

Rural America in the Digital Age

**A Preliminary Assessment of the State of the
Information/Telecommunications Infrastructure in Ten Counties of North
Dakota and Pennsylvania:**

By

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The Americans never use the word peasant, because they have no idea of the class which that term denotes; the ignorance of more remote ages, the simplicity of rural life, and the rusticity of the villagers have not been preserved among them; and they are alike unacquainted with the virtues, the vices, the coarse habits, and the simple graces of an early stage of civilization
—Alexis de Tocqueville¹

There is hardly a pioneer's hut which does not contain a few odd volumes of Shakespeare. I remember reading the feudal drama of Henry V for the first time in a log cabin. -- Alexis de Tocqueville²

De Tocqueville traveled throughout central Pennsylvania observing, with the eye of a French aristocrat, the peculiarities of American society. He peered into the lives of ordinary farmers and noted with some surprise the rejection of second class status in matters of democratic participation by even the most remote settler. Those backwoods farmers saw themselves as integral to the life blood of the nation as any wealthy Boston trader or Philadelphia merchant. And now, into the 21st century, that insistence persists; thus motivating our concern for equal access—rural and urban—within an age of rapid technological change, media convergence, and increasing dependence on new channels of communication.

In this paper, we examine the conditions under which ten rural counties experience the information age. The paper presents a statistical description of the information infrastructure in each county (five counties in North Dakota and five in Pennsylvania), with the goal of providing a framework for the development of policy research agendas seeking to identify and serve the information needs of rural America.

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

¹ *Democracy in America* (1835) v. 1, ch. 17, p. 316.

² (1835) *Democracy in America*, vol. 2, pt. 1, ch. 13, of the reading habits of Americans. Of de Tocqueville's many surprises, this one repeated itself. Coming from Catholic France with its high levels of illiteracy, the reading patterns of this largely Protestant nation astonished him.

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)).

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 policymakers in mind, and variations observed, the following sections provide an introductory overview of access to: Internet services; telephony; TV and radio broadcasting, print media; and, public libraries.

The People of North Dakota and Pennsylvania

North Dakota and Pennsylvania capture the poles in the circumstances of being rural. 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.

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 farm houses. As the 1989 North Dakota Blue Book 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.³ Total population exceeds twelve million, with the

³ 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

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 6th⁴ 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 nonmetro counties in 2000⁵; and, especially in the eastern half of the state, many of its small towns are the same ones recorded in the census of 1790.

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).

Table 1

North Dakota and Pennsylvania: Selected Characteristics

North Dakota	Pennsylvania
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

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).

⁴ 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.

⁵ U.S. Dept. of Agriculture, Economic Research Service. (2002, September 19). *Population change 1990-2000 for Pennsylvania*. Retrieved March 31, 2003, from <http://www.ers.usda.gov/Data/Population/PopList.asp?ST=PA&LongName=Pennsylvania>.

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)

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 (See Appendix J for the many definitions of “rurality.”). 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 (See tables offering further comparisons of the these counties in appendix XXX.).

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.

Table 2

North Dakota: Demographic Statistics for Counties Studied

North Dakota: Demographic Statistics for Selected Counties	Benson County	Divide County	McIntosh County	Ramsey County	Sioux County
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%
North Dakota: Demographic Statistics for Selected Counties	Benson County	Divide County	McIntosh County	Ramsey County	Sioux County
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 county selection map*. Retrieved February 13, 2003, from http://quickfacts.census.gov/qfd/maps/north_dakota_map.html

Table 3

Pennsylvania: Demographic Statistics for Counties Studied

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

Access and Usage⁶

In the Information Age, rural Americans must achieve access to the national information infrastructure (NII), 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 NII accrue to all of the individuals on the network. Furthermore, access to communication services available from the NII 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. With these caveats in mind, we describe the range of information assets available to residents of these counties.

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 84⁷. 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.

Table 4

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

County	Newspaper	Daily or Weekly	Circulation
Benson County, ND	<i>Benson County Farmers Press</i> (Minnewaukan, ND) http://www.besoncountynews.com	Weekly (Weds.)	2,716 free & paid
Divide	<i>The Journal</i> (Crosby, ND)	Weekly	2,700 paid

⁶ Americans enjoy an abundance of information about themselves but fall short when it comes to ease of use. As we took on this project, we discovered that within the constraints of our time and budget we would be unable to generate the desired data for these ten counties. Though we explored numerous sources, both public and private, some categories of data require more resources than available to us. As a result, we have drawn upon data at the state and national level.

⁷ U.S. Census Bureau, *Statistical Abstract of the United States: 2001* (121st ed.). Daily and Sunday newspapers--Number and circulation by state: 2000, p. 707.

County, ND	http://www.crosbynd.com/journal	(Weds.)	
McIntosh County, ND	<i>The Ashley Tribune</i> (Ashley, ND)	Weekly (Weds.)	1,450 paid
Ramsey County, ND	<i>Devil's Lake Journal</i> (Devil's Lake, ND)	Daily	4,900 paid
Bradford County, PA	<i>Canton Independent-Sentinel</i> (Canton, PA)	Weekly (Thurs.)	2,000 free & paid
Bradford County, PA	<i>Daily Review/Sunday Review</i> http://www.thedailyreview.com	Daily	9,000 paid, 9,200 paid (Sunday ed.)
Bradford County, PA	<i>Evening Times</i> (Sayre, PA)	Daily	9,000 paid
Clinton County, PA	<i>Express</i> (Lock Haven, PA) http://lockhaven.com	Daily	11,200 paid
Forest County, PA	<i>Forest Press</i> (Tionesta, PA)	Weekly	4,500 paid
Potter County, PA	<i>Potter Leader-Enterprise</i> (Coudersport, PA)	Weekly	12,000 paid
Sullivan County, PA	<i>Sullivan Review</i> (Dushore, PA)	Weekly	7,000 paid

Source: R. R. Bowker. (2002). *2003 Working press of the nation, Volume 1: Newspaper directory* (53rd ed.). New Providence, NJ: The Author.

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's *Star-Gazette* in the case of Bradford county and the *Williamsport Sun Gazette* and *Centre Daily Times* in the case of Clinton County, PA.)

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, seventy-five percent of Internet users patronize public libraries, while 60% of library users also go online.⁸ At present, because almost all public libraries – 95% – maintain an Internet connection, functional access extends to nearly every American without household Internet connectivity.

