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Subgroup/Office of Origin: National Economic Council
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OA/ID Number: 20240
FolderID:

Folder Title:
Digital Divide North Carolina Book April 26, 2000 [binder] [3]

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Wednesday, April 26, 2000

SCHEDULE OF THE PRESIDENT
FOR
WEDNESDAY, APRIL 26, 2000

Draft Schedule

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WASHINGTON, D.C.

WILMINGTON, NORTH CAROLINA

LITTLE ROCK, ARKANSAS

April 24, 2000 (11:22 AM)

Wednesday, April 26, 2000

**SCHEDULE OF THE PRESIDENT
FOR
WEDNESDAY, APRIL 26, 2000
Draft Schedule**

9:00	am-	MEETING
9:15	am	MAP ROOM OR OVAL OFFICE Staff Contact: John Podesta
9:15	am-	BRIEFING
9:35	am	MAP ROOM OR OVAL OFFICE Staff Contact: Joe Lockhart, Charles Brain
9:35	am-	PRESCRIPTION DRUGS DEPARTURE STATEMENT
9:55	am	LOCATION TBD Remarks: Staff Contact: Joe Lockhart, Charles Brain Event Coordinator: Laura Schwartz PRESS TBD

• general aviation
• Sheriffs Bldg
• Customs Bldg
- where greet will be held

757-8528
David Nesten
is point of
contact.

Note: There will be approximately tbd guests in attendance.

- Off-stage announcement of **the President**, accompanied by Senator Thomas Daschle and Representative Richard Gephardt.
- Senator Thomas Daschle or Representative Richard Gephardt makes brief remarks and introduces Senator Thomas Daschle or Representative Richard Gephardt.
- Senator Thomas Daschle or Representative Richard Gephardt makes brief remarks and introduces **the President**.
- **The President** makes remarks and departs.

10:00	am	THE PRESIDENT departs The White House via Marine One (T) en route Andrews Air Force Base [flight time: 10 minutes] (T)
10:10	am (T)	THE PRESIDENT arrives Andrews Air Force Base
10:25	am	THE PRESIDENT departs Andrews Air Force Base via Air Force One en route Wilmington International Airport, Wilmington, North Carolina [flight time: 1 hour, 5 minutes]

April 24, 2000 (11:22 AM)

Wednesday, April 26, 2000

11:30 am THE PRESIDENT arrives Wilmington International Airport

11:45 am THE PRESIDENT departs Wilmington International Airport via Marine One en route Columbus County Airport Landing Zone, Whiteville, North Carolina
[flight time: 35 minutes]

12:20 pm THE PRESIDENT arrives Columbus County Airport Landing Zone

12:30 pm THE PRESIDENT departs Columbus County Airport Landing Zone via motorcade en route Remote Data Services
[drive time: 10 minutes]

Will have
greet at
L2

Laura DiPaese POC
757-8529

12:40 pm THE PRESIDENT arrives Remote Data Services

12:45 pm-
1:00 pm

DEMONSTRATION

WAREHOUSE 1
Remote Data Services

Staff Contact: Gene Sperling

Event Coordinator: Stephen Lamb

POOL PRESS

• RDS • QUALCOMM
• Jacobs
• Bowles
• Hunt
• POTUS

Note: There will be approximately tbd guests in attendance.

1:05 pm-
2:00 pm

DIGITAL DIVIDE ROUNDTABLE

WAREHOUSE 2
Remote Data Services

Remarks:

Staff Contact: Gene Sperling

Event Coordinator: Stephen Lamb

PRINT REPORTER ONLY

Kate Howard
202-757-8605

Remote Data Sys
~~Main~~ Assembly area

163
Brunswick
Electric
Rel

910-
640-
3349

Note: There will be approximately 20-30 guests in attendance.

-- Erskine Bowles makes brief welcoming remarks.

-- The President makes remarks.

-- Governor James Hunt makes brief remarks.

-- Erskine Bowles opens and moderates discussion.

-- Upon conclusion of discussion, the President departs.

Bill Applewhite

April 24, 2000 (11:22 AM)

Roundtable participants
should arrive
@ RDS @
12 noon

Wednesday, April 26, 2000

2:05 pm

THE PRESIDENT departs Remote Data Services via motorcade en route
Whiteville Train Depot
[drive time: 15 minutes]

2:20 pm

THE PRESIDENT arrives Whiteville Train Depot

2:30 pm-

SPEECH

3:30 pm

WHITEVILLE TRAIN DEPOT

Remarks:

Staff Contact: Gene Sperling

Event Coordinator: Stephen Lamb

OPEN PRESS

Note: There will be approximately 1,000 guests in attendance.

3:35 pm

THE PRESIDENT departs Whiteville Train Depot via motorcade en route Columbus County Airport Landing Zone
[drive time: 15 minutes]

3:50 pm

THE PRESIDENT arrives Columbus County Airport Landing Zone

4:00 pm

THE PRESIDENT departs Columbus County Airport Landing Zone via
Marine One en route Wilmington International Airport
[flight time: 35 minutes]

4:35 pm

THE PRESIDENT arrives Wilmington International Airport

4:50 pm
(EDT)

THE PRESIDENT departs Wilmington International Airport via Air Force One en route Adams Field, Little Rock, Arkansas
[flight time: 2 hours, 5 minutes]
[time change: -1 hour]

5:55 pm
(CDT)

THE PRESIDENT arrives Adams Field

6:10 pm

THE PRESIDENT departs Adams Field via motorcade en route Private Residence
[drive time: tbd minutes]

6:25 pm

THE PRESIDENT arrives Private Residence

DOWN FOR THE EVENING

April 24, 2000 (11:22 AM)

Wednesday, April 26, 2000

BC RON

PRIVATE RESIDENCE
LITTLE ROCK, ARKANSAS

HRC RON

TBD

April 24, 2000 (11:22 AM)

**THE PRESIDENT'S NEW MARKETS TRIP:
FROM DIGITAL DIVIDE TO DIGITAL OPPORTUNITY**

Expanding High-Speed Internet Access in Rural America

DRAFT April 26, 2000

TODAY, PRESIDENT CLINTON WILL CONTINUE HIS DIGITAL DIVIDE NEW MARKETS TRIP WITH A VISIT TO WHITEVILLE, NORTH CAROLINA TO HIGHLIGHT THE IMPORTANCE OF BROADBAND INTERNET ACCESS TO RURAL COMMUNITIES. President Clinton will spend today in Whiteville, NC, where he will highlight the importance of high-speed (broadband) Internet access to rural economic prosperity. In order to fully participate in the emerging digital economy, rural communities like Whiteville need access to the infrastructure of the 21st century -- advanced telecommunications services.

The President will begin his trip with a visit to Remote Data Systems, an environmental monitoring firm, where he will host a roundtable discussion with CEOs from leading technology and communication companies, North Carolina small business owners, Members of Congress, North Carolina Governor Jim Hunt, and former SBA Administrator and White House Chief of Staff Erskine Bowles. President Clinton will then speak to the people of Whiteville about expanding "digital opportunity" to rural communities.

PRESIDENT CLINTON WILL FOCUS ATTENTION ON DIGITAL OPPORTUNITY FOR RURAL AMERICA

The President recently issued a National Call to Action with the goals of 1) Providing 21st century learning tools for every child in every school, and 2) Creating digital opportunity for every American family and community. Last week he visited East Palo Alto, CA, Shiprock, NM and spoke at the COMDEX/Spring conference in Chicago, to highlight the importance of these goals in underserved areas. His visit to Whiteville, NC will focus on the challenges faced by rural America in the Information Age.

Despite the rapid expansion of the digital economy, rural America still faces significant barriers to fully utilizing information technology as a tool for economic development and life-long learning. Many rural areas lack access to advanced telecommunications services at affordable rates:

- **Lack of High-Speed Service.** Regional Bell Operating Companies deploy DSL (high-speed Internet access using copper phone lines) primarily in urban areas. 56 percent of cities over 100,000 had DSL service available compared to less than 5 percent of towns with populations of less than 10,000 (Department of Commerce, Advanced Telecommunications in Rural America, April 2000).

In February 2000, the North Carolina Rural Prosperity Task Force, created by Governor Jim Hunt and Chaired by Erskine Bowles, identified broadband Internet access and IT skills as engines of economic growth in rural North Carolina. Whiteville, NC, which is located in Columbus County, vividly illustrates the challenges identified in the Report:

- **High Unemployment.** Columbus County has an unemployment rate of 12.1 percent – one of the highest in the state (Employment Security Commission, State of North Carolina, February 2000).
- **High Costs of Internet Service.** The advanced telecommunications service used by business for high-speed Internet access costs \$21000 per year in Columbus County, compared to \$3000 per year in urban areas like Raleigh, NC – a sevenfold difference in annual costs (Rural Prosperity Task Force Report, February 2000).

PRESIDENT CLINTON WILL ANNOUNCE KEY PUBLIC AND PRIVATE SECTOR INITIATIVES TO BRING DIGITAL OPPORTUNITY TO RURAL AMERICA:

- For the First Time, the Rural Utilities Service (RUS) Will Expand Its \$670 Million Telecommunications Loan Program To Companies that Provide High-Speed Internet Access to Rural America
- QUALCOMM Will Announce a \$1 Million Investment in High-Speed Internet in Whiteville, NC and 7 Additional Rural Communities, Working with Other Telecommunications Carriers
- MCI/WorldCom Will Announce a \$2 Million Multi-Year Commitment to Rural America for Wireless Broadband Access
- The National Science Foundation Will Announce a \$10 Million Commitment in R&D for Next Generation Broadband Technologies in Rural America
- Red Hat Will Pledge \$225,000 to Provide Software and Training to 100 Small Businesses in Rural North Carolina
- T&T will Pledge \$1.2 Million to Develop IT Curricula in North Carolina Universities
- The Department of Commerce and The Department of Agriculture Will Release a New Report on the Challenges of Broadband Access in Rural America

A COMPLETE LIST OF CLINTON-GORE AND PRIVATE SECTOR INITIATIVES TO BRING DIGITAL OPPORTUNITY TO RURAL AMERICA

- For the First Time, the Rural Utilities Service (RUS) Will Expand Its \$670 Million Telecommunications Loan Program To Companies that Provide High-Speed Internet Access to Rural America. Currently, the RUS can only lend to companies providing basic phone service in rural America. Today, for the first time, the RUS will propose policy changes that will expand its \$670 million loan program to companies that are providing high-speed Internet access in rural America. The RUS will be able to accomplish this through a change in its regulations.
- QUALCOMM Will Announce a \$1 Million Investment in High-Speed Internet in Whiteville, NC and 7 Additional Rural Communities, Working with Other Telecommunications Carriers. QUALCOMM Inc., will invest \$1 million in efforts to provide rural and underserved areas with access to the Internet, using wireless technology called High Data Rate (HDR). HDR provides economical high-speed Internet access over the existing wireless phone network and can work in existing cellular and digital networks. Working with other telecommunications carriers, QUALCOMM will deploy its new HDR wireless broadband Internet technology in Whiteville, NC and at least seven other rural and underserved communities. Each of these deployments will serve a minimum of 10 square miles and provide broadband wireless access for a minimum of 100 PCs.
- MCI/WorldCom Will Announce a \$2 Million Multi-Year Commitment to Rural America. MCI/WorldCom will announce a \$2 million investment to expand wireless high-speed Internet access in Raleigh, NC and three rural communities; Hattiesburg, MS; Houma, LA; and Dothan, AL -- and to provide free access for five-to-seven schools, libraries and community technology centers in each trial area.
- The National Science Foundation Will Announce a \$10 Million Commitment for Research in Next Generation Broadband Technologies for Rural America. The National Science Foundation (NSF) will increase its FY2001 research investment in broadband technologies by \$10 million, with particular focus on the needs of rural America. Since NSF supports university-based research, this initiative will also increase the supply of undergraduate and graduate students in technical fields with insights into the challenges of providing broadband telecommunications to rural areas.
- Red Hat Will Pledge to Provide Software and Training to 100 Small Businesses in Rural North Carolina. Software provider Red Hat will donate 500 copies of Red Hat Linux to rural North Carolina small businesses and non-profit organizations. In addition, Red Hat will provide training and certification as Red Hat Certified Engineers to employees of 100 rural small businesses.
- AT&T Will Pledge \$1.2 Million to the Education Alliance. AT&T will announce a \$1.2 million multi-year investment to develop information technology and network management training for higher education students at North Carolina State University, North Carolina AT&T University, Ohio State University, Miami University of Ohio, and Steven's Institute of Technology.
- The Department of Commerce and The Department of Agriculture Will Release a New Report on the Challenges of Broadband Access in Rural America. The Department of Commerce (National Telecommunications and Information Administration) and the Department of Agriculture (Rural Utilities Service) will release their latest report, "*Advanced Telecommunications in Rural America*," which analyzes the current state of deployment of broadband services in rural areas, and the strengths and weaknesses of different broadband technologies. The report also recommends steps that could accelerate the deployment of advanced services to rural communities. This report was requested by Senators Daschle, Harkin, Johnson, Wyden, Conrad, Kerrey, Wellstone, Murray, Baucus, and Dorgan.
- Technology For All Will Pledge Broadband Access to 100 HUD Neighborhood Network Centers. Technology For All (TFA), a national non-profit technology organization, will provide broadband Internet access for 100 computer learning centers affiliated with the Department of Housing and Urban Development (HUD). TFA will connect up to 25 HUD Neighborhood Network located in rural communities.
- The New Market Equity Fund Will Launch with \$4 Million in Commitments. The New Market Equity Fund (NMEF) will announce its official launch with \$4 million in total capital. NMEF will announce a \$2 million capital commitment from the Pequot Indian Tribe and a \$2 million capital commitment from AT&T. In addition, AT&T has committed to serve on the NMEF advisory board and provide \$30 million in investment referrals of technology projects. Working with AT&T and other strategic partners, NMEF has committed to making its first investment in ATLATL Enterprises, a Native-American owned technology industry firm located in rural North Carolina.

April 24, 2000

DEMONSTRATION AT REMOTE DATA SYSTEMS IN WHITEVILLE, NC

Date: April 26, 2000
Time: 12:55-1:10 pm
Location: Warehouse
Remote Data Systems
163 Brunswick Electric Road
Whiteville, NC
From: Gene Sperling

I. PURPOSE

The purpose of this event is to highlight ways that access to broadband can help companies in rural areas grow and gain entry to new markets – by, for example, being able to sell products online, having the capacity to expand their services to clients, and providing distance learning opportunities for their employees.

You will see a demonstration of how a computer with high-speed Internet access can download information and images at much faster rates. You will view two computer screens placed side-by-side, one with narrowband capacity (Internet access through a regular phone line) and the other with broadband capacity (high speed Internet access). Each computer will begin downloading the same image. You will see that the image on the computer with broadband access will appear almost instantly, while the narrowband computer image will take several minutes to download.

QUALCOMM will provide the broadband network for this demonstration and QUALCOMM CEO Dr. Irwin Jacobs will conduct the presentation. QUALCOMM has also made a commitment to provide free high-speed Internet access for schools, libraries, and community technology centers in 8 rural communities. You will make this announcement in your remarks later in the day.

You will also have an opportunity to view the environmental monitoring instruments that are manufactured by Remote Data Systems. These instruments are primarily used to determine whether or not a given land is a "wetland" or not.

II. BACKGROUND

Remote Data Systems (RDS) is a small 11-person company located in Whiteville, in Columbus County, North Carolina. RDS produces equipment used for environmental monitoring. The company's President is Ben Frink and its Chief of Operations and Treasurer is Bill Applewhite. Both Frink and Applewhite are natives of North Carolina and started RDS in 1993. The company currently has sales of just over \$1 million.

At this time, RDS only has a narrowband connection to the Internet because broadband is too expensive. The current cost per month for broadband Internet access in Columbus County is \$1750, in contrast to urban areas in North Carolina such as Raleigh, where monthly costs are as low as \$250 – a \$15,000 difference per year. If RDS had a broadband connection, it would be able to expand its business by analyzing the data that is collected using its instruments. In addition, its engineers would be able to take web-based courses over the Internet as opposed to driving 2 hours to North Carolina State.

You should know that RDS has a patent dispute with the Department of Energy, but its President will not raise this issue during your visit.

You will be joined at the demonstration by Governor Jim Hunt, Erskine Bowles, Congressman Mike McIntyre, Ben Frink, and Dr. Irwin Jacobs, CEO of QUALCOMM.

III. PARTICIPANTS

YOU

Erskine Bowles

Ben Frink, President, Remote Data Systems, Inc.

Governor Jim Hunt

Dr. Irwin Jacobs, CEO, QUALCOMM

US Representative Mike McIntyre (D-NC)

IV. SEQUENCE OF EVENTS

- YOU will arrive at Remote Data Systems.
- YOU will view the demonstration accompanied by Ben Frink, Governor Hunt, Erskine Bowles, Representative McIntyre, and Dr. Irwin Jacobs.
- YOU will proceed into the Remote Data Systems assembly room for the roundtable, where the remaining participants will already be seated.

V. PRESS

This event is POOL PRESS.

VI. ATTACHMENTS

None.

April 24, 2000

**REMARKS TO WHITEVILLE COMMUNITY AT
THE WHITEVILLE TRAIN DEPOT**

Date: April 26, 2000
Time: 2:40-3:40 pm
Location: Whiteville Train Depot
Whiteville, NC
From: Gene Sperling

I. PURPOSE

The combination of the day's events in North Carolina allows you to hold a substantive discussion on broadband issues and deliver a broader speech to the community of Whiteville. After seeing the demonstration and holding a roundtable at Remote Data Systems, you will have an opportunity to speak directly to 1,000 to 2,000 Whiteville residents in front of the Whiteville Train Depot.

Your speech will focus on the importance of bringing "digital opportunity" to rural America -- with an emphasis on the need to provide rural communities with access to affordable, high-speed Internet access. You will highlight the goals you outlined in the National Call to Action:

- 21st Century learning skills for every child in every school; and
- Creating digital opportunity for every American family and community.

In addition, you will emphasize how important these goals are for economic prosperity and educational opportunity for rural areas like Whiteville, NC.

You will also announce significant public and private sector commitments designed expand access to broadband Internet services in rural areas.

II. BACKGROUND

This event will emphasize your commitment to ensuring that rural communities like Whiteville are full participants in the digital economy. There is a pervasive sense among rural communities that they may be the last to benefit from new information and communications technologies, even though overcoming the "tyranny of distance" is particularly important in rural areas.

Whiteville is a rural town with a population of 5,000. It is located in Columbus County, which has a current unemployment rate of over 12 percent. Rural communities like Whiteville are lagging behind in their ability to take advantage of the educational and economic opportunities that come with greater access to information technology. The advanced telecommunications service used by business for high-speed Internet access costs \$1750 per month in Columbus County, compared to \$250 per month in urban areas such as Raleigh.

The Whiteville Train Depot, which will serve as the backdrop for your speech, was built in the 1870s. The Depot has been vacant since 1968. It is located in the downtown section of Whiteville, an area that has struggled since the early 1980s with the growth of big box retail and strip malls on the outskirts of the community. Within the next three years, the Depot will undergo a major renovation and conversion into a community recreation center. This effort is a collaboration of Federal (Department of Transportation), state and local entities, in cooperation with the Whiteville business community.

This event will allow you to highlight the Administration's FY2001 proposals to help close the digital divide for rural America, and to make the following announcements of public and private sector commitments:

- For the First Time, the Rural Utilities Service (RUS) Will Expand Its \$670 Million Telecommunications Loan Program To Companies that Provide High-Speed Internet Access to Rural America. Currently, the RUS can only lend to companies providing basic phone service in rural America. Under the new policy, the RUS will be able to expand its \$670 million loan program to companies that are providing high-speed Internet access in rural America. The RUS will be able to accomplish this through a change in its regulations.
- A \$1 Million Investment by QUALCOMM, Inc. in Internet Access Technology for Rural America. QUALCOMM will invest in efforts to provide rural and underserved areas with access to the Internet, using wireless technology called High Data Rate (HDR). Working with telecommunications carriers, QUALCOMM will deploy its new broadband wireless technology in at least eight rural and underserved communities, and will work with other telecommunications companies to make Whiteville a test site for this technology. Each of these deployments will serve a minimum of 10 square miles and provide broadband wireless access for a minimum of 100 PCs.

- A \$10 Million National Science Foundation Commitment for Next Generation Broadband Technologies for Rural America. The National Science Foundation (NSF) will increase its FY2001 research investment in broadband technologies by \$10 million, with particular focus on the needs of rural America. Since NSF supports university-based research, this initiative will also increase the supply of undergraduate and graduate students in technical fields with insights into the challenges of providing broadband telecommunications to rural areas.
- A \$2 Million Multi-Year MCI/WorldCom Commitment to Rural America. MCI/WorldCom will provide a \$2 million investment in increasing wireless high-speed Internet access in Raleigh, NC and three rural communities; Hattiesburg, MS; Houma, LA; and Dothan, AL.
- A Commitment by Red Hat to Provide Software and Training to North Carolina Communities. Software provider Red Hat will donate 500 copies of its Linux web server software to organizations in rural North Carolina. In addition, Red Hat will provide free training and certification to the employees of 100 rural small businesses.
- A \$1.2 Million AT&T Pledge to the Education Alliance. AT&T will announce a \$1.2 million multi-year investment to develop information technology curricula and provide training in network management technology for higher education students with North Carolina State University, North Carolina AT&T University, Ohio State University, Miami University of Ohio, and Steven's Institute of Technology.
- Release of the Department of Commerce's National Telecommunications and Information Administration (NTIA) Report on the Challenges of Broadband Access in Rural America. The NTIA will release its latest report, "*Advanced Telecommunications in Rural America*," which addresses the barriers to accessing information technology in remote communities. The report also outlines recommendations for supporting advanced services to rural areas to ensure that they have greater access to telecommunications and information services.

III. PARTICIPANTS

YOU

Erskine Bowles

Craig Turner, Corporate Secretary of the Board of Directors, Remote Data Systems, Inc.

Governor Jim Hunt

FCC Chairman William Kennard

US Representative Mike McIntyre (D-NC)

Whiteville Mayor Ann Jones

Jill Long Thompson, Undersecretary for Rural Development, USDA

IV. SEQUENCE OF EVENTS

- Upon arrival at the Whiteville Depot, YOU will be greeted by Mayor Jones and led to the offstage position.
- Offstage announcement of Mayor Jones, Chairman Kennard, and Undersecretary Thompson.
- YOU are announced offstage, accompanied by Erskine Bowles, Craig Turner, Congressman McIntyre and Governor Hunt.
- Congressman McIntyre makes brief remarks and introduces Craig Turner.
- Craig Turner makes brief remarks and introduces Erskine Bowles.
- Erskine Bowles makes brief remarks and introduces Governor Hunt.
- Governor Hunt makes brief remarks and introduces YOU.
- YOU give remarks, work a ropeline and depart.

V. PRESS

This event is OPEN PRESS.

VI. REMARKS

To be provided by Speechwriting.

VII. ATTACHMENTS

None.



