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Advanced Telecommunications in Rural America

The Challenge of Bringing Broadband Service to All Americans

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EXECUTIVE SUMMARY

Advanced Telecommunications in Rural America is a response by the National Telecommunications and Information Administration (NTIA) and the Rural Utilities Service (RUS) to a request by ten U.S. Senators on the status of broadband deployment in rural versus non-rural areas in the United States. This report also responds to a call by President Clinton and Vice President Gore to bridge the digital divide and create digital opportunities for more Americans. The rate of deployment of broadband services will be key to the future economic growth of every region, particularly in rural areas that can benefit from high-speed connections to urban and world markets.

This report finds that rural areas are currently lagging far behind urban areas in broadband availability. Deployment in rural towns (populations of fewer than 2,500) is more likely to occur than in remote areas outside of towns. These latter areas present a special challenge for broadband deployment.

Only two technologies, cable modem and digital subscriber line (DSL), are being deployed at a high rate, but the deployment is occurring primarily in urban markets. Broadband over cable, which provides most broadband service, has been deployed in large cities, suburban areas, and towns. One survey found that, while less than five percent of towns of 10,000 or less have cable modem service, more than 65 percent of all cities with populations over 250,000 have such service.

DSL technology also has been deployed primarily in urban areas. The Regional Bell Operating Companies (RBOCs) are providing DSL service primarily in cities with populations above 25,000 according to public RBOC data. While more than 56 percent of all cities with populations exceeding 100,000 had DSL available, less than five percent of cities with populations less than 10,000 had such service. Deployment of both cable modems and DSL service in remote rural areas is far lower.

The primary reason for the slower deployment rate in rural areas is economic. For wireline construction, the cost to serve a customer increases the greater the distance among customers. Broadband service over cable and DSL is also limited by technical problems incurred with distance and service to a smaller number of customers. Both technologies, however, promise to serve certain portions of rural areas. Cable operators promise to serve smaller rural towns, and smaller, independent telecommunications companies and competitive providers may soon be able to offer DSL to remote rural customers on a broader scale.

Advanced services in rural areas are likely also to be provided through new technologies, which are still in the early stages of deployment or are in a testing and trial phase. Satellite broadband service has particular potential for rural areas as the geographic location of the customer has virtually no effect on the cost of providing service. Several broadband satellite services are planned. Their actual deployment remains uncertain, especially in light of the recent entry into Chapter 11 bankruptcy of two satellite service companies.

Wireless broadband services are also planned for rural areas. More immediately, multipoint-multichannel distribution system (and potentially local-multipoint distribution system) fixed service capabilities may provide a solution for some rural areas. In as little as five years, third generation mobile wireless services providing data rates as high as two megabits/second may be operational.

Policymakers should promote competition, where possible. Using the pro-competitive provisions of the Telecommunications Act, some competitive local exchange carriers have deployed advanced services in rural areas of the country. Some wireless carriers have also indicated an interest in providing voice and high rate data, especially if universal service policies can be reformed.

Competition leads to lower prices, more customer choice, rapid technological advances, and faster deployment of new services. Given unique challenges faced by rural Americans, however, other government policies must be considered as well.

In order to support advanced services in rural areas, NTIA and RUS recommend a number of actions. We recommend the continued support and expansion of those government programs, such as the E-rate program, that ensure access to new technologies including broadband services. We also urge the Federal Communications Commission to consider a definition of universal service and new funding mechanisms to ensure that residents in rural areas have access to telecommunications and information services comparable to those available to residents of urban areas.

Support for alternative technologies will also be crucial to the deployment of advanced services in rural America. The Administration is committed to increasing investment in research and development to promote the next generation of broadband technologies. NTIA and RUS will also collect and disseminate "promising practices" that can promote private sector investment in rural broadband services.

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I. INTRODUCTION

This is a joint report of the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce and the Rural Utilities Service (RUS) of the U.S. Department of Agriculture. This report responds to a letter to Mr. Larry Irving, former Administrator of NTIA, and Mr. Wally Beyer, former Administrator of RUS, co-signed by Senators Baucus, Conrad, Daschle, Dorgan, Harkin, Johnson, Kerrey, Murray, Wellstone, and Wyden (See attached letter). In their letter, the Senators requested that NTIA and RUS examine six issues relating to the availability and deployment of advanced telecommunication capabilities to all Americans, particularly those who live in rural areas.[1] These issues concern:

1. The investment in telecommunications facilities with advanced capability in rural areas compared with non-rural areas, including an assessment of the various levels of capability being deployed under different technologies and the bandwidth capabilities of such deployment and whether or not comparable bandwidth is being deployed consistent with the objectives under Section 254(b)(2) and (3) of the Communications Act and Section 706 of the Telecommunications Act.

2. The availability of telecommunications backbone networks and "last mile" facilities with advanced capability in rural areas compared with advanced telecommunications backbone networks and last mile facilities in non-rural areas.

3. The rate of deployment of advanced telecommunications capability in rural areas compared with the deployment of such capabilities in non-rural areas and identity of specific geographic areas where advanced telecommunications capabilities are being deployed at a significantly lower rate than the deployment of such services elsewhere in the Nation.

4. The feasibility of various technological alternatives to provide last mile advanced telecommunications capability in rural areas.

5. The capability of various technical enhancements to existing wireline and wireless networks to provide last mile advanced telecommunications capability in rural areas.

6. The effectiveness of competition and universal service support mechanisms to promote the deployment of advanced telecommunications capability and the availability of advanced telecommunications services in rural areas.

The Administration and the Congress have recognized the importance of deploying advanced capabilities to all people and regions in the United States. As Vice President Gore noted:

1. We have renumbered several of the issues in the Senators' May 20, 1999 letter to align them with the report's organization.

> One of the most important goals that President Clinton and I have set for this country is … to make sure that every person in America, regardless of race, income, or where they live, will be able to participate in and benefit from the Information Revolution ….[2]

To ensure that all Americans can partake in the economic benefits of the digital economy, President Clinton convened an Electronic Working Group within the Administration. This past year, the Working Group fashioned three directives to guide its work over the next year, including a directive to close the digital divide between those with and without access to new technologies. President Clinton also announced new budget proposals to create digital opportunities for all Americans, as discussed in Part D, several of which will promote broadband deployment.

Advanced telecommunications capabilities are crucial to the future of an increasingly interconnected America. These advanced capabilities mean that data can be delivered at rates that far exceed what can be carried by an ordinary telephone voice circuit. What might have taken hours to deliver may now take minutes; what might have taken minutes, can take seconds. For example, a student with one megabit/second broadband access at home could conduct a one hour virtual tour of the Louvre in real-time from her own living room, while a child with a 28 kilobit/second modem would require 36 hours to download the same information.

Advanced capabilities are becoming ever more important as businesses and consumers increasingly rely on the Internet and on sophisticated applications incorporating audio and video which require sustained high information rates. Availability of advanced telecommunications will become essential to the development of business, industry, shopping, and trade, as well as distance learning, telemedicine, and telecommuting. The rate of deployment therefore has implications for the welfare of Americans and the economic development of our nation's communities.

This is particularly true for those who live in the rural towns and countryside, who can especially benefit from high-speed, distance-defying connections to external markets and employment opportunities, urban medical centers, large universities offering specialty courses, and similar distant resources. Access to broadband means, for example, that a rural automotive designer need no longer relocate to the company headquarters to participate in interactive, real-time computer aided modeling of a new vehicle. It also gives a doctor in rural America the kind of access to sophisticated, data-intensive applications (such as three-dimensional imaging) previously only available to doctors connected by a local area network.

Congress has repeatedly recognized the significance of improved telecommunications for rural America. In 1993, Congress enacted the Rural Electrification Loan Restructuring Act (RELRA).[3] A primary intent of RELRA was to spread the deployment of advanced services and to ensure that these services were deployed at uniform rates in rural and non-rural areas.

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2. U.S. Vice President Gore on Connecting Communities for the Future, Email for All Event, May 8, 1998 (www.iaginteractive.com/emfa/msg00029.html).

3. Rural Electrification Loan Restructuring Act, Pub. L. No. 103-129, 107 Stat. 1356, codified at 7 U.S.C. 902 *et seq.* *See* §935(d)(3) regarding requirements for State Telecommunications Modernization Plans.

Congress more specifically addressed universal service in the Telecommunications Act of 1996,[4] which rests on the two pillars of competition and universal service. The universal service principles found in Section 254 of the Communications Act of 1934, as amended by the Telecommunications Act, are intended to ensure access to advanced services for all Americans, so that those living in rural areas will be able to share in the buildout of advanced services to the same degree as those living in more densely populated areas.[5] Section 706 of the Telecommunications Act complements the universal service provisions of Section 254 by directing Federal and State regulatory bodies to encourage the deployment of advanced telecommunications capability to all Americans.[6]

Advanced services are just beginning to be deployed on a broader basis, although they are still primarily available only for business and urban users. Most Americans with access to the Internet still connect through a telephone voice circuit.

This report is intended to provide an initial assessment of the availability and rate of deployment for rural and non-rural areas to help gauge whether all Americans are benefiting from advanced capabilities.

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4. Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996), codified at 47 U.S.C. §151 *et seq.* [hereinafter Telecommunications Act].

5. Section 254(b)(2) provides that "(a)ccess to advanced telecommunications and information services should be provided in all regions of the Nation." Section 254(b)(3) provides that "(c)onsumers 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." Section 254(c)(1) states that "(u)niversal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services." The FCC in its May 8, 1997 order on universal service (Report and Order, 12 FCC Rcd 8776 (rel. May 8, 1997)) [hereinafter May 8 Order], stated that it will convene a Federal-State Joint Board to review the definition of supported services on or before January 1, 2001. In a keynote address at a Senate conference (*Going the Extra Mile: Closing the Digital Divide in Rural America,* held October 27, 1999), Chairman William Kennard stated that the Joint Board will be convened well in advance of that date.

6. Telecommunications Act, *supra* note 4. Section 706(a) provides that "(t)he Commission and each State commission with regulatory jurisdiction over telecommunications services shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms) by utilizing, in a manner consistent with the public interest, convenience, and necessity, price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment." Section 706(b) requires the Commission to conduct a periodic inquiry. "(I)n the inquiry, the Commission shall determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. If the Commission's determination is negative, it shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market." Section 706(c)(1) states that "(t)he term 'advanced telecommunications capability' is defined without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."

II. APPROACH, METHOD, AND DEFINITIONS

A. Approach and Method

The report provides an overview of broadband technologies and the deployment of these technologies. As yet, there are no comprehensive, publicly available surveys or studies documenting broadband deployment across the nation.[7] NTIA and RUS staff therefore provided this overview by drawing on a variety of sources including electrical engineering texts, professional and trade journals, specialized studies, and discussions with rural communication providers, Regional Bell Operating Companies (RBOCs), cable TV providers, terrestrial and satellite wireless communication companies, and state regulators. These discussions were supplemented with an examination of industry supplied information pertaining to current and future deployment of broadband services, where available.

The agencies decided not to collect information through a formal survey. We note that, on March 30, 2000, the Commission adopted rules requiring a semi-annual, mandatory collection of data on the availability of broadband services.[8] Given this systematic collection of data in the future, the agencies felt it would be best to provide an informal overview report at this point.

B. Definitions

The following terms are used through the report.

Rural: The term *rural* can be interpreted many ways. Many assume that any area outside of a major metropolitan area is rural. This is clearly too broad a definition as it includes fairly large cities.

NTIA and RUS have adopted the Census Bureau's definition.[9] In our report, *rural* means towns of fewer than 2,500 inhabitants as well as areas outside of towns, including farmland, ranchland, and wilderness. Under this definition, there were approximately 22.3 million households living in rural areas (approximately 25% of the total United States population), according to the 1990 Census.[10]

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7. Broadband information collected by the FCC up to this time has come from voluntary surveys that have not provided comprehensive data.

8. *See In the Matter of Local Competition and Broadband Reporting*, Report and Order, CC Docket No. 99-301 (rel. March 30, 2000) [hereinafter Broadband Reporting Order]. Providers are required to complete and file the Local Competition and Broadband Reporting Form (FCC Form 477) no later than May 15, 2000 and semi-annually thereafter. *Id.* On February 18, 2000, the FCC also released a second Notice of Inquiry to determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. *In the Matter of Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, Notice of Inquiry, CC Docket No. 98-146 (rel. Feb. 18, 2000).

9. *See* U.S. Census Bureau, Urban and Rural Definitions and Data (www.census.gov/population/censusdata/ur-def.html.)

10. *The Rural Difference*, Rural Task Force White Paper 2, January 2000, at 60 (based on RUS analysis of the 1990 Census conducted with assistance from the Rural Policy Research Institute) [hereinafter *Rural Difference*].

The Census definition encompasses both traditionally small rural towns and outlying areas, as well as areas that are developing or urbanizing. Approximately 43% of the households classified by the Census as *rural* are in metropolitan statistical areas.[11] That is, this definition may include areas that are only temporarily rural, such as suburban developments with brand new utilities built relatively close to an urban or suburban area. These areas tend to be relatively affluent and their characteristics are more like the adjacent metropolitan area than what one ordinarily thinks of as rural. Rural statistics can be misleading if these variations are not considered.

The remaining 57% of rural households are outside of metropolitan statistical areas and are more likely to be in areas traditionally considered as rural. Of these, 23.5% live in towns with fewer than 2,500 people. The remaining 76.5% (or approximately 10 million households) live outside of towns in areas that are often more remote or sparsely settled.[12]

The suitability of various telecommunications technologies will depend on the characteristics of the rural area. For example, low population density is linked to a high cost-to-serve for any technology, especially for wireline technologies such as telephone or cable TV. This is because customers in close proximity, whether in small towns or big cities, can be served with less wire than a similar number of customers scattered through the countryside where the wire cost can be orders of magnitude greater.[13]

Given the impact of geography and the population distribution on cost, we will discuss a technology's suitability for different kinds of rural areas. We will pay special attention to the most rural areas, *i.e.*, those areas outside of towns and suburbs. Historically, these areas have been the most expensive to serve and, generally, are the last to receive a new (or any) type of telecommunications service. In many cases, before the introduction of the Rural Electrification Administration's (now RUS) Telephone Program in 1950, these areas received no service at all. These customers provide the greatest test for the universal service principles in Sections 254 and the complementary provisions of Section 706 of the Telecommunication Act, which seek to ensure access to advanced services for <u>all</u> Americans.

Advanced Services: The term *advanced (telecommunications) capability* found in the Senators' letter and the term *advanced services* found in Sections 254 and 706 are taken to be synonymous. Such services are generally understood to mean digital information transmission rates (bit rates) that are significantly higher than the nominal 56 kilobits/second which can be transmitted through an ordinary, high quality telephone voice circuit. *Broadband* is another term commonly used to describe high bit rates. In this report, *advanced capability*, *advanced services*, and *broadband* will be used interchangeably.

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11. *Id.*

12. *Id* at 61. Although not published in the White Paper, the RUS analysis performed during its preparation showed that there are approximately 9.6 million households in this unquestionably rural area; that is, outside of towns and not in a metropolitan statistical area. This represented approximately 11% of the nation's households in 1990.

13. For wireline construction, a large part of the cost is the installation, irrespective of the size of the cable. There is a high fixed cost associated with plowing a mile of cable whether that cable contains one pair of wires or 50. This is sometimes referred to as the "sheath cost" and typically runs about $10,000 to $15,000 per mile. In low population density areas where pair counts are low, this is a dominant construction cost and it rapidly drives the cost per customer higher as the distance between customers increases.

We have adopted the Federal Communication Commission's (FCC or Commission) definition of *broadband:* the capability of supporting at least 200 kilobits/second in the consumer's connection to the network ("last mile"), both from the provider to the consumer (downstream) and from the consumer to the provider (upstream).[14] Because most consumers use the Internet to receive data, broadband service offerings are generally asymmetrical (*i.e.*, the downstream link operates at a higher rate than the upstream link).[15]

The following table demonstrates how the FCC definition of broadband compares to information rates required for different types of well-known applications, such as telephone and video.[16] The uses of broadband are obviously much more extensive than the list provided below.

Application	Representative Rate kilobits/second
V34 Modem over Telephone Voice Circuit	33
Inter-office Digital Telephone Voice Circuit	64
Low-resolution Conference-Quality Video (compressed)	200
Compact Disc Audio	1,400
VCR Quality TV (compressed)	1,500
Broadcast Quality TV (compressed)	5,000
High Definition TV (compressed)	20,000

At a rate nearly four times faster than the best conventional modem access over a voice circuit, a rate of 200 kilobits/second can be considered advanced. That rate, however, will not support high data rate applications such as VCR quality video. Nor will VCR-equivalent video likely be achieved through compression. The bit rate requirements of the various digital video qualities shown in the table above are already obtained through compression (data reduction), which reduces the bit rate to a small fraction (on the order of $1/30^{th}$) of the uncompressed digital rate. Compression has greatly reduced the bandwidth required for video and other information and has, for example, made it possible to provide high definition television in the same six megahertz bandwidth required for conventional analog television signals. However, the ability to compress

14. *See* Broadband Reporting Order, *supra* note 8, at ¶ 22 (explaining that "'full broadband' is synonymous with the term "advanced telecommunications capability," *i.e.*, as having the capability of supporting, in both the downstream and upstream directions, a speed in excess of 200 Kbps in the last mile."); *see also Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, 14 FCC Rcd. 2398, 2406 ¶ 20 (1999) [hereinafter Section 706 Report]. NTIA and RUS believe that two-way capability is an essential element of broadband service because it enables an end-user to be a content originator or service provider.

