Data, May 2003; Counties - U.S. Census Bureau, June 2000

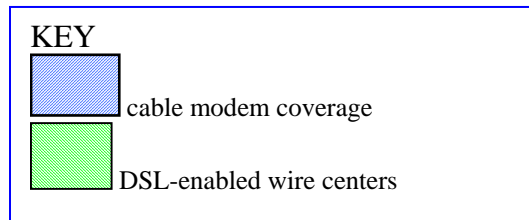


Map 4

*Cable Modem Coverage & DSL-Enabled Wire Centers: Bradford County  
Pennsylvania*

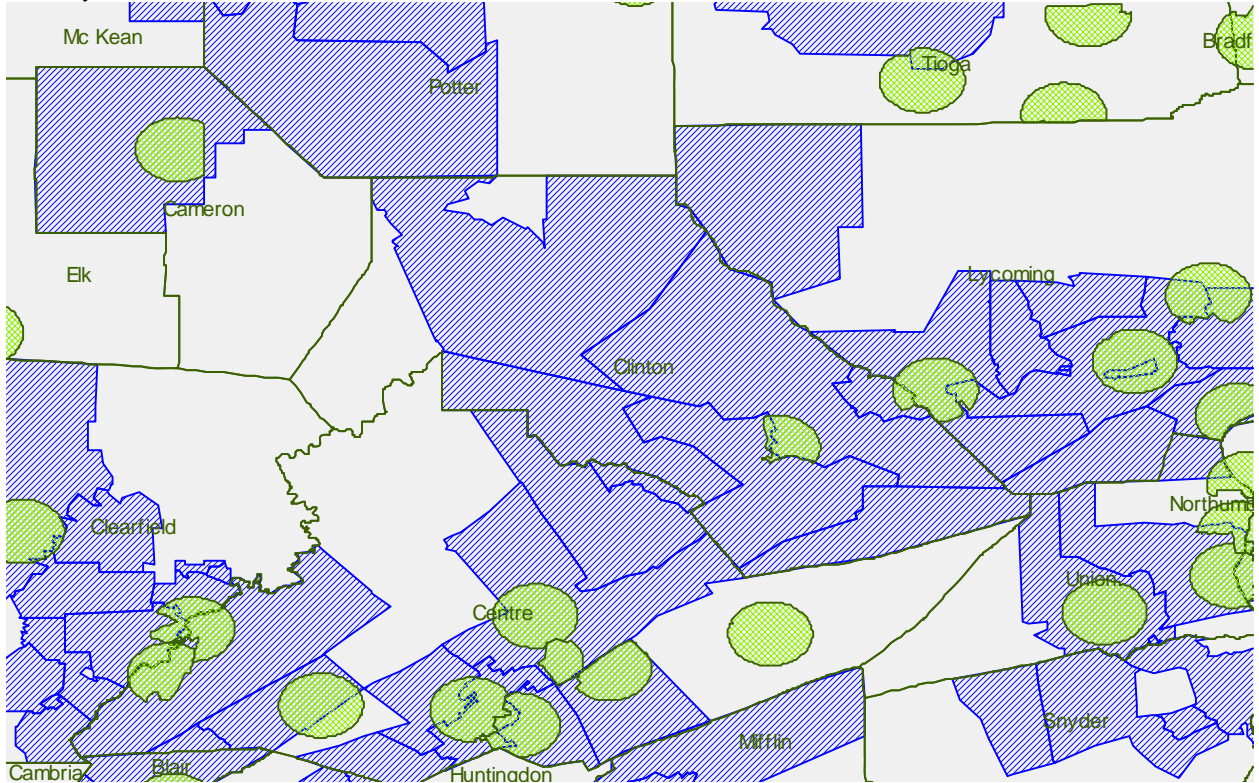


Sources: Cable Modem Coverage - iMapData, January 2003; DSL-Enabled Wire Centers – MapInfor Exchange Infor/iMap Data, May 2003; Counties - U.S. Census Bureau, June 2000