Lowell A. Weiss
04/24/2000 06:15:08 PM

Record Type: Record

To: See the distribution list at the bottom of this message

cc:

Subject: north carolina remarks -- 6:10pm draft (includes big hunt/erskine announcement)

Draft 4/24/00 6:10pm

Lowell Weiss

**PRESIDENT WILLIAM J. CLINTON
REMARKS ON CREATING DIGITAL OPPORTUNITY
IN RURAL AMERICA
WHITEVILLE, NC
April 26, 2000**

Acknowledge: Remote Data Systems Co-Founder Ben Frink; Erskine Bowles; Jim Hunt; Reps. Mike McIntyre, Eva Clayton, Robert Etheridge, David Price; Mayor Ann Jones; Qualcomm CEO Dr. Irwin Jacobs; Gene Sperling; Maria Echaveste; FCC Chairman Bill Kennard; Undersec. of Agriculture Jill Long Thompson; Assist. Sec. of Commerce Gregory Rohde [ROWE-dee]; my business liaison, Jay Dunn, from Wilkes County. And I'd like to say a special word of appreciation to one person who is not here who helped us to develop our entire approach to closing the digital divide: Vice President Al Gore.

This is a fortunate time for our country. We have the strongest economy in history. We have the lowest African American and Hispanic unemployment rates our country has ever recorded, and the lowest female unemployment rate in 40 years. But we all know there are people and places that are at risk of being left behind.

Over the past year, on my New Markets tours, I have visited many of these places – from the inner cities of Newark and Hartford ... to Lakota and Navajo lands in South Dakota and New Mexico ... to rural communities like this one, where farmers are struggling, plants are closing, and Mother Nature has a way of washing away hopes and dreams.

But in each of the places I have traveled, I have seen a lot of untapped potential. I have met intelligent, able Americans eager for work. I have seen remarkable business opportunities for investors willing to look a few exits off the beaten path. That's what I saw this morning when I visited Remote Data Systems. That's what I want to help you to build throughout Columbus County.

Because Columbus County matters. And rural America matters. In the words of

George Autry, North Carolina's late, great champion of rural economic development, "Even those of us a generation or two removed from the farm trace our love of the environment, our feelings for fellowman, and our sense of place to the routines of rural community life." My friends, I grew up in small-town America, and I want every American to recognize that we can't flourish as a nation unless we tend to our rural roots.

In this day and age, one of the best ways we can do that is by helping every family and every business get access to the tools of the Information Age. And that is why when we decided to focus our third New Markets tour on efforts to close the digital divide, I knew we had to put special emphasis on rural America.

Of course, there are some people out there who don't know why we're making such a fuss about this digital divide. They say, "Don't worry. High-speed Internet access will extend to rural communities. Sure, it might take an extra 5 or 10 or 15 years. But it will eventually get there." Well, I came here today to say: That's not good enough.

I know that your Governor agrees. That's why he appointed Erskine Bowles, one of the finest men I know, to head the Rural Prosperity Task Force. Let's face it: there are a lot of task forces out there. But when you create a task force and put a leader like Erskine Bowles in charge, you know you're going to get results.

And that's exactly what North Carolina got. In February, when the task force released its final report, the group set an ambitious goal: "Providing, at affordable rates, high speed, reliable Internet access to the homes and businesses of rural North Carolina." It is now less than three months later, and already Erskine and Gov. Hunt have signed an agreement with the state's three largest telecommunications companies that will allow you to achieve this goal. This is a stunning announcement, and one of the wisest investments this state has ever made.

I want you to think about the old railroad depot where we meet today. Just think how important the railroads – and then electricity, bridges, and your remarkable network of farm-to-market roads – were to the economic development of this state. Today, affordable, high-speed Internet access is every bit as important. High-speed Internet access will allow you to compete with metropolitan areas for new business. It will allow companies like Remote Data Systems to communicate far more efficiently with customers and suppliers. It will help farmers to find markets for crops and cattle ... give families in rural health clinics access to the finest medical specialists ... and give students even in the most remote schoolhouses access to the same world of knowledge, at the same instant, as children in the wealthiest communities in America. I believe that these new technologies can be the greatest equalizers our society has ever known.

But if we want them to spread to every part of rural America, we've got a long way to go. Today, the Departments of Commerce and Agriculture are releasing a major report on the state of advanced telecommunications in rural America. The report, which was commissioned by 10 Democratic Senators, documented the disparities between urban and rural areas in broadband availability. It found that well over half of all cities with more than 100,000 people

had access to high-speed DSL services; only 5% of small towns could get this DSL service. And as you've already heard, even when broadband services are available, they are often unaffordable.

That's why I am so pleased with the agreement you have reached here in North Carolina. And that is why we want to help every state follow your lead.

Already, through the E-rate initiative, our Technology Opportunity Program, and our new \$450 million Technology Literacy Challenge, we're helping to provide computers, training, Internet access, and innovative software to thousands of communities at risk of falling behind. My new budget goes even further. I'm asking Congress for \$100 million in loan guarantees to companies that are willing to provide broadband services to rural areas; \$2 billion in tax incentives to encourage private sector firms to donate computers, provide technology training to workers, and adopt community technology centers; \$150 million for training all new teachers in how to use technology effectively in the classroom; and \$100 million to help create 1,000 community technology centers across the country.

Today, I am also proud to announce two new federal commitments that will make an enormous difference. First, the Rural Utilities Service, the successor to the Rural Electrification Administration, is proposing to expand its \$670 million telecommunications loan program so that companies can use it for offering broadband services, not just phone service. Second, the National Science Foundation will increase its research investment in broadband technologies by \$10 million, with particular focus on the needs of rural America.

A few weeks ago, I issued a National Call to Action for Digital Opportunity – to enlist the support of businesses, community groups, and foundations in bringing 21st century technology into every school and every community. Today, I want to highlight some of the forward-thinking ways that private-sector firms are answering our Call to Action for the benefit of rural America.

Over the next two years, Qualcomm will invest \$1 million to deploy its new HDR wireless broadband technology to at least eight rural and underserved communities, including Columbus County. MCI/WorldCom will invest \$2 million to increasing wireless Internet access in three rural communities in the South. AT&T is making a \$1.2 million investment to develop information technology and network management training with North Carolina State, North Carolina AT&T, and other distinguished universities. And Red Hat Software, based in Durham, will provide free professional training and certification in the use of its software to employees of 100 rural small businesses. I am grateful to all of these public and private organizations for their commitments. I will continue to work with them and others until you have all the technological tools you need and deserve.

And, of course, we will also work with you to provide the educational tools you need. After all, in the words of Erskine's report, "even good roads don't work if people don't know how to drive on them." Under the leadership of Gov. Hunt, North Carolina has become a model for our entire nation – through your successful efforts to give children a "smart start"

in life, enhance teacher quality, and demand real accountability from every school. In fact, under the new accountability system, Whiteville High School has achieved “exemplary growth” in student achievement for the past two years in a row. I think you ought to be proud.

My new budget will help you build on your success by continuing to invest more and demand more from our schools. In my budget I have proposed a new \$1 billion teacher quality plan to recruit, train and reward good teachers, and I have asked Congress to continue its investment to reduce class size in the early grades. I am also calling on Congress to double the size of our Education Accountability Fund, to \$250 million. Districts can use this money to improve staffing, overhaul curriculum, and make the kind of major changes that have helped turn around low-performing schools here in North Carolina. When Erskine’s father used to speak about obligation to community and to the future, he spoke of “adding to the woodpile.” Well, as far as I’m concerned, there’s no better way for this nation to “add to woodpile” than by strengthening our schools.

A half century ago, Gov. William Kerr [KAR] Scott forever altered the course of North Carolina’s economy and society with his remarkable program of farm-to-market roads. For the first time, farmers in remote areas were able to get their perishable goods to market throughout the state and the nation – alleviating the pressure for rural North Carolinians to crowd into cities, empowering thousands of families to earn a good living in rural communities.

Today, with same old foresight and the newest of tools, North Carolina is setting out to build the farm-to-market roads of the 21st century. In the words of William Kerr Scott, you have “consulted courage and chosen to invest in the development” of every corner of this state. And I am deeply grateful. For as you lay down new cable, you are also laying down a marker for our entire nation. You are saying, we cannot – and will not – leave rural America behind.

#

Message Sent To: _____

Elliott H. Baer/OPD/EOP@EOP
Melissa G. Green/OPD/EOP@EOP
Gigi E. Georges/OPD/EOP@EOP
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Maria Echaveste/WHO/EOP@EOP
Leslie Bernstein/WHO/EOP@EOP
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**Whiteville City, NC-Columbus County, NC
Demographic Tables**

Total Population

	Columbus County, NC	City of: Whiteville, NC
1970	46,937	4,195
1980	51,037	5,565
1990	49,587	5,078
1992	50,167	5,347
1998	52,634	5,272

Change in Total Population

	Columbus County, NC	City of: Whiteville, NC
1970 to 1980	8.7%	32.7%
1980 to 1990	-2.8%	-8.8%
1990 to 1998	6.1%	3.8%
1990 to 1992	1.2%	5.3%
1992 to 1998	4.9%	-1.4%
1970 to 1998	12.1%	25.7%

Poverty Rate (Percent)

	Columbus County, NC	City of: Whiteville, NC
1969	33.0%	18.3%
1979	26.5%	20.6%
1989	24.0%	26.5%
1993 Estimated ¹	23.7%	25.1%
1995 Estimated ¹	22.6%	24.6%

Unemployment Rate (Percent)

	Columbus County, NC	City of: Whiteville, NC
1970	4.5%	2.8%
1980	7.3%	8.9%
1990 ²	6.0%	9.6%
1992 ²	10.0%	N/A
1998 ²	7.5%	N/A

Source: Census (unless otherwise noted).

¹Estimated poverty rates for 1993 and 1995 are derived from the Census Bureau's Small Area Income and Poverty Estimates.

²Source: Bureau of Labor Statistics.

Percent of Persons Aged 25 or more by Highest Educational Attainment

		Columbus County, NC	City of: Whiteville, NC
Did Not Graduate High School	1970	70.3%	43.6%
	1980	55.8%	41.8%
	1990	40.6%	30.5%
High School Graduate	1970	18.5%	21.5%
	1980	24.6%	20.9%
	1990	31.8%	28.6%
Some College or Associate Degree	1970	6.4%	17.6%
	1980	11.5%	20.3%
	1990	18.5%	21.4%
College Graduate or Advanced Degree	1970	4.8%	17.3%
	1980	8.1%	16.9%
	1990	9.1%	19.5%

Race/Ethnicity Groups as Percent of Total Population

		Columbus County, NC	City of: Whiteville, NC
White, Non-Hispanic	1980	67.1%	69.4%
	1990	66.0%	65.4%
Black, Non-Hispanic	1980	29.8%	30.1%
	1990	30.6%	33.0%
Other Races, Non-Hispanic	1980	2.2%	0.3%
	1990	2.9%	1.1%
Total Hispanic (All Races)	1980	0.9%	0.1%
	1990	0.6%	0.5%

Source: Census (unless otherwise noted).

¹Estimated poverty rates for 1993 and 1995 are derived from the Census Bureau's Small Area Income and Poverty Estimates.

²Source: Bureau of Labor Statistics.

MEMORANDUM

To: Tom Kalil
Fr: Kate Howard
Re: Whiteville/Roundtable-Exhibition Site - The Whiteville Business Development Center
Dt: April 21, 2000

Tom, David asked me to fax you information on the roundtable event site that may be of interest.

WHITEVILLE BUSINESS DEVELOPMENT CENTER OTHER BUSINESSES:

In addition to Remote Data Systems Inc. (which produces the wetlands water monitoring device), the site also houses other businesses of possible interest/would benefit from better access to internet technology that you may want to be aware of:

1. **Carolina Home Healthcare** provides home healthcare services. It is owned and operated by an African-American woman and employs approximately 90 part-time health care professionals.
2. **Calibration's** is a female owned company that calibrates electric meters and ships nationwide.
3. **Ambu-Med Billing Services**, is a female owned company that will open for business in early May. It will provide nation-wide billing service for ambulance and medical billing.

Judy Morris, the Center's manager and Southeastern Community's College's representative at the Center indicated that these companies would benefit from access to the web/internet technology. Judy will provide a complete list of the Center's businesses and their need for internet technology by COB today.

NOTE: These businesses have not been vetted.

NAFTA'S IMPACT ON THE COMMUNITY:

Nafta was mentioned several times. Specifically, the business and community leaders have mentioned that the county has lost several textile factories since the passage of the NAFTA agreement in 1993 and has an unemployment rate of 12%. They are thrilled about the presidential visit but ask practical questions about what happens after he leaves. Specifically, they would like to know what, if any, deliverables are available to provide transition assistance or to develop the technology needed to bridge the digital divide such as USDA's Rural Utility Programs or NAFTA adjustment assistance programs out of Commerce.

BRUNSWICK ELECTRIC MEMBERSHIP CORPORATION:

The Whiteville Business Development Center rents space rates from the Brunswick Electric Membership Corporation. Brunswick Electric, a rural cooperative, is interested in the roundtable discussion. The rural electric cooperative provides (often in partnership with USDA Rural Development loan and grant programs) its community with access to electric power; acts as an economic development investor in the community; develops distance learning programs; and works to provide the infrastructure necessary for the community to attract new business.

USDA CONTACTS:

Carl Whilock, White Liaison, USDA, (202) 720-2406
Clyde Williams, Deputy Chief of Staff, Office of the Secretary at (202) 720-3631

QUALCOMM'S DEMONSTRATION:

The Qualcomm demonstration will display the technical aspects of how 1xHDR can provide enhanced Internet access for rural businesses. Qualcomm is developing 1xHDR, a "Fast to Market" wireless broadband technology. This technology is primarily designed for Cellular and PCS Operators. (e.g. Sprint, PrimeCo, Bell Atlantic...) It will allow the Sprints of this world to access in the Rural and Urban Internet markets with a high speed and low cost service.

Please let me know if you would like further information or any item vetted.

Population Characteristics

Wealth Index

The wealth index shown below is a measure of relative total personal income per capita weighted by the source of income. The national average for each year = 100.0. Columbus County has seen considerable increases since 1990 and ranks highly to some of our neighboring southeastern North Carolina counties.

	1990	1994	1996
Bladen County	65.12	70.21	67.79
Brunswick County	72.10	72.14	72.16
Columbus County	67.18	73.16	71.14
Cumberland County	68.74	76.26	76.75
Hoke County	58.19	55.69	54.60
New Hanover County	90.82	94.04	94.04
Pender County	72.04	72.70	68.87
Richmond County	68.32	67.33	67.04
Robeson County	60.66	66.42	65.99
Sampson County	78.31	87.50	87.91
Scotland County	67.53	73.86	72.64

Source: Woods & Poole Economics, Inc.

Income Measurements

Per Capita Income (Current Dollars)

	1980	Percent of NC	Percent of US	1992	Percent of NC	Percent of US	1995	Percent of NC	Percent of US
Columbus County	6,231	78%	63%	14,507	81%	72%	17,821	85%	78%

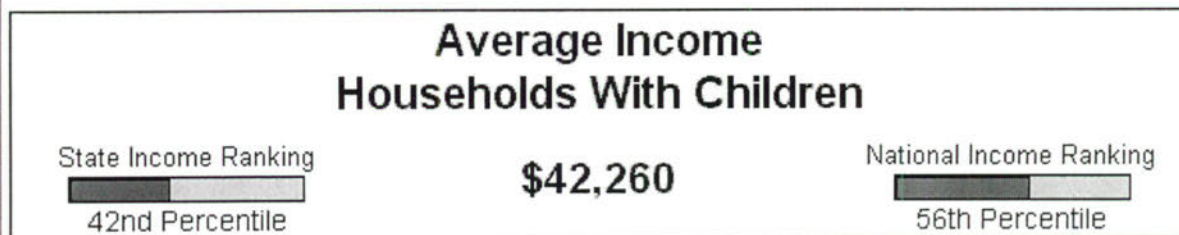
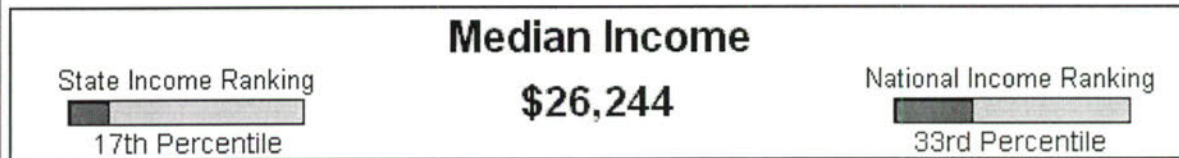
Source: N.C. State Data Center

Median Family Income

	Fiscal Year 1991		Fiscal Year 1992		Fiscal Year 1993		Fiscal Year 1995		Fiscal Year 1996	
MSA	State	% of NC	State	% of NC	State	% of NC	State	% of NC	State	% of NC
Asheville	32,900	97%	33,100	96%	34,500	97%	35,000	97%	37,800	97%
Burlington	37,100	109%	37,100	108%	36,700	104				
Charlotte, Gastonia, NC/Rock Hill, SC	40,200	118%	40,500	118%	40,600	115	41,700	116	45,400	116%
Fayetteville	28,900	85%	29,100	85%	31,300	89	31,500	87	33,800	86%

Goldsboro							31,600	88	34,700	89%
Greensboro/Winston Salem/High Point	36,600	108%	36,900	107%	39,300	112	38,800	107	42,200	108%
Greenville									38,700	99%
Hickory/Morganton	36,200	106%	36,200	105%	35,800	102	35,800	99	38,700	99%
Jacksonville	23,900	70%	23,900	69%	27,800	79	28,000	78	30,000	77%
Norfolk/Virginia Beach/Newport News, VA-NC							39,900	111	42,100	108%
Raleigh/Durham	43,700	129%	45,200	131%	46,500	132	46,800	130	50,700	130%
Rocky Mount							34,000	94	36,200	93%
Wilmington (New Hanover & Brunswick Counties)	34,000	100%	34,000	99%	37,600	107	37,600	104	38,800	99%
Non-Metro County										
Bladen County	24,000	71%	24,000	70%	24,800	70%	24,800	69%	25,000	64%
Columbus County	24,300	71%	25,100	73%	25,100	71%	26,300	73%	28,600	73%
Hoke County	27,800	82%	27,800	81%	28,600	81%	29,300	81%	32,200	82%
Pender County	26,900	79%	27,800	81%	31,000	88%	31,000	86%	34,100	87%
Robeson County	25,700	76%	25,700	75%	25,900	74%	26,900	75%	28,900	74%
Sampson County	26,500	78%	26,500	77%	27,100	77%	28,400	79%	30,700	79%
Scotland County	31,900	94%	31,900	93%	30,200	86%	30,900	86%	33,700	86%
North Carolina	34,000		34,400		35,200		35,200		39,100	
<i>Source: N.C. State Data Center</i>										

Income For Columbus County



Source: Know the Neighborhood, 1999

Effective Buying Income Percentage of Households by Effective Buying Income Group

	\$20,000-34,999	\$35,000-49,999	\$50,000 or More	Median Household Income
Columbus County	24.2	13.8	16.4	22,316

Source: "1996 Survey of Buying Power," Sales and Marketing Management Magazine, 1996

New Vehicle Registrations

	1990	1991	1992	1993	1994	1995	1996
Columbus County	1,613	1,194	1,284	1,464	1,737	1,848	1,884

Source: North Carolina Automobile Dealers Association

Columbus County EDC
 P.O. Box 456
 Whiteville, NC 28472
 910-640-6608
 fax: 910-642-1876



Email Us!
columcty@intrstar.net

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County Data

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
ALAMANCE COUNTY								
LABOR FORCE	65980	66270	0	0	0	0	0	0
EMPLOYMENT	64020	64270	0	0	0	0	0	0
UNEMPLOYMENT	1960	2000	0	0	0	0	0	0
RATE %	3.0%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
ALEXANDER COUNTY								
LABOR FORCE	16740	16880	0	0	0	0	0	0
EMPLOYMENT	16410	16500	0	0	0	0	0	0
UNEMPLOYMENT	330	380	0	0	0	0	0	0
RATE %	2.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
ALLEGHANY COUNTY								
LABOR FORCE	5320	5470	0	0	0	0	0	0
EMPLOYMENT	5040	5050	0	0	0	0	0	0
UNEMPLOYMENT	280	420	0	0	0	0	0	0
RATE %	5.3%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
ANSON COUNTY								
LABOR FORCE	10450	10430	0	0	0	0	0	0
EMPLOYMENT	9750	9800	0	0	0	0	0	0
UNEMPLOYMENT	700	630	0	0	0	0	0	0
RATE %	6.7%	6.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
ASHE COUNTY								
LABOR FORCE	10700	11090	0	0	0	0	0	0
EMPLOYMENT	9790	10020	0	0	0	0	0	0
UNEMPLOYMENT	910	1070	0	0	0	0	0	0
RATE %	8.5%	9.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
AVERY COUNTY								
LABOR FORCE	7520	7580	0	0	0	0	0	0
EMPLOYMENT	7190	7190	0	0	0	0	0	0
UNEMPLOYMENT	330	390	0	0	0	0	0	0
RATE %	4.4%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
BEAUFORT COUNTY								
LABOR FORCE	19310	19580	0	0	0	0	0	0
EMPLOYMENT	17640	17790	0	0	0	0	0	0
UNEMPLOYMENT	1670	1790	0	0	0	0	0	0
RATE %	8.6%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					BERTIE COUNTY			
LABOR FORCE	8480	8640	0	0	0	0	0	0
EMPLOYMENT	7980	8070	0	0	0	0	0	0
UNEMPLOYMENT	500	570	0	0	0	0	0	0
RATE %	5.9%	6.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					BLADEN COUNTY			
LABOR FORCE	19370	19660	0	0	0	0	0	0
EMPLOYMENT	18190	18540	0	0	0	0	0	0
UNEMPLOYMENT	1180	1120	0	0	0	0	0	0
RATE %	6.1%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					BRUNSWICK COUNTY			
LABOR FORCE	31690	31600	0	0	0	0	0	0
EMPLOYMENT	29720	30020	0	0	0	0	0	0
UNEMPLOYMENT	1970	1580	0	0	0	0	0	0
RATE %	6.2%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					BUNCOMBE COUNTY			
LABOR FORCE	99470	100700	0	0	0	0	0	0
EMPLOYMENT	96810	97720	0	0	0	0	0	0
UNEMPLOYMENT	2660	2980	0	0	0	0	0	0
RATE %	2.7%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					BURKE COUNTY			
LABOR FORCE	42100	42320	0	0	0	0	0	0
EMPLOYMENT	41150	41380	0	0	0	0	0	0
UNEMPLOYMENT	950	940	0	0	0	0	0	0
RATE %	2.3%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					CABARRUS COUNTY			
LABOR FORCE	65950	66040	0	0	0	0	0	0
EMPLOYMENT	64430	64600	0	0	0	0	0	0
UNEMPLOYMENT	1520	1440	0	0	0	0	0	0
RATE %	2.3%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					CALDWELL COUNTY			
LABOR FORCE	39890	40090	0	0	0	0	0	0
EMPLOYMENT	38980	39200	0	0	0	0	0	0
UNEMPLOYMENT	910	890	0	0	0	0	0	0
RATE %	2.3%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

2000



	2000	2001	2002	2003	2004	2005	2006	2007
LABOR FORCE	26270	26650	0	0	0	0	0	0
EMPLOYMENT	25810	26170	0	0	0	0	0	0
UNEMPLOYMENT	460	480	0	0	0	0	0	0
RATE %	1.8%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%