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

⁸ D'Elia, G.. and E. J. Rodger, Impacts of the Internet on public library use, Urban Libraries Council (2000).

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.

Table 5

Public Libraries in North Dakota and Pennsylvania: A Statistical Comparison

	North Dakota	Pennsylvania
Population, 2000 census	642,200	12,281,054
Population Served by Public Libraries, 2000	578,204	11,597,010
Population Unserved by Public Libraries, 2000	63,996	291,900
Number of Public Libraries	81	457
Total Volumes in Public Libraries, 2000	2,173,558	28,787,956
Volumes per capita, 2000	3.76	2.47 (population served)
Total Public Library Circulation, 2000	3,909,292	55,006,947
Circulation per capita, 2000	6.76	4.74 (population served)
Total Public Library Income (including grants-in-aid)	\$8,140,667	\$235,350,703
Mean Library Income	NA	\$300,106 (excluding Phila. & Pittsburgh)
Source of income	Mainly public funds	Public funds: \$144,144,300 State aid: \$44,196,817 Federal: \$2,495,410 Private funds (including gifts): \$44,370,510
Total Operating Expenditures	NA	\$232,759,436
Expenditures per capita	\$12.05	\$19.91 (Operating expenditures per capita; population served)
Number of county or multi-county libraries	Counties Served: 30; Counties unserved: 23	Libraries: 55 Counties served: 67 of 67 total
Number of bookmobiles in state	13	33
Grants in aid for public libraries	\$444,372	Federal (Library Services & Technology Act), 1999-2000 Public Libraries: \$4,496,641 Other Libraries: \$2,579,034
State Aid	NA	\$47,289,000 ⁹
Quality Libraries Aid	NA	The rate of distribution based on a

⁹ The formulas to calculate state aid were revised in 1999-2000. To be eligible for state aid, the local financial effort of a library or library system must be at least \$5 per capita unless the library serves an economically distressed municipality.

		population served at \$1.57 per capita.
Incentive for Excellence Aid	NA	Libraries eligible for this aid received \$.759048 per dollar for local financial effort (expenditures) between \$5 and \$7.50 per capita.
County Coordination Aid	NA	55 county libraries or library systems qualified for this aid.
District Library Center Aid	NA	This aid was paid to 28 libraries designated to make their resources and services available to the people in assigned districts and to render other services to other local libraries in the district. The rate of this aid was \$1 per capita for the population of the assigned district or a minimum of \$2000,000 per District Library Center.

Sources: American Library Directory, 55th ed., 2002-2003, v. 1. Date of Statistics: 2000 (North Dakota); 1999 & 2000 (PA). U.S. Dept. of Education, Office of Educational Research and Improvement. National Center for Education Statistics. (2002). Public libraries in the United States: Fiscal year 2000. Accessed February 21, 2003 from: <http://nces.ed.gov/pubs2002/2002344.pdf>

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.

291,900 Pennsylvanians and 63,996 North Dakotans are unserved by libraries. 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))¹⁰

While Pennsylvania is home to 457 public libraries compared to North Dakota's 81 libraries, North Dakota boasts 3.76 volumes per population served while Pennsylvania offers only 2.47 volumes. In North Dakota, 13 bookmobiles serve populations living some distance from the state's public libraries whereas Pennsylvania has 33 bookmobiles serving its more remote patrons.

¹⁰ Pennsylvania. Office of Commonwealth Libraries. *2000 Directory of Pennsylvania Libraries*.

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, their 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.

A review of the national factors contributing to lack of a household telephone indicates that rural households without phones comprise multiple but overlapping groups:

- ◆ Income makes a difference. E.g., Households receiving energy assistance, food stamps, school lunch programs, welfare, and public assistance tend to have lower telephone penetration rates, as much as 20 points below the national average.
- ◆ Housing characteristics influence telephone penetration. E.g., renters experience on average a lower telephone penetration level than those owning their dwelling. The difference in telephone penetration between owner- and renter-occupied housing units (OHUs) at the state level was no less than 3.8% (Hawaii) and was as much as 17.5% (Arkansas). In 19 of the 50 states, owner OHUs had a telephone penetration level at least 10% higher than their renting counterparts.
- ◆ Women as heads of households experience phonelessness in inordinate numbers. The Census category, "Single Civilian Female with Children" has the second lowest telephone penetration (82.6%), exceeded only by the homeless. In addition, this category has shown little improvement, 80.1% in 1984 to 82.6% in 1993. [Can these statistics be updated?] [Is this also true in these counties?]
- ◆ Youth suffers as well. Younger households suffer lower telephone penetration levels than do households headed by older people. (What are the data, if any, for these counties?)
- ◆ Unemployment directly affects telephone penetration. All groups experienced lower penetration among the unemployed at the national level; compare Whites with Indians.

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.¹¹

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% increase¹². 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."

Indians and the Telephone Gap

Indian¹³ households, particularly those on reservations and trust lands, experience the widest gap between their levels of telephone penetration and both the White and national penetration averages. The two states with the largest numbers of Indians—Oklahoma and Arizona—rank in the bottom quintile of overall state telephone penetration. The 314 US reservations and trust lands have an average telephone penetration rate of 46.6%—less than half the national average.

TV and Radio Broadcasting

In North Dakota, approximately 50% of Benson county, 20-25% of Divide county, and a significant percentage of McIntosh county appear beyond the coverage of either Grade A or Grade B broadcast television. (See table 6.)

¹¹ 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.

¹² Source: Federal Communications Commission. (2002). Table 2: Telephone Penetration by State. In *Telephone subscribership in the United States (Data through November 2001)*. Washington, DC: The Author.

¹³ According to the Census Bureau, persons who broadly identify themselves as Indian, Eskimo, or Aleut. More specifically, the term includes any indigenous people of the US. Indian tribes are sometimes aggregated into the term "Native American." Native American is considered a racial category.