15. There are also services that do not meet the FCC definition of broadband yet offer higher rates than conventional dial-up modems, at least in one direction. These include two-way services where the upstream rate is under 200 kilobits/second and one-way (unidirectional) services that use some other path, usually the telephone, for the upstream link. In order to provide a complete overview, this report will also discuss these high data rate services.

16. This chart was prepared by RUS and NTIA using publicly available information. Some devices, such as the compact disc, operate at fixed rates. Others, such as compressed video, operate at varying rates according to need. The representative rates shown here are intended to put the requirements of different applications in context.

information is not unlimited. For a given level of perceived video quality including fidelity to the original image, today's mechanisms are approaching the point of diminishing returns for reducing the bit rate requirement. Any improvements in compression technology will be marginal compared to the reductions made to date and will not negate the need for broadband access to the Internet and other sources of information.

Users may need even higher bit rates in the future as Internet throughput rates increase and demand for high quality video and other information-intensive applications rises. Such demand will accelerate with the increasing use of distance learning, electronic commerce, medical applications, and as yet unforeseen uses of the Internet.

III. RESPONSES TO THE SENATORS' REQUESTS FOR INFORMATION

In their letter to the Administrators of NTIA and RUS, the Senators requested specific information on the deployment of advanced telecommunications capabilities, particularly in rural areas. The issues are set forth below, with the agencies' responses following each issue. In certain cases, we have combined our responses to the issues because of the overlapping nature of the material.

A. Capability and Availability of Advanced Telecommunications Facilities

Issue 1. Investment in telecommunications facilities with advanced capability in rural areas compared with non-rural areas, including an assessment of the various levels of capability being deployed under different technologies and the bandwidth capabilities of such deployment and whether or not comparable bandwidth is being deployed consistent with the objectives under Section 254(b)(2) and (3) of the Communications Act and Section 706 of the Telecommunications Act.

Issue 2. Availability of telecommunications backbone networks and "last mile" facilities with advanced capability in rural areas compared with advanced telecommunications backbone networks and last mile facilities in non-rural areas.

Part A treats the issues of capability and general availability of backbone and last mile facilities. We first examine these issues in relation to "backbone" facilities, the main arteries of the nation's advanced telecommunications network, and then turn to "last mile" facilities, which connect users to the network. In discussing "last mile" technologies, we have further divided our discussion between those that are significantly deployed and those that are not. A comparison of deployment differences between rural and non-rural areas is set forth in Part B.

We note that complete and reliable investment information is difficult to obtain at present. Regulated providers do not itemize their broadband investments, and non-regulated providers do not readily disclose such competitively sensitive information. Even if the investment data were available, it is unlikely that it could be identified as urban or rural. Investment must mainly be inferred from deployment and availability for existing systems and from estimates for prospective systems.

1. Capability and Availability of Broadband Backbone

The majority of the nation's broadband backbone is composed of fiber optic cables, with satellite links connecting areas that are difficult to reach by landlines or underwater cable. Fiber provides an almost unlimited capacity for transporting data at high rates. With current wave division technology, it is possible for a single fiber to carry 400 gigabits/second which is equivalent to two million broadband signals (at 200 kilobits/second) or six million telephone calls (at 64 kilobits/second).

Investment in backbone is proceeding at a rapid pace spurred largely by market forces unleashed by the divestiture of the Bell System and the rapid increase in demand for data services. Companies such as AT&T, MCI/WorldCom, Sprint, Qwest, Level 3, ITXC, and Williams have rapidly been building data networks. There are currently more than 40 Internet backbone providers, and six new networks (estimated to cost $18 billion) will come into service in the next two years.[17]

Cable systems, electric utilities, and municipalities have also deployed backbone. Utilities had already installed 40,000 route miles of fiber optic cable by the end of 1997.[18] Montana Power, for example, has installed 10,000 miles of fiber.[19] Midcontinent Cable, a cable operator in the Great Plains states, has constructed a 530-mile fiber optic network that is expected to connect approximately 150,000 subscribers in North and South Dakota.[20]

While many believe that the continued buildout of the backbone is appropriate in light of growing bandwidth demand, others have speculated that there may be too much backbone capacity.[21] Many of the installed fibers still are not used and remain as "dark fibers." In addition, advancements such as wave division multiplexing are allowing a greater portion of the fiber's potential bandwidth to be used and, as a result, are multiplying the amount of information each fiber can carry.

Despite the rapid buildout of these data networks, there still is the issue of whether long-haul fiber optic backbones are connecting rural areas. In a report released by iAdvance, it was claimed that some states have little or no access to broadband hubs and the broadband backbone. The report dubbed these states the "disconnected dozen."[22] This report of a backbone and backbone hub shortage was characterized by the Competitive Broadband Coalition as "myth."[23]

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17. *Setting the Record Straight: The Fallacies and Realities of the Broadband Debate,* released by the Competitive Broadband Coalition, Oct. 25, 1999 (citing *Building a Better Backbone - And Business Plan*, Inter@ctive Week, 9/16/99) [hereinafter *Setting the Record Straight*].

18. Section 706 Report, *supra* note 14, at ¶40.

19. *See* www.in-tch.com/maps-fiber.htm.

20. Jim Barthold, *Miles of Fiber Optics Connect the Dakotas, Midcontinent, ADC team for Network of High-Speed Data and Telephone Services*, Cable World, Feb. 1, 1999.

21. Rachel King, *Too Much Long Distance*, Fortune, March 15, 1999 at 107.

22. Eric R. Olbeter and Matt Robison, *Breaking the Backbone: The Impact of Regulation on Internet Infrastructure Deployment,* July 27, 1999.

23. *See Setting the Record Straight, supra* note 17.

The latter position is probably closer to the truth. It is true that the dedicated Internet backbone primarily connects urban centers, but access to this dedicated backbone can be provided to users through other network facilities. Though they serve some of the most remote areas, RUS-financed carriers who provide Internet access have found that there are many means to gain indirect access to the backbone. For example, the backbone can be reached over leased facilities. The most prominent source of leased connection is through the nation's toll and local providers, but there are also connections available from private providers such as the utilities mentioned above. These facilities, while part of the telephone plant or even private facilities, provide connectivity to the Internet backbone and can be considered extensions of the backbone.

As a result, access to the backbone is generally not a significant problem for rural areas. The exceptions are in extremely isolated areas outside the contiguous 48 states, such as the many scattered and remote villages in Alaska or islands that lack fiber connection to the mainland. These remote areas will no doubt require fiber or additional satellite capacity to reach the backbone.

2. Capabilities and Availability of "Last Mile" Technologies with Significant Deployment

In general, it is the last mile, not the backbone, that presents the greatest challenge to bringing broadband to all Americans. There are a number of last mile facilities that connect the user to the network. Several of these (cable modems and digital subscriber line) are being deployed rapidly. Others (such as fiber to the home and terrestrial and satellite wireless) are in the early stages of deployment or are still being tested with the expectation of deployment in the next few years. A table that follows this report summarizes the state of development of last mile facilities.

Cable Modem

The majority of broadband service today is provided over cable modems although authorities differ on the exact numbers of both subscribers and customers passed by cable modem ready systems. According to Cable Datacom News, a leading industry source, there were 1.5 million cable modem subscribers in the U.S. and 560,000 in Canada at the end of February 2000. The same source reported that cable modem service was available to 43 million North American homes.[24] According to another source, cable modems were in 1.1 million American homes at the end of 1999, and systems that were cable modem ready at that time reportedly served about 27 million customers.[25] Whatever the exact number, it is evident that the number of working cable modems and cable modem ready systems is increasing rapidly. Estimates of future penetration show even more variation. One analyst projects that there will be 9.6 million cable modem customers in 2004.[26] As discussed later, most of this penetration has occurred in large towns and metropolitan areas.

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24. *Cable Modem Customer Count Tops 2 Million*, Cable Datacom News, March 1, 2000 (www.cabledatacomnews.com).

25. Seth Schiesel, *Broadband; How Broadly? How Soon?: A Technology's Promised Arrival May Finally Be Here,* N.Y. Times, Jan. 17, 2000, at C1 (reporting results from the Yankee Group) [hereinafter Schiesel].

26. *DSL Gaining on Cable as the Big Pipe of Choice*, Washington Post, Feb. 10, 2000, at E10 (reporting analysis from the Yankee Group).

Traditional cable television networks were designed to provide analog television signals to subscribers via coaxial cables. Until recently, only television signals (typically about 70 channels in earlier systems and 120 channels in more recent and upgraded systems) were transported downstream to the customer through a coaxial cable network with a node and branch structure.

Because coaxial cable has a useful bandwidth of nearly one gigahertz for short distances, it is a natural candidate for providing broadband data services and access to the Internet. The first cable systems adapted for data were unidirectional using the telephone for the return link. More recent systems are designed for two-way communication. According to information supplied by the cable industry, approximately 90% of existing cable modem service is two-way.[27]

Upgrading a cable system for two-way broadband service requires substantial financial investment. It has been estimated that the cable industry will expend $21 billion to upgrade their systems to reach roughly one half of the homes passed in the United States and an additional $31 billion to upgrade their systems to reach all homes passed.[28]

Most systems built today are not engineered to provide broadband to all their customers. Current practice in the cable industry is to provide broadband from a node passing between 500 to 1000 homes (350 to 700 customers) with the expectation that only a fraction of customers will take the service.[29] In the event of more widespread subscription to broadband, companies will need to split the nodes, which will require additional investment, or devote additional channels to cable modem service. The latter option may be problematic in the near term because of the impending transition to digital television. During this period, spectrum may not be available because providers will be duplicating the analog channels in the digital format.

There is also a limit to how far broadband can be delivered from the node. To maintain the quality of the TV signals, the signal must be amplified at about 2,000 feet from the node and reamplified every 2,000 feet after that. Each amplifier adds noise and subtle distortions that have a small cumulative effect on the TV signal but which can severely impair the performance of cable modem operation.[30] As a result, when a cable provider adds cable modem service to its

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27. Sixth Annual Report: *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, FCC 99-418, rel. Jan. 14, 2000 at ¶58 [hereinafter Sixth Annual Report].

28. *Cable Access Debate*, Excite@Home (www.home.net/source).

29. One must be careful when comparing projections of the number of customers a system can serve. Some of these projections are based on older concepts about the nature of Internet traffic, which assume that high data rates are usually needed only for extremely small periods to download a file or to load a page. Implicit in this assumption is that the customer does not use the shared channel for the vast majority of time and that, during this "idle" time, others can use the channel. This is why usage is sometimes referred to as "bursty." This assumption, however, is becoming less and less valid. As web pages become more graphically intensive and with the increasing use of applications that require high, sustained rates, the number of customers who can share a data channel will decline.

30. Even though a cable modem system is carrying a digital signal, the amplifiers are analog and simply "repeat what they hear." These amplifiers balance for attenuation with frequency, amplify, and then retransmit the TV channels including any noise, or distortion that has joined the signal or been added by the amplifier itself. This cumulative distortion does not occur, by contrast, with digital repeaters. Digital transmission is effective at resisting noise and other distortions because the signal is deliberately encoded so as to be unambiguous. For illustration purposes, if a system operates with only "1" and "0, when it receives a "1" that has been distorted by the

cable system, it generally adds no more than eight amplifiers, resulting in a maximum range of 16,000 feet from the node. Because it is more reliable and requires less maintenance and adjustment, the preferred method is to operate without amplifiers, which limits the range to about 2,000 feet.[31]

Cable can theoretically provide downstream broadband at multi-megabit rates. Under the recently-adopted industry standard, users share a bitstream, typically 27 megabits/second downstream and up to ten megabits/second upstream, but these rates are almost never available to a single user.[32] Because the capacity is shared, the system can slow dramatically under heavy use. For example, if 540 users simultaneously attempted to watch streaming video, the shared data rate could be as low as 50 kilobits/second per user. To prevent wildly varying performance levels, many systems restrict the maximum bit rate available to a single user to a minor fraction (10%, or less) of the full channel capability in both directions. Media General in Fairfax County Virginia, for example, restricts its Road Runner service to 1.5 megabits/second downstream and 192 kilobits upstream.[33] This means it falls slightly below the FCC definition of broadband, as do many of today's service offerings whether provided by cable, DSL, or other methods.

In addition to these factors, performance via cable also varies depending on the overall quality of the cable system and the subscriber's equipment, as well as the performance of the Internet. These variables mean that it is nearly impossible to provide a single number that describes cable data throughput rates. According to the cable industry, an individual subscriber may experience access rates between 500 kilobits/second and 1.5 megabits/second depending on the network architecture and traffic load.[34]

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transmission channel to "0.9," it knows it must be "1" and can restore it to its original form. Every time it passes through an amplifier, the amplifier can regenerate an exact original. When passing through analog amplifiers, this regeneration does not occur. Eventually, the signal is so deteriorated that it is no longer unambiguous. To return to the illustration, if the "1" has deteriorated to "0.5," the regenerator cannot know whether the signal should be a "1" or a "0."

31. *AT&T Plans Distributed CMTS Architecture: Lightwire Roadmap Calls for Integration of DOCSIS CMTS Funtionality into Mini-Fiber Nodes*, Feb. 1, 2000. (www.cabledatacomnews. com/feb00/feb00-5.html).

32. CableLabs (Cable Television Laboratories, Inc.) issued the DOCSIS 1.1 standard (Data Over Cable Service Interface Specification) on April 22, 1999. This specification allows cable operators to provide guaranteed bandwidth to cable modem customers (http://www.cablelabs.com/PR/DOCSIS-042299.html).

33. Mike Musgrove, *Cable Modems: Is the Price Right?* interviewing Media General's Bob Mechelin, August 13, 1999 (www.washingtonpost.com/wp-srv/business/talk/transcripts/pegaro081399.htm).

34. *Overview of Cable Modem Technology and Services*, Cable Datacom News (www.cabledatacomnews.com). In one field test of recent cable modems, long-term average performance was under one megabit/second. Jim Louderback, *A New Age of Consumer Cable Modems* (reporting field test results for throughput of five new DOCSIS cable modems), ZDNet.com (www.zdnet.com/zdtv/cablemodem/reviews/story/0/7501/2382118.html) (viewed on 1/20/00).

Digital Subscriber Line (DSL)

Digital Subscriber Line (DSL) is the second most widely used broadband service, and its deployment is also growing quickly.[35] While there is a range of estimates for DSL deployment, that range is not as wide as that for cable modem deployment, discussed above. According to one source, there were 504,000 customers at the end of 1999.[36] This source predicts that this number will climb to 2.1 million by year-end, 2000.[37] Some project that broadband via DSL will surpass cable within a year or two.[38] Long-term estimates, which are much more speculative, range from 7 million DSL customers in 2004[39] to 9.6 million in 2003.[40]

The customer start-up cost is about the same for DSL as it is for cable modem, typically $200 to $300. There are numerous service offerings, some of which do not meet the full definition of broadband because the upstream link is lower than 200 kilobits/second. Many customers choose downstream services offered in the 250 to 600 kilobits/second range. Some real-world tests show lower rate DSL outperforming cable modems.[41] Although cable modem performance varies with the number of users, DSL broadband operates at a more fixed rate.[42]

In contrast to cable systems, which require extensive upgrades to provide data services, a substantial majority (over 70%, according to one source) of the copper loops in the existing telephone system can provide some form of DSL broadband merely with the addition of equipment at each end.[43] SBC Communications, Inc. (SBC), for example, has pledged to make DSL available to 80% of its subscribers within three years.[44]

Unfortunately, many of the loops on which DSL cannot operate are in rural areas. Telephone loops can be grouped into two categories: those that extend less than 18,000 feet (about 3 ½ miles) from their central switching office or carrier serving area and those that are longer. The

35. Whereas cable broadband is primarily a residential service, approximately 33% of DSL services are for business at this time. According to TeleChoice, there were 504,110 business and residential customers at the end of the fourth quarter of 1999. Of these, approximately 76.5% were provided by incumbent LECs, 22% by competitive LECs, and 1.5% by inter-exchange carriers. *See* www.xdsl.com [hereinafter Telechoice]. The incumbents primarily served residences (81% residential) whereas the competitive and interexchange carriers primarily serve businesses (77% and 65% respectively). *Id.*

36. *Id.*

37. *Id.*

38. George T. Hawley, *DSL: Broadband by Phone*, Scientific American, October, 1999 (www.sciam.com) [hereinafter Hawley].

39. *DSL Gaining on Cable as the Big Pipe of Choice*, Washington Post, Feb. 10, 2000, at E10 (reporting analysis from the Yankee Group).

40. *See* Telechoice, *supra* note 35.

41. *DSL Beats Cable Modem in Prime Time Internet Performance Duel - Based on Over 150,000 Performance measurements on the Networks of At Home and Pacific Bell*, Press Release, Keynote Systems, Inc., May 17. 1999.

42. *See* Schiesel, *supra* note 25.

43. *See* Hawley, *supra* note 38.

44. Sixth Annual Report, *supra* note 27, at ¶62.

shorter loops can generally support DSL-based advanced services.[45] Most customers in cities and towns, even very small towns, are served by plant that is inherently advanced services capable given the addition of DSL equipment because they are served by these short loops.

Longer loops (over 18,000 feet) generally are not DSL-capable because they must be "loaded" to maintain quality voice service.[46] Loaded plant is laced with inductors placed every mile or so along the cable to maintain good frequency response in the voice band. This comes at the price of blocking higher frequencies, including frequencies needed for DSL broadband. As a result, people served by long loops, generally those in outlying rural areas, may not have DSL-capable plant.