	CLAY COUNTY							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
LABOR FORCE	4030	4110	0	0	0	0	0	0
EMPLOYMENT	3860	3900	0	0	0	0	0	0
UNEMPLOYMENT	170	210	0	0	0	0	0	0
RATE %	4.2%	5.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000 CLEVELAND COUNTY							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
LABOR FORCE	44800	44770	0	0	0	0	0	0
EMPLOYMENT	42020	42400	0	0	0	0	0	0
UNEMPLOYMENT	2780	2370	0	0	0	0	0	0
RATE %	6.2%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000 COLUMBUS COUNTY							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
LABOR FORCE	22980	22980	0	0	0	0	0	0
EMPLOYMENT	20130	20190	0	0	0	0	0	0
UNEMPLOYMENT	2850	2790	0	0	0	0	0	0
RATE %	12.4%	12.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000 CRAVEN COUNTY							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
LABOR FORCE	34860	35160	0	0	0	0	0	0
EMPLOYMENT	33460	33660	0	0	0	0	0	0
UNEMPLOYMENT	1400	1500	0	0	0	0	0	0
RATE %	4.0%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000 CUMBERLAND COUNTY							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
LABOR FORCE	115120	116650	0	0	0	0	0	0
EMPLOYMENT	110280	111430	0	0	0	0	0	0
UNEMPLOYMENT	4840	5220	0	0	0	0	0	0
RATE %	4.2%	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000 CURRITUCK COUNTY							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
LABOR FORCE	8970	9020	0	0	0	0	0	0
EMPLOYMENT	8570	8630	0	0	0	0	0	0
UNEMPLOYMENT	400	390	0	0	0	0	0	0
RATE %	4.5%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000 DARE COUNTY							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
LABOR FORCE	15480	15550	0	0	0	0	0	0
EMPLOYMENT	13260	13490	0	0	0	0	0	0
UNEMPLOYMENT	2220	2060	0	0	0	0	0	0
RATE %	14.3%	13.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000 DAVIDSON COUNTY							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
LABOR FORCE	78860	79360	0	0	0	0	0	0

EMPLOYMENT	76840	77140	0	0	0	0	0	0
UNEMPLOYMENT	2020	2220	0	0	0	0	0	0
RATE %	2.6%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

					2000			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

					DAVIE COUNTY			
LABOR FORCE	17760	17690	0	0	0	0	0	0
EMPLOYMENT	17000	17060	0	0	0	0	0	0
UNEMPLOYMENT	760	630	0	0	0	0	0	0
RATE %	4.3%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

					2000			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

					DUPLIN COUNTY			
LABOR FORCE	20890	21140	0	0	0	0	0	0
EMPLOYMENT	19860	20100	0	0	0	0	0	0
UNEMPLOYMENT	1030	1040	0	0	0	0	0	0
RATE %	4.9%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

					2000			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

					DURHAM COUNTY			
LABOR FORCE	116280	118010	0	0	0	0	0	0
EMPLOYMENT	113550	115130	0	0	0	0	0	0
UNEMPLOYMENT	2730	2880	0	0	0	0	0	0
RATE %	2.3%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

					2000			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

					EDGECOMBE COUNTY			
LABOR FORCE	24080	24200	0	0	0	0	0	0
EMPLOYMENT	22070	22340	0	0	0	0	0	0
UNEMPLOYMENT	2010	1860	0	0	0	0	0	0
RATE %	8.3%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

					2000			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

					FORSYTH COUNTY			
LABOR FORCE	152850	153710	0	0	0	0	0	0
EMPLOYMENT	148800	149380	0	0	0	0	0	0
UNEMPLOYMENT	4050	4330	0	0	0	0	0	0
RATE %	2.6%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

					2000			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

					FRANKLIN COUNTY			
LABOR FORCE	23270	23660	0	0	0	0	0	0
EMPLOYMENT	22700	23010	0	0	0	0	0	0
UNEMPLOYMENT	570	650	0	0	0	0	0	0
RATE %	2.4%	2.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

					2000			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

					GASTON COUNTY			
LABOR FORCE	101130	101520	0	0	0	0	0	0
EMPLOYMENT	96290	96530	0	0	0	0	0	0
UNEMPLOYMENT	4840	4990	0	0	0	0	0	0

RATE %	4.8%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
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	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					GATES COUNTY			
LABOR FORCE	4460	4480	0	0	0	0	0	0
EMPLOYMENT	4340	4340	0	0	0	0	0	0
UNEMPLOYMENT	120	140	0	0	0	0	0	0
RATE %	2.7%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					GRAHAM COUNTY			
LABOR FORCE	3630	3630	0	0	0	0	0	0
EMPLOYMENT	3170	3220	0	0	0	0	0	0
UNEMPLOYMENT	460	410	0	0	0	0	0	0
RATE %	12.7%	11.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					GRANVILLE COUNTY			
LABOR FORCE	22340	22460	0	0	0	0	0	0
EMPLOYMENT	21620	21770	0	0	0	0	0	0
UNEMPLOYMENT	720	690	0	0	0	0	0	0
RATE %	3.2%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					GREENE COUNTY			
LABOR FORCE	8620	8660	0	0	0	0	0	0
EMPLOYMENT	8240	8290	0	0	0	0	0	0
UNEMPLOYMENT	380	370	0	0	0	0	0	0
RATE %	4.4%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					GUILFORD COUNTY			
LABOR FORCE	218220	219640	0	0	0	0	0	0
EMPLOYMENT	212160	212980	0	0	0	0	0	0
UNEMPLOYMENT	6060	6660	0	0	0	0	0	0
RATE %	2.8%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					HALIFAX COUNTY			
LABOR FORCE	21700	22090	0	0	0	0	0	0
EMPLOYMENT	20000	20080	0	0	0	0	0	0
UNEMPLOYMENT	1700	2010	0	0	0	0	0	0
RATE %	7.8%	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					HARNETT COUNTY			
LABOR FORCE	36050	36470	0	0	0	0	0	0
EMPLOYMENT	34660	35110	0	0	0	0	0	0
UNEMPLOYMENT	1390	1360	0	0	0	0	0	0
RATE %	3.9%	3.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

JAN FEB MAR APR MAY JUN JUL AUG

JOHNSTON COUNTY

LABOR FORCE	58920	59780	0	0	0	0	0	0
EMPLOYMENT	57570	58370	0	0	0	0	0	0
UNEMPLOYMENT	1350	1410	0	0	0	0	0	0
RATE %	2.3%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

				2000				
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

JONES COUNTY

LABOR FORCE	4400	4410	0	0	0	0	0	0
EMPLOYMENT	4090	4110	0	0	0	0	0	0
UNEMPLOYMENT	310	300	0	0	0	0	0	0
RATE %	7.0%	6.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

				2000				
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

LEE COUNTY

LABOR FORCE	25940	26060	0	0	0	0	0	0
EMPLOYMENT	24840	24960	0	0	0	0	0	0
UNEMPLOYMENT	1100	1100	0	0	0	0	0	0
RATE %	4.2%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

				2000				
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

LENOIR COUNTY

LABOR FORCE	28380	28660	0	0	0	0	0	0
EMPLOYMENT	26770	26930	0	0	0	0	0	0
UNEMPLOYMENT	1610	1730	0	0	0	0	0	0
RATE %	5.7%	6.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

				2000				
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

LINCOLN COUNTY

LABOR FORCE	31940	32040	0	0	0	0	0	0
EMPLOYMENT	30940	31020	0	0	0	0	0	0
UNEMPLOYMENT	1000	1020	0	0	0	0	0	0
RATE %	3.1%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

				2000				
	JAN	FEB	MAR	APR	MAY	JUN	JUL	*AUG

MC DOWELL COUNTY

LABOR FORCE	19560	19720	0	0	0	0	0	0
EMPLOYMENT	18630	18790	0	0	0	0	0	0
UNEMPLOYMENT	930	930	0	0	0	0	0	0
RATE %	4.8%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

				2000				
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

MACON COUNTY

LABOR FORCE	13060	13100	0	0	0	0	0	0
EMPLOYMENT	12230	12260	0	0	0	0	0	0
UNEMPLOYMENT	830	840	0	0	0	0	0	0
RATE %	6.4%	6.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

				2000				
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

MADISON COUNTY

LABOR FORCE	8910	8980	0	0	0	0	0	0
EMPLOYMENT	8510	8590	0	0	0	0	0	0
UNEMPLOYMENT	400	390	0	0	0	0	0	0
RATE %	4.5%	4.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					MARTIN COUNTY			
LABOR FORCE	10960	11040	0	0	0	0	0	0
EMPLOYMENT	9950	9980	0	0	0	0	0	0
UNEMPLOYMENT	1010	1060	0	0	0	0	0	0
RATE %	9.2%	9.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					MECKLENBURG COUNTY			
LABOR FORCE	364070	365480	0	0	0	0	0	0
EMPLOYMENT	355460	356350	0	0	0	0	0	0
UNEMPLOYMENT	8610	9130	0	0	0	0	0	0
RATE %	2.4%	2.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					MITCHELL COUNTY			
LABOR FORCE	6710	6710	0	0	0	0	0	0
EMPLOYMENT	6250	6250	0	0	0	0	0	0
UNEMPLOYMENT	460	460	0	0	0	0	0	0
RATE %	6.9%	6.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					MONTGOMERY COUNTY			
LABOR FORCE	11420	11470	0	0	0	0	0	0
EMPLOYMENT	10980	11050	0	0	0	0	0	0
UNEMPLOYMENT	440	420	0	0	0	0	0	0
RATE %	3.9%	3.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					MOORE COUNTY			
LABOR FORCE	28940	29500	0	0	0	0	0	0
EMPLOYMENT	27700	27980	0	0	0	0	0	0
UNEMPLOYMENT	1240	1520	0	0	0	0	0	0
RATE %	4.3%	5.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					NASH COUNTY			
LABOR FORCE	41550	42430	0	0	0	0	0	0
EMPLOYMENT	39400	39890	0	0	0	0	0	0
UNEMPLOYMENT	2150	2540	0	0	0	0	0	0
RATE %	5.2%	6.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					NEW HANOVER COUNTY			
LABOR FORCE	77490	78360	0	0	0	0	0	0
EMPLOYMENT	74410	75180	0	0	0	0	0	0

UNEMPLOYMENT	3080	3180	0	0	0	0	0	0
RATE %	4.0%	4.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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NORTHAMPTON COUNTY

LABOR FORCE	7860	8020	0	0	0	0	0	0
EMPLOYMENT	7370	7390	0	0	0	0	0	0
UNEMPLOYMENT	490	630	0	0	0	0	0	0
RATE %	6.2%	7.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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ONslow COUNTY

LABOR FORCE	46130	46520	0	0	0	0	0	0
EMPLOYMENT	44370	44840	0	0	0	0	0	0
UNEMPLOYMENT	1760	1680	0	0	0	0	0	0
RATE %	3.8%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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ORANGE COUNTY

LABOR FORCE	63550	64470	0	0	0	0	0	0
EMPLOYMENT	62750	63620	0	0	0	0	0	0
UNEMPLOYMENT	800	850	0	0	0	0	0	0
RATE %	1.3%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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PAMLICO COUNTY

LABOR FORCE	5310	5450	0	0	0	0	0	0
EMPLOYMENT	5070	5100	0	0	0	0	0	0
UNEMPLOYMENT	240	350	0	0	0	0	0	0
RATE %	4.5%	6.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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PASQUATANK COUNTY

LABOR FORCE	14550	14600	0	0	0	0	0	0
EMPLOYMENT	13890	13960	0	0	0	0	0	0
UNEMPLOYMENT	660	640	0	0	0	0	0	0
RATE %	4.5%	4.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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PENDER COUNTY

LABOR FORCE	15870	15990	0	0	0	0	0	0
EMPLOYMENT	15020	15130	0	0	0	0	0	0
UNEMPLOYMENT	850	860	0	0	0	0	0	0
RATE %	5.4%	5.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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PERQUIMANS COUNTY

LABOR FORCE	4580	4610	0	0	0	0	0	0
EMPLOYMENT	4410	4430	0	0	0	0	0	0
UNEMPLOYMENT	170	180	0	0	0	0	0	0
RATE %	3.7%	3.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					PERSON	COUNTY		
LABOR FORCE	16960	17120	0	0	0	0	0	0
EMPLOYMENT	16080	16280	0	0	0	0	0	0
UNEMPLOYMENT	880	840	0	0	0	0	0	0
RATE %	5.2%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					PITT	COUNTY		
LABOR FORCE	66370	66000	0	0	0	0	0	0
EMPLOYMENT	63320	62990	0	0	0	0	0	0
UNEMPLOYMENT	3050	3010	0	0	0	0	0	0
RATE %	4.6%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					POLK	COUNTY		
LABOR FORCE	7630	7670	0	0	0	0	0	0
EMPLOYMENT	7310	7380	0	0	0	0	0	0
UNEMPLOYMENT	320	290	0	0	0	0	0	0
RATE %	4.2%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					RANDOLPH	COUNTY		
LABOR FORCE	70520	70830	0	0	0	0	0	0
EMPLOYMENT	68290	68560	0	0	0	0	0	0
UNEMPLOYMENT	2230	2270	0	0	0	0	0	0
RATE %	3.2%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					RICHMOND	COUNTY		
LABOR FORCE	17990	18170	0	0	0	0	0	0
EMPLOYMENT	16880	17040	0	0	0	0	0	0
UNEMPLOYMENT	1110	1130	0	0	0	0	0	0
RATE %	6.2%	6.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					ROBESON	COUNTY		
LABOR FORCE	53230	53820	0	0	0	0	0	0
EMPLOYMENT	48570	49020	0	0	0	0	0	0
UNEMPLOYMENT	4660	4800	0	0	0	0	0	0
RATE %	8.8%	8.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
					ROCKINGHAM	COUNTY		
LABOR FORCE	43640	43850	0	0	0	0	0	0
EMPLOYMENT	41180	41120	0	0	0	0	0	0
UNEMPLOYMENT	2460	2730	0	0	0	0	0	0
RATE %	5.6%	6.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
	ROWAN COUNTY							
LABOR FORCE	65560	65750	0	0	0	0	0	0
EMPLOYMENT	63650	63810	0	0	0	0	0	0
UNEMPLOYMENT	1910	1940	0	0	0	0	0	0
RATE %	2.9%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
	RUTHERFORD COUNTY							
LABOR FORCE	29400	29290	0	0	0	0	0	0
EMPLOYMENT	26960	27020	0	0	0	0	0	0
UNEMPLOYMENT	2440	2270	0	0	0	0	0	0
RATE %	8.3%	7.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
	SAMPSON COUNTY							
LABOR FORCE	22360	22740	0	0	0	0	0	0
EMPLOYMENT	21340	21610	0	0	0	0	0	0
UNEMPLOYMENT	1020	1130	0	0	0	0	0	0
RATE %	4.6%	5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
	SCOTLAND COUNTY							
LABOR FORCE	16820	16770	0	0	0	0	0	0
EMPLOYMENT	15590	15580	0	0	0	0	0	0
UNEMPLOYMENT	1230	1190	0	0	0	0	0	0
RATE %	7.3%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
	STANLY COUNTY							
LABOR FORCE	26370	26360	0	0	0	0	0	0
EMPLOYMENT	25140	25340	0	0	0	0	0	0
UNEMPLOYMENT	1230	1020	0	0	0	0	0	0
RATE %	4.7%	3.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
	STOKES COUNTY							
LABOR FORCE	23030	23220	0	0	0	0	0	0
EMPLOYMENT	22370	22460	0	0	0	0	0	0
UNEMPLOYMENT	660	760	0	0	0	0	0	0
RATE %	2.9%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
	SURRY COUNTY							
LABOR FORCE	34000	34340	0	0	0	0	0	0
EMPLOYMENT	32420	32700	0	0	0	0	0	0
UNEMPLOYMENT	1580	1640	0	0	0	0	0	0
RATE %	4.6%	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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	SWAIN COUNTY							
LABOR FORCE	5650	5580	0	0	0	0	0	0
EMPLOYMENT	4180	4190	0	0	0	0	0	0
UNEMPLOYMENT	1470	1390	0	0	0	0	0	0
RATE %	26.0%	24.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

	TRANSYLVANIA COUNTY							
LABOR FORCE	10730	10780	0	0	0	0	0	0
EMPLOYMENT	10460	10540	0	0	0	0	0	0
UNEMPLOYMENT	270	240	0	0	0	0	0	0
RATE %	2.5%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

	TYRRELL COUNTY							
LABOR FORCE	1540	1570	0	0	0	0	0	0
EMPLOYMENT	1270	1290	0	0	0	0	0	0
UNEMPLOYMENT	270	280	0	0	0	0	0	0
RATE %	17.5%	17.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

	UNION COUNTY							
LABOR FORCE	59690	59910	0	0	0	0	0	0
EMPLOYMENT	58490	58640	0	0	0	0	0	0
UNEMPLOYMENT	1200	1270	0	0	0	0	0	0
RATE %	2.0%	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

	VANCE COUNTY							
LABOR FORCE	18560	18880	0	0	0	0	0	0
EMPLOYMENT	17530	17670	0	0	0	0	0	0
UNEMPLOYMENT	1030	1210	0	0	0	0	0	0
RATE %	5.5%	6.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

	WAKE COUNTY							
LABOR FORCE	345280	350290	0	0	0	0	0	0
EMPLOYMENT	340030	344760	0	0	0	0	0	0
UNEMPLOYMENT	5250	5530	0	0	0	0	0	0
RATE %	1.5%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

	WARREN COUNTY							
LABOR FORCE	6840	6940	0	0	0	0	0	0
EMPLOYMENT	6380	6430	0	0	0	0	0	0
UNEMPLOYMENT	460	510	0	0	0	0	0	0
RATE %	6.7%	7.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	2000							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG

WASHINGTON COUNTY

LABOR FORCE	5760	5820	0	0	0	0	0	0
EMPLOYMENT	5430	5470	0	0	0	0	0	0
UNEMPLOYMENT	330	350	0	0	0	0	0	0
RATE %	5.7%	6.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					WATAUGA COUNTY			
LABOR FORCE	22230	22400	0	0	0	0	0	0
EMPLOYMENT	21760	21910	0	0	0	0	0	0
UNEMPLOYMENT	470	490	0	0	0	0	0	0
RATE %	2.1%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					WAYNE COUNTY			
LABOR FORCE	47320	47950	0	0	0	0	0	0
EMPLOYMENT	45320	46050	0	0	0	0	0	0
UNEMPLOYMENT	2000	1900	0	0	0	0	0	0
RATE %	4.2%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					WILKES COUNTY			
LABOR FORCE	31050	31250	0	0	0	0	0	0
EMPLOYMENT	29980	30110	0	0	0	0	0	0
UNEMPLOYMENT	1070	1140	0	0	0	0	0	0
RATE %	3.4%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					WILSON COUNTY			
LABOR FORCE	34830	34920	0	0	0	0	0	0
EMPLOYMENT	32450	32810	0	0	0	0	0	0
UNEMPLOYMENT	2380	2110	0	0	0	0	0	0
RATE %	6.8%	6.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					YADKIN COUNTY			
LABOR FORCE	18290	18370	0	0	0	0	0	0
EMPLOYMENT	17700	17770	0	0	0	0	0	0
UNEMPLOYMENT	590	600	0	0	0	0	0	0
RATE %	3.2%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	JAN	FEB	MAR	APR	2000 MAY	JUN	JUL	AUG
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					YANCEY COUNTY			
LABOR FORCE	6050	6160	0	0	0	0	0	0
EMPLOYMENT	5720	5810	0	0	0	0	0	0
UNEMPLOYMENT	330	350	0	0	0	0	0	0
RATE %	5.5%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Samson + Columbus / Bladen 1,130

Wake and Bladen

↳ Chatham → \$700

Table 1. Places

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

NORTH CAROLINA

105TH CONGRESSIONAL DISTRICT T1-1

Table 1. Places—Con.

Place	County	Congressional district	Place	County	Congressional district
East Laurinburg town	Scotland	8	Halifax town	Halifax	1
Eastover CDP	Cumberland	7	Hamilton town	Martin	1
East Rockingham CDP	Richmond	8	Hamlet city	Richmond	8
East Spencer town	Rowan	12	Harkers Island CDP	Carteret	3
Eden city	Rockingham	5	Harmony town	Iredell	10
Edenton town	Chowan	1	Harrells town	Duplin	1
Elizabeth City city	Camden	3	Harrellsville town	Sampson	3
Elizabethtown town	Pasquotank	1,3	Harrisburg town	Hertford	1
Elkin town	Bladen	1	Hassell town	Cabarrus	8
Elk Park town	Surry	5	Havelock city	Martin	1
Ellenboro town	Wilkes	10	Haw River town	Craven	1,3
Ellerbe town	Avery	10	Hayesville town	Alamance	12
Elm City town	Rutherford	11	Hays CDP	Clay	11
Elon College town	Richmond	8	Hazelwood town	Wilkes	10
Elroy CDP	Wilson	1,2	Hemby Bridge CDP	Haywood	11
Emerald Isle town	Alamance	6	Henderson city	Union	8
Enfield town	Wayne	3	Hendersonville city	Vance	1,2
Enochville CDP	Carteret	3	Hertford town	Henderson	11
Erwin town	Halifax	1	Hickory city	Perquimans	1
Etowah CDP	Rowan	8	Highlands town	Burke	10
Eureka town	Hamett	2	High Point city	Catawba	10
Everetts town	Henderson	11		Jackson	11
Fair Bluff town	Wayne	3		Macon	11
Fairmont town	Martin	3		Davidson	6
Fairplains CDP	Columbus	7		Forsyth	12
Fairview CDP	Robeson	7		Guilford	6,12
Faison town	Wilkes	5,10		Randolph	6
Faith town	Buncombe	10		Gaston	9
Falcon town	Duplin	3		Burke	10
Falkland town	Rowan	6		Orange	4
Fallston town	Cumberland	7		Halifax	1
Farmville town	Sampson	3		Richmond	8
Fayetteville city	Pitt	1		Brunswick	7
Fearrington CDP	Cleveland	9		Onslow	7
Flat Rock CDP	Pitt	1		Wake	4
Fletcher town	Cumberland	1,7		Greene	1
Forest City town	Chatham	4		Cumberland	7
Forest Oaks CDP	Surry	5		Madison	11
Fort Bragg CDP	Henderson	10		Caldwell	10
	Rutherford	11		Mocklenburg	9,12
	Guilford	6		Burke	10
	Cumberland	7		Carteret	3
Fountain town	Pitt	1		Union	8
Four Oaks town	Johnston	2		Northampton	1
Foxfire village	Moore	2		Onslow	3,7
Franklin town	Macon	11		Craven	3
Franklinton town	Franklin	2		Guilford	6,12
Franklinville town	Randolph	6		Martin	3
Fremont town	Wayne	3		Ashe	5
Fuquay-Varina town	Wake	4		Yadkin	10
Gamewell town	Caldwell	5,10		Cabarrus	8
Garland town	Sampson	3		Rowan	8
Garner town	Wake	4		Bertie	1
Garysburg town	Northampton	1		Duplin	1
Gaston town	Northampton	1		Johnston	2
Gastonia city	Gaston	9,12		Wilson	2
Gatesville town	Gates	1		Forsyth	5
Gibson town	Scotland	8		Dare	3
Gibsonville town	Alamance	6		Forsyth	10
Glen Alpine town	Guilford	12		Stokes	5
Glen Raven CDP	Burke	5		Cleveland	9
	Alamance	6,12		Gaston	9
Godwin town	Cumberland	7		Cleveland	11
Goldsboro city	Wayne	3		Lenoir	1,3
Goldston town	Chatham	4		Vance	2
Gorman CDP	Durham	12		Dare	3
Graham city	Alamance	6,12		Wake	4
Grandfather village	Avery	10		New Hanover	7
Granite Falls town	Caldwell	10		Lenoir	1
Granite Quarry town	Rowan	6		Haywood	11
Greeneville town	Duplin	1		Rutherford	10
Greensboro city	Guilford	6,12		Columbus	7
Greenville city	Pitt	1,3		Rowan	8
Gritton town	Lenoir	1		Ashe	5
	Pitt	1		Northampton	1
Grimesland town	Pitt	1		Cleveland	11
Grover town	Cleveland	9		Henderson	11
Half Moon CDP	Onslow	3,7			

NORTH CAROLINA

105TH CONGRESSIONAL DISTRICT T1-2

Table 1. Places—Con.