Table 6: Television Stations Serving North Dakota Counties Included in the Study

County	Stations	Network Affiliation	Service	Total TV Households
Benson	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)
Divide	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)
McIntosh	KXMB-TV (Satellite of KXMC-TV, Minot, ND)	CBS	Grade B (approximately 40% of county);	51,700
McIntosh	KFYZ-TV (Operates satellites KQCD-TV, Dickinson; KMOT, Minot & KUMV-TV, Williston, ND)	NBC	Grade B (approximately 50% of county)	56,390 (estimated)
Ramsey	KNRR (Satellite of KVRR, Fargo, ND)	Fox	Grade B (approximately 5-10% of county); DTV (approximately 20% of county)	25,490 (estimated)
Ramsey	KVLY-TV, Fargo, ND	NBC	Grade B (minute portion of county)	218,570 (estimated)
Ramsey	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)

Sioux County	KXMB-TV (Satellite of KXMC-TV, Minot, ND)	CBS	Grade A (approximately 75% of county); Grade B (approximately 95% of county)	51,700
Sioux County	KFYR-TV (Operates satellites KQCD- TV, Dickinson; KMOT, Minot & KUMV-TV, Williston, ND)	NBC	Grade A (approximately 50%); Grade B (approximately 99%)	56,390
Sioux County	KBYM (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 factbok*, 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).

Few, if any, of the counties in the study serve as a home base for commercial television stations¹⁴ although four of the counties are home to two or more AM and/or FM radio stations (See Table 7.). 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, such as in Potter County, residents living in the higher elevations of the county 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 Bismark or other larger cities in the state.

¹⁴ 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*.

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.

Table 6a

North Dakota and Pennsylvania Radio Stations

	Radio Stations (Total)	Radio Stations (AM)	Radio Stations (FM)
North Dakota	79	34	45
Pennsylvania	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	Radio Station/Location	FM or AM?	Frequency/Power	Population Served	Licensee
Ramsey County, ND	KDLR (Devil's Lake)	AM	1240 khz; 1 kw-U	Unknown	Dakota Rose Broadcasting Inc.
Ramsey County, ND	KDVL (Devil's Lake)	FM	102.5 mhz; 100 kw	90,000	Dakota Rose Broadcasting Inc.
Ramsey County, ND	KQZZ (Devil's Lake)	FM	96.7 mhz; 45 kw	Unknown	Two Rivers Broadcasting Inc.
Ramsey County, ND	KZZY (Devil's Lake)	FM	103.5 mhz; 100 kw	13,000	Double Z Broadcasting Inc.
Bradford County, PA	WATS (Sayre, PA)	AM	960 khz; 5 kw-D	100,000	WATS Broadcasting Inc.
Bradford County, PA	WREQ (Elmira, NY) -- Ridgebury	FM	96.9 mhz; 3.6 kw	Unknown	CSN International
Bradford County, PA	WHGL	FM	100.3 mhz; 3.9 kw	Unknown	Cantroair Communications Inc.
Bradford County, PA	WTTC (Towanda, PA)	FM	95.3 mhz; 3 kw	Unknown	WATS Broadcasting Inc.
Bradford	WTTC	AM	1550 khz; 500 w-	30,000	WATS

County, PA	(Towanda, PA)		D		Broadcasting Inc.
Bradford County, PA	WTZN (Troy, PA)	AM	1310 khz; 500 w-D, 72 w-N	Unknown	Cantroair Communications Inc.
Clinton County, PA	WBPZ (Lock Haven, PA)	AM	1230 khz; 1 kw-U	50,000	Lipez Broadcasting Corp.
Clinton County, PA	WSNU (Lock Haven, PA) Note: Co-owned with WBPZ (AM)	AM	92.1 mhz; 3 kw	70,000	Lipez Broadcasting Corp.
Clinton County, PA	WQBR (McElhattan, PA)	FM	99.9 mhz; 900w	300,000	Maximum Impact Communications Inc.
Clinton County, PA	WVRT	FM	97.7 mhz; 6 kw	136,000	Capstar TX LP
Clinton County, PA	WZYY (Renovo, PA)	FM	106.9 mhz; 650 w	Unknown	Westview Communications Inc.
Potter County, PA	WFRM	AM	600 khz; 1 kw-D, 46 w-N	2,831	Farm & Home Broadcasting Inc.
Potter County, PA	WFRM	FM	96.7 mhz; 1.45 kw	Unknown	Unistar

Source: R. R. Bowker. (2002). *2003 Working press of the nation, volume 3: TV and radio directory*. New Providence, NJ: The Author.

Table 8

North Dakota and Pennsylvania Television Stations

TV Stations (Total)

North Dakota 24
 Pennsylvania 46

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

Cable/Broadband

Though cable service passes most American homes, we found no cable company listed for McIntosh county, ND in the *TV & cable factbook*. Indeed, only one system in North Dakota had more than 1,000 subscribers (i.e., Devils Lake, Ramsey county). Midcontinent Communications owns 5 of the 7 North Dakota cable systems in the counties studied. Only one of the seven systems was operating "2 way".

Table 9: Cable Systems and Service by State

State	Cable Systems (Total)	Total Communities Served	Miles of Plant	Homes Passed	Number of Basic Subscribers	Number of Expanded Basic Subscribers	Number of Pay Units
North Dakota	102	219	2,731	226,062	156,878	126,019	50,553
Pennsylvania	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 9a: Cable Systems: North Dakota Counties Studied

County/Town	Cable System Name	Subscribers	Channel Capacity	Miles of Plant	Homes Passed
Benson (Esmond)	Midcontinent Communications	68 (basic service)	40 (not 2-way capable)	2.3 (coaxial); None (fiber optic)	132
Benson (Leeds)	Midcontinent Communications	211 (basic service)	40 (not 2-way capable). Channels available but not in use: 1	8.0 (coaxial); None (fiber optic)	375
Benson (Maddock)	Maddock Cable TV	205 (basic service)	28 (operating 2-way); Channels available but not in use: 18	5.0 (coaxial)	253
Benson (Minnewaukan)	Midcontinent Communications	126 (basic service)	40 (not 2-way capable);	2.9 (coaxial); None (fiber optic)	173

			Channels available but not in use: 4		
Divide (Crosby)	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
Ramsey (Devils Lake)	Midcontinent Communications	3,340 (basic service)	40 (not 2-way capable)	67.0 (coaxial); None (fiber optic)	4,800
Sioux (Solen)	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 9b: Cable Systems: Pennsylvania Counties Studied