Loading has fallen out of favor with the development of distributed carrier systems in the 1980s and, more recently, DSL. Indeed, the FCC's Synthesis Cost Model (which designs modern, efficient telephone plant with no barriers to advanced services) does not use loading.[47] Under this design, referred to as a carrier serving area (CSA) design, no customer is beyond 18,000 feet from a central office or distributed carrier system. As explained below in Issue 5, much of the plant in rural areas is now built in this manner. If universal service support is used to build the modern, efficient plant envisioned by the FCC, inductive loading, which acts as a barrier to broadband, will eventually disappear in rural areas.

3. Capabilities and Availability of "Last Mile" Technologies without Significant Deployment

Fiber to Homes and Businesses

Fiber optic cable, typically used for backbone networks and the nation's long distance phone network, can also be used to connect homes and businesses. A fiber modem at the home or business (or nearby, for fiber to the curb) is used to convert light waves into electrical signals.

Among last mile technologies, fiber offers the largest bandwidth and could truly bring "the death of distance." The information carrying capacity of fiber is many millions of times that of

45. While not as wide band as coaxial cable, twisted pair has always been capable of carrying broadband. T-Carrier, developed in the 1960s, carries 1.544 megabits/second for 6000 feet before it is digitally regenerated. It is extremely robust because it was designed for long-distance voice service. Better electronics and less robust encoding allow for higher rates or longer distances. This broadband capability has been exploited in recent digital subscriber line (DSL) systems, which multiplex the digital signal over an ordinary analog voice signal. In other words, the DSL equipment pulls the upstream data off of the wire before the voice circuit discards it and adds the downstream data above the frequencies in the voice signal. DSL can carry 1.5 megabits/second to about 18,000 feet operating in this manner. Even higher rates can be carried for shorter distances. VDSL, for example, can carry rates of 53 megabits/second to 1,000 feet.

46. Although there are other forms of DSL that can reach beyond 18,000 feet by using repeaters, these repeaters do not allow for the telephone to remain on network power. One of the strong points of DSL from a public safety standpoint is that the telecommunications provider powers both ends of the voice circuit just as in plain old telephone service (POTS) so the telephone remains available for emergency use during power outages. When a repeater is inserted, voice service is dependent on less reliable forms of local power at the subscriber end, such as batteries. The subject of telephone reliability is discussed further in footnote 82.

47. *See infra* note 81.

copper-based facilities such as twisted pair or coaxial cable. The loss of signal with distance is so small compared to copper that a fiber can carry bit rates thousands of times higher than cable modems and DSL for distances of one hundred miles with no intervening electronics.

The down side is that fiber to the home is costly. For a typical home or business the cost for terminal equipment alone was about $1,500 in 1997.[48] While this price has since dropped, it still is not as low as the typical cost of about $500 or $600 per subscriber for adding cable modem or DSL broadband to a cable or telephone system.[49] Even without considering the cost of a plant rebuild, connecting the user to a fiber network is significantly more expensive than upgrading existing cable or telephone plant.

For these reasons, fiber deployment directly to homes and businesses has been minimal to date. Several examples, however, demonstrate that fiber deployment may be worth the additional cost:

- Clear Works plans to provide voice, video, and data to 2,700 new residences in Virginia, with 1,500 planned for a later date.
- BellSouth intends to offer video and data to 400 Atlanta residences via ATM technology and expects to provide service to an additional 200,000 residences in Atlanta and Florida later in the year.
- SBC has already deployed fiber-to-the-curb at more than 30,000 residences in Richardson, Texas, and plans to add 10,000 more links by the end of the year. [50]
- The Rural Telephone Company, an RUS borrower in Kansas, has built a fiber-to-the-home system that serves the rural towns of Hill City and Bogue.[51] Early versions of the technology used in this project were financed as a field experiment by RUS.

Whether fiber optic cable will be deployed to a large number of individuals in the future remains to be seen. It will largely be a function of whether bandwidth appetite grows to HDTV levels (20 megabits/second) or higher, thus moving beyond the practical capabilities of cable modems and DSL. Assuming there is greater deployment of fiber to the home, the costs of fiber and subscriber lightwave equipment will also fall, potentially spurring even further fiber deployment.

Multipoint Multichannel Distribution System

Multipoint multichannel distribution system (MMDS), commonly known as "wireless cable," is a wireless system for delivery of data via point-to-multipoint microwave radio signals. It

48. Bhumip Khashnabish, *Broadband to the Home (BTTH): Architectures, Access Models, and the Appetite for Bandwidth*, IEEE Network, Jan. 1, 1997.

49. *See* Schiesel, *supra* note 25.

50. Jason P. McKay, *Optical Illusion Disappears*, 4 tele.com 15 (1999) (www.teledotcom.com) (describing Clear Works, Bell South, and SBC).

51. www.ruraltelephone.com/history/pagesix/index.htm

operates below three gigahertz (GHz) at distances up to 35 miles under the best circumstances.[52] Given this range, MMDS could be an attractive "last mile" solution.

MMDS is descended from the older Multipoint Distribution Service (MDS), which was designed to transmit only television signals. MDS never became widely deployed, probably because the allotted spectrum only allowed for the broadcast of about 32 analog TV channels, compared to the 60 or 70 channels typically found on cable systems.

The FCC approved use of MMDS for two-way data service in September 1998, which greatly increased the interest in MMDS.[53] Several companies have tested MMDS data service, including Wireless One, CAI Wireless, American Telecasting and People's Choice TV. In these tests, downstream rates have been as high as 10 megabits/second and upstream rates have been as high as 128 kilobits/second (rates that are lower than the FCC's definition for broadband). MCI/WorldCom has launched tests in Baton Rouge, Louisiana; Memphis, Tennessee; and Jackson, Mississippi, with plans for a more significant test this summer in Boston.[54]

MMDS is already deployed in several areas. In Phoenix, for example, Sprint now serves over 10,000 customers, competing with the local cable operator and U.S. West.[55] Nucentrix Broadband Networks (in the Dallas metro area) plans to offer MMDS to small to medium sized businesses. It is currently deploying MMDS in two of its 58 markets (Sherman-Dennison, Texas and Austin, Texas) with the intent to offer service to 18 additional markets by the end of 2001.[56] Collectively, MCIWorldCom and Sprint have spent approximately $3 billion acquiring MMDS licenses in areas holding more than 50 million people, half of whom reportedly live in rural areas.[57] They have announced a plan to deploy MMDS to rural markets, although the term "rural" was not defined.[58]

Local Multipoint Distribution System

Local Multipoint Distribution Service (LMDS) is another fixed wireless technology capable of providing broadband service. LMDS was originally used for one-way wireless cable-like

52. There are many factors that can reduce the practical range, the primary one being the limitations resulting from a line-of-sight requirement given diffraction and the curvature of the earth. For example, over flat ground with no intervening obstructions like hills or buildings, to achieve a 25-mile range requires that both antennas be 75 feet above the ground. To keep the customer end to a more reasonable 33 feet height requires a 500-foot central tower. *See* David Urban, *Data Over MDS Cable Modems with Fixed 2 GHz Radio Link* (www.adc.com/Corp/BWG/MSD/cmodems.html).

53. *In the Matter of Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions*, 12 FCC Rcd 19112 (1998).

54. Peter Goodman, *MCI WorldCom Plans Wireless Test*, Washington Post, March 28, 2000 at E1 [hereinafter Goodman].

55. Sixth Annual Report, *supra* note 27, at ¶90.

56. www.nucentrix.com.

57. *See* Goodman, *supra* note 54.

58. *Ebbers Points to Rapid Digital Divide Crossing by MCI-Sprint*, Wireless Today, Jan. 13, 2000. (Bernard Ebbers promised that the two companies will serve rural markets through MMDS within a year of the proposed merger.)

service. The FCC auctioned LMDS spectrum for two-way broadband data service in 1997 and required that licensees build out the service within ten years of winning the license.[59] LMDS offers higher data rates than MMDS, but has a much shorter range, typically no more than three or four miles. The large amount of spectrum allocated, 1,300 megahertz near the 30 gigahertz range, has generated significant interest in LMDS by the telecommunications industry.[60] This capacity is enabling some LMDS operators to provide data rates greater than 150 megabits/second. Many small and some large companies are interested in using LMDS to provide integrated broadband data, voice, and video services.

LMDS is being tested or deployed by several companies. Currently, most deployment is for service to business customers in urban areas, in competition with existing and new wireline providers. (LMDS can be far less expensive to deploy than new wireline facilities, for which providers must obtain rights of way and often face expensive installation costs in congested urban areas.) Cellular Vision USA now offers LMDS service in the New York City area. World Wide Wireless also offers LMDS (and MMDS) service in the suburban areas surrounding San Francisco and San Diego. Highspeed.com is offering LMDS in mid-sized and large cities in the western United States, including Walla Walla, Washington; Bakersfield, California; Boise, Idaho; Denver, Colorado; and Honolulu, Hawaii.

Other companies are exploring deployment in areas that are partially rural. As discussed below, however, rural deployment of LMDS may be limited by several factors.

Broadband Data Satellite Systems

Satellite systems may offer another possibility for broadband service. One specialized system that has just come on line is Tachyon, which markets its services to Internet Service Providers (ISPs). Tachyon provides a two-way broadband satellite link to connect end users to their ISPs, carrying the end user's Internet traffic via satellite to the ISP gateway. The system promises to help ISPs reach customers in more remote rural areas. Tachyon offers service at varying data rates, from 200 kilobits/second to two megabits/second for the downstream rate and from 64 kilobits/second to 256 kilobits/second upstream. Deployment of this service began in March 2000.

The best known satellite system currently offering general Internet access to residences in North America is DirecPC, which offers downstream service at $200 for the start up charge and a $30 monthly fee. DirecPC reports that remote customers are assured a clear satellite signal so long as a clear line of sight to the southern sky is maintained. Installation kits are available at local retailers across the country.

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59. *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5 GHz Frequency Band, To Reallocate the 29.5-30.0 GHz Frequency Band, To Establish Rules and Policies For Local Multipoint Distrisbution Service and For Fixed Satellite Services, CC Docket 92-297, Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rulemaking,* 12 FCC Rcd 12545 (1997) (Second Report).

60. This bandwidth is equivalent to about 217 conventional broadcast television channels, compared to 32 for MMDS.

DirecPC is provided over a system originally designed to deliver television programming. Subsequently, this system was adapted to provide limited high-rate Internet access. Downstream rates are shared and can be as high as 400 kilobits/second, while the upstream link is via standard phone lines. As such, it does not meet the FCC's definition of broadband. DirecPC also restricts heavier users under a "fairness" policy to rates that are a small fraction of the 400 kilobit/second maximum. This restriction may make DirecPC less attractive as a high-speed data link than other broadband technologies.

Because DirecPC provides customers in the most remote rural areas with the same quality of service provided to those in urban areas, it provides a preview of the potential for satellite broadband to eliminate geography and location as a cost factor. Several new broadband satellite systems are expected to come online in the next few years (as discussed in Part C), all of which will provide significantly higher capacities than DirecPC.

Summary on Capability and Availability

The problem with regard to broadband access in rural areas lies primarily with last mile connections rather than access to the backbone network. DSL and cable modems are the most widely available last mile broadband technologies. As discussed below, however, their deployment in rural areas lags that in urban areas. New technologies hold promise for broadband access in rural areas but may be years away from widespread availability.

B. Rates of Deployment in Rural and Non-Rural Areas

Issue 3. Rate of deployment of advanced telecommunications capability in rural areas compared with the deployment of such capabilities in non-rural areas and identify specific geographic areas where advanced telecommunications capability is being deployed at a significantly lower rate than such services are being deployed elsewhere in the Nation.

In responding to Issue 3, we address broadband services that are already widely deployed so that we can compare rural and non-rural areas and examine specific locales that are not yet served by these technologies. For this reason, we have limited our discussion to cable modems and DSL.

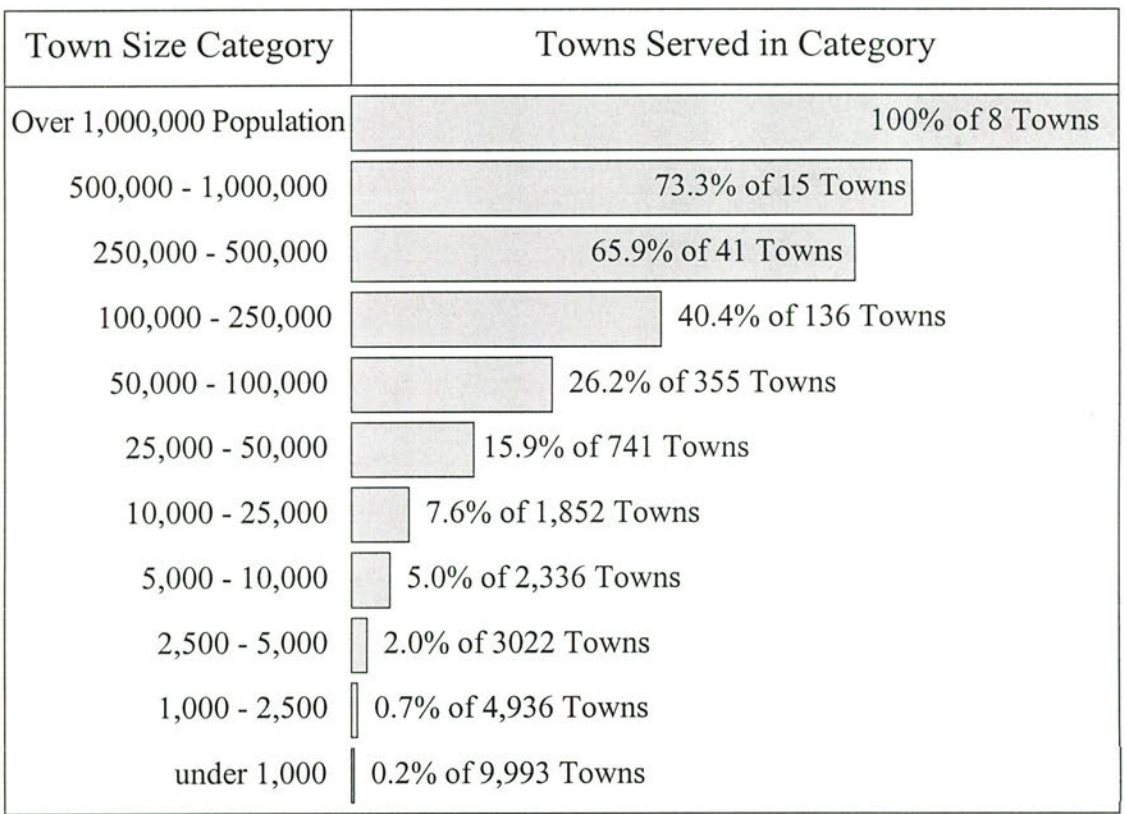
Deployment in urban and rural areas is not proceeding at a comparable pace. For various reasons, the major cable and DSL providers are both concentrating on serving metropolitan urban areas with high population densities. The likelihood of receiving broadband service through either technology declines with population density. As a result, residents in rural areas will generally be the last to receive service.

That said, the size of the provider and the nature of its service area are undoubtedly significant factors in determining which areas are served. Providers with both rural and non-rural service areas will likely bring broadband to their larger, urban, and more lucrative markets first, whereas rural providers are most likely to serve rural towns before remote, out-of-town areas. This means that those last served will be in the sparsely-settled countryside.

Cable Modems

In general, the larger the city or town, the more likely it is to find cable modem service. The information in Appendix A provides a recent snapshot of cable modem deployment, based on the "Cable Modem Deployment Update" in Communications, Engineering, and Design (CED) Magazine from March 2000. As noted previously, these numbers are changing rapidly.

Figure 1 - Broadband Cable Access by Town Size



Sources: *Cable Modem Deployment Update*, CED Magazine (March 2000); U.S. Census Bureau's *1990 Census Gazetteer.*

Figure 1 shows the deployment of cable modem service across cities and towns of various sizes.[61] This chart shows that the percentage of cities or towns with cable modem service declines as the population size decreases. For example, according to this study, cable modem service was available in some portion of all eight cities with populations exceeding one million. Cable broadband was also available in portions of more than 70 percent of cities with populations between 500,000 and one million. That rate declines for smaller cities. Approximately 25 percent of cities ranging from 50,000 to 100,000 in population had cable

61. This chart is based on Appendix A, which uses CED magazine's list of areas (primarily cities) with cable modem service in at least part of the city. We then used data from the U.S. Census Bureau's *1990 Census Gazetteer* (www.census.gov/cgi-bin/gazetteer) to determine the size of the cities. For the 26 counties identified in Appendix A, we identified cities and towns within those counties for which we could confirm cable modem service and included them in the chart.

modem deployment, compared to less than five percent of towns with populations between 5,000 and 10,000 and less than one percent in towns with populations under 2,500. We recognize that companies may report their deployment with varying degrees of accuracy and that any list is probably not complete.

For several reasons, cable modem service is less successful in reaching some rural areas. It is estimated that cable is available to somewhere between 81% and 97% of Americans, depending on the method of calculation.[62] Nevertheless, rural areas outside of towns still have less access to cable TV.[63] With the arrival of direct broadcast satellite for television, it is even less likely that cable systems will extend further into the countryside. Additionally, as with all types of wireline service, the costs of high-speed cable data deployment and operation in rural areas are high.[64] Because the subscriber base in rural areas is more dispersed than in more densely populated areas, there is less economic incentive to connect rural areas.