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

NORTH CAROLINA

105TH CONGRESSIONAL DISTRICT T1-3

Table 1. Places—Con.

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

NORTH CAROLINA

105TH CONGRESSIONAL DISTRICT T1-4

Table 1. **Places**—Con.

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

Table 2. Counties

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

NORTH CAROLINA**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

Table 3. Districts and Counties—Con.

CONGRESSIONAL DISTRICT 11—Con.

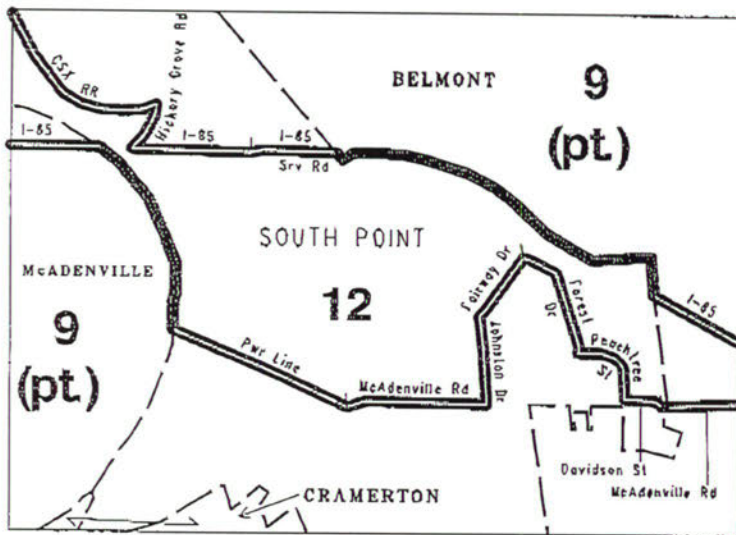
McDowell (pt.)
Macon
Madison
Polk (pt.)
Rutherford (pt.)
Swain
Transylvania
Yancey

CONGRESSIONAL DISTRICT 12

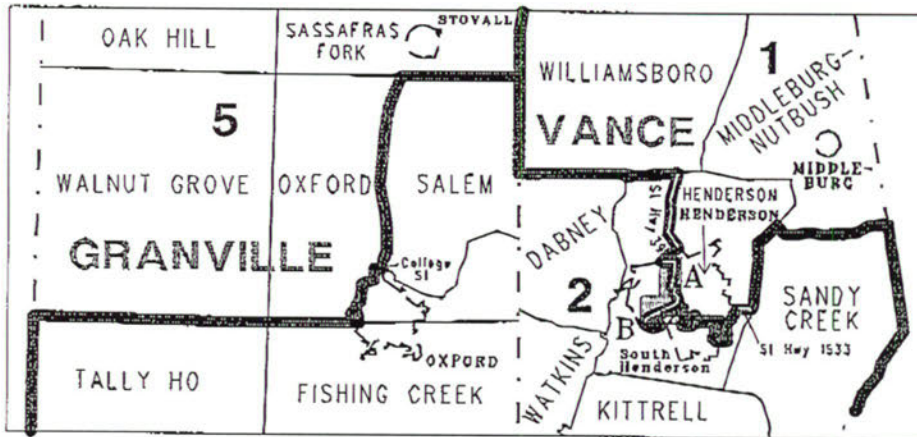
Alamance (pt.)
Davidson (pt.)
Durham (pt.)
Forsyth (pt.)
Gaston (pt.)
Guilford (pt.)
Iredell (pt.)
Mecklenburg (pt.)
Orange (pt.)
Rowan (pt.)

Congressional Districts - Insets

GASTON COUNTY - INSET H



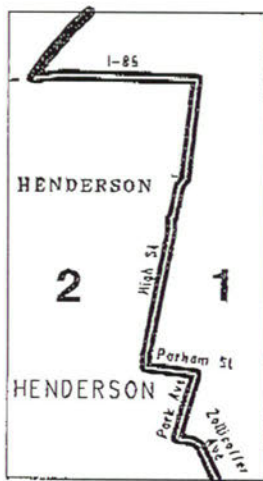
GRANVILLE AND VANCE COUNTIES (PART)



INSET LOCATION



INSET A

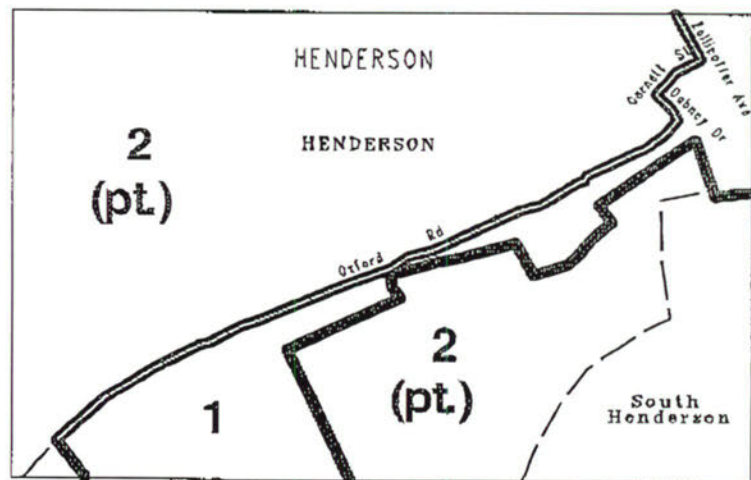


SCALE

1000 Meters

1000 2000 3000 4000 5000 Feet

INSET B



SCALE

1000 Meters

1000 2000 3000 Feet

WELCOME

Whether you're driving down streets lined with lacy dogwood trees or strolling around the Courthouse Square, you'll have the same reaction as so many before you: Whiteville is a great place to be! The people of Whiteville and Columbus County pride themselves on having the best of all possible worlds - beautiful natural settings, a growing business and industry climate, an impressive assortment of amenities and a solid emphasis on quality of life.

So welcome to Whiteville, where a diverse combination of people lend influence to the southern hospitality typically found in North Carolina.

Whether you're here for the long haul or just paying a visit, Whiteville's warm weather and warm people make it the place to be when you want to be at home.

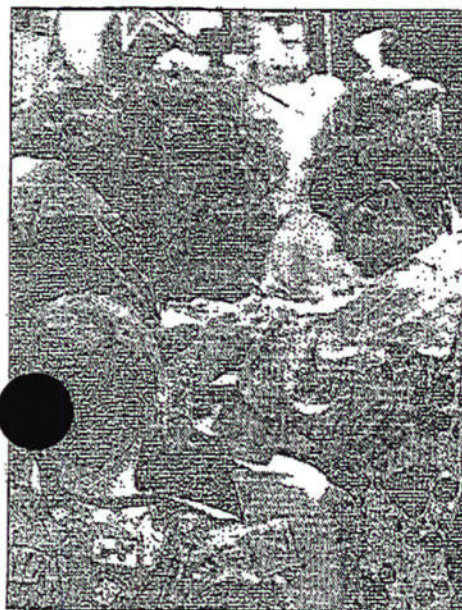
We're pleased that you have taken the time to inquire about Whiteville, North Carolina. You'd expect us to be biased about the place we call home, but if you'll accept our invitation to visit, we're sure you, too, will become enchanted with the enthusiasm and spirit of Whiteville.



CIVIC AND CULTURAL INVOLVEMENT

Vibrant communities pay special attention to cultural and civic affairs, Whiteville is no exception. Under the umbrella of the Columbus County Arts Council, many diverse groups receive funding or cultural guidance. These include the Columbus County Theatre Association, the Oratorio society, the Visual Arts Guild and many others. Dozens of community, school and church groups provide a broad spectrum of cultural and artistic opportunities for Whiteville residents. The Southeastern Community College Performing Arts Series brings acclaimed performers in music, dance and theatre to the community such as The Count Basie Orchestra, The Kingston Trio and Broadway hits like "Camelot." Monthly art exhibits featuring outstanding area artists are always well-received.

Whiteville also enjoys the efforts of many national civic organizations such as: Optimist, Civitan, Lions, Rotary and Kiwanis Clubs, just to mention a few. These clubs contribute much to the quality of life we enjoy in Whiteville. For addresses of specific organizations, please contact the Greater Whiteville Chamber of Commerce.



03/24/00 MON 10:40 FAX 44001 WHITEVILLE STAFF ADV --> Sched Advance 008

OUR HERITAGE

Whiteville's beginnings date back to 1733 land grants. James B. White, from whom Whiteville is named, owned over 2000 acres of land which included a plantation, Marsh Castle. It was originally part of 640 acre tract of land inherited by John Burgin and his wife, Margaret. John Burgin, an attorney, served as secretary to Governor Arthur Dobbs in 1754 and was treasurer of the colony in 1766.

In the years following the Revolutionary War, the area became more populous. For the convenience of these settlers, a new county, Columbus, was established from Bladen and Brunswick Counties. The site of Columbus County Courthouse was chosen and given to Columbus County by James B. White, who became the county's first state senator. Today's Courthouse Square can be seen on the original plan of Whiteville.

Later, the railroad depot was located south of Whiteville at Vineland, which existed as a separate town until 1926 when it became a part of Whiteville. The Vineland section is still referred to as "downtown" and old Whiteville is "uptown."

get address from city

Soldiers from Whiteville and Columbus County participated in the major battles of the Civil War from Manassas to Appomatox. Residents of Whiteville reported hearing the guns fired at Fort Fisher. Tales of looting and destruction, by marauders from Sherman's army, have been handed down for years.

As the South slowly rebuilt after the Civil war, so did Columbus County and Whiteville. Better roads and communications in the early decades of the 20th century changed Whiteville from an agricultural community to a growing town. Population increased over 30% from 1920 to 1930.

Whiteville has long been an important business and cultural center, to the surprise of some who call it "that little town with the big city ways." A pretty town with its mixture of old and new, most would agree that Whiteville puts on its most splendid show in the spring with its dazzling array of camellias, azaleas and dogwood.

From humble beginnings, Whiteville has grown into a prospering "little city," offering all the ingredients necessary to make it one of the most desirable communities in North Carolina to work, play and raise a family.

HEALTH CARE

Quality health care is important to the people of Whiteville and Columbus County. Our local hospital, Columbus County Hospital, is committed to providing our residents with high quality medical care. Located in Whiteville, Columbus County Hospital is a public, not-for-profit community hospital with 166 private patient rooms. The hospital continues to grow to provide the medical needs of the area. Area residents can now receive cardiac and pulmonary rehab services in the county. A variety of services are provided by the hospital through mobile service units such as the Duke Mobile Heart Catheterization lab, MRI machine, and Lithotripsy Unit. These mobile services enable our citizens to stay in town for a treatment they would otherwise have to travel to a major medical center to receive. Duke Life Flight provides transportation services for high trauma patients. Columbus County Hospital is committed to taking care of the health needs of our community and county by bringing highly-trained physicians to its medical staff. If you need help in finding a physician for your family, please call the Marketing Department at the hospital.



COMMUNITY PROFILE

LOCATION

Southeastern North Carolina
Driving Time to Metropolitan City:

Raleigh	150 minutes	130 miles
Wilmington	50 minutes	45 miles
Fayetteville	80 minutes	70 miles
Myrtle Beach	55 minutes	45 miles

POPULATION

	1997	1990	% Change 1980-1990
Columbus	52,000	49,587	-2.84
Whiteville	5,700	5,078	+8.8

HOUSING

Homes and Acreage:

The average price for a home in Whiteville is \$76,000. The average time a home is on the market is 4 months.

Rentals:

The average monthly cost of rentals in the Whiteville area is \$295.00 for a 2 bedroom, 1 bath apartment and \$375.00 for a 2 bedroom unit in an apartment or duplex. The average rent for a 2 bedroom, single family house is approximately \$450.

CLIMATE

Temperature	62.8 (annual average)
Rainfall	48.5 (annual average)
Snowfall	2 inches (annual average)

LABOR FORCE

Total Labor Force	22,810
Total Employment	20,630
Unemployment Rate	9.6%

WORK FORCE

	Number	Percent
Manufacturing	6,300	27.0
Non-Manufacturing	5,950	64.3
Agriculture	2,050	8.7

RECRUITABLE LABOR

(1999) ESC Job Applicants
within 25 miles5,542

TAXES

County Taxes695 per \$100 valuation

CITY TAXES

Whiteville	.44
Lake Waccamaw	.35
Fair Bluff	.70
Tabor City	.69
Chadbourn	.75

SCHOOLS

Whiteville City Schools

Number of:	Schools	Teachers	Grades	Enrollment
Primary	1	50	PreK-2	690
Elementary	1	47	3-5	679
Middle	1	49	6-8	668
High School	1	57	9-12	784

Columbus County Schools

Elem. & Middle	5	333	K-8	5,444
Elementary	4	160	9-12	2,129

HIGHWAYS

Highways serving our area:

US Primaries	701, 74-76, 410, 904, 211
State Primary	130
Nearest Interstate	I-95, 30 miles (35 minutes)

PORTS

International Deep Water Port in Wilmington
Channel Depth38'

RAILROADS

Name:
CSX Transportation, Mid-Atlantic Piggyback
Service: Lumberton34 minutes
Frequency of switching serviceDaily

COMMUNICATIONS

Major Newspapers	3
Local Newspapers	3
Telephone Services	Sprint
Local Radio Stations	7

LOCAL AIRPORT

5,500 ft. Runway • Terminal with fuel
Governed by Airport Authority
Paved, Lighted and Charter Service

REGIONAL AIRPORTS

Nearest Commercial Airports:
Wilmington AirlinesUS Air, Delta-ASA
Myrtle Beach AirlinesUS Air, American,
Delta-ASA, Midway
Florence AirlinesUS Air, Delta-ASA

ECONOMIC DEVELOPMENT PROGRAM

County Development Program
(4) Local Development Corporation Chambers of Commerce
Industrial Properties Available
Two Industrial Parks
Shell Buildings
Columbus County Business Development Centers (Hwy. 130 • Hwy. 904 W.)
Southeastern Community College Training Ctr.

WASTEWATER TREATMENT

Town of Whiteville

Sewer SystemYes
Treatment Plant:
TypeExtended Aeration
Capacity5,000,000 GPD
Available Surplus780,000 GPD
Separate Storm Sewer SystemYes
Expansion PlansNon-System Designed
Ind. waste water / can be expanded 3 M

Town of Chadbourne

Sewer SystemYes
Treatment Plant:
TypeExtended Aeration
Capacity180,000 GPD
Available Surplus80,000 GPD
Separate Storm Sewer SystemYes
Expansion Plans201 Facilities Plan, Step II

Town of Lake Waccamaw

Sewer SystemYes
Treatment Plant:
TypeExtended Aeration
Capacity400,000 GPD
Available Surplus185,000 GPD
Separate Storm Sewer SystemYes

EDUCATION

Education is top priority in Whiteville, from the preschool year all the way to one of the best community colleges in state. The Whiteville City Schools operate under the belief that students and their welfare are at the center of all school decisions. Effective schools, which exist first and foremost for an academic purpose, should strive to ensure that students at all levels and from all backgrounds achieve at their highest ability level.

The Whiteville City School System is an independent public school district of approximately 2,800 students attending four separate schools: Whiteville Primary School (Pre-K-2), Edgewood Elementary School (3-5), Central Middle School (6-8) and Whiteville High School (9-12).

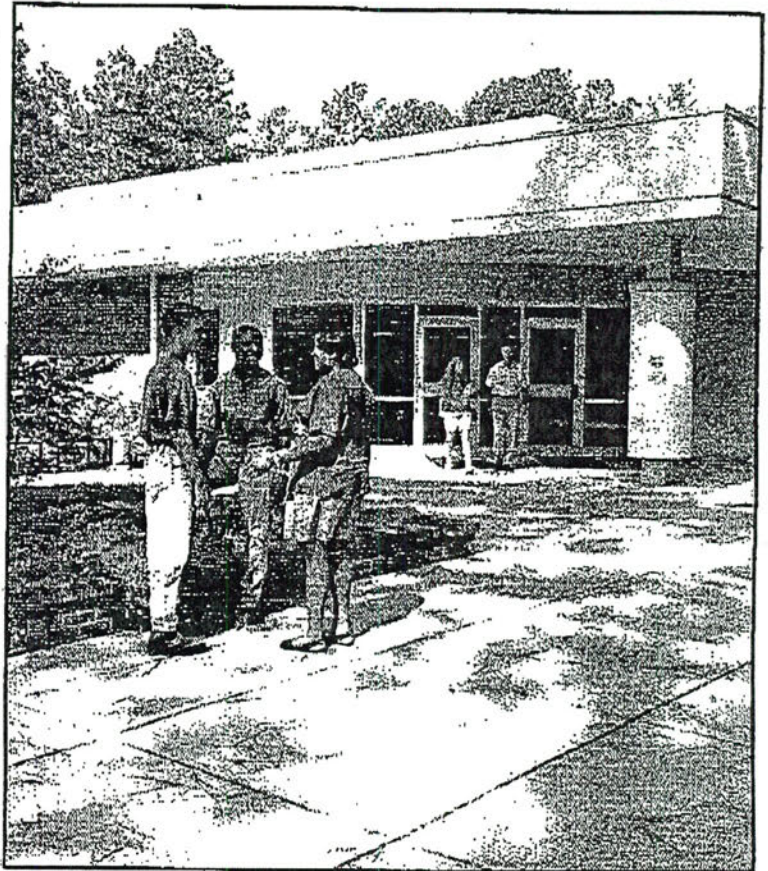
The school district is entirely within Columbus County, covering approximately 9 percent of the county's land area, but containing approximately 23 percent of the county's total population and approximately 27 percent of the county's school-age population. Although the Whiteville City School System is a separate and autonomous educational entity, there is no local school tax and the system receives all local funding from the Columbus County Board of Commissioners, which also supports the Columbus County School System. Local funding is distributed proportionately based on student population.

The school system is governed by the Whiteville City Board of Education which is currently composed of five members. Four members are elected from four voting districts, and one member is elected from the district at large.

The school system employs approximately 380 full-time employees, including approximately 215 certified staff (classroom teachers, principals, administrators) and approximately 160 support staff (teacher assistants, clerical/secretarial, food service, maintenance and bus drivers).

Approximately 700 students attend each of the system's four schools. The student population is approximately 54 percent white, 43 percent black and 3 percent other (American Indian, Asian American, Hispanic). Programs are in place to help all special student populations, including programs for physically, mentally and/or emotionally handicapped students, remedial programs for below-average students, accelerated programs for academically gifted students, and other programs for special student populations, such as migrant students and limited English proficient students.

Only 5 minutes away and situated on 100 wooded acres on Highway 74-Business, between Whiteville and Chadbourne, Southeastern Community College (SCC) is a cultural and educational center. Southeastern offers



GOVERNMENT

Whiteville is governed by the council-manager form of government with a mayor, six council members and an appointed city manager. Local advisory groups work to improve our community, such as the Parks and Recreation Commission, the Planning and Zoning Board, the Housing Authority and the Board of Adjustments.

Whiteville provides all the service one would expect to find in any metropolitan city - water, sewer, police, fire, rescue and more.

City officials as well as Columbus County Commissioners are listed below. We invite you to contact any of these involved men and women with your questions about Whiteville. You'll find them informed and eager to share their own personal thoughts about why Whiteville is a "great place to be."

WHITEVILLE CITY COUNCIL

Mayor - Anne Jones
Post Office Box 96
Whiteville, North Carolina 28472
Phone 910-642-5562

City Manager - Hazen Blodgett
City of Whiteville
Post Office Box 607
Whiteville, North Carolina 28472
Phone 910-642-8046

David Clarida
Pecan Street
Whiteville, North Carolina 28472
Phone 910-640-3087

Howard Jones
1402 N. James Street
Whiteville, North Carolina 28472
Phone 910-642-3411

Robert Leder
P.O. Box 937
Whiteville, North Carolina 28472
Phone 910-642-2766

Harold Marlowe
117 E. Oliver Street
Whiteville, North Carolina 28472
Phone 910-642-4714

Bettie Lou Memory
106-M Memory Plaza
Whiteville, North Carolina 28472
Phone 910-642-5824

Harold G. Troy, Sr.
201 W. Columbus Street
Whiteville, North Carolina 28472
Phone 910-642-2082

COLUMBUS COUNTY COMMISSIONERS

County Administrator - Dempsey Herring
111 Washington Street
Whiteville, North Carolina 28472
Phone 910-640-6600

Spruell Randolph "Randy" Britt
Post Office Box 395
Fair Bluff, North Carolina 28439
Phone 910-649-7316 or 649-7007

David Dutton, Jr.
181 Gaston Sellers Road
Whiteville, North Carolina 28472
Phone 910-642-4199 or 642-5069

A. Dial Gray, III
Columbus County Warehouse
Post Office Box 455
Whiteville, North Carolina 28472
Phone 910-642-3734

Sammie Jacobs
Post Office Box 188
Bolton, North Carolina 28423
Phone 910-655-8581
Phone 800-543-6743

Amon McKenzie
P.O. Box 1884
Whiteville, North Carolina 28472
Phone 910-642-7121
910-648-4800 (home)

Lynwood Norris
6087 Swamp Fox Road East
Tabor City, North Carolina 28463
Phone 910-653-2622 or 653-4433

C. E. (Gene) Wilson
Post Office Box 383
Whiteville, North Carolina 28472
Phone 910-648-2690

UTILITIES

Brunswick Electric Membership
Highway 130
Whiteville, North Carolina 28472
Phone 910-642-5011

Carolina Power & Light Co.
1-800-452-2777

Sprint
Clinton, North Carolina
Phone 910-592-9111

Cablevision
Whiteville, North Carolina 28472
Phone 910-642-7171

Benchmark
Phone 910-640-2008

Waccamaw Cable
Phone 910-754-3030

EMERGENCY SERVICES FOR WHITEVILLE & SURROUNDING AREA

Ambulance Service
Columbus County E.M.S.
Lake Waccamaw, North Carolina 28450
Phone 910-646-3049

INDUSTRY

Historically, Whiteville and Columbus County was an agricultural area and its early growth powered by products of land. While agriculture is still an important part of our economy, future-minded business and civic leaders actively seek new industries to our area.