County/Town	Cable System Name	Subscribers	Channel Capacity	Miles of Plant	Homes Passed
Bradford and Sullivan (Dushore)	Blue Ridge Cable TV	853 (basic service)	42	N.A.	N.A.
Bradford (East Smithfield)	Community Cable Corp.	134 (basic service)	17 (not 2-way capable)	8.0 (coaxial)	150
Bradford (Leroy Township)	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
Bradford (Little Meadows)	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
Bradford (Meshoppen)	Blue Ridge Cable TV Inc.	7,556 (basic service)	42	178.1 (coaxial)	N.A.
Bradford (Rome)	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)	
Bradford (Sayre)	Time Warner Cable	8,475 (basic service)	60	143.0 (coaxial)	9,469; Total homes in franchise area: 10,185
Bradford (Towanda)	Adelphia	2,511 (basic service); 2,410	36	61.4 (coaxial)	3,059

		(expanded basic service)			
Bradford (Troy)	Blue Ridge Cable TV Inc.	N.A.	35 (not 2-way capable)	25.0 (coaxial)	1,800; Total homes in franchise area: 1,800
Bradford (Ulster)	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
Bradford (West Burlington Township)	Barrett's TV Cable System	35 (basic service)	13	4.0 (coaxial)	N.A.
Clinton (Eastville)	Eastville TV Cable	N.A.	12. Channels available but not in use: 8	1.5 (coaxial)	28
Clinton (Lock Haven)	Adelphia	5,193 (basic service)	40 (not 2-way capable). Channels available but not in use: 11	N.A.	N.A.
Clinton (Mill Hall)	Susquehanna Communications Co.	4,000 (basic service)	36 (2-way capable)	Miles of plant included with Williamsport, PA	Homes passed included with Williamsport, PA
Clinton (Tylersville)	Community TV	N.A.	12. Channels available but not in use: 5	N.A.	N.A.
Clinton (Williamsport)	Susquehanna Communications Co.	37,000 (basic service); 3,600 (digital basic)	78	885.0 (coaxial)	49,000

		service); Internet service available			
Forest (Marienville)	CableVision Communications	389 (basic service); 312 (expanded basic service)	N.A.	16.0 (coaxial)	663
Potter (Coudersport)	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
Potter (Gaines)	Gaines-Watrous TV Inc.	300 (basic service)	36 (not 2- way capable)	20.0 (coaxial)	330
Potter (Galeton)	Blue Ridge Cable TV Inc.	574 (basic service)	35	12.0 (coaxial)	640; Total homes in franchised area: 640
Potter (Oswayo)	Kellogg Communications	N.A.	N.A.	N.A.	N.A.
Potter (Ulysses)	Time Warner Cable	168 (basic service)	61	6.0 (coaxial)	244
Sullivan (Laporte borough)	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.).

Pennsylvania's geography, those same mountains that prompted 18th century settlement in the valleys, also provoked the 20th 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 of cable's urban-rural service gap 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.

Two cable providers in Clinton county PA have 12 channel capacity. Of the 12 channel capacity, Eastville TV Cable has 8 channels available but not in use while Community TV in Tylersville has 5 channels available but not in use. Barrett's TV Cable System in West Burlington, Bradford

county has 13 channel capacity. 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. Still, in the state that pioneered cable service for the rurally isolated, the attractiveness of urban profit margins renders rural service unappealing to providers.¹⁵

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 10 through 10c are excerpted from The Federal Communications Commission's December 2002 report *High-speed services for Internet Access: Status as of June 30, 2002* and indicate that 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.¹⁶

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 differs a bit. 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.

¹⁵ We were unable to find satellite service subscribership info, within the time frame of the study.

¹⁶ FCC data, for the most part, does not break down Internet statistics by county. Instead, the data is broken down by state and then zip code (e.g., data provided in *High speed services for Internet access, etc.*). The data appears to be available from private research firms at a substantial price (e.g., KMI market study, *Residential Broadband Access in the United States: Fiber-to-the-Curb and Fiber-to-the-Home*, October 2001 (\$6,850) @ http://www.kmicorp.com/fiberoptics_market_studies/broadband.htm.

Table 10

*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)
North Dakota	7	*	6	12
Pennsylvania	12	9	20	29
Nationwide (Unduplicated) June 2002	141	68	137	237

* 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

Table 10a

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

	Dec 1999 Total	June 2000 Total	Dec 2000 Total	June 2001 Total	Dec 2001 Total	June 2002 ADSL	June 2002 Coaxial Cable	June 2002 Other	June 2002 Total	% Change June 2001- Dec 2001	% Change Dec 2001- June 2002
North Dakota	*	2,437	4,227	6,277	6,082	6,575	*	*	14,164	-3%	133%
Pennsylvania	71,926	79,892	176,670	263,236	376,439	162,258	300,840	53,390	516,488	43%	37%
Reported Total	2,754,286	4,367,434	7,069,874	9,616,341	12,792,812	5,101,493	9,172,895	1,928,152	16,202,540	33%	27%

* 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

Table 10b

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

	Residential & Small Business	Other ¹	Total
North Dakota	13,105	1,059	14,164
Pennsylvania	425,676	90,812	516,488
Reported Total	13,984,287	2,218,253	16,202,540

¹Other 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

Table 10c

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

	Number of Providers										
	Zero	One	Two	Three	Four	Five	Six	Seven	Eight	Nine	Ten or More
North Dakota	51	36	10	2	1	0	0	0	0	0	0
Pennsylvania	15	16	15	12	9	9	5	3	3	2	9
Nationwide	16%	18%	16%	13%	10%	7%	5%	3%	3%	2%	6%

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

Recent Telecom Developments in North Dakota and Pennsylvania

Centers of Excellence in Rural America (CERA)

The creation of Centers of Excellence in Rural America (CERA) is one notable recent telecom initiative which involves North Dakota. "Sponsored by the Western Governors' Association, state and local leaders from Wyoming and North Dakota have been working over the past few years to create the Centers" that they describe as a "... network of small rural towns deploying affordable, high speed telecommunications services." Communities currently participating in the project include Lusk, Powell, and Glenrock in Wyoming and Watford City and Mayville in North Dakota (Western Governors' Association, 2001). As the CERA page notes,

The CERA concept builds on the roots of small towns in the West balancing their independence with mutual support for the common good. CERA is an effort to test the hypothesis that creating a network of small rural towns deploying affordable, high speed telecommunications services will result in increased job creation and/or income in those towns while also improving access to education, healthcare, and governmental services.