While the prospects for deploying cable modem service in remote areas outside of towns seems low, the prospects are higher in small rural towns. Appendix A shows that many small towns

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62. Statistics for the availability of cable vary according to whether a comparison is made to TV households, all households, or housing units. The most commonly used statistic is to compare homes passed by cable to TV households. According to estimates developed by Paul Kagan Associates, Inc., and reported in the National Cable Television Association's (NCTA's) *Cable Television Developments*, there were 99 million TV households, 66 million cable customers, and 95.6 million homes passed by cable service. *See* NCTA, 23 *Cable Television Developments* 1 (Summer 1999). Using these figures, the ratio of homes passed by cable to TV households was 96.6%. *Id.* The Warren Report, a second source reported by NCTA on its website, estimated that there were fewer homes (91 million) passed by cable in 1999 based on information collected from cable providers (ncta.cyberserv.com/qs/user_pages/Dev%28statedata%29.cfm). Comparing the Warren estimate of homes passed to the Kagan estimate for TV households yields a ratio of approximately 92%.

Another way to measure the availability of cable is to compare homes passed by cable to all households, not only TV households. According to a December 8, 1999 report, there were approximately 101 million households (occupied housing units) and 112 million housing units (occupied or unoccupied) as of July 1998. *See* Census Bureau, *Estimates of Housing Units, Households, Households by Age of Householder, and Persons per Household: July 1, 1998* (www.census.gov/population/estimates/housing/sthuhh1.txt). Comparing the Kagan and Warren estimates for homes passed to total households yields ratios of 95% and 90%, respectively.

Finally, a third comparison is between houses passed by cable and total housing units. This comparison is especially useful because there is evidence that cable providers may be reporting housing units passed, not households or TV households passed. For example, the Warren report listed 258,832 homes passed by cable in Washington, D.C., while Census estimated 265,000 housing units but only 225,000 households for the same area. The cable provider in Arlington, Virginia reported 89,968 homes passed and 89,968 housing units in its franchise area. It is reasonable that providers report housing units passed because, when it does not serve a house, a cable provider has no easy way to distinguish among a household without TV, a household with TV, or an unoccupied housing unit. Comparing the Kagan and Warren estimates for homes passed to total housing units yields ratios of 86% and 81%, respectively.

63. National Telecommunications and Information Administration, U.S. Department of Commerce, *Survey of Rural Information Infrastructure Technologies* (September 1995) at 3-7 ("Cable television service providers are generally unwilling to extend their cables into rural areas where the subscriber density is less than 10 per mile.")

64. National Cable Television Association, *Imposing Common Carrier-Style Regulations On Cable Would Impede Deployment of Cable's High Speed Internet Service to Rural and Small Communities* (May 1999) ("In lower density rural markets, where computer penetration is generally less than the national average, the high fixed costs involved in establishing high speed networks are spread over a much smaller customer base. Although customers are responding favorably, these small cable system operators are still unsure about how many customers they will attract and what return they will see.").

with populations less than 2,500 are already receiving cable modem service, including Freeman, South Dakota (pop. 1,293); Hardin, Kentucky (pop. 595); and Machias, Maine (pop. 1,773).

Many mid-sized and small cable operators are installing turnkey systems that allow them to offer cable modem service. For example, cable companies in conjunction with the ISP Channel are offering data services in such towns as Atchison, Kansas; Kennebunk, Maine; Lake Travis, Texas; and Bonneville, Mississippi.[65] While these towns do not fall under our definition of rural, they are certainly smaller than the large metropolitan areas where cable modem service first appeared.

In addition, a number of municipal utilities are offering high rate data services, primarily over cable systems. The American Pubic Power Association reported that, of the 127 municipal electric utilities across the country that currently offer telecommunications, approximately one-sixth are providing cable modem service.[66] Four of these systems are in the rural towns of Coon Rapids, Hawardan, and Manning, Iowa; and Schulenburg, Texas. Electric utilities are also providing service in somewhat larger towns, such as Scottsboro, Alabama; Fairborn, Georgia; and Barbourville, Kentucky.

To gauge the likelihood of deployment in rural areas, NTIA spoke to approximately two dozen small cable companies serving 1,000 customers or fewer about the deployment of broadband over their cable systems. Approximately half of the companies currently offer, or plan to offer, cable modem service to small towns, some of which would likely be rural. These companies reiterated that, because cable service is more economical where there is a higher density of customers, it is unlikely that they will build out to isolated customers in the rural countryside.

DSL

To date, DSL has been deployed primarily in urban centers. The Regional Bell Operating Companies (RBOCs) and GTE, which serve a large majority of all DSL customers,[67] planned to offer DSL to as many as 45 million lines (approximately 45% of their customers) by the end of 1999.[68] As demonstrated in Appendix B, RBOC DSL deployment has primarily occurred in cities of 10,000 or more, while most localities with DSL have populations of 25,000 or higher. These data are based on public information provided by the RBOCS (primarily on the Web) in

65. Lee L. Selwyn *et al*, *The Broadband Road to Rural America: The Competitive Keys to the Future of the Internet*, May 1999 at 72-3 and Table 3.3.

66. These municipal cable systems also provide Internet access, presumably over a cable modem system. *See* American Public Power Association, *Municipal Electric Utilities Providing Broadband Telecommunications Services* (1999). Other municipalities also reportedly offered "high speed data" service although it was not clear how this was delivered or at what rate and to whom it was delivered.

67. According to TeleChoice, 76.5% of DSL was provided by incumbent LECs *See* Telechoice, *supra* note 35. The RBOCs serve the vast majority of ILEC customers.

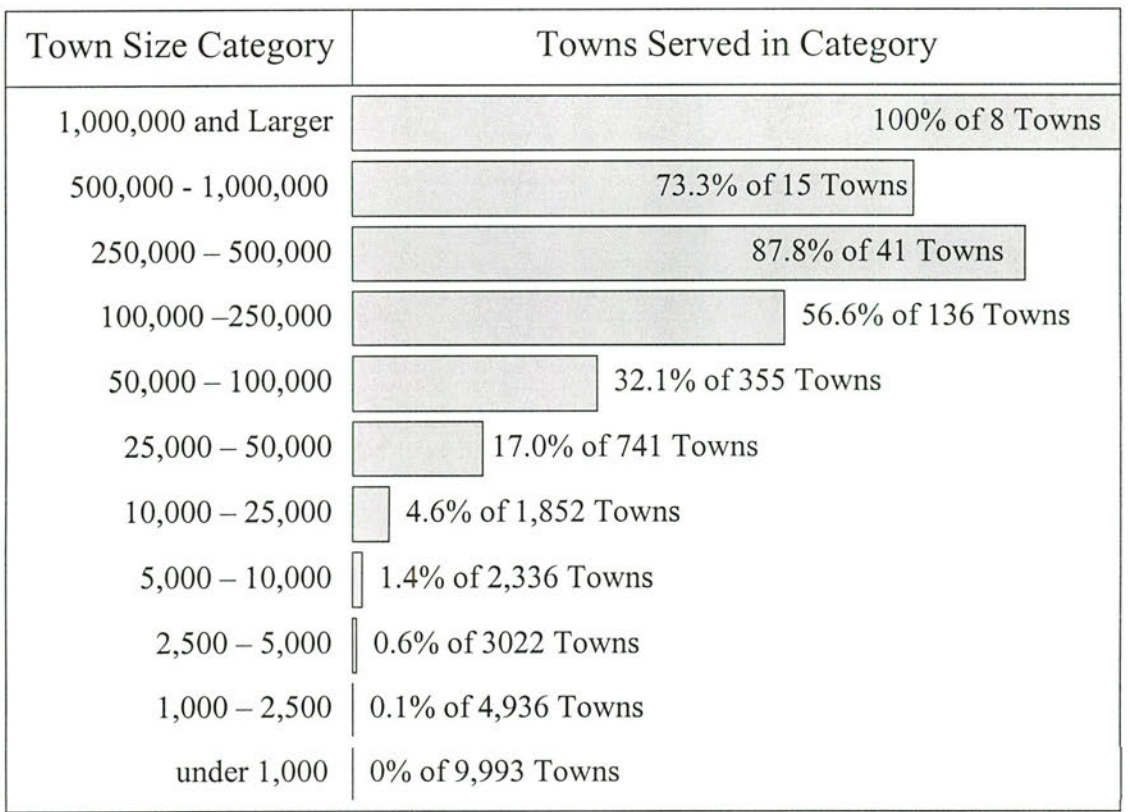
68. Selwyn, *et al.*, *Bringing Broadband to Rural America: Investment and Innovation in the Wake of the Telecom Act,* September 1999, at 15. This figure may be somewhat ambitious because of extensive bridge taps in RBOC plant. However, bridge taps are easily remedied and do not represent a long-term roadblock to broadband like loading does for rural loops.

March 2000. The data provided by the various RBOCs differed in their degrees of comprehensiveness.[69]

According to the data in Appendix B, the major population centers on the West Coast are in the lead, followed by other metropolitan areas in the Western Interior, the Southeast, the Midwest, and the East Coast. With respect to small towns, DSL deployment has occurred more rapidly in more affluent small towns, such as Vail, Colorado, and Carmel, California.

Figure 2 shows the deployment of DSL service by the RBOCs across cities and towns of various sizes using data in Appendix B.[70] As reported in March 2000, the RBOCs were offering DSL service in portions of 551 cities or towns.

Figure 2 - RBOC Provided DSL by Town Size



Sources: Public Data From RBOCs; U.S. Census Bureau's *1990 Census Gazetteer.*

69. Some RBOCs, such as Ameritech, listed only a few cities in which they provide DSL. Others, such as Pacific Bell, provided a detailed, apparently more comprehensive, list.

70. This chart used data from Appendix B, and then used the Census Gazetteer to determine the size of the cities. This chart is not directly comparable to the chart on cable modem deployment, which was prepared using evidence from one source. The data from the various RBOCs, by contrast, vary in scope and detail, and do not include deployment by competitive and independent telecommunications providers. Additionally, the data may not be tied as closely to city boundaries as data provided for cable service. In certain instances, RBOCs may deploy DSL for the entire metropolitan service area, but only list the chief city's name. In these cases, Figure 2 may under-represent deployment in the surrounding urban area.

As can been seen in Figure 2, the percentage of cities with some RBOC-provided DSL service decreases rapidly with city size.[71] While all eight cities with populations exceeding one million had DSL available, only 1.4 percent of towns with populations less than 10,000 and 0.1 percent of towns with populations less than 2,500 had such service. (These figures do not include the many smaller cities where non-RBOC, smaller telephone companies may be deploying DSL.)[72]

Despite these figures, we cannot conclude that rural areas will necessarily be ignored for long. Competitive local exchange carriers (CLECs) provide approximately 22% of DSL nationwide.[73] Several of the CLECs intend to target less densely populated areas. For example, New Edge Networks, a wholesale data CLEC that typically operates in partnership with an Internet service provider, announced a two-year plan to provide DSL in smaller cities and what they describe as rural areas in all 50 states.[74] At the end of 1999, this CLEC was offering service in Sequim, Washington; Port Townsend, Washington; and other small towns throughout the Western States. Although these towns exceed our definition of rural, they are fairly small. Similarly, Northwest Telephone Inc. and Electric Lightwave Inc. agreed to offer high-speed services to businesses in Wenatchee, Washington, as well as to other communities in that state.[75]

Additionally, independent telecommunication companies have shown more interest in providing services to customers outside major population centers, and have demonstrated a greater willingness to build the plant necessary for advanced services. Those independent providers that are financed by the Rural Utilities Service are, in fact, required to upgrade their infrastructure so that it is DSL-capable when they build new plant or rebuild old plant. Under the Rural Electrification Loan Restructuring Act of 1993, all direct lending by RUS must be for plant that conforms to State Telecommunications Modernization Plans.[76] These plans require that financed plant, as built or with additional equipment, support the provision of data communications at a speed of one million bits per second.

In 1995, RUS began reviewing designs to ensure that financing went only for advanced services capable plant. Among other things, RUS looks for plant designs that ensure that customers are grouped so that loops do not exceed 18,000 feet. At the time of the last survey, in 1992, approximately 65% of rural customers served by an RUS financed provider were within 18,000 feet of a central office or carrier site, and theoretically could be provided with DSL service. That

---

71. Of the 551 cities in Appendix B, 39 could not be associated with entries in the Census Gazetteer and are not included in the chart.

72. There are well over 1,000 independent telephone companies providing service. Many of these companies did not have publicly available data. Even if they had, collection of these data would have been extremely time and resource intensive.

73. *See supra* note 35.

74. Salvatore Salamone, *DSL Heads to Smaller Cities – Start-Up New Edge Networks Aims to Ease Telecommuting Challenges*, Internet Week, Nov. 29, 1999.

75. News Release, *Northwest Telephone and Electric Lightwave Bring High-Tech Telecom to Rural Areas*, Nov. 8, 1999.

76. *See* §905(d)(3) of Rural Electrification Act of 1936, 7 U.S.C. §935(d)(3).

number is undoubtedly higher today, although the precise number will not be known until the next loop survey.

facsimile TRANSMITTAL

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

to: Kendra Goldbas
fax #: 456-5334
re:
date: 4-19-00
pages: 3

Kendra: Attached is the Senators' letter requesting our response on six issues. This provides the framework for the report, which I will email to you momentarily.
Wendy

From the desk of...

Wendy Lader
Senior Policy Advisor

Office of Policy Analysis and Development
Room 4725 Herbert C. Hoover Building
Washington, D.C.

Phone: (202) 482-1880
Fax: (202) 482-6173

United States Senate

WASHINGTON, DC 20510

May 20, 1999

The Honorable Larry Irving
Administrator
The National Telecommunications and Information Administration
U.S. Department of Commerce
14th Street & Constitution Avenue, NW
Washington, D.C. 20230

The Honorable Wally Beyer
Administrator
The Rural Utility Service
U.S. Department of Agriculture
14th Street & Independence Avenue, SW
Washington, D.C. 20250

Dear Mr. Irving and Mr. Beyer:

We are writing to ask the National Telecommunications and Information Administration (NTIA) and the Rural Utility Service (RUS) to conduct a joint assessment of the availability of advanced telecommunications capability to all Americans, with a particular focus on rural and high cost areas, and provide us with recommendations to ensure ubiquitous deployment of advanced telecommunications capability to all Americans particularly in rural areas. This study should assess:

(1) the investment in telecommunications facilities with advanced capability in rural areas compared with non-rural areas, including an assessment of the various levels of capability being deployed under different technologies and the bandwidth capabilities of such deployment and whether or not comparable bandwidth is being deployed consistent with the objectives under Sec. 254(b)(2) and (3) of the Communications Act and Sec. 706 of the Telecommunications Act;

(2) the availability of telecommunications backbone networks and "last mile" facilities with advanced capability in rural areas compared with advanced telecommunications backbone networks and last mile facilities in non-rural areas;

(3) the capability of various technological enhancements to existing wireline and wireless networks to provide last mile advanced telecommunications capability in rural areas;

Page Two
May 20, 1999

(4) the feasibility of various technological alternatives to provide last mile advanced telecommunications capability in rural areas;

(5) the rate of deployment of advanced telecommunications capability in rural areas compared with the deployment of such capability in non-rural areas and identify specific geographic areas where advanced telecommunications capability is being deployed at a significantly lower rate than such services are being deployed elsewhere in the Nation; and

(6) the effectiveness of competition and universal service support mechanisms to promote the deployment of advanced telecommunications capability and the availability of advanced telecommunications services in rural areas.

If your assessment finds that deployment of advanced telecommunications capability and services is not occurring in rural areas at a reasonably comparable pace as in non-rural areas, we would appreciate any recommendations, either legislative and non-legislative (including regulatory) that could improve deployment of advanced telecommunications capability and the availability of advanced telecommunications services in rural areas.

We look forward to working with you on this important project.

Sincerely,

Paul Weller

Patty Murray

Max Baucus

Byron L. Dorgan

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Divider Title: 11 _____

Also introduced in the House (H.R. 4122) 3/29

II

106TH CONGRESS
2D SESSION

S. 2307

To amend the Communications Act of 1934 to encourage broadband deployment to rural America, and for other purposes.

IN THE SENATE OF THE UNITED STATES

MARCH 28, 2000

Mr. DORGAN (for himself, Mr. DASCHLE, Mr. BAUCUS, Mr. JOHNSON, and Mr. HARKIN) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

---

A BILL

To amend the Communications Act of 1934 to encourage broadband deployment to rural America, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Rural Broadband Enhancement Act".

SEC. 2. FEDERAL COMMUNICATIONS COMMISSION TO PROVIDE SUPPORT FROM UNIVERSAL SERVICE FUND.

Section 254(e) of the Communications Act of 1934 (47 U.S.C. 254(e)) is amended—

(1) by redesignating so much of the text of such subsection as follows "(e) UNIVERSAL SERVICE SUPPORT.—" as paragraph (1);

(2) by inserting before "After" the following heading: "(1) IN GENERAL.—"; and

(3) by adding at the end the following:

"(2) RURAL AREA BROADBAND SUPPORT.—In addition to any other support provided under paragraph (1), the Commission shall, within 90 days after the date of enactment of the Rural Broadband Enhancement Act, initiate a proceeding to provide Federal universal service support for the deployment of broadband service (as defined in section 156(e)(1) of the National Telecommunications and Information Administration Organization Act) to eligible rural communities (as defined in section 156(e)(2) of that Act). The proceeding shall be completed within 240 days. Federal universal service support provided as a result of that proceeding shall be determined without cost averaging of any above-average cost areas with any lower cost areas, such as

would occur in statewide or study averaging, and may be used for the deployment of—

"(A) loop treatments and digital subscriber line access multiplexers;

"(B) cable modems;

"(C) wireless technology; and

"(D) satellite technology.".