The Columbus County Economic Development Commission (EDC) exists to create new economic development in Columbus County. The county is host to a number of diverse manufacturers providing jobs at varying employment levels. Working with the Committee of 100, the EDC seeks to recruit viable industries while assisting the growth and stability of firms already located in the county. Groundbreaking ceremonies were held recently for a new industrial park in order to accommodate new investment in Columbus County.

Available land and buildings, coupled with an abundant supply of potential labor, make Whiteville and Columbus County a desirable area for industrial growth.

Our work force is ambitious, nurtured by strong work ethics and committed to excellence. The future looks promising. Come to Whiteville and see that we mean business.

Atlantic Corp.

Printing, Paper Products

Established 1946 • 125 Employees
Rusty Carter, Owner • Mike Grove, VP
Post Office Box 67
Tabor City, North Carolina 28463
Phone 910-653-3153

Council Tool Co.

Forging Tools

Established 1886 • 80 Employees
Jack Council • James Bass
Post Office Box 165
Lake Waccamaw, North Carolina 28450
Phone 910-646-3011

Four Season Apparel Co.

Sportswear

Established 1994 • 120 Employees
Rich Fary, Plant Manager
Highway 701 North
Tabor City, North Carolina 28463
Phone 910-653-2738

W.E. Bailey & Son, Inc.

Wholesale Produce

Established 1940 • 25 Employees
George Wooten, Plant Manager
South Mills Street • Post Office Box 467
Chadbourn, North Carolina 28431
Phone 910-654-5163

C & J Tire Service

Tires, Recapping

Established 1954 • 40 Employees
Jerry Stephens, Plant Manager
116 West 1st Avenue
Chadbourn, North Carolina 28431
Phone 910-654-4108

Georgia-Pacific Corp.

Chip & Saw

Established 1971 • 76 Employees
John Livingston, Plant Manager
1980 Georgia-Pacific Road
Whiteville, North Carolina 28472
Phone 910-642-5081

Carolina Power & Light Co.

30 Employees

3524 Chadbourn Highway
Whiteville, North Carolina 28472
Phone 800-452-2777

Exact Equipment Corp.

Automated Mechanical Scales & Wrapping Equip.

Established 1996 • 25 Employees
Stan L. Smith, Plant Manager
523 Fitter Hill Road
Whiteville, North Carolina 28472
Phone 910-642-5913

Georgia-Pacific Corp.

Structural Panels (Plywood)

Established 1973 • 314 Employees
Nick Nicolcitta, Plant Manager
1980 Georgia-Pacific Road
Whiteville, North Carolina 28472
Phone 910-642-5041

Coca-Cola Bottling Co.

(Consolidated) Soft Drinks

Established 1920 • 50 Employees
Hugh McMillian, Plant Manager
239 Industrial Park Boulevard
Whiteville, North Carolina 28472
Phone 910-642-3002

Filtex-Precise, Inc.

Synthetic Yarn

Established 1989 • 31 Employees
David Griggs, Plant Manager
218 701 By-Pass • Post Office Box 755
Tabor City, North Carolina 28463
Phone 910-653-5200

Gore Trailer Mfg., Inc.

Horse & Stock Trailers

Established 1964 • 22 Employees
D. Jackson Gore, Pres. • Brett Gore, Mgr.
305 Gore Trailer Road
Whiteville, North Carolina 28472
Phone 910-642-4298

Conflandey Inc.

Fine Steel Wire

Established 1986 • 50 Employees
Bertrand Bougenot, Plant Manager
3620 Chadbourn Hwy.
Whiteville, North Carolina 28472
Phone 910-641-0413

Flowline

Division of Markovitz Enterprises, Inc.

Corrosion Resistant Pipe Fittings
Established 1984 • 27 Employees
Richard Price, Plant Manager
164 Industrial Drive
Whiteville, North Carolina 28472
Phone 910-642-2058

Haworth Myrtle Mueller Operations

Office Furniture

Established 1984 • 225 Employees
Chester Clark, Plant Manager
US 76 West • Post Office Box 426
Chadbourn, North Carolina 28431
Phone 910-654-3104

HoltraChem Mfg. Inc.

Chlorine & Caustic Acid
Established 1963 • 85 Employees
Richard Crafts, Plant Manager
#1 Industrial Drive • Post Office Box 127
Riegelwood, North Carolina 28463
Phone 910-655-2223

Huron Tech Corp.

Electrolytic Cells Parts Equipment
Established 1964 • 35 Employees
Warren Bailey, President, CEO
R.C. Alzcorbe, Marketing Manager
Post Office Box 189
Delco, North Carolina 28438
Phone 910-655-3845

International Paper

Riegelwood Operation
Pulp & Paper Products
Established 1952 • 1,097 Employees
Louis O. Grissom, Plant Manager
865 John L. Riegel Road
Riegelwood, North Carolina 28456
Phone 910-655-2212

International Paper

Pine Lumber
Established 1976 • 184 Employees
John Alford, Plant Manager
Post Office Box 57
Riegelwood, North Carolina 28456
Phone 910-655-4106

J & C Wholesale/Jones Stores

Distribution Center for Variety Stores
Established 1954 • 59 Employees
Mike Jones, President
Highway 701 ByPass
Tabor City, North Carolina 28463
Phone 910-653-4001

J.L. Powell & Co., Inc.

Heart Pine Flooring
Whiteville, North Carolina 28472
Phone 910-642-8989

KRS Plastics

Polyester
Established 1985 • 9 Employees
William E. Douglas, Plant Manager
Post Office Box 693
Tabor City, North Carolina 28463
Phone 910-653-3602

Millwork Specialties

Windows & Doors
Established 1988 • 11 Employees
Emory Worley, Owner
2530 James B. White Hwy. N.
Whiteville, North Carolina 28472
Phone 910-642-7511

National Spinning Co., Inc.

Yarn
Established 1957 • 325 Employees
Buford Hutchins, Plant Manager
Post Office Box 547
Whiteville, North Carolina 28472
Phone 910-642-4181

The News Reporter

Publisher, Printer, Office Supplies
Established 1896 • 61 Employees
James C. High, Publisher • Les High, Editor
Post Office Box 707
Whiteville, North Carolina 28472
Phone 910-642-4104

Owens-Corning

Vinyl Siding
Established 1994 • 200 Employees
John Oleson, Plant Manager
Post Office Box 919
Fair Bluff, North Carolina 28439
Phone 910-649-7501

Penn Ventilation Co., Inc.

Ventilators
Established 1970 • 148 Employees
Ted Sharpe, Plant Manager
Post Office Box 714
Tabor City, North Carolina 28463
Phone 910-653-3061

Pridgen Cabinet Works, Inc.

Cabinets & Woodworking
Established 1947 • 47 Employees
Lester Pridgen, President
910 Jefferson Street
Whiteville, North Carolina 28472
Phone 910-642-7175

Remote Data Systems

Water Monitoring Instruments
Established 1993 • 13 Employees
Ben Frink • Bill Applewhite
163 BEMC Road
Whiteville, North Carolina 28472
Phone 910-640-3349

Sumitomo Electric Lightwave, Corp.

Fiber Optics
Established 1996 • 150 Employees
Ed Dozier, Plant Manager
Industrial Park
Whiteville, North Carolina 28472
Phone 910-642-8413
910-862-2576 (Elizabethtown)

Telemarketing Concepts

Telemarketing
Established 1997 • 200 Employees
Torie Jones, Manager
809 S. Madison Street
Whiteville, North Carolina 28472
Phone 910-640-3003

Top Tobacco Co., LP

Pipe & Roll Your Own Tobacco
Established 1988 • 61 Employees
Claus Platt, Plant Manager
Post Office Box 205
Lake Waccamaw, North Carolina 28450
Phone 910-646-3014

Waccamaw Lumber Co.

Lumber
Established 1935 • 53 Employees
B.C. "Sonny" Sanders, Plant Manager
Post Office Box 37
Tabor City, North Carolina 28463
Phone 910-653-3162

Whiteville Plywood, Inc.

Plywood
Established 1958 • 100 Employees
Dick Crutchfield, President
Post Office Box 722
Whiteville, North Carolina 28472
Phone 910-642-7114

Wright Corporation

Special Chemicals
Established 1959 • 120 Employees
Dave Swart, General Manager
Post Office Box 402
Riegelwood, North Carolina 28456
Phone 910-655-2263

Fire Department

Whiteville, North Carolina 28472
Phone 910-642-3111

Highway Patrol

Whiteville, North Carolina 28472
Phone 910-642-7169

Columbus County Hospital

Whiteville, North Carolina 28472
Phone 910-642-8011

Whiteville Police Department

Whiteville, North Carolina 28472
Phone 910-642-5112

Sheriff, Columbus County

Whiteville, North Carolina 28472
Phone 910-642-6551

Rescue Squad

Whiteville, North Carolina 28472
Phone 910-642-5111

Brunswick Ambulance Service

Whiteville, North Carolina 28472
Phone 910-642-4272

American Red Cross

Columbus County Chapter
Phone 910-642-3364

Help Mission

Commerce Street
Whiteville, North Carolina 28472
Phone 910-642-2724

Carolinas Medical Response

Ambulance Transport
7683 Sidney Cherry Grove Rd.
Tabor City, North Carolina 28463
Phone 910-649-5830

Columbus County Medac-EMS

209 W. Main Street
Whiteville, North Carolina 28472
Phone 910-640-3049

GENERAL INTEREST NUMBERS

Post Office

Lee Street
Whiteville, North Carolina 28472
Phone 910-642-3336

Social Security Administration

Whiteville, North Carolina 28472
Phone 910-642-7182

Columbus County Health Dept.

Jefferson Street
Whiteville, North Carolina 28472
Phone 910-640-6615

Liberty Home Health

901 Jefferson Street
Whiteville, North Carolina 28472
Phone 910-642-5808

Board of Elections

304 Jefferson Street
Whiteville, North Carolina 28472
Phone 910-640-6609

City Hall

South Madison Street
Whiteville, North Carolina 28472
Phone 910-642-8046

Animal Control

Jefferson Street
Whiteville, North Carolina 28472

Drivers License

Chadbourn Highway
Whiteville, North Carolina 28472
Phone 910-642-2017

License Plate Office

Love Mill Road
Whiteville, North Carolina 28472
Phone 910-642-7345

IRS

Toll Free (Internal Revenue Service)
Phone 800-242-1040

Library

407 North J. K. Powell Boulevard
Whiteville, North Carolina 28472
Phone 910-640-6620

Columbus County Tax Office

Courthouse Square
Whiteville, North Carolina 28472
Phone 910-640-6635

Whiteville Downtown

Development Commission
P.O. Box 1064
Whiteville, North Carolina 28472
Phone 910-642-9212

Columbus County**Economic Development Commission**

P.O. Box 456
Whiteville, North Carolina 28472
Phone 910-640-6608

Columbus County Tourism Bureau

104 E. Walter Street
Whiteville, North Carolina 28472
Phone 910-640-2818
1-800-845-8419
www.discovercolumbus.org

Greater Whiteville Chamber of Commerce

601 S. Madison Street
Whiteville, North Carolina 28472
Phone 910-642-3171
888-533-7196
www.whitevillechamber.nu

Greater Tabor City Chamber of Commerce

Tabor City, North Carolina 28463
Phone 910-653-2031

Greater Chadbourn Chamber of Commerce

208-A Brown Street
Chadbourn, North Carolina 28431
Phone 910-654-3445

Greater Fair Bluff Chamber of Commerce

170 Barden Street
Fair Bluff, North Carolina 28439
Phone 910-649-7202

REST HOMES AND/OR NURSING HOMES

Century Care Center

316 West Burke Street
Whiteville, North Carolina 28472
Phone 910-642-7139

Waccamaw Village Rest Home

Highway 74 East
Lake Waccamaw, North Carolina 28450
Phone 910-646-3153

Premiere Living

106 Cameron Drive
Lake Waccamaw, North Carolina 28450
Phone 910-646-3132

Shoreland Health Care & Retirement

Flowers-Pridgen Drive
Whiteville, North Carolina 28472
Phone 910-642-4300

Hazem Bladgett

20 college transfer and technical associate degree programs, job training and training, adult literacy and high school completion classes, and customized "in-plant" education for business and industry. Over 2,500 citizens are served annually through SCC's College Transfer Guarantee and Allied Health Consortium agreements, students can be sure that designated courses taken at Southeastern will transfer to other community colleges, colleges and universities. The college's Small Business Center serves 1,300 area business people yearly through free seminars, professional development opportunities, and consultation services.

The college works closely with business and industry to build a well-trained workforce, to provide services and educational opportunities for existing firms, and to attract new companies to the area.

Because the job of educating students is too complex to be done in isolation, effective schools depend upon a working partnership among parents, community leaders, businesses and school personnel. Whiteville educators encourage total involvement, active participation and support from all citizens, and we're proud to say that support is freely given.

WHITEVILLE CITY SCHOOLS

Whiteville Primary School

510 Washington Street
Whiteville, North Carolina 28472
Pre-Kindergarten - 2nd grade
Phone 910-642-4119
Email - lhewitt@mail.whiteville.k12.nc.us

Wood Elementary School

Calhoun Street
Whiteville, North Carolina 28472
3rd - 5th grade
Phone 910-642-3121
Email - dharritan@mail.whiteville.k12.nc.us

Central Middle School

S. Martin Luther King Jr. Avenue
Whiteville, North Carolina 28472
6th - 8th grade
Phone 910-642-3546
Email - mfrink@mail.whiteville.k12.nc.us

Whiteville High School

413 North Lee Street
Whiteville, North Carolina 28472
9th - 12th grade
Phone 910-642-8054
Email - whiteville.k12.nc.us

Vocational Rehabilitation

Whiteville High School

413 North Lee Street
Whiteville, North Carolina 28472
Phone 910-642-7113

WHITEVILLE PRIVATE SCHOOLS

Columbus Christian Academy

North Madison Street
Whiteville, North Carolina 28472
Phone 910-642-6196
Kindergarten - 12th grade
K-6 Beka Material
7-12 Accelerated Christian Education

Waccamaw Academy

Warrior Trail
Whiteville, North Carolina 28472
Phone 910-642-7530
Pre-School - 12th Grade
Academic Excellence in a Caring
Environment

PRESCHOOL PRIVATE

Whiteville United Methodist Church Preschool

902 Pinkney Street
Whiteville, North Carolina 28472
Phone 910-642-3376

Westminster Children School

"Montessori Method of Teaching"
307 S. Franklin Street
Phone 910-642-2762

Waccamaw Academy School

Warrior Trail
Whiteville, North Carolina 28472
Phone 910-642-7530

COLLEGES

Southeastern Community College

Highway 74-76 (Chadbourn Hwy.)
P.O. Box 151
Whiteville, North Carolina 28472
Phone 910-642-7141

Churches available in area.....	Protestant - 97
	Jewish - 1
	Catholic - 1
Local Motels/Hotels.....	6
Number of Rooms	252
Shopping Centers	8
Rec. Programs Provided by City & Council	
Swimming Pools	5 Private
Tennis Courts	24
Golf Courses.....	1 Private, 2 Public
Country Clubs	1
Movie Theaters.....	3
Parks	20
1 state park	Lake Waccamaw State Park

	Employees
Atlantic Publishing	113
C&J Tire Company	29
Carolina Power & Light	30
Coca-Cola	33
Conflandey	50
Council Tool Company	72
Exact Equipment Company	22
Filtrec-Precise	31
Flowline Corporation	27
Four Seasons Apparel	120
Georgia Pacific	349
Gore Trailer Manufacturing	25
Haworth Myrtle-Muller	225
Holtra Chemical	85
Huron Tech Corporation	5
International Paper	1092
International Wood Products	184
KRS Plastics	9
Millwork Specialties	20
National Spinning	337
News Reporter	66
Owens-Corning	222
Penn Ventilation	148
J & C Wholesale / Jones Stores	150
J.L. Powell / Heart Pine Flooring	6
Pridgen Cabinet Works, Inc.	47
Remote Data Systems	20
Southeastern Community College	348
Sumitomo Electric	150
Telemarketing Concepts	200
Top Tobacco	66
Waccamaw Lumber	53
Whiteville Apparel	600
Whiteville Plywood	72
Wright Chemical	120

Here Are Several Reasons To Grow With Us!

COLUMBUS COUNTY HOSPITAL PHYSICIAN LIST

• Anesthesiology

Robin Dimitriou, M.D.
642-8011

Fred Obrecht, M.D. F.A.C.P.
642-8011

• Cardiology

V. Wade Hash, M.D.
642-8100

• Family Medicine

Ray Thigpen, M.D.
642-6121

Caroline Gessert, M.D.
641-0202

Essam Eskander, M.D.
654-3143

Melvin Gerald, M.D.
642-2050

Richard Schmits, M.D.
642-4078

• Gastroenterology

Allan Menachem, M.D.
F.A.C.G.
642-6121

• General Surgery

B.U. Changappa, M.D.
642-4711

• Gynecology

Samuel N. Wheatley, M.D.
642-3294

**• General, Vascular,
Thoracic Surgery**

Hugh Daniel, M.D.
642-3214

Ronald M. Walters, M.D.
642-3214

Tod Hanover, M.D.
642-3214

L.E. Donayre, M.D.
642-3136

• Internal Medicine

Allan Menachem, M.D.
F.A.C.G.
642-6121

Richard Berry, M.D.
642-0300

Richard Fleming, M.D.
642-8157

John D. Hodgson, M.D.
642-0331

Henry W. Traylor, M.D.
642-6121

Shobha Farias, M.D.
642-4711

Jeff Hurwitz, M.D.
646-4078

Ashrito Dayal, M.D.
642-2706

Cynthia Green, M.D.
914-0370

David A. Martin, M.D.
642-2286

T. Yenumulapally, M.D.
642-2050

• Neurology

Donald Solomon, M.D.
640-2232

• Obstetrics/Gynecology

Peter M. Kindschuh, M.D.
642-3294

Stephen T.F. Varner, M.D.
642-3294

• Orthopedics

Stephen J. Candela, M.D.
640-1102

William S. Ogden, M.D.
642-0337

• Otorhinotaryngology

(Ear, Nose and Throat)
Erik Kenyon, D.O.
914-0540

• Pain Management

Toni Harris, M.D.
640-3273

• Pathology

M. Ausley, M.D.
642-8011

• Pediatrics

Richard Waldman, M.D.
642-6121

Usha Dayal, M.D.
642-2706

Caroline Gessert, M.D.
641-0202

Ray Thigpen, M.D.
642-6121

**• Pediatrics/Pediatrics
Neurology**

Usha Dayal, M.D.
642-2706

• Podiatry

Don Peacock, D.P.M., M.S.
642-7755

• Radiology

Doug Burnette, M.D.
642-8011

D. Bastug, M.D.
642-8011

• Rheumatology

Ashrito Dayal, M.D.
642-2706

• Urology

Ronald P. Glinski, M.D.
642-5832

C. Cheuk, M.D.
642-5832

*Name:

Ph:

7 Year old from Columbia (Tyrell county) who doesn't have access to a library (but with high speed Internet access would be able to access the Library of Congress)

** We will have name and contact information by Monday.

***Name: Larry Keck of Montage Data Systems**

Ph: 828-265-2407, hm: 828-264-6673;

email: lkeck@montagedata.com

Owner of Montage Data Systems and its subsidiary NewRiverNet.com. located in Western North Carolina. NewRiverNet.com provides clients with Internet applications and services that help them with e-commerce. By offering a low cost package that includes web site design as well as other tools necessary for e-commerce, they help their rural customers save time, money and increase overall website effectiveness.

Larry moved his business from Durham to Boone to have access to recent Appalachian State graduates to work for his company. His cost for Internet access went from \$800 per month to \$2000 per month.

Name: Marion Sofield, Economic Development Director for Boone Area Chamber of Commerce, Watauga County;

Ph: 828-264-3082; email: wccdc@boone.net.

Marion is an economic development director who deals regularly with connectivity issues in trying to locate companies to Watauga County. She has worked with Larry Keck and Montage Data Systems extensively and is well-versed in technology related fields.

***Name: Buddy Lemons, Baker Limestone**

Ph: 919-742-4881

His company, Baker Limestone, went on-line to sell farm equipment and quintupled sales in the first year – from \$1 million to \$5 million. *** Because his company was one of the sites considered by the White House, no one from the Dept. of Commerce has contacted him. We didn't know what the White House had already told him regarding the potential visit.

***Name: Wally Bowen, Mountain Area Information Network**

Ph: 828-255-0182

home: 828-252-0600

cell: 828-777-6130.

Tess is assistant to Wally - 828-255-0182;

her home: 828-689-4633

His company, Mountain Area Information Network, used \$800,000 federal grant money to bring together 13 rural mountain counties. He has 4,000 paying users paying \$150 per

year. Successes include a couple from Burnsville that uses its website to sell Buddhist prayer cushions internationally.

Name: WH Cole, President, Image Design, Bladen County

Ph: 910-872-1046

This company has had and is having multiple problems with connectivity. This company is involved with every step of the graphic design process, from designing advertising, logos, signs, etc., to manufacturing to distribution of the finished product. Their business has become increasingly reliant on Internet technology. In order to compete with other graphic design companies, they have to be able to show customers, or potential customers, examples of the finished product. The Color Image files that they deal with are very large and can only be handled with high speed access. Currently they rely on Fed Ex and the US Mail while their competitors are able to download and email files in minutes.

*** Rep. McIntyre's office has been contacted about this company, and he has in turn been in contact with the White House and the Dept. of Commerce to try to get the President to visit their site. Because their site was not chosen, I think it would be a good idea to include them in the roundtable, to appease both them, and Rep. McIntyre.

Name: Don Watson, House Autry Mills, Sampson county

Ph: 910-594-0802

House Autry Mills, a producer of corn meal breaders and mixers, has no local internet access and currently use AOL as their internet service provider, which means they have to dial up Raleigh, Fayetteville, or Wilmington – all long distance calls - each time they need to be online. Furthermore, as more of their customers are requiring them to be on line more, their IT related costs are rising.

Furthermore, most of House Autry's sales reps are located in surrounding states and on-line communications are increasingly important for internal communications, downloading files, retrieving information, etc. Because the company is going to open up a new facility later this year, which will increase the need for internal on-line communications.

Having faster access is also an issue. In the near future, House Autry is looking to manage inventory with grocery store warehouses on-line, but downloading inventory information directly from a warehouse, determining their supply of House Autry products and re-supplying them as needed. Because this will require the downloading of detailed information, they will need higher speed access, and again, lower costs before that can be fully implemented.

Name: Steve Runyon, Manager of Resource Planning for Clifton Precision, Murphy, NC

Ph: 828-837-5115 ext. 276

Steve Runyon is the manager of Resource Planning for Clifton Precision in Murphy, which makes fractional horsepower motors and employs 350 people. Clifton Precision

does much of its work on line including inventory, sales and marketing and financial analysis. But to do that in Murphy costs \$4800 a month, compared to the \$1800 the company's sister plants and headquarters spend. Over time, this makes his plant less profitable, and puts the 350 people who work there at risk if business slows down.

*** Steve was a part of the Rural Prosperity Task Force report presentation to the Gov. in January. Although he didn't give a formal speech at that event, he did talk to reporters afterwards and was found to be well spoken, intelligent and sincere.