The technologies deployed will enable citizens in these towns to pool their collective talent that can be utilized in an extended workplace situation and market that pool of talent to corporations. In addition, with the high speed telecommunications capabilities in place, the participating towns will focus on improving access to health, education, and government services to take full advantage of the installed infrastructure and may share services and expertise among the towns over the network as well.

Several new telecom initiatives have also been recently announced in Pennsylvania to supplement a number of other ongoing projects. Given the relatively recent nature of these endeavors, however, it is still somewhat early to judge their effectiveness in providing additional telecom access to rural populations in both states. Nevertheless, the concept of cooperatives has long and deep roots in rural America; and, because cooperatives succeed by aggregating demand, they offer the potential for overcoming the longstanding loss of population.¹⁷

Connectivity, Capability, and Content—The Determinants of Rural Access

The provision of telecommunications services will not by itself guarantee participation for rural citizens. The other side of the equation requires an understanding of the tools an individual must acquire to gain full access to the national network: that basket of tools encompasses **connectivity, capability, and content**.

¹⁷ Pennsylvania continues to host a statewide Grange fair and encampment, as it has for the last XXX years, a testament to the persistence of rural cultural institutions.

- ◆ The basic step toward access requires connecting to the network, often assumed to be the home. **Connectivity**, however, is not so simple; the cost of information technologies ranging from the telephone to Internet-ready PCs remains beyond the means of many households.¹⁸ Furthermore, even when a household earns disposable income sufficient to purchase connectivity, geography may still impose a barrier; significant tracts of rural America lack the infrastructure necessary for Internet access, must pay long-distance charges to connect, or receive access inferior to that enjoyed by their city cousins. In such climates, public libraries offering connectivity fulfill a critical need. Yet, several of these counties are poorly served, if at all, by public libraries.
- ◆ In the information age, **capability** consists of traditional literacy, and informational literacy. These are often assumed to be part of the skills kit that youngsters develop on their own; the teenage geek with a computer reigns as one of America's most visible cultural icons. However, the validity behind this myth comes from the ready access to computers enjoyed by middle class urban youth. In rural areas, informational literacy is harder to come by as part of the growing up experience, and may not be compensated for in formal schooling.
- ◆ Ultimately, the value of access comes down to the **content** available to the individual user. Indeed, the very abundance of information available today poses a paradox – with so much, why is it so difficult to find the answer to a specific question? Furthermore, superabundance does not provide all with equal access.

The Fork in the Road

One question continues to trouble us. Do rural communities experience a tipping point when information and telecommunications assets fall below some undetermined level? That is, as the information and telecommunications infrastructure declines, it becomes harder to attract new businesses and industries, because they need that infrastructure. With fewer new businesses and industries locating in the area, it becomes harder to create new jobs. And, without new jobs, young adults seek their fortunes elsewhere. Eventually, urban travelers will find themselves, “passin’ towns that have no name.”¹⁹ Thus, out-migration becomes its own curse.

Once the information and telecommunications infrastructure falls below its level of self sustenance and sets in motion a spiral of decline, can these processes be reversed? After all, the rise of the information society and economy locates the infrastructure that supports it at center stage; so that, as it falls, it drags everything else down with it. At this juncture, when many rural communities face cloudy futures, policy makers and researchers should pursue an agenda that

¹⁸ Approximately seven million American households lack telephone service. At an average of 2.5 persons per household, that leaves 17.5 million individuals unconnected to the most basic telecommunications technology.

¹⁹ From *City of New Orleans*, by Arlo Guthrie.

clarifies the conditions that lead to irreversible decline. 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.

De Tocqueville saw the future when he observed capability and content in the log cabins that he visited. Today, though capability, content (and connectivity) vary considerably from household to household, community to community, the goal remains the same—they must be achieved for all, if all are to realize the promise of the information age.

Appendices

Appendix A: Map of North Dakota counties

QuickTime™ and a
GIF decompressor
are needed to see this picture.

Appendix B: Map of Pennsylvania counties

QuickTime™ and a
GIF decompressor
are needed to see this picture.

Appendix C: Selected demographic statistics: North Dakota & Pennsylvania (state and selected counties)

Demographic Statistics: US, North Dakota & Pennsylvania	United States	North Dakota	Pennsylvania
Population, 2001 estimate	284,796,887	634,448	12,287,150
Population percent change, April 1, 2000-July 1, 2001	1.20%	-1.2%	Z
Population, 2000	281,421,906	642,200	12,281,054
Population, percent change, 1990 to 2000	13.1%	0.5%	3.4%
Persons under 5 years old, percent, 2000	6.8%	6.1%	5.9%
Persons under 18 years old, percent, 2000	25.7%	25.0%	23.8%
Persons 65 years old and over, percent, 2000	12.4%	14.7%	15.6%
White persons, percent, 2000 (a)	75.1%	92.4%	85.4%
Black or African American persons, percent, 2000 (a)	12.3%	0.6%	10.0%
American Indian and Alaska Native persons, percent, 2000 (a)	0.90%	4.9%	0.1%
Asian persons, percent, 2000 (a)	3.60%	0.6%	1.8%
Native Hawaiian and Other Pacific Islander, percent, 2000 (a)	0.01%	Z	Z
Persons reporting some other race, percent, 2000 (a)	5.50%	0.4%	1.5%
Persons reporting two or more races, percent, 2000	2.40%	1.2%	1.2%
Female persons, percent, 2000	50.90%	50.1%	51.7%
Persons of Hispanic or Latino origin, percent, 2000 (b)	12.50%	1.2%	3.2%
White persons, not of Hispanic/Latino origin, percent, 2000	69.10%	91.7%	84.1%
High school graduates, persons 25 years and over, 1990	80.4%	304,123	5,878,654
College graduates, persons 25 years and over, 1990		71,639	1,412,746
Total Degree-granting institutions, 2000-01	4,182	21	263
All public degree-granting institutions, 2000-01	1,698	15	67
Public, 4 year Degree-granting institutions, 2000-01	622	6	46
All private, Degree-granting institutions, 2000-01	2,484	6	196
Total private, 4 year Degree-granting institutions, 2000-01	1,828	4	105
Housing units, 2000	115,904,641	289,677	5,249,750
Homeownership rate, 2000	66.20%	66.6%	71.3%
Households, 2000	105,480,101	257,152	4,777,003
Persons per household, 2000	2.59	2.41	2.48
Households with persons under 18, percent, 2000		32.7%	32.6%
Median household money income, 1997 model-based estimate	\$41,994	\$31,764	\$37,267
Persons below poverty, percent, 1997 model-based estimate	12.4%	12.5%	10.9%
Children below poverty, percent, 1997 model-based estimate		16.8%	16.6%