SEC. 3. RURAL UTILITIES SERVICE LOAN PROGRAM.

Part C of title I of the National Telecommunications and Information Administration Organization Act (47 U.S.C. 901 et seq.) is amended by adding at the end thereof the following:

"SEC. 156. BROADBAND TELECOMMUNICATIONS SERVICES.

"(a) IN GENERAL.—The Rural Utilities Service of the Department of Agriculture, after consultation with the NTIA, shall make loans or other extensions of credit to companies certified as eligible telecommunications carriers providers, or that accept the obligations of an eligible telecommunications carrier, in accordance with the provisions of this section to finance the deployment of broadband telecommunications services to eligible rural communities.

"(b) ELIGIBILITY REQUIREMENTS.—To be eligible for a loan or other extension of credit under this section, a project shall—

"(1) be capable of delivering broadband service;

"(2) be for the purpose of making access to broadband service available to an eligible rural community where broadband service is not otherwise generally available throughout that community; and

"(3) be subject to the standards for service and area wide coverage applicable to other projects administered by the Rural Utilities Service.

"(c) TERMS AND CONDITIONS.—Loans made under this section—

"(1) shall be made available in accordance with the requirements of the Federal Credit Reform Act of 1990 (2 U.S.C. 661);

"(2) shall bear interest at an annual rate of not more than 2 percent per annum; and

"(3) shall be made for the longer of—

"(A) a term of 30 years; or

"(B) the useful life of the assets constructed, reconstructed, or acquired.

"(d) LIMITATIONS.—

"(1) TECHNOLOGY NEUTRALITY.—In making loans under this section, the Rural Utilities Service may not take into consideration the technology proposed to be employed.

"(2) SECURITY INTEREST.—The Rural Utilities Service may take a security interest in assets or rev-

enue streams, in connection with a loan or other extension of credit made under this section, of not more than the amount sufficient to cover the assets financed by that loan or extension of credit.

"(e) DEFINITIONS.—In this section:

"(1) BROADBAND SERVICE.—The term 'broadband service' includes, without regard to any particular transmission medium or technology, high-speed, switched, broadband telecommunications capable of delivering not less than 1.0 megabits of data per second to the user and 0.5 megabits of data per second from the user that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications. The Commission shall, from time-to-time as circumstances warrant, revise the rate-of-data-transmission criteria stated in the preceding sentence upward to reflect technological advances, and the criteria, as so revised, shall be applied under the preceding sentence in lieu of the rate-of-data-transmission criteria stated or previously revised by the Commission under this sentence.

"(2) ELIGIBLE RURAL COMMUNITY.—The term 'eligible rural community' means any incorporated or unincorporated place that—

"(A) has not more than 20,000 inhabitants, based on the most recent available population statistics of the Bureau of the Census; and

"(B) is not located in an area designated as a Metropolitan Area by the Office of Management and Budget.".

SEC. 4. FUNDING.

There are authorized to be appropriated to the Secretary of Agriculture to carry out the provisions of section 156 of the National Telecommunications and Information Administration Organization Act $3,000,000,000 for fiscal years 2001, 2002, 2003, 2004, through 2005, such amount to remain available until expended.

○

106TH CONGRESS
2D SESSION

S. 2321

To amend the Internal Revenue Code of 1986 to allow a tax credit for development costs of telecommunications facilities in rural areas.

IN THE SENATE OF THE UNITED STATES

MARCH 29, 2000

Mr. ROCKEFELLER (for himself and Ms. SNOWE) introduced the following bill; which was read twice and referred to the Committee on Finance

---

A BILL

To amend the Internal Revenue Code of 1986 to allow a tax credit for development costs of telecommunications facilities in rural areas.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Rural Telecommunications Modernization Act of 2000".

SEC. 2. CREDIT FOR TELECOMMUNICATIONS FACILITIES DEVELOPMENT IN RURAL AREAS.

(a) IN GENERAL.—Section 46(a) of the Internal Revenue Code of 1986 (relating to amount of investment credit) is amended by striking "and" at the end of paragraph

(2), by striking the period at the end of paragraph (3) and inserting ", and", and by adding at the end the following:

"(4) the rural telecommunications facilities credit."

(b) AMOUNT OF CREDIT.—Subpart E of part IV of subchapter A of chapter 1 of the Internal Revenue Code of 1986 (relating to rules for computing investment credit) is amended by inserting after section 47 the following:

"SEC. 47A. RURAL TELECOMMUNICATIONS FACILITIES CREDIT.

"(a) IN GENERAL.—For purposes of section 46, the rural telecommunications facilities credit for any taxable year is an amount equal to the applicable percentage of the qualified broadband local access facilities expenditures for such taxable year.

"(b) APPLICABLE PERCENTAGE.—For purposes of subsection (a), the applicable percentage in the case of qualified broadband local access facilities expenditures in connection with—

"(1) broadband telecommunications facilities, is 10 percent, and

"(2) enhanced broadband telecommunications facilities, is 15 percent.

"(c) QUALIFIED BROADBAND LOCAL ACCESS FACILITIES EXPENDITURE.—For purposes of this section, the term 'qualified broadband local access facilities expenditure' means any expenditure—

"(1) chargeable to capital account—

"(A) for property for which depreciation is allowable under section 168, and

"(B) incurred in connection with broadband telecommunications facilities or enhanced broadband telecommunications facilities serving rural subscribers, and

"(2) incurred during the period—

"(A) beginning with the taxpayer's (or any predecessor's) first taxable year beginning after the date of the enactment of this section, and

"(B) ending with the taxpayer's (or any predecessor's) third taxable year beginning after such date.

"(d) DEFINITIONS AND SPECIAL RULES.—For purposes of this section—

"(1) BROADBAND TELECOMMUNICATIONS FACILITIES.—The term 'broadband telecommunications facilities' means broadband local access facilities capable of—

"(A) transmitting voice, and

"(B) downloading data at a rate of 1.5 MBPS and uploading data at a rate of .5 MBPS.

"(2) ENHANCED BROADBAND TELECOMMUNICATIONS FACILITIES.—The term 'enhanced broadband telecommunications facilities' means the broadband local access facilities capable of—

"(A) transmitting voice, and

"(B) downloading and uploading data at a rate of 10 MBPS.

"(3) DETERMINATION OF BROADBAND LOCAL ACCESS FACILITIES.—Broadband local access facilities—

"(A) begin at the switching point closest to the rural subscriber, which is—

"(i) the subscriber side of the nearest switching facility in the case of local exchange carriers,

"(ii) the subscriber side of the headend or the node in the case of cable television operators, and

"(iii) the subscriber side of the transmission and reception facilities in the case of a wireless or satellite carrier,

"(B) end at the interface between the network and the rural subscriber's location, and

"(C) do not include any switching facility.

"(4) RURAL SUBSCRIBER.—The term 'rural subscriber' means a subscriber who lives in area which—

"(A) is not within 10 miles of any incorporated or census designated places containing more than 25,000 people, and

"(B) is not within a county or county equivalent which has an overall population density of more than 500 people per square mile of land."

(c) SPECIAL RULE FOR MUTUAL OR COOPERATIVE TELEPHONE COMPANIES.—Section 501(c)(12)(B) of the Internal Revenue Code of 1986 (relating to list of exempt organizations) is amended by striking "or" at the end of clause (iii), by striking the period at the end of clause (iv) and inserting ", or", and by adding at the end the following new clause:

"(v) which is not described in subparagraph (A), in an amount which does not exceed in any year an amount equal to the applicable percentage of the qualified broadband local access facilities expendi-

tures (as determined in section 47A) of the mutual or cooperative telephone company for such year."

(d) CONFORMING AMENDMENT.—The table of sections for subpart E of part IV of subchapter A of chapter 1 of the Internal Revenue Code of 1986 is amended by inserting after the item relating to section 47 the following:

"Sec. 47A. Rural telecommunications facilities credit."

(e) EFFECTIVE DATES.—

(1) IN GENERAL.—Except as provided in paragraph (2), the amendments made by this section shall apply to expenditures incurred after the date of the enactment of this Act.

(2) SPECIAL RULE.—The amendments made by subsection (c) shall apply to amounts received after the date of the enactment of this Act.

○

Gigi E. Georges
04/13/2000 06:42:24 PM

Record Type: Record

To: Elliott H. Baer/OPD/EOP@EOP, Jamie H. Ginott/OPD/EOP@EOP

cc: Melissa G. Green/OPD/EOP@EOP
Subject: Digdiv trip - NCscheduling

For gene --

It does sound like the President is interested in doing this (per Laura Graham --see below for more detail). It would be a digital divide speech at Shaw college (HBCU) in the afternoon of April 26th. We would still do the braodband event in the morning. Ok to go ahead with it? thanks.

---------- Forwarded by Gigi E. Georges/OPD/EOP on 04/13/2000 06:38 PM ----------

Gigi E. Georges
04/07/2000 02:25:48 PM

Record Type: Record

To: David Tseng/OPD/EOP@EOP, Elliott H. Baer/OPD/EOP@EOP, Jamie H. Ginott/OPD/EOP@EOP

cc:
Subject: Digdiv trip - NCscheduling

(Given Gene's schedule today, I may not get to talk to him, but I do want to follow up on one thing we had begun to talk about yesterday. thanks.)

For Gene:

Talked to Laura Graham again about considering whether the President should do a speech at Shaw College (an HBCU) in Raliegh, NC. focusing on the Digital Divide. Apparently, Shaw was beign considered as a commencement speech venue (which would have been on May 13), but the President wanted us to look at the alternative option of speaking on the Digital Divide at Shaw.

Scheduling wants to know how you feel about adding the speech to the day on April 26th. We would start the day with the broadband event in Eastern NC in the morning, and do the Shaw speech in the afternoon.

You had said you would like to talk to Erskine Bowles about the idea before going ahead on it. His numbers:

Work in New York: 212-355-5656
Work in NC: 704-372-2040
Home in NC: 704-364-1279

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LISC RURAL

Rural LISC Fact Sheet

CDCs - Partnerships - Supporters - Toolkit - Home Page

MISSION | DESCRIPTION | DATE ESTABLISHED | GEOGRAPHIC AREA | RESOURCE GOAL
PRODUCTION GOAL | GOVERNANCE | RESOURCES COMMITTED | PRODUCTION RESULTS
OTHER ACHIEVEMENTS | STAND UP FOR RURAL AMERICA CAMPAIGN ACTIVITIES
STAND UP FOR RURAL AMERICA CAMPAIGN OUTCOMES

Our Mission: To build the capacity of resident led rural community development corporations (CDCs), increase their production and impact, demonstrate the value of investing in and through rural CDCs and make the resource and policy environment more supportive of rural CDCs and their work.

Description: Rural LISC has pledged to: provide 68 CDCs with training, technical and financial support; reach another 400 rural CDCs, plus funders and lenders, through its training and information network; and forge alliances among rural CDCs, funders, lenders and policy makers to build the support base for these CDCs.

Date Established: April, 1995 (participating CDCs selected August, 1995)

Geographic Area: 37 states

Revised Resource Goal: 1995-1999 -- $108 million; 1999-2003 -- $198 million; and 1995-2003 -- $306 million.

Production Goal:
Affordable Homes: 1995-1999 -- 2,000 homes; 1999-2003 -- 4,100 homes; and 1995-2003 -- 6,100 homes.
Square Feet of Commercial, Industrial and Community Facilities: 1995-1999 -- 250,000 square feet; 1999-2003 -- 500,000 square feet; and 1995-2003 -- 750,000 square feet.

Governance: A 24 member Rural LISC Advisory Committee composed of donor, lender and CDC representatives and other rural CDC supporters. Public members do not vote. (Rural Advisory Committee and Rural LISC's Staff)

Resources Committed (3/1/00):

- A total of $221.6 million secured, including:
- More than $53.8 million in grant and loan commitments mobilized from LISC and 29 other private and public partners;
- More than $164 million committed by NEF in equity and bridge loans; and
- $3.8 million in loan purchases made by LIMAC

Production Results:

- Participating CDCs are developing some 3,834 affordable homes, including 1,456 apartments with NEF assistance.
- Participating CDCs are developing some 690,631 square feet of essential facilities.

Other achievements:

- Technical assistance to 53 CDCs, involving some 142 developments financed by Rural LISC.
- More than $202.6 million invested in and through participating CDCs.
- More than $223 million leveraged in development financing.
- Investments include more than $7.1 million in capacity building grants, $2.02 million in project

related grants and recoverable grants, and $29.5 million in loans and loan guarantees.
- Sponsorship initiative to help CDCs secure new capacity building resources, resulting in over $6.7 million in matching funds raised by CDCs through 232 separate "Sponsorships."
- Nine national training Seminars for participating CDCs.
- Six Asset Management trainings for participating CDCs and other rural CDCs, plus twenty-four Regional Workshop trainings, for a total of nearly 1,850 rural CDC leaders, private funders and lenders and government officials, including representatives from participating and 504 other rural CDCs.
- Two groundbreaking public/private partnerships, one for homeownership, and one for child care facilities, involving 78 CDCs producing 1,137 homes and seven CDCs developing nine child care facilities.
- *Rural Developments*, the first newsletter dedicated to rural CDCs, circulation 12,000.
- Rural LISC web site.

Stand Up for Rural America Campaign Activities:

- Coordinating and staffing national coalition effort to help rural CDCs gain the resources and policy support their work deserves.
- Recruiting more than 750 Sponsor organizations from 49 states.
- Organizing Steering Committee of 36, chaired by Group Vice President, Federal Home Loan Bank of Atlanta, meeting monthly.
- Publishing and distributing first "Directory of Rural Community Developers," containing results from a comprehensive survey of 1,079 rural CDCs, plus lists and maps of survey respondents (available online at: www.ruralamerica.org).
- Commissioning and distributing 24 minute Appalshop produced, award winning Video, "Rural Communities Creating Opportunity," and companion Photo Exhibit showing how rural CDCs impact peoples' lives.
- Organizing *National Stand Up for Rural America Day*, involving Premiere of Video and Photo Exhibit, plus Issues Forum, attended by a total of 600 funders, lenders, policy makers and rural CDCs.
- Supporting *State Stand Up Days* in CA, CO, IA, MD, ME, MO, MS, NE, NM, NY, OR and TX.
- Assisting and participating in Rural Funders Working Group under Neighborhood Funders Group (recognized by the Council on Foundations as an affinity group).
- Providing regular updates on funding opportunities and policy issues to 1,350 member Rural Community Developers Network.
- Advocating for additional private investment and funding for the Rural Community Development Initiative (RCDI) in USDA.

Stand up for Rural America Campaign Outcomes:

- $6 million allocated to Rural Community Development Initiative in the FY2000 Agriculture Appropriations Bill to fund nonprofit capacity building.
- The first Rural Funders Working Group started in the Neighborhood Funders Group (recognized by the Council on Foundations as an affinity group).
- $10.3 billion in private investment initiatives for rural community development undertaken by Bank of America, Fannie Mae, Freddie Mac and LISC's National Equity Fund.
- A 1,350 member Rural Community Developers Network organized to serve and represent all rural community based developers.
- House leaders from both sides of the aisle reviving the Congressional Rural Caucus, with 125 Members recruited to date.