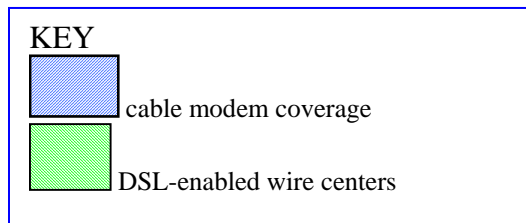


Map 5

*Cable Modem Coverage & DSL-Enabled Wire Centers: Clinton County  
Pennsylvania*

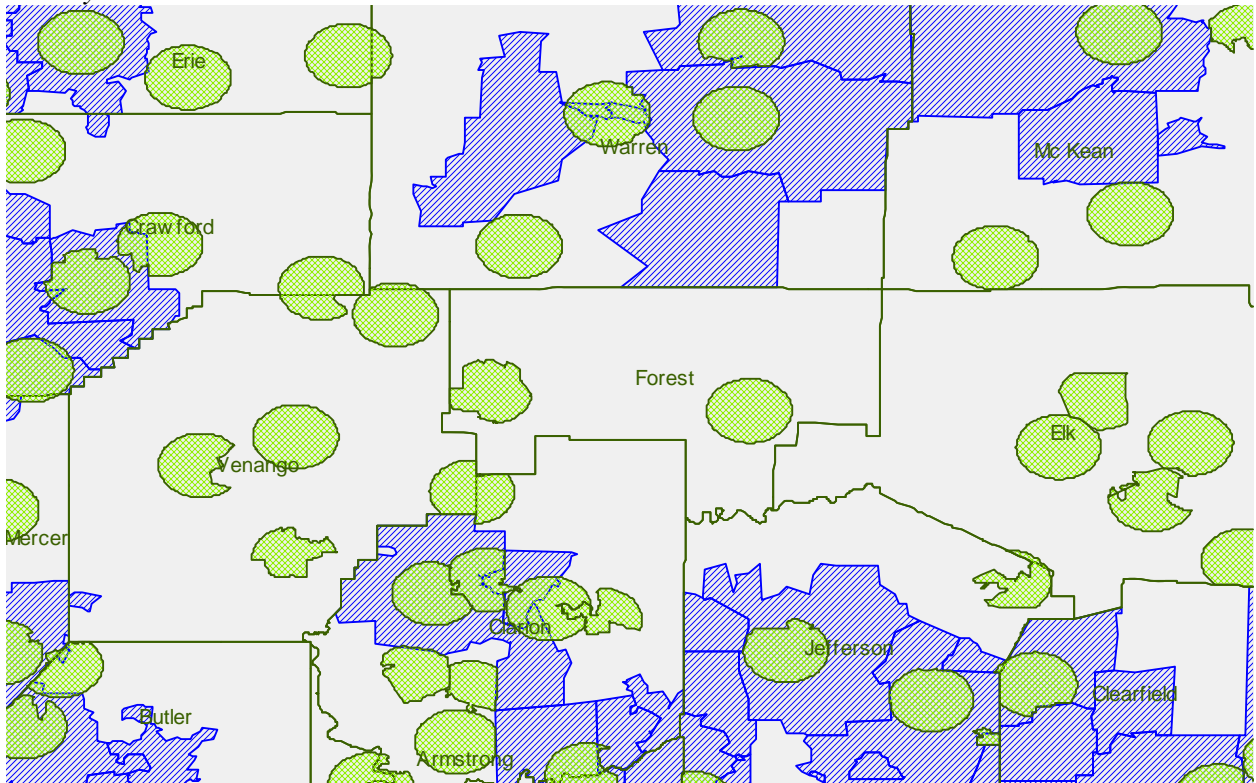


Sources: Cable Modem Coverage - iMapData, January 2003; DSL-Enabled Wire Centers – MapInfor Exchange Infor/iMap Data, May 2003; Counties - U.S. Census Bureau, June 2000

