About the e-NC Authority

Devoted to connecting people to the Internet and a better future, the e-NC Authority works with all 100 of North Carolina's counties with a focus on rural and distressed urban areas. The e-NC Authority, operating out of the NC Rural Economic Development Center, is dedicated to increasing prosperity for North Carolina citizens and businesses through technology-led economic development, which requires an Internet platform for success. The authority builds on the work of its predecessor, the Rural Internet Access Authority, which was created by the N.C. General Assembly in 2000. Operating statewide from a base in Raleigh, N.C., e-NC is supported through contributions from public, private and non-profit entities. For more information, visit www.e-nc.org or call 1-866-627-8725.

North Carolinians Online

Trends from the Citizen Surveys 1999-2004

e-NC

May 2005

May 2005

The Internet may be increasingly ubiquitous in commerce, education, health care, and government, but it is not universally accessible. Tapping into it requires capable technology (hardware and software), an affordable connection with necessary bandwidth, and the know-how to utilize web content and services. Since January 2001, e-NC has worked with state and local public and private sector partners to ensure that as many North Carolina households and businesses as possible — in all regions and at all levels of income — have the technologies, infrastructure and skills they need to go online.

As part of that effort, e-NC closely monitors trends in online connectivity, broadband infrastructure deployment, computer technology usage and digital literacy. This report, using data from extensive household telephone surveys conducted by East Carolina University in 1999, 2002 and 2004, shows that North Carolinians are using the Internet in record numbers, that location is no longer a significant barrier to basic online connectivity, and that non-metro home Internet users in North Carolina are switching to broadband at a pace exceeding the national trend. As infrastructure and services continue to expand and improve, insufficient income and basic digital literacy are emerging as the chief remaining barriers to widespread Internet adoption and use.

The following are specific findings from the report:

✿ **Gap in household computer ownership between whites and African Americans has narrowed substantially in last five years.** In 1999, there was a 30 percentage point difference in home computer ownership in African American and white households (31 versus 61 percent). By early 2004, the gap had narrowed to 5 percentage points (63 versus 68 percent).

✿ **Overall Internet penetration in North Carolina exceeds the national average.** In early 2004, 71 percent of North Carolina adults reported using the Internet at home, work or elsewhere, compared to 64 percent of adults nationwide. The penetration rate was 65 percent in North Carolina in mid-2002, compared to 58 percent nationwide.

✿ **Internet penetration in non-metro North Carolina also exceeds the national average.** Approximately 66 percent of adults in non-metro North Carolina counties were Internet users in early 2004, compared to 55 percent of non-metro adults nationwide.

✿ **Home Internet use has increased dramatically in North Carolina in the last five years, with the fastest increases in rural (and non-metro) counties.** In early 2004, 58 percent of all North Carolina adults reported using dialup or broadband service from home, up from 36 percent in 1999. The household Internet penetration rate increased fastest in 85 counties designated as rural-from 27 to 51 percent, a 24 percentage point gain. The increase in 60 non-metro counties was 29 percentage points, from 23 to 52 percent.

✿ **In most of North Carolina, location is no longer a significant barrier to basic home Internet access.** Eighty-nine percent of North Carolina households that own a computer now access the Internet from home with at least a dial-up connection, a share that is nearly identical in rural and urban counties (and metro and non-metro counties). In early 2004, less than 2 percent of non-metro home Internet users reported making a long distance call to connect to an Internet Service Provider, down from 5 percent in mid-2002. It should be noted that local, non-toll access is available across the entire state now.

✿ **Home use of broadband is growing rapidly in North Carolina, in parallel with national trends.** In mid-2002, 19 percent of home Internet users in North Carolina utilized a broadband connection (e.g., DSL, cable, or ISDN), compared to 22 percent nationwide. By early 2004, 40 percent of North Carolina home Internet users had a broadband connection, compared to 39 percent nationwide.

✿ **Non-metro North Carolina is going "high speed" faster than the rest of non-metro U.S.** In early 2004, 32 percent of home Internet users in non-metro counties of North Carolina were linked to the Internet via a broadband connection, up from 15 percent in mid-2002. Comparable U.S. non-metro household broadband take rates in 2002 and 2004 were 11 and 25 percent, respectively, according to the Pew Internet & American Life Project.