North Dakota: Demographic Statistics for Selected Counties	Benson County	Divide County	McIntosh County
Population, 2001 estimate	6,879	2,203	
Population percent change, April 1, 2000-July 1, 2001	-1.2%	-3.5%	
Population, 2000	6,964	2,283	
Population, percent change, 1990 to 2000	-3.3%	-21.2%	
Persons under 5 years old, percent, 2000	8.9%	3.1%	
Persons under 18 years old, percent, 2000	36.1%	20.2%	
Persons 65 years old and over, percent, 2000	13.5%	29.5%	
White persons, percent, 2000 (a)	50.8%	99.0%	
Black or African American persons, percent, 2000 (a)	0.1%	0.0%	
American Indian and Alaska Native persons, percent, 2000 (a)	48.0%	0.1%	
Asian persons, percent, 2000 (a)	Z	0.5%	
Native Hawaiian and Other Pacific Islander, percent, 2000 (a)	Z	0.0%	Z
Persons reporting some other race, percent, 2000 (a)	0.2%	0.2%	
Persons reporting two or more races, percent, 2000	0.8%	0.2%	
Female persons, percent, 2000	49.5%	49.8%	
Persons of Hispanic or Latino origin, percent, 2000 (b)	0.8%	0.6%	
White persons, not of Hispanic/Latino origin, percent, 2000	50.7%	98.6%	
High school graduates, persons 25 years and over, 1990	2,699	1,456	
College graduates, persons 25 years and over, 1990	381	269	
Total Degree-granting institutions, 2000-01			
All public degree-granting institutions, 2000-01			
Public, 4 year Degree-granting institutions, 2000-01			
All private, Degree-granting institutions, 2000-01			
Total private, 4 year Degree-granting institutions, 2000-01			
Housing units, 2000	2,932	1,469	
Homeownership rate, 2000	68.3%	82.1%	
Households, 2000	2,328	1,005	
Persons per household, 2000	2.97	2.18	
Households with persons under 18, percent, 2000	44.0%	23.5%	
Median household money income, 1997 model-based estimate	\$21,833	\$29,291	
Persons below poverty, percent, 1997 model-based estimate	28.7%	12.6%	
Children below poverty, percent, 1997 model-based estimate	38.5%	18.3%	
Number of Public Libraries			
North Dakota: Demographic Statistics for Selected Counties	Benson County	Divide County	McIntosh County

Appendix D: Project Overview

The project consisted of three phases carried out during summer/fall 2002:

Phase I: Identification and organization of sources of data/information (e.g., databases, tables, reports, etc. dealing with telecommunications access in rural areas of the U.S. with concentration on the Internet). Sources consulted for this phase included:

- A. U.S. census data, U. S. Department of Agriculture (USDA) materials, Federal Communications Commission (FCC) documents.
- B. Identification of research institutes, centers, and organizations that deal with rural related issues.

An annotated bibliography was then compiled of the sources.

Phase II: Identification of rural counties in the United States and selection of counties for detailed demographic and telecommunications analysis.

- A. The U.S. states were initially divided into two general groupings based upon whether they were above or below the Mason-Dixon line.
- B. Using the U.S. Census Bureau's *State and County QuickFacts* Web site (, demographic statistics were compiled on counties within each assigned grouping of states with special attention paid to "rural" counties.
- C. Demographic data for counties in each grouping was reviewed and counties having the following characteristics were flagged:
 - Relatively comparable populations
 - Lack of major interstate highways
 - Populations that include various racial/ethnic groups
 - Lack of a large metropolitan area within the borders or in adjacent counties
- D. Five counties from two states (i.e., North Dakota and Pennsylvania) were selected from the resulting group for closer examination. North Dakota counties included in the detailed analysis included: Benson, Divide, McIntosh, Ramsey, and Sioux. Their Pennsylvania counterparts analyzed included: Bradford, Clinton, Forest, Potter, and Sullivan. The two states selected represent the diverse array of areas classified under one or more of the definitions of rural. On the one hand, North Dakota ranks as one of the least densely populated rural states while Pennsylvania represents one of the most densely populated rural states.

Phase III: Assembly of final report, including the identification of areas of low telecommunications access.

Appendix E: Defining Rural

What is rural? Prairies dotted by farms? A small town of 2000 inhabitants nestled in the Appalachians. For most Americans, the term "rural" evokes mental images of sparsely populated areas removed both in character and physical distance from cities. Yet though many Americans may share similar general perceptions of rural, policymakers and others involved in rural issues are in far less agreement on the subject. Indeed, 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)
- 6) Frontier Area Designations (FEC) (Frontier Education Center)

U.S. Census Bureau Rural-Urban Delineation, 2000 Census

The U.S. Census Bureau in the 2000 census (U.S. Census Bureau, August 23, 2002) distinguishes urban from rural areas as follows:

Urban

All territory, population, and housing units located within an urbanized area (UA) or an urban cluster (UC). UA and UC boundaries encompass densely settled territory, which consists of:

- Core census block groups or blocks that have a population density of at least 1,000 people per square mile and
- Surrounding census blocks that have an overall density of at least 500 people per square mile

Rural

All territory, population, and housing units located outside of UAs and UCs. Geographic entities, such as census tracts, counties, metropolitan areas, and the territory outside metropolitan areas, often are "split" between urban and rural territory, and the population and housing units they contain often are partly classified as urban and partly classified as rural.

Metropolitan and Non-Metropolitan Counties: Definitions from the U.S. Office of Management and Budget

A number of other federal, state, and local agencies also have individual definitions for urban, rural and related terms such as metropolitan and non-metropolitan. The Office of Management and Budget (OMB) refers to counties situated inside metropolitan area as *metropolitan* counties and denotes counties outside metropolitan areas as *non-metropolitan*. Consequently, non-metropolitan counties are considered "rural" counties.