For further information about this Campaign, contact Grant Moser at: 1825 K Street, NW, Suite 1100, Washington, DC 20006; 202-739-9297; or email: gmoser@liscnet.org

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RAC MEETING IN WISCASSET, MAINE - AUGUST, 1999

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LISC RURAL

Rural Advisory Committee / Staff

Rural Advisory Committe (RAC)

Bob Warwick, Committe Chair

Name	Title	Organization
Laura V. Arce	Director of Community Development	National Council of La Raza (NCLR)
Lee Beaulac	Senior Vice President	Rural Opportunities, Inc. (ROI)
Howard Boutte	President	Sun Delta Capital Corporation
Caroline Carpenter	Program Director Food Systems & Rural Development	W.K. Kellogg Foundation
Dee Davis	Director	Appalshop, Inc.
Perry Eaton		
Manuel Estrada, Jr.	Executive Director	Neighborhood Housing Services of Dimmit County
Brian Fogle	Vice President, Community Investment	Bank of America
Carolyn Ford	Executive Director	North Florida Educational Development Corporation
Sharon Gerber	Vice President	Wells Fargo Bank
John Kastellic	Senior Vice President	KeyBank
Michael Levine, Esq.	General Counsel	Local Initiatives Support Corporation
Brenda McDaniel	Vice President	Kentucky Highlands Investment Corporation
John Mills	Community Development Officer	Fleet Bank
Joe Parker	President	Wachovia Mortgage
Roderick Petrey, Esq.		Holland & Knight
Ronald L. Phillips	President	Coastal Enterprises, Inc. (CEI)
Roy O. Priest	President and CEO	National Congress for Community Economic Development (NCCED)
Robby Russell	Vice President, CRA Lending Manager Community Reinvestment	First Union Corporation
Leonard Teller	Executive Director	Navajo Townsite CDC
Fred Wacker	Southeast Regional Director	Fannie Mae Foundation
Jim Wagele	Senior Vice President Corporate Community Development	Bank of America
Bob Warwick	Group Vice President & Director	Federal Home Loan Bank of Atlanta

LISC RURAL

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FIRST UNION	TCF NATIONAL BANK Minnesota
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FORD FOUNDATION	USDA United States Department of Agriculture



"...Through our grant to LISC, we're confident that community organizations will acquire the skills, resources and vision they need to expand and prosper."
-- William Richardson, President and Chief Executive Officer, W.K. Kellogg Foundation

"...Particularly in rural areas...an intermediary like LISC brings financial strength and technical expertise in both housing and economic development...to new or growing organizations. LISC can expedite the learning curve for a rural CDC and make funders feel comfortable that the groups are being supported by someone who knows the ropes."
-- Jane Henderson, Senior Vice President, Community Reinvestment, First Union Corporation

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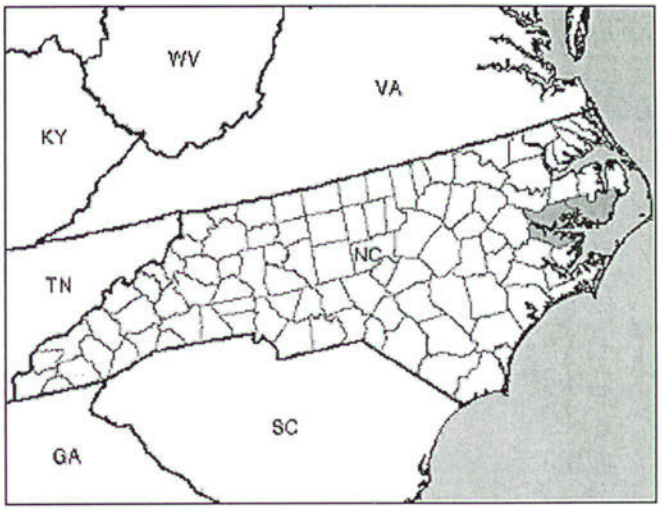
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Community Developers of Beaufort-Hyde, Inc.

CONTACT INFORMATION | OVERVIEW OF CDC | COMMUNITY DEVELOPMENT STRATEGIES

CONTACT INFORMATION

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Counties Served: Beaufort, Hyde
Congressional Representative / Began Service:
3rd District: Walter B. Jones (R) / 1995
Senators / Began Service:
Jesse Helms (R) / 1973
John Edwards (D) / 1999
Incorporation Date: 1986



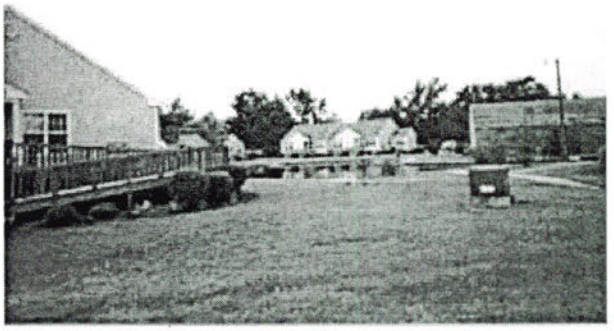
OVERVIEW OF CDC



The Community Developers of Beaufort-Hyde, Inc. (CDBH), located in Belhaven, was formed in 1986 to address the needs for affordable housing for low-income households, and senior housing linked with supportive services. CDBH, designated as a CHDO (Community Housing Development Organization), serves Hyde and Beaufort counties in eastern North Carolina. The CDC's mission is to provide elderly and disabled persons with the necessary housing and supportive services designed to meet their needs, facilitate homeownership for moderate and low-income residents by serving as a developer, loan application packager, and financier of interim and long-term loans along with lease/purchase arrangements. CDBH also facilitates the development of needed community services, such as child day care, by serving as a developer for other nonprofit corporations and packaging loan applications.

CDBH's target area has around 15,879 residents. Around 60 percent of the residents are white; 40 percent are black. In Belhaven, the largest town and CDC headquarters, 63 percent of the 2,300 residents are African-American. Poverty rates are 24 percent in Hyde County, 21 percent in Pantego and 23 percent in Richland Township. There are no major private employers other than TexasGulf, which operates a phosphate mine in Richland Township. The other closest major employers are located in Washington and Greenville, which are 50 to 125 miles away. There is no public transportation. Most of the jobs are seasonal in seafood processing or agriculture. During the winter, official unemployment often exceeds 20 percent.

Much of the housing stock is badly deteriorated, including most of the 22 percent of the units that are vacant. Between 20 to 30 percent of the housing units are single width mobile homes. There is little new housing construction. In Belhaven, CDBH has pulled over 84 percent of the housing permits since 1990.



Basic commercial facilities are few and far between. In Hyde County and Richland Township, there is only one small IGA supermarket and no national fast food franchise. Belhaven serves as the commercial center for Hyde County and Pantego; it has one small supermarket, three fast food restaurants, and a small hospital.

CDBH is one of 68 community development corporations (CDCs) competitively selected from across the nation to participate in the Rural LISC Initiative.

COMMUNITY DEVELOPMENT STRATEGIES

The major program focus of CDBH is the provision of affordable, high quality, for-sale and rental housing in its service area. CDBH has produced 120 multifamily and over 100 single-family units of low-income housing, 4,200 square feet of commercial space, and raised over $8 million in financing for affordable developments for low-income families.



Pungo Village (38 units) and Mattamuskeet Village (16 units) are designed to serve low-income elderly and disabled individuals and their families. Hyceinda Heights, a 24-unit development consisting of 12 duplexes was built to serve low-income families in Hyde County. This project has a community building that is slated to become a child day care center. Bridgewood Square is a complex of 16 single-family homes in Belhaven rented to low-income families. CDBH also created Hyde Housing I, a 16-unit scattered site rental development in rural Hyde County. CDBH self-manages Bridgewood Square and Hyde Housing developments.

CDBH recently completed construction on Wynne View, a mixed-use project that houses six commercial/retail spaces on the first floor and ten senior citizen rental units on the second and third floors, located in downtown Belhaven.

The CDC also operates a First Time Home Buyer Program in which 10-15 families are assisted with on-going homeownership counseling, access to down payment assistance, affordable housing construction, permanent financing, and aid in securing land and negotiating with contractors.

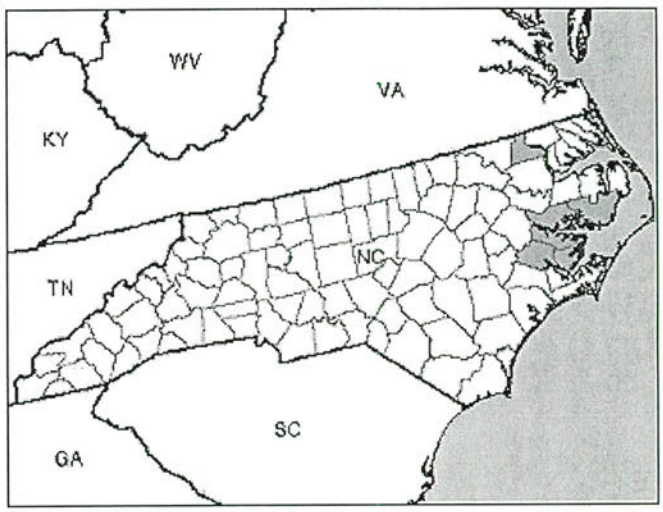
CDBH, in partnership with the Metropolitan Low-Income Housing and Community Development Corporation (MLIHCDC), is piloting an Individual Development Account (IDA) Program. The CDCs are matching support from state public agencies and foundations with the savings of local households for future homeownership and educational activities. The matching funds for the participants become available after they have completed the terms of the program.

Metropolitan Housing and Community Development Corporation, Inc.

CONTACT INFORMATION | OVERVIEW OF CDC | COMMUNITY DEVELOPMENT STRATEGIES

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County Served: Beaufort, Craven, Hertford Hyde, Pamlico
Congressional Representative / Began Service:
1st District: Eva M. Clayton (D) / 1992
3rd District: Walter B. Jones (R) / 1995
Senators / Began Service:
Jesse Helms (R) / 1973
John Edwards (D) / 1999
Incorporation Date: 1990



OVERVIEW OF CDC

Metropolitan Housing and Community Development Corporation (MHCDC), located in Washington, North Carolina, was formed in 1990. The CDC's mission is to improve the quality of life for low-income persons through a systematic and sustainable community development effort. The original organization members were community residents who sought to do something about the problem of substandard housing conditions in the area. MHCDC focuses on affordable for-sale, rental and special needs housing, economic development-credit union and health care. The CDC serves the town of Washington, (a.k.a. "The Original Washington") and the surrounding Beaufort County. MHCDC's general development corridor is two blocks away from downtown and within walking distance from schools, the hospital and medical facilities and social service agencies.

Little Washington is on the Pamlico River, roughly 25 miles from Greenville --the major urban center in the area-- where a large branch of the state university system and a major medical center are located. The primary employers are: National Spinning, Stanadyne, seasonal crab houses and agriculture, including cotton, hog, poultry and tobacco production. It is relatively close to Cypress landing, a major development being done by Weyerhaeuser real estate subsidiary.





About 47,000 persons live in Beaufort County, a county in Tidewater North Carolina with significant scenic waterfront coastline. The population grew 9.5 percent between 1980 and 1990. Thirty-one percent of the residents are African-American; the remainder are white. Some 37 percent of the black population live below the poverty line, as compared to 11 percent of white residents. The average household income from wages is $18,575 for blacks and $27,967 overall. Black per capita income is $6,495 compared with the overall per capita income of $19,772. The unemployment rate for blacks is 13 percent, versus six percent for the general population.

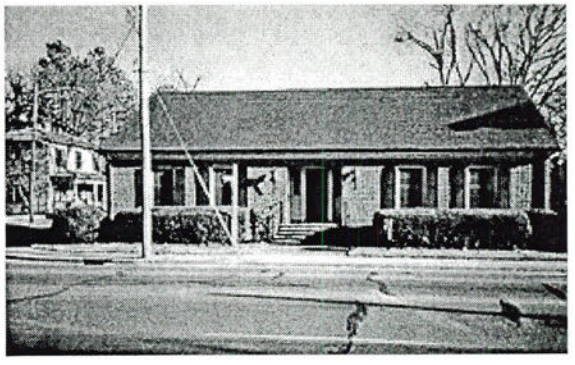
MHCDC is one of 68 community development corporations (CDCs) competitively selected from across the nation to participate in the Rural LISC Initiative.

COMMUNITY DEVELOPMENT STRATEGIES



Since its inception, MHCDC has completed a number of development projects that serve many underserved Washington-area residents. MHCDC produced over 50 units of new construction, low-income single-family housing and rehabilitated 57 units of ownership housing using state CDBG (Community Development Block Grant) and HOME funds. It recently completed Metro Arms, a 12-unit senior citizen multifamily complex, and Metro House, a nine-unit development for persons and families with HIV/AIDS. This development was funded through the HUD 811 program. The CDC also developed the first phase (four units) of its Hope Village, which provides special needs housing to individuals with emotional challenges. New Horizons, MHCDC's first Low Income Housing Tax Credit project, a 24-unit development, was completed in 1999. A third of the units in this project are set aside for victims of domestic violence. MHCDC also owns and manages eleven scattered site houses that it leases to low-income families. The CDC is the co-sponsor and developer of Wactor Gardens in Ahoskie, NC, an 11-unit HUD-funded senior citizen apartment complex. This development was also completed in 1999. The CDC is sponsoring a 24-unit apartment complex for the physically challenged with spinal cord injuries, brain damage and wheel-chair bound people. MHCDC

hopes to find funding for this project this year. The CDC is also in the predevelopment stage for a 70-unit subdivision for single-family homes. This planned development will be in the town of Grifton, North Carolina, which was severely damaged by Hurricane Floyd.



Economic development is another strong MHCDC focus. In February 1999, the CDC received its charter from the state of North Carolina to operate a credit union. The credit union received its CDFI (Community Development Financial Institution) designation in February 2000 and will serve the same target area as the CDC. It will initially provide consumer loans to the area and plans to offer down payment assistance support in the near future. The CDC also owns and operates a bowling alley that will be retrofitted to house the Agape Community Health Clinic. It plans to develop a multipurpose commercial facility that will contain office space, classrooms, and other amenities. In 1999, this nonprofit was awarded a $500,000 community development block grant. This grant will allow the purchase of a building to house the credit union and the Small Business Development Center, which is working to start 8 new businesses and create 24 new jobs.

Health care delivery also is an integral part of MHCDC's mission. The CDC recently opened Agape Community Health Clinic and now employs a full-time doctor, a physician's assistant, a mid-level nurse and a Hispanic medical outreach worker. MHCDC owns and manages the facilities at 328 North Market St., the Ryan White Title 4 Network and delivers support services to persons that are HIV positive or have AIDS.

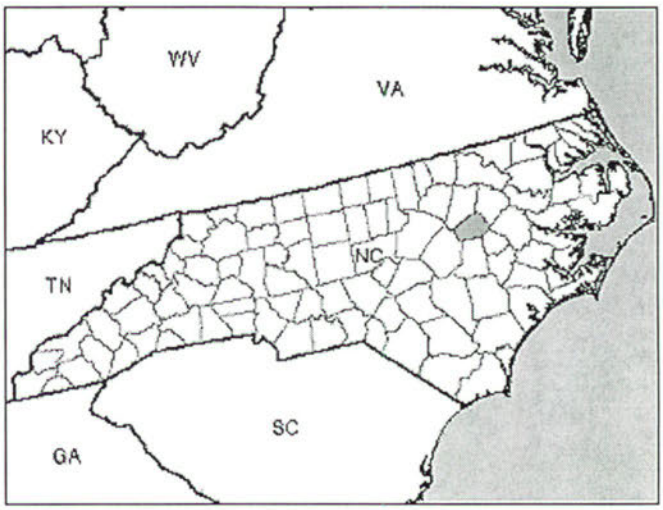
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Wilson Community Improvement Association

CONTACT INFORMATION | OVERVIEW OF CDC | COMMUNITY DEVELOPMENT STRATEGIES

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Congressional Representative / Began Service:
1st District: Eva Clayton (D) / 1992
2nd District: Bob Etheridge (D) / 1997
Senators / Began Service:
Jesse Helms (R) / 1973
John Edwards (D) / 1999
Incorporation Date: 1973



OVERVIEW OF CDC

Wilson Community Improvement Association (WCIA) was organized in 1968 as a nonprofit neighborhood organization with the expressed purpose of empowering grassroots African-Americans of Wilson, NC, to become self-sufficient through increased education, job training and economic development by forming partnerships throughout the community. Since its incorporation in 1973, WCIA has addressed such issues as health, job creation, housing, crime, education, and leadership development. The focus in the early days were on voter education and addressing community concerns such as unpaved streets, substandard housing, youth, and employment.

Wilson, NC is located in the eastern part of the state, about 45miles northeast of Raleigh, and is the county seat. More than 80 percent of the land area is undeveloped, though most tillable land is in use. Sustained flooding from recent hurricanes has devastated this region. The population served is predominantly African-American and living below the poverty level; the average area income is less than $15,000. Due to its poverty level Wilson has been designated a federal Empowerment Zone (EZ) and East Wilson is an Enterprise Community (EC). The unemployment rate for the County is 8.4 percent compared with 2.6 percent for the state. The East Wilson EC designation illustrates the problem of poverty and the need for resources. The population in the EC is 11,026; 17 percent of the population is over 25 years old and has less than a ninth grade education. Women head 57 percent of the households. The education drop out rate is 4.2 percent compared with the surrounding county's rate of 3.5 percent.

COMMUNITY DEVELOPMENT STRATEGIES



WCIA has partnered with more then twenty corporations, foundations, and state and federal institutions that have created 285 units of housing for senior citizens, low and moderate income persons, self-help projects, and job training programs. WCIA created over 300 jobs and has assisted approximately 100 at-risk teenagers through job training. The CDC's existing programs include affordable housing, housing and family counseling, comprehensive senior citizens programs and services, youth mentoring and life survival skills training, job creation, development training and retention, and community leadership training and development.



WCIA's current activities include the management of the Mercy Business Training and Development Center (MBTDC). MBTDC, previously known as Mercy Hospital, once housed the Wilson Hospital and Tubercular Home. Mercy Hospital was one of three health care facilities in eastern North Carolina available to African-Americans prior to desegregation in the 1960s. The two-story structure, once a hub of the East Wilson community and prior to WCIA's renovation efforts, was the largest and most dilapidated structure in its neighborhood. MBTDC houses the CDC's offices and has the capacity to serve ten small businesses.



WCIA developed two subdivisions Adventura East I and II, constructing over 98 units, with another 77 homes planned. This development also includes extensive counseling and pre-qualifications. The CDC also developed Beacon Pointe, a transitional and rental housing resource for East Wilson. This 104-unit apartment complex was acquired as a HUD foreclosed property. WCIA renovated the development and provided counseling and offered supportive services to the existing residents.

WCIA's first housing development is the 38-unit senior complex, Gee-Corbett Village. The development was constructed to provide affordable quality housing and ancillary services to its residents. Gee-Corbett Village is also home to the Wilson Senior Center, which offers arts and crafts, exercise, health and consumer related seminars and congregate meals.