✿ **Among households with computers that do not have home Internet access, the principal reasons are lack of need and cost.** In 2004, 67 percent of adults with a home computer and no home Internet access indicated that the reason is that they do not have a significant need for home Internet. Approximately 27 percent of households with home computers and no Internet service cited "cost/too expensive" as the reason. These figures changed little between 2002 and 2004.

✿ **Demographics increasingly account for the remaining gap between the average urban and rural home Internet take rates (62 versus 51 percent).** North Carolina home Internet users are, on the whole, younger, more educated, and wealthier than non-Internet users. A predominance of older, less educated, and lower income populations in rural counties is the principal factor reducing average rural area take rates.

Even as the Internet becomes ever more integrated into the core functions of government, education, health and business, troubling barriers to ubiquitous access and gaps in the ability to use the Internet remain. Since January 2001, e-NC has worked with state and local public- and private sector partners to ensure that as many North Carolina households and businesses as possible-in all regions and at all levels of income-have the technologies, infrastructure and skills they need to go online.

As part of that effort, e-NC closely monitors trends in online connectivity, broadband infrastructure deployment, computer technology usage and digital literacy. This report highlights trends revealed in three household telephone surveys conducted by Dr. Kenneth Wilson and the East Carolina University Survey Research Group in 1999, 2002 and 2004. The report's focus is on home Internet access and broadband use, particularly between urban and rural areas.[1] Where possible, North Carolina data are compared to national figures assembled by the Pew Internet & American Life Project.[2]

About the Citizen Survey Data

In 1999, a total of 522 adults in households randomly sampled from throughout the state completed an extensive telephone interview that sought information on perceptions of the role of science and technology in the North Carolina economy. The survey, which was sponsored by the North Carolina Board of Science and Technology, also included several questions on computer and Internet use.[3] Two subsequent surveys, commissioned by e-NC (formerly the Rural Internet Access Authority) and completed in June 2002 and January/February 2004, focused more specifically on the use by adults of computers and the Internet at home, work, and other locations. The 2002 and 2004 surveys yielded 12,904 and 1,197 completed interviews, respectively. The 2002 sample was considerably larger in order to permit the valid calculation of detailed results for all 100 North Carolina counties.

Household telephone numbers were obtained from Survey Sampling, Inc. Unlike many other surveys that are limited to English-speaking respondents, a significant number of the interviews were conducted in Spanish using a bi-lingual interviewer. To permit generalization to the entire state, the data are weighted by the county population and the respondent's level of education.[4]