The OMB defines a Metropolitan Area (MA) as one large population core, together with adjacent communities that are economically and socially integrated with the core. Some MA's are defined around two or more cores. According to this definition, a Metropolitan Area contains:

1. At least one central county with either...
 - a place with a minimum population of 50,000 or
 - a Census Bureau-defined urbanized area and a total MA population of at least 100,000 (75,000 in New England)
2. One or more outlying counties having close economic and social relationships with the central county. An outlying county must have a specific level of commuting to the central counties and also must meet certain standards regarding metropolitan character, such as population density, urban population, and population growth (RUPRI, 2002; U.S. Census Bureau, August 1, 2002).

According to RUPRI (2002), the OMB's definition of "non-metropolitan" areas is the most common definition of "rural" areas used for research, analysis, and policy making in the United States.

Rural-Urban Continuum Codes (USDA)

Rural-Urban Continuum Codes, devised by the United States Department of Agriculture (USDA) Economic Research Service offer a third method to delineate urban and rural areas of the nation. As the USDA notes:

the 1993 rural-urban continuum codes form a classification scheme that distinguishes metropolitan counties by size, and nonmetropolitan counties by degree of urbanization and proximity to metropolitan areas¹. The standard OMB metropolitan and nonmetropolitan categories have been subdivided into 4 metro and 6 nonmetro

categories, resulting in a 10-part county codification. The scheme, originally developed in 1975, was updated in 1983 and slightly revised again in 1988 (September 19, 2002).

As shown in Table A-1, the revised scheme allows subdivision of county data into finer residential groups, beyond metro and nonmetro. This flexibility is particularly useful for the analysis of trends in nonmetro areas that are related to population density and metro influence

(USDA, September 19, 2002). Furthermore, according to the USDA:

all U.S. counties and county equivalents are grouped according to the official metro status announced by OMB in June 1993, when the current population and commuting criteria were first applied to results of the 1990 Census of Population²⁰. Metro counties are further distinguished by the population size of the Metropolitan Statistical Area (MSA) of which they are a part, with counties in MSA's of 1 million or more classified as central or fringe counties. Nonmetro counties are classified according to the aggregate size of their urban populations. Within the three urban size categories, counties adjacent to an MSA are identified. Adjacent counties (1) are physically adjacent to one or more MSA's, and (2) have at least 2 percent of the employed labor force in the nonmetro county commuting to central metro counties. Nonmetro counties that do not meet the above criteria fall into the "not adjacent" category (USDA, September 19, 2002).

At present, the overall rural-urban continuum code scheme includes 813 metro counties and 2,288 nonmetro counties²¹ (USDA, September 19, 2002).

²⁰ New Rural-Urban Continuum Codes based on the 2000 Census are not expected to be available until 2003. The development of the updated codes requires journey-to-work commuting data from the long form of the 2000 Census and delineation of the new metropolitan area boundaries by the Office of Management and Budget. OMB's work is not scheduled to be completed until 2003 (USDA, September 19, 2002).

²¹ In Virginia, independent cities are combined with their counties of origin (USDA, September 19, 2002).

Table A-1

Rural-Urban Continuum Codes

Code	Description
Metro counties:	
0	Central counties of metro areas of 1 million population or more.
1	Fringe counties of metro areas of 1 million population or more.
2	Counties in metro areas of 250,000 to 1 million population.
3	Counties in metro areas of fewer than 250,000 population.
Nonmetro counties:	
4	Urban population of 20,000 or more, adjacent to a metro area.
5	Urban population of 20,000 or more, not adjacent to a metro area.
6	Urban population of 2,500 to 19,999, adjacent to a metro area.
7	Urban population of 2,500 to 19,999, not adjacent to a metro area.
8	Completely rural or less than 2,500 urban population, adjacent to a metro area.
9	Completely rural or less than 2,500 urban population, not adjacent to a metro area.

Note. From "Measuring rurality: Rural-urban continuum codes" by U.S. Dept. of Agriculture, Economic Research Service, September 19, 2002, [Washington, DC]: The Author. Retrieved February 25, 2003, from <http://www.ers.usda.gov/Briefing/Rurality/ruralurbcon/>

Urban Influence Codes (USDA)

Urban influence codes²² are yet another methodology employed by the USDA to measure the economic impact of an urban area upon surrounding rural areas. According to the USDA

(August 13, 2002):

An area's geographic context has a significant effect on its development. Economic opportunities accrue to a place by virtue of both its size and its access to larger economies. And, access to larger economies—centers of information, communication, trade, and finance—enables a smaller economy to connect to national and international marketplaces. These relationships among economies are basic concepts of the central place theory commonly studied in regional economics. Population size, urbanization, or access to larger communities are often crucial elements in research dependent on county-level data sets. To further such research, we have developed a set of county-level urban influence categories that captures some differences in economic opportunities.

The USDA (August 13, 2002) describes the resulting codes as follows (see Table A-2):

The urban influence codes divide the 3,141 counties, county equivalents, and independent cities in the United States into nine separate groups. Metropolitan counties are divided into two groups by the size of the metro area—those in "large" areas with at least 1 million residents and those in "small" areas with fewer than 1 million residents. Nonmetro counties are divided into groups by their adjacency to metro areas—adjacent to a large metro area, adjacent to a small metro area, and not adjacent to a metro area. Nonmetro counties adjacent to either size metro area are further classified by the size of their "own city"—those containing all or part of a city of 10,000 or more residents and those containing no part of a city that large. Nonmetro counties not adjacent to a metro area are divided by the size of the largest place they contain—those containing all or part of their "own city" of 10,000 or more residents, those containing all or part of a "town" of 2,500-9,999 residents, and those containing no part of a town with at least 2,500 residents (putting the entire county in the Census Bureau's definition of "rural"). Census-defined places are considered to be cities or towns in this classification.²³

²² For more information about the urban influence code, see A County-level measure of urban influence see *Rural Development Perspectives*, 12(2). Available from <http://www.ers.usda.gov/briefing/rurality/UrbanInf/urbinf.pdf>

²³ According to the USDA (August 13, 2002), "Virginia's independent cities are considered in determining the largest city or town in the counties which the independent cities border. Hawaii's Kalawao County is considered to have the size of place that island-sharing Maui County, HI, has, and Montana's Yellowstone National Park is considered to have the size of place that adjoining Park County has".