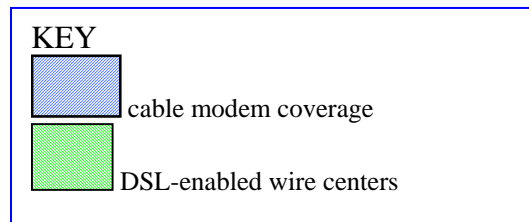


Map 6

*Cable Modem Coverage & DSL-Enabled Wire Centers: Forest County  
Pennsylvania*



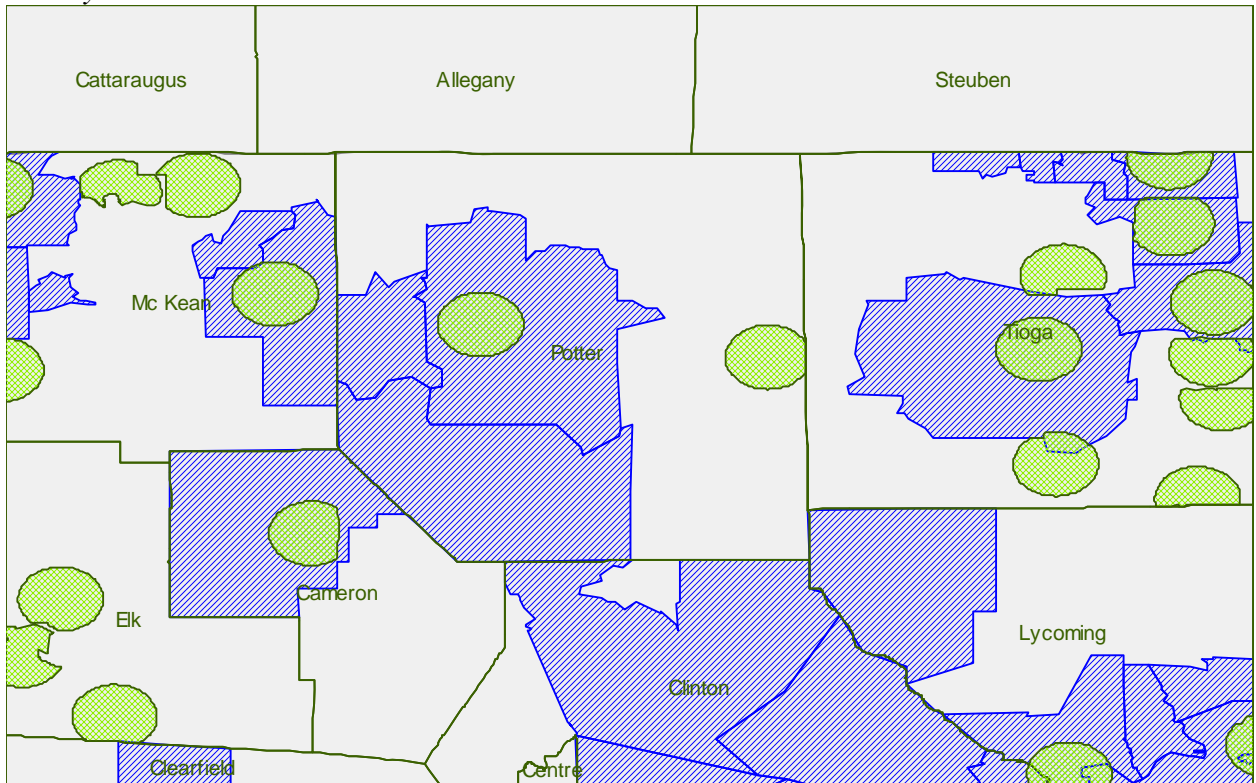
Sources: Cable Modem Coverage - iMapData, January 2003; DSL-Enabled Wire Centers – MapInfor Exchange Infor/iMap Data, May 2003; Counties - U.S. Census Bureau, June 2000.