Business Internet Use and Service Deployments

e-NC also tracks Internet usage trends among businesses and the deployment of Internet access services by cable, telephone, satellite and wireless companies. A survey sponsored by e-NC and conducted by the Appalachian Regional Development Institute in early 2003 found that 63 percent of North Carolina businesses are connected to the Internet. Slightly over half of the connected businesses utilize a broadband link. Broadband usage rates are lower for small and rural firms. See *Statewide Survey of Business Internet Usage in North Carolina* by J. Paul Combs and Chilton Rogers (Boone, NC: Appalachian Regional Development Institute, Appalachian State University, June 2003), available online at http://www.e-nc.org/pdf/statewidesurveyfinal.pdf.
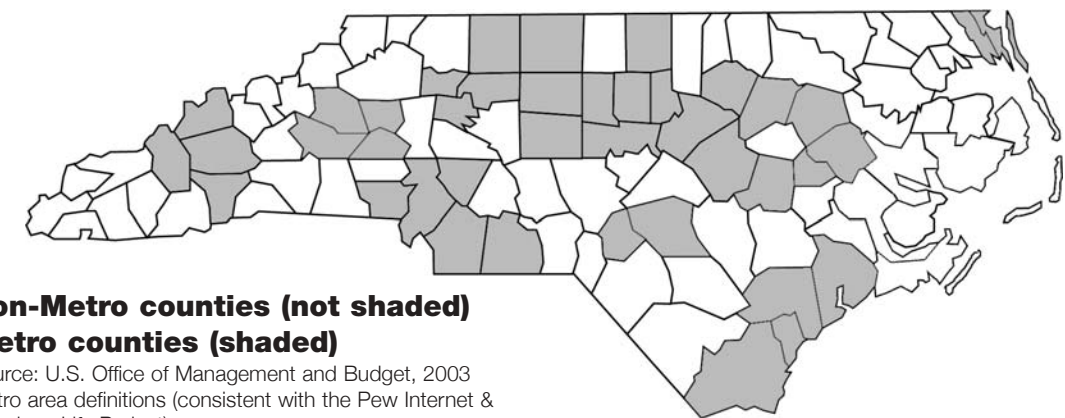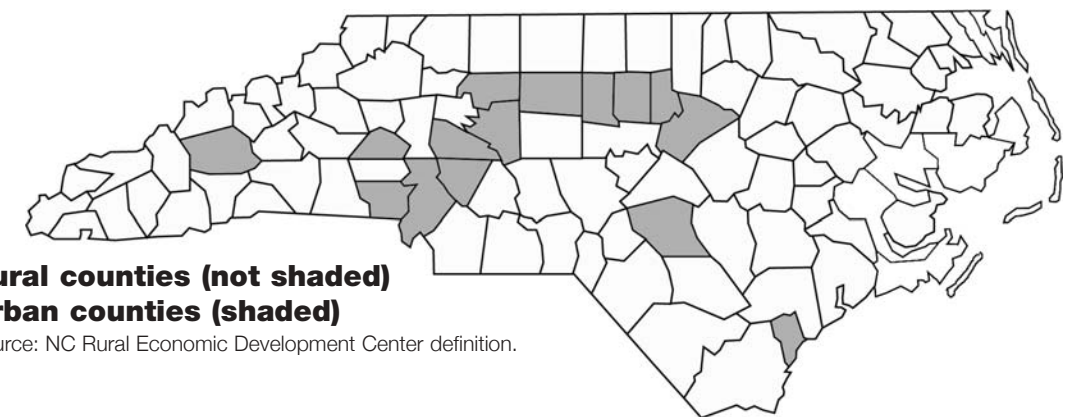
An e-NC study of Internet access providers found that 82 percent of North Carolina households had the ability to access high-speed Internet service — defined as a transmission speed of at least 384 kilobits per second in both directions — by the end of 2004, up from 75 percent of households at the end of 2002. See *High-Speed Internet Access in North Carolina* by Charles G. Pittman (Raleigh, NC: e-NC Authority, May 2005), available online at http://www.e-nc.org/pdf/hsi-aexecsummary.pdf.

Differences in overall and rural trends are reported two ways in this report:

✪ The first classifies a survey respondent as *rural* if he or she resides in one of 85 rural counties designated by the North Carolina Rural Economic Development Center (see the top panel of Figure 1);

✪ The second classifies a respondent as *non-metro* if he or she resides in one of 60 counties defined as non-metropolitan by the U.S. Office of Management and Budget (OMB).[5] In June 2003, OMB released metropolitan statistical area definitions based on Census 2000 data that identified 40 North Carolina counties as part of metropolitan areas. The non-metro figures are directly comparable to national level survey data released by the Pew Internet & American Life Project, which defines "rural" America as all non-metropolitan counties. (see the bottom panel of Figure 1)

Figure 1

County rural/non-metro designations

Rural counties (not shaded)
Urban counties (shaded)
Source: NC Rural Economic Development Center definition.

Non-Metro counties (not shaded)
Metro counties (shaded)
Source: U.S. Office of Management and Budget, 2003 metro area definitions (consistent with the Pew Internet & American Life Project).

The following sections highlight major findings from an analysis of trends reported in the three surveys and compared, where possible, to national trends. The focus is on computer use, Internet use, and differences in rural and urban areas.

Personal Computer Ownership Increasing & Some Gaps Narrowing

Computer ownership is a basic port of entry to the Internet. An estimated 65 percent of North Carolina adults had a personal computer in the home in the beginning of 2004, up from 53 percent in 1999 (see Table 1). Gains were particularly strong among African Americans (from 31 to 63 percent) and those with children in the home (from 64 to 81 percent).

Table 1

Home computer penetration demographics
Percent of NC adults with a computer in the home

	1999	2002	2004
Overall	53	60	65
Gender			
Men	59	65	68
Women	53	57	63
Age			
18-27	55	68	76
28-39	60	71	79
40-49	60	72	70
50-58	66	58	73
59-68	44	43	50
69+	24	28	35
Race and ethnicity			
White	61	65	68
African American	31	44	63
Native American	n/a	50	39
Hispanic	n/a	37	31
Other	n/a	65	74
Household income			
Less than $15,000	35	34	31
$15,000 to $24,999	25	43	43
$25,000 to $29,999	37	60	64
$30,000 to $49,999	43	71	78
$50,000 to $74,999	49	79	88
$75,000 to $99,999	50	86	92
$100,000 and above	66	91	97
Educational attainment			
Less than high school	20	33	36
High school graduate	47	60	65
Two year degree	65	75	78
Four year degree	76	84	87
Graduate degree	78	87	93
Children living in household			
No	49	54	55
Yes	64	69	81

Source: Citizen surveys in 1999, 2002 and 2004. n/a=data not available in given year.