Like their rural-urban continuum code counterparts, urban influence codes group metro and nonmetro counties according to the official metropolitan status announced by the OMB in June 1993, derived from population and commuting data from the 1990 Census of Population²⁴. Nonmetro counties are considered adjacent if they are adjacent to a metro area and have at least two percent of employed persons commuting to work in core county(ies) of the metro area. In cases where a nonmetro county met the adjacency criteria to more than one metro area, it was designated as adjacent to the metro area to which the largest percentage of its workers commuted.

Currently, according to the USDA (August 13, 2002), there are 836 metro counties, of which 311 are part of large metro areas and 525 are part of small metro areas. There are 2,305 nonmetro counties. Of the 186 nonmetro counties that are adjacent to large metro areas, 63 have their own city. Another 815 nonmetro counties are adjacent to small metro areas, 188 of which have their own city. Of the 1,304 nonmetro counties that are not adjacent to a metro area, 234 have their own city, 555 have a town, and 515 are rural. As the USDA points out, "Not all the metro areas are completely surrounded by adjacent counties. Some counties abutting metro areas do not meet the 2-percent commuting requirement to be considered "adjacent." Others have more commuting to a metro area of the other size, and so are classified as adjacent to the other area. Some of the urban influence groups are concentrated in particular census divisions. Most concentrated are the rural nonadjacent counties—41 percent are in the West North Central division.

Table 2

Urban Influence Codes

Code	Description
Metro counties:	
1	Large—in a metro area with at least 1 million residents or more.
2	Small—in a metro area with fewer than 1 million residents.
Nonmetro counties:	
3	Adjacent to a large metro area and contains a city of at least 10,000 residents.
4	Adjacent to a large metro area and does not have a city of at least 10,000 residents.
5	Adjacent to a small metro area and contains a city of at least 10,000 residents.
6	Adjacent to a small metro area and does not have a city of at least 10,000 residents.
7	Not adjacent to a metro area and contains a city of at least 10,000 residents.
8	Not adjacent to a metro area and contains a town of 2,500- 9,999 residents.
9	Not adjacent to a metro area and does not contain a town of at least 2,500 residents.

²⁴ New Urban Influence Codes based on the 2000 Census are not expected to be available until 2003. The development of the updated codes requires journey-to-work commuting data from the long form of the 2000 Census and delineation of the new metropolitan area boundaries by the Office of Management and Budget. OMB's work is not scheduled to be completed until 2003.

Note. From "Measuring rurality: Urban influence codes" by U.S. Dept. of Agriculture, Economic Research Service, August 13, 2002, [Washington, DC]: The Author. Retrieved February 25, 2003, from <http://www.ers.usda.gov/briefing/rurality/UrbanInf/>

Isolated Rural Areas (Goldsmith Definition)

In 1993, Harold F. Goldsmith proposed modifications to the OMB's definitions of "metropolitan" and "non-metropolitan" areas in order to more precisely differentiate rural sections of Large Metropolitan Counties (counties with at least 1,225 square miles) that most likely do not have easy access to central urban market areas²⁵. As a result, Goldsmith's definition uses census tracts to identify rural areas in Large Metropolitan Counties.

To identify parts of Large Metropolitan Counties that are Isolated Rural Areas, Goldsmith used the following methodology:

- The designation of Large Metropolitan Counties (LMC's) as counties with at least 1,225 square miles. Not surprisingly, these counties are located principally in the West, including Alaska.
- The designation of Rural Areas in large metropolitan counties as census tracts with:
 - no persons living in central areas (a city of 50,000 or more persons plus the surrounding densely settled suburbs, i.e. urbanized areas)
 - no persons living in cities of 25,000 or more persons
- The exclusion of census tracts with large institutional population or no population from the analysis. Census tracts with large institutional population are defined as tracts with 75 percent of the population or more in institutional or group quarters (such as a prison or hospital).

In addition, Goldsmith defines Isolated Rural Areas as:

- Rural Areas (census tracts) in which less than 15 percent of the population commuted to work in the central area (operationally, a city of 50,000 or more persons plus the surrounding densely settled suburbs) or
- Rural Areas (census tracts) in which more than 15 percent of the population commuted to work in the central area, if 45 percent of the labor force commuted 30 minutes or more to work.

It should also be noted that rural areas (census tracts) located in Rationally Metropolitan Areas (RMA's) were not considered Isolated Rural Areas.

²⁵ For more information about Goldsmith's definition see <http://www.nal.usda.gov/ric/richs/goldsmith.htm>

Goldsmith's definition offers several advantages over the Census Bureau's and OMB's definitions. One primary advantage is that Goldsmith's version does not "... assume that all residents of the county have easy geographical access to services in central areas. The OMB definition of "metropolitan" counties does not reflect the fact that some residents of small-town and open-country parts of Large Metropolitan Counties are in a similar position to residents of non-metropolitan counties, i.e. have limited geographical access to services concentrated in the central areas of metropolitan counties." In addition, the definition of isolated rural areas has helped "improve the operational definition of 'rural areas' for federal programs (RUPRI, May 1, 2000). Finally, Goldsmith's definition uses the census tract--a relatively small geographic area--to more precisely identify rural portions of metropolitan counties (Cromartie and Swanson 1996).

Frontier Area Designations (FEC) (Frontier Education Center)

The last delineation of rurality to be discussed in the present paper is the Frontier Education Center's "Frontier Area". A frontier area is defined as an area with extremely low population density, usually fewer than six people per square mile²⁶. All counties designated as *frontier* are located in the western United States. Given the remote nature of Frontier Areas, "these areas have unique needs that must be considered in policy making" (RUPRI, May 1, 2000. Rural policy context, frontier areas. Retrieved November 4, 2002 from <http://www.rupri.org/policyres/context/fa.html>).

²⁶ According to RUPRI, "some definitions, including the definition developed by the Frontier Mental Health Services Resources Network <http://www.du.edu/frontier-mh/> were developed in order to identify isolated rural areas that have limited accessibility to health care services. Some organizations have been using a definition of Frontier Areas which defines a frontier area as an area with a population density of 7 people or less per square mile." The Frontier Mental Health Services Resources Network <http://www.du.edu/frontier-mh/letter2.html> provides more detailed information about these varying definitions (RUPRI. (DATE?) Rural policy context, frontier areas. Retrieved November 4, 2002 from <http://www.rupri.org/policyres/context/fa.html>).

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