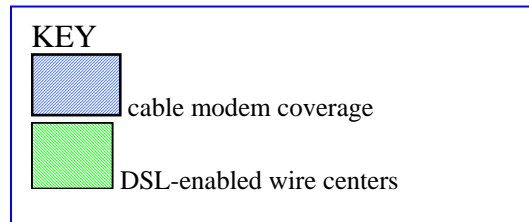


Map 7

*Cable Modem Coverage & DSL-Enabled Wire Centers: Potter County  
Pennsylvania*

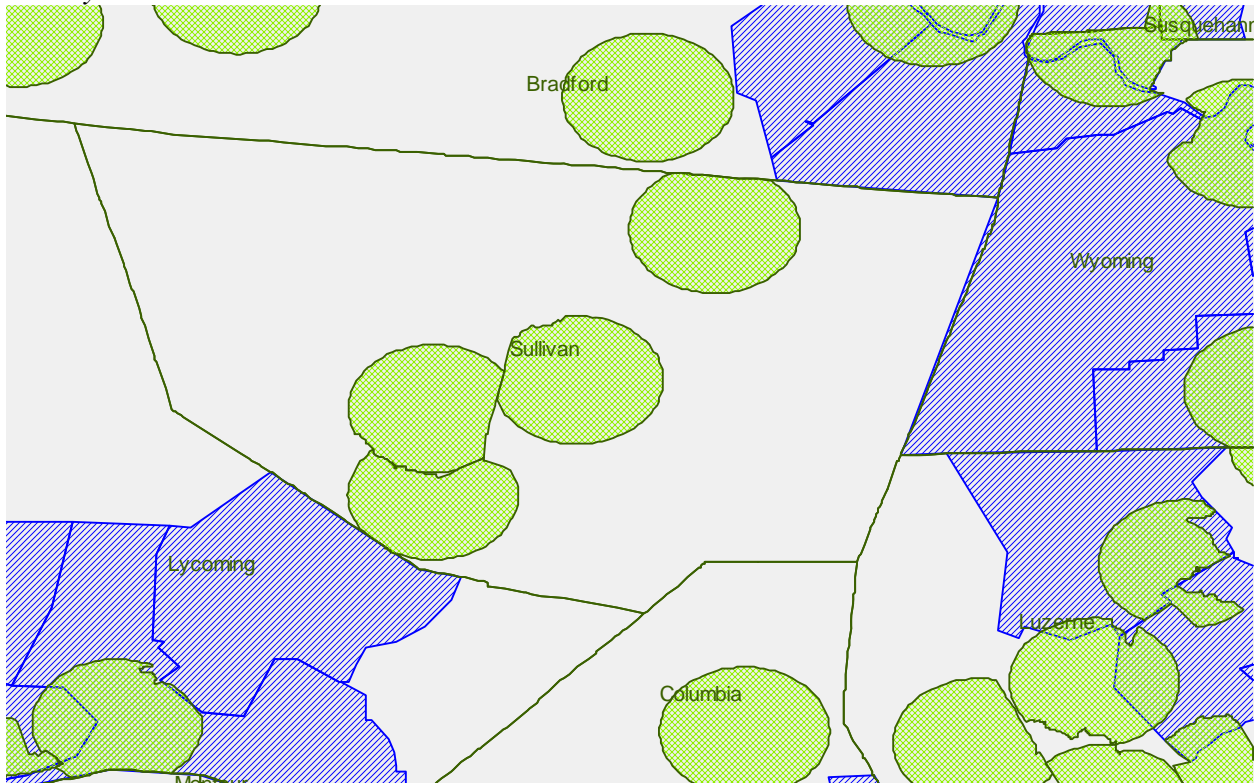


Sources: Cable Modem Coverage - iMapData, January 2003; DSL-Enabled Wire Centers – MapInfor Exchange Infor/iMap Data, May 2003; Counties - U.S. Census Bureau, June 2000.



Map 8

*Cable Modem Coverage & DSL-Enabled Wire Centers: Sullivan County  
Pennsylvania*



Sources: Cable Modem Coverage - iMapData, January 2003; DSL-Enabled Wire Centers – MapInfor Exchange Infor/iMap Data, May 2003; Counties - U.S. Census Bureau, June 2000.