Computer ownership is highly correlated with income. In 2004, 97 percent of adults with household incomes over $100,000 reported having a home computer, compared to just 31 percent of adults in households earning less than $15,000. Survey data indicate home computer ownership has not changed appreciably in the lowest income category since 1999, despite substantial decreases in the price of personal computers.

North Carolina Internet Use Exceeding National Average

A comparison of North Carolina with Pew survey data for the U.S. suggests that North Carolinians are using the Internet at rates above the national average.[6] In early 2004 roughly 71 percent of North Carolina adults reported using the Internet at home, work, or a third location (see Table 2). The Pew Internet & American Life project estimated the national Internet penetration rate among adults at 64 percent in the same period, with a margin of error of 2 percentage points.[7] Non-metro North Carolina adults are also going online at rates above the national average: at 66 versus 55 percent.

Table 2

Internet Use
Percent of NC adults that use the Internet from home, work or elsewhere

	2002		2004	
	NC	US	NC	US
Overall	65	58	71	64
Urban	69	--	73	--
Rural (85 counties)	60	--	68	--
Urban/rural difference	9	--	5	--
Metro	69	--	73	--
Non-metro (60 counties)	59	49	66	55
Metro/non-metro difference	10	--	7	--

Source: Citizen surveys in 2002 and 2004 (NC) and Pew Internet & American Life Project (US).
-- = data not available. Urban/rural: Based on North Carolina Rural Economic Development Center definition of rural counties. Metro/non-metro: Based on 2003 metropolitan statistical area definitions (US Office of Management and Budget).

The gap between non-metro and metro Internet use among adults in North Carolina narrowed slightly between 2002 and 2004 from 10 to 7 percentage points. The rural-urban gap — where 85 counties are defined as rural and 15 counties as urban — narrowed from 9 to 5 percentage points over the period.

Home Internet Use Increasing Rapidly

In early 2004, 59 percent of all North Carolina adults reported using dialup or broadband service from home, up from 36 percent in 1999 (see Table 3). The household Internet penetration rate increased fastest in non-metro counties-from 23 to 52 percent, a 29 percentage point gain.

Table 3

Home Internet penetration
Percent with home Internet access

	Of all NC adults			Of adults w/computers		
	1999	2002	2004	1999	2002	2004
Overall	36	52	58	68	87	89
Urban	44	57	63	74	89	90
Rural (85 counties)	27	46	51	56	83	89
Urban/rural difference	17	11	12	18	6	1
Metro	37	56	60	72	89	90
Non-metro (60 counties)	23	45	52	58	82	87
Metro/non-metro difference	14	11	8	14	7	3

Source: Citizen surveys in 1999, 2002 and 2004. n/a=data not available in given year. Urban/rural: Based on North Carolina Rural Economic Development Center definition of rural counties. Metro/non-metro: Based on 2003 metropolitan statistical area definitions (US Office of Management and Budget).

The three right-most columns of Table 4 report home Internet penetration rates for households with home computers, illustrating the near ubiquity of home Internet access for some demographic categories (adults in households earning over $75,000 annually and college-educated adults). Just under 90 percent of North Carolina adults that own a personal computer now access the Internet from home with at least a dial-up connection. That share is nearly identical in metro/non-metro and rural/urban counties, indicating that location is no longer a significant barrier to basic home Internet access in most of North Carolina.

Table 4 shows that home Internet users tend to be younger, more educated, and/or wealthier than non-home Internet users. However, differences across demographic categories are narrowing in some instances. Gains in home Internet use over the last five years were particularly strong among adults aged 50 to 68 and African Americans, for example, narrowing differences across age and race categories.