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Thomas A. Kalil

04/19/2000 10:16:48 AM



Record Type: Record

To: Elliott H. Baer/OPD/EOP@EOP

cc: Gigi E. Georges/OPD/EOP@EOP, Kendra P. Goldbas/OPD/EOP@EOP

Subject: Possible North Carolina Sites

Gene:

In addition to some sites - it would be good to ask him a few other questions:

1. People that he would like to have included in the roundtable -- if we decide to have one.
2. Someone we can follow up with on his staff if we have additional questions
3. Other NC companies that might be willing to announce deliverables
4. Any aspects of his report that have been controversial with the private sector -- e.g. using the state network to provide broadband services to rural areas.

We're checking out one other site that I'm trying to get information on ASAP.

Rural North Carolina

On April 26th, the President will travel to eastern North Carolina to discuss the digital divide and rural broadband.



Baker Limestone, Inc & Farms.com
Siler City, North Carolina

Baker Limestone is a small farm supply dealer located near Siler City. The business was built primarily on selling agricultural lime, fertilizer, seed and feed to farmers. Faced with increasing local competition, Baker's owner Buddy Lemmons and his wife Joanne decided to diversify into e-commerce market. He realized that farmers, with less dollars to pay employees, were having to do more of the work themselves and finding less time to shop for the supplies they needed. He has set up a website and now sells ~~agricultural chemicals all over the United States~~. Buddy joined with other farmers in North Carolina and began Farms.com. Using the internet has allowed farmers to have products delivered to them without having to travel great distances to shop. It has allowed Baker Limestone to expand its customer base beyond the 40,000 people living in their county. In 1998, Baker Limestone had \$1 million in sales; in

1
1999, Baker Limestone had \$5 million in sales.

Whole county only had 40,000 people in it -- so it is pretty rural.

Note: This is the county where county commissioner made anti-immigrant comments - followed by David Duke rally.

House Autrey Mills
Newton Grove, North Carolina

(Note: company has an EPA violation -- we're checking to see how serious it is)

House Autrey Mills is a small business (48 employees) that produces corn-meal breaders mixers. It has no local internet access and currently uses AOL as their internet service provide, which means they have to dial up Raleigh, Fayetteville or Wilmington -- all long distance calls -- each time they need to be online.

Their customers primarily consist of grocery stores and restaurants throughout the southeast, the northeast and mid-Atlantic. Most of these companies do purchasing on line, and as their customers need House Autry Mills to be on line, their IT costs are rising. Although House Autrey Mills is a successful company, but in the near future, they will need broadband wireless in order to stay competitive with other companies in urban areas.



Thomas A. Kalil

04/19/2000 10:23:23 AM



Record Type: Record

To: Elliott H. Baer/OPD/EOP@EOP

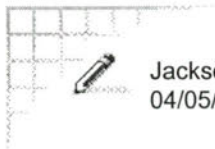
cc: Gigi E. Georges/OPD/EOP@EOP, Kendra P. Goldbas/OPD/EOP@EOP

Subject: Possible back-up site for NC

Pls print this off and give it to Gene ASAP
for Erskine call

Remote Data Systems
Whiteville, North Carolina
Columbus County
7th Congressional District (McIntyre D)
www.rdsys.com

Remote Data Systems is a successful small business in eastern North Carolina that manufactures equipment made in wetland studies. It is difficult to get internet access in Columbus County. They have had only one phone line and in order to use the internet they would miss incoming calls. They paid \$7,000 out of pocket to have phone and data services put into their site, but this is as much as they can do and still is not sufficient. In addition, they are paying \$100 - \$250 a month in internet access. They believe that in order for their business to remain success, they must be more efficient in e-commerce. Operating out of such a remote area, e-commerce is the only way to expand their business.



Jackson T. Dunn
04/05/2000 08:30:58 PM

*Background
from the Website*

Record Type: Record

To: Thomas A. Kalil/OPD/EOP@EOP, Natasha F. Bilimoria/OPD/EOP@EOP, Gigi E. Georges/OPD/EOP@EOP

cc:

Subject: Possible North Carolina Sites

Rural North Carolina

On April 26th, the President will travel to eastern North Carolina to discuss the digital divide and rural broadband.

Possible locations include:

House Autrey Mills
Newton Grove, North Carolina

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[Swine](#)

[Animal Health](#)

[Poultry & Egg](#)

[Cattle](#)

[Real Estate](#)

[Feed & Grain](#)

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About Us

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4/6/00

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Upcoming Markets

Mar. 30

- [PVA Cattle Auction](#)
Apr. 4
- [CRi Pig Auction](#)
Apr. 11
- [CRi Pig Auction](#)
Apr. 14
- [PVA Cattle Auction](#)
Apr. 18
- [CRi Pig Auction](#)
Apr. 25
- [CRi Pig Auction](#)

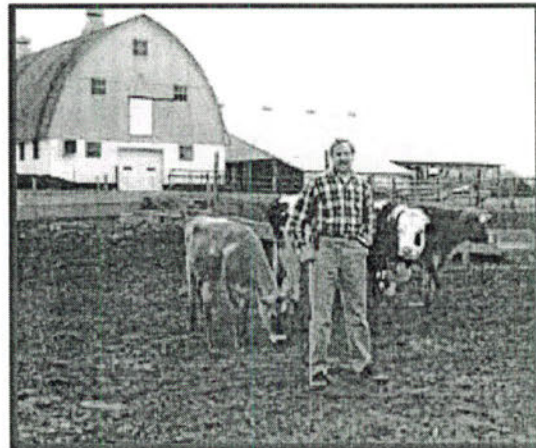
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Farms.com was started in 1995 by cattle farmer Ben Zaitz. Zaitz grew up on a dairy farm and was dissatisfied as hard times hit the dairy business. He had a vision of creating, "a complete marketplace for all participants in agriculture, where crop producers and livestock farmers could come together and do business without having to step a foot off their farms."



CEO & Founder, Benjamin Zaitz

Some of Zaitz's dairy business buddies poked gentle fun when he developed his first Web site called COW (Cattle Offerings Worldwide), which displayed classified ads for cattle. Not a lot of farmers were hooked up to the Internet four years ago. Now its estimated that up to 60% of family farms are online.

COW has since become Farms.com, which provides an arena for real-time farm auctions and trading. Close to 100,000 farmers and people in agribusiness use this site every month. Millions of dollars in cattle, agricultural chemicals, pigs, feed & grain commodities, poultry and egg products, and animal healthcare products are traded every month.

Forrester Research of Cambridge, Mass, a leading Internet analyst, in its report Resizing Online Business Trade, predicts that B2B (Business to Business) e-commerce will hit a total of \$1.3 trillion by 2003, accounting for 9.4% of total U.S. business sales. Varda Lief, a senior analyst at Forrester specializing in e-commerce, says B2B transactions will far surpass business-to-consumer deals and dwarf giants like eBay and Amazon.com in revenue and sales.

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The E-Trade Stampede

The Big Bucks on the Internet these days are coming from B2B (business-to-business) deals--buying and selling commodities like paper, plastics, chemicals, even cows

BY JANICE MALONEY

Like his daddy before him, Ben Zaitz knew he was going to grow up to be a cowman. And until four years ago, he was--moving 2,000 to 3,000 head of cattle a year between his farm in North Carolina and his farm in Minnesota. But in 1995, Zaitz, then 40, got dissatisfied. His customers were disappearing as hard times hammered the dairy business, especially in the Southeast. And his "profit margins were going to nothing," he says. "I just couldn't see much future in what I was doing." But Zaitz could see a future on the Internet, to which he'd been introduced a few months earlier. He had a vision of creating "a complete marketplace for all participants in agriculture," he says, "where crop producers and livestock farmers could come together and do business without having to step a foot off their farms."

Zaitz traded in his farm boots for a laptop and developed COW, the Cattle Offerings Worldwide website. In its first incarnation, COW was basically online classified ads for cattle. "There were not very many farmers on the Internet back then," says Zaitz. "In fact, it was mildly embarrassing. I'd be at cattle sales, conferences and dairy shows, and people would come up to me and say, 'Hey, Ben, how's that Internet thing going?' and they'd slap me on the back with a smirk."

Eventually the farmers caught up with Zaitz's vision, helped along by new technology. In just the few years since Zaitz bought his first modem, analysts estimate that close to 35% of the nation's 3 million farmers have gone online. COW has evolved into <http://Farms.com>, one of the first e-business sites to support real-time farm auctions. Farmers who visit the site can buy and sell entire lots of cattle via digital video feeds and still images. They can also get chemicals, grain and feed commodities online. On average, says Zaitz, <http://Farms.com> has more than 40,000 unique visitors a month. During the past year, the site has held in excess of \$2 million worth of auctions of livestock and

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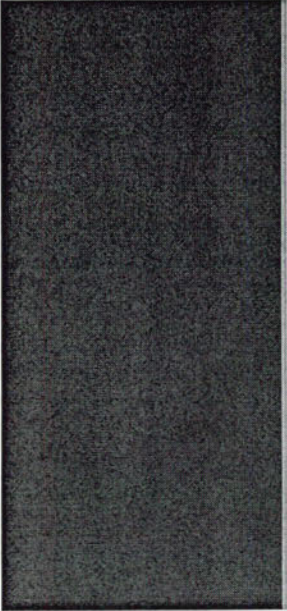
of \$2 million worth of auctions of livestock and commodities. Zaitz, who has invested more than \$1 million of his own money in his venture, expects revenues to increase tenfold this year.

Zaitz's story is not unique. From farming to food to microprocessors; from solid-waste control to plastics to such traditional Rust Belt goods as steel, virtually every American industry is represented online by at least one entrepreneur who has set up shop to cement business-to-business commerce. Meanwhile, large corporations are using the Internet to build bridges between themselves and their strategic partners. Each member of the online biz-to-biz (B2B) brigade is hoping to use the Net's instantaneous global reach to build digital marketplaces where buyers and sellers who may never have met in the off-line world can gather daily to move huge and growing amounts of the nation's basic goods.

Experts who follow this emerging business-to-business electronic-commerce market call it frictionless, because no faxes, phone calls or paper trails snake back and forth to clog the communications channel between buyer and seller. That is just one aspect of these new wholesale channels that has analysts salivating. B2B companies "are going to reshape the entire economy," says Charles Finnie of Volpe Brown Whelan & Co., an investment-banking firm based in San Francisco. "It's not unlikely that Mr. Greenspan will be sitting in front of Congress in the next couple of years saying one of the main reasons inflation is dead is the B2B Internet companies."

Forrester Research of Cambridge, Mass., a leading Internet analyst, agrees. Its report, *Resizing Online Business Trade*, predicts that B2B e-commerce will hit a total of \$1.3 trillion by 2003, accounting for 9.4% of total U.S. business sales. Varda Lief (see the box, following), a senior analyst at Forrester specializing in e-commerce, says business-to-business transactions will far surpass business-to-consumer deals and dwarf giants like eBay and <http://Amazon.com> in revenue and sales. "Business-to-business is the stuff that makes everything run," says Lief.

If B2B is so basic, how come most of us are about as familiar with it as we are with life on Mars? Steve Jurvetson, a partner in Silicon Valley venture-capital firm Draper Fisher Jurvetson who has invested in FastParts, an electronics trading exchange, and Sonnet Financial, an online foreign exchange, calls B2B "the iceberg waiting to emerge." "Most people," Jurvetson says, "understand the business-to-consumer market because they are consumers themselves. It's kind of like the Beardstown Ladies' investment protocol: use a product, come to understand it and then invest in it. With business-to-business, though, unless you are entrenched in that industry and really understand that market segment, you are not going to appreciate how it's revolutionizing that



business."

But sometimes numbers alone can paint a pretty clear picture. Take <http://Chemdex.com>, a vertical e-market based in Palo Alto, Calif., developed for the pharmaceutical and biotech industry in 1997. Chemdex is reducing sales and distribution costs industrywide by 20%--more than \$4 billion of the total \$20 billion global life-sciences research-products market, according to Volpe Brown analyst Finnie. "In effect," he says, "Chemdex is turning around to the chemical producers, and it is saying, 'Congratulations! This is your lucky day. You just won the lottery. Here's a check for \$4 billion.' These guys have not seen their costs structure improved like this ever. It's a tectonic shift." [MORE>>](#)

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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.

Advanced Telecommunications in Rural America

The Challenge of Bringing Broadband Service to All Americans

National Telecommunications and Information Administration

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Communications and Information

Rural Utilities Service

Christopher A. McLean, Acting Administrator

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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 Revolution²

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.

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.

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

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 all 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.

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 1/30th) 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

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.

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

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

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 Functionality into Mini-Fiber Nodes*, Feb. 1, 2000. (www.cabledatcomnews.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.cabledatcomnews.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/zdntv/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 2004³⁹ 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, MCI/WorldCom 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.

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 Distribution 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

Town Size Category	Towns Served in Category
Over 1,000,000 Population	100% of 8 Towns
500,000 - 1,000,000	73.3% of 15 Towns
250,000 - 500,000	65.9% of 41 Towns
100,000 - 250,000	40.4% of 136 Towns
50,000 - 100,000	26.2% of 355 Towns
25,000 - 50,000	15.9% of 741 Towns
10,000 - 25,000	7.6% of 1,852 Towns
5,000 - 10,000	5.0% of 2,336 Towns
2,500 - 5,000	2.0% of 3022 Towns
1,000 - 2,500	0.7% of 4,936 Towns
under 1,000	0.2% of 9,993 Towns

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

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 Public 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, Hawarden, 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

Town Size Category	Towns Served in Category
1,000,000 and Larger	100% of 8 Towns
500,000 - 1,000,000	73.3% of 15 Towns
250,000 - 500,000	87.8% of 41 Towns
100,000 - 250,000	56.6% of 136 Towns
50,000 - 100,000	32.1% of 355 Towns
25,000 - 50,000	17.0% of 741 Towns
10,000 - 25,000	4.6% of 1,852 Towns
5,000 - 10,000	1.4% of 2,336 Towns
2,500 - 5,000	0.6% of 3,022 Towns
1,000 - 2,500	0.1% of 4,936 Towns
under 1,000	0% of 9,993 Towns

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

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).

Because of recent upgrades by small and rural providers, many rural customers may soon be able to receive DSL service. The National Exchange Carrier Association (NECA) recently reported in its Access Market Survey that 14% of the respondents now provide DSL service.⁷⁷ More than 700 (68%) of the 1,000 small, mostly rural companies that participate in NECA's pooled interstate traffic sensitive access tariff responded to this survey.

The National Telephone Cooperative Association (NTCA) and the Organization for the Protection and Advancement of Small Telephone Companies (OPASTCO) also released a survey of 412 small, rural telephone companies, or approximately 40% of the small telephone companies in the United States.⁷⁸ According to NTCA, 29% of the 412 respondents are planning to offer (as opposed to providing) DSL service in at least part of their service areas.⁷⁹

Nevertheless, the independents have yet to deploy DSL in their rural areas at the same rate as the RBOCs in their metropolitan areas, and their deployment is also dependent on density. According to engineers serving the independent carriers, the likelihood of offering advanced services in rural service areas is highest in the Southeast and Northeast, lower in the Midwest, and lowest in the Southwest. This roughly corresponds to the number of customers per route-mile (density) of plant in those areas. Low density equates to long loops. When loops are long, they are frequently loaded, which prevents DSL operation.

Another factor in the lower rate of independents' deployment is the fact that equipment has not been readily available for small carriers. Manufacturers have addressed the large lucrative markets by building equipment for the multi-thousand line offices found in urban areas. Rural areas, on the other hand, require small line counts and rugged equipment that frequently must function in a cabinet where there is no heating or cooling. With the recent adoption of the G.lite, standard (discussed below), which removed the uncertainty of competing but incompatible systems, it is expected that equipment suitable for rural installations will become more readily available.

Summary of Rates of Deployment in Rural Compared to Non-Rural Areas

Cable modem and DSL are the two broadband technologies that are now being rapidly deployed, permitting a comparison between rural and non-rural areas. The deployment of both technologies declines with population density. As a result, cable modem and DSL services, although increasingly available in rural towns, are still far more available in larger metropolitan areas.

77 National Exchange Carrier Association, *Keeping America Connected: The Broadband Challenge, Access Market Survey of NECA's Traffic Sensitive Pool Members*, December 1999. (www.neca.org/ams.htm) According to a NECA spokesperson, approximately 90% of customers receiving service from NECA pool members can receive some type of service beyond voice grade access on existing lines using "off-the-shelf" technology. This would include services such as extended range ISDN (128 kilobits/second) which do not meet the FCC definition of broadband.

78. National Telephone Cooperative Association (NTCA), *Internet/Broadband Availability Survey - Report*, September 15, 1999.

79. *Id.*

C. Capability of Enhancements and Feasibility of Alternatives for Rural Broadband

Issue 4. Capability of various technical enhancements to existing wireline and wireless networks to provide last mile advanced telecommunications capability in rural areas.

Both existing cable TV and telephone systems can be enhanced to provide broadband, although their capacities to serve rural areas vary. For cable, the system is typically upgraded to a hybrid fiber-coax (HFC) network. These upgrades involve building fiber to service nodes; replacing cables and connections that were either inadequate for digital data as originally installed, or that have deteriorated with time; replacing one-way amplifiers with two-way amplifiers; and placing new amplifiers at closer intervals than original amplifiers. The new amplifiers that meet these control requirements are more expensive than those required for television transmission. Systems must also be installed for monitoring and controlling signal levels within the cable system.

For rural towns, cable offers a viable “last mile” option as long as the cable operator is willing to make a significant investment to upgrade the plant. As explained above, a significant number of cable operators say that they will make that investment to serve rural towns. On the other hand, as noted, cable modem services do not generally reach out-of-town rural customers because the cable plant itself does not extend into those areas.

In contrast to the extensive physical upgrades that are usually required throughout a cable network to provide cable modem services, DSL can be provided to the majority of telephone customers by installing high-speed switches (called DSL Access Multiplexers, or DSLAMs) in local telephone company central office and subscriber carrier sites. As discussed earlier, telephone plant can support DSL if the customer does not live more than 18,000 feet from the DSLAM equipped point. As also mentioned above, the 1992 RUS loop survey shows that at least 65% of the rural plant in RUS-financed systems is DSL capable. The readiness of national plant is undoubtedly higher because it encompasses non-rural, therefore shorter, loops.⁸⁰

As long as the plant is DSL-capable, DSL can offer a last mile solution in hard-to-serve rural areas. Rural carriers building new plant have stated that building DSL-capable loop plant is generally only 20%-35% more expensive than non-DSL capable plant. The development of G.lite has also made it easier to deploy DSL to rural areas. G.lite is a new DSL standard that generally limits customers to 1.5 Megabits/second downstream and 500 kilobits/ second upstream. It trades slightly reduced bandwidth (relative to higher rate types of DSL) for reliable operation on most existing telephone lines. Operating under this new standard, twisted pair can provide up to 1.5 megabits/second out to 14,000 feet on 26-gauge copper and 18,000 feet on 24 gauge cable. This range, coupled with the presence of subscriber carrier serving areas in the countryside, may make DSL more practical than cable modems for remote areas.

80. Recent surveys demonstrate that approximately 80% of customers nationwide gain access to the Internet at rates of at least 28 kilobits/second. This level of performance strongly correlates with operation over loops shorter than 18,000 feet. See http://808hi.com/56k/_out (providing, *inter alia*, surveys of 3Com and Lucent users).

Issue 5. Feasibility of various technological alternatives to provide last mile advanced telecommunications capability in rural areas.

There are a number of new technologies that currently provide, or promise to provide, broadband service. These include fiber to the home, third generation (3G) cellular, MMDS, LMDS, and broadband satellite service. The economic and technical feasibility for serving rural areas is discussed for each technology.⁸¹

Fiber to the Home

Fiber to the home can be considered as either a technological enhancement or a technological alternative. Both cable and telephone systems have been installing fiber fed distribution points in their networks. Extending that link to the home with fiber can be considered an enhancement to the existing system. If the entire system were built from scratch, however, it could be considered a technological alternative.

Neither approach has yet demonstrated an economic advantage over conventional coax and twisted-pair copper but that day seems to be fast approaching. The cost of installed fiber in the loop has dropped to the point where it is roughly the same as copper when doing a complete system rebuild or a new area build.⁸² Because telephone plant lasts a long time and companies try to avoid rebuilds, fiber trials have generally been in new developments where the excess cost of a fiber system is primarily in the terminal equipment.

81. It should be noted that all the alternative technologies require the customer to provide the power for the equipment at his or her end. The monthly cost to power these devices may not be insignificant. More important, reliability of phone service, even with battery backup, can be affected if it is provided over one of these alternatives. During a power outage, a traditional phone system can rely on a standby generator, whereas a customer using one of these alternatives must rely on a battery that may have gone bad since the last outage. Also, batteries are generally short-term back-ups and cannot maintain reliable operation for the days or weeks of a weather-related emergency.

82. The competitiveness of fiber direct-to-the home in extreme low-density areas can be illustrated through the FCC's current Synthesis Cost Model. This model, a tool for helping to determine universal service support for the large (non-rural) carriers, designs a hypothetical telephone system for the entire country in order to calculate what it would cost to build a telephone system today. The model designs a system as if there were no existing telephone system, except that it retains the location of the wire centers.

Because the model is a mechanism of universal service, it builds its hypothetical system so that it is advanced services ready for 100% of the customers. The model groups customers into clusters that can be served with the least plant. Each cluster is served either directly by the switch or, for the more distant customers, by a fiber feeder and its own digital carrier system. All the customers within the cluster are connected to the switch or carrier system with less than 18,000 feet of twisted pair copper.

Where there are fewer than ten customers in a cluster, it may be more cost-effective to build fiber direct-to-the-home rather than use the combination of fiber, carrier, and copper as designed by the Synthesis Cost Model. This is because, under the model, each cluster requires a fixed investment of \$15,000 for carrier equipment, not counting land, building, and power. As an alternative, subscriber terminal equipment for fiber can be obtained today for approximately \$1,500 per subscriber and eliminates the need for the \$15,000 investment. Ironically, fiber may be most cost effective for the hardest-to-serve customers where new plant is being built.

MMDS

MMDS offers a last mile solution for rural areas, primarily as a technological alternative. While it is conceivable that existing MMDS television systems will be converted to digital broadband, it is far more likely that MMDS broadband will be offered primarily as a new service because the existing MMDS television customer base is so small.⁸³

MMDS holds promise for rural areas because it can operate at a radius of up to 35 miles under the best circumstances (3,848 square miles). Based on trials and early implementations, MMDS broadband can reach remote customers within that radius as long as there are appropriate conditions, such as available spectrum and a clear line of sight. As with any terrestrial microwave system, MMDS signal coverage is affected by terrain, vegetation, and buildings. These problems are exacerbated at higher frequencies.