WCIA developed two Neighborhood Resource Centers adjacent to the single-family subdivision and Beacon Pointe. In these 3,000 square foot Centers, the CDC is able to offer and provide workshops, training, special events, and other activities to bring the residents together and foster a climate of community.

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OFFICE OF LEGISLATIVE AFFAIRS
HOUSE LIAISON

112 East Wing
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Office fax: 456-2604

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DATE: 4.19.00

TO: Gigi Georges

FAX: 65334 PHONE: _____

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- ___ BRODERICK JOHNSON
- ___ LISA KOUNTOUPES
- ___ MARK MAGANA
- ✓ MARTY HOFFMANN
- ___ JOSH ACKIL
- ___ ERICA MORRIS
- ___ BRIAN MASON
- ___ TANEESHA JOHNSON

Comments: NC table + Map

FYI: Etheridge is in #2, Clayton is in #1

PAGE ONE OF 10

Table 1. Places

Place	County	Congressional district
Aberdeen town	Moore	2
Ahoskie town	Hertford	1
Alamance village	Alamance	6
Albemarle city	Stanly	8
Alexander Mills town	Rutherford	11
Alliance town	Pamlico	3
Altamahaw-Ossipee CDP	Alamance	12
Andrews town	Cherokee	11
Angier town	Harnett	2
Ansonville town	Anson	8
Apex town	Wake	4
Arapahoe town	Pamlico	3
Archdale city	Guilford	6
	Randolph	6
Arlington town	Yadkin	10
Asheboro city	Randolph	6
Asheville city	Buncombe	11
Askewville town	Bertie	1
Atkinson town	Pender	1
Atlantic Beach town	Carteret	3
Aulander town	Bertie	1
Aurora town	Beaufort	1
Autryville town	Sampson	3
Avery Creek CDP	Buncombe	11
Ayden town	Pitt	1,3
Badin CDP	Stanly	8
Bailey town	Nash	2
Bakersville town	Mitchell	10
Bald Head Island village	Brunswick	7
Balfour CDP	Henderson	11
Banner Elk town	Avery	10
Barker Heights CDP	Henderson	11
Barker Ten Mile CDP	Robeson	7
Bath town	Beaufort	3
Battleboro town	Edgecombe	1
	Nash	1
Bayboro town	Pamlico	3
Bayshore CDP	New Hanover	7
Beargrass town	Martin	3
Beaufort town	Carteret	3
Beech Mountain town	Avery	10
	Watauga	5
Belhaven town	Beaufort	3
Belmont city	Gaston	9,12
Belville town	Brunswick	7
Belwood town	Cleveland	9
Benson town	Johnston	2
Bent Creek CDP	Buncombe	11
Bessemer City city	Gaston	9
Bethel town	Pitt	1
Bethlehem CDP	Alexander	10
Beulaville town	Duplin	3
Biltmore Forest town	Buncombe	11
Biscoe town	Montgomery	8
Black Creek town	Wilson	2
Black Mountain town	Buncombe	11
Bladenboro town	Bladen	7
Blowing Rock town	Caldwell	10
	Watauga	5
Boger City CDP	Lincoln	10
Boiling Spring Lakes city	Brunswick	7
Boiling Springs town	Cleveland	9
Bolivia town	Brunswick	7
Bolton town	Columbus	1
Bonnie Doone CDP	Cumberland	7
Boone town	Watauga	5
Boonville town	Yadkin	10
Bostic town	Rutherford	11
Brevard city	Transylvania	11
Bridgeton town	Craven	3
Broadway town	Harnett	2
	Lee	2
Brogden CDP	Wayne	3
Brookford town	Catawba	10
Brunswick town	Columbus	1
Bryson City town	Swain	11
Bules Creek CDP	Harnett	2
Bunn town	Franklin	2
Burgaw town	Pender	3
Burlington city	Alamance	6,12
Burnsville town	Yancey	11
Butner CDP	Granville	2
Cajah's Mountain town	Caldwell	5,10
Calabash town	Brunswick	7
Calypso town	Duplin	3
Cameron town	Moore	2
Camp Lejeune Central CDP	Onslow	7
Candor town	Montgomery	8
Canton town	Haywood	11
Cape Carteret town	Carteret	3
Carolina Beach town	New Hanover	7
Carrboro town	Orange	4
Carthage town	Moore	8
Cary town	Wake	4
Casar town	Cleveland	9
Castalia town	Nash	2
Castle Hayne CDP	New Hanover	7
Caswell Beach town	Brunswick	7
Catawba town	Catawba	10
Cedar Point town	Carteret	3
Centerville town	Franklin	2
Cerro Gordo town	Columbus	7
Chadbourn town	Columbus	1,7
Chapel Hill town	Durham	2
	Orange	4
Charlotte city	Mecklenburg	9,12
Cherryville city	Gaston	9
China Grove town	Rowan	8
Chocowinity town	Beaufort	1
Claremont city	Catawba	10
Clarkton town	Bladen	1
Clayton town	Johnston	2
Clemmons village	Forsyth	10
Cleveland town	Rowan	8
Clinton city	Sampson	3
Clyde town	Haywood	11
Coats town	Harnett	2
Cofield village	Hertford	1
Colerain town	Bertie	1
Columbia town	Tyrrell	3
Columbus town	Polk	11
Como town	Hertford	1
Concord city	Cabarrus	8
Conetoe town	Edgecombe	2
Connelly Springs town	Burke	10
Conover city	Catawba	10
Conway town	Northampton	1
Cooleemee town	Davie	6
Cornelius town	Mecklenburg	8,9,12
Cove City town	Craven	1
Cramerton town	Gaston	9
Creedmoor city	Granville	2
Creswell town	Washington	1
Cricket CDP	Wilkes	10
Crossnore town	Avery	10
Cullowhee CDP	Jackson	11
Dallas town	Gaston	9
Danbury town	Stokes	5
Davidson town	Iredell	10
	Mecklenburg	8,9,12
Dellview town	Gaston	9
Denton town	Davidson	6
Dillsboro town	Jackson	11
Dobbins Heights town	Richmond	8
Dobson town	Surry	5
Dortches town	Nash	1,2
Dover town	Craven	1
Drexel town	Burke	5
Dublin town	Bladen	7
Dunn city	Harnett	2
Durham city	Durham	2,12
	Orange	4
Earl town	Cleveland	9
East Arcadia town	Bladen	1
East Bend town	Yadkin	10
East Flat Rock CDP	Henderson	11

Table 1. **Places**—Con.

Place	County	Congressional district
East Laurinburg town	Scotland	8
Eastover CDP	Cumberland	7
East Rockingham CDP	Richmond	8
East Spencer town	Rowan	12
Eden city	Rockingham	5
Edenton town	Chowan	1
Elizabeth City city	Camden	3
	Pasquotank	1,3
Elizabethtown town	Bladen	1
Elkin town	Surry	5
	Wilkes	10
Elk Park town	Avery	10
Ellenboro town	Rutherford	11
Ellerbe town	Richmond	8
Elm City town	Wilson	1,2
Elon College town	Alamance	6
Elroy CDP	Wayne	3
Emerald Isle town	Carteret	3
Enfield town	Halifax	1
Enochville CDP	Rowan	8
Erwin town	Harnett	2
Etowah CDP	Henderson	11
Eureka town	Wayne	3
Everetts town	Martin	3
Fair Bluff town	Columbus	7
Fairmont town	Robeson	7
Fairplains CDP	Wilkes	5,10
Fairview CDP	Buncombe	10
Faison town	Duplin	3
Faith town	Rowan	6
Falcon town	Cumberland	7
	Sampson	3
Falkland town	Pitt	1
Fallston town	Cleveland	9
Farmville town	Pitt	1
Fayetteville city	Cumberland	1,7
Fearrington CDP	Chatham	4
Flat Rock CDP	Surry	5
Fletcher town	Henderson	10
Forest City town	Rutherford	11
Forest Oaks CDP	Guilford	6
Fort Bragg CDP	Cumberland	7
Fountain town	Pitt	1
Four Oaks town	Johnston	2
Foxfire village	Moore	2
Franklin town	Macon	11
Franklinton town	Franklin	2
Franklinville town	Randolph	6
Fremont town	Wayne	3
Fuquay-Varina town	Wake	4
Gamewell town	Caldwell	5,10
Garland town	Sampson	3
Garner town	Wake	4
Garysburg town	Northampton	1
Gaston town	Northampton	1
Gastonia city	Gaston	9,12
Gatesville town	Gates	1
Gibson town	Scotland	8
Gibsonville town	Alamance	6
	Guilford	12
Glen Alpine town	Burke	5
Glen Raven CDP	Alamance	6,12
Godwin town	Cumberland	7
Goldsboro city	Wayne	3
Goldston town	Chatham	4
Gorman CDP	Durham	12
Graham city	Alamance	6,12
Grandfather village	Avery	10
Granite Falls town	Caldwell	10
Granite Quarry town	Rowan	6
Greenevers town	Duplin	1
Greensboro city	Guilford	6,12
Greenville city	Pitt	1,3
Grifton town	Lenoir	1
	Pitt	1
Grimesland town	Pitt	1
Grover town	Cleveland	9
Half Moon CDP	Onslow	3,7

Place	County	Congressional district
Halifax town	Halifax	1
Hamilton town	Martin	1
Hamlet city	Richmond	8
Harkers Island CDP	Carteret	3
Harmony town	Iredell	10
Harrells town	Duplin	1
	Sampson	3
Harrellsville town	Hertford	1
Harrisburg town	Cabarrus	8
Hassell town	Martin	1
Havelock city	Craven	1,3
Haw River town	Alamance	12
Hayesville town	Clay	11
Hays CDP	Wilkes	10
Hazelwood town	Haywood	11
Hemby Bridge CDP	Union	8
Henderson city	Vance	1,2
Hendersonville city	Henderson	11
Hertford town	Perquimans	1
Hickory city	Burke	10
	Catawba	10
Highlands town	Jackson	11
	Macon	11
High Point city	Davidson	6
	Forsyth	12
	Guilford	6,12
	Randolph	6
High Shoals city	Gaston	9
Hildebran town	Burke	10
Hillsborough town	Orange	4
Hobgood town	Halifax	1
Hoffman town	Richmond	8
Holden Beach town	Brunswick	7
Holly Ridge town	Onslow	7
Holly Springs town	Wake	4
Hookerton town	Greene	1
Hope Mills town	Cumberland	7
Hot Springs town	Madison	11
Hudson town	Caldwell	10
Huntersville town	Mecklenburg	9,12
Icard CDP	Burke	10
Indian Beach town	Carteret	3
Indian Trail town	Union	8
Jackson town	Northampton	1
Jacksonville city	Onslow	3,7
James City CDP	Craven	3
Jamestown town	Guilford	6,12
Jamesville town	Martin	3
Jefferson town	Ashe	5
Jonesville town	Yadkin	10
Kannapolis city	Cabarrus	8
	Rowan	8
Kelford town	Bertie	1
Kenansville town	Duplin	1
Kenly town	Johnston	2
	Wilson	2
Kernersville town	Forsyth	5
	Guilford	6
Kill Devil Hills town	Dare	3
King city	Forsyth	10
	Stokes	5
Kings Mountain city	Cleveland	9
	Gaston	9
Kingstown town	Cleveland	11
Kinston city	Lenoir	1,3
Kittrell town	Vance	2
Kitty Hawk town	Dare	3
Knightdale town	Wake	4
Kure Beach town	New Hanover	7
La Grange town	Lenoir	1
Lake Junaluska CDP	Haywood	11
Lake Lure town	Rutherford	10
Lake Waccamaw town	Columbus	7
Landis town	Rowan	8
Lansing town	Ashe	5
Lasker town	Northampton	1
Lattimore town	Cleveland	11
Laurel Park town	Henderson	11

Table 1. **Places**—Con.

Place	County	Congressional district
Laurinburg city	Scotland	8
Lawndale town	Cleveland	11
Leggett town	Edgecombe	1
Leland town	Brunswick	7
Lenoir city	Caldwell	5,10
Lewiston Woodville town	Bertie	1
Lewisville CDP	Forsyth	10
Lexington city	Davidson	6,12
Liberty town	Randolph	6
Light Oak CDP	Cleveland	11
Lilesville town	Anson	8
Lillington town	Harnett	2
Lincolnton city	Lincoln	10
Linden town	Cumberland	7
Littleton town	Halifax	1,2
Locust city	Stanly	8
Long Beach town	Brunswick	7
Long View town	Burke	10
	Catawba	10
Louisburg town	Franklin	2
Love Valley town	Iredell	10
Lowell city	Gaston	9,12
Lowesville CDP	Lincoln	10
Lucama town	Wilson	2
Lumber Bridge town	Robeson	8
Lumberton city	Robeson	7
McAdenville town	Gaston	9,12
Macclesfield town	Edgecombe	2
McDonald town	Robeson	7
McFarlan town	Anson	8
McLeansville CDP	Guilford	6
Macon town	Warren	1
Madison town	Rockingham	5
Maggie Valley town	Haywood	11
Magnolia town	Duplin	1
Maiden town	Catawba	10
	Lincoln	10
Manteo town	Dare	3
Marietta town	Robeson	7
Marion city	McDowell	11
Mar-Mac CDP	Wayne	3
Marshall town	Madison	11
Mars Hill town	Madison	11
Marshville town	Union	8
Masonboro CDP	New Hanover	7
Matthews town	Mecklenburg	9
Maxton town	Robeson	8
	Scotland	8
Mayodan town	Rockingham	5
Maysville town	Jones	3
Mebane city	Alamance	6
	Orange	4
Mesic town	Pamlico	3
Micro town	Johnston	2
Middleburg town	Vance	1
Middlesex town	Nash	2
Millers Creek CDP	Wilkes	10
Milton town	Caswell	5
Minnesott Beach town	Pamlico	3
Mint Hill town	Mecklenburg	9
Mocksville town	Davie	6
Monroe city	Union	8
Montreat town	Buncombe	11
Mooresboro city	Cleveland	11
Mooresville town	Iredell	8,10,12
Moravian Falls CDP	Wilkes	5
Morehead City town	Carteret	3
Morganton city	Burke	5
Morrisville town	Durham	2
	Wake	4
Morven town	Anson	8
Mountain Home CDP	Henderson	11
Mountain View CDP	Catawba	10
Mount Airy city	Surry	5
Mount Gilead town	Montgomery	8
Mount Holly city	Gaston	9
Mount Olive town	Duplin	3
	Wayne	3
Mount Pleasant town	Cabarrus	8
Mulberry CDP	Wilkes	10
Murfreesboro town	Hertford	1
Murphy town	Cherokee	11
Myrtle Grove CDP	New Hanover	7
Negs Head town	Dare	3
Nashville town	Nash	2
Navassa town	Brunswick	7
Neuse Forest CDP	Craven	3
New Bern city	Craven	1,3
New Hope CDP	Wake	4
New Hope CDP	Wayne	3
Newland town	Avery	10
New London town	Stanly	8
Newport town	Carteret	3
New River Station CDP	Onslow	3,7
Newton city	Catawba	10
Newton Grove town	Sampson	3
Norlina town	Warren	1
Norman town	Richmond	8
North Hickory CDP	Catawba	10
Northlakes CDP	Caldwell	10
North Wilkesboro town	Wilkes	5
Norwood town	Stanly	8
Oakboro town	Stanly	8
Oak City town	Martin	1
Ocean Isle Beach town	Brunswick	7
Ogden CDP	New Hanover	7
Old Fort town	McDowell	11
Oriental town	Pamlico	3
Orrum town	Robeson	7
Oxford city	Granville	2,5
Pantego town	Beaufort	3
Parkton town	Robeson	8
Parkwood CDP	Durham	2,12
Parmele town	Martin	1
Patterson Springs town	Cleveland	9
Peachland town	Anson	8
Pembroke town	Robeson	7
Pikeville town	Wayne	3
Pilot Mountain town	Surry	5
Pinebluff town	Moore	2
Pinehurst town	Moore	2
Pine Knoll Shores town	Carteret	3
Pine Level town	Johnston	2
Pinetops town	Edgecombe	2
Pineville town	Mecklenburg	9
Piney Green CDP	Onslow	3,7
Pink Hill town	Lenoir	3
Pittsboro town	Chatham	4
Pleasant Garden CDP	Guilford	6
Pleasant Hill CDP	Wilkes	10
Plymouth town	Washington	1
Polkton town	Anson	8
Polkville city	Cleveland	11
Pollocksville town	Jones	1
Pope AFB CDP	Cumberland	7,8
Poplar Tent CDP	Cabarrus	8
Powellsville town	Bertie	1
Princeton town	Johnston	2
Princeville town	Edgecombe	1,2
Proctorville town	Robeson	7
Pumpkin Center CDP	Onslow	7
Raeford city	Hoke	8
Raleigh city	Wake	4
Ramseur town	Randolph	6
Randleman city	Randolph	6
Ranlo town	Gaston	9
Raynham town	Robeson	7
Red Oak town	Nash	2
Red Springs town	Robeson	7,8
Reidsville city	Rockingham	5
Rennert town	Robeson	8
Rhodhiss town	Burke	10
	Caldwell	10
Richfield town	Stanly	8
Richlands town	Onslow	3
Rich Square town	Northampton	1

Table 1. **Places**—Con.