Table 4

Home Internet penetration demographics
Percent with home Internet access

	Of all NC adults			Of adults w/computers		
	1999	2002	2004	1999	2002	2004
Overall	36	52	58	68	87	89
Gender						
Men	41	58	61	68	88	90
Women	35	49	55	67	86	89
Age						
18-27	40	59	65	72	87	85
28-39	40	63	72	69	89	91
40-49	42	64	67	70	88	96
50-58	49	50	65	74	87	89
59-68	23	34	43	52	80	84
69+	12	24	29	50	85	81
Race and ethnicity						
White	43	57	62	69	88	91
African American	19	34	49	61	70	78
Native American	n/a	37	38	n/a	75	100
Hispanic	n/a	35	22	n/a	95	74
Other	n/a	57	67	n/a	89	90
Household income						
Less than $15,000	9	25	25	29	72	82
$15,000 to $24,999	4	33	32	17	78	76
$25,000 to $29,999	27	52	55	73	87	87
$30,000 to $49,999	23	62	68	53	88	87
$50,000 to $74,999	34	73	83	70	93	94
$75,000 to $99,999	31	81	87	62	94	95
$100,000 and above	43	85	94	64	94	98
Educational attainment						
Less than high school	2	26	28	8	79	78
High school graduate	30	51	57	64	85	88
Two year degree	45	65	69	67	86	89
Four year degree	58	78	83	76	92	96
Graduate degree	64	83	88	82	95	95
Children living in household						
No	43	61	74	70	88	92
Yes	34	46	48	66	85	87

Source: Citizen surveys in 1999, 2002 and 2004. n/a=data not available in given year.

Home Broadband Use Up Significantly, Rural Growth Especially Strong

Home use of broadband is growing rapidly in North Carolina, in parallel with national trends. In mid-2002, 19 percent of home Internet users in North Carolina utilized a broadband connection (e.g., DSL, cable, or ISDN), compared to 22 percent nationwide (see Table 5). By early 2004, 40 percent of North Carolina home Internet users had a broadband connection, compared to 39 percent nationwide. The deployment of digital subscriber line (DSL) and cable modem services account for nearly all of the increase.

Table 5

Home Internet connection
type

	2002		2004	
	NC	**US**	**NC**	**US**
Overall				
Dial-up	73	78	57	61
Broadband	19	22	40	39
DSL	5	--	15	--
Cable	14	--	24	--
Other	0	--	1	--
Other/don't know	8	1	3	0
Non-metro (60 counties)				
Dial-up	75	89	62	75
Broadband	15	11	32	25
DSL	4	--	16	--
Cable	11	--	16	--
Other	0	--	0	--
Other/don't know	10	78	6	0

Source: NC citizen surveys in June 2002 and January/February 2004. US data from the Pew Internet & American Life Project (surveys conducted in March-May 2002 and February 2004; margin of error ± 2 percent). Numbers do not always sum to 100 due to rounding. -- indicates comparable data not available. Non-metro designation is based on 2003 metropolitan statistical area definitions (US Office of Management and Budget).

Non-metro North Carolina is going "high speed" faster than the rest of non-metro U.S. In early 2004, 32 percent of home Internet users in rural counties of North Carolina were linked to the Internet via a broadband connection, up from 15 percent in mid-2002. Comparable U.S. non-metro household broadband take rates in 2002 and 2004 were 11 and 25 percent, respectively, according to data from the Pew Internet & American Life Project.

## Need and Cost Cited as Reasons for No Home Internet Access

Why some North Carolina households do not have a home Internet is a question of considerable policy interest. Reasons could include an absence of need for service (lack of demand), unavailability of service (lack of supply), the cost of terminal equipment (e.g., personal computer), lack of knowledge of the technology (digital literacy), or the cost and quality of Internet access services. Of particular focus for e-NC are differences in the cost and quality of Internet services between rural and urban areas.

Controlling for home computer ownership, the principal reason why households do not have home Internet access relates to a perceived lack of need for home Internet. But cost remains a significant barrier as well. In 2004, 11 percent of North Carolina adults with a personal computer in the home reported that they do not have home Internet access. Of those adults, 67 percent indicated that the reason is that they do not have a significant need for it.[8] Approximately 27 percent of households with computers and no Internet service cited "cost/too expensive" as the reason. These figures changed little between 2002 and 2004 (see Figure 2).