MMDS may have an advantage over wireline service in rural areas because its cost-to-serve is not quite as dependent on the exact location of the customer within the operating radius. In other words, the cost to serve a customer living six miles from the tower is hypothetically about the same as the cost to serve a customer living one mile from the tower. Cost can still be affected by distance, however. Systems operating at ranges approaching 35 miles require much higher towers due to the curvature of the earth and the cost of towers rises rapidly with their height.⁸⁴

Economic considerations will play a role in determining where MMDS is deployed because MMDS operators may need a sizable customer base over which to spread their fixed costs. A new tower can cost between \$200,000 and \$1 million. According to certain equipment and systems providers, base station and data access equipment costs are about \$200,000 to \$400,000. Given these fixed costs, MMDS will more likely be deployed in larger towns or areas with high population densities that are not yet served by DSL or cable modems.⁸⁵

In rural America, MMDS will likely be used to serve the rural countryside surrounding a non-rural town or a cluster of rural towns that can be served from one site. To date, MMDS is deployed in towns with populations as low as 6,000. If fixed costs drop or a new tower is not required, MMDS may also become feasible in isolated rural towns and the surrounding countryside.

83. There were approximately 821,000 MMDS video subscribers in June 1999, falling from one million subscribers in June 1998. Of these, 721,000 were analog TV subscribers. See Sixth Annual Report, *supra* note 27, at ¶87.

84. See *supra* note 52.

85. In smaller rural markets, cable modems and DSL may have an advantage over new technologies, such as MMDS, because they gain revenue from services other than broadband and can offer broadband service on an incremental cost basis. Additionally, telephone companies may be eligible for universal service support system for high cost lines. Given these advantages, MMDS is unlikely to enter a market already dominated by these existing utilities.

LMDS

While LMDS is generally considered a promising wireless “last mile” solution for broadband, it holds less promise than MMDS for serving rural areas. Because LMDS operates at such high frequencies, the transmit and receive antennas must be in close line of sight of each other. In addition, rain can more easily cause a loss of the LMDS, than the MMDS, signal. For these reasons, LMDS links are typically no longer than three or four miles, limiting its use to tightly clustered groups of users. A typical application is communication between a base station and an antenna on a building rooftop, which serves the occupants of a building.

LMDS will likely be deployed in cities and higher density towns. Touch America, the telecommunications subsidiary of The Montana Power Company, now offers commercial LMDS in Butte and Billings to government and business customers. It anticipates spending \$15 million to build out its initial LMDS footprint in 25 cities.⁸⁶ The company explained, however, that it has no plans to build out to rural areas because of LMDS’s limited range.

On the other hand, several smaller incumbent carriers are testing or deploying LMDS in areas that are at least partially rural. For example, Central Texas Cooperative, located in Goldthwaite, Texas, and South Central Telephone, located in Medicine Lodge, Kansas, are both trying LMDS for their customers.⁸⁷ Virginia Polytechnic Institute is also conducting research to determine LMDS’ technical and financial viability in rural markets. The university, which won four licenses and has two wireless research centers, has created a testbed to evaluate the technology and its applications. The ultimate fate of LMDS as a rural solution will become more apparent through such trials.

Third Generation (3G) Wideband Cellular

Existing mobile wireless systems, whether analog or digital, cellular or PCS, are narrowband by design and cannot provide broadband services. Third generation wireless (3G) promises much more. Spectrum has not yet been allocated in the United States, but 3G could provide an alternative for some broadband applications.

There is no single definition of what constitutes 3G. Considerable attention has been focused on international agreements for an International Telecommunication Union standard, known as International Mobile Telecommunications - 2000, which is expected to provide:

- A wide range of data capabilities (multi-media, high-speed Internet connections, video conferencing).
- Operation in virtually every environment (indoor, pedestrian, vehicular, urban, and rural).
- World-wide connectivity available in a single device.

86. See www.mtpower.com/headlines/1999

87. Skip Richter, *Diving into LMDS*, Rural Telecommunications, July-August, 1999.

Under current proposals, there are three data rate standards. Two of these, portable at 384 kilobits/second and fixed at two megabits/second, meet the FCC definition of broadband. The third, a mobile standard, at 144 kilobits/second, does not. Other future mobile services offering lower rates than 3G are sometimes referred to as “2.5 G.”

At present, any estimates of cost or deployment would be purely speculative. Given the sophisticated nature of a cellular operation, which requires mobile handoffs from one site to another, the fixed costs per site may be significantly more than for a simpler fixed technology such as MMDS. And it must be remembered that fifteen years after cellular service was started in the United States, there are still rural areas where first generation cellular coverage is spotty or non-existent.

Broadband Satellite

Satellite systems offer another technological alternative to provide wireless broadband. These systems have an obvious advantage over terrestrial wireless systems in providing broadband to rural areas because they have a direct line-of-sight to most locations. Geo-stationary satellites have a line-of-sight to almost every location and low earth orbit multi-satellite systems are designed to have a line-of-sight to every location above ground.

Satellites may therefore be an attractive alternative for remote locations that cannot be economically connected via other last-mile technologies. These systems are not constrained by distance and offer the opportunity to leap directly to broadband service without upgrading existing terrestrial communications infrastructure. Both factors make satellite systems especially promising for serving remote rural areas, such as towns and villages in Alaska and remote western deserts and mountainous areas, which have yet to be connected via land lines for technical and/or economic reasons.

Two-way satellite systems specifically designed for broadband data are mostly still in the planning phase. Companies, such as Teledesic, Skybridge, Orblink, Pentriad, Virtual Geo/VIRGO, Spaceway, CyberStar, Sky Station, and HALO and others, are promising to deploy broadband services. Appendix C provides a non-comprehensive list of prospective systems.

Broadband satellite systems can serve different groups of customers depending on the satellites' altitude above earth. Orbital altitudes include geo-stationary orbits (approximately 36,000 kilometers above earth), medium earth orbits (approximately 10,000 kilometers), and low earth orbits (approximately 1,500 kilometers). There are even proposals for aircraft-based platforms operating in the upper atmosphere at approximately 20 kilometers above the earth. The platform altitude has an effect on the coverage area, propagation delay, power requirements, and antenna requirements, among other things. These factors build a complex set of tradeoffs and drive the variety in system designs. The low earth systems are targeted more at individual users, along with larger business customers. The medium earth and geo-stationary systems are targeted more at large users and ISP providers with the end user attached via a local network.

The potential for broadband, two-way satellite systems will become clearer in the next few years. Economic and technical considerations will play key roles in determining the success of

satellite deployment. To begin with, the required investment is huge. Estimated costs for satellite systems range from \$4 billion to more than \$10 billion for global systems.⁸⁸ This high fixed start-up cost represents a substantial risk and has been prohibitively expensive for many companies to consider. The recent financial difficulties of several satellite systems have dimmed the expectations of some analysts that satellite might provide the key answer to last mile connections in rural areas. On the other hand, some observers are optimistic that broadband data satellites may represent an opportunity for satellite industry recovery.⁸⁹ While the bankrupt satellite systems emphasized voice communication, the broadband satellite systems may ride the crest of increasing global demand for data services.⁹⁰ An industry shakeout over the next few years will make the economic situation clearer.

Technical issues will also play a role. For example, satellite systems have long lead times. Most companies anticipate a three-year deployment horizon for their systems, with start-up around 2002. This means that much of the technology may be locked in years before the system is turned on. During that time, technologies are likely to change and competing technologies may become more desirable.

Lower orbit systems (where satellites circle the globe every 90 minutes to several hours) require many satellites and complicated hand-off systems since no satellite stays overhead for long. As more systems come on line, signal power could be restricted to limit interference.

Finally, delivery of broadband to individuals requires tremendous system capacity. The feasibility of satellites as a broadband delivery vehicle will depend upon bandwidth availability and the efficiency with which available bandwidth can be reused.⁹¹ These constraints will ultimately determine how many customers a broadband satellite can serve.

For example, one of the proposed low-earth-orbit, multi-satellite systems, which will offer both data and voice, plans a total worldwide throughput capacity of 200 gigabits/second given the expected bandwidth in which it will operate. Assuming that no more than 20% of this capacity could be directed towards the United States at any one time,⁹² this system could devote about 40 gigabits/second to America.

88. Robert Norcross, *Satellites: The Strategic High Ground*, Scientific American, Oct. 1999, at 107.

89. Joseph Anselmo, *Can Broadband Industry Fix Space Industry Woes?*, Aviation Week and Space Technology, Nov. 8, 1999, at 96-97.

90. *Id.*

91. The primary way to increase a system's capacity is through the reuse of its operating bandwidth. For wireline systems, each new twisted pair, coaxial cable, or fiber is capable of reusing the spectrum of every previously installed wire. Terrestrial wireless systems, such as cellular mobile radio, add capacity by "cell division." By substituting several geographically dispersed lower power radios for a single higher power radio, they can split the cell into multiple cells, reusing the bandwidth in each non-adjacent cell.

When it comes to satellites, there are two methods of bandwidth reuse. One is through the use of multiple satellites with earth-based, directional antennae that receive a signal only from one satellite. The other is through the use of directional antennae on the satellite (spot beams) so that the signal is transmitted only to a limited geographical area, which allows reuse of the bandwidth in another area.

92. This is a generous assumption because the surface area of the United States is less than 2% of the earth.

What does this equate to in terms of the number of households served? Earlier, it was noted that cable providers offer their service from a node that serves between 350 to 700 TV customers' homes with the expectation that not every TV customer will take broadband. The broadband customers typically share a 27 megabit/second downstream channel. By extrapolation, if 27 megabits/second can serve 350 to 700 homes, 40 gigabits/second can serve about 1,500 times as many, or about 500,000 to one million homes.⁹³ This represents about one-half to one percent of the nation's households.

Thus, although such a system would be a valuable addition to the possible methods of providing broadband in rural areas, it would require many such systems to serve rural America even if the systems were devoted entirely to rural service. Broadband over satellite is an exciting prospect and represents an extremely attractive solution for the most remote areas but it must be recognized that even the multi-satellite prospective systems have limited capacity to meet rural needs.

Summary Regarding Broadband Enhancements and Alternatives In Rural Areas

With the exception of prospective satellite systems, the challenge for bringing broadband to rural America increases as the population density decreases. While both cable and DSL technologies promise to become more widely available in smaller and rural towns, DSL offers greater promise for reaching remote, out-of-town areas. Fiber and MMDS offer two other promising solutions for serving rural areas, although their potential for reaching remote rural areas is still questionable. Broadband satellite offers the most promising solution for remote, out-of-town customers if this technology can provide sufficient capacity and remain commercially viable.

It is important to remember that there is probably not one technological "silver bullet." Providing broadband service to rural America will likely require a combination of these, and perhaps other, technologies.

D. Effectiveness of Existing Mechanisms in Promoting Rural Deployment

Issue 6. 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.

Consistent with the Telecommunications Act, the Administration believes that, as a general principle, competition can accelerate the diffusion of broadband applications.⁹⁴ There are strong indications that competition has produced many benefits in such markets as long-distance

93. $40 \text{ gigabits/second} \div 27 \text{ megabits/second} = 1481$.

94. Some evidence points to the salient effects of competition on broadband delivery. See, e.g., Economics and Technology, Inc. (ETI), *Bringing Broadband to Rural America: Investment and Innovation in the Wake of the Telecom Act*, September 1999, and FCC, Sixth Annual Report. ETI found that a "wide array of broadband services delivered over a variety of technologies is now in the offing, and these services are already available in many parts of the country." *Bringing Broadband to Rural America* at 42. The FCC concluded that the "case studies [they examined] suggest that subscribers have benefited from 'head-to-head' competition" in terms of lower prices and upgraded systems." *Id.* at 100.

telephone services, wireless telephony, and telecommunications equipment.⁹⁵ Less progress has occurred in local telephone service markets, where regulatory and legislative changes that promoted entry have been adopted much more recently than in other areas.⁹⁶

Competition is succeeding in spurring broadband deployment in certain locations. In some markets, incumbent local exchange carriers are deploying DSL, for example, where cable operators have begun to offer cable modem service.⁹⁷ Wall Street analysts have also observed that the RBOCs have accelerated DSL deployment in certain markets where CLECs already offer such services.⁹⁸

Other areas, however, are not yet seeing competition among broadband providers. It can be expected that competition will succeed first in large cities and metropolitan areas, and possibly later in less urbanized areas. As documented in this report, there is little evidence, to date, that competition among wire-based and terrestrial wireless-based systems has promoted near-term deployment of advanced telecommunications services in rural areas outside of towns.⁹⁹ For all the terrestrial technologies discussed in this report, per unit cost rises with decreasing population density, making service to homes and businesses outside of towns very expensive. One exception is for satellite systems, which are less sensitive to customer location but still require a sufficient customer base.

To ensure that all Americans are able to reap the benefits of the Information Age, Congress added the universal service provisions of Section 254 to the Communications Act, codifying what had formerly been public policy. The success of the policy and the law can be judged in part by the extent to which affordable, quality telecommunications service is available in rural areas, particularly the high cost areas outside of town. Properly crafted telecommunications

95. See, e.g., Council of Economic Advisers, *Progress Report: Growth and Competition in U.S. Telecommunications, 1993-1998*, released February 8, 1999.

96. *Id.* at 15-25.

97. See Cable Services Bureau, FCC, *Broadband Today: A Staff Report to William E Kennard, Chairman, Federal Communications Commission*, Oct. 1999, at 27 (citing Lehman Brothers, *ADSL v. Cable Modems: And the Winner Is . . .* at 6).

98. See, e.g., J.P. Morgan, Company Report on Covad Communications, Dec. 7, 1999, at 24.

99. The problem is particularly acute on Native American tribal lands, where such factors as difficult terrain, low-density population clusters, lack of economic infrastructure, and insufficient strategic planning are especially apparent. See Linda Ann Riley, Bahram Nasserharif, and John Mullen, *Assessment of Technology Infrastructure in Native Communities*, New Mexico State University, College of Engineering, Las Cruces, New Mexico (prepared for the Economic Development Administration, U.S. Department of Commerce) (July 1999) at 29. As a result of these obstacles, Native American reservations face some of the lowest telephone subscriber rates in the nation and are lagging behind many other rural areas in broadband service. According to the 1990 Decennial Census, approximately 53% of Native households on reservations and trust lands had telephones, compared to 94.8% of households nationwide. *Id.* at 16. With respect to broadband availability, the National Telephone Cooperative Association (NTCA) found that six (or 24%) of its 25 member companies responding to its survey reportedly provided broadband Internet service to some portion of an American Indian reservation or trust land. This study did not report how "broadband" was defined or what portion received broadband service. NTCA, *NTCA Members Serving Tribal Areas Survey Report*, December 10, 1999.

policies are critical both for the continued availability of ordinary telephone service as well as for the availability and deployment of advanced services in hard-to-serve areas.

Policymakers must make certain that the universal service mechanisms are carefully targeted to high cost areas. The FCC must ensure that Sections 254 and 706 are fully enforced, and that support is *specific, predictable, and sufficient* to preserve and advance universal service. Its definition of supported service must also be compatible with the concept of evolving improvements to service. NTIA and RUS are encouraged that the FCC is revisiting this definition, and hope that the findings in this report will be useful in that proceeding.¹⁰⁰

For more than 60 years, policymakers have remained committed to the universal service concept that seeks to ensure ubiquitous, affordable telephone service in the United States. Cable, MMDS, and other alternative technologies might have greater penetration in rural areas if these providers were to become eligible for universal service support by offering telephone service. To date, there is little evidence that rural cable providers are moving in this direction, although MMDS and certain satellite companies will probably offer voice service.

As technology has brought new service features and capabilities, new policies have also been initiated that would make these advances more readily available to all Americans. In the section below, we describe some of the most important federal programs that support broadband deployment or may do so soon, either as an element of the program or as its primary focus.

1. Universal Service Support Mechanisms and Broadband

Funding for advanced services traces its origins to an evolving public policy. In 1993 through a vision statement, *The National Information Infrastructure: Agenda for Action*,¹⁰¹ the Administration announced its goal to extend the concept to ensure that information resources are available to all Americans at affordable prices. Working with the Administration and other interested parties, Congress adopted as part of the Telecommunications Act of 1996 an expanded universal service policy.

Two primary components of the universal service mechanism include high cost support and support for schools, libraries, and rural health care. We believe, in addition to policies that promote competition, both components of the universal service mechanism are necessary for the deployment of broadband in rural America.

High Cost Support

For a number of years through mechanisms such as the high cost fund and access charges, the FCC has supported basic telephone service in high cost (primarily rural) areas. Other universal

100. See FCC, *Common Carrier Bureau Seeks Comment on Requests To Redefine "Voice Grade Access" for Purposes of Federal Universal Service Support*, CC Docket No. 96-45 (rel. Dec. 22, 1999) [hereinafter Public Notice on Voice Grade Access].

101. Information Infrastructure Task Force, *The National Information Infrastructure: Agenda for Action* (Sept. 15, 1993) at 8.

service mechanisms similarly target ordinary telephone service. For example, among the FCC's low-income assistance programs, *Link-up America* provides support for up-front installation charges, and *Lifeline Assistance* helps defray monthly telephone bills for local service.

There currently exists no direct support for the deployment of advanced services to U.S. households. As discussed below, however, support for advanced services has been considered while setting the definition of supported services and is tacitly expressed in the new universal service mechanism.

The definition of supported services, which is intended to evolve over time, is important to the deployment of broadband in rural America and even access to dial-up Internet services.¹⁰² During the universal service proceedings before the FCC, some recommended that the definition of support include a specified performance level, such as 28 kilobits/second (V.34 standard) for modems that operate over a voice circuit.¹⁰³ The Commission determined that the definition of supported service should cover only voice grade access without a specific modem requirement.¹⁰⁴ On December 22, 1999, the Commission issued a Public Notice seeking comment in response to requests to redefine voice grade access.¹⁰⁵

The high cost support system will also affect the degree to which broadband plant is available in rural areas. Prior to the breakup of the Bell System, high cost support was based almost entirely on implicit support within that system. The support mechanism was subsequently adapted to accommodate the breakup of the Bell System and deregulation of the toll industry. Under this system, the high cost fund has been used to support study areas where the average embedded cost exceeds the national embedded cost.¹⁰⁶ The support varied according to a schedule, with small carriers receiving proportionately more support than large carriers. This lesser support for large carriers was based on the assumption of implicit support flowing within a company from its low cost areas to its high cost areas just as had occurred earlier in the Bell System.

102. Section 254(c)(1) establishes generally 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."

103. V.34 is the industry standard for modems commonly known as 28 K modems. It is designed to allow a maximum bit rate of 33.6 kilobits/second in both directions over a dial-up voice circuit. RUS, among others, argued that plant that is capable of supporting a 28 kilobit/second modem will generally support advanced services with additional equipment and that such plant serves the overwhelming majority of the residents of non-rural areas. Adopting a modem performance requirement as part of the definition of voice grade access would therefore ensure comparable service in rural and non-rural areas, as well as access to advanced services, as required by Section 254(b). In addition, RUS argued that supported plant should be capable of evolving to meet the anticipated changes in the definition of universal services. (www.usda.gov/rus/home/fccom.txt and www.usda.gov/rus/unisrv/fc7_10_27xp.htm)

104. See May 8 Order, *supra* note 5, at ¶ 64.

105. See Public Notice on Voice Grade Access, *supra* note 100.

106. In general, a study area, for purposes of universal service support, is an operating company's entire service area within a state.

In compliance with Congressional intent that support be explicit, the FCC recently adopted a new mechanism for the high cost areas served by non-rural local exchange carriers.¹⁰⁷ This system is based on forward-looking cost, *i.e.* what it would cost to build a telephone system today as estimated by a computer cost model (the Synthesis Cost Model).¹⁰⁸ Although the new mechanism is not designed to support broadband plant, the estimated cost is based on a broadband capable design, given the addition of DSL equipment.

E-Rate

Section 254 is also designed to encourage access to advanced telecommunications and information services for all public and non-profit elementary and secondary school classrooms, libraries, and rural health care providers. Schools and libraries are to be provided discounted telecommunications services, Internet access, and classroom connections. This is known as the education or "E-rate." Under the implementation method adopted by the FCC, this can include discounts on broadband applications if provided as part of a school or library's authorized technology implementation plan. Rural health care providers are to be provided rates comparable to urban rates for similar services.¹⁰⁹

The E-rate program has been operating since 1998, with a second-year (July 1, 1999 through June 30, 2000) authorized funding level of \$2.25 billion dollars. The program provides discounts of 20% to 90% based on the number of students eligible for the National School Lunch Program. Thus, the largest discounts are given to schools and libraries operating in poor communities. Currently, more than 90% of the nation's public schools and libraries possess Internet access, in some cases broadband, and 63% of U.S. classrooms are connected.¹¹⁰

The E-rate program has had a significant impact on rural areas, providing vital Internet connections in communities where deployment is slower.¹¹¹ The Kuspuk School District in Aniak, Alaska, was so remote that not a single one of the district's eight villages was accessible by road, and none of the eleven schools had Internet access. Through E-rate funds, however, Aniak was able to wire all of its school buildings and install satellite-based Internet connections at every school, enabling the children to get access to online learning resources.¹¹² The Nevada

107. See *Ninth Report and Order and Eighteenth Order on Reconsideration*, CC Docket Nos. 96-45, 97-160, FCC 99-306; and *Tenth Report and Order*, CC Docket Nos. 96-45, 97-160, FCC 99-304 (rel. Nov. 2, 1999) (effective January 1, 2000).

108. See *supra* note 82.

109. Section 254(h)(1)(B).

110. More specifically, 95% of the nation's public schools are connected. See National Center for Education Statistics, *Stats in Brief: Internet Access in Public Schools and Classrooms, 1994-99* (Feb. 2000). Approximately 93% of public libraries have such connectivity. See John Carlo Bertot and Charles McClure, *The 1998 National Survey of Public Library Outlet Internet Connectivity: Final Report* (Washington, D.C.: American Library Association, Office for Information Technology Policy).

111. In year one of the E-rate program, 43% of the funded applications were in rural areas and 22% of the amount allocated was for rural applications. In year two, 43.7% of the funded applications were in rural areas and 31.3% of the amount allocated was for rural applications. See Schools and Libraries Division national statistical analysis at www.sl.universalservice.org.

112. See EdLinc, *E-Rate: Connecting Kids & Communities to the Future* (May 1999) at 4

State Library system similarly benefited from e-rate funds. E-rate enabled all of the state's 23 public libraries to gain access to the Internet and provide Nevada's rural communities with the same access to information as those living in Las Vegas and Reno.¹¹³

In some cases, E-rate has enabled broadband applications in rural areas and small non-rural towns. E-rate funds helped defray the cost of upgrading to a fiber optics connection for School Union 49 in Boothbay Harbor, Maine and the West Point School District in West Point, Mississippi, for example.¹¹⁴ Often, E-rate can be a magnet for broadband deployment by stimulating demand for broadband services.

2. Other Existing Sources of Financing Broadband Capabilities

U.S. Department of Commerce

Sources of funding for advanced service capabilities currently exist outside the universal service system. One source is grants awarded by NTIA's Technology Opportunities Program (TOP), formerly named the Telecommunications and Information Infrastructure Assistance Program (TIIAP), to rural as well as urban locations. TOP gives grants to public and non-profit sector entities for model projects demonstrating innovative uses of network technology. The program evaluates and actively shares the lessons learned from these projects to ensure that the benefits are broadly distributed across the country, especially in rural and underserved communities. NTIA officials believe that, driven by research efforts in academia, the federal government, and the private sector, new technology shows great promise to improve the quality of today's networks.