Place	County	Congressional district
River Bend town	Craven	3
River Road CDP	Beaufort	1,3
Roanoke Rapids city	Halifax	1,2
Robbins city	Moore	8
Robbinsville town	Graham	11
Robersonville town	Martin	1
Rockingham city	Richmond	8
Rockwell town	Rowan	6
Rocky Mount city	Edgecombe	1
	Nash	1,2
Rolesville town	Wake	4
Ronda town	Wilkes	10
Roper town	Washington	1
Roseboro town	Sampson	3
Rose Hill town	Duplin	3
Rosman town	Transylvania	11
Rowland town	Robeson	7
Roxboro city	Person	5
Roxobel town	Bertie	1
Royal Pines CDP	Buncombe	10
Rural Hall town	Forsyth	5
Ruth town	Rutherford	11
Rutherford College town	Burke	10
Rutherfordton town	Rutherford	10,11
St. Helena village	Pender	3
St. Pauls town	Robeson	8
St. Stephens CDP	Catawba	10
Salem CDP	Burke	5
Salemburg town	Sampson	3
Salisbury city	Rowan	6,8,12
Saluda city	Henderson	11
	Polk	11
Sandy Creek town	Brunswick	7
Sanford city	Lee	2
Santeetlah town	Graham	11
Saratoga town	Wilson	1
Sawmills town	Caldwell	10
Saxapahaw CDP	Alamance	6
Scotland Neck town	Halifax	1
Seaboard town	Northampton	1
Seagate CDP	New Hanover	7
Seagrove town	Randolph	6
Sedge Garden CDP	Forsyth	5,12
Selma town	Johnston	2
Seven Devils town	Avery	10
	Watauga	5
Seven Lakes CDP	Moore	2
Seven Springs town	Wayne	3
Severn town	Northampton	1
Shallotte town	Brunswick	7
Sharpsburg town	Edgecombe	2
	Nash	2
	Wilson	1
Shelby city	Cleveland	9,11
Sherrills Ford CDP	Catawba	10
Siler City town	Chatham	4
Silver City CDP	Hoke	8
Silver Lake CDP	New Hanover	7
Simpson village	Pitt	3
Sims town	Wilson	2
Smith Creek CDP	New Hanover	7
Smithfield town	Johnston	2
Sneads Ferry CDP	Onslow	7
Snow Hill town	Greene	1
Southern Pines town	Moore	2
Southern Shores town	Dare	3
South Gastonia CDP	Gaston	9
South Henderson CDP	Vance	2
Southport city	Brunswick	7
South Rosemary CDP	Halifax	1,2
South Weldon CDP	Halifax	1
Sparta town	Alleghany	5
Speed town	Edgecombe	1
Spencer town	Rowan	12
Spencer Mountain town	Gaston	9
Spindale town	Rutherford	11
Spring Hope town	Nash	2
Spring Lake town	Cumberland	7,8
Spruce Pine town	Mitchell	10
Staley town	Randolph	6
Stallings town	Union	8
Stanfield town	Stanly	8
Stanley town	Gaston	9
Stanleyville CDP	Forsyth	5
Stantonsburg town	Wilson	1
Star town	Montgomery	8
Statesville city	Iredell	10,12
Stedman town	Cumberland	7
Stem town	Granville	2
Stokesdale town	Guilford	5,6
Stoneville town	Rockingham	5
Stonewall town	Pamlico	3
Stony Point CDP	Alexander	10
	Iredell	10
Stovall town	Granville	5
Sugar Mountain village	Avery	10
Summerfield CDP	Guilford	6
Sunset Beach town	Brunswick	7
Surf City town	Onslow	7
	Pender	7
Swannanoa CDP	Buncombe	11
Swansboro town	Onslow	3
Swepsonville CDP	Alamance	6,12
Sylva town	Jackson	11
Tabor City town	Columbus	7
Tarboro town	Edgecombe	1,2
Tar Heel town	Bladen	7
Taylorsville town	Alexander	10
Taylortown town	Moore	2
Teachey town	Duplin	3
Thomasville city	Davidson	6,12
Toast CDP	Surry	5
Topsail Beach town	Pender	7
Trenton town	Jones	1
Trent Woods town	Craven	3
Trinity CDP	Randolph	6
Troutman town	Iredell	10,12
Troy town	Montgomery	8
Tryon town	Polk	11
Turkey town	Sampson	3
Valdese town	Burke	5,10
Valley Hill CDP	Henderson	11
Vanceboro town	Craven	3
Vandemere town	Pamlico	3
Vander CDP	Cumberland	7
Varnamtown town	Brunswick	7
Vass town	Moore	2
Waco town	Cleveland	9
Wade town	Cumberland	7
Wadesboro town	Anson	8
Wagram town	Scotland	8
Wake Forest town	Wake	4
Walkertown town	Forsyth	5
Wallace town	Duplin	1,3
	Pender	1
Walnut Cove town	Stokes	5
Walnut Creek village	Wayne	3
Walstonburg town	Greene	1
Wanchese CDP	Dare	3
Warrenton town	Warren	1
Warsaw town	Duplin	1
Washington city	Beaufort	1,3
Washington Park town	Beaufort	3
Watha town	Pender	3
Waxhaw town	Union	8
Waynesville town	Haywood	11
Weaverville town	Buncombe	11
Webster town	Jackson	11
Weddington town	Mecklenburg	9
	Union	8
Welcome CDP	Davidson	6
Weldon town	Halifax	1
Wendell town	Wake	4
West Canton CDP	Haywood	11
West Jefferson town	Ashe	5
West Marion CDP	McDowell	10,11

Table 1. **Places**—Con.

Place	County	Congressional district
Westport CDP	Lincoln	10
West Smithfield CDP	Johnston	2
Whispering Pines village	Moore	2
Whitakers town	Edgecombe	1
	Nash	1
White Lake town	Bladen	7
White Plains CDP	Surry	5
Whiteville city	Columbus	1,7
Wilkesboro town	Wilkes	5,10
Williamston town	Martin	1
Wilmington city	New Hanover	1,7
Wilson city	Wilson	1,2
Windemere CDP	New Hanover	7
Windsor town	Bertie	1
Winfall town	Perquimans	1
Wingate town	Union	8
Winston-Salem city	Forsyth	5,10,12
Winterville town	Pitt	3
Winton town	Hertford	1
Woodfin town	Buncombe	11
Woodland town	Northampton	1
Wrightsboro CDP	New Hanover	1,7
Wrightsville Beach town	New Hanover	7
Yadkinville town	Yadkin	10
Yanceyville town	Caswell	5
Yaupon Beach town	Brunswick	7
Youngsville town	Franklin	2
Zebulon town	Wake	4

Table 2. Counties

County	Congressional district
Alamance	6,12
Alexander	10
Alleghany	5
Anson	8
Ashe	5
Avery	10
Beaufort	1,3
Bertie	1
Bladen	1,7
Brunswick	7
Buncombe	10,11
Burke	5,10
Cabarrus	8
Caldwell	5,10
Camden	3
Carteret	3
Caswell	5
Catawba	10
Chatham	4
Cherokee	11
Chowan	1
Clay	11
Cleveland	9,11
Columbus	1,7
Craven	1,3
Cumberland	1,7,8
Currituck	3
Dare	3
Davidson	6,12
Davie	6,10
Duplin	1,3
Durham	2,12
Edgecombe	1,2
Forsyth	5,10,12
Franklin	2
Gaston	9,12
Gates	1
Graham	11
Granville	2,5
Greene	1
Guilford	5,6,12
Halifax	1,2
Harnett	2
Haywood	11
Henderson	10,11
Hertford	1
Hoke	8
Hyde	3
Iredell	8,10,12
Jackson	11
Johnston	2
Jones	1,3
Lee	2
Lenoir	1,3
Lincoln	10
McDowell	10,11
Macon	11
Madison	11
Martin	1,3
Mecklenburg	8,9,12
Mitchell	10
Montgomery	8
Moore	2,8
Nash	1,2
New Hanover	1,7
Northampton	1
Onslow	3,7
Orange	4,12
Pamlico	3
Pasquotank	1,3
Pender	1,3,7
Perquimans	1
Person	5
Pitt	1,3
Polk	10,11
Randolph	6
Richmond	8
Robeson	7,8
Rockingham	5
Rowan	6,8,12
Rutherford	10,11
Sampson	3
Scotland	8
Stanly	8
Stokes	5
Surry	5
Swain	11
Transylvania	11
Tyrrell	3
Union	8
Vance	1,2
Wake	2,4
Warren	1
Washington	1
Watauga	5
Wayne	1,3
Wilkes	5,10
Wilson	1,2
Yadkin	10
Yancey	11

Table 3. Districts and Counties

CONGRESSIONAL DISTRICT 1

Beaufort (pt.)
Bertie
Bladen (pt.)
Chowan
Columbus (pt.)
Craven (pt.)
Cumberland (pt.)
Duplin (pt.)
Edgecombe (pt.)
Gates
Greene
Halifax (pt.)
Hertford
Jones (pt.)
Lenoir (pt.)
Martin (pt.)
Nash (pt.)
New Hanover (pt.)
Northampton
Pasquotank (pt.)
Pender (pt.)
Perquimans
Pitt (pt.)
Vance (pt.)
Warren
Washington
Wayne (pt.)
Wilson (pt.)

CONGRESSIONAL DISTRICT 2

Durham (pt.)
Edgecombe (pt.)
Franklin
Granville (pt.)
Halifax (pt.)
Harnett
Johnston
Lee
Moore (pt.)
Nash (pt.)
Vance (pt.)
Wake (pt.)
Wilson (pt.)

CONGRESSIONAL DISTRICT 3

Beaufort (pt.)
Camden
Carteret
Craven (pt.)
Currituck
Dare
Duplin (pt.)
Hyde
Jones (pt.)
Lenoir (pt.)
Martin (pt.)
Onslow (pt.)
Pamlico
Pasquotank (pt.)
Pender (pt.)
Pitt (pt.)
Sampson
Tyrrell
Wayne (pt.)

CONGRESSIONAL DISTRICT 4

Chatham
Orange (pt.)
Wake (pt.)

CONGRESSIONAL DISTRICT 5

Alleghany
Ashe
Burke (pt.)
Caldwell (pt.)
Caswell
Forsyth (pt.)

CONGRESSIONAL DISTRICT 5—Con.

Granville (pt.)
Guilford (pt.)
Person
Rockingham
Stokes
Surry
Watauga
Wilkes (pt.)

CONGRESSIONAL DISTRICT 6

Alamance (pt.)
Davidson (pt.)
Davie (pt.)
Guilford (pt.)
Randolph
Rowan (pt.)

CONGRESSIONAL DISTRICT 7

Bladen (pt.)
Brunswick
Columbus (pt.)
Cumberland (pt.)
New Hanover (pt.)
Onslow (pt.)
Pender (pt.)
Robeson (pt.)

CONGRESSIONAL DISTRICT 8

Anson
Cabarrus
Cumberland (pt.)
Hoke
Iredell (pt.)
Mecklenburg (pt.)
Montgomery
Moore (pt.)
Richmond
Robeson (pt.)
Rowan (pt.)
Scotland
Stanly
Union

CONGRESSIONAL DISTRICT 9

Cleveland (pt.)
Gaston (pt.)
Mecklenburg (pt.)

CONGRESSIONAL DISTRICT 10

Alexander
Avery
Buncombe (pt.)
Burke (pt.)
Caldwell (pt.)
Catawba
Davie (pt.)
Forsyth (pt.)
Henderson (pt.)
Iredell (pt.)
Lincoln
McDowell (pt.)
Mitchell
Polk (pt.)
Rutherford (pt.)
Wilkes (pt.)
Yadkin

CONGRESSIONAL DISTRICT 11

Buncombe (pt.)
Cherokee
Clay
Cleveland (pt.)
Graham
Haywood
Henderson (pt.)
Jackson

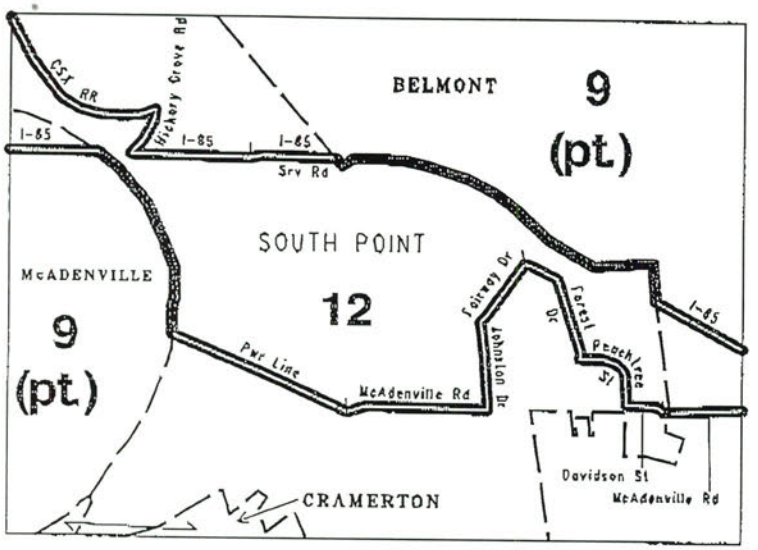
NORTH CAROLINA

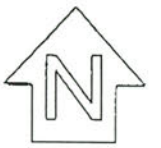
Table 3. **Districts and Counties**—Con.

CONGRESSIONAL DISTRICT 11—Con.	CONGRESSIONAL DISTRICT 12
McDowell (pt.)	Alamance (pt.)
Macon	Davidson (pt.)
Madison	Durham (pt.)
Polk (pt.)	Forsyth (pt.)
Rutherford (pt.)	Gaston (pt.)
Swain	Guilford (pt.)
Transylvania	Iredell (pt.)
Yancey	Mecklenburg (pt.)
	Orange (pt.)
	Rowan (pt.)

Congressional Districts - Insets

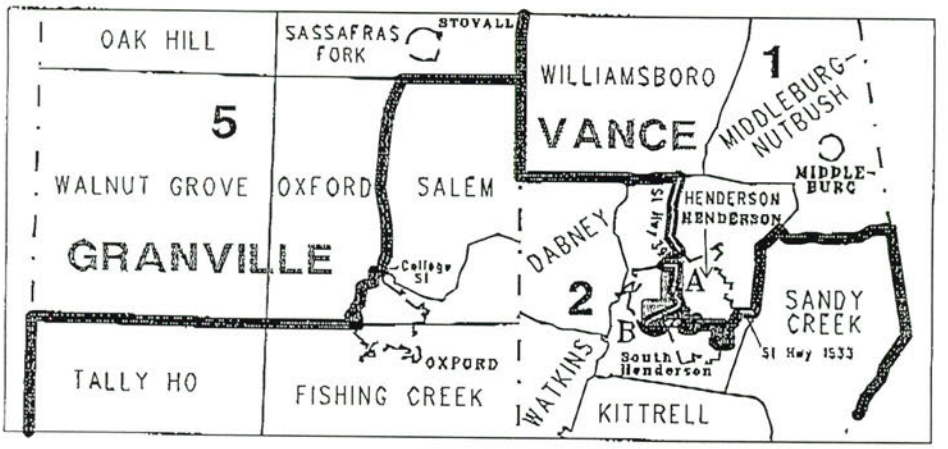
GASTON COUNTY - INSET H



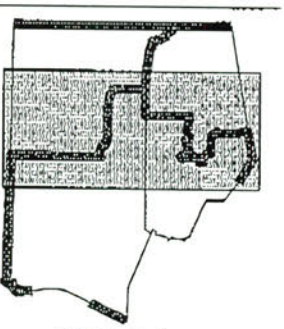


SCALE
0 1000 Meters
0 1000 2000 3000 Feet

GRANVILLE AND VANCE COUNTIES (PART)

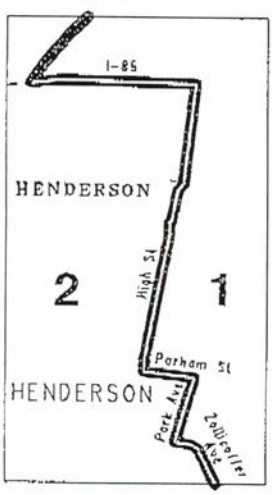






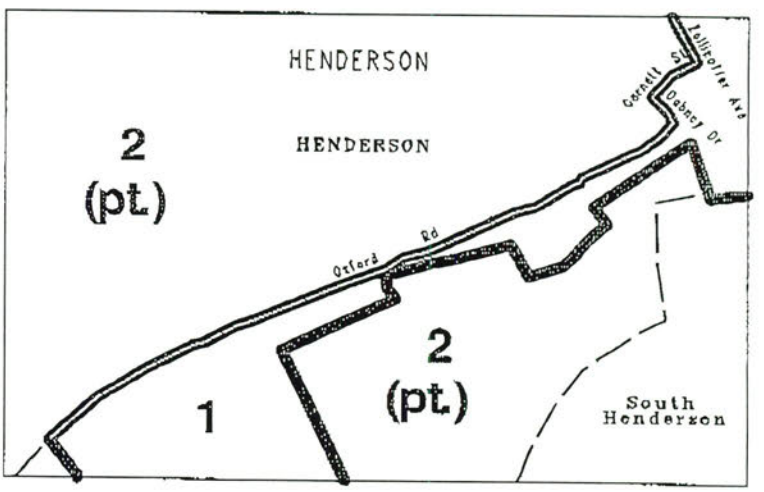
SCALE
0 1 2 3 4 5 6 7 8 9 10 Kilometers
0 1 2 3 4 5 6 7 8 9 10 Miles

INSET A



SCALE
1000 Meters
1000 2000 3000 4000 5000 Feet

INSET B



SCALE
0 1000 Meters
0 1000 2000 3000 Feet