Figure 2

Reasons for lack of home Internet access
Percent of households with a home computer citing reasons for no access
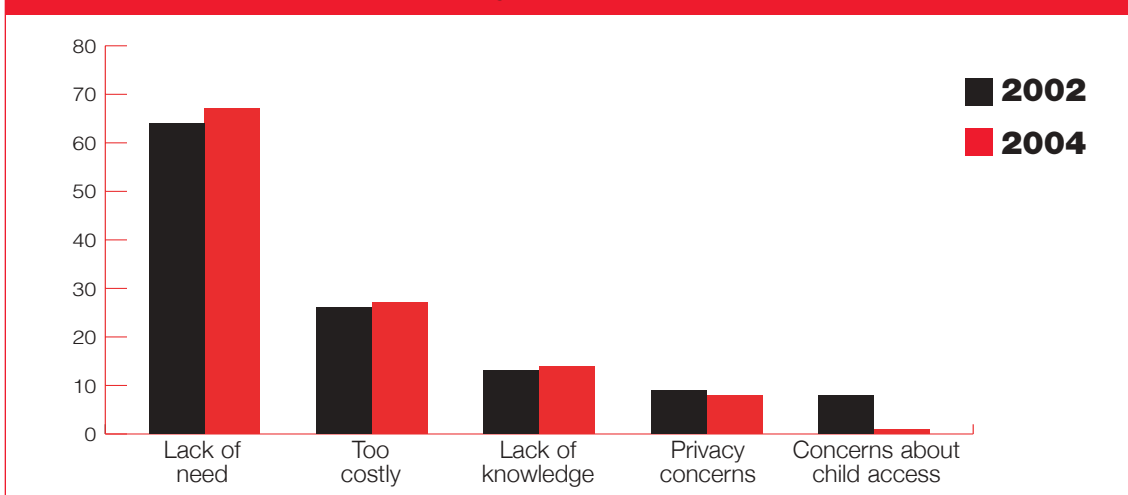
Source: North Carolina household surveys in 2002 and 2004. Note: Respondents could cite more than one reason.

Demographics Increasingly at Root of Rural-Urban Differences in Home Access

In 2002, the only survey year for which the sample size is sufficient for extended analysis, rural households earning $25,000 or less were somewhat more likely than urban house-holds in the same income category to cite cost as a reason why they have no home Internet access. However, urban households in the middle income category-those earning between $25,000 and $75,000-were more likely than rural households in the same category to cite cost as a barrier. These mixed findings suggest that rural/urban differences in the price of home access service are probably narrowing. That is to be expected as the number of access providers proliferate throughout the state and infrastructure improves as the result of private sector deployments and the activities of e-NC.

As the availability of Internet access improves, demographic differences increasingly account for the remaining gap between the average (overall) urban and rural home Internet take rates (62 versus 51 percent). North Carolina home Internet users are, on the whole, younger, more educated, and wealthier than non-Internet users. A predominance of older, less educated, and lower income populations in rural counties is the principal factor reducing average rural area take rates. More generally, improving information tech-nology infrastructure means that the challenge of getting all North Carolinians connected will begin to shift more and more from an infrastructure supply problem to one of adequate income (to purchase a home computer and Internet access) and digital literacy.