Specifically, TOP provides matching grants on a competitive basis to state, local and tribal governments, health care providers, schools, libraries, police departments, and community-based non-profit organizations. These grants are used to purchase equipment for connection to networks, including computers, video conferencing systems, network routers, and telephones; to buy software for organizing and processing information; to train staff, users, and others in the use of equipment and software; and to purchase communications services, such as Internet access; to evaluate the projects; and to disseminate the project's findings. TOP projects demonstrate how networks support lifelong learning for all Americans, help public safety officials protect the public, assist in the delivery of health care and public health services, and foster communication, resource-sharing, and economic development within rural and urban communities.

Since its inception in 1994, TOP has awarded grants in all 50 states, the District of Columbia, and the U.S. Virgin Islands. There have been 421 grants totaling \$135.8 million and leveraging \$203 million in local matching funds. In FY 2000, TOP's authorized funding for grants is \$12.5 million. Overall, approximately 65% of the grants go to projects supporting rural areas.

(www.edlinc.org/pubs/eratereport.html).

113. *Id.* at 29.

114. *Boothbay Harbor: Schools to Get Telecommunications Funds*, Portland Press Herald (July 29, 1999); *Central Will Be 1st to Go All Web*, Daily Times Leader (July 23, 1999).

For the FY 1999 grant competition, TOP emphasized its special interest in projects that proposed to use advanced network technologies to enhance the quality and efficiency of services delivered through non-profit organizations. Higher bandwidth networks will afford the opportunity to deliver high-resolution video to the desktop and emerging wireless networks will give end users greater flexibility in how and when they can gain access to information. Among the broadband applications submitted, TOP selected three that feature DSL capabilities. It should be noted that any grant award winner must meet several evaluation criteria on which each application is rated.

Over the years, TOP has supported projects that demonstrated the value of broadband networks in rural areas. For example, a 1994 grant to the State of North Carolina used the ATM-based North Carolina Information Highway to support telemedicine links between the emergency rooms of small rural hospitals and specialists at the state's teaching hospitals. The City of Aberdeen, South Dakota used high-speed links to support a variety of videoconferencing applications such as distance learning, telemedicine, and business teleconferencing and to provide Internet access for its residents.

Another Department of Commerce agency, the Economic Development Administration (EDA), has also supported broadband infrastructure development through its grant programs. EDA has funded a variety of projects that support technology-driven economic development in local communities. For example, EDA has helped fund industrial parks pre-wired with fiber optic cable, such as the March 1999 grant for \$750,000 awarded to Cedartown, Georgia for a 200-acre high-tech industrial park. Other grants have helped support distance learning networks, technology business incubator facilities, and research parks. During FY 2000, EDA is giving priority consideration to projects that, among other things, emphasize the commercialization and deployment of technology.

U.S. Department of Agriculture

The Rural Utilities Service Telecommunications Program (Telecommunications Program) also provides two sources of funding for advanced telecommunications infrastructure in rural America. First, RUS provides loans for telecommunications infrastructure investment for commercial, non-profit, and limited liability companies that are providing or propose to provide local exchange telecommunications services to rural areas. The Telecommunications Program has been financing modern rural services for 50 years. Today, about 825 RUS-financed carriers serve 5.5 million rural subscribers over 866,235 route miles of line, for an average density of 6.27 subscribers per route mile or 4.72 subscribers per square mile.¹¹⁵

In 1993, Congress directed RUS to finance plant that is capable of transmitting and receiving one megabit/second. Over the last three fiscal years, RUS' telecommunications infrastructure loans totaling over \$1.4 billion will provide over 783,000 of the nation's most rural households and businesses with the opportunity to subscribe to advanced services. The 591 rural exchanges built with these loans will have an average density of 5.73 customers per route mile, and the average exchange size is 1,325 customers. The average density of exchanges being upgraded to provide

115. RUS financed companies comprise about two-thirds of the rural carriers as defined in the Telecommunications Act. On a national basis, the population density in areas served by rural carriers is 13, compared to 105 in areas served by non-rural carriers. See *Rural Difference*, *supra* note 10, at 20.

advanced services capable plant is lower than the average density of all RUS-financed carriers (6.32 customers per route mile) demonstrating that such plant is practical in thinly populated areas.

RUS financing is supporting advanced services capable plant in even some of the most difficult-to-serve rural areas. One of the poorest counties in the United States is the home of the Pine Ridge Indian Reservation in South Dakota. The Pine Ridge exchange is served by the Golden West Telecommunications Cooperative (Golden West), which borrowed \$65,948,658 from RUS in 1996 to upgrade its facilities to provide modern telecommunications services, including building advanced services capable loops. Facilities now in place in Pine Ridge offer DSL capability to all customers.

RUS also provides loans and grants for distance learning and telemedicine (DLT) initiatives to enhance learning and health care in rural schools, libraries and health clinics. Financing is provided primarily for end user equipment, including computer hardware and software, interactive video equipment and inside wiring. The DLT program has provided \$68 million to meet the educational and health care needs for 252 projects in 43 states and two US territories. RUS financed organizations are encouraged to participate in these projects.

In Oklahoma, the Wheatlands Rural Educational Link Consortium (RELC) was created by eight school districts and one area vocational center to improve the quality of education in their communities. In 1995, RELC was awarded an RUS Distance Learning grant of \$222,000. Pioneer Telephone Cooperative, an RUS financed local exchange carrier, also lent its financial support to the project.

The grant money was used to construct a fiber optic network connecting nine schools in eleven rural farming communities to the University of Oklahoma, Oklahoma State University, and Northwestern Oklahoma State University. Courses offered include foreign languages, music appreciation, world geography, and physiology. The state-of-the art system will provide telemedicine links with the Oklahoma University Health Science Center, and Baptist Medical Center in Oklahoma City.

In the past, RUS loans have helped Pioneer to build the advanced telecommunications infrastructure needed to accommodate the demand for new services such as distance learning networks. Pioneer is also providing the fiber optic service for RELC and other schools in northwest Oklahoma. Partnerships between RUS borrowers and grant recipients are enabling rural areas to achieve a quality of life equal to their urban counterparts in health care and educational opportunities.

U.S. Department of Housing and Urban Development

Another potential source of broadband assistance is the Housing and Urban Development's (HUD) Neighborhood Networks program. Neighborhood Networks is an initiative to help establish computer learning centers in FHA insured multifamily housing complexes; such centers may possess either broadband or narrowband applications. Programmatic success is dependent on the ability of the owner, management agent, and the residents to enter into partnership with

members of their neighborhood and business community. The initiative started in 1996 to mitigate the reduction in welfare support for many residents in HUD assisted/insured multifamily housing. During the four years this initiative has been active, over 550 computer learning centers have been established serving more than 700 FHA insured apartment complexes and more than 150,000 low-income residents. With recent openings in Montana and South Dakota, the centers have expanded to all 50 states, the District of Columbia and Puerto Rico. Many centers have facilitated the graduation of residents from high school and college, the creation of micro-enterprises and businesses, and the development of healthier residents through on-line telehealth information.

U.S. Department of Education

Finally, the U.S. Department of Education provides computer and Internet access, broadband in some instances, and training for working-class families through its Community Technology Centers (CTC) program. In FY 1999, the Department of Education launched its CTC grants program. The program's stated purpose is to "promote the development of model programs that demonstrate the educational effectiveness of technology in urban and rural areas and economically distressed communities." Under the CTC initiative, the Department awards three-year grants on a competitive basis to state or local educational agencies, institutions of higher education, or other eligible public and private nonprofit or for-profit entities. In its inaugural year, the program awarded grants to 40 organizations in the amount of \$10 million. For FY 2000, authorized funding is \$32.5 million.

These initiatives not only give citizens access to technology, they can also stimulate demand for broadband infrastructure, in effect becoming anchor tenants. Once in place, these facilities and the technologies they encourage can become community resources.

3. Future Funding of Broadband Deployment

To ensure ubiquitous availability of advanced telecommunications services for those who desire them, adequate and targeted funding will be needed. This goal may not be quickly realizable unless access outside as well as inside the home is provided. As found in NTIA's July 1999 *Falling Through the Net* study, the information disadvantaged disproportionately turn to key neighborhood institutions such as schools and libraries for their Internet access.¹¹⁶ A study sponsored by the National Science Foundation also confirms that Community Technology Centers are helping to bridge the digital divide. Of the users surveyed: 62 percent had incomes of less than \$15,000; 65 percent took computer classes to improve their job skills; and 41 percent got homework help or tutoring at the center.¹¹⁷

Continuance of, and adequate funding for, all of the above programs will promote this vital public access to the Internet and other advanced services primarily outside the home. Being able

116. NTIA, U.S. Department of Commerce, *Falling Through the Net: Defining the Digital Divide* at 34-37, 42 (July 1999).

117. White House, Office of the Press Secretary, *The Clinton-Gore Administration: From Digital Divide to Digital Opportunity*, issued Feb. 2, 2000, at 3.

to use the Internet at home, of course, is more desirable. For purposes of ensuring access for rural households and businesses, RUS lending and grant programs must continue to receive the resources required to accomplish this important task.

Federal Initiatives

On February 2, 2000, President Clinton announced new budget proposals that, if adopted in full by Congress, would feature \$2 billion in tax incentives to encourage private sector activities creating digital opportunities and \$380 million in new and expanded initiatives to serve as a catalyst for public-private partnerships. More specifically, the proposals include:

1. \$2 billion in tax incentives over 10 years to encourage private sector donation of computers, sponsorship of community technology centers, and technology training for workers.
2. \$150 million to help train all new teachers entering the workforce to use technology effectively.
3. \$100 million to create 1,000 Community Technology Centers in low-income urban and rural neighborhoods.
4. \$50 million for a public/private partnership to expand home access to computers and the Internet for low-income families.
5. \$45 million to promote innovative applications of information and communications technology for under-served communities.
6. \$25 million to accelerate private sector deployment of broadband networks in under-served urban and rural communities.
7. \$10 million to prepare Native Americans for careers in information technology and other technical fields.¹¹⁸
8. \$100 million in new loan authority and \$2 million in grants for RUS to target towards the provision of broadband and Internet service in rural areas.

Proposal number six explicitly would provide monies for broadband deployment in areas where such networks might otherwise not occur for many years; portions of the funding for most, if not all of the other seven proposals, could also include broadband applications.

State and Local Initiatives

In addition, state and local governments around the country are experimenting with new models and new forms of public-private partnerships to promote private sector investment in advanced telecommunications services. The State of Washington, for example, has passed legislation to promote broadband backbone in rural areas by encouraging local public utilities to sell Internet access on a non-discriminatory, wholesale basis over their fiber optic systems.¹¹⁹ The State hopes that, by opening these networks, competing ISPs can more easily provide broadband service to remote homes and businesses.

118. *Id.* at 1-2.

119. John Borland, *State Looks To Power Companies for Rural Broadband*, Yahoo! News (March 28, 2000).

Several other states and local communities are using "demand aggregation" as a mechanism to attract the private sector investment needed to provide advanced services. The State of Colorado has introduced legislation to promote pooling telecom traffic among state agencies and local communities on the backbone network. These arrangements are intended to provide a market incentive to private providers to set up high speed connection points across the State. Recently, a consortium of telecommunications users in rural western Massachusetts called "Berkshire Connect" reached an agreement with Global Crossing and Equal Access Networks that will result in a 50 percent reduction in the cost of a T1 line (a service that provides 1.5 megabits/second). Berkshire Connect was able to do this in part by aggregating demand from users of telecommunications services in business, government, educational and non-profit institutions.

A number of cities and municipal utilities have also invested in establishing a broadband network to provide advanced telecommunications services to City agencies and residents. The City of LaGrange, Georgia, for example, financed and constructed a state-of-the-art two-way hybrid fiber coaxial network. The City recently announced that it would take the further step of providing residents with free Internet service using cable modem service.

While these projects may not necessarily be in rural areas of America, such innovative initiatives have the potential to further spur the deployment of advanced telecommunications capabilities to all regions of the nation.

Summary of Effectiveness of Competition and Universal Service Mechanisms

Competition has had varied success in bringing advanced telecommunications services to rural America. Broadband deployment has been more evident in the towns, relatively speaking, but little diffusion has manifested in the more remote rural areas. Current universal service mechanisms may help schools and libraries to gain affordable access to advanced services. Other sources of financing promote the spread of broadband capabilities to a range of geographic areas and groups. However, there is no assurance that competition, coupled with the current system of universal service, grant, and loan programs, can by themselves systematically provide affordable advanced services to rural America in the near term.

IV. RECOMMENDATIONS

In recent years, the United States has emerged as a leader in the Information Revolution. By some estimates, more than 100 million Americans have access to the Internet. Private sector investment in new competitive telecommunications companies has skyrocketed, and many of these companies are providing broadband telecommunications services and high-speed Internet access. Several million households have now subscribed to broadband Internet services, and that number continues to grow rapidly. Researchers are now developing networking equipment that will transmit over one trillion bits of information per second on a single strand of fiber, which will provide the infrastructure for applications that we can only dream of today.

America's success shows the wisdom of public policies that encourage private sector investment, competition, and technological innovation. But the government also has a special obligation to ensure that all Americans, including Americans living in rural communities, have the opportunity to be full participants in the Information Age. NTIA and RUS recommend the following steps be taken to expand access to broadband networks in rural America:

1. Increase support for programs that will expand broadband infrastructure and innovative applications of information and communications technologies in rural America

This year, President Clinton and Vice President Gore have proposed new programs and increases in several existing programs that will help expand access to information technology and broadband telecommunications services for rural communities, including:

- An increase in NTIA's Technology Opportunities Program (TOP) from \$15 million to \$45 million and the creation of a new \$50 million grant program to expand home access for low income families. Approximately 65% of NTIA's TOP grants serve rural communities, and the new home access program may help to assist families in rural areas.
- An increase in the Department of Education's Community Technology Center program from \$32.5 million to \$100 million. This will enable the creation or expansion of up to 1,000 Community Technology Centers.
- The creation of a new pilot program at the Rural Utilities Service that could provide up to \$100 million in loan guarantees for rural broadband services and continued support for the RUS Telecommunications infrastructure loan program.
- An increase in the RUS Distance Learning and Telemedicine Loan and Grant Program from \$20 million in grants and \$200 million in loans to \$25 million in grants and \$300 million in loans.

The maintenance and expansion of these programs, among others, are necessary to closing the broadband divide between urban and rural areas in America.

2. Adopt an evolving definition of "universal service" that will support advanced services in all regions of the nation

The Telecommunications Act of 1996 states that "access to advanced telecommunications and information services should be provided in all regions of the Nation," and that customers in rural and high-cost areas should have access to advanced services at rates that are "reasonably comparable" to rates in urban areas. Under the Act, the Federal-State Joint Board on Universal Service and the Federal Communications Commission are charged with updating the definition of universal service to reflect the evolving nature of telecommunications services.

In the context of current supported services, NTIA and RUS commend the Commission's reexamination of the definition of voice grade access.¹²⁰ Because voice grade service in rural

120. See Public Notice on Voice Grade Access, *supra* note 100. The Commission originally selected a voice grade bandwidth of 3,500 Hz (500 to 4,000 Hz), which would generally support modem operation at 28 kilobits/second.

areas is the primary path to the Internet, and is likely to remain so in the near term, it is especially important that universal service support promote voice service that is comparable both in bandwidth and data rate to that available to the vast majority of Americans. For that reason, the Administration has supported both a voice grade bandwidth of 300 to 3,400 Hz and a data rate of at least 28.8 kilobits/second.¹²¹

In light of the rapid changes in telecommunications services, NTIA and RUS urge that, during the next periodic review of the definition of supported services, the Federal-State Joint Board and the Commission make it a priority to adopt a definition that will advance the widespread and timely deployment of advanced services to all regions of the country.

3. Consider universal service funding mechanisms to fulfill the Act's mandate

The Telecommunications Act of 1996 requires the FCC to base policies of universal service on the principle that consumers in rural areas should have access to advanced services that are reasonably comparable to services in urban areas, and that there should be specific, predictable and sufficient support mechanisms to advance universal service.¹²² NTIA and RUS recommend that the Commission make it a priority to fashion a comprehensive high-cost program, by identifying all necessary support mechanisms, to achieve the statutory goal established four years ago.¹²³ Pending its ultimate decision on high-cost reform, the Commission should also consider measures that eliminate barriers to infrastructure investment. Among other things, the Commission should consider the need to adjust the existing cap on the universal service fund, particularly with respect to exchanges sold to a rural carrier from a non-rural carrier.¹²⁴ Further, attention should be given to the needs of unserved areas, especially tribal communities.¹²⁵

See May 8 Order, *supra* note 5. Later, on its own motion, the FCC reduced the supported bandwidth to 2,700 Hz (300 to 3,000 Hz), a bandwidth that cannot reliably support modem operation at 28 kilobits/second. See *Fourth Order on Reconsideration*, CC Docket No. 96-4, *Report and Order* in CC Docket Nos. 96-45, 96-262, 94-1, 91-213, 95-72, FCC 97-420 (rel. Dec. 30, 1997). The Commission is now reviewing its more recent definition.

121. See Comments and Ex Parte Comments of the Rural Utilities Service, *Common Carrier Bureau Seeks Comment on Requests to Redefine "Voice Grade Access" for Purposes of Federal Universal Service Support*, CC Docket No. 96-45 (filed Jan. 19, 2000 and April 11, 2000, respectively). (www.usda.gov/rus/unisrv). See also *supra* note 103 and accompanying text.

122. See 47 U.S.C. § 254(b)(3), (5)(Supp. III 1997).

123. The Commission has taken steps to provide universal service support to high-cost areas served by larger telecommunications carriers. Reform of the high-cost program for areas served by rural telephone companies will be considered by the Joint Board.

124. See Comments of Rural Utilities Service, *Federal-State Joint Board on Universal Service: Promoting Deployment and Subscribership in Unserved and Underserved Areas, Including Tribal and Insular Areas*, Further Notice of Proposed Rulemaking, CC Docket No. 96-45, 14 FCC Rcd 2117 (filed Dec. 17, 1999) (www.usda.gov/rus/unisrv/12-17com.htm).

125. *Id.* See also Ex Parte Comments of the National Telecommunications and Information Administration (filed April 14, 2000) in the same proceeding.

4. Reform RUS lending policies to stimulate private sector investment in broadband services

Under current regulations, RUS can lend to service providers only if, at a minimum, they meet the "basic local exchange telephone service needs of rural areas," *i.e.*, provide wireline voice service.¹²⁶ This prevents RUS from lending to providers that want to offer, for example, advanced telecommunications services without offering voice. Given Administration and Congressional interest in promoting the availability of broadband, RUS is proposing regulatory reforms to change these policies. This would allow RUS to use more of its \$670 million in lending authority for rural telecommunications to encourage private sector investment in rural broadband services. RUS has already proposed a rule that will allow financing of mobile telecommunications providers who do not offer wireline voice service in their wireless area.¹²⁷

5. Ensure continued support for the E-rate

The E-rate provides up to \$2.25 billion in discounts to connect schools and libraries to the Internet. In certain cases, the E-rate program has brought broadband connections to rural areas and small non-rural towns and catalyzed market demand for those services. Continued support and funding for this program is particularly important for rural communities, which often face higher prices for advanced telecommunications services.

6. Publicize recent changes in rural health care discount program

In 1999, the FCC adopted reforms in the rural health care discount program that make it easier for rural health care providers to purchase advanced telecommunications services for telemedicine and other health care applications. NTIA and RUS will publicize these changes so that more rural health care providers are aware of these improvements to the program.

7. Collect and disseminate "promising practices" for accelerating private sector investment in rural broadband services

Communities around the country are experimenting with new models and new forms of public-private partnerships to promote private sector investment in advanced telecommunications services. Programs, such as the "Berkshire Connect" initiative to aggregate demand in rural areas, are helping attract the private sector investment needed to provide advanced services. NTIA and RUS are committed to collecting and disseminating these kinds of promising practices, using mechanisms such as the "Digital Divide" web site (www.digitaldivide.gov).

8. Increase research to discover "last mile" solutions for rural America

The Administration has proposed significant increases in federal funding for information and communications research and development (R&D), an initiative known as "Information Technology for the Twenty-First Century." This initiative follows the recommendations of the

126. See 7 CFR 1735.14 (c)

127. See Proposed Rule 7 CFR 1735, 65 Fed. Reg. 6922 (Feb. 11, 2000).

President's Information Technology Advisory Committee (PITAC), which concluded that industry was unlikely to make investments in long-term, high-risk research. The recommendations of the PITAC enjoy strong bipartisan support, and legislation that would authorize much of the Administration's initiative (Networking and Information Technology Research and Development Act) recently passed the House.

As part of this initiative, the Administration is committed to increasing investment in R&D to address the unique "last mile" challenges of rural America. As noted in this report, the current generation of broadband technologies (satellite, wireline, fixed and mobile wireless) have shortcomings that can limit their deployment in rural areas. Agencies such as NTIA and the National Science Foundation (NSF) will increase their support of research that could result in next generation broadband technologies for rural America. The Administration has called for a budget increase for NTIA's Institute for Telecommunications Sciences to provide broadband technology research, standards development, and policy support vital to the successful commercialization and widespread deployment of broadband capabilities, particularly in rural and disadvantaged areas. Since NSF supports university-based research, this initiative will also increase the supply of undergraduate and graduate students in technical fields with insights into the challenges of providing broadband telecommunications to rural areas.

Table Data Performance Comparison¹

Technology ²	Downstream Typical (Max) Kb/sec	Upstream Typical (Max) Kb/sec	Range (Miles) ³	Availability	Deployment	Typical Use	
						Business	Personal
Cellular/PCS dial up	9.6 (20)	9.6 (20)	10	Recent	1000s	✓	✓
V34 Modem-dialup	28 (34)	28 (34)	3.5	Common	35-40 million		✓
V90 Modem-dialup	45 (53)	28 (34)	2.5	Common.	millions		✓
Basic Rate ISDN-dialup	128	128	10	Common	100,000s	✓	
DBS Satellite	350 (400)	through phone	NA	Nearly Universal	10,000s		✓
MultiChan. Multipoint Dist.System	100s (1,000s)	100s (1,000s)	35	Recent	10,000s	✓	✓
Prospective Satellite Systems	100s (1,000s)	100s (1,000s)	NA	Under Development	None	✓	✓
3 rd Generation Cellular	100s (2,000)	100s (1,000s)	10	Under Development	None	✓	✓
Primary Rate ISDN-dialup	1,544	1,544	2.4	Rare	1000s	✓	
T1	1,544	1,544	1.1	Common	10,000s	✓	
G.lite DSL	400 (1,500)	64-256 (500)	3.5	Recent	~½ million	✓	✓
Cable TV Modem	>1,000 (27,000 ⁴)	200 (10,000 ⁴)	3	Recent	~1.5 million		✓
Local Multipoint Dist. System	(155,000)	(155,000)	4	Recent	1,000s	✓	
Fiber to the Home	millions	millions	100s	Recent	1,000s	✓	✓

1. This table was compiled by NTIA and RUS from publicly available information. Most of the services delivered by these technologies are available at several bit rates. Performance of each technology varies with the nature of the communication medium. Also, some of the services operate at varying rates. This makes a simple comparison difficult. Most of the numbers provided here are representative, not exact. They are meant to place the capabilities of these technologies in context.

2. Wireless technologies are shaded.

3. Maximum range from electronic interface or antenna for typical downstream/upstream performance. Wireless requires line of sight.

4. Shared among users and seldom available to a single user.