Percentage of Households with Access to High-Speed Internet Service – 2004

■ **0 - 49.9% High-Speed Access**

□ **50 - 69.9% High-Speed Access**

□ **70 - 100% High-Speed Access**
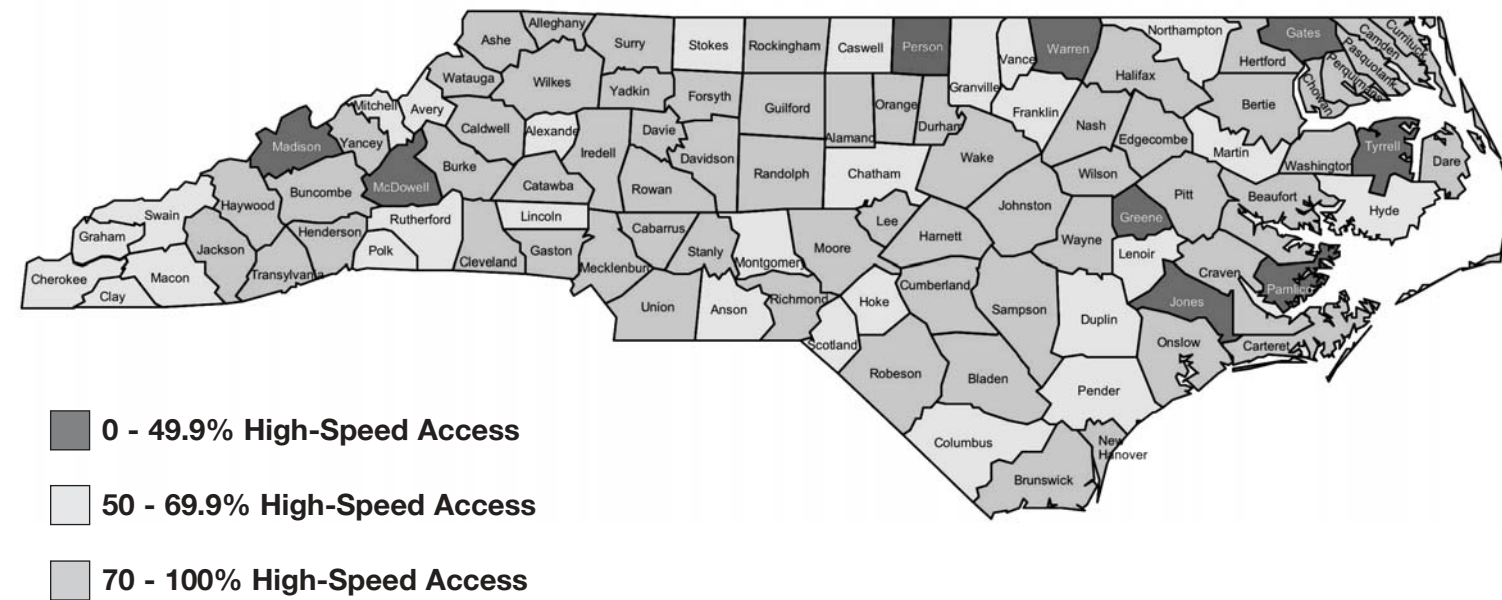
Composite of Cable Modem and DSL Access[9]

[1] A more extensive summary of data in the three surveys is available in *Tracking Home Computers and Internet Access in North Carolina: 1999 to 2004* by Kenneth Wilson (Raleigh, NC: e-NC, June 2004).

[2] For information on the Pew Internet & American Life Project go to http://www.pewInternet.org.

[3] The full report detailing the findings of the 1999 survey is available at http://www.e-nc.org/citizen_survey.asp.

[4] All survey data are available by request from Dr. Kenneth Wilson, Department of Sociology, East Carolina University, Greenville, NC 27858, wilsonk@mail.ecu.edu.

[5] *Rural Areas and the Internet* by Peter Bell, Pavani Reddy, and Lee Rainie (Washington, DC: Pew Internet & American Life Project, February 2004).

[6] Comparisons of household Internet survey data have to be made carefully. Questionnaires may structure questions slightly differently and fairly small differences in survey dates can yield significant differences in trends, given the rapid rate at which computer and Internet use is growing. This document emphasizes only substantial differences in NC and Pew reported trends for similar survey dates and questions. Future e-NC citizen surveys should be designed to permit a broader range of comparisons with Pew's national surveys.

[7] Pew trends cited in this report are from the following documents: *Rural Areas and the Internet, ibid; Broadband Adoption in Rural America* by John B. Horrigan, a presentation to the Rural Broadband Coalition (Washington, DC: Pew Internet & American Life Project, October 27, 2004); and *Trends in Internet Adoption and Use: Comparing Minority Groups* by John B. Horrigan, presentation for OTX Research (Washington, DC: Pew Internet & American Life Project, May 11, 2004).

[8] Note that respondents could select more than one reason why they do not have home Internet access. Respondents could select one of four options related to need: "Can use [the Internet] somewhere else," "Not enough time to use [the Internet at home]," "[home Internet] not useful," and "Just don't need [home Internet access]. The "lack of need" category in Figure 2 includes respondents which selected any one of those four options. The knowledge category includes respondents who selected either or both of the two following options: "[Internet] not user friendly, too difficult," or "Don't know much about [the Internet]."

[9] Wireless deployment in North Carolina is increasing at a rapid pace. Wireless data for households is not calculated in e-NC's report on *High-Speed Internet Acccess in North Carolina* due to lack of specificity on area coverage by the Internet service providers. Go to http://e-nc.org/pdf/hsiaexecsummary.pdf to access